Woodfibre LNG Project:

Waste Discharge Authorization Permit Application for Effluent (Stormwater / Drainage) to the BC Energy Regulator

November 2026

This package contains:

- **Environmental Protection Notice**
- **Forms and Maps**
  - **Final Application Form**
  - **Location Map**
  - **Site Map**
  - **Discharge Factors Form**
- **Technical Assessment Report**

ENVIRONMENTAL PROTECTION NOTICE

ENVIRONMENTAL PROTECTION NOTICE

Application for a Permit under the provisions of the *Environmental Management Act*

We, Woodfibre LNG General Partner Inc, as a General Partner on behalf of the Woodfibre LNG Limited Partnership, 900-1185 West Georgia Street, Vancouver, BC, V6E 4E6, intend to submit this application to the Director to authorize the discharge of effluent (stormwater / drainage) from the Woodfibre liquefied natural gas (LNG) facility.

The Woodfibre LNG facility is located approximately seven kilometres from Squamish, British Columbia within the traditional territory of Skwxwú7mesh Úxwumixw (Squamish Nation) and səlilwətaɬ (Tsleil-Waututh Nation). The site is situated at National Topographic System (NTS) A-001-K/092-G-11 on the following fee-simple lots: District Lot 6237 Group 1 New Westminster Dist., District Lot 5899 Group 1 New Westminster Dist., District Lot 2351 Group 1 New Westminster Dist., District Lot 2802 Group 1 New Westminster Dist., District Lot 8294 Group 1 New Westminster Dist., District Lot 8295 Group 1 New Westminster Dist., and District Lot 8296 Group 1 New Westminster Dist.

Separate contact water systems for contaminated, potentially contaminated, and non-contaminated water are used to manage stormwater runoff from the site according to contaminant risk. The source of effluent is stormwater runoff and drainage water that may have come into contact with industrial infrastructure, equipment, or operational areas during LNG facility commissioning and operations. Contaminated contact water that drains from equipment areas will be collected and conveyed to an Oily Water Treatment System (OWTS) for the treatment of extractable petroleum hydrocarbons (EPH) and total suspended solids (TSS) or transported off-site for appropriate disposal. The treated effluent from the OWTS will be discharged to Howe Sound at existing Outfall 10 (OUT-10) via the non-contaminated contact water drainage system. Treated effluent from the OWTS is expected to be discharged via OUT-10 during storm events, and occasionally during dry conditions (approximately once or twice per month). During these dry periods, the discharge rate will be limited by the OWTS treated water forwarding pump capacity of 30 m^3/hr (8.3 L/s). The characteristics of the effluent are provided in the table below.

Source	Parameter	Proposed Discharge Limit
Contact Water to OUT-10	Total Suspended Solids (TSS)	25 mg/L
	Extractable Petroleum Hydrocarbons (EPH) (C10-C32)	15 mg/L

Any person may review a printed copy of the application at the Squamish Public Library or download an electronic copy of the application material from the Woodfibre LNG website at https://woodfibrelng.ca/about-woodfibre-lng/regulatory-overview/regulatory-filings/.

Any person who may be adversely affected by the proposed discharge of effluent (stormwater drainage) and wishes to provide relevant information may, within 30 days after the last date of posting, publishing, service or display, send written comments to the applicant, with a copy to Environmental Stewardship, BC Energy Regulator at 6534 100th Ave, Fort St John, BC, V1J 8C5. Comments may also be submitted to by email to the applicant (info@wlng.ca), with a copy to the BC Energy Regulator (waste.management@bc-er.ca). The identity of any respondents and the contents of anything submitted in relation to this application will become part of the public record.

Dated this 28 day of October, 2026. Marnie Gohemas

Contact person: Janine Forrest

Email address: info@wlng.ca

Phone: 1-888-801-7929

FORMS AND MAPS

- Final Application Form
- Location Map
- Site Map
- Discharge Factors Form

Ministry of Environment and Climate Change Strategy

FINAL Application Form for a NEW Authorization

for authorization to discharge waste under the *Environmental Management Act*

New Permit, Approval, or Operational Certificate

FORM REFERENCE CODE: EPD-EMA-02.2

INSTRUCTIONS:

The application process is comprised of multiple steps that require the submission of a preliminary application and fee, followed by meetings with Ministry staff, and submission of a final application. **This form may be used for submission of a Final Application for a new Permit, Approval or Operational Certificate.**

Before completing this application form, please review the following:

- Waste Discharge Regulation under the *Environmental Management Act* at www.bclaws.ca; and,
- Ministry information and guidance documents that will assist in understanding the registration process and any other documents that may be required at http://www2.gov.bc.ca/gov/content?id=0876E90DA4744A449423D35EB4E09785.

It is preferred that this form is completed using a computer or typewriter. If completing this form by hand, please PRINT clearly.

Mandatory fields are marked with an asterisk (*). Please ensure all required fields are completed or the application form may not be accepted.

Once the Final Application has been submitted, the application will be screened for completeness before proceeding through the Screening Phase.

A Pre-Authorization Number and Tracking Number has been assigned to this request. Both numbers should be referenced on all documents submitted to support the new application request.

Under *Environmental Management Act, a* person is prohibited from introducing waste into the environment without authorization. Submitting an application to discharge is NOT an authorization to discharge.

This application can be submitted to the Ministry by email (preferred), mail or by courier.

Mail or Email	**Courier**
Environmental Protection Division Business Services PO Box 9377 Stn Prov Govt Victoria, BC V8W 9M6 **Email:** PermitAdministration.VictoriaEPD@gov.bc.ca	Ministry of Environment & Climate Change Strategy Environmental Protection Division Business Services 3rd Floor, 525 Superior Victoria, BC V8V 0C5

Section 1: Application Information

***Tracking Number**	455731	1
***Pre-Authorization Number**	PE 113093	2
***Applicant Name**	Woodfibre LNG General Partner Inc., as General Partner on behalf of the Woodfibre L	3
***Facility Name**	Woodfibre LNG Export Facility	4
***Name of person completing this application**	Janine Forrest	5
***The person submitting this application is**	☒ The Applicant as named on the Preliminary Application Form, Section 2 ☐ The Agent, as named on the Preliminary Application Form, Section 4	6

The Application Package must include the following components or the application may be returned. Please refer to the guidance documents or contact the Ministry for further information on these requirements.

	Included	Not required / applicable	Submitted with Preliminary Application
Application Instruction Document (AID)	☐	☒	
Information Requirements Table (IRT)	☒	☐	☐
Technical Assessment Report	☒	☐	☐
Consultation Report	☒	☐	☐
Discharge Factors Application Form (Form EPD-EMA-03)	☒	☐	☐
Site Plan Form (Form EPD-EMA-09)	☒	☐	☐
Location Map Form (Form EPD-EMA-08)	☒	☐	☐

Section 2: Declaration and Signature

Please carefully read the following before placing your signature.

By completing this Application for an authorization, the Applicant understands and agrees with the following terms and conditions:

1. In this section:

   "Applicant" means the applicant as identified in section 2 of this application form;

   "Authorization" means the permit, approval, operational certificate, or amended permit, approval, operational certificate, sought pursuant to this application;

   "Director" means any statutory decision maker under EMA;

   "EMA" means the *Environmental Management Act*, S.B.C. 2003, c. 53, as amended or replaced from time to time;

   "FOIPPA" means the Freedom of Information and Protection of Privacy Act, R.S.B.C. 1996, c. 165, as amended or replaced from time to time;

   "Province" means Her Majesty the Queen in Right of British Columbia;

   "Regulatory Document" means:

   a) this application form,
   b) any document that the Applicant submits or causes to be provided submitted to the Province or the Director in support of this application, and
   c) any document that the Applicant submitted or causes to be submitted to the Director or the Province pursuant to
      i. the Authorization;
      ii. any regulation made under EMA that regulates the facility described above or the discharge of waste from that facility; or
      iii. any order issued under EMA directed against the Applicant that is related to the facility described above or the discharge of waste from that facility.

2. In consideration of the Province receiving this application, subject to paragraph 3, the Applicant hereby irrevocably authorizes the Province to publish on the B.C government website the entirety of any Regulatory Document.

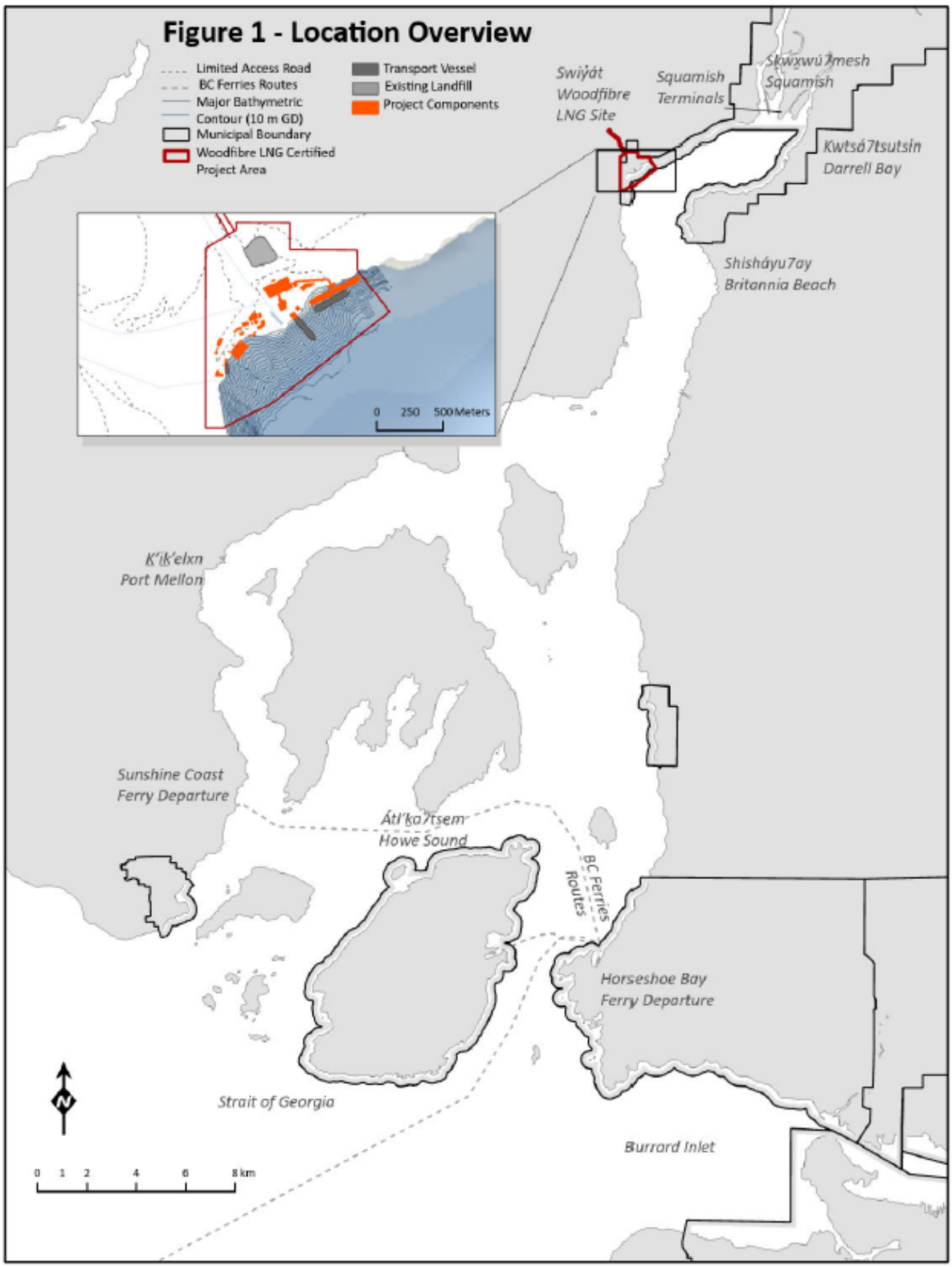
3. Despite paragraph 2, if the Applicant clearly identifies on the face of a Regulatory Document that the Regulatory Document, or clearly identified portions of it, are confidential and provides in writing with the document a rationale for why the document or portion thereof could not be disclosed under FOIPPA, the Applicant does not consent to the Province publishing the document or any portion of it if, in the opinion of the Director, the document or portion could not be disclosed under FOIPPA, if it were subject to a request under section 5 of FOIPPA.

4. In consideration of the Province receiving this application, the Applicant agrees that it will indemnify and save harmless the Province and the Province's employees and agents from any claim for infringement of copyright or other intellectual property rights that the Province or any of the Province's employees or agents may sustain, incur, suffer or be put to at any time that arise from the publication of a Regulatory Document.

5. The Applicant certifies that the information provided in this registration form is true, complete and accurate, and acknowledges that the submission of insufficient information may result in this registration being returned causing delays in the registration review process.

*Name of Applicant or Agent (print)	*Signature of Applicant or Agent	*Date
Marnie Yohemas	Marnie Yohemas	October 22, 2026

Location Map



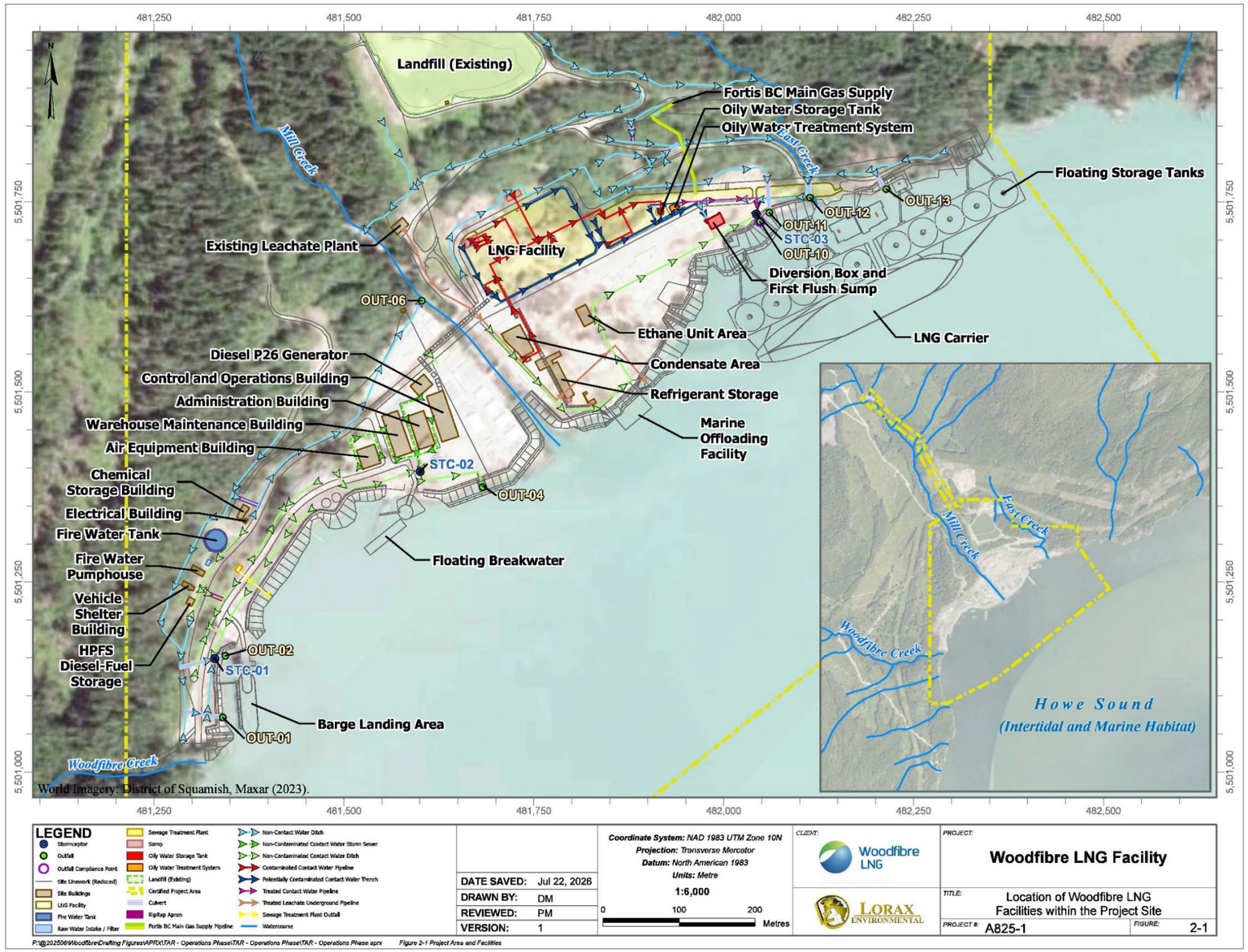
AUTHORIZATION:
Date:

(Office Use Only)

_____
for Director, *Environmental Management Act*

(Office Use Only)

Site Plan



AUTHORIZATION:
Date:

(Office Use Only)

for Director, *Environmental Management Act*

(Office Use Only)

Ministry of Environment and Climate Change Strategy

Discharge Factors Application Form

for authorization to discharge waste under the *Environmental Management Act*

New Permit, Approval, or Operational Certificate

FORM REFERENCE CODE: EPD-EMA-03.2

INSTRUCTIONS:

The application process is comprised of multiple steps that requires submission of a preliminary application and fee, followed by meetings with Ministry staff, and submission of a final application. **This form may be used in conjunction with the submission of an Application for a new Permit, Approval or Operational Certificate (Form EPD-EMA-02).**

Before completing this application form, please review the following:

- Waste Discharge Regulation under the *Environmental Management Act* at www.bclaws.ca; and,
- Ministry information and guidance documents that will assist in understanding the registration process and any other documents that may be required at http://www2.gov.bc.ca/gov/content?id=0876E90DA4744A449423D35EB4E09785.

It is preferred that this form is completed using a computer or typewriter. If completing this form by hand, please PRINT clearly.

Mandatory fields are marked with an asterisk (*). Please ensure all required fields are completed or the application form may not be accepted.

Once the final application has been submitted, the application will proceed through the Screening Phase to verify administrative and technical completeness.

A Pre-Authorization Number and Tracking Number has been assigned to this request. Both numbers should be referenced on all documents submitted to support the new application request.

Under *Environmental Management Act, a* person is prohibited from introducing waste into the environment without authorization. Submitting an application to discharge is NOT an authorization to discharge.

This application can be submitted to the Ministry by email (preferred), mail or by courier.

Mail or Email	Courier
Environmental Protection Division Business Services PO Box 9377 Stn Prov Govt Victoria, BC V8W 9M6 **Email:** PermitAdministration.VictoriaEPD@gov.bc.ca	Ministry of Environment & Climate Change Strategy Environmental Protection Division Business Services Branch 3rd Floor, 525 Superior Street Victoria, BC V8V 0C5

Section 1: Application Information

***Tracking Number**	455731	1
***Pre-Authorization Number**	PE 113093	2
***Applicant Name**	Woodfibre LNG General Partner Inc., as General Partner on behalf of the Woodfibre	3
***Facility Name**	Woodfibre LNG Facility	4
***Number of discharge points**	1	7

A copy of Section 2 must be completed for each discharge point. I.e. If there are three points of discharge, there should be three copies of Section 2 completed and submitted.

Section 2: Discharge Details

***Discharge Name** e.g. Planer Mill Cyclone #2	LNG Facility - Process Areas		1
***Discharge Type**	☐ Air ☒ Effluent ☐ Refuse		2
***Site ID as Referenced on Site Map**[1] e.g. Site A	OUT-10		3
Additional description (if needed)			4
Proposed treatment method and equipment to be used e.g. UV Disinfection, baghouse	Oily Water Treatment System (i.e., Corrugated Plate Interceptor (CPI) separator) [Note, comingled with stormwater at discharge point]		5
Discharge location description e.g. end of pipe, landfill, stack #1,etc	End of Pipe		6
***Discharge location position** i.e. end of pipe coordinates *must be in decimal degree format to 4 decimal places*	Latitude (e.g., 49.8952) N 49.6678 N	Longitude (e.g., 116.8177) W 123.2488 W	7
***Source of Data**	☐ GPS ☐ Survey ☐ Google Earth ☒ Other (specify): Project Plot Plan		8
If the Legal Land Description for the facility location is different than this discharge location			
Legal Land Description (Lot/Block/Plan) OR PID/PIN/Crown File No.	District Lot 2351, Group 1, New Westminster Dist; District Lot 8295, Group 1, New Westminster Dist; District Lot 8296, Group 1, New Westminster Dist;		9

[1] For each point of discharge, there must be a corresponding point displayed on a map using the Site Form (Form EPD-EMA-09.1).

*Table A: Proposed Flows

INSTRUCTIONS: Complete the maximum rate of discharge, and if applicable, the minimum, and/or average rate. Typically, only a maximum is needed. Include the duration of the discharge (e.g., hours/day) and the frequency of the discharge (e.g., days/week, days/month or days/year). Typically, a discharge may start when the authorization is issued and continues until the authorization is cancelled. If this discharge is to be time limited, this should be discussed at your pre-application meeting. All units are to be in System International (SI) metric units.

Rates are specific to the Oily Water Treatment System - there will be higher continuous flow rates during storm events

Minimum Discharge Rate+	Average Discharge Rate	Maximum Discharge Rate	Units (e.g. m^3/day)	Duration	Duration Units (e.g. hrs/day)	Frequency	Frequency units (days/weeks)
0		30	m3/hr	12	hrs	7	days

+ For composting facilities, maximum annual production capacity

*Table B: Proposed Contaminant Concentrations

INSTRUCTIONS: The contaminant data should be the characteristics of the waste when it enters the environment. Guidance on acceptable discharge quality may be found in applicable Provincial and Federal Regulations, Objectives, Guidelines, Criteria, Policies, Codes of Practice, Best Achievable Control Technology (BACT), Best Management Practices and, in some cases, draft documents.

Enter the contaminant and its maximum concentration and if applicable, the minimum, and/or average concentrations. All units are to be SI metric units. If the contaminant is to be discharged for a period less than the life of the authorization, enter the start and/or end dates. All air discharge rates are to be corrected to 20ºC, 1 atmosphere pressure, and zero water vapour.

Parameter or Contaminant Name[i]	Minimum Concentration	Average Concentration	Maximum Concentration	Units (e.g. mg/L)
Extractable Petroleum H	0		15	mg/L
Total Suspended Solids	0		25	mg/L

[i] For composting, type of material to be composted

Section 3: Receiving Environment Characteristics

Where a technical assessment of the discharge is not required by the Director, details of the receiving environment are to be listed here. If necessary, provide the information as an appendix to the application form. If a technical assessment is required, completion of this section is preferred, but optional. However, the details and supporting information to describe the receiving environment must be discussed in the technical assessment report.

Brief description of the receiving environment
e.g. name, description and characteristics of the water body, aquifer or airshed

Howe Sound near the mouth of Mill Creek, approximately 7km SW of Squamish, BC.
Further information is provided in the Technical Assessment Report.

Section 4: Distance to Nearest Specified Features

All measurements in metres

Water well	3000	m	**Serviced Lot**	7000	m	**Park or Protected Area**	6000	m
Reservoir	32000	m	**Recreational Area**	6000	m	**School or Daycare**	7000	m
Dwelling	5700	m	**Residential or Health Care Facility**	7000	m	**Surface water (lake, stream, marine)**	0	m

TECHNICAL ASSESSMENT REPORT

Technical Assessment Report for Stormwater Effluent from the Woodfibre LNG Facility

Prepared for:
Woodfibre LNG General Partner Inc.
900-1185 West Georgia Street
Vancouver, B.C., V6E 4E6

Prepared by:
Lorax Environmental Services Ltd.
#305 - 1770 W 7th Avenue
Vancouver, B.C., V6J 4Y6

Project No.: A825-1

WLNG Doc No.: WLNG-W0001-RE-RP-00287

November 2, 2026

Revision 1

Preamble



Preamble

The Woodfibre LNG Project ('the Project') is a liquefied natural gas export facility located on the former Woodfibre Pulp and Paper Mill site in Nexwnéwu7ts Átlk̲´a7tsem (Howe Sound), approximately seven kilometers south of Sk̲wx̲wú7mesh (Squamish). The Project is on the historical location of a Sk̲wx̲wú7mesh Úxwumixw (Squamish Nation) village known as Swiy̓át. Swiy̓át and Nexwnéwu7ts Átlk̲´a7tsem (Howe Sound) are tied to the cultural well-being of Sk̲wx̲wú7mesh Úxwumixw (Squamish Nation) members, their ancestors, and their descendants, and to other Indigenous groups as defined in the Project's Environmental Assessment Certificates. Woodfibre LNG General Partner Inc. recognizes the importance of these areas to the Sk̲wx̲wú7mesh Stélmexw (Squamish People), and other Indigenous groups. Woodfibre LNG General Partner Inc. seeks to construct and operate the Project in a manner that is respectful of Indigenous values. This Technical Assessment Report for the Woodfibre LNG Facility is primarily written in English with some important place names, phrases, and passages provided in the Squamish language.

Temíxwiy̓ik̲w chet wa naantem chet ti temíxw Swiy̓át

Chet wa sméṅhemswit kwis ns7éyx̲nitas chet ti temíxw

We7ú chet kwis t'íchimwit iy íẇas chet ek̲' I tti.

Our ancient ancestors named this place Swiy̓át

We, as their descendants safeguard these lands

We will continue to swim and fish in these clear waters.

Version History



Version History

Version #	Date Released	Description
0	October 21, 2026	Issued for Information.
1	November 2, 2026	Minor edits to clarify existing conditions and effects assessment.

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NOTE: APPENDICES ARE NUMBERED ACCORDING TO SECOND-LEVEL CHAPTER NUMBERS OF THE REPORT.

Acronyms and Abbreviations



Acronyms and Abbreviations

ABA	Acid Base Accounting
ARD	Acid Rock Drainage
AP	Acid Potential
BATA	Best Achievable Technology Assessment
B.C.	British Columbia
BCER	British Columbia Energy Regulator
BOG	Boil-Off Gas
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CALA	Canadian Association for Laboratory Accreditation Inc.
CCME	Canadian Council of Ministers of the Environment
cm	Centimetre
CofC	Certificate of Compliance
CPA	Certified Project Area
CPI	Corrugated Plate Interceptor
CSR	Contaminated Sites Regulation
DFO	Fisheries and Oceans Canada
DRO	Diesel Range Organics
DSI	Detailed Site Investigation
EAO	B.C. Environmental Assessment Office
EAC	B.C. Environmental Assessment Certificate

ECCC	Environment and Climate Change Canada
EEM	Environmental Effects Monitoring
ENSO	El Niño Southern Oscillation
EPH	Extractable Petroleum Hydrocarbons
FDS	Federal Decision Statement
FST	Floating Storage Tank
FWAL	Freshwater Aquatic Life
GPM	Gallons Per Minute
ha	Hectare
HEPH	Heavy Extractable Petroleum Hydrocarbons
HHERA	Human Health and Ecological Risk Assessment
hr	Hour
HWR	Hazardous Waste Regulation
IDF	Intensity-Duration-Frequency
IDZ	Initial Dilution Zone
IL	Industrial Land
IRT	Information Requirements Table
ISO	International Organization for Standardization
kg	Kilogram
km	Kilometre
km^2	Square Kilometre
KPI	Key Performance Indicator

L	Litre
L/s	Litres Per Second
LEPH	Light Extractable Petroleum Hydrocarbons
LNG	Liquefied Natural Gas
m	Metres
m^3	Cubic Metre
m^3/day	Cubic Metres Per Day
m^3/min	Cubic Metres Per Minute
m/s	Metres Per Second
m^3/s	Cubic Metres Per Second
masl	Metres Above Sea Level
MDL	Method Detection Limit
MDO	Minimum Discharge Objective
MDR	McDermott International Ltd.
mg/kg	Milligrams Per Kilogram
mg/L	Milligrams Per Litre
ML	Metal Leaching
mm	Millimetre
mm/hr	Millimetres Per Hour
MOF	Marine Offloading Facility
MWAL	Marine Water Aquatic Life
ng/kg	Nanograms Per Kilogram

ng/L	Nanograms Per Litre
NOEC	No Observable Effect Concentration
NP	Neutralization Potential
NPR	Neutralization Potential Ratio
NTU	Nephelometric Turbidity Unit
OWTS	Oily Water Treatment System
P&ID	Piping & Instrumentation Diagram
PAH	Polycyclic Aromatic Hydrocarbon
PCDD	Polychlorinated Dibenzo-p-dioxin
PCDF	Polychlorinated Dibenzofuran
PE-	Effluent Permit
POC	Parameter of Concern
POPC	Parameter of Potential Concern
ppm	Parts Per Million
PSI	Preliminary Site Investigation
QA/QC	Quality Assurance / Quality Control
QP	Qualified Professional
RoRo	Roll-On / Roll-Off
RPD	Relative Percent Difference
SFE	Shake Flask Extraction
SNEAA	Squamish Nation Environmental Assessment Agreement
SSI	Supplementary Site Investigation

SWDMP	Stormwater Drainage Management Plan
t	Tonne
TAR	Technical Assessment Report
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxic Equivalency Quotient
TSS	Total Suspended Solids
UTM	Universal Transverse Mercator
VH	Volatile Hydrocarbon
VOC	Volatile Organic Compound
VPH	Volatile Petroleum Hydrocarbon
WDA	Waste Discharge Authorization
WLNG	Woodfibre LNG General Partner Inc.
WQG	Water Quality Guideline
WWTP	Wastewater Treatment Plant

Executive Summary



Executive Summary

Woodfibre LNG General Partner Inc. (WLNG) is seeking a Waste Discharge Authorization (WDA) under the British Columbia (B.C.) *Environmental Management Act* for the discharge of treated stormwater and drainage effluent associated with commissioning and operation of the Woodfibre LNG facility ('the Project') near Squamish, B.C. This Technical Assessment Report (TAR), prepared by Lorax Environmental Services Ltd., provides the technical basis for regulatory review of the proposed discharge and demonstrates that the Project has incorporated appropriate water management, treatment, monitoring, and contingency measures to protect the receiving environment while supporting long-term facility operation. The TAR forms part of the WDA Effluent Permit application submitted to the B.C. Energy Regulator (BCER) and addresses the information requirements identified through the regulatory pre-application process.

The proposed authorization relates specifically to stormwater runoff and drainage water that may come into contact with industrial infrastructure, equipment, or operational areas during LNG facility commissioning and operations. Contact water that drains from equipment will be collected and conveyed to an Oily Water Treatment System (OWTS) for the treatment of extractable petroleum hydrocarbons (EPH) and total suspended solids (TSS). The treated effluent will be discharged to Atl'ka7tsem (Howe Sound) at existing Outfall 10 (OUT-10) via the non-contaminated contact water drainage system. Therefore, treated effluent will be mixed with non-contaminated contact water runoff prior to discharge to Howe Sound.

The scope of the TAR is limited to comingled stormwater runoff that has the potential to contact contamination sources during LNG facility commissioning and operations, and excludes discharges authorized under existing permits for treated landfill leachate and treated domestic wastewater, as well as effluent discharges associated with the FortisBC natural gas supply pipeline. The authorization is intended to support commencement of LNG facility operations following commissioning of the permanent water management systems and would remain in place throughout the operational life of the LNG facility.

The Project's water management program incorporates source control, runoff segregation, and treatment of potentially contaminated water. Stormwater is anticipated to represent the primary effluent stream managed during operations, with smaller contributions from operational activities such as vehicle washing. Water management infrastructure has been designed to collect, segregate, convey, treat, and discharge runoff in a manner that protects workers, safeguards Project infrastructure, and minimizes environmental risk. A key objective of the water management approach is to prevent contact between stormwater

runoff and potential contamination sources wherever practicable, thereby limiting the volume of water that requires active treatment and reducing overall management complexity.

To support these objectives, WLNG has developed an Operations Stormwater Drainage Management Program (SWDMP), which provides the operational framework for management of stormwater and drainage water throughout the life of the facility. The SWDMP describes the permanent drainage infrastructure, including diversion systems, collection systems, sumps, and outfalls, and establishes procedures for managing runoff based on its potential for contamination. The program also includes operational controls, monitoring requirements, residuals management, contingency planning, episode management for natural events, trigger-and-response protocols, and adaptive management measures intended to maintain compliance and support continuous improvement. Through implementation of the SWDMP, WLNG will systematically manage contaminated and potentially contaminated contact water, non-contaminated contact water, and non-contact water to minimize potential environmental effects associated with facility runoff.

The OWTS design has been informed by technical evaluations and is supported by a Best Achievable Technology Assessment (BATA). The OWTS utilizes proven industrial treatment methods, based on corrugated plate interceptor technology, to remove oil (*i.e.*, EPH) and suspended solids (*i.e.* TSS) through enhanced gravity separation. These separators are widely used in industrial wastewater treatment and are recognized as robust and reliable.

Commissioning of the water management system and the LNG Facility are expected to generate water streams that differ from routine operational runoff; therefore, additional controls have been incorporated into the commissioning strategy. Wastewater generated from activities such as flushing, cleaning, degreasing, hydrotesting additives, lube oil flushing, chemical cleaning, glycol systems, or other non-routine commissioning activities will be segregated from the permanent stormwater drainage system unless specifically assessed as suitable for treatment through the OWTS. Off-specification commissioning effluent will be collected and recycled or removed from site for disposal at an appropriate facility. Formal handover of the permanent water management systems from construction to operations will occur only after completion of mechanical completion, pre-commissioning activities, functional testing, cause-and-effect verification, instrument calibration, diversion logic testing, and commissioning acceptance testing in accordance with approved procedures.

To characterize the anticipated quantity and quality of discharge from OUT-10, the TAR includes an effluent model comprising both a water balance and water quality model. The

water balance was developed from the site hydraulic model to illustrate typical water management during the first 24 hours of a storm event, when some of the stormwater (*i.e.*, the first flush of 25 mm of rainfall) from the LNG Processing Area will be segregated and, if suitable, treated by the OWTS prior to discharge. Existing water quality monitoring data and OWTS treatment specifications were used to model water quality. The effluent model simulates the expected quantity and quality of contact water that will be discharged at OUT-10 during a 2-year return period 24-hour storm event, and during dry conditions when treated effluent from the OWTS may be the only source of water that is discharged at OUT-10. The effluent model included 113 parameters; predictions indicate that pH, TSS, EPH, total copper (T-Cu) and total zinc (T-Zn) may exceed the provincial long-term water quality guidelines (WQGs) for the protection of marine aquatic life in the effluent discharged to Howe Sound at OUT-10. The predicted T-Cu and T-Zn exceedances are attributed to particulate-bound metal fractions associated with TSS, which are considered less bioavailable than dissolved forms, while the predicted pH exceedances are attributed to natural background conditions rather than Project-related influences. The predicted concentrations T-Cu and T-Zn in OUT-10 effluent are within the range of concentrations that has been observed in Howe Sound receiving waters.

The mixing of OUT-10 effluent discharge with the Howe Sound receiving environment was modelled using a steady state mixing model, CORMIX. The CORMIX modelling software is recognized and accepted by professionals and regulators as appropriate for characterizing the initial dilution zone (IDZ) of receiving waterbodies. Discharge from OUT-10 is primarily associated with stormwater runoff or occasional OWTS operation during dry conditions; therefore, discharge from OUT-10 is expected to be frequent during rainy conditions and infrequent during dry conditions. Therefore, the model evaluates plume characteristics and effluent concentrations in Howe Sound for the two discharge scenarios: a storm event scenario representing discharge conditions for a 2-year return period 24-hour storm event, and a dry condition scenario representing discharge of OWTS effluent only. Wind is predicted to be a significant factor that influences effluent mixing. Therefore, the model was also configured to predict mixing for low, moderate and high wind speeds. The mixing model predicts that the OUT-10 initial mixing zone will form a buoyant effluent plume ranging from approximately 0.2 to 3.9 m in depth, with deeper mixing occurring with moderate and high winds.

Across the evaluated scenarios, concentrations of EPH, TSS, T-Cu, and T-Zn decline rapidly with distance from OUT-10, and all modelled parameters meet applicable concentration thresholds protective of chronic effects to marine aquatic life within approximately 80 m of the discharge. Based on the model results, the edge of the IDZ was established at a 100 m radius from OUT-10.

The environmental effects assessment considered parameters of concern (POCs) identified through the effluent model and focused on those parameters with the potential to exceed relevant WQGs or effect thresholds under modelled discharge conditions. The POCs originate from background conditions (*i.e.,* pH is naturally low in site runoff), TSS (*i.e.,* T-Cu and T-Zn are associated with TSS), and from the LNG Processing Area (*i.e.,* EPH from oils used in LNG processing equipment). The environmental effects assessment concludes that residual effects to marine aquatic life from the predicted WQG exceedances in effluent discharged from OUT-10 are unlikely to cause adverse effects to aquatic life in the receiving environment.

The monitoring and adaptive management framework has been developed to support regulatory compliance and verify environmental performance. Monitoring activities will include routine sampling and analysis of influent and effluent water quality, operational monitoring of treatment system performance, daily inspections of key treatment system components, and maintenance of operating records. Operational parameters such as flow, pressure, and turbidity will be routinely tracked to establish normal operating conditions and identify deviations that may indicate maintenance requirements or performance concerns. Monitoring information will be used to confirm compliance with discharge objectives, support operational decision-making, and inform adaptive management actions where necessary.

Overall, the Project will implement a comprehensive and integrated approach to stormwater and drainage management that combines source control measures, treatment, monitoring programs, and contingency planning. Effluent quality and quantity, and the IDZ have been modelled, and the environmental effects assessment indicates the modelled effluent quality discharged from OUT-10 is unlikely to cause adverse effects to aquatic life in the receiving environment. The predicted concentrations of T-Cu and T-Zn in effluent are within the range of concentrations observed in Howe Sound water, and are associated with less bioavailable, particulate-bound metal fractions associated with TSS. The predicted pH values reflect natural background conditions rather than Project-related influences. Therefore, discharge limits are proposed at OUT-10 for TSS and EPH, the parameters that are specifically treated by the OWTS. The proposed discharge limits are equal to the maximum EPH and TSS concentrations predicted by the effluent model and are based on the achievable OWTS treatment levels for these parameters.

1. Introduction



1 Introduction

This Technical Assessment Report (TAR) has been prepared on behalf of Woodfibre LNG General Partner Inc. (WLNG) by Lorax Environmental Services Ltd. (Lorax). WLNG is seeking a Waste Discharge Authorization (WDA) permit under the B.C. *Environmental Management Act*, Waste Discharge Regulation from the B.C. Energy Regulator (BCER) for discharge of stormwater / drainage effluent associated with the operating Woodfibre Liquified Natural Gas (LNG) export facility ('the Project') near Squamish, B.C. The effluent consists of stormwater runoff that may come into contact with potential contamination sources associated with LNG facility commissioning and operations. Contact water that drains from equipment and piping is collected and conveyed to an oily water treatment system (OWTS) for treatment. Treated water, along with local stormwater runoff, is discharged to Atl'ka7tsem (Howe Sound) through the existing outfall, Outfall 10 (OUT-10). This TAR addresses the information requirements that have been identified for review and approval of the WDA, and are listed in Appendix 1.1-1.

1.1 Project Overview

The Project is located approximately seven kilometers southwest of Skwxwú7mesh (Squamish), B.C. on the northwestern shoreline of Nexwnéwu7ts Átlk'a7tsem (Howe Sound) (refer to Figure 1-1). The Project site is within the Traditional Territory of the Skwxwú7mesh Úxwumixw (Squamish Nation) at the historical site of Swiẏát, a Skwxwú7mesh Úxwumixw (Squamish Nation) village.

The Project has capacity to liquefy up to 2.1 million tonnes per year of natural gas and an LNG storage capacity of 250,000 m^3. The stored LNG will be exported to market via LNG carriers. Refer to Section 2 for further description of the Project.

The site is comprised of fee simple, industrially zoned, brownfield lands, along with existing stakw (water) lots. The site previously operated as a pulp mill facility from 1912 until 2006. There is no road access to the Project site; all personnel, equipment, and supplies are brought in by vessel via Nexwnéwu7ts Átlk'a7tsem (Howe Sound).



LEGEND

- Certified Project Area
- Highway
- Watercourse

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VERSION:	1

Coordinate System: NAD 1983 UTM Zone 10N
Projection: Transverse Mercator
Datum: North American 1983
Units: Metres

1:300,000

0 2 4 6 km

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Geographic Location of the Project Site

PROJECT #: A825-1

FIGURE: 1-1

P:\@202506\Woodfibre\Drafting Figures\APRX\Regional Maps\Project Location\Project Location.aprx Figure 1-1_Location Map Printed by: DesMacDonald

1.2 Regulatory Context

The Project underwent a comprehensive environmental assessment process from 2013 to 2015, where WLNG received:

- An Environmental Assessment Certificate (EAC) for the Certified Project Area (CPA) from the Environmental Assessment Office (EAO) under the B.C. Environmental Assessment Act (EAC #E15-02) in 2015;
- An environmental assessment approval from Skwxwú7mesh Úxwumixw (Squamish Nation) through the Squamish Nation Environmental Assessment Agreement (SNEAA) in 2015; and
- A positive Federal Decision Statement (FDS) from the Canadian Environmental Assessment Agency (now known as the Impact Assessment Agency of Canada (IAAC) under the Canadian Environmental Assessment Act, 2012 in 2016.

There have been subsequent amendments issued by EAO, Skwxwú7mesh Úxwumixw (Squamish Nation) and IAAC. The provincial, Sḵwx̱wú7mesh Úxwumixw (Squamish Nation), and federal environmental assessment processes have each yielded conditions of approval that Woodfibre LNG must address, which include effluent discharges.

The BCER issued the Facility Permit AD#100105360 in July 2019, and there have been subsequent amendments issued.

There are currently three permits for the discharge of effluent from the Project site to Howe Sound:

- Permit 1239 for the treatment and discharge of leachate to Howe Sound from the closed on-site landfill that supported previous activities on the site. This permit was issued in 1975 and has been transferred to WLNG as it will be applicable during operations. The discharge is to Howe Sound is via an existing submerged outfall east of Mill Creek, separate to the stormwater/drainage system outlets.
- Permit 2334 for treatment and discharge of domestic wastewater to Howe Sound from the sewage treatment plants that supported previous activities on the site. This permit was issued in 1975 and has been transferred to WLNG as it will be applicable to the WLNG sewage treatment system during operations. The discharge is to Howe Sound is via an existing submerged outfall south of Mill Creek, separate to the stormwater/drainage system outlets.
- WDA Permit 111578 for treatment and discharge of construction contact water to Howe Sound from the Project construction area via two discharge locations: SP-W-OUT and SP-E-OUT. This permit was issued in 2024 and will not be

required after the Project completes the transition from the construction stormwater management system to operations stormwater management system (refer to Section 2.2 for further information).

There are two Certificates of Compliance (CofC) on the site due to the historical land use, as follows:

- Site Identification Number 9930 and 17544 were issued in December 2014 for the upland portion of the site and marine sediments within the existing water lots, respectively. Each certificate specifies a number of controls that are required to be maintained. These conditions will be maintained during facility operations.

1.3 Objectives of the TAR

This TAR forms part of the WDA permit application and is intended to provide a summary of technical information required by BCER to assess the application. The required information is identified in the Information Requirements Table (IRT) that WLNG submitted to the BCER on March 21, 2025, and in the pre-application package submitted to the BCER on March 18, 2026. The Table of Concordance that shows where the requirements of the IRT are addressed in the TAR is included as Appendix 1.1-1.

The specific objectives of this TAR are to:

- Describe the Project, including an overview of the relevant Project phases/activities for context;
- Summarize the environmental setting of the Project related to the proposed stormwater/drainage effluent discharge;
- Describe the approach for site water management and treatment;
- Characterize anticipated discharge associated with the operation of the LNG facility to the receiving environment, including the location, duration, estimated volume and quality of treated effluent discharged at Outfall 10 (OUT-10);
- Characterize the potential environmental effects of the stormwater/drainage effluent discharges; and
- Identify mitigation measures, the monitoring program, as well as contingency measures that will be implemented to manage potential environmental risk.

1.4 Scope of the TAR

The scope of this TAR is limited to the discharge of the comingled stormwater runoff that has the potential interface with contamination sources during LNG facility commissioning and operations activities.

1.4.1 Temporal Scope

WLNG is seeking the WDA permit by Q2 2027, when the permanent water management systems are forecast to be commissioned and put into service to manage the stormwater runoff and drainage during commissioning and operations.

The WDA would remain in effect until the permanent water management systems are closed/decommissioned at the end of the LNG facility life and/or effluent discharge ceases to Howe Sound, which could be after year 2067 based on the 40-year LNG export license issued by the Canada Energy Regulator.

1.4.2 Spatial Scope

The spatial scope of this TAR is defined by where stormwater will come into contact with the Project during commissioning and operations activities. For the purposes of the WDA permit application, the Project site is defined by the CPA authorized under the EAC which includes the following fee simple lots:

- Parcel Identifier 015-791-611, District Lot 6237, New Westminster District
- Parcel Identifier 015-822-061, District Lot 5899, New Westminster District
- Parcel Identifier 015-910-717, District Lot 2351, New Westminster District
- Parcel Identifier 031-813-992, District Lot 2802, New Westminster District

The CPA also includes two lots along the foreshore (District Lot 8294 and 8295) and one marine lot (District Lot 8296).

1.4.3 Exclusions

The scope of this TAR excludes the following effluent discharges; however, they are referenced in the cumulative effects discussion in Section 5.5:

- Discharge of effluents authorized by Permit 1239 (treated landfill leachate) and Permit 2334 (treated domestic wastewater).
- Effluent discharges that may be associated with pipeline operation that supplies natural gas to the WLNG facility (operated by FortisBC).

1.5 Structure of the TAR

This TAR is structured as follows:

- Section 2 contains the description of the various Project activities. This is intended to provide context for the LNG facility operations, including the nature of contact water that is expected to be generated.
- Section 3 contains the description of the environmental setting. This section is intended to provide information on the terrestrial, freshwater aquatic and marine environment of the Project and the receiving environment for effluent discharges.
- Section 4 summarizes the management plans relevant to the operation of the stormwater drainage and treatment systems, and contains the description of the effluent discharges. This includes consideration of the water management system and water treatment, and summarizes the results of the hydraulic, effluent quality and mixing models prepared to provide quantitative predictions of discharge volumes and quality.
- Section 5 contains a discussion on the potential effects of the predicted discharges to aquatic life.
- Section 6 discusses the proposed monitoring plan and discharge limits that are requested for the WDA permit.

2. Project Description



2 Project Description

This section provides a description of Project operations (Section 2.1), followed by an overview of the activities that occur during commissioning (Section 2.2) and closure / post-closure (Section 2.3). Figure 2-1 illustrates some of the key components of the Project, including the discharge locations. Further detailed information on the stormwater drainage system design and outfalls into Howe Sounds are provided in Section 4.

2.1 Operational Description

Natural gas will be supplied to the LNG facility by FortisBC from western Canadian market hubs. In the land-based LNG facility processing area, located on the east side of Mill Creek, the impurities and other components of the incoming pipeline quality gas that would not meet the LNG specification are removed. Condensates (lighter hydrocarbons) are also removed from the gas and stored as a liquid for export to market. The natural gas is then cooled (liquefied) to -162°C to produce LNG, using a propane pre-cooled mixed refrigerant (C3MR) technology. The LNG is subsequently transferred to the marine terminal via the LNG jumper arms for storage in floating storage tanks (FSTs), which are two retrofitted Moss LNG vessels (FST-1 and FST-2). The LNG is then loaded into an LNG carrier for export to market via loading arms located on FST-2.

There are a range of utilities that support the LNG process, which include:

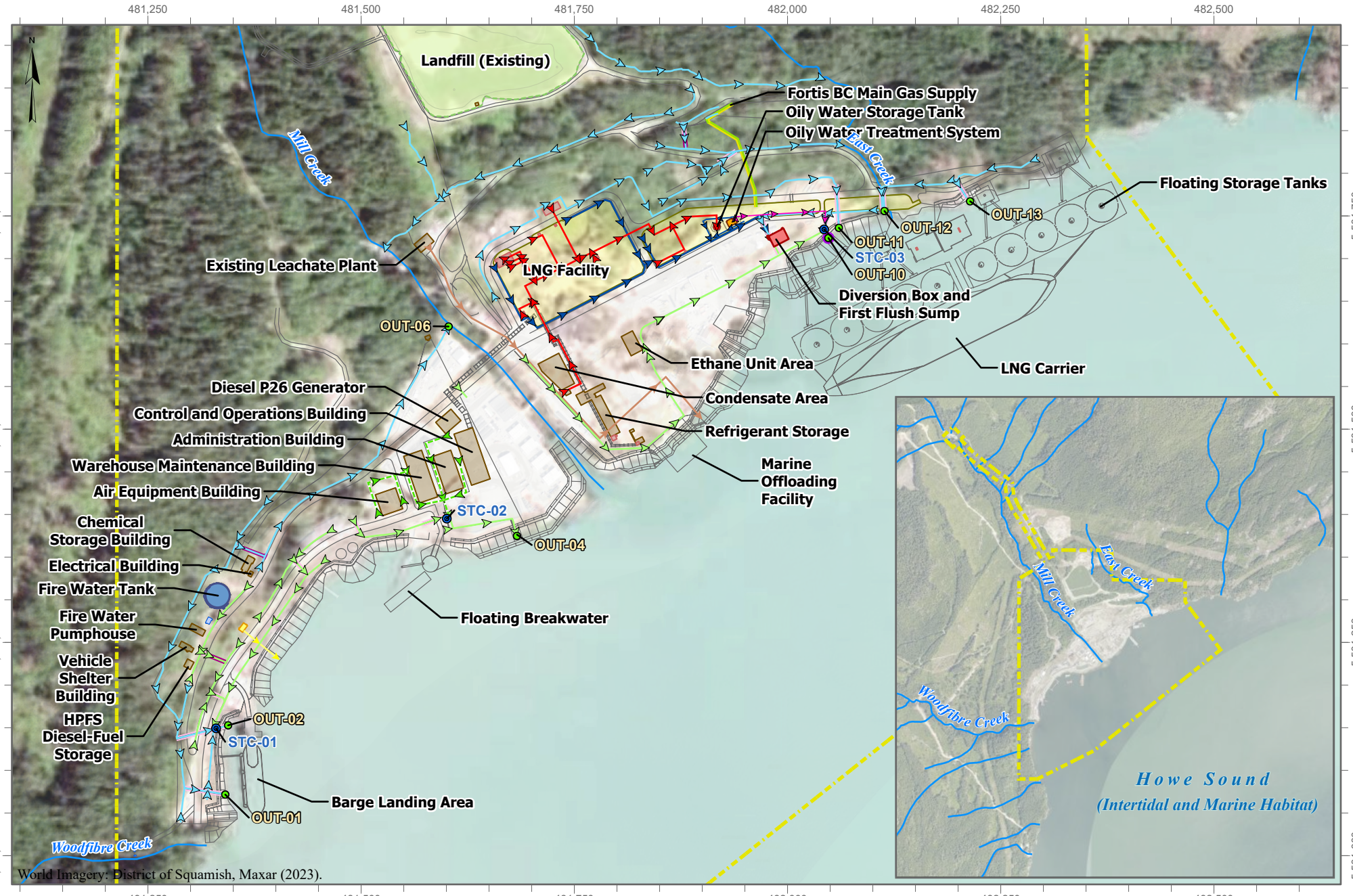
- Electrical power sourced from B.C. Hydro; there are substations and transformers on site that support the distribution of power to the various LNG facility equipment.
- Boil-off gas (BOG), which is the vapor that is generated off the LNG when it is subject to warmer temperatures. It is recovered from the FSTs and LNG loading system, recompressed in BOG compressors, and routed to the fuel gas system that supplies fuel gas to several systems in the process. Surplus compressed BOG is reinjected back into the LNG liquefication process.
- Process heat, which is supplied by a gas-fired Heating Medium Heater (*i.e.*, furnace) to a closed loop of heating medium fluid.
- Tempered water, which is an inhibited ethylene glycol solution. It is used to cool several compressors and circulated back to the air-cooler in a closed loop system.

For the purpose of further describing facilities and associated discharges, the site is conceptually divided into four main zones (refer to Figure 2-2):

- LNG Processing Area;

- Refrigerant and Condensate Storage Area;
- Marine Terminal Area; and
- Industrial Area (on the west side of Mill Creek).

The Project area contains a mixture of site surface coverings, including paving (asphalt or concrete) for the operational process areas, containment areas, buildings, and primary access roads that connect the various areas of the Project site; and granular base for non-operational areas near the Refrigerant and Condensate Storage Area.



LEGEND

- Stormceptor
- Outfall
- Outfall Compliance Point
- Site Linework (Reduced)
- Site Buildings
- LNG Facility
- Fire Water Tank
- Raw Water Intake / Filter
- Sewage Treatment Plant
- Sump
- Oily Water Storage Tank
- Oily Water Treatment System
- Landfill (Existing)
- Certified Project Area
- Culvert
- RipRap Apron
- Fortis BC Main Gas Supply Pipeline
- Non-Contact Water Ditch
- Non-Contaminated Contact Water Storm Sewer
- Non-Contaminated Contact Water Ditch
- Contaminated Contact Water Pipeline
- Potentially Contaminated Contact Water Trench
- Treated Contact Water Pipeline
- Treated Leachate Underground Pipeline
- Sewage Treatment Plant Outfall
- Watercourse

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Coordinate System: NAD 1983 UTM Zone 10N
Projection: Transverse Mercator
Datum: North American 1983
Units: Metre

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0 100 200 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

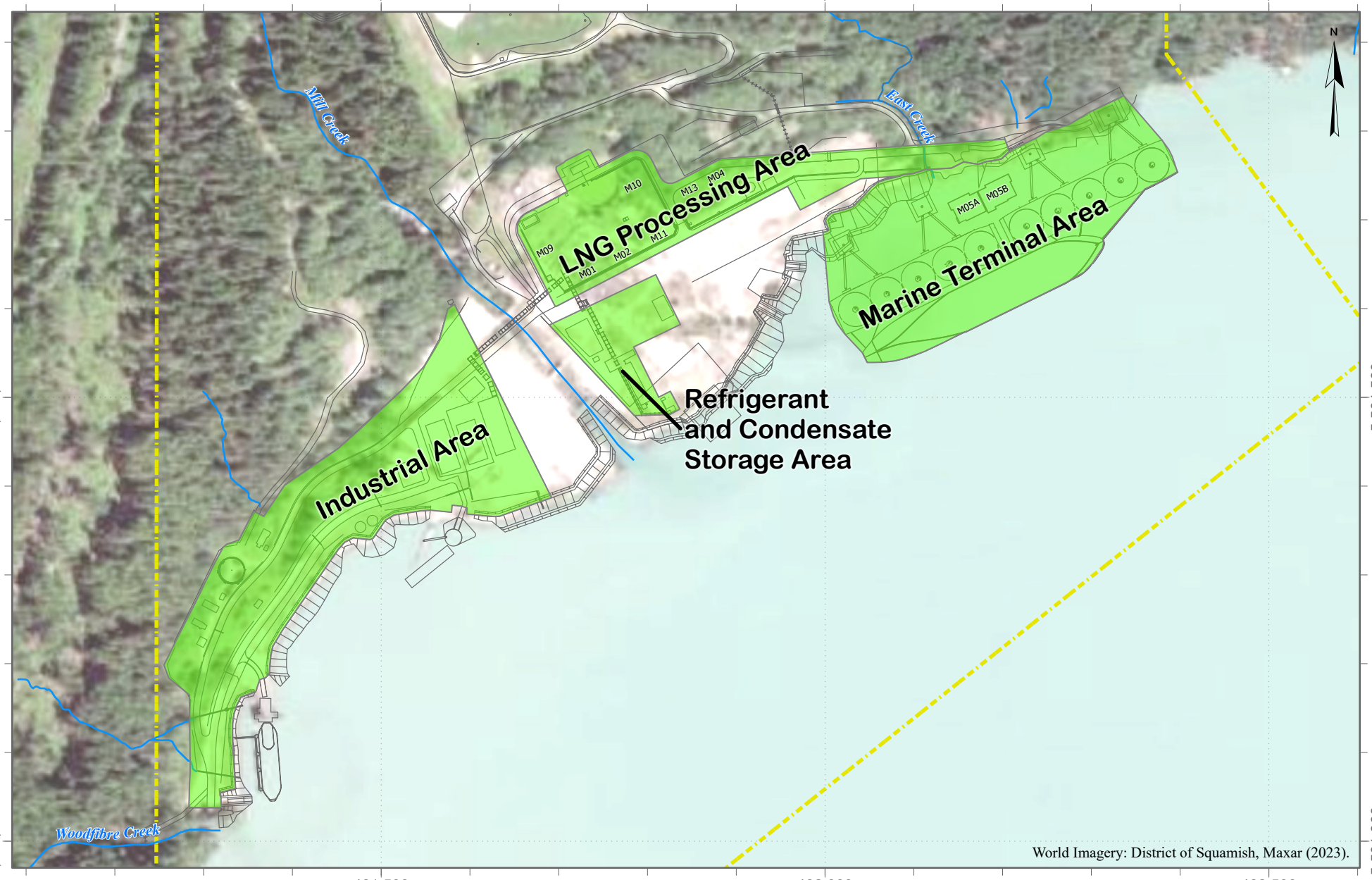
TITLE: Location of Woodfibre LNG Facilities within the Project Site

PROJECT #: A825-1

FIGURE: 2-1

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Figure 2-1 Project Area and Facilities



LEGEND

- Certified Project Area
- Site Linework (Reduced)
- Watercourse

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Coordinate System: NAD 1983 UTM Zone 10N
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0 50 100 150 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Conceptual Layout of Operational Areas within the Project Site

PROJECT #: A825-1

FIGURE: 2-2

2.1.1 LNG Processing Area Overview

The LNG Processing Area is comprised of several modules that contain the required equipment and piping to process LNG. These modules are often referred to when describing elements of the stormwater drainage system, as several of the modules have their own dedicated drainage sump related to the OWTS. For ease of reference in the TAR, the module number, purpose and relevance to the stormwater drainage system is outlined in Table 2-1, with further information provided in Section 4. Note the LNG jumper arms located on module M05 connect the LNG Processing Area to the Marine Terminal Area.

2.1.2 Refrigerant and Condensate Storage Area Overview

The refrigerants, including propane and ethane, used in the liquification process are stored south of the LNG Processing Area. There is a dedicated unloading area as the refrigerants are imported to site. The condensate is stored in a tank south of the LNG Processing Area. There is a dedicated condensate loading area (via truck or barges) to support the export from site.

2.1.3 Marine Terminal Area Overview

The FSTs and LNG carrier loading area is located at the Marine Terminal on the foreshore of Howe Sound. LNG Transfer Platform Modules M05A and M05B (Figure 2-2) will be used to transfer the LNG from the LNG rundown lines using jumper arms into the FSTs. The FSTs are two retrofitted Moss LNG vessels (FST-1 and FST-2) that are permanently moored at the Marine Terminal Area, with each vessel containing five LNG Storage Tanks. The LNG carrier, with the assistance of tugs, moors parallel to the FSTs; LNG is then loaded onto the LNG carrier for export.

2.1.4 Industrial Area Overview

Supporting infrastructure is located in the Industrial Area on the west side of Mill Creek, which includes the following:

- Permanent buildings, including the Warehouse and Maintenance Building, Administration Building, Control and Operations Buildings, Instrument Air Building, Vehicle Shelter Building and Chemical Storage Building;
- Utilities, including chlorinated fire water/service water, potable water, sanitary wastewater, diesel fuel (to support essential diesel generators and the diesel fire water pumps), nitrogen, and instrumentation air;
- Personnel transportation infrastructure, including the passenger ferry and guard house; and
- Material handling ramps such as roll-on/roll-off (RoRo) and west ramp.

Table 2-1:
Summary of LNG Processing Area Modules

Module No.	Module Name	Purpose[1]	Relevance to Stormwater/Drainage System[2]
M01	Pre-treatment Module	Removes impurities from the natural gas feedstock.	Carbon dioxide (CO_2), hydrogen sulphide and other sulphur compounds and volatile organic compounds are removed from the feed gas using an amine solvent. These impurities are then separated from the solvent stream in the solvent regenerator, and the impurities are incinerated in the thermal oxidizer in M09. The amine solvent is used within a closed drainage system so any excess solvent will gravity drain to a solvent drain drum for reuse in the process. However, there is a curbed area and sump dedicated to the collection of stormwater in this area in the event stormwater came into contact with amine. This module includes gaseous and liquid hydrocarbon containing equipment and piping; therefore, the stormwater collected near those systems is classified as contaminated contact water and directed to the OWTS.
M02	Liquefaction Module	Removes the condensate (butane, pentane, *etc*.) and cools (liquefies) the treated gas using C3MR system.	This module includes gaseous and liquid hydrocarbon containing equipment and piping; therefore, the stormwater collected near those systems is classified as contaminated contact water and directed to the OWTS.
M04	Boil-Off Gas (BOG) Compressor Module	BOG compressor helps with the capture of natural gas that re-vapourizes (boils off) and its re-injection back into the process to be reliquefied into LNG or for use as fuel gas.	This module includes gaseous and liquid hydrocarbon containing equipment and piping; therefore, the stormwater collected near this system is classified as contaminated contact water and directed to the OWTS.
M09	Process Utility Module	Supplies the critical common process utilities for the LNG process, including the tempered water system, hot oil (heating medium) heating system and the thermal oxidizer.	The heating medium equipment is within a closed drainage system, so any excess heating medium will gravity drain to a heating medium drain drum for reuse in the process. However, there is a curbed area and sump dedicated to the collection of stormwater in this area in the event stormwater came into contact with heating medium. The tempered water system is also a closed loop system that is within curbed areas to contain any inhibited ethylene glycol spills or leaks. The thermal oxidizer incinerates impurities removed from the feed gas in M01 (separated from the amine solvent stream).
M10/M11	Powerhouse Modules	Supplies and distributes the critical power for the LNG process.	There are a range of transformers on site used to change the voltage based on the system requirements, including dry and wet types. Wet transformers contain a dielectric oil to insulate and cool the transformer, therefore are located within curbed areas to contain any spills and leaks.
M13	Flare Knock Out (KO) Drums Module	Flare KO drums are designed to protect the facility's flare system by separating any liquids from gases set to be flared, ensuring safe and efficient flare operation.	This module includes hydrocarbon containing equipment and piping; therefore, the stormwater collected near those systems is classified as contaminated contact water and directed to the OWTS.

Notes:
[1] The purpose provided herein is high-level only and not intended to be a detailed description of all the processes/activities that occur within each module.
[2] Refer to Section 4 for further information related to the stormwater drainage system.

2.2 Commissioning Activities

The permanent stormwater management systems are planned to be commissioned and put into service ahead of the overall LNG facility commencing operations, and prior to the completion of construction activities. WLNG has retained McDermott International Ltd. ("McDermott") to lead the construction, pre-commissioning and commissioning activities, with supports from various subcontractors and WLNG oversight/assurance. There is a robust handover process implemented between McDermott and WLNG prior to each system being formally handed over to WLNG to start-up and operate. Temporary infrastructure used solely to support construction activities is forecast to commence being systematically decommissioned in the second half of 2027, once no longer required for site water management, including the backfilling of the sedimentation ponds and demobilization of the construction wastewater treatment plants. The transition from the temporary (construction) to the permanent (operations) stormwater management system is further described in Section 4.1.10.

The temporary construction stormwater management system includes sedimentation ponds, construction wastewater treatment plants, and associated temporary works, as authorized under WDA Effluent Permit PE-111578. There are two authorized discharge locations into Howe Sound (SP-W-OUT and SP-E-OUT) under WDA Permit PE-111578.

The temporary construction stormwater system will be used while the permanent stormwater management system is being constructed, pre-commissioned, commissioned, and handed over (from McDermott to WLNG) as part of substantial completion. The intent is that the permanent stormwater management systems within each module/area will have completed commissioning activities prior to the LNG equipment and piping in that area being commissioned, and prior to the commissioning of the OWTS. Formal handover of the permanent water management systems from construction to operations shall occur only after completion of:

- mechanical completion;
- pre-commissioning activities;
- functional testing;
- cause and effect verification;
- instrument calibration;
- diversion logic testing; and
- commissioning acceptance testing in accordance with approved procedures.

During LNG facility commissioning, any wastewater generated from flushing, cleaning, degreasing, hydrotesting additives, lube oil flushing, chemical cleaning, glycol systems, or other non-routine commissioning activities will be segregated from the permanent stormwater drainage system unless specifically assessed as suitable for treatment through the OWTS. Off-specification commissioning effluent shall be collected and recycled, or removed from site for disposal at an appropriate facility.

2.3 Closure & Post-Closure

The *Energy Resource Activities Act, LNG Facility Regulation*, Section 2.1 defines the activities required to be undertaken when an LNG facility permit holder no longer intends to operate the LNG facility. WLNG will also develop a decommissioning plan in accordance with the EAC and FDS.

Prior to the cessation of operations, a review will be undertaken to identify whether subsequent industrial activity could re-use any of the LNG equipment or supporting works, and what components need to be retained beyond closure for environmental purposes (*e.g.*, treatment facilities) or future industrial activities (*e.g.*, ancillary buildings). The review will also identify what equipment and materials can be salvaged for reuse or recycling, or require offsite disposal at a licensed facility.

Closure activities will include de-energizing / de-pressurizing and draining of systems, and residuals will be removed for proper management and disposal. Discharges to the environment will be undertaken in conformance with the WDA in effect. Generated waste will be classified and subsequently disposed of in accordance with the applicable Acts and Regulations.

Post-closure activities will be developed once it is determined what infrastructure will remain on site, and if the outcomes of the contamination testing program result in further actions in consultation with the BCER. Waste generated during post-closure activities will also be classified and subsequently disposed of in accordance with the applicable Acts and Regulations.

3. Environmental Setting



3 Environmental Setting

This section describes the environmental setting for the WLNG Project. It provides contextual information and describes current conditions for the terrestrial landscape, watercourses, and marine environment. The information provided includes a description of physiography, bedrock and soils; groundwater, surface water quantity and quality; as well as oceanography, marine sediments, marine water quality and marine ecology. Due to the lead time required for TAR preparation, the construction records and environmental monitoring records presented in this section extend to the end of May 2025 (water quality data) and August 2025 (sediment quality and excavations), when the data analysis for these sections commenced.

3.1 Physiography

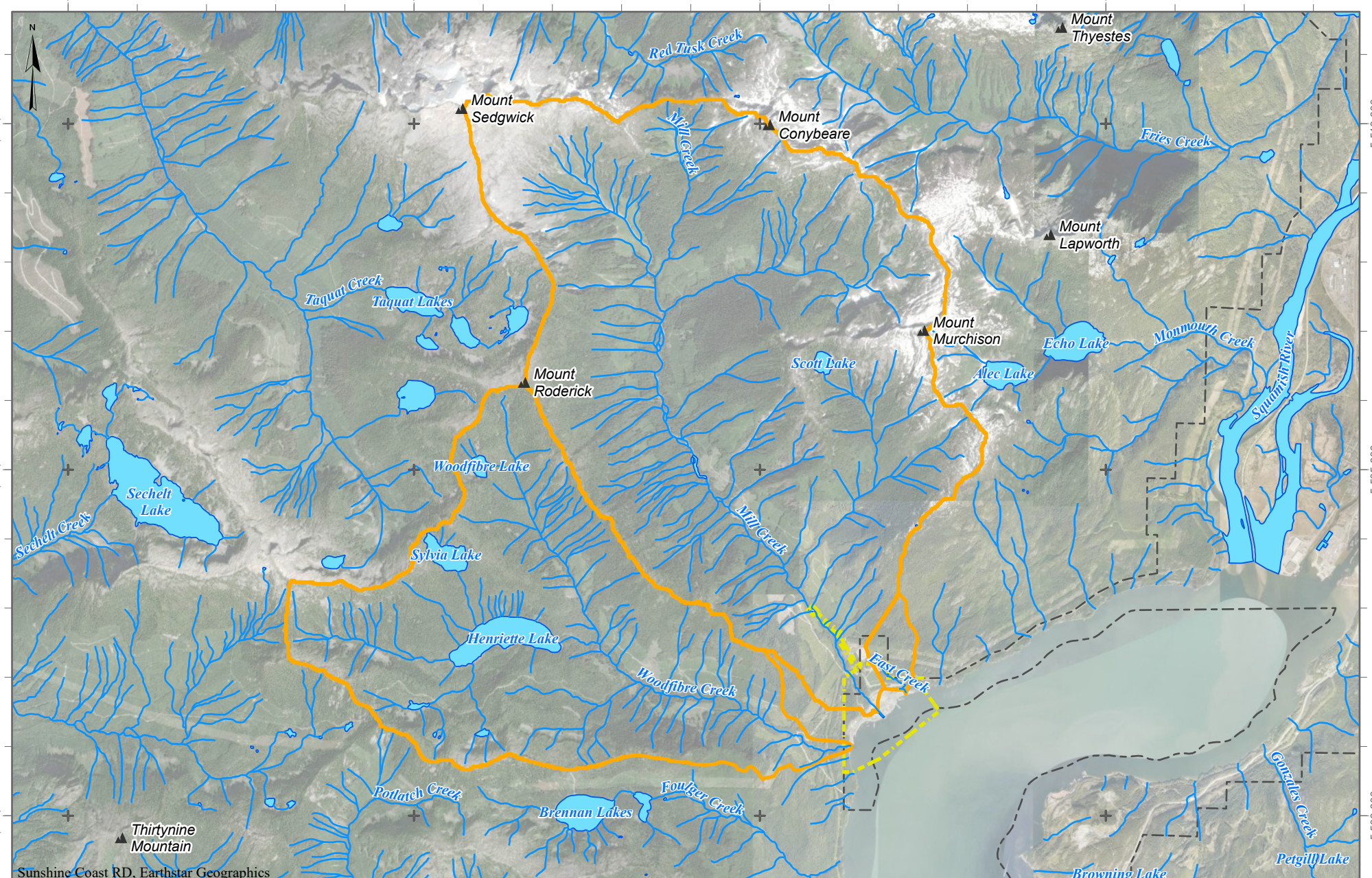
The Project is located on the northern basin of Howe Sound, a coastal fjord located in the Strait of Georgia. The inlet extends 42 km south from the mouth of the Squamish River to the base of the inlet, which is near West Vancouver (Figure 1-1). In the vicinity of the Project site, steep mountains descend from the Tantalus Range peaks of roughly 2,000 m elevation to the shore of Howe Sound. The area was inundated by the Cordilleran Ice Sheet during the Fraser Glaciation. The slopes above the Project property comprise steep bedrock cliffs and forested terrain. The mid-slopes are generally bedrock controlled, sometimes with a veneer of colluvium and occasionally with a veneer of glacial till. A fluvial fan forms a small level area at the edge of Howe Sound where the Project site is located.

The hillsides and mountain valleys located at higher elevations above the Project property are generally undeveloped and mainly forested. However, there are gravel roads that extend up the valleys from the Project site, and in the past clearcut logging has been undertaken in the watersheds that extend inland from the Project site. In recent years, logging related road construction has been conducted approximately 1 km south and east of the Project property and extending into the lower extent of the Woodfibre Creek watershed. Transmission line right of ways cross the hillslopes and watersheds above the Project site and some ground preparation activities have been undertaken within the right of ways on the north side of the Mill Creek watershed approximately 200 m northwest of the Project property. Ground preparation for a natural gas compressor station has also been initiated at the north side of the property and within the East Creek watershed area.

Three small streams discharge to Howe Sound within the Project boundaries as shown in Figure 3-1. The largest of these is Mill Creek which flows from Mount Sedgewick through moderately steep terrain and a small canyon prior to bisecting the fluvial fan at the edge of

Howe Sound. The creek is tidally influenced through most of flat area formed by the fluvial fan. The smaller Woodfibre Creek drains Woodfibre Lake to the north-west and Henriette Lake to the west, and the south-facing slopes of Mount Roderick through a steeply descending slope at the southern edge of the Project site. East Creek has smallest watershed of the three creeks with the lower extent of the stream with lower tributaries flowing through constructed channels, and ultimately discharging through a culvert on the eastern side of the Project site.

The Squamish River discharges from a large glacier-fed watershed to the head of the Howe Sound approximately 5 km east of the Project. The river is the dominant freshwater input to Howe Sound and exerts a significant influence on the Howe Sound marine water quality within the marine portion of the Project site.



LEGEND

- Catchment
- Certified Project Area
- Municipal Boundary
- Mountain Peak
- Waterbody
- Watercourse

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VERSION:	1

Coordinate System: *NAD 1983 UTM Zone 10N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Metre*

1:75,000

0 1,000 2,000 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Drainage Catchments for Woodfibre, Mill, and East Creeks

PROJECT #: A825-1

FIGURE: 3-1

P:\@202506\Woodfibre\Drafting Figures\APRX\WLNG TAR\WLNG TAR.aprx Figure 3-1 Creek Catchments

3.2 Soils

Soils within the Project site are predominantly composed of glaciofluvial or glaciolacustrine sediments (overburden) deposited in an alluvial fan by Woodfibre and Mill Creeks. These have been altered by excavation and deposition of fill material undertaken from the time the Woodfibre Pulp Mill was constructed and operated beginning in the early 1910s until the mill closed in 2006. Site investigations conducted under the B.C. *Environmental Management Act* Contaminated Sites Regulation (CSR) in 2005 identified potential contaminant sources which may have impacted soil and marine sediment quality at the Project site, including placement of fill, fuel tanks, chemical storage tanks, an asbestos storage area, wood chip storage and handling, and pulp processing areas (Keystone 2014a). Site remediation was completed in 2014.

Additional rounds of soil characterization were conducted in 2020 and 2021. Site preparation activities occurred from June 2022 to October 2023. The construction contractor mobilized to site in September 2023, with construction of the facility commencing in November 2023. As of August 2025, most of the Project site was covered with imported fill material that is discussed in Section 3.3. This section summarises the soil monitoring conducted from 2006 to August 2025.

3.2.1 Monitoring Prior to Site Preparation (2006 to 2021)

Soil monitoring was conducted from 2006 to 2014 to delineate contamination in areas of potential concern identified by the preliminary site investigation (Keystone, 2014a). These investigations identified localized soil contamination in historic fill locations where metals, light extractable hydrocarbons (LEPH), and heavy extractable hydrocarbon (HEPH), were present at concentrations greater than the CSR soil matrix standards for Industrial Land (IL) for the following applicable pathways: human intake of contaminated soil, toxicity to soil invertebrates and plants and groundwater flow to surface water used by aquatic life (freshwater and marine). Remediation of the upland area of the Project site was completed, and a CofC was issued in December 2014 for the uplands portion of the Project site by the B.C. Ministry of Environment (refer to Section 1.2).

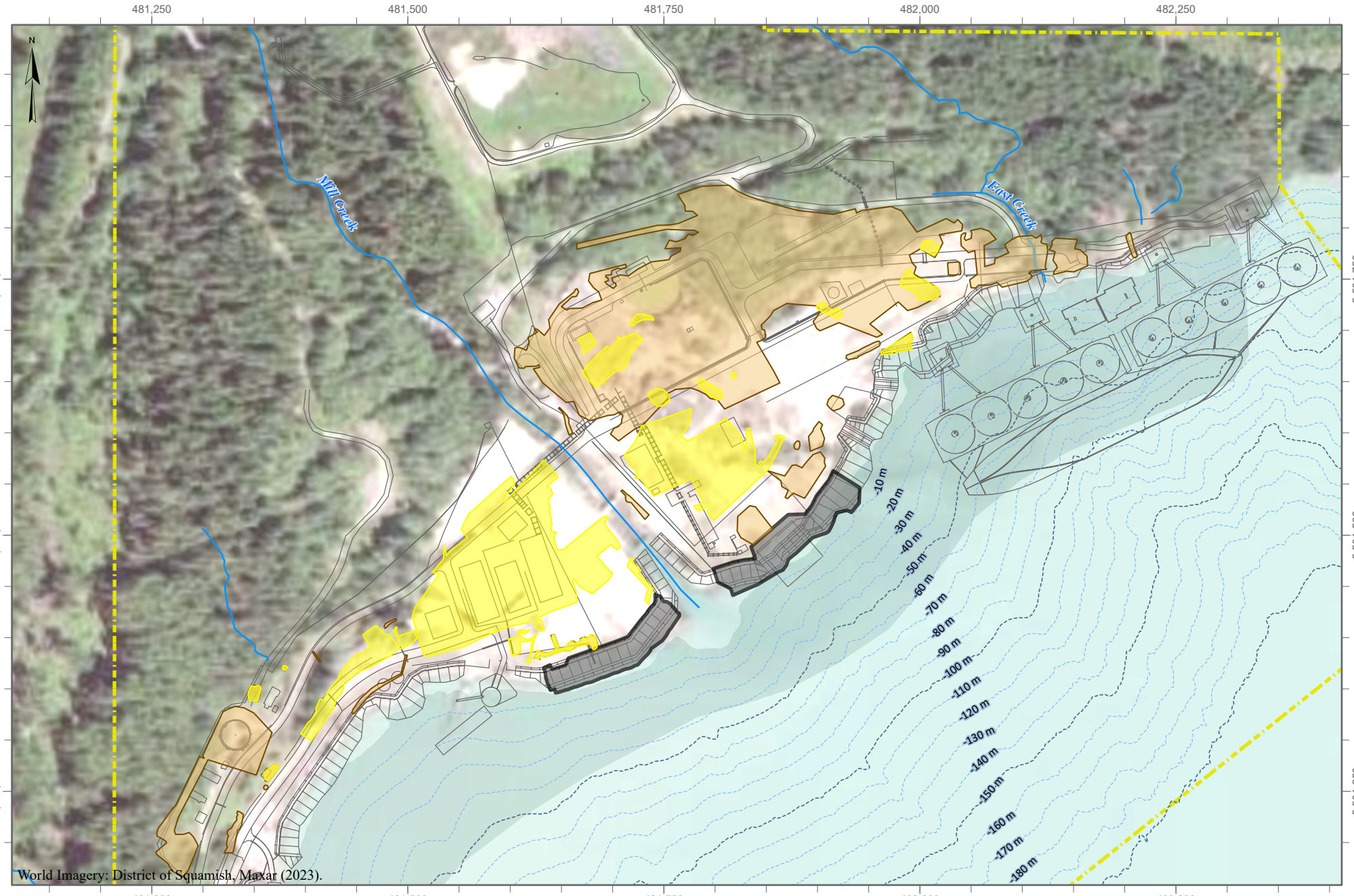
Further soil monitoring was carried out from December 2020 to February 2021 for the evaluation of soil quality specifically within the planned Project excavation areas (Keystone, 2021a). The monitoring included a surficial soil investigation and an investigative drilling program that were supplemental to the monitoring conducted 2006 to 2014 (Keystone 2014a). The monitoring objectives were to classify soil quality based on CSR definitions within the general excavation areas, to delineate contaminated soils within and adjacent to the Project construction areas, and to estimate the volumes of soil that would require different management approaches based on the soil classification. The soil

quality results were screened against the CSR IL standards for the following site-specific factors: human intake of contaminated soil, toxicity to soil invertebrates and plants, and groundwater flow to surface water used by aquatic life (freshwater and marine). Metals (arsenic [As], cadmium [Cd], cobalt [Co], chromium [Cr], copper [Cu], iron [Fe], manganese [Mn], nickel [Ni], lead [Pb] and zinc [Zn]) were present at greater than the CSR IL standards. The results of this monitoring program were presented in the Technical Assessment Report for the Woodfibre LNG Export Facility Construction Phase Waste Discharge Authorization (Lorax, 2023) that supported the application for WDA Effluent Permit PE-111578.

3.2.2 Site Preparation Demolition and Soil Improvement (2022 to 2023)

Pre-construction site preparation occurred from June 2022 to October 2023 and included demolition of all existing buildings and structures within the Project footprint, removal of building foundations, as well as stripping and grubbing of vegetation. Demolition materials included lumber, metal, asbestos and concrete. The lumber, metal and asbestos were shipped off site to facilities that were licensed to receive them for disposal or recycling. Stripped vegetation was disposed of in the on-site landfill prior to its closure in 2023. Concrete was crushed and re-used as fill on-site to maintain a minimum one metre thick cover over contaminated materials, in compliance with the CofC for the upland portion of the site.

The demolition and soil improvement areas disturbed by site preparation activities are shown in Figure 3-2. The activities were overseen by a registered professional for contaminated sites (Keystone Environmental Ltd.). To facilitate excavation of concrete foundations it was necessary to excavate some soils below the one metre cap adjacent to the foundations. Soils excavated from within areas of environmental concern and soils with invasive plant species were stockpiled on site for further characterization and disposal during construction. Approximately 35,000 m^3 of soils were stockpiled for further characterization (refer to Section 3.2.3).



LEGEND

- Cut and Demo - Soil Improv Excavation
- Overburden Excavation
- Shoreline Excavation
- Certified Project Area
- Site Linework (Reduced)
- Watercourse
- Bathymetry Contour (Major: 50m)
- Bathymetry Contour (Minor: 10m)

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Coordinate System: *NAD 1983 UTM Zone 10N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Metre*

1:5,000

0 50 100 150 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Location of Pre-Construction Soil Disturbance and Construction Phase Overburden Excavation Areas

PROJECT #: A825-1

FIGURE: 3-2

P:\@202506\Woodfibre\Drafting Figures\APRX\WLNG Excavation\WLNG Excavation\WLNG Excavation.aprx Figure 3-2 Pre-Construction Soil Disturbance, Overburden Excavation

3.2.3 Construction Overburden Excavations and Monitoring (2023 to 2025)

Excavations were managed in accordance with the requirements of CofC 26250-20/9930 for the uplands portion of the Project site, and were overseen by the registered professional for excavation works (Stantec Consulting Limited). Approximately 297,000 m^3 of soil and overburden were excavated from upland areas within the Project site from November 2023 to August 2025. Materials that either did not meet the CSR IL standard, contained invasive plant species, or were otherwise not suitable for construction use were disposed off-site at facilities licensed to receive these materials. A total of 152,000 m^3 were exported from the site as of August 2025, with the balance used as fill. Excavations of soil and overburden were collectively tracked as overburden. The excavation areas are shown in Figure 3-2.

Excavations from upland areas were placed in on-land stockpiles with sub-samples tested for chloride, metals, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), volatile petroleum hydrocarbons (VPH), LEPH and HEPH (Keystone, 2024b and 2026). Soil stockpiled during pre-construction soil improvement excavations was also tested (refer to Section 3.2.2). A total of 97 samples were collected. All test results met the CSR IL standards, except soluble chloride and metals (As, Cu, Cr, selenium [Se] and Zn) in one or more samples. The test results are summarized in Table 3-1 and are tabulated in Table 1 of Appendix 3.2-1.

Out of the 97 upland soil samples, 10 were duplicate samples. Overall, the quality control evaluation of duplicate sample pairs indicated that the soil samples have acceptable representativeness (Appendix 3.2-1, Table 2). However, elevated variability was observed for metals (Cd, mercury [Hg], Pb and antimony [Sb]) and PAHs in one or more duplicate data pairs, and was attributed to heterogeneous distribution of these parameters in the soils.

Table 3-1:
Upland Soil Quality Summary (2024-2025)

Parameter	CSR IL Standard (mg/kg) [1]	Concentration Range (mg/kg)
Leach Test Parameters		
Chloride, soluble	600	399 - 407
pH, Soluble (2:1)	-	6.29 – 10.20
Volatile Organic Compounds (VOC), Halogenated		
Carbon Tetrachloride	50	<0.020 - <0.020
Chlorobenzene	10	<0.020 - <0.020
Chloroform	50	<0.020 - <0.020
Dichloromethane	50	<0.080 - <0.080
Tetrachloroethene	2.5	<0.010 - <0.010
Trichloroethene	0.3	<0.0090 - <0.0090
Volatile Organic Compounds (VOC), Non-Halogenated		
Benzene	2.5	<0.0050 - 0.011
Ethylbenzene	200	<0.010 - 0.02
Styrene	50	<0.030 - 0.26
Toluene	0.5	<0.050 - <0.050
Xylenes, Total	20	<0.040 - 0.15
Polycyclic Aromatic Hydrocarbons (PAH)		
Benz(a)anthracene	10	<0.020 - 3.4
Benzo(b+j)fluoranthene	10	<0.020 - 4
Benzo(k)fluoranthene	10	<0.020 - 1.4
Dibenz(a-h)anthracene	10	<0.020 - 0.6
Indeno(1,2,3-cd)pyrene	10	<0.020 - 2
Naphthalene	75	<0.010 - 14
Phenanthrene	50	<0.010 - 18
Pyrene	100	<0.020 - 10
Strong Acid Extractable Metals		
Antimony (Sb)	40	0.13 - 22.7
Arsenic (As)	10	2.54 - **18.4**
Barium (Ba)	1,500	57 - 531
Beryllium (Be)	1 – 500 [2]	<0.20 - 0.71
Cadmium (Cd)	1 – 50 [2]	<0.050 - 1.1
Chromium (Cr)	60	11.2 - **139**
Cobalt (Co)	25	4.62 - 8.66
Copper (Cu)	150 – 1,500 [2]	14.9 – **2,300**
Lead (Pb)	1,500 – 15,000 [2]	2.69 – 1,070
Molybdenum (Mo)	650	1.26 - 6.64
Nickel (Ni)	70 – 500 [2]	5.04 - 55
Selenium (Se)	1	<0.50 - **2.65**
Silver (Ag)	40	<0.050 - 0.344
Thallium (Tl)	25	<0.050 - 0.14
Tin (Sn)	300	0.22 - 55.2
Uranium (U)	150	0.831 - 18.8
Zinc (Zn)	150 – 200 [2]	29.3 - **555**
Petroleum Hydrocarbons		
LEPH (C10-19)	2,000	<100 – 1,400
HEPH (C19-32)	5,000	<100 – 1,200

Notes:
Values highlighted in **bold** font exceed the corresponding CSR IL standard.
[1] The most stringent applicable CSR (Schedule 3.1) numerical soil standard for Industrial Land (IL) use for human health protection (intake of contaminated soil), and environmental protection (toxicity to soil invertebrates and plants, groundwater flow to surface water used by aquatic life). The hexavalent Cr standard is applied to the total Cr results.
[2] pH dependant standard.

3.2.4 Construction Foreshore Excavations and Monitoring (2024)

Construction activities included the installation of foreshore armouring to protect the site from erosion caused by wave action along the Howe Sound shoreline, and for installation of the Marine Offloading Facility (MOF). Excavation of pre-existing foreshore fill was required to facilitate this work and was conducted in 2024. The locations of the foreshore excavation areas are shown in Figure 3-2. All foreshore excavated materials were removed from the Project site by barge for off-site disposal. A total of 39 samples was collected from excavated material that was stockpiled in the barges and were tested for chloride, metals, PAHs, LEPH and HEPH. Information and monitoring results for the foreshore fill excavations were provided by McDermott and Roe Environmental Inc.

The results are screened against the CSR IL standards. The test results are summarized in Table 3-2 and are tabulated in Table 1 of Appendix 3.2-2. The IL standard is exceeded in one or more samples for chloride, metals (As and Sb) and PAH (phenanthrene). The elevated As and Sb concentrations detected in a few samples may be from historical use of anti-fouling agents that contained compounds made from these elements. Creosote covered pilings and boards from historical wharf structures are the likely source of PAHs in samples that were collected in the vicinity of these structures.

Out of 39 foreshore samples, 10 are duplicate samples. The quality control results are tabulated in Table 2 of Appendix 3.2-2 and indicate that, overall, the soil results have acceptable representativeness for metals. Elevated variability was observed for PAHs in a majority of the duplicate pairs, and was attributed to heterogeneous distribution of these parameters in the foreshore materials.

Table 3-2:
Foreshore Fill Quality Summary (2024)

Parameter	CSR IL Standard (mg/kg) [1]	Concentration Range (mg/kg)
Leach Test Parameters		
Chloride, soluble	600	220 – **2,910**
pH, Soluble (2:1)	-	6.99 – 9.61
Polycyclic Aromatic Hydrocarbons (PAH)		
Benz(a)anthracene	10	0.094 - 9.17
Benzo(b+j)fluoranthene	10	0.074 - 4.3
Benzo(k)fluoranthene	10	0.03 - 1.5
Dibenz(a-h)anthracene	10	0.0059 - 0.215
Indeno(1,2,3-cd)pyrene	10	0.018 - 0.7
Naphthalene	75	0.031 - 5.88
Phenanthrene	50	0.588 - **58.7**
Pyrene	100	0.391 - 29.7
Strong Acid Extractable Metals		
Antimony (Sb)	40	0.19 - **311**
Arsenic (As)	10	1.89 - **10.9**
Barium (Ba)	1500	37.6 - 1310
Beryllium (Be)	1 - 500 [2]	<0.10 - 0.96
Cadmium (Cd)	1 - 50 [2]	0.046 - 0.513
Chromium (Cr)	60	8.35 - 37.9
Cobalt (Co)	25	3.24 - 14.8
Copper (Cu)	150 - 1,500 [2]	11.6 - 677
Lead (Pb)	1,500 - 15,000 [2]	5.79 – 1,900
Molybdenum (Mo)	650	1.02 - 10.4
Nickel (Ni)	70 - 500 [2]	3.76 - 200
Selenium (Se)	1	<0.20 - 0.62
Silver (Ag)	40	<0.10 - 0.5
Thallium (Tl)	25	<0.050 - 0.109
Tin (Sn)	300	<2.0 - 144
Uranium (U)	150	0.636 - 4.38
Zinc (Zn)	150 - 200 [2]	23.7 - 101
Petroleum Hydrocarbons		
HEPH (C19-32)	5,000	<200 - 410
LEPH (C10-19)	2,000	<200 - 240

Notes:
Values highlighted in **bold** font exceed the corresponding CSR IL standard.
[1] The most stringent applicable CSR (Schedule 3.1) numerical soil standard for Industrial Land (IL) use for human health protection (intake of contaminated soil), and environmental protection (toxicity to soil invertebrates and plants, groundwater flow to surface water used by aquatic life). The hexavalent Cr standard is applied to the total Cr results.
[2] pH dependent standard

3.3 Overburden and Bedrock Geology

3.3.1 Geologic Setting

The Coast Plutonic Intrusive Group dominates over 70 percent of the Howe Sound region by area and includes the Mill Creek watershed south of Mount Sedgewick, based on publicly available regional mapping. The Jurassic to Tertiary-aged Coast Plutonic Group is composed of plutonic rocks such as quartz diorite, granodiorite, granite, and minor gabbro.

The local formation is mapped but is unnamed based on available bedrock mapping (Cui *et al.,* 2017). The unit consists of mid-Cretaceous granodioritic intrusive rock. The mountain slopes are composed of bedrock of the Coast Plutonic Intrusive Group, as noted above. Shallow bedrock is composed of granite and granodiorite. The upper bedrock surface dips steeply from north to south into the subsurface across the site, from at or near the surface at the toe of the mountain slopes, descending to a depth of approximately 60m below the surface at the mouth of Mill Creek. A stiff, silty indurated layer with gravel and cobbles has been observed at the bedrock interface, which may be basal till that pre-dates glaciofluvial and glaciolacustrine sediments.

From the base of the adjacent mountains, there is a gentle slope towards Howe Sound across an alluvial fan where the Project is situated. Sediment increases in thickness from north to south. The slope is comprised of unconsolidated sediments consisting of fine-grained or mixed grain sediments of glaciofluvial or glaciolacustrine origin, along with various fill material (concrete, construction debris). The natural topography within the CPA has been altered by grading and filling as part of the historic development of the site and ongoing construction.

3.3.2 Construction Phase Excavations and Fill Placement

This section summarizes records of overburden and bedrock excavated during construction from November 2023 to August 2025. Geochemical monitoring records and spatial extents of overburden and bedrock excavations were provided by Roe Environmental Limited and McDermott International Limited. The areas where overburden and bedrock were excavated and geochemical samples were collected are shown in Figure 3-3.

3.3.2.1 Overburden Excavations

As described in Section 3.2.3, approximately 297,000 m^3 of overburden was excavated during construction from November 2023 to August 2025. Approximately 152,000 m^3 of overburden was exported from site as of August 2025, and approximately 180,000 m^3 was

re-used as fill. The overburden sample test results indicate the re-used material was geochemically suitable for use as fill.

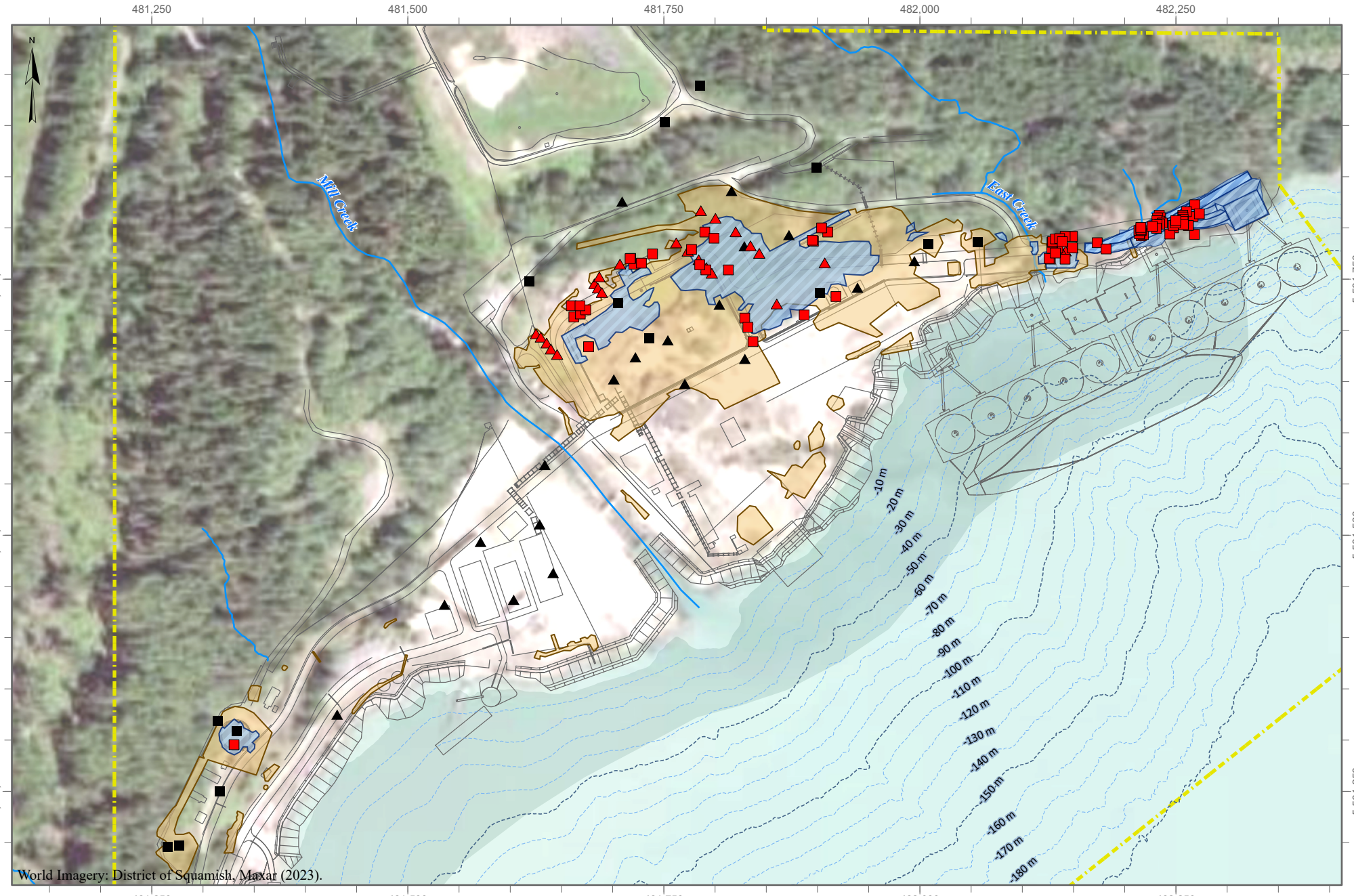
3.3.2.2 Bedrock Excavations

Approximately 102,000 m^3 of bedrock was blasted and excavated from November 2023 to August 2025 in the Process and Marine Terminal Areas, and the upper Industrial Area in the vicinity of the Firewater Tank. The excavated bedrock was reused for construction purposes. The material was tested and determined to be geochemically suitable for re-use by Lorax Environmental, the qualified professional for metal leaching and acid rock drainage evaluations.

3.3.2.3 Fill Placement

Fill has been sourced from on-site excavations and, where required, imported from off-site quarries. Bedrock and overburden geochemically suitable for re-use were crushed on-site to make aggregate that could be used for fill. As of August 2025, all of the Project construction area had been covered with fill to a depth of approximately 1 m or more.

Approximately 110,000 m^3 of aggregate has been imported as of August 2025 for civil site preparation from off-site B.C. quarries (Gilley's Quarry and Sechelt Mine, in Coquitlam and Sechelt, respectively) including clear crush, granular base, granular subbase, drain rock, pit run sand, and Type A and D aggregates. The geochemistry of the imported materials was assessed based on geochemical test results of representative samples collected by the quarry and mine owners. The fill material from both sources was determined to be geochemically suitable for construction use (Lorax, 2024a).



LEGEND

- Bedrock Sample (Baseline)
- Overburden Sample (Baseline)
- Bedrock Sample (Construction)
- Overburden Sample (Construction)
- Overburden Excavation
- Bedrock Excavation
- Certified Project Area
- Site Linework (Reduced)
- Watercourse
- Bathymetry Contour (Major: 50m)
- Bathymetry Contour (Minor: 10m)

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Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Metre*

1:5,000

0 50 100 150 Metres

CLIENT: Woodfibre LNG

PROJECT: **Woodfibre LNG Facility**

TITLE: Construction Phase Overburden and Bedrock Excavation Areas to August 2025 and Geochemistry Sampling Locations

LORAX ENVIRONMENTAL

PROJECT #: A825-1

FIGURE: 3-3

P:\@202506\Woodfibre\Drafting Figures\APRX\WLNG Excavation\WLNG Excavation\WLNG Excavation.aprx Figure 3-3 Construction Phase Overburden and Bedrock Excavation

3.3.3 Geochemical Assessment

A baseline geochemical characterization and assessment was completed by Stantec (2022a) of site bedrock and overburden, which is further discussed in the Lorax (2024a) Bedrock and Overburden Geochemical Characterization and Construction Phase ML/ARD Management Plan. The assessments determined the potential for acid rock drainage (ARD) for both bedrock and overburden is low. Similarly, bedrock exhibits low potential for metal leaching (ML). However, the laboratory shake flask extraction (SFE) test method identified a Cu leaching potential in a small proportion of overburden samples.

Confirmatory geochemistry sampling and testing of overburden and bedrock was conducted prior to excavated materials being re-used for fill during construction. Material excavated to the end of August 2025 that was determined to be geochemically suitable has been used as fill in the construction site. Results from samples collected from November 2023 to August 2025 are tabulated in Appendix 3.3-1. In summary, a total of six (6) overburden and 82 bedrock samples were collected and tested for acid base accounting (ABA), solid phase elemental analysis, and SFE elemental analysis.

3.3.3.1 ARD Potential

The combined ABA test results indicate that the overburden is not potentially acid generating (Table 3-3). The overburden material exhibits:

- Circumneutral paste pH (median = 7.1);
- Low sulphide S content (median =0.025 %);
- Generally low neutralization potential (NP; median = 9.3 kg $CaCO_3$/t); and
- Neutralization potential ratio (NPR) > 2.0 in more than 75% of the samples.

Similarly, bedrock material is also classified as not potentially acid generating (Table 3-4). The bedrock confirmatory samples exhibit:

- Circumneutral to slightly alkaline paste pH (median = 8.3);
- Low sulphide S content, generally below the method detection limit (median = <0.010 %);
- Low NP (median = 2.7 kg $CaCO_3$/t); and
- NPR > 2.0 in more than 75% of the samples.

The overburden and bedrock samples that were tested and assessed during excavations to the end of August 2025 were classified as not potentially acid generating. These results are consistent with the baseline geochemical assessment (Stantec, 2022a; Lorax, 2024a).

Table 3-3:
Summary of ABA Results for Confirmatory Overburden Samples

	Paste pH	Total S	Sulphide S	AP	Carbonate NP	Modified NP	NPR	CaNPR
	(s.u.)	(%S)	(%S)	(kg $CaCO_3$/t)	(kg $CaCO_3$/t)	(kg $CaCO_3$/t)	(kg $CaCO_3$/t)	(kg $CaCO_3$/t)
Min	6.1	0.040	0.020	0.63	<1.7	1.2	1.0	1.8
P25	6.2	0.048	0.020	0.63	2.3	1.9	2.3	2.9
Median	7.1	0.070	0.025	0.78	5.0	9.3	6.3	3.4
P75	8.4	0.085	0.038	1.2	6.5	16	22	7.9
Maximum	10	0.11	0.060	1.9	11	21	34	17
Count	6	6	6	6	6	6	6	6

Notes:
AP = Acid Potential = Sulphide S x 31.25 kg $CaCO_3$/tonne
Carbonate NP = Carbonate Neutralization Potential = Total Inorganic Carbon x 100.09/12.01 x 10
Modified NP = Modified Sobek Neutralization Potential, measured
NPR = Modified NP/AP
CaNPR = Carbonate NP/AP

Table 3-4:
Summary of ABA Results for Confirmatory Bedrock Samples

	Paste pH	Total S	Sulphide S	AP	Carbonate NP	Modified NP	NPR	CaNPR
	(s.u.)	(%S)	(%S)	(kg $CaCO_3$/t)	(kg $CaCO_3$/t)	(kg $CaCO_3$/t)	(kg $CaCO_3$/t)	(kg $CaCO_3$/t)
Min	6.1	0.010	<0.010	<0.30	<1.7	0.7	1.7	1.8
P25	8.1	0.020	<0.010	<0.30	<1.7	1.9	5.9	5.7
Median	8.5	0.030	<0.010	<0.30	<1.7	2.7	8.0	5.7
P75	8.8	0.040	<0.010	<0.30	<1.7	3.5	11	5.7
Maximum	10	0.11	0.060	1.9	11	21	37	17
Count	86	86	86	86	86	86	86	86

Notes:
AP = Acid Potential = Sulphide S x 31.25 kg $CaCO_3$/tonne
Carbonate NP = Carbonate Neutralization Potential = Total Inorganic Carbon x 100.09/12.01 x 10
Modified NP = Modified Sobek Neutralization Potential, measured
NPR = Modified NP/AP
CaNPR = Carbonate NP/AP

3.3.3.2 Metal Leaching Potential

The metal leaching potential was evaluated using SFE testing. The results were compared to upper estimates of seepage source chemistry for overburden and bedrock (Lorax, 2024a) as well as the Canadian Council of Ministers of the Environment (CCME), Environment and Climate Change Canada (ECCC), and B.C. Marine Water Aquatic Life (MWAL) water quality guidelines (WQGs). When considering SFE results, it is important to note the sample was crushed into a fine powder as part of the analysis. This increases the material surface area available for leaching. Therefore, the SFE test may overestimate the leachability of the tested material compared to leaching from the larger grain size of materials that are re-used for construction purposes.

Generally, overburden SFE results for confirmatory overburden samples collected during construction are consistent with the pre-construction observations (Stantec, 2022a; Lorax, 2024a) and below the screening criteria established in the ML/ARD Management Plan. With the exception of copper for all overburden samples and vanadium for select samples, the overburden SFE leachate results were below WQGs for the protection of MWAL (Table 3-5). Mercury was not detected in the samples; however, the detection limit was above the WQG. Therefore, the SFE mercury results could not be evaluated against the mercury WQG.

As with overburden samples, the bulk of bedrock sample SFE leachate results were consistent with the results of the Stantec (2022a) study and below the ML/ARD Management screening criteria. Confirmatory bedrock SFE results are, generally, below WQGs for the protection of MWAL (Table 3-6). Maximum concentrations of copper, lead, and vanadium in bedrock SFE leachate samples are above the WQGs in <7%, <2% and <3% of bedrock samples, respectively, and overall are not considered to be parameters of concern in bedrock. Mercury was not detected in most bedrock samples, with the exception of five samples (6% of the samples), that are slightly above the detection limit, and above the WQG. The detection limit for mercury is above the WQG and is a limitation of the analytical method. The detected mercury concentrations in SFE leachates are likely in part due to analytical variability as the concentrations are close to the detection limit of the analytical method; therefore, the metal leaching potential for mercury in bedrock cannot be appropriately assessed from SFE testing. It is important to note that this should be considered a screening exercise and is not intended to provide quantitative water quality predictions. Given the infrequent detection of mercury in bedrock samples (<6%), overall mercury is not considered to be a parameter of concern in bedrock.

Table 3-5:
Summary of SFE Results for Confirmatory Overburden Samples

Parameter	Unit	Federal WQG	B.C. WQG	Min	P10	P25	Median	P75	P90	Max	Count
Sulphate (SO_4)	mg/L	n/v	n/v	2.6	3.1	3.8	4.8	5.9	8.6	11	6
Aluminum (Al)	mg/L	n/v	n/v	0.075	0.077	0.079	0.19	0.35	0.46	0.56	6
Antimony (Sb)	mg/L	n/v	n/v	0.000078	0.000099	0.00017	0.00038	0.00047	0.00087	0.0013	6
Arsenic (As)	mg/L	0.0125[A]	0.0125[E]	0.00038	0.00043	0.00049	0.00062	0.00077	0.0014	0.0020	6
Bismuth (Bi)	mg/L	n/v	n/v	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	6
Cadmium (Cd)	mg/L	0.00012[A]	n/v	<0.0000020	0.0000028	0.000005	0.000011	0.000022	0.000026	0.000027	6
Chromium (Cr)	mg/L	n/v	n/v	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0019	0.0033	6
Cobalt (Co)	mg/L	n/v	n/v	0.000024	0.000035	0.000052	0.000093	0.00016	0.00027	0.00037	6
Copper (Cu)	mg/L	n/v	0.002[D] 0.003[E]	**0.0022**	**0.0028**	**0.0034**	**0.0047**	**0.0058**	**0.0064**	**0.0068**	6
Iron (Fe)	mg/L	n/v	n/v	0.005	0.0092	0.019	0.041	0.05	0.076	0.10	6
Lead (Pb)	mg/L	n/v	0.002[D] 0.140[E]	0.00005	0.00005	0.000062	0.00014	0.00028	0.00051	0.00071	6
Lithium (Li)	mg/L	n/v	n/v	0.00005	0.000058	0.000074	0.00014	0.00021	0.00028	0.00034	6
Magnesium (Mg)	mg/L	n/v	n/v	0.11	0.12	0.13	0.17	0.31	0.44	0.54	6
Manganese (Mn)	mg/L	n/v	n/v	0.0011	0.0016	0.0023	0.0074	0.012	0.015	0.018	6
Mercury (Hg)	mg/L	0.000016[A]	n/v	***<0.000020***	***<0.000020***	***<0.000020***	***<0.000020***	***<0.000020***	***<0.000020***	***<0.000020***	6
Molybdenum (Mo)	mg/L	n/v	n/v	0.00033	0.00042	0.00055	0.0015	0.0028	0.0031	0.0031	6
Nickel (Ni)	mg/L	n/v	n/v	0.00016	0.00023	0.00034	0.00054	0.0009	0.0011	0.0012	6
Selenium (Se)	mg/L	n/v	n/v	<0.00010	<0.00010	<0.00010	0.00013	0.00027	0.00038	0.00044	6
Uranium (U)	mg/L	n/v	n/v	0.000070	0.00019	0.00035	0.0005	0.00061	0.0026	0.0045	6
Vanadium (V)	mg/L	0.0050[C]	n/v	<0.0010	0.0011	0.0013	0.0014	**0.0051**	**0.0070**	**0.0076**	6
Zinc (Zn)	mg/L	n/v	0.01[D] 0.055[E]	0.0013	0.0018	0.0024	0.0029	0.0031	0.0052	0.0072	6

Notes:

n/v	No standard/guideline value.
Federal	Canadian Council of Ministers of the Environment or Environment and Climate Change Canada
A	Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine Aquatics Long Term
B	Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine Aquatics Short Term
C	Environment and Climate Change Canada
B.C. WQG	British Columbia Approved Water Quality Guidelines
D	Approved Water Quality Guidelines - Long-Term Chronic (Marine Aquatic Life)
E	Approved Water Quality Guidelines - Short-Term Acute (Marine Aquatic Life)
Guideline Comparison	
6.5	Concentration is above Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine Aquatics Long Term
6.5	Concentration is above Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine Aquatics Short Term
6.5	Concentration is above Approved B.C. Water Quality Guidelines - Long-Term Chronic (Marine Aquatic Life)
6.5	Concentration is above Approved B.C. Water Quality Guidelines - Short-Term Acute (Marine Aquatic Life)
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.

Table 3-6:
Summary of SFE Results for Confirmatory Bedrock Samples

Parameter	Unit	Federal WQG	B.C. WQG	Min	P10	P25	Median	P75	P90	Max	Count
Sulphate (SO_4)	mg/L	n/v	n/v	0.010	0.50	1.0	2.4	3.4	4.3	7.7	82
Aluminum (Al)	mg/L	n/v	n/v	0.0078	0.037	0.046	0.083	0.16	0.27	0.73	82
Antimony (Sb)	mg/L	n/v	n/v	<0.000050	<0.000050	0.000057	0.000095	0.00018	0.00031	0.00085	82
Arsenic (As)	mg/L	0.0125[A]	0.0125[E]	<0.00005	0.00028	0.00050	0.00095	0.0017	0.0024	0.0099	82
Bismuth (Bi)	mg/L	n/v	n/v	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	82
Cadmium (Cd)	mg/L	0.00012[A]	n/v	0.000004	0.000002	0.0000033	0.0000047	0.0000065	0.0000095	0.00013	82
Chromium (Cr)	mg/L	n/v	n/v	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0011	0.0038	82
Cobalt (Co)	mg/L	n/v	n/v	0.0000065	0.000013	0.000025	0.000053	0.00012	0.00025	0.0029	82
Copper (Cu)	mg/L	n/v	0.002[D] 0.003[E]	0.00017	0.00023	0.00036	0.00064	0.0010	0.0015	**0.0048**	82
Iron (Fe)	mg/L	n/v	n/v	0.0027	0.0040	0.0053	0.0092	0.013	0.023	0.063	82
Lead (Pb)	mg/L	n/v	0.002[D] 0.140[E]	<0.000050	<0.000050	<0.000050	<0.000050	0.000084	0.00015	**0.0032**	82
Lithium (Li)	mg/L	n/v	n/v	0.00038	0.00078	0.0013	0.0021	0.0033	0.0049	0.0086	81
Magnesium (Mg)	mg/L	n/v	n/v	0.023	0.050	0.066	0.10	0.13	0.19	0.26	82
Manganese (Mn)	mg/L	n/v	n/v	0.0013	0.0028	0.0038	0.0058	0.0090	0.012	0.027	82
Mercury (Hg)	mg/L	0.000016[A]	n/v	***<0.000020***	***<0.000020***	***<0.000020***	***<0.000020***	***<0.000020***	**0.000021**	**0.000046**	82
Molybdenum (Mo)	mg/L	n/v	n/v	0.00021	0.00077	0.0013	0.0028	0.0058	0.0081	0.66	82
Nickel (Ni)	mg/L	n/v	n/v	<0.000040	<0.000040	<0.000040	<0.000040	0.000086	0.00016	0.00032	82
Selenium (Se)	mg/L	n/v	n/v	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.00022	0.0012	82
Uranium (U)	mg/L	n/v	n/v	0.000041	0.00011	0.00019	0.00029	0.00062	0.0011	0.023	82
Vanadium (V)	mg/L	0.0050[C]	n/v	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	0.0023	**0.040**	82
Zinc (Zn)	mg/L	n/v	0.01[D] 0.055[E]	<0.0010	<0.0010	<0.0010	<0.0010	0.0013	0.0017	0.0061	82

Notes:

n/v	No standard/guideline value.
Federal	Canadian Council of Ministers of the Environment or Environment and Climate Change Canada
A	Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine Aquatics Long Term
B	Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine Aquatics Short Term
C	Environment and Climate Change Canada
B.C. WQG	British Columbia Approved Water Quality Guidelines
D	Approved Water Quality Guidelines - Long-Term Chronic (Marine Aquatic Life)
E	Approved Water Quality Guidelines - Short-Term Acute (Marine Aquatic Life)
Guideline Comparison	
6.5	Concentration is above Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine Aquatics Long Term
6.5	Concentration is above Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine Aquatics Short Term
6.5	Concentration is above Approved B.C. Water Quality Guidelines - Long-Term Chronic (Marine Aquatic Life)
6.5	Concentration is above Approved B.C. Water Quality Guidelines - Short-Term Acute (Marine Aquatic Life)
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.

Consequently, as the majority of overburden and bedrock samples exhibited SFE leachate concentrations that were low and below the criteria outlined in the ML/ARD Management Plan (Lorax, 2024a) and the Federal and B.C. WQG for the protection of MWAL, these materials are considered to have a low metal leaching potential. The confirmatory bedrock SFE results are consistent with the baseline geochemical assessment (Stantec, 2022a and Lorax, 2024a).

3.4 Climate and Meteorology

Climate in southwestern B.C. is characterized by an annual cycle, where there is a rapid onset of wet weather in the autumn, which persists through the winter, with a gradual transition in spring months to warm, dry summers.

In winter, the jet stream conveys a steady progression of storms that originate in the Pacific Ocean onto the coast of B.C. Orographic lift causes these systems to rise over the Coast Mountains, cooling the air mass resulting in abundant precipitation. The dominant winter flow from the west and southwest also conveys relatively mild air into the region, relative to the high latitude of the Project site. In general, winter precipitation on the southwest coast falls as snow at elevations above 1,000 m, where a deep snowpack often accumulates, and falls as rain at elevations below 500m, where there is a maritime influence, with alternating rain and snow at elevations in between. This weather pattern is intensified by the effects of the El Niño Southern Oscillation (ENSO) in some years.

This generally mild, wet weather pattern is occasionally interrupted when high pressure systems descend from the western Arctic, resulting in outflow winds that convey cold, dry air from the interior to the coast. This usually lasts for a few days, although it may persist for up to two weeks or more. When storms from the Pacific move into these conditions, the interaction of mild, moist air from the Pacific and cold, dry air from the interior can result in snowfall at low elevations, and a snowpack may persist, even at sea level, for as long as air temperatures remain cold.

The steady stream of storms from the Pacific Ocean gradually abates in spring months, marked by a steady decrease in monthly precipitation, and gradual rise in mean monthly temperature, from February to July.

Summer weather is dominated by the northward migration of the North Pacific High, a semi-permanent, subtropical anticyclone located in the northeast Pacific Ocean. Once it has moved to its northerly position west of B.C. in summer months, it dominates weather patterns in the region, resulting in a warm, dry, Mediterranean climate. This typically lasts from early summer to early autumn.

Hourly averages of air temperature, precipitation, barometric pressure, relative humidity, wind speed and direction are measured at an on-site meteorological station located within the Project site along the foreshore, just east of the mouth of Mill Creek (Figure 3-4). Data collection began on April 28, 2022, and is ongoing; a summary of the measured data is provided herein. Table 3-7 lists the components of the on-site meteorological station (Stantec, 2025).

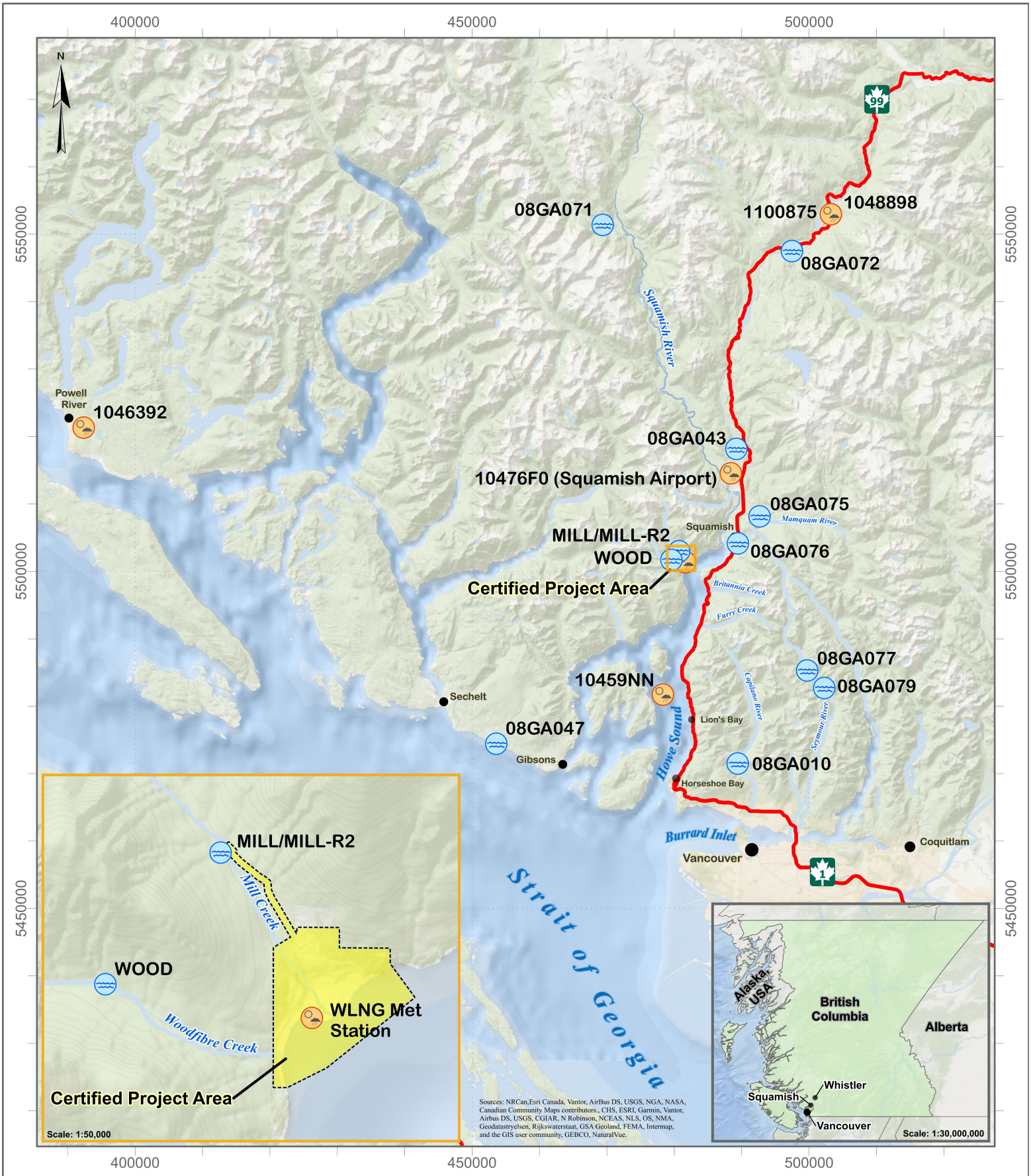
Table 3-7:
Woodfibre LNG Meteorological Monitoring Station Components

Parameter	Instrumentation
Data Collection	
Barometric pressure	Campbell Scientific BaroVUE10 digital barometric pressure sensor (500 to 1100 hPa) (Operating Temperature -40°C to +60°C
Wind[1]	05108L40 RM Young wind monitor heavy duty
Rainfall	SBS500L Environmental Measurements Ltd. (EML) Tipping Bucket Rain Gauge
	61 cm Alter Wind Screen for use with Tipping Bucket Rain Gauge
Relative humidity and air temperature	Rotronics HC2S3L relative humidity (0 to 100%) and air temperature probe Temperature: -40°C to +60°C
Data Storage and Retrieval	
Datalogger and cellular communications	Campbell Scientific CR310Cell205: Measurement & Control Datalogger with CELL205 modern (4G LTE CAT1) (Operating Range -40°C to +70°C)
Power supply	Solar panel: SP20L Solar Panel 20-Watt 12 Volt with Mount Battery: BP8.5 Battery Rechargeable Lead Acid 12 Volt 8.5 Amp-hour
Enclosure and instrument monitoring	ENC 12/14 Enclosure Fibreglass 30 cm x 36 cm

Notes:
Reproduced from Stantec, 2025.
The location selected for the WLNG meteorological station meets the requirements listed in the Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (B.C. ENV, 2016). The station is required to be placed in an open level area with unobstructed wind flow.
[1]A RM Young 05305 air quality wind sensor replaced the RM Young 05108L40 heavy duty wind sensor on November 28, 2024.

Long-term climate data from the Environment Canada Squamish Airport Station (ECCC, 2025a) are used as a proxy for historical climate patterns within the Project site. The Squamish Airport Station is located approximately 15 km northeast of the Project site in Squamish, B.C., roughly 11 km upstream from the mouth of the Squamish River. The climate stations and parameters summarized in this section are outlined below in Table 3-8. The location of these stations in relation to the CPA are shown in Figure 3-4.

The following discussion summarizes the data collected at the WLNG Meteorological Station and the 1991-2020 Canadian Climate Normals for the Squamish Airport Station (ECCC, 2025b).



LEGEND

- Climate Station
- Hydrometric Station
- Certified Project Area
- Highway

DATE SAVED:	Jul 22, 2026
DRAWN BY:	DM
REVIEWED:	PM
VERSION:	1

Coordinate System: NAD 1983 UTM Zone 10N
Projection: Transverse Mercator
Datum: North American 1983
Units: Metre

1:750,000

0 5 10 15 km

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Regional and Project Site Hydrometric and Climate Stations

PROJECT #: A825-1

FIGURE: 3-4

P:\@202506\Woodfibre\Drafting Figures\APRX\Regional Maps\Hydrometric and Climate Stations\Hydrometric and Climate Stations.aprx Figure 3-4 Woodfibre Regional Hydrometric and Climate Stations Printed by: DesMacDonald

Table 3-8:
Climate Stations, Station Characteristics and Monitoring Parameters

Station Name	Station ID	Coordinates (UTM 10)	Elevation (m asl)	Record Period	Air Temperature	Precipitation	Wind Speed	Wind Direction
WLNG Meteorological Station	-	481618 E, 5501354 N	8.43	2022 to 2024 [A]	X	X	X	X
Squamish Airport	10476F0	488395 E, 5514539 N	53.7	1982 to 2024 [A]	X	X	-	-

[A] Records were evaluated to the end of 2024, the last full year of records that were available at the time of preparation of this report.

3.4.1 Air Temperature

Air temperature measurements collected at the WLNG Meteorological station and at Squamish Airport Station from April 2022 to December 2024 followed similar trends, with temperatures at Squamish Airport showing a slightly wider range than those recorded at the WLNG station (Figure 3-5).

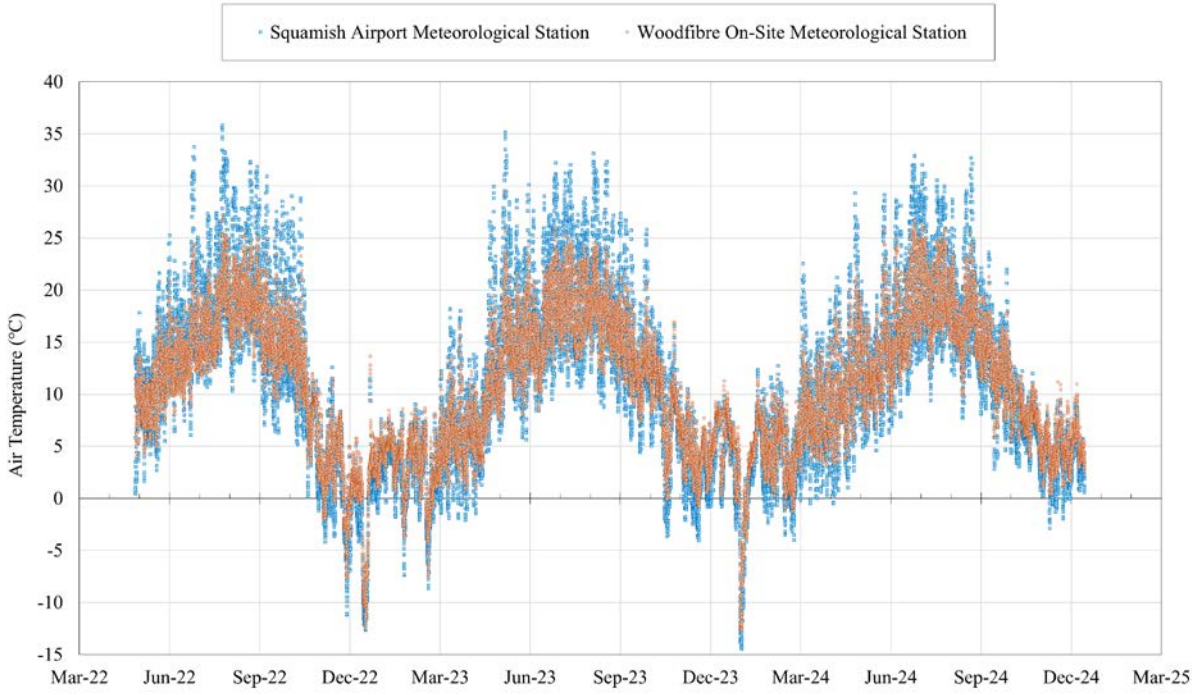


Figure 3-5: Hourly Air Temperature at WLNG Meteorological Station and Squamish Airport Station from April 28, 2022 to December 31, 2024

The 2022 to 2024 hourly temperature measurements follow the long-term annual trends of the mean daily temperatures observed at the Squamish Airport Station from 1982 to 2024, as shown by the statistical summary presented in Figure 3-6. The mean daily temperature varies significantly throughout the year, with the monthly average mean daily temperature ranging from 1.2°C (December) to 18.4°C (July and August). Overall, the mean daily

temperature decreases rapidly in autumn, followed by a more gradual warming trend from late winter through early summer.

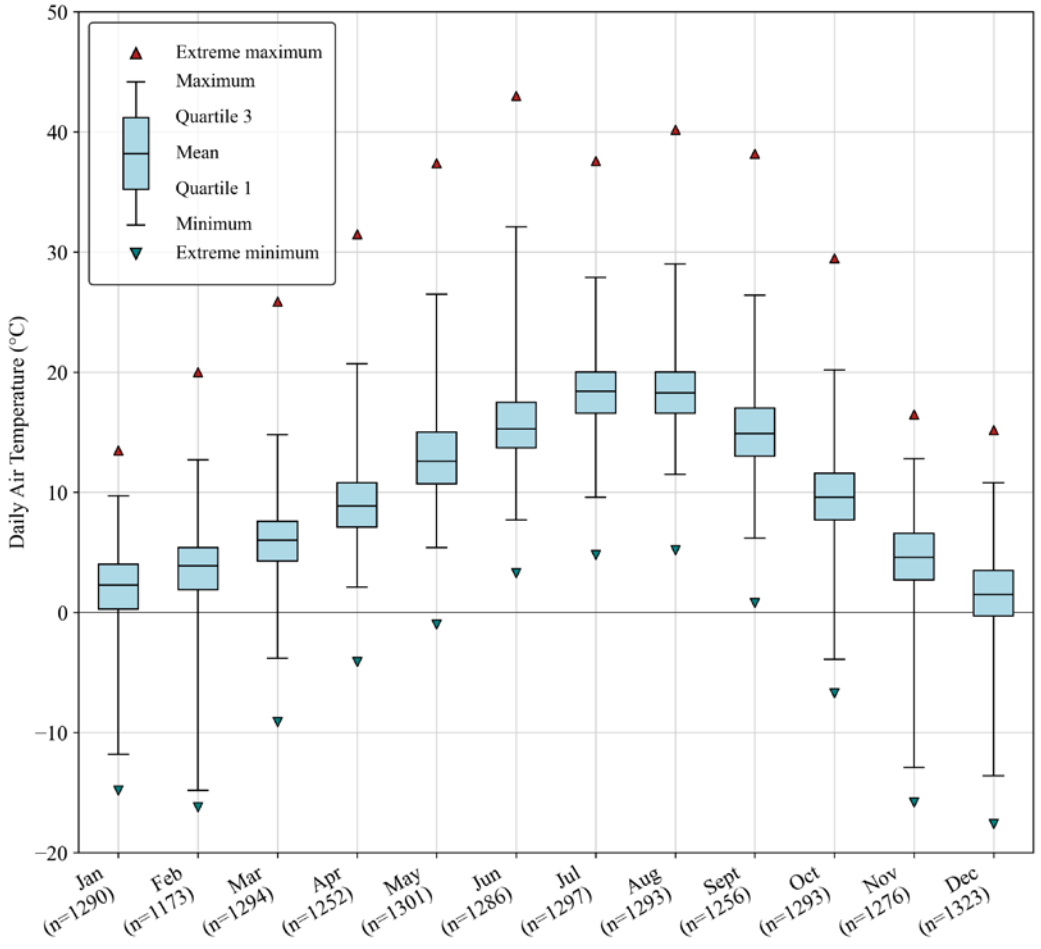


Figure 3-6: Mean Daily Temperature Statistical Values for Squamish Airport Station and Extreme Values (1982 to 2024)

While mean daily temperature provides a good indication of general trends with the predominant influence of maritime conditions, daily extreme minimum and maximum values reflect the full range of temperatures that have been observed at the Squamish Airport Station. The extreme values are the highest maximum and lowest minimum daily temperatures observed over the 1982 to 2024 period, and these values are also shown in Figure 3-6.

The extreme minimum values illustrate the effects of temporary arctic outflow conditions in winter months, and extreme maximum values reflect the influence high pressure system heat domes that may establish in the summer months. While the monthly average mean daily temperatures remain above 0°C year-round, sub-zero extreme daily minimum temperatures have occurred from October through May, with the extreme minimum

temperatures ranging from -1.0°C to -17.6°C during the October to May period. The highest extreme maximum temperatures, ranging from 37.4°C to 43.0°C were observed in the months of May to September.

3.4.2 Precipitation

The statistical values for total monthly precipitation at the Squamish Airport Station also show a strong seasonal pattern as illustrated in Figure 3-7. Over the 1982 to 2024 period, the lowest mean total monthly precipitation values are observed from May to September (95 to 107 mm) and the highest monthly precipitation values are from October through March (211 to 396 mm) with the highest monthly precipitation totals typically occurring in November. The primary driver of high-magnitude, multi-day rainfall events in Squamish are atmospheric rivers, which are long and narrow bands of water vapor in the atmosphere (Legarth *et al.*, 2025). Atmospheric rivers can cause extreme flooding events when they pass over mountainous terrain as they are forced upwards by the landform, ultimately forming clouds and causing periods of high intensity precipitation.

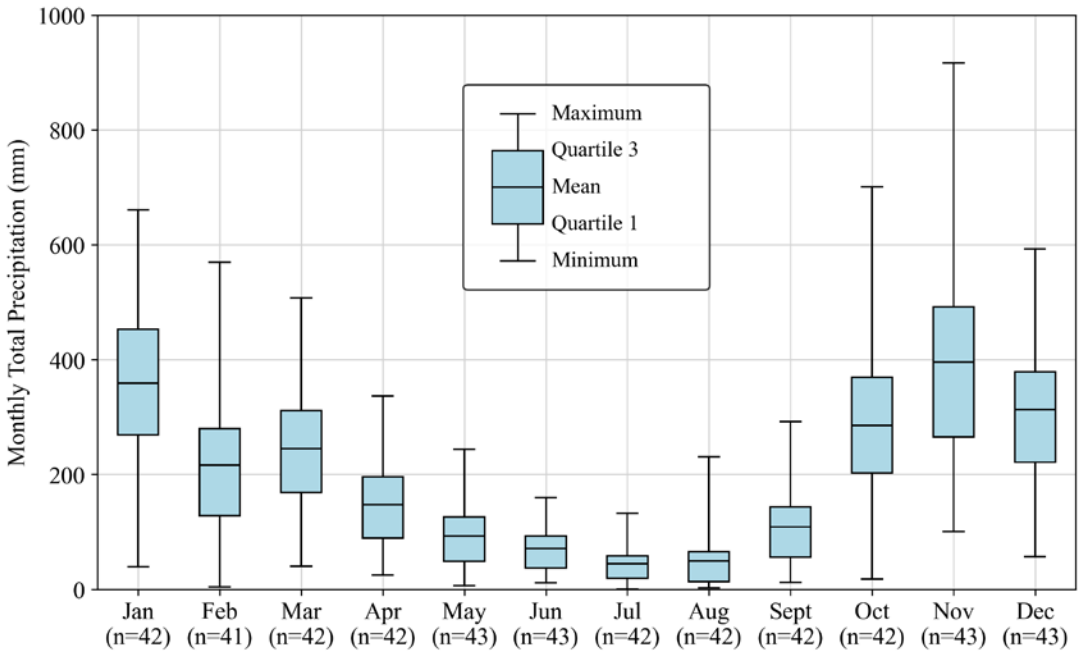


Figure 3-7: Total Monthly Precipitation Statistical Values for Squamish Airport Station from 1982 to 2024

Cumulative precipitation trends between the CPA and Squamish Airport were similar in 2023 and 2024; however, the WLNG Meteorological Station received approximately 20% more precipitation compared to the Squamish Airport Station in both years (Figure 3-8).

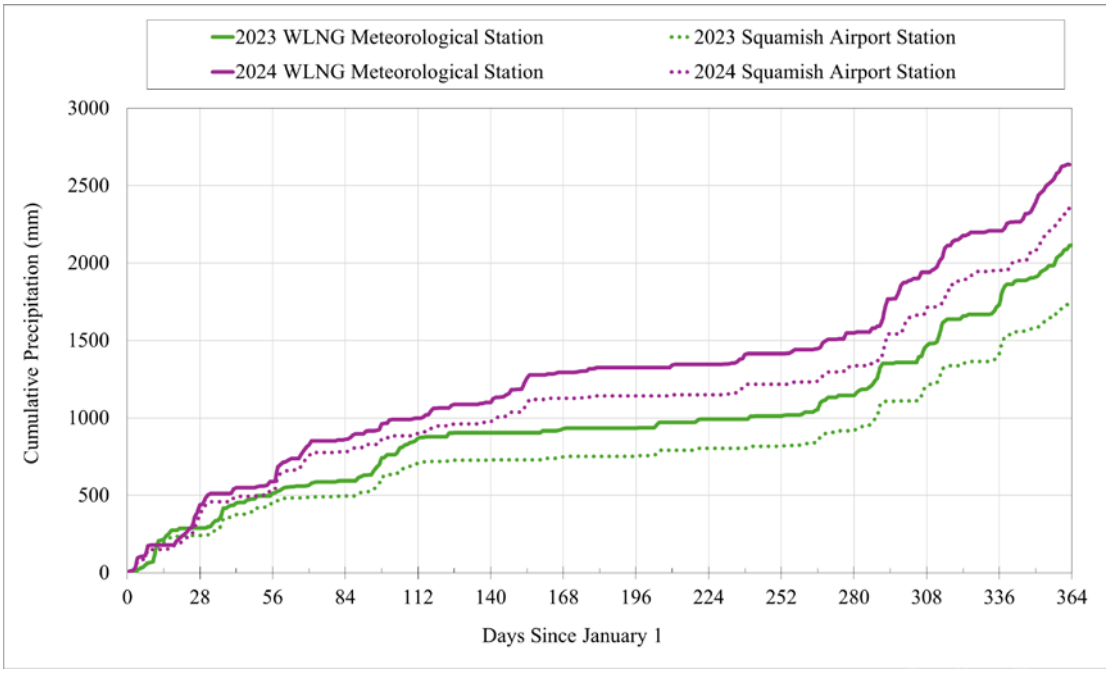
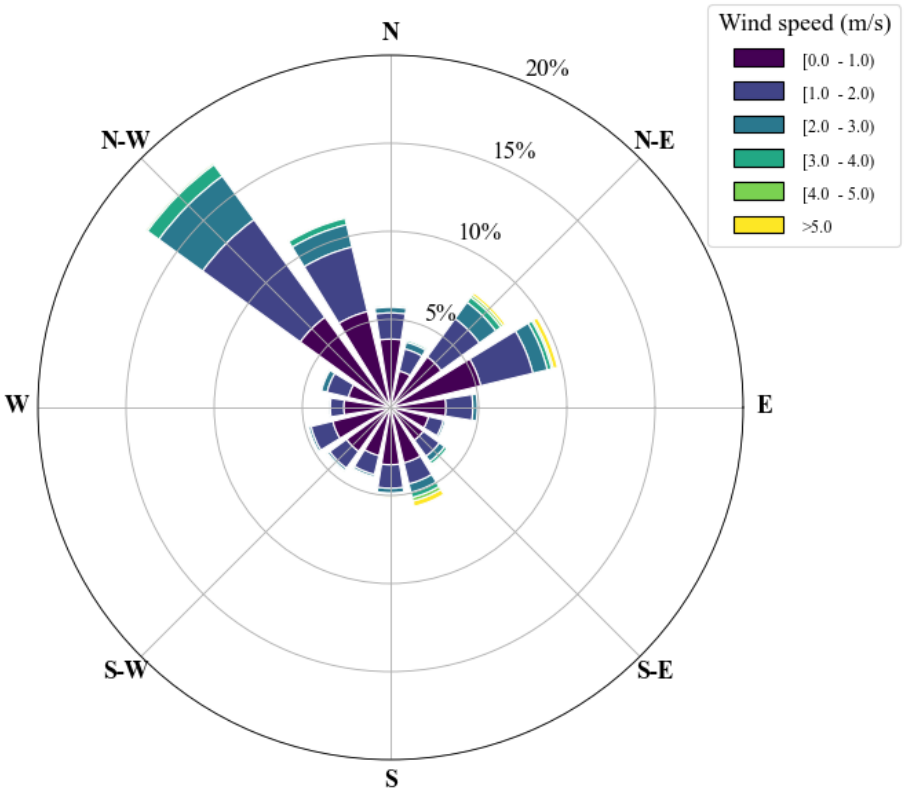


Figure 3-8: Cumulative Precipitation at WLNG Meteorological Station and Squamish Airport Station (2023 and 2024)

3.4.3 Wind

Strong winds are often experienced in the Project area due to a temperature gradient between the Strait of Georgia and mountain valleys to the north and is amplified by local topography. The regional topography results in diurnal winds forming due to the absorption of radiant heat by the ocean in contrast with more pronounced heating or cooling of air over the land surface to the north. This is strengthened by the Venturi effect (increased wind speed as winds are drawn through a narrow passage), as Howe Sound and the Squamish River valley are oriented north-northeast to south-southwest and are bounded by steep mountains to the west and east.

The resulting winds are katabatic (or 'outflow') in winter, when the air over Howe Sound is warmer, and therefore rises more quickly, than air over the land to the north. Wind speeds reach greater than 5 m/s from the north-northeast in winter. Winds are anabatic (or 'inflow') during warm, summer days, when the air over the land surface to the north is warmer, and therefore rises more quickly, than the air over the ocean to the south. Wind speed periodically ranges from 3-10 m/s from south-southeast in summer. Monitoring results from the WLNG meteorological station collected from April 2022 to December 2024 indicate the predominant wind direction and highest wind speeds at the Project site are from the northwest suggesting the Mill Creek valley exerts a strong local influence (Figure 3-9).



Notes: The brackets and parentheses next to wind speed values in the legend indicate those values are included and excluded, respectively, in that range of values.

Figure 3-9: Wind Rose for the WLNG Meteorological Station from April 2022 to December 2024

3.4.4 Evaporation

The rates of evaporation at the WLNG Meteorological Station were obtained from a climate model for B.C. that was developed at the University of British Columbia (UBC, 2022). The model is based on 1991 to 2020 Climate Normals data (Wang *et al*, 2016). The model results for the location of the WLNG Meteorological Station indicate that mean monthly evaporation ranges from 8 mm in December to 114 mm in July and is directly related to the seasonal changes in air temperature, with higher rates of evaporation occurring during the summer months. The modelled mean monthly evaporation rates are shown in Table 3-9.

Table 3-9:
Modelled Mean Monthly Evaporation at WLNG Meteorological Station (UBC, 2022)

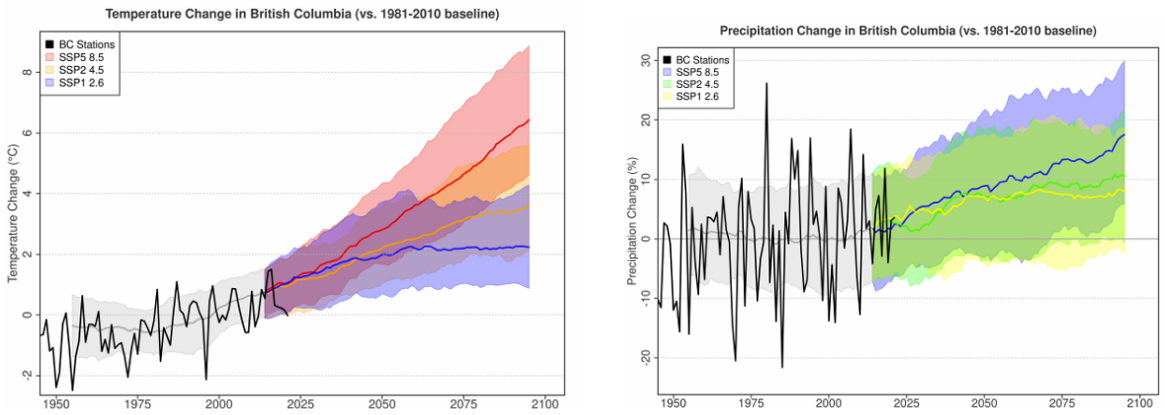
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Evaporation (mm)	10	19	37	63	94	102	114	97	62	30	13	8

Note: Evaporation was modelled using the coordinates of the WLNG meteorological station (UTM 481618 E, 5501354 N).

3.4.5 Climate Change

Air temperatures and precipitation are expected to continue increasing globally and in B. C. A study by Picketts & Hamilton (2016) forecasts that the District of Squamish will warm by 1.7°C and experience a 6% annual increase in precipitation by the 2050s, along with a significant decrease in snowfall.

Similar observations were made in study by Curry & Sobie (2023) which compared historical air temperature and precipitation measurements from climate stations in B.C. with projections from three different global models published by the Intergovernmental Panel on Climate Change, as shown in Figure 3-10. Each model assumed a different amount of future global greenhouse gas emissions, with SSP1 2.6 assuming a large reduction in emissions, SSP2 4.5 a moderate reduction in emissions, and SSP5 8.5 a high-emissions scenario (continued use of fossil fuels with no reduction in emissions; IPCC, 2023). All three scenarios predict an increase in air temperature and precipitation in B.C. by 2100, with the SSP5 8.5 projection predicting the greatest increase in temperature and precipitation and the SSP1 2.6 projection predicting the least (Curry & Sobie, 2023).



Note:
Figures reproduced from Climate Projections for the City of Vancouver: Highlights Report, page 7 (Curry & Sobie, 2023). The coloured lines represent median values within each model projection. The shaded areas represent the 10th to 90th percentile of each model projection for both historical and future values. The black lines show station data collected in B.C. from 1948 to 2021.

Figure 3-10: Comparison of Historical Air Temperature and Precipitation in British Columbia to Global Climate Model Scenarios (Curry & Sobie, 2023).

3.5 Hydrology

3.5.1 Watershed Characteristics

The Project is adjacent to the lower extent of the Mill Creek, Woodfibre Creek, and East Creek watersheds that discharge to Howe Sound at the Project site as shown in Figure 3-1. These watersheds are densely vegetated, have been previously logged and have negligible glacial coverage. Additional information with respect to the hydrometric monitoring

program and derived data summaries for the Woodfibre and Mill Creek watersheds are described in the Woodfibre Hydrometeorological Baseline Report (Stantec, 2020).

The Mill Creek watershed is the largest of the three watersheds (40.8 km^2) and contains the highest elevation contributing areas (refer to Table 3-10), as well as a lake (Scott Lake) located at 1,300 m that comprises less than 1% of the total catchment area. The Mill Creek stream channel spans approximately 9 km from its source near Mount Sedgwick to the confluence with Howe Sound, with an average gradient of 7.5%. Channel gradients are steepest in the headwaters, moderate at mid-elevation, and steeper in the lower reaches (10%). The channel gradient slackens to 4% at within the CPA where it flows over an alluvial fan (Knight Piésold, 2019b). Mill Creek is fish-bearing and is characterized by upstream freshwater conditions and downstream estuarine conditions. Cascade pool morphology and steep falls are observed in the upper reaches, while the lower reach that bisects the Project area has been channelized with riprap armouring the southern bank. The estuarine segment of Mill Creek overlaps with the industrialized portion of the Project site and is within the riparian reserve zone downstream of the third bridge, which represents the extent of tidal influence in the creek (Keystone, 2021b). A historical water diversion intake is located on Mill Creek upstream of the Project boundary. The diversion structure directs a portion of the Mill Creek flows to the intake of a pipeline that conveys water to the Project site and was used as water supply for the historical pulp mill.

The Woodfibre Creek watershed has a catchment area of 21.8 km^2 and ranges in elevation from sea level to 1,600 m (refer to Table 3-10). The watershed contains five lakes: Henriette Lake, Sylvia Lake, Woodfibre Lake and two smaller unnamed lakes (Knight Piésold, 2019a). Henriette Lake is the largest, and its catchment area accounts for approximately 37% of the total Woodfibre Creek watershed area (Stantec, 2020). Henriette Lake has a control structure (forming a dam) that influences the flow regime in the Woodfibre Creek watershed, and has higher summer flows and lower freshet flow in comparison to Mill Creek (Knight Piésold, 2019a). The Woodfibre Creek stream channel spans approximately 6.8 km^2 from its source near Woodfibre Lake to the confluence with Howe Sound. Channel gradients average 15%, and remain steep throughout the creek's length, with a small alluvial fan at its outlet (Knight Piésold, 2019a). The creek bed is characterized by large boulders, cobbles, and gravel which may provide salmonid spawning habitat. Anthropogenic influence, including rebar and concrete foundations from historic pulp mill operations, has been observed on the banks of the lower segment of the creek (Keystone, 2021b).

East Creek is located on the northern periphery of the Project area, approximately 450 m northeast of Mill Creek (Keystone, 2021b). The East Creek watershed is approximately 0.6 km^2 and ranges in elevation from sea level to 900 m (refer to Table 3-10), with no lakes,

and an average gradient of 13%. East Creek has two main tributaries. The upper tributary runs through forested areas, upslope of a historic fill area, and descends through a series of steep cascades to Howe Sound at an average gradient of 13%. The lower tributary passes through a constructed channel beside a road downslope of the historic fill area. East Creek flows into a culvert beneath the service road along the shoreline before discharging into Howe Sound (Keystone, 2014a).

Table 3-10:
Watershed Areas and Elevations

Watershed	Catchment Area (km^2)	Watershed Elevation (m asl)		
		Min	Mean	Max
Mill Creek	40.8	0	975	2,000
Woodfibre Creek	21.8	0	928	1,600
East Creek	0.6	0	300	900

3.5.2 Hydrometric Data

Hydrometric data has been collected intermittently in the local catchments as early as 2009 (Mill Creek and Woodfibre Creek) and starting in 2019 in the East Creek catchment (Stantec, 2020). The following discussion summarizes the results of the Woodfibre Hydrometeorological Baseline Report (Stantec, 2020) and the results from monitoring records collected from 2021 through 2025. Local and regional hydrometric stations, and the period of record for each station are listed in Table 3-11, and the locations are shown in Figure 3-4.

Knight Piésold deemed the 2009-2010 and 2017-2025 streamflow record for Mill Creek, and the 2017-2025 record for Woodfibre Creek reliable, with most variables receiving a data grade of 'A' with some limited exceptions per the B.C. RISC standards ENV (2018) as outlined by Knight Piésold (2025a,b). The data available at the time the Stantec (2020) baseline report were analysed along with regional hydrometric data from the Water Survey of Canada Capilano River above Intake station to generate longer-term synthetic timeseries of streamflow and flow statistics (Stantec, 2020; Knight Piésold, 2019a,b).

Table 3-11:
Regional and WLNG Site Hydrometric Stations

Network	Station Name	Station ID	Record Period	Catchment Area (km^2)
Water Survey of Canada	Capilano River Above Intake [1]	08GA010	1914-2025	173
	Cheakamus River Above Millar Creek	08GA072	1982-2025	297
	Elaho River Near The Mouth	08GA071	1981-2025	1,200
	Mamquam River Above Ring Creek	08GA075	1989-2025	284
	Roberts Creek At Roberts Creek	08GA047	1959-2025	32.6
	Seymour River Above Lakehead	08GA079	1995-2025	82.9
	Seymour River Below Orchid Creek	08GA077	1992-2025	63
	Stawamus River At Highway No. 99	08GA076	1990-2025	52.8
	Cheakamus River Near Brackendale	08GA043	1957-2025	965
Woodfibre LNG	Mill Creek	MILL / MILL-R2	2009–2010, 2013–2014, 2017–2025	38
	Woodfibre Creek	WOOD	2009–2010, 2013–2014, 2017–2025	20
	East Creek	EAST	2019-2020	0.2-0.5 [2]

Notes:
[1] The record from this station was used to develop long-term daily synthetic streamflow records for Mill Creek and Woodfibre Creek (Knight Piésold, 2019a,b).
[2] Stantec (2020) installed flow monitoring equipment in East Creek downstream of the landfill area in 2019. The exact location and drainage area of the monitoring location is not specified by Stantec (2020). The landfill is approximately 400 m upstream of the mouth of East Creek.

3.5.3 Mean Annual Runoff and Monthly Distribution

As described in Section 3.4, precipitation at the Project site follows a seasonal pattern, with greater precipitation in the winter months, and relatively drier conditions persisting throughout the summer months. While winter precipitation is dominated by snowfall at the higher elevations within the local catchments, elevated freezing levels can result in rain or snow to the highest elevations. This can result in rain-on-snow events at the Project site that drive annual maximum stream flows during the winter months, and primarily during the months of October to February.

Mean annual runoff has been estimated to be 2,881 mm in Mill Creek and 3,987 mm in Woodfibre Creek (based on long-term synthetic streamflow timeseries; Knight Piésold 2019a and 2019b). The difference in runoff between these two watersheds is attributed to local orographic and wind shadow effects that significantly influence runoff amounts between adjacent watersheds in the region (Stantec, 2020). East Creek drains a small watershed adjacent to Mill Creek and runoff is estimated to be similar to Mill Creek

(2,881 mm; Stantec, 2020). Mean annual discharge in Mill Creek, Woodfibre Creek and East Creek watersheds are estimated to be 3.73 m^3/s, 2.76 m^3/s and 0.06 m^3/s, respectively (Stantec, 2020). Due to the Henriette Lake dam outlet control on the discharge regime of Woodfibre Creek, the synthetic streamflow record developed by Knight Piésold (2019b) for Mill Creek is used here to represent the local unregulated streamflow regime within the Project site.

Mill Creek and East Creek are estimated to have similar monthly runoff distributions with the higher flows occurring in April through June with May being the highest average month (Stantec, 2020; Figure 3-11 and Figure 3-12). Monthly average runoff data from the nearby Stawamus River hydrometric station operated by the Water Survey of Canada (station 08GA076; 52.8 km^2) are provided for reference and show good correspondence with the long-term streamflow record developed for Mill Creek, albeit with lower freshet runoff due to its lower median elevation and therefore, lower snowpack. The monthly distribution in Woodfibre Creek is estimated to have a slightly delayed high flow, compared to the other two watersheds, with June being the highest average month and elevated flows in October and November.

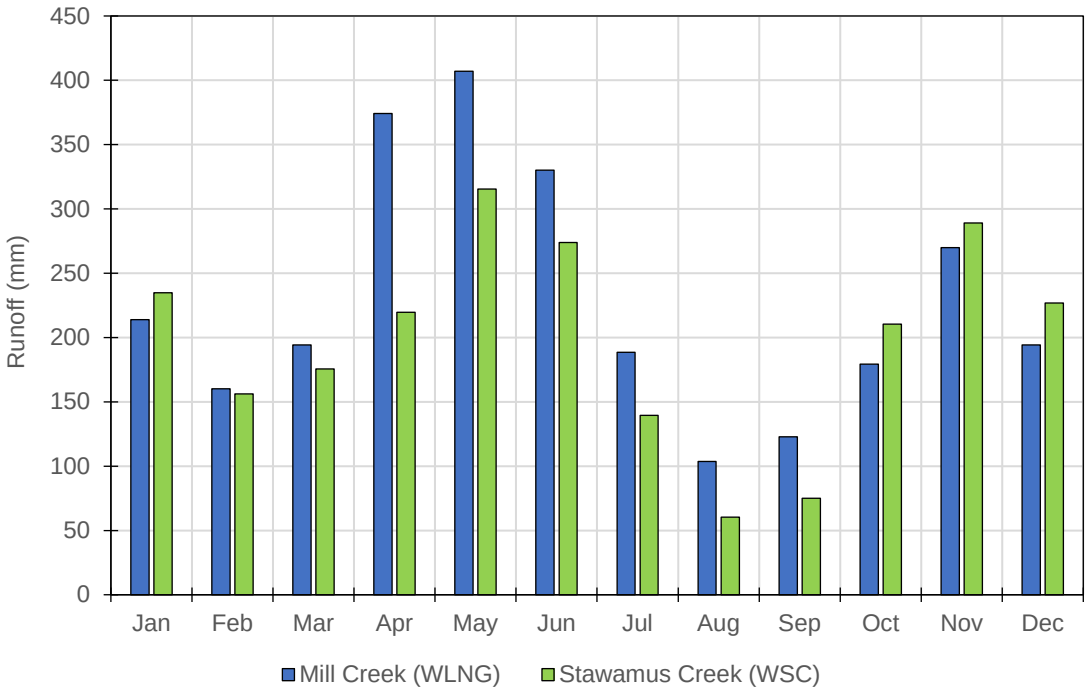


Figure 3-11: Monthly Runoff Distribution for Mill Creek and the Stawamus River at Highway 99 Water Survey of Canada gauges

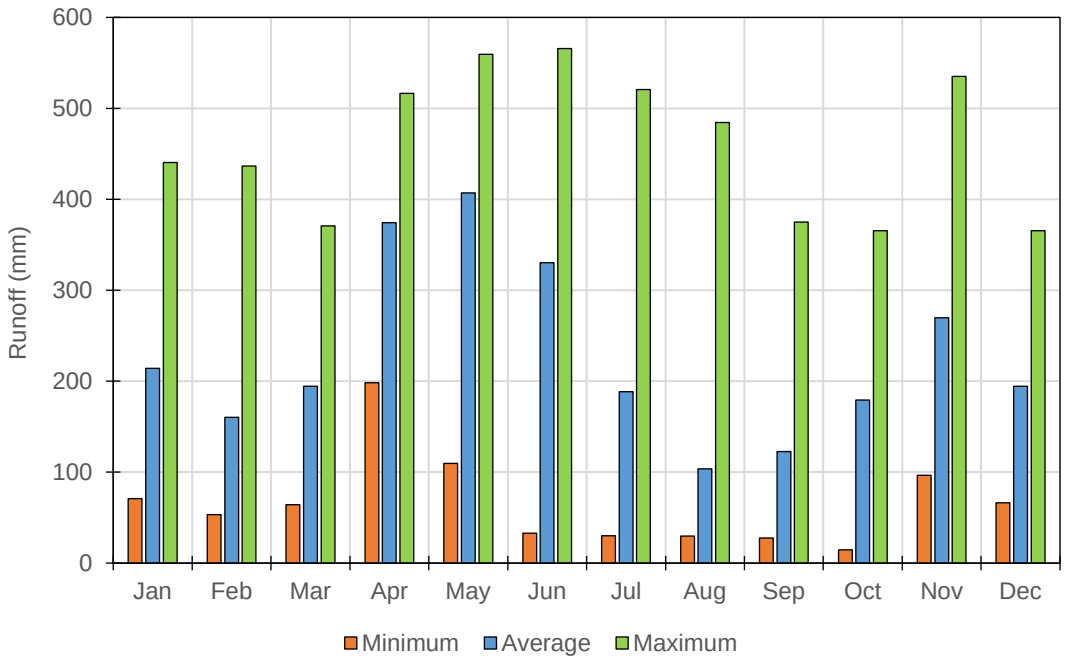


Figure 3-12: Minimum, Mean and Maximum Monthly Runoff Distribution for Mill Creek

3.5.4 Peak Flows and Low Flows

Estimates of extreme low flows (based on a 7-day rolling average streamflow) and peak flows (instantaneous, or 15-minute maximum) are required to set limits on allowable withdrawals from local streams, or other reductions in streamflow (*e.g.*, alteration of contributing catchment area), and for the design of water management infrastructure to convey and withstand high-magnitude flow events, respectively.

The minimum annual seven-day average flow with a 10-year return period (annual $7Q_{10}$) is estimated to be 0.19 m^3/s for Mill Creek (refer to Table 3-12). The minimum June to September seven-day average flow with a 10-year return period (June to September $7Q_{10}$) for Mill Creek is estimated to be 0.26 m^3/s (Stantec, 2020). These values are used as indicators of extreme low flow conditions.

Estimates of instantaneous peak flows were derived by Stantec (2020) using multiple methods, and the values derived from the regional analysis are presented in Table 3-13.

Table 3-12:
Minimum, Mean and Maximum Mean Monthly Runoff and Discharge Estimates for Mill Creek

Month	Runoff (mm)			Discharge (m^3/s)		
	Minimum	Average	Maximum	Minimum	Average	Maximum
Jan	71	214	440	1.08	3.26	6.71
Feb	53	160	437	0.81	2.44	6.65
Mar	64	194	371	0.98	2.96	5.65
Apr	198	374	517	3.02	5.70	7.87
May	110	407	559	1.67	6.20	8.52
Jun	33	330	566	0.50	5.03	8.62
Jul	30	188	521	0.46	2.87	7.93
Aug	30	104	484	0.45	1.58	7.38
Sep	28	123	375	0.42	1.87	5.71
Oct	14	179	366	0.22	2.73	5.57
Nov	97	270	535	1.47	4.11	8.15
Dec	66	194	366	1.01	2.96	5.57
Annual		**2,738**		**0.22**	**3.48**	**8.62**

Table 3-13:
Instantaneous Peak Flow Estimates Based on Regional Analysis for Mill Creek, Woodfibre Creek and East Creek

Recurrence Interval	Peak Flow Estimate (m^3/s)		
	Mill Creek	Woodfibre Creek	East Creek
2-year	81	51	3.4
5-year	102	64	4.3
10-year	115	72	4.9
20-year	127	79	5.3
25-year	130	81	5.5
50-year	140	88	5.9
100-year	150	94	6.3
200-year	160	100	6.7

3.6 Surface Water Quality

As described in Section 3.5.2, Mill Creek, Woodfibre Creek and East Creek discharge to Howe Sound within the Project site. In addition, stormwater runoff (*i.e.*, non-contact water) from the hillslopes above the Project site is intercepted by diversion ditches that discharge to Howe Sound or Mill Creek. Flow is observed in the creeks year-round. However, diversion ditches only contain running water during rainy periods with flows most frequently observed from October to May.

The water quality of Mill Creek and diversion ditches have been monitored at various locations and frequencies since 2006. Monitoring periodically occurred between 2006 to 2013 as described in the construction WDA technical assessment report (Lorax, 2023). Regular monitoring commenced in August 2018, and was expanded to include diversion ditch stations in 2022. The water quality results from August 2018 through May 2025 are considered a comprehensive representation of water quality prior to LNG facility operation and the limited number of samples collected prior to 2018 are excluded from the dataset presented herein. The water quality results for individual samples are tabulated in Appendix 3.6-1.

3.6.1 Surface Water Quality Monitoring Programs

A total of 745 surface water monitoring samples were collected from August 2018 to May 2025. The monitoring station locations are shown in Figure 3-13 and a description of the monitoring stations is provided in Table 3-14. Of the 745 monitoring samples, 544 were collected from downstream monitoring stations located near the mouth of Woodfibre, Mill and East Creeks (*i.e.*, SW-01, SW-02, SW-03 and SW-04) and 154 were collected from upstream background monitoring stations (*i.e*., SW-08, SW-07 and SW-09) on the same creeks. The remaining 77 samples were non-contact water from within the diversion ditches (SW-05 and SW-06) or at the outlet of the ditches (OUT-01, OUT-02 and OUT-06). The surface water quality sampling programs are summarized below:

- WLNG commenced pre-construction quarterly sampling in August 2018 at Mill Creek (SW- 03) and Woodfibre Creek (SW-01) stations. Monthly monitoring commenced in January 2021 and expanded the monitoring network to include an additional station on Mill Creek (SW-02) and a new station at East Creek (SW-04). The diversion ditch stations (SW-05 and SW-06) were monitored from April 2022 to December 2023, when there was water in the ditches. The Mill Creek background station (SW-07) was added to the program in August 2023.
- Surface water monitoring has continued since construction commenced at stations SW-01, SW-02, SW-03, SW-04 and SW-07. Monitoring of the diversion ditch stations SW-05 and SW-06 was discontinued in January 2024. Background stations were added for Woodfibre Creek (SW-08) and East Creek (SW-09) in April 2024.
- Monitoring in accordance with WDA Effluent Permit PE-111578 commenced April 2024, and has included stations SW-01, SW-02, SW-03, SW-04, SW-07, and diversion ditch stations OUT-01, OUT-02 and OUT-06. The SW-06 station was also monitored in February and March of 2025.

Table 3-14:
Surface Water Quality Monitoring Stations

Station	Latitude	Longitude	Description
SW-01	49.661392	-123.258933	Lower reach of Woodfibre Creek (near mouth)
SW-02	49.667981	-123.256544	Lower reach of Mill Creek (upstream of third bridge)
SW-03	49.665219	-123.252525	Mill Creek estuary
SW-04	49.668044	-123.247828	Lower reach of East Creek (near outlet to the outfall culvert)
SW-05	49.662462	-123.259216	Watercourse P1 (non-contact diversion ditch) at the culvert inlet
SW-06	49.664586	-123.258327	Tributary 1 (non-contact diversion ditch), northeast of the confluence with ditch D10
SW-07	49.679100	-123.266900	Upstream Mill Creek (at water intake)
SW-08	49.6673709	-123.2830505	Upstream Woodfibre Creek
SW-09	49.6716937	-123.2535137	Upstream East Creek
OUT-01	49.6618988	-123.2585679	Non-contact water diversion ditch outlet
OUT-02	49.66262905	-123.2585254	Non-contact water diversion ditch outlet
OUT-06	49.6668422	-123.2549651	Non-contact water diversion ditch outlet

The surface water quality monitoring programs generally included field measurements (*i.e.*, temperature, turbidity, conductivity, salinity, pH and dissolved oxygen) and analytical testing at accredited laboratories for physical parameters (pH, turbidity, total suspended solids [TSS], and total dissolved solids [TDS]), general parameters (nutrients and anions), total and dissolved metals, speciated metals (methylmercury, hexavalent and trivalent chromium), petroleum hydrocarbons, PAHs, VOCs, polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans (PCDD/Fs) and *Escherichia coli* (E. coli).

Analytical testing was completed at laboratories accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for the analyses performed, which use test methods that conform with ISO 17025 standards. The program switched laboratories at the start of 2024 and for most of the tested parameters, analytical detection limits have either decreased or remained the same with the change in analytical testing laboratories; therefore, higher detection limits are observed during the pre-construction surface water quality monitoring. It is noted that detection limit values for parameters reported as not detectable occasionally vary between samples due to changes in testing technology, or due to test interferences that reduce the sensitivity of a test method for a particular sample at the time of testing.

3.6.2 Quality Assurance and Quality Control

Collection of field quality control samples, including blank and duplicate samples, was initiated in January 2021 and February 2022 (respectively) and has continued as part of the standard monitoring suite. A total of 167 QA/QC samples, consisting of 91 blank samples (14 travel blanks and 77 field blanks) and 76 duplicate samples, have been collected, and represent 22% of the total number of monitoring samples (n=745) collected during the August 2018 to May 2025 period.

Overall, the blank sample evaluation indicates that 1.6% of all parameters tested in blank samples show concentrations above the detection limit value and 0.7% of detectable parameters show concentrations greater than two times the detection limit value. Metal species with multiple instances of detectable concentrations at a similar magnitude to the monitoring dataset include total Co, molybdenum (Mo), and methylmercury. However, these instances occur in less than 11% of all blank samples and monitoring data show low concentrations of these parameters relative to federal and provincial WQGs; therefore, the potential contamination indicated by the blank samples does not meaningfully alter the interpretation of the data or lead to misinterpretation of the monitoring results. Notably, select PAHs (benz(a)anthracene, benzo(a)pyrene, dibenz(a-h)anthracene, and quinoline) and a VOC compound (chloroform) show similar frequency of detection and magnitude of concentrations in blank samples relative to the monitoring dataset. In one field blank sample collected in August 2021, benz(a)anthracene and benzo(a)pyrene concentrations were detected at 2.6 and 2.3 times greater than the long-term WQGs (0.000018 mg/L and 0.000015 mg/L, respectively).

It is inferred that contamination associated with sampling supplies or field collection contributed to the elevated concentrations observed in blank samples. Therefore, monitoring results for benzo(a)pyrene, benz(a)anthracene, dibenz(a-h)anthracene and quinoline are inferred to reflect a higher degree of uncertainty compared to other parameters in the dataset. The source of chloroform contamination in blank samples is confirmed to be from deionized water supplied by the laboratory containing trace levels of chloroform that was used to fill the blank sample bottles; therefore, the interpretation of the monitoring data is not affected because deionized water is not added to environmental samples.

Relative percent difference calculated for field duplicate pairs demonstrates sufficient reproducibility as less than 2% of all duplicate parameter pairs show relative percent difference greater than 20% and less than 1% of all duplicate parameter pairs show relative percent difference greater than 50%. Total Fe, Mn and methylmercury concentrations account for multiple instances of relative percent difference values greater than 50%.

Anomalies in duplicate samples may reflect inherent sample variability and/or spatial variability of suspended particulate material. Overall, the duplicate results indicate the monitoring dataset is considered representative and reliable as more than 98% of duplicate parameter pairs are shown to be highly reproducible.

3.6.3 Surface Water Quality Results

The surface water quality dataset from August 2018 to May 2025 is considered representative of pre-operations surface water quality for the Project. Key observations and conclusions from August 2018 to May 2025 surface water quality monitoring results are described in the following sections, including comparison of results to federal and provincial WQGs, and evaluation of background pH conditions in the watercourses within and adjacent to the Project site. Statistical summary tables of key parameters for Woodfibre Creek, Mill Creek, East Creek and non-contact water diversion ditches are presented at the end of this section. The monitoring results for surface water samples are tabulated in Appendix 3.6-1.

3.6.3.1 Background pH Conditions in Freshwater

Background freshwater quality conditions are characterized using upstream monitoring stations for Woodfibre Creek (SW-08), Mill Creek (SW-07), East Creek (SW-09) and stations that monitor non-contact water conveyed by diversion ditches (OUT-01, OUT-02, OUT-06, SW-05 and SW-06). The creek background stations shown in Figure 3-13 are located above areas of historical disturbance. The non-contact water quality stations monitor stormwater runoff from hillslopes above the Project site that is intercepted by diversion ditches that were largely constructed within overburden gravels and is directed to Howe Sound or Mill Creek. The data collected at these stations are considered to be generally free of Project-related influence and representative of natural baseline conditions for creek water and stormwater runoff from forested areas.

Monthly field measurements summarized in Table 3-15 indicate that pH conditions are naturally mildly acidic to circumneutral, with observed background ranges of pH 5.63 to 6.49 in Woodfibre Creek (SW-08), pH 5.25 to 8.40 in Mill Creek (SW-07), pH 6.26 to 7.38 in East Creek (SW-09) and pH 5.60 to 8.20 in diversion ditch water (OUT-01, OUT-02, OUT-06, SW-05 and SW-06). The pH values frequently fall outside the lower limit of the B.C. WQG of pH 6.50. The observed values are comparable with the pH range of 5.4 to 7.6 for Cascade Mountains region reported in the B.C. pH Water Quality Guidelines (ENV, 2021). The Cascade Mountains region is characterized as "a high rainfall area" (150 to >350 cm/yr) that has fairly uniform granitic geology with thin soils, similar to the Project setting. The combination of slow weathering of the granitic rock and the high runoff

rates produces very dilute levels of carbonate in surface waters that contributes to low pH values.

Table 3-15:
Statistical Summary of Background pH Conditions in Fresh and Estuarine Water Quality Stations

Station	Description	No. Samples	Min.	P5	P10	Median	P90	P95	Max.
Woodfibre Creek									
SW-01	Lower reach of Woodfibre Creek	84	**5.41**	**5.54**	**5.77**	**6.45**	7.20	7.43	**9.10**
SW-08	Upstream Woodfibre Creek	14	**5.63**	**5.64**	**5.66**	**5.82**	**6.20**	**6.31**	**6.49**
Mill Creek									
SW-02	Lower reach of Mill Creek	79	**5.17**	5.66	6.03	6.70	7.38	7.61	8.40
SW-03[1]	Mill Creek estuary	82	**5.43**	**5.91**	**6.18**	**6.82**	7.93	8.05	8.60
SW-07	Upstream Mill Creek	54	**5.25**	5.52	5.69	6.38	6.90	7.14	8.40
East Creek									
SW-04	Lower reach of East Creek	86	**5.02**	6.54	6.83	7.46	7.90	8.00	8.30
SW-09	Upstream East Creek	22	**6.26**	**6.26**	**6.34**	6.92	7.10	7.13	7.38
Non-contact water[2]									
SW-05, SW-06, OUT- 01, OUT-02, OUT-06	Diversion ditch (in-ditch or outlet)	60	**5.60**	**5.89**	**6.09**	6.60	7.60	7.71	8.20

Notes:
Values in bold are outside the B.C. or federal WQG pH range for the protection of freshwater aquatic life (6.5 to 9.0).
[1] SW-03 is estuarine and is compared to the B.C. and federal pH range for the protection of marine water aquatic life (7.0 to 8.7). Values in bold are outside the range.
[2] Data presented are the statistics of the compiled dataset (OUT-01, OUT-02, OUT-06, SW-05, SW-06) for the August 2018 to May 2025 monitoring period (Appendix 3.6-1); duplicate samples are not included.

Downstream stations exhibit similar pH conditions, with values ranging from mildly acidic to circumneutral and generally consistent with those measured upstream. The frequency of pH measurements below the WQG lower limit for pH at downstream stations (5% to 57%) is comparable to that observed at upstream stations (18% to 100%), indicating pH at downstream stations is not influenced by the Project site.

3.6.3.2 Comparison to Water Quality Guidelines

All surface water monitoring samples are evaluated by comparison with WQG for the protection of freshwater aquatic life (FWAL) with the exception of samples from lower

Mill Creek (SW-03). Lower Mill Creek is estuarine water due to marine water influence (as described in Section 3.5.1), and is therefore compared to Federal and B.C. WQG for the protection of MWAL. Results below detection limits are screened using the detection limit value. A statistical summary of water quality results for key parameters is provided for Woodfibre Creek (Table 3-16), upper Mill Creek (Table 3-17), lower Mill Creek (Table 3-18) and East Creek (Table 3-19). Water quality results for background stations is provided for Mill Creek (Table 3-20), Woodfibre Creek (Table 3-21) and East Creek (Table 3-22). Non-contact water quality collected from diversion ditches is summarized in Table 3-23.

The total aluminum (Al) concentration in all creeks is variable throughout the monitoring period, with lower concentrations typically measured during summer months and highest concentrations typically measured during the spring and autumn months. Frequent exceedances of the total Al WQG are noted at both Project site monitoring stations (SW-01, SW-02 and SW-04) and background monitoring stations upstream of the Project site (SW-08, SW-07 and SW-09) on Woodfibre Creek, Mill Creek and East Creek. Although the concentration of total Al was higher in samples from East Creek (SW-04) relative to other stations, the frequency of WQG exceedances was lower due to the dependence of the WQG on the concentration of DOC, total hardness and pH which are present in higher concentrations at SW-04.

Frequent exceedances of the dissolved Cu WQG (chronic and acute) were measured at all surface water monitoring stations on Woodfibre Creek, Mill Creek and East Creek. The frequency of dissolved Cu exceedances is similar between Woodfibre Creek, upper Mill Creek and East Creek, however, dissolved Cu concentrations are typically higher in East Creek. Although the dissolved Cu concentrations at the East Creek background monitoring station SW-09 are lower than those measured at SW-04, they are elevated relative to the background stations outside of the Project site on Woodfibre and Mill Creek suggesting dissolved Cu concentrations in East Creek are naturally higher than in the other Creeks.

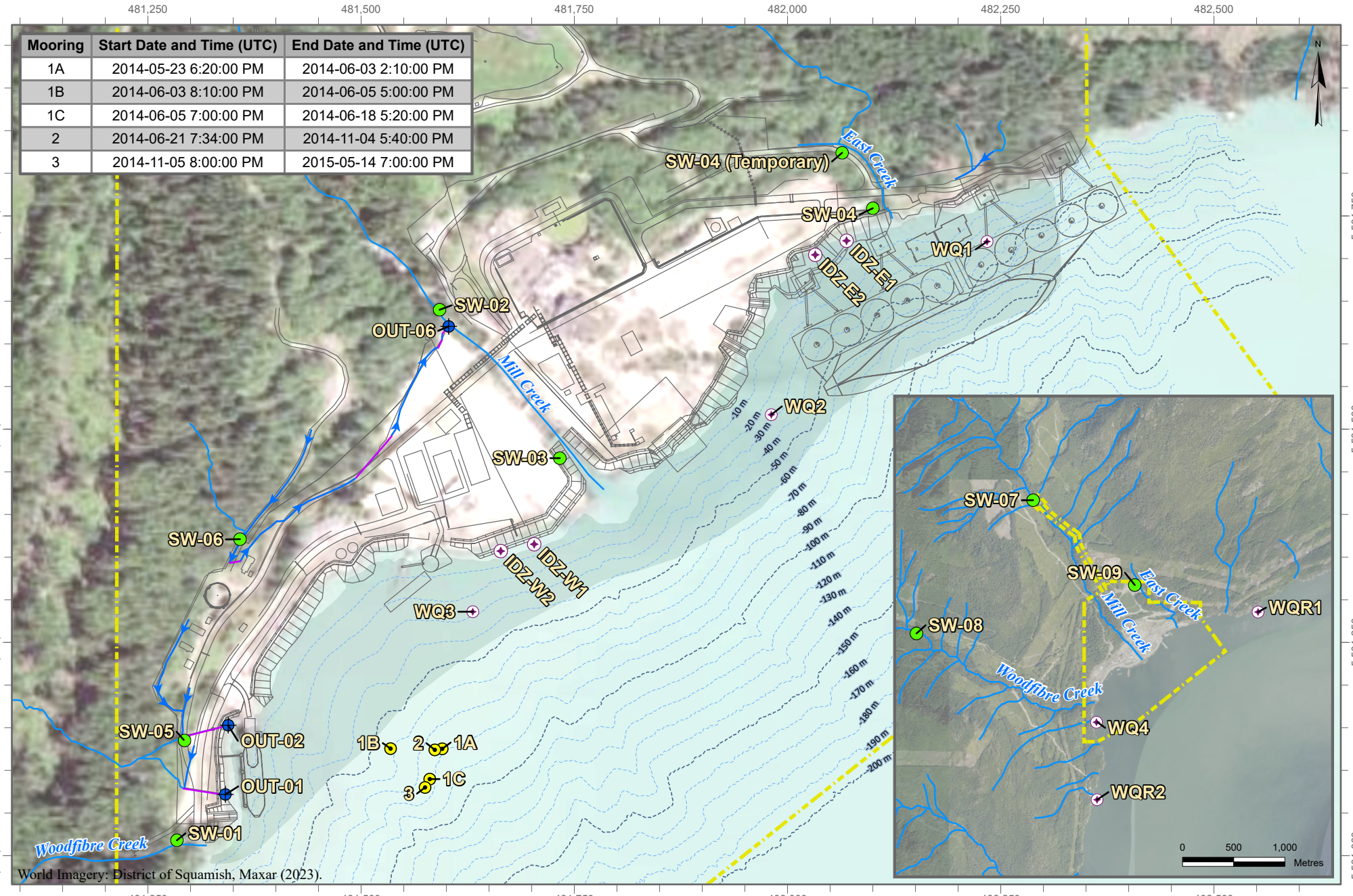
Infrequent exceedances of total methylmercury and dissolved Zn WQGs were measured at Project site monitoring stations on Woodfibre Creek, upper Mill Creek and East Creek. Exceedances of these metals occur at a similar frequency in the upstream Mill Creek station (SW-07); however, there were no exceedances for total methylmercury or dissolved Zn measured at upstream Woodfibre Creek (SW-08) or East Creek (SW-09). The concentration of total methylmercury and dissolved Zn was generally higher in samples from the downstream East Creek monitoring station (SW-04) relative to the upstream station SW-09, as well as Woodfibre Creek and upper Mill Creek upstream and downstream stations.

Overall, the concentration of most metals (*e.g.*, Cd, Cu, Fe, Mo, Ni, Fe, Sb, strontium [Sr], uranium [U], Zn) were higher in samples from downstream East Creek (SW-04) relative to both upstream East Creek and Woodfibre and Mill Creek.

Trace concentrations of some PAHs and VOCs were infrequently detected in samples from Project site monitoring stations on Woodfibre Creek, upper Mill Creek and East Creek at concentrations below applicable WQG with the exception of one sample from SW-02 (Table 3-16 through Table 3-22). Although WQG for anthracene, benz(a)anthracene, benzo(a)pyrene and fluoranthene were exceeded in one sample collected from SW-02 on April 22, 2021, all other samples collected from this station during the monitoring period were below the limits of detection for these parameters. No PAHs or VOCs were detected in samples from background stations outside of the Project site (*i.e.*, SW-07, SW-08 or SW-09). PCDD/Fs were detected in some monitoring samples from the Project site stations (11% to 14% of samples) and at background stations (16% to 28% of samples). Although the lower bound PCDD/F toxic equivalent (TEQ) values are generally higher for downstream Woodfibre Creek and Mill Creek stations (SW-01, SW-02) relative to background stations (SW-07, SW-08), the upper bound PCDD/F TEQ values are comparable between Project site and background monitoring stations at all creeks. No heavy extractable petroleum hydrocarbons (HEPH) or light extractable petroleum hydrocarbons (LEPH) were detected in surface water samples from Woodfibre Creek, Mill Creek or East Creek during the monitoring period.

Exceedances of Federal and B.C. WQG for the protection of MWAL were noted in monitoring samples from lower Mill Creek station SW-03 for pH, dissolved oxygen, total metals (*i.e.*, boron [B], Cu, Cr) and benzo(a)pyrene. Although the field pH was frequently below the lower limit of the WQG range (7.0 – 8.7) at SW-03 during the monitoring period, the median pH was comparable to that measured at the upstream Mill Creek stations (*i.e.*, SW-02 and SW-07). Total B, Cu and Cr concentrations, while infrequently above WQG, were typically higher in samples from lower Mill Creek relative to upper Mill Creek stations. The high concentrations of total B and Cu are likely reflective of the marine influence noted at SW-03. Organic contaminants (hydrocarbons, PAHs, VOCs, PCDD/Fs) were also infrequently detected in samples from lower Mill Creek station, however, only benzo(a)pyrene was detected at concentrations above WQG in two monitoring samples.

Non-contact water from the slopes above and outside the Project construction area is intercepted by diversion ditches and conveyed to Howe Sound or Mill Creek. To evaluate non-contact water quality, samples from monitoring stations OUT-01, OUT-02, OUT-03, SW-05 and SW-06 are compared to WQG for the protection of FWAL. The pH of non-contact water quality is frequently below the lower limit of the WQG range (pH 6.5 to 9.0). Frequent exceedances of total Al and dissolved Cu, occasional exceedances of dissolved Zn and infrequent exceedances of total methylmercury are observed in non-contact water. Trace concentrations of organic contaminants are infrequently detected in non-contact water samples, at concentrations less than WQG.



Mooring	Start Date and Time (UTC)	End Date and Time (UTC)
1A	2014-05-23 6:20:00 PM	2014-06-03 2:10:00 PM
1B	2014-06-03 8:10:00 PM	2014-06-05 5:00:00 PM
1C	2014-06-05 7:00:00 PM	2014-06-18 5:20:00 PM
2	2014-06-21 7:34:00 PM	2014-11-04 5:40:00 PM
3	2014-11-05 8:00:00 PM	2015-05-14 7:00:00 PM

LEGEND

- Freshwater Monitoring Station
- Marine Water Monitoring Station
- Clean Water Diversion Discharge Station
- Mooring Location (Golder, 2015)
- Certified Project Area
- Watercourse
- Non-Contact Ditch
- Culvert / Outfall
- Bathymetry Contour (Major: 50m)
- Bathymetry Contour (Minor: 10m)

DATE SAVED:	Jul 22, 2026
DRAWN BY:	DM
REVIEWED:	PM
VERSION:	1

Coordinate System: NAD 1983 UTM Zone 10N
Projection: Transverse Mercator
Datum: North American 1983
Units: Metre

1:6,000

0 100 200 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Water Quality Monitoring Stations (2020 to 2025) and Oceanographic Study Mooring Locations (2014 and 2015)

PROJECT #: A825-1

FIGURE: 3-13

P:\@202506\Woodfibre\Drafting Figures\APRX\TAR - Pre-Operations Phase\TAR - Pre-Operations Phase\TAR - Pre-Operations Phase.aprx Figure 3-13 WQMS for Surface and Marine Waters

Table 3-16:
Woodfibre Creek (SW-01) Surface Water Quality Summary

Parameter	Unit	Provincial Guideline (BC WQG FWAL)		Federal Guideline (CWQG FWAL)		Woodfibre Creek (SW-01)						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Paramters												
Total Alkalinity	mg/L	-	-	-	-	66	61	<1.00	1.10	2.00	3.05	5.50
Conductivity (Field)	µS/cm	-	-	-	-	74	74	2.6	3.9	5.7	21.7	310
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	58	58	4.0	5.6	8.4	13.9	41.0
Dissolved Oxygen (Field)	mg/L	>=8	>=5	>=8	-	85	85	9.5	10.9	12.6	14.1	15.8
pH (Field)	s.u.	6.5 - 9.0	-	6.5 - 9.0	-	85	85	**5.41**	**5.77**	**6.45**	7.20	9.10
Salinity (Field)	ppt	-	-	-	-	59	59	0	0	0	0.0200	0.210
Temperature	°C	-	-	-	-	88	88	0.226	3.13	6.20	11.7	22.0
Total Suspended Solids (TSS) [1]	mg/L	-[1]	-[1]	-	-	99	7	<2.00	<2.00	<3.00	<3.30	9.60
Total Hardness	mg/L	-	-	-	-	99	99	1.49	1.99	2.54	3.72	79.4
Turbidity (Field) [1]	NTU	-[1]	-[1]	-	-	76	76	0	0	0.295	1.65	4.70
Nutrients												
Total Ammonia (as N)	mg/L	1.92	26.5	48.3	-	97	14	<0.00500	<0.00500	0.00680	<0.0500	0.112
Bromide	mg/L	-	-	-	-	72	0	<0.0500	<0.0500	<0.0500	<0.100	<0.100
Chloride	mg/L	150	600	120	640	73	45	0.180	<0.5	0.530	0.700	10.4
Fluoride	mg/L	-	0.4	0.12	-	73	0	<0.0200	<0.0200	<0.0200	<0.100	<0.100
Nitrate (as N)	mg/L	3	32.8	3	124	94	90	<0.0100	0.0130	0.0300	0.0536	0.0970
Nitrite (as N)	mg/L	0.02	0.06	0.06	-	81	0	<0.00100	<0.00100	<0.00100	<0.0100	<0.0100
Sulphate	mg/L	128	-	-	-	73	50	<0.300	0.320	0.500	<1.00	2.60
Total Organic Carbon (TOC)	mg/L	-	-	-	-	53	53	1.83	2.20	2.96	3.65	4.39
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	86	86	1.08	1.91	2.77	3.60	4.22
Total Metals												
T-Al	mg/L	0.0186	-	0.005	-	99	99	**0.0379**	**0.0893**	**0.143**	**0.189**	**0.294**
T-Sb	mg/L	0.074	0.25	-	-	99	6	<0.0000500	<0.0000500	<0.000100	<0.000200	0.000458
T-As	mg/L	0.005	-	0.005	-	99	52	0.0000600	0.0000810	<0.000100	<0.000500	0.00101
T-Be	mg/L	0.00013	-	-	-	99	0	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
T-B	mg/L	1.2	-	1.5	29	99	36	<0.00200	0.00708	<0.0100	<0.0500	0.0597
T-Ba	mg/L	1	-	-	-	99	78	0.00116	0.00138	0.00183	<0.00500	0.0136
T-Cd	mg/L	-	-	0.0000364	0.0001061	99	28	<0.00000200	0.00000228	<0.00000500	<0.0000100	**0.0000470**
T-Ca	mg/L	-	-	-	-	99	99	0.487	0.667	0.840	1.20	30.0
T-Cr [2]	mg/L	0.0025	-	0.001	-	99	25	<0.000100	0.000186	<0.000500	<0.000500	**0.00107**
Total Hexavalent Chromium	mg/L	0.0025	-	0.001	-	48	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Total Trivalent Chromium	mg/L	0.0089	-	0.0089	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
T-Co	mg/L	-	-	0.001	-	99	28	0.0000115	0.0000196	<0.000100	<0.000100	<0.000100
T-Cu	mg/L	-	-	0.002	-	99	39	<0.000200	0.000260	<0.000500	0.000642	0.00184
T-Fe	mg/L	-	1	0.3	-	99	99	0.0100	0.0244	0.0330	0.0492	0.126
T-Pb	mg/L	-	-	-	-	99	68	<0.0000500	<0.0000500	0.0000650	<0.000200	0.000521
T-Mg	mg/L	-	-	-	-	99	99	0.0546	0.0768	0.103	0.158	1.05
T-Mn	mg/L	0.62	0.57	-	-	99	99	0.000339	0.000610	0.000940	0.00167	0.00705
T-Hg [3]	mg/L	0.00002	-	-	-	99	12	0.00000127	0.00000190	<0.00000500	<0.0000100	<0.0000400
Total Methylmercury	mg/L	0.0000001	-	0.000004	-	84	21	<0.0000000200	<0.0000000200	<0.0000000230	0.0000000759	0.000000508
T-Mo	mg/L	7.6	46	0.073	-	99	99	0.000100	0.000169	0.000252	0.000414	0.00120
T-Ni	mg/L	-	-	0.025	-	99	30	0.0000490	0.0000978	<0.000500	<0.000500	<0.00300
T-Se	mg/L	0.002	-	0.001	-	99	3	<0.0000500	<0.0000500	<0.0000500	<0.000500	0.000540
T-Sr	mg/L	-	-	-	-	99	99	0.00214	0.00260	0.00349	0.00524	0.0752
T-Ag	mg/L	0.00012	-	0.00025	-	99	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
T-Tl	mg/L	0.00003	-	0.0008	-	99	1	<0.00000400	<0.00000400	<0.0000100	<0.0000200	<0.0000200
T-U	mg/L	0.0075	-	0.015	0.033	99	99	0.000107	0.000380	0.000533	0.000631	0.000778
T-V	mg/L	0.06	-	0.12	-	99	10	<0.000200	0.000482	<0.000500	<0.00100	<0.00500
T-Zn	mg/L	-	-	-	-	99	17	<0.00100	<0.00100	<0.00300	<0.00400	0.00580
Dissolved Metals												
D-Al	mg/L	-	-	-	-	83	83	0.0190	0.0773	0.126	0.153	0.193
D-Sb	mg/L	-	-	-	-	83	1	<0.0000500	<0.0000500	<0.000100	<0.000200	<0.000200
D-As	mg/L	-	-	-	-	83	20	<0.0000500	0.0000690	<0.000100	<0.000500	0.000540
D-Be	mg/L	-	-	-	-	83	0	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
D-B	mg/L	-	-	-	-	83	24	<0.00200	0.00754	<0.0100	0.0227	<0.05
D-Ba	mg/L	-	-	-	-	83	68	0.00109	0.00132	0.00176	<0.00500	0.0131
D-Cd	mg/L	0.000018	0.000038	-	-	83	16	<0.00000200	0.00000272	<0.00000500	<0.0000100	0.000158
D-Ca	mg/L	-	-	-	-	83	83	0.510	0.651	0.835	1.19	29.2
D-Cr	mg/L	-	-	-	-	83	10	0.000130	0.000260	<0.000500	<0.000500	0.000510
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	48	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dissolved Trivalent Chromium	mg/L	-	-	-	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
D-Co	mg/L	0.00039	-	-	-	83	19	0.00000690	0.0000134	<0.000100	<0.000100	0.000110
D-Cu	mg/L	0.0002	0.0002	0.0002	-	83	52	0.000170	<0.000200	**0.000230**	**<0.000400**	**0.00228**
D-Fe	mg/L	-	0.35	-	-	83	81	0.00750	0.0151	0.0210	0.0290	0.210
D-Pb	mg/L	0.00159	-	0.003185	-	83	14	<0.0000500	<0.0000500	<0.0000500	<0.000200	0.000350
D-Mg	mg/L	-	-	-	-	83	83	0.0550	0.0744	0.100	0.164	1.06
D-Mn	mg/L	-	-	0.21	0.2647	83	81	<0.000200	0.000308	0.000420	0.000806	0.00525
D-Hg	mg/L	-	-	-	-	83	12	0.00000102	0.00000163	<0.00000500	<0.0000100	0.0000200
D-Mo	mg/L	-	-	-	-	83	82	<0.000100	0.000168	0.000236	0.000413	0.000610
D-Ni	mg/L	0.0007	0.0109	-	-	83	17	<0.0000400	0.0000764	<0.000500	<0.000500	<0.000500
D-Se	mg/L	-	-	-	-	83	0	<0.0000500	<0.0000500	<0.0000500	<0.000500	<0.000500
D-Sr	mg/L	1.25	-	2.5	-	83	83	0.00190	0.00261	0.00343	0.00510	0.0718
D-Ag	mg/L	-	-	-	-	83	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
D-Tl	mg/L	-	-	-	-	83	0	<0.00000400	<0.00000400	<0.0000100	<0.0000200	<0.0000200
D-U	mg/L	-	-	-	-	83	83	0.000100	0.000382	0.000520	0.000613	0.000730
D-V	mg/L	-	-	-	-	83	0	<0.000400	<0.000500	<0.000500	<0.00100	<0.00500
D-Zn	mg/L	0.00758	0.00962	0.00193	0.00470	83	7	<0.00100	<0.00100	<0.00100	**<0.00400**	**0.0180**
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	0.0058	-	89	1	<0.0000100	<0.0000100	<0.0000100	<0.0000500	0.0000550
Acridine [4]	mg/L	0.003	0.00005	0.0044	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.000165
Anthracene [4]	mg/L	0.004	0.0001	0.000012	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Benz(a)anthracene [4]	mg/L	0.0001	0.0001	0.000018	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Benzo(a)pyrene	mg/L	0.00001	-	0.000015	-	89	0	<0.00000500	<0.00000500	<0.00000500	<0.0000100	<0.0000100
Chrysene	mg/L	-	-	-	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
Fluoranthene [4]	mg/L	0.004	0.0002	0.00004	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000300	<0.0000300
Fluorene	mg/L	0.012	-	0.003	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
1-methylnaphthalene	mg/L	-	-	-	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.000100	<0.000100
2-methylnaphthalene	mg/L	-	-	-	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.000100	<0.000100
Naphthalene	mg/L	0.001	0.001	0.0011	-	89	0	<0.0000500	<0.0000500	<0.0000500	<0.000200	<0.000200
Phenanthrene	mg/L	0.0003	-	0.0004	-	89	0	<0.0000200	<0.0000200	<0.0000200	<0.000100	<0.000100
Pyrene [4]	mg/L	0.00002	0.00002	0.000025	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000200	<0.0000200
Quinoline	mg/L	0.0034	-	0.0034	-	71	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000156
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.04	-	0.37	-	89	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.2	-	0.09	-	89	0	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Methyl-tert-butyl-ether	mg/L	-	3.4	10	-	89	0	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Styrene	mg/L	0.072	-	0.072	-	89	0	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Toluene	mg/L	0.0005	-	0.002	-	89	0	<0.000400	<0.000400	<0.000400	<0.00100	<0.00100
Total Xylenes	mg/L	0.03	-	-	-	89	0	<0.000500	<0.000500	<0.000500	<0.00200	<0.00200
Chlorobenzene	mg/L	0.0013	-	0.0013	-	51	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
1-2-Dichlorobenzene	mg/L	0.0007	-	0.0007	-	51	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [5]	pg/L	-	-	-	-	49	49	0	0	0.00206	0.0598	0.442
Upper Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	49	49	0.609	0.706	1.19	1.80	3.56
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	50	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	50	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	50	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	50	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:
Data presented is the statistics of the compiled dataset for the August 2018 to May 2025 monitoring period (Appendix 3.6-1); duplicate samples are not included.
B.C. WQG FWAL: British Columbia water quality guideline for the protection of freshwater aquatic life; CWQG FWAL: Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of freshwater aquatic life.
For parameters with variable water quality guidelines, values presented are based on median sample toxicity modifying factors (*e.g.*, dissolved organic carbon (DOC), pH, temperature) calculated from the Aug 2018 to May 2025 dataset.
Non-detect results are screened using the detection limit value.
Values shaded in light grey exceed the applicable long-term B.C. WQG FWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG FWAL.
Bolded values exceed the applicable long-term CWQG FWAL and underlined values exceed the applicable short-term CWQG FWAL.
[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment.
[2] The WQG for hexavalent chromium (Cr(IV)) is conservatively applied to total chromium results.
[3] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.
[4] The B.C. WQG-FWAL for acridine, anthracene, benz(a)anthracene, fluoranthene and pyrene applied are for photo-toxic freshwater environments.
[5] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.
[6] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-17:
Upper Mill Creek (SW-02) Surface Water Quality Summary (Upstream of Estuary)

Parameter	Unit	Provincial Guideline (BC WQG FWAL)		Federal Guideline (CWQG FWAL)		Upper Mill Creek (SW-02)						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	55	55	1.20	1.90	2.80	4.26	5.40
Conductivity (Field)	µS/cm	-	-	-	-	71	71	3.40	5.40	11.1	30.8	1430
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	58	58	5.30	7.52	14.9	31.1	261
Dissolved Oxygen (Field)	mg/L	>=8	>=5	>=8	-	85	85	**6.83**	10.3	12.8	14.1	15.2
pH (Field)	s.u.	6.5 - 9.0	-	6.5 - 9.0	-	83	83	**5.17**	**6.03**	6.70	7.38	8.40
Salinity (Field)	ppt	-	-	-	-	66	66	0	0	0.0100	0.0200	0.810
Temperature	°C	-	-	-	-	86	86	1.60	2.85	6.25	13.6	19.3
Total Suspended Solids (TSS) [1]	mg/L	-[1]	-[1]	-	-	89	8	<2.00	<2.00	<3.00	3.76	7.40
Total Hardness	mg/L	-	-	-	-	90	90	1.77	2.50	3.99	6.64	9.62
Turbidity (Field) [1]	NTU	-[1]	-[1]	-	-	73	73	0	0	0.220	1.78	32.3
Nutrients												
Total Ammonia (as N)	mg/L	1.92	24.9	48.3	-	89	8	<0.00500	<0.00500	<0.00500	<0.0500	0.108
Bromide	mg/L	-	-	-	-	73	0	<0.0500	<0.0500	<0.0500	<0.100	<0.100
Chloride	mg/L	150	600	120	640	74	49	0.180	<0.500	0.570	1.67	4.22
Fluoride	mg/L	-	0.4	0.12	-	74	0	<0.0200	<0.0200	<0.0200	<0.100	<0.100
Nitrate (as N)	mg/L	3	32.8	3	124	87	87	0.0120	0.0209	0.0527	0.119	0.201
Nitrite (as N)	mg/L	0.02	0.06	0.06	-	74	2	<0.00100	<0.00100	<0.00100	<0.0100	0.0101
Sulphate	mg/L	128	-	-	-	74	71	0.720	1.02	1.99	3.63	5.80
Total Organic Carbon (TOC)	mg/L	-	-	-	-	51	51	0.800	1.00	1.60	2.16	3.60
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	86	86	0.560	0.940	1.53	2.23	3.67
Total Metals												
T-Al	mg/L	0.0229	-	0.1	-	90	90	0.0179	0.0289	0.0852	**0.168**	**0.668**
T-Sb	mg/L	0.074	0.25	-	-	90	4	<0.0000500	<0.0000500	<0.000100	<0.000200	0.000274
T-As	mg/L	0.005	-	0.005	-	90	16	<0.0000500	<0.0000500	<0.000100	<0.000500	<0.000500
T-Be	mg/L	0.00013	-	-	-	90	2	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
T-B	mg/L	1.2	-	1.5	29	90	40	<0.00200	0.00685	<0.0100	<0.0500	0.0604
T-Ba	mg/L	1	-	-	-	90	79	0.00130	0.00152	0.00291	<0.00500	0.0169
T-Cd	mg/L	-	-	0.0000364	0.0001061	90	62	0.00000230	<0.00000500	0.00000695	<0.0000100	0.0000113
T-Ca	mg/L	-	-	-	-	90	90	0.558	0.864	1.38	2.17	3.16
T-Cr [2]	mg/L	0.0025	-	0.001	-	90	23	<0.000100	0.000140	<0.000500	<0.000500	0.000920
Total Hexavalent Chromium	mg/L	0.0025	-	0.001	-	51	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Total Trivalent Chromium	mg/L	0.0089	-	0.0089	-	26	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
T-Co	mg/L	-	-	0.001	-	90	32	0.0000105	0.0000239	<0.000100	<0.000100	0.000230
T-Cu	mg/L	-	-	0.002	-	90	34	<0.000200	0.000209	<0.000500	0.000560	0.00151
T-Fe	mg/L	-	1	0.3	-	90	73	0.00290	0.00667	0.0130	0.0623	**0.523**
T-Pb	mg/L	-	-	-	-	90	15	<0.0000500	<0.0000500	<0.0000500	<0.000200	0.000794
T-Mg	mg/L	-	-	-	-	90	90	0.0624	0.0856	0.149	0.261	0.428
T-Mn	mg/L	0.62	58	-	-	90	89	0.000189	0.000290	0.000578	0.00227	0.0116
T-Hg [3]	mg/L	0.00002	-	-	-	89	11	0.000000550	0.00000128	<0.00000500	<0.0000100	<0.0000100
Total Methylmercury	mg/L	0.0000001	-	0.000004	-	82	17	<0.0000000200	<0.0000000200	0.0000000215	0.0000000599	0.000000499
T-Mo	mg/L	7.6	46	0.073	-	90	90	0.000176	0.000281	0.000403	0.000748	0.00101
T-Ni	mg/L	-	-	0.025	-	90	27	0.0000690	0.000101	<0.000500	<0.000500	<0.00300
T-Se	mg/L	0.002	-	0.001	-	90	1	<0.00005	<0.00005	<0.0000500	<0.000500	<0.000500
T-Sr	mg/L	-	-	-	-	90	90	0.00277	0.00369	0.00633	0.0109	0.0177
T-Ag	mg/L	0.00012	-	0.00025	-	90	1	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
T-Tl	mg/L	0.00003	-	0.0008	-	90	7	<0.00000400	<0.00000400	<0.0000100	<0.0000200	<0.0000200
T-U	mg/L	0.0075	-	0.015	0.033	90	90	0.0000975	0.000113	0.000162	0.000199	0.000264
T-V	mg/L	0.06	-	0.12	-	90	12	<0.0002	0.000467	<0.000500	<0.00100	<0.00500
T-Zn	mg/L	-	-	-	-	90	19	<0.00100	<0.00100	<0.00300	<0.00400	0.00470
Dissolved Metals												
D-Al	mg/L	-	-	-	-	73	73	0.0169	0.0280	0.0683	0.0950	0.133
D-Sb	mg/L	-	-	-	-	73	0	<0.0000500	<0.0000500	<0.000100	<0.000100	<0.000200
D-As	mg/L	-	-	-	-	73	5	<0.0000500	<0.0000500	<0.000100	<0.000100	<0.000500
D-Be	mg/L	-	-	-	-	73	0	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
D-B	mg/L	-	-	-	-	73	28	<0.00200	<0.0100	<0.01	0.0437	0.0592
D-Ba	mg/L	-	-	-	-	73	68	0.00111	0.00146	0.00259	<0.00500	0.00669
D-Cd	mg/L	0.00002	0.000038	-	-	73	45	0.00000370	<0.000005	0.00000620	0.00000994	0.0000140
D-Ca	mg/L	-	-	-	-	73	73	0.566	0.853	1.38	2.21	3.17
D-Cr	mg/L	-	-	-	-	73	8	<0.000100	0.000168	<0.000500	<0.000500	<0.000500
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	50	1	<0.000500	<0.000500	<0.000500	<0.000500	0.000620
Dissolved Trivalent Chromium	mg/L	-	-	-	-	25	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
D-Co	mg/L	0.00039	-	-	-	73	18	0.0000105	0.0000227	<0.000100	<0.000100	0.000174
D-Cu	mg/L	0.0002	0.000726	0.0002	-	75	54	0.000120	<0.000200	**0.000240**	**<0.000400**	**0.00107**
D-Fe	mg/L	-	0.35	-	-	73	29	<0.00200	0.00382	<0.0100	0.0120	0.0280
D-Pb	mg/L	0.00129	-	0.002586	-	73	2	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000200
D-Mg	mg/L	-	-	-	-	73	73	0.0580	0.0852	0.141	0.266	0.437
D-Mn	mg/L	-	-	0.23	0.393	73	73	0.000116	0.000160	0.000352	0.000928	0.00279
D-Hg	mg/L	-	-	-	-	73	10	<0.000000500	0.000000974	<0.00000500	<0.0000100	<0.0000100
D-Mo	mg/L	-	-	-	-	73	73	0.000110	0.000278	0.000383	0.000742	0.000933
D-Ni	mg/L	0.0006	0.0094	-	-	73	17	0.0000720	0.000142	<0.000500	<0.000500	0.000640
D-Se	mg/L	-	-	-	-	73	1	<0.0000500	<0.0000500	<0.0000500	<0.000100	<0.000500
D-Sr	mg/L	1.25	-	2.5	-	73	73	0.00260	0.00379	0.00634	0.0110	0.0174
D-Ag	mg/L	-	-	-	-	73	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
D-Tl	mg/L	-	-	-	-	73	2	<0.00000400	<0.00000400	<0.0000100	<0.0000100	<0.0000200
D-U	mg/L	-	-	-	-	73	73	0.0000797	0.000107	0.000150	0.000182	0.000254
D-V	mg/L	-	-	-	-	73	0	<0.000400	<0.000500	<0.000500	<0.00100	<0.00500
D-Zn	mg/L	0.00508	0.00834	0.0019	0.00593	73	22	<0.00100	<0.00100	<0.00100	**0.00202**	**<u>0.00840</u>**
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	0.0058	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
Acridine [4]	mg/L	0.003	0.00005	0.0044	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.000124
Anthracene [4]	mg/L	0.004	0.0001	0.000012	-	89	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	**0.0000540**
Benz(a)anthracene [4]	mg/L	0.0001	0.0001	0.000018	-	89	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	**0.0000540**
Benzo(a)pyrene	mg/L	0.00001	-	0.000015	-	89	1	<0.00000500	<0.00000500	<0.00000500	<0.0000100	**0.0000230**
Chrysene	mg/L	-	-	-	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
Fluoranthene [4]	mg/L	0.004	0.0002	0.00004	-	89	1	<0.0000100	<0.0000100	<0.0000100	<0.0000300	**0.000130**
Fluorene	mg/L	0.012	-	0.003	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
1-methylnaphthalene	mg/L	-	-	-	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.000100	<0.000100
2-methylnaphthalene	mg/L	-	-	-	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.000100	<0.000100
Naphthalene	mg/L	0.001	0.001	0.0011	-	89	0	<0.0000500	<0.0000500	<0.0000500	<0.000200	<0.000200
Phenanthrene	mg/L	0.0003	-	0.0004	-	89	0	<0.0000200	<0.0000200	<0.0000200	<0.000100	<0.000100
Pyrene [4]	mg/L	0.00002	0.00002	0.000025	-	89	0	<0.0000100	<0.0000100	<0.0000100	<0.0000200	**<0.000100**
Quinoline	mg/L	0.0034	-	0.0034	-	70	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000124
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.04	-	0.37	-	89	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.2	-	0.09	-	89	0	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Methyl-tert-butyl-ether	mg/L	-	3.4	10	-	89	0	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Styrene	mg/L	0.072	-	0.072	-	89	0	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Toluene	mg/L	0.0005	-	0.002	-	89	0	<0.000400	<0.000400	<0.000400	<0.00100	<0.00100
Total Xylenes	mg/L	0.03	-	-	-	89	0	<0.000500	<0.000500	<0.000500	<0.00200	<0.00200
Chlorobenzene	mg/L	0.0013	-	0.0013	-	52	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
1-2-Dichlorobenzene	mg/L	0.0007	-	0.0007	-	52	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [5]	pg/L	-	-	-	-	61	61	0	0	0.00348	0.0512	0.610
Upper Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	61	61	0.566	0.658	1.09	1.79	4.24
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	51	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	51	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	54	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	54	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:
Data presented is the statistics of the compiled dataset for the August 2018 to May 2025 monitoring period (Appendix 3.6-1); duplicate samples are not included.
B.C. WQG FWAL: British Columbia water quality guideline for the protection of freshwater aquatic life; CWQG FWAL: Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of freshwater aquatic life.
For parameters with variable water quality guidelines, values presented are based on median sample toxicity modifying factors (*e.g.*, dissolved organic carbon (DOC), pH, temperature) calculated from the Aug 2018 to May 2025 dataset.
Non-detect results are screened using the detection limit value.
Values shaded in light grey exceed the applicable long-term B.C. WQG FWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG FWAL.
Bolded values exceed the applicable long-term CWQG FWAL and underlined values exceed the applicable short-term CWQG FWAL.
[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment.
[2] The WQG for hexavalent chromium (Cr(IV)) is conservatively applied to total chromium results.
[3] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.
[4] The B.C. WQG-FWAL for acridine, anthracene, benz(a)anthracene, fluoranthene and pyrene applied are for photo-toxic freshwater environments.
[5] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.
[6] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-18:
Lower Mill Creek (SW-03) Estuarine Water Quality

Parameter	Unit	Provincial Guideline (BC WQG MWAL)		Federal Guideline (CWQG MWAL)		Mill Creek Estuary (SW-03)						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	64	62	<1.00	1.76	3.75	13.6	46.6
Conductivity (Field)	µS/cm	-	-	-	-	72	72	3.90	13.6	387	12300	25600
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	59	59	5.70	15.7	585	20400	38200
Dissolved Oxygen (Field)	mg/L	-	-	>=8	-	87	87	**6.83**	10.4	12.2	13.4	15.7
pH (Field)	s.u.	7.0 - 8.7	-	7.0 - 8.7	-	84	84	**5.43**	**6.18**	6.82	7.93	8.60
Salinity (Field)	ppt	-	-	-	-	70	70	0	0	0.335	11.6	24.1
Temperature	°C	-	-	-	-	87	87	2.47	4.31	7.00	14.0	19.3
Total Suspended Solids (TSS) [1]	mg/L	-[1]	-[1]	-	-	100	27	<2.00	<2.00	<3.00	6.00	17.8
Total Hardness	mg/L	-	-	-	-	99	99	1.81	3.43	26.0	491	2140
Turbidity (Field) [1]	NTU	-[1]	-[1]	-	-	74	74	0	0	0.555	3.66	32.3
Nutrients												
Total Ammonia (as N) [2]	mg/L	20	131	-	-	97	16	<0.00500	<0.00500	0.00530	<0.0500	0.104
Bromide	mg/L	-	-	-	-	73	39	<0.0500	<0.0500	0.390	<5.00	20.4
Chloride	mg/L	-	-	-	-	74	67	0.190	1.27	114	1660	6270
Fluoride	mg/L	-	1.5	-	-	74	2	<0.0200	<0.0200	<0.100	<1.00	<1.00
Nitrate (as N)	mg/L	3.7	-	45	339	95	77	<0.0100	0.0199	0.0500	<0.500	<1.00
Nitrite (as N)	mg/L	-	-	-	-	82	1	<0.00100	<0.00100	<0.0100	<0.100	0.14
Sulphate	mg/L	-	-	-	-	74	69	0.840	1.35	24.6	227	879
Total Organic Carbon (TOC)	mg/L	-	-	-	-	51	51	0.560	1.00	1.55	2.10	3.88
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	87	87	0.550	0.980	1.49	2.15	3.48
Total Metals												
T-Al	mg/L	-	-	-	-	100	100	0.0113	0.0430	0.0858	0.201	0.491
T-Sb [3]	mg/L	0.27	-	-	-	100	4	<0.0000500	<0.0000500	<0.000100	<0.00100	<0.00100
T-As	mg/L	-	0.0125	0.0125	-	100	45	<0.0000500	0.0000918	0.000156	<0.000500	0.000610
T-Be	mg/L	0.1	-	-	-	100	0	<0.0000100	<0.0000100	<0.000100	<0.000500	<0.000500
T-B	mg/L	1.2	-	-	-	100	70	0.00210	<0.0100	<0.0500	0.357	1.53
T-Ba	mg/L	-	-	-	-	100	82	0.00120	0.00170	0.00431	0.00719	0.0122
T-Cd	mg/L	0.00012	-	0.00012	-	100	66	0.00000340	<0.00000500	<0.0000100	<0.0000200	0.0000510
T-Ca	mg/L	-	-	-	-	100	100	0.645	1.00	3.05	32.1	136
T-Cr [4]	mg/L	0.0015	-	0.0015	-	100	20	<0.000100	0.000199	<0.000500	<0.000500	**0.00281**
Total Hexavalent Chromium	mg/L	0.0015	-	0.0015	-	51	0	<0.000500	<0.000500	<0.000500	<0.00150	**<0.00250**
Total Trivalent Chromium	mg/L	0.056	-	0.056	-	26	1	<0.000500	<0.000500	<0.000500	<0.000500	0.00163
T-Co	mg/L	-	-	-	-	100	41	0.0000206	0.0000446	<0.000100	0.000115	<0.0005
T-Cu	mg/L	0.002	0.003	-	-	100	48	<0.000200	0.000320	<0.000500	<0.00100	<0.00250
T-Fe	mg/L	-	-	-	-	100	94	0.00940	0.0110	0.0270	0.0962	0.425
T-Pb	mg/L	0.002	0.14	-	-	100	27	<0.0000500	<0.0000500	<0.000100	0.000243	0.00197
T-Mg	mg/L	-	-	-	-	100	99	0.0760	0.136	4.69	95.7	436
T-Mn	mg/L	-	-	-	-	100	98	<0.000200	0.000457	0.00144	0.00427	0.0713
T-Hg [5]	mg/L	0.000011	-	0.000016	-	100	11	<0.000000500	0.00000137	<0.00000500	<0.0000100	<0.0000100
Total Methylmercury	mg/L	-	-	-	-	82	18	<0.0000000200	<0.0000000200	<0.0000000230	0.0000000716	0.000000327
T-Mo	mg/L	-	-	-	-	100	100	0.000201	0.000303	0.000590	0.00141	0.00342
T-Ni	mg/L	0.0083	-	-	-	100	27	0.0000600	0.000156	<0.000500	<0.000500	<0.00300
T-Se	mg/L	0.002	-	-	-	100	1	<0.0000500	<0.0000500	<0.000100	<0.000500	<0.00100
T-Sr	mg/L	-	-	-	-	100	100	0.00310	0.00477	0.0328	0.578	2.10
T-Ag	mg/L	0.0015	0.003	-	0.0075	100	1	<0.0000100	<0.0000100	<0.0000100	<0.000100	<0.000100
T-Tl	mg/L	-	-	-	-	100	4	<0.00000400	<0.00000400	<0.0000100	<0.0000500	<0.0000500
T-U	mg/L	-	-	-	-	100	100	0.000112	0.000141	0.000192	0.000396	0.00113
T-V	mg/L	0.05	-	0.005	-	100	17	<0.000200	<0.000500	0.000545	<0.00200	<0.00500
T-Zn	mg/L	0.01	0.055	-	-	100	22	<0.00100	0.00120	<0.00300	<0.00500	<0.0150
Dissolved Metals												
D-Al	mg/L	-	-	-	-	84	84	0.0142	0.0245	0.0635	0.0964	0.137
D-Sb	mg/L	-	-	-	-	84	1	<0.0000500	<0.0000500	<0.000100	<0.00100	<0.00100
D-As	mg/L	-	-	-	-	84	20	<0.0000500	<0.000100	0.000110	<0.000500	<0.000500
D-Be	mg/L	-	-	-	-	84	0	<0.0000100	<0.0000100	<0.000100	<0.000500	<0.000500
D-B	mg/L	-	-	-	-	84	50	0.00210	<0.0100	<0.0500	0.400	1.26
D-Ba	mg/L	-	-	-	-	84	71	0.00118	0.00142	0.00382	0.00676	0.00949
D-Cd	mg/L	-	-	-	-	84	44	0.00000300	<0.00000500	0.0000097	<0.0000200	0.0000362
D-Ca	mg/L	-	-	-	-	84	84	0.591	0.953	2.76	34.7	106
D-Cr	mg/L	-	-	-	-	84	5	0.000140	<0.000500	<0.000500	<0.000500	<0.00250
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	50	0	<0.000500	<0.000500	<0.000500	<0.00150	<0.00250
Dissolved Trivalent Chromium	mg/L	-	-	-	-	25	0	<0.000500	<0.000500	<0.000500	<0.00150	<0.00250
D-Co	mg/L	-	-	-	-	84	21	0.0000137	0.0000261	<0.000100	<0.000100	<0.000500
D-Cu	mg/L	-	-	-	-	84	46	0.000150	<0.000200	0.000320	<0.000500	0.00138
D-Fe	mg/L	-	-	-	-	84	25	<0.00200	0.00590	<0.0100	0.0137	<0.0500
D-Pb	mg/L	-	-	-	-	84	0	<0.0000500	<0.0000500	<0.0000500	<0.000200	<0.000250
D-Mg	mg/L	-	-	-	-	84	84	0.0610	0.127	5.08	97.7	272
D-Mn	mg/L	-	-	-	-	84	81	0.000180	0.000240	0.000675	0.00221	0.109
D-Hg	mg/L	-	-	-	-	84	12	<0.000000500	0.00000107	<0.00000500	<0.0000100	0.0000150
D-Mo	mg/L	-	-	-	-	84	84	0.000120	0.000290	0.000570	0.00162	0.00264
D-Ni	mg/L	-	-	-	-	84	16	0.0000650	0.000148	<0.000500	<0.000500	0.00290
D-Se	mg/L	-	-	-	-	84	0	<0.0000500	<0.0000500	<0.000100	<0.000500	<0.000500
D-Sr	mg/L	-	-	-	-	84	84	0.00270	0.00474	0.0336	0.613	1.60
D-Ag	mg/L	-	-	-	-	84	0	<0.0000100	<0.0000100	<0.0000100	<0.000100	<0.000100
D-Tl	mg/L	-	-	-	-	84	2	<0.00000400	<0.00000400	<0.0000100	<0.0000500	<0.0000500
D-U	mg/L	-	-	-	-	84	84	0.0000959	0.000130	0.000181	0.000425	0.000890
D-V	mg/L	-	-	-	-	84	0	<0.000400	<0.000500	<0.000500	0.00235	<0.00500
D-Zn	mg/L	-	-	-	-	84	24	<0.00100	<0.00100	0.00105	<0.00400	0.00780
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	-	-	90	5	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
Acridine	mg/L	-	-	-	-	90	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000800
Anthracene	mg/L	-	-	-	-	90	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.0000180
Benz(a)anthracene	mg/L	-	-	-	-	90	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.0000300
Benzo(a)pyrene	mg/L	0.00001	-	-	-	90	2	<0.00000500	<0.00000500	<0.00000500	<0.0000100	0.0000170
Chrysene	mg/L	0.0001	-	-	-	90	1	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
Fluoranthene	mg/L	-	-	-	-	90	6	<0.0000100	<0.0000100	0.0000110	<0.0000300	0.000134
Fluorene	mg/L	0.012	-	-	-	90	5	<0.0000100	<0.0000100	<0.0000100	<0.0000500	0.0000560
1-methylnaphthalene	mg/L	0.001	-	-	-	90	2	<0.0000100	<0.0000100	<0.0000100	<0.000100	<0.000100
2-methylnaphthalene	mg/L	0.001	-	-	-	90	2	<0.0000100	<0.0000100	<0.0000100	<0.000100	<0.000100
Naphthalene	mg/L	0.001	-	0.0014	-	90	1	<0.0000500	<0.0000500	<0.0000500	<0.000200	<0.000200
Phenanthrene	mg/L	-	-	-	-	90	5	<0.0000200	<0.0000200	<0.0000200	<0.000100	<0.000100
Pyrene	mg/L	-	-	-	-	90	5	<0.0000100	<0.0000100	<0.0000100	<0.0000200	0.0000880
Quinoline	mg/L	-	-	-	-	72	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000147
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.11	-	0.11	-	90	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.25	-	0.025	-	90	0	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Methyl-tert-butyl-ether	mg/L	-	0.44	5	-	90	0	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Styrene	mg/L	-	-	-	-	90	0	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Toluene	mg/L	-	-	0.215	-	90	0	<0.000400	<0.000400	<0.000400	<0.00100	<0.00100
Total Xylenes	mg/L	-	-	-	-	90	0	<0.000500	<0.000500	<0.000500	<0.00200	<0.00200
Chlorobenzene	mg/L	0.025	-	0.025	-	52	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
1-2-Dichlorobenzene	mg/L	0.042	-	0.042	-	52	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	55	55	0	0	0.00438	0.0560	0.397
Upper Bound PCDD/F TEQ [7]	pg/L	-	-	-	-	55	55	0.431	0.670	1.06	2.18	4.74
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	51	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	51	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	62	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	62	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:

Data presented is the statistics of the compiled dataset for the August 2018 to May 2025 monitoring period (Appendix 3.6-1); duplicate samples are not included.

B.C. WQG MWAL: British Columbia water quality guideline for the protection of marine and estuarine aquatic life; CWQG MWAL: Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of marine and estuarine aquatic life.

Non-detect results are screened using the detection limit value.

Values shaded in light grey exceed the applicable long-term B.C. WQG MWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG MWAL.

Bolded values exceed the applicable long-term CWQG MWAL and underlined values exceed the applicable short-term CWQG MWAL.

[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment.

[2] The approved total ammonia nitrogen B.C. WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in B.C. WQG guidance document.

[3] The working B.C. WQG for trivalent antimony [Sb(III)] is 0.27 mg/L and is applied to total antimony results.

[4] The WQG for hexavalent chromium (Cr(IV)) is applied to total chromium results.

[5] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.

[6] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.

[7] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-19:
East Creek (SW-04) Surface Water Quality Summary

Parameter	Unit	Provincial Guideline (BC WQG FWAL)		Federal Guideline (CWQG FWAL)		East Creek (SW-04)						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	54	54	5.10	16.8	30.0	68.4	85.1
Conductivity (Field)	µS/cm	-	-	-	-	74	74	5.70	24.3	47.5	149	446
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	60	60	7.50	30.9	58.3	185	626
Dissolved Oxygen (Field)	mg/L	>=8	>=5	>=8	-	87	87	8.13	9.62	11.4	13.0	14.3
pH (Field)	s.u.	6.5 - 9.0	-	6.5 - 9.0	-	86	86	**5.02**	6.83	7.46	7.90	8.30
Salinity (Field)	ppt	-	-	-	-	73	73	0	0.00200	0.0300	0.100	0.420
Temperature	°C	-	-	-	-	89	89	1.90	5.12	10.0	15.0	18.6
Total Suspended Solids (TSS) [1]	mg/L	-[1]	-[1]	-	-	90	23	<2.00	<2.00	<3.00	5.11	62.9
Total Hardness	mg/L	-	-	-	-	90	90	2.34	15.1	27.9	76.9	111
Turbidity (Field) [1]	NTU	-[1]	-[1]	-	-	74	74	0	0.155	1.78	8.95	404
Nutrients												
Total Ammonia (as N)	mg/L	1.85	12.7	3.26	-	90	20	<0.00500	<0.00500	0.00635	<0.0500	0.0790
Bromide	mg/L	-	-	-	-	73	0	<0.0500	<0.0500	<0.0500	<0.100	<0.100
Chloride	mg/L	150	600	120	640	74	74	0.450	0.543	0.950	4.69	10.1
Fluoride	mg/L	-	0.82	0.12	-	74	46	<0.0200	0.0220	<0.0500	0.108	**0.165**
Nitrate (as N)	mg/L	3	32.8	3	124	87	77	<0.00500	0.00952	0.0260	0.0873	1.95
Nitrite (as N)	mg/L	0.02	0.06	0.06	-	74	8	<0.00100	<0.00100	<0.00100	<0.0100	<0.0100
Sulphate	mg/L	128	-	-	-	74	72	<1.00	2.10	2.99	6.64	57.5
Total Organic Carbon (TOC)	mg/L	-	-	-	-	50	50	1.21	1.29	2.11	4.46	10.2
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	86	86	0.970	1.31	2.08	3.77	9.06
Total Metals												
T-Al	mg/L	0.123	-	0.1	-	90	90	0.0158	0.0425	0.0882	**0.368**	**8.59**
T-Sb	mg/L	0.074	0.25	-	-	90	47	<0.0000500	<0.0000500	<0.000100	0.000230	0.000400
T-As	mg/L	0.005	-	0.005	-	90	77	0.0000540	0.0000848	0.000170	0.000762	0.00347
T-Be	mg/L	0.00013	-	-	-	90	1	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
T-B	mg/L	1.2	-	1.5	29	90	44	0.00380	0.00609	<0.0100	<0.0500	<0.0500
T-Ba	mg/L	1	-	-	-	90	81	0.00156	0.00433	0.00625	0.0150	0.0302
T-Cd	mg/L	-	-	0.0000549	0.0005738	90	77	0.00000300	0.00000656	<0.0000100	0.0000184	**0.0000839**
T-Ca	mg/L	-	-	-	-	90	90	0.789	5.47	10.2	26.7	41.8
T-Cr [2]	mg/L	0.0025	-	0.001	-	90	33	0.000110	0.000180	<0.000500	<0.000500	**0.00363**
Total Hexavalent Chromium	mg/L	0.0025	-	0.001	-	51	6	<0.000500	<0.000500	<0.000500	0.000670	**0.00212**
Total Trivalent Chromium	mg/L	0.0089	-	0.0089	-	27	3	<0.000500	<0.000500	<0.000500	0.000638	0.00193
T-Co	mg/L	-	-	0.001	-	90	36	0.00000990	0.0000246	<0.000100	<0.000100	0.000900
T-Cu	mg/L	-	-	0.002	-	90	85	0.000330	0.000509	0.000755	0.00146	**0.00623**
T-Fe	mg/L	-	1	0.3	-	90	90	0.0256	0.0448	0.110	**0.348**	**5.90**
T-Pb	mg/L	-	-	-	-	90	73	<0.0000500	0.0000510	0.000107	0.000225	0.00342
T-Mg	mg/L	-	-	-	-	90	90	0.0893	0.390	0.596	1.19	6.38
T-Mn	mg/L	0.73	0.85	-	-	90	90	0.000763	0.00320	0.00658	0.0290	0.458
T-Hg [3]	mg/L	0.00002	-	-	-	90	13	0.000000670	0.00000262	<0.00000500	<0.0000100	0.0000160
Total Methylmercury	mg/L	0.0000001	-	0.000004	-	84	43	<0.0000000200	<0.0000000200	0.0000000345	<0.0000000800	0.000000404
T-Mo	mg/L	7.6	46	0.073	-	90	90	0.000271	0.000436	0.000757	0.00933	0.0172
T-Ni	mg/L	-	-	0.025	-	90	41	0.0000620	0.000288	<0.0005	0.000743	<0.003
T-Se	mg/L	0.002	-	0.001	-	90	10	<0.0000500	<0.0000500	0.0000630	<0.000500	<0.000500
T-Sr	mg/L	-	-	-	-	90	90	0.00308	0.0184	0.0313	0.0775	0.104
T-Ag	mg/L	0.00012	-	0.00025	-	90	1	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
T-Tl	mg/L	0.00003	-	0.0008	-	90	4	<0.00000400	<0.00000400	<0.0000100	<0.0000200	<0.0000200
T-U	mg/L	0.0075	-	0.015	0.033	90	90	0.0000655	0.0000807	0.000135	0.00135	0.00511
T-V	mg/L	0.06	-	0.12	-	90	20	<0.000200	0.000395	<0.000500	0.00182	<0.00500
T-Zn	mg/L	-	-	-	-	90	45	<0.00100	0.00270	<0.00300	0.00711	0.0210
Dissolved Metals												
D-Al	mg/L	-	-	-	-	74	74	0.0140	0.0221	0.0493	0.120	0.731
D-Sb	mg/L	-	-	-	-	74	33	<0.0000500	<0.0000500	<0.000100	0.000217	0.000540
D-As	mg/L	-	-	-	-	74	52	<0.0000500	0.0000685	0.000140	0.000659	0.00326
D-Be	mg/L	-	-	-	-	74	0	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
D-B	mg/L	-	-	-	-	74	33	0.00290	0.00572	<0.0100	0.0191	<0.0500
D-Ba	mg/L	-	-	-	-	74	69	0.00148	0.00422	0.00571	0.0146	0.0185
D-Cd	mg/L	0.000083	0.000158	-	-	74	65	0.00000240	<0.00000500	0.00000750	0.0000129	0.0000223
D-Ca	mg/L	-	-	-	-	74	74	0.761	6.32	10.9	29.2	41.3
D-Cr	mg/L	-	-	-	-	74	15	0.000130	0.000210	<0.000500	<0.000500	0.00332
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	50	6	<0.000500	<0.000500	<0.000500	0.000733	0.00224
Dissolved Trivalent Chromium	mg/L	-	-	-	-	26	2	<0.000500	<0.000500	<0.000500	0.000515	0.00238
D-Co	mg/L	0.00039	-	-	-	74	19	0.00000630	0.0000131	<0.000100	<0.000100	0.000240
D-Cu	mg/L	0.000516	0.003083	0.000468	-	74	73	0.000220	0.000365	**0.000620**	**0.00107**	**0.00322**
D-Fe	mg/L	-	0.35	-	-	74	71	0.00330	0.0106	0.0195	0.0340	0.0590
D-Pb	mg/L	0.0023	-	0.00459	-	74	3	<0.0000500	<0.0000500	<0.0000500	0.0000527	<0.000200
D-Mg	mg/L	-	-	-	-	74	74	0.0954	0.433	0.633	1.21	5.94
D-Mn	mg/L	-	-	0.35	2.17	74	74	0.000250	0.00177	0.00316	0.0127	0.0309
D-Hg	mg/L	-	-	-	-	74	11	0.000000520	0.00000137	<0.00000500	<0.0000100	<0.0000100
D-Mo	mg/L	-	-	-	-	74	74	0.000214	0.000446	0.000915	0.00938	0.0168
D-Ni	mg/L	0.0011	0.0167	-	-	74	26	0.0000600	0.000240	<0.000500	<0.000500	0.00251
D-Se	mg/L	-	-	-	-	74	2	<0.0000500	<0.0000500	<0.0000500	<0.000100	<0.000500
D-Sr	mg/L	1.25	-	2.5	-	74	74	0.00298	0.0201	0.0315	0.0761	0.105
D-Ag	mg/L	-	-	-	-	74	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
D-Tl	mg/L	-	-	-	-	74	0	<0.00000400	<0.00000400	<0.0000100	<0.0000100	<0.0000200
D-U	mg/L	-	-	-	-	74	73	<0.0000100	0.0000759	0.000161	0.00135	0.00485
D-V	mg/L	-	-	-	-	74	7	<0.000400	<0.000500	<0.000500	<0.00100	<0.00500
D-Zn	mg/L	0.00365	0.01614	0.007307	0.03228	74	62	<0.00100	<0.00100	0.00190	0.00374	0.00450
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	0.0058	-	90	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000640
Acridine [4]	mg/L	0.003	0.00005	0.0044	-	90	1	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000870
Anthracene [4]	mg/L	0.004	0.0001	0.000012	-	90	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	**<0.0000130**
Benz(a)anthracene [4]	mg/L	0.0001	0.0001	0.000018	-	90	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000130
Benzo(a)pyrene	mg/L	0.00001	-	0.000015	-	90	0	<0.00000500	<0.00000500	<0.00000500	<0.0000100	<0.0000130
Chrysene	mg/L	-	-	-	-	90	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000640
Fluoranthene [4]	mg/L	0.004	0.0002	0.00004	-	90	0	<0.0000100	<0.0000100	<0.0000100	<0.0000300	<0.0000390
Fluorene	mg/L	0.012	-	0.003	-	90	0	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000640
1-methylnaphthalene	mg/L	-	-	-	-	90	7	<0.0000100	<0.0000100	0.0000110	<0.000100	<0.000128
2-methylnaphthalene	mg/L	-	-	-	-	90	10	<0.0000100	<0.0000100	0.0000120	<0.000100	<0.000128
Naphthalene	mg/L	0.001	0.001	0.0011	-	90	0	<0.0000500	<0.0000500	<0.0000500	<0.000200	<0.000257
Phenanthrene	mg/L	0.0003	-	0.0004	-	90	0	<0.0000200	<0.0000200	<0.0000200	<0.000100	<0.000128
Pyrene [4]	mg/L	0.00002	0.00002	0.000025	-	90	0	<0.0000100	<0.0000100	<0.0000100	<0.0000200	**<0.0000260**
Quinoline	mg/L	0.0034	-	0.0034	-	72	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000113
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.04	-	0.37	-	90	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.2	-	0.09	-	90	0	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Methyl-tert-butyl-ether	mg/L	-	3.4	10	-	90	0	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Styrene	mg/L	0.072	-	0.072	-	90	1	<0.000500	<0.000500	<0.000500	<0.00100	<0.00100
Toluene	mg/L	0.0005	-	0.002	-	90	0	<0.000400	<0.000400	<0.000400	<0.00100	<0.00100
Total Xylenes	mg/L	0.03	-	-	-	90	1	<0.000500	<0.000500	<0.000500	<0.00200	<0.00200
Chlorobenzene	mg/L	0.0013	-	0.0013	-	52	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
1-2-Dichlorobenzene	mg/L	0.0007	-	0.0007	-	52	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [5]	pg/L	-	-	-	-	44	44	0	0	0.00148	0.0587	0.179
Upper Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	44	44	0.587	0.690	1.15	2.05	2.84
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	51	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	51	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	54	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	54	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:
Data presented is the statistics of the compiled dataset for the August 2018 to May 2025 monitoring period (Appendix 3.6-1); duplicate samples are not included.
B.C. WQG FWAL: British Columbia water quality guideline for the protection of freshwater aquatic life; CWQG FWAL: Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of freshwater aquatic life.
For parameters with variable water quality guidelines, values presented are based on median sample toxicity modifying factors (*e.g.*, dissolved organic carbon (DOC), pH, temperature) calculated from the Aug 2018 to May 2025 dataset.
Non-detect results are screened using the detection limit value.
Values shaded in light grey exceed the applicable long-term B.C. WQG FWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG FWAL.
Bolded values exceed the applicable long-term CWQG FWAL and underlined values exceed the applicable short-term CWQG FWAL.
[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment.
[2] The WQG for hexavalent chromium (Cr(IV)) is conservatively applied to total chromium results.
[3] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.
[4] The B.C. WQG-FWAL for acridine, anthracene, benz(a)anthracene, fluoranthene and pyrene applied are for photo-toxic freshwater environments.
[5] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.
[6] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-20:
Upstream Mill Creek (SW-07) Surface Water Quality

Parameter	Unit	Provincial Guideline (BC WQG FWAL)		Federal Guideline (CWQG FWAL)		Upstream Mill Creek (SW-07)						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	53	51	<1.00	1.62	2.40	3.40	4.50
Conductivity (Field)	µS/cm	-	-	-	-	54	54	2.90	5.23	10.1	27.6	140
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	31	31	5.00	8.00	12.6	28.8	53.6
Dissolved Oxygen (Field)	mg/L	>=8	>=5	>=8	-	54	54	9.52	10.4	12.5	13.7	14.4
pH (Field)	s.u.	6.5 - 9.0	-	6.5 - 9.0	-	54	54	**5.25**	**5.69**	**6.38**	6.90	8.40
Salinity (Field)	ppt	-	-	-	-	53	53	0	0	0.0100	0.0180	0.0800
Temperature	°C	-	-	-	-	55	55	1.40	3.31	6.00	12.6	15.0
Total Suspended Solids (TSS) [1]	mg/L	-[1]	-[1]	-	-	55	3	<2.00	<3.00	<3.00	<3.00	<5.00
Total Hardness	mg/L	-	-	-	-	55	55	2.28	2.48	3.36	5.72	8.18
Turbidity (Field) [1]	NTU	-[1]	-[1]	-	-	54	54	0	0	0.330	1.73	390
Nutrients												
Total Ammonia (as N)	mg/L	1.92	26.5	48.3	-	55	4	<0.00500	<0.00500	<0.00500	0.0155	<0.0500
Bromide	mg/L	-	-	-	-	54	0	<0.0500	<0.0500	<0.0500	<0.0500	<0.100
Chloride	mg/L	150	600	120	640	55	33	0.380	<0.500	0.550	1.78	6.68
Fluoride	mg/L	-	0.4	0.12	-	55	2	<0.0200	<0.0200	<0.0200	0.0222	<0.100
Nitrate (as N)	mg/L	3	32.8	3	124	54	54	0.0159	0.0201	0.0471	0.108	0.162
Nitrite (as N)	mg/L	0.02	0.06	0.06	-	55	0	<0.00100	<0.00100	<0.00100	<0.00100	<0.0100
Sulphate	mg/L	128	-	-	-	55	55	0.800	1.09	1.76	3.76	5.00
Total Organic Carbon (TOC)	mg/L	-	-	-	-	50	50	0.720	0.967	1.52	2.25	2.70
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	55	55	0.630	0.902	1.51	2.03	2.64
Total Metals												
T-Al	mg/L	0.0126	-	0.005	-	55	55	0.0210	0.0351	0.0814	0.142	0.337
T-Sb	mg/L	0.074	0.25	-	-	55	0	<0.0000500	<0.000100	<0.000100	<0.000100	<0.000100
T-As	mg/L	0.005	-	0.005	-	55	4	<0.0000500	<0.000100	<0.000100	<0.000100	<0.000100
T-Be	mg/L	0.00013	-	-	-	55	0	<0.0000100	<0.0000200	<0.000100	<0.000100	<0.000100
T-B	mg/L	1.2	-	1.5	29	55	19	0.00250	<0.0100	<0.0100	0.0196	0.0521
T-Ba	mg/L	1	-	-	-	55	55	0.00121	0.00143	0.00235	0.00459	0.00618
T-Cd	mg/L	-	-	0.000036	0.0001061	55	32	<0.00000500	<0.00000500	0.00000570	0.00000914	0.0000116
T-Ca	mg/L	-	-	-	-	55	55	0.779	0.837	1.12	1.91	2.69
T-Cr [2]	mg/L	0.0025	-	0.001	-	55	4	<0.000100	<0.000500	<0.000500	<0.000500	<0.000500
Total Hexavalent Chromium	mg/L	0.0025	-	0.001	-	50	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00150
Total Trivalent Chromium	mg/L	0.0089	-	0.0089	-	26	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
T-Co	mg/L	-	-	0.001	-	55	8	0.0000154	<0.000100	<0.000100	<0.000100	0.000160
T-Cu	mg/L	-	-	0.002	-	55	13	0.000200	<0.000500	<0.000500	0.000528	0.000700
T-Fe	mg/L	-	1	0.3	-	55	34	<0.00200	<0.0100	0.0120	0.0324	0.246
T-Pb	mg/L	-	-	-	-	55	3	<0.0000500	<0.0000500	<0.0000500	<0.0000500	0.000100
T-Mg	mg/L	-	-	-	-	55	55	0.0771	0.0897	0.132	0.251	0.467
T-Mn	mg/L	0.62	0.58	-	-	55	55	0.000230	0.000278	0.000530	0.00251	0.00575
T-Hg [3]	mg/L	0.00002	-		-	55	11	0.000000550	0.000000800	<0.00000500	<0.00000500	<0.0000100
Total Methylmercury	mg/L	0.0000001	-	0.000004	-	53	5	<0.0000000200	<0.0000000200	<0.0000000200	<0.0000000500	0.000000149
T-Mo	mg/L	7.6	46	0.073	-	55	55	0.000172	0.000272	0.000378	0.000654	0.000857
T-Ni	mg/L	-	-	0.025	-	55	5	0.000125	<0.000500	<0.000500	<0.000500	<0.000500
T-Se	mg/L	0.002	-	0.001	-	55	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000100
T-Sr	mg/L	-	-	-	-	55	55	0.00336	0.00377	0.00518	0.0104	0.0163
T-Ag	mg/L	0.00012	-	0.00025	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
T-Tl	mg/L	0.00003	-	0.0008	-	55	0	<0.00000400	<0.0000100	<0.0000100	<0.0000100	<0.0000100
T-U	mg/L	0.0075	-	0.015	0.033	55	55	0.0000220	0.0000850	0.000149	0.000185	0.000212
T-V	mg/L	0.06	-	0.12	-	55	1	<0.000400	<0.000500	<0.000500	<0.000500	<0.00100
T-Zn	mg/L	-	-	-	-	55	5	<0.00100	<0.00300	<0.00300	<0.00300	0.00348
Dissolved Metals												
D-Al	mg/L	-	-	-	-	55	55	0.0206	0.0330	0.0694	0.108	0.136
D-Sb	mg/L	-	-	-	-	55	1	<0.0000500	<0.000100	<0.000100	<0.000100	0.000130
D-As	mg/L	-	-	-	-	55	3	<0.0000500	<0.000100	<0.000100	<0.000100	<0.000100
D-Be	mg/L	-	-	-	-	55	0	<0.0000100	<0.0000200	<0.000100	<0.000100	<0.000100
D-B	mg/L	-	-	-	-	55	19	0.00220	<0.0100	<0.0100	0.0200	0.0556
D-Ba	mg/L	-	-	-	-	55	55	0.00128	0.00141	0.00216	0.00388	0.00575
D-Cd	mg/L	0.000018	0.000038	-	-	55	32	<0.00000500	<0.00000500	0.00000580	0.00000826	0.0000110
D-Ca	mg/L	-	-	-	-	55	55	0.698	0.822	1.09	1.91	2.73
D-Cr	mg/L	-	-	-	-	55	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	49	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dissolved Trivalent Chromium	mg/L	-	-	-	-	25	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
D-Co	mg/L	0.00039	-	-	-	55	6	0.0000145	<0.000100	<0.000100	<0.000100	0.000210
D-Cu	mg/L	0.0002	0.000374	0.0002	-	55	33	0.000160	<0.000200	0.000210	0.000308	**0.000540**
D-Fe	mg/L	-	0.35	-	-	55	15	<0.00200	<0.0100	<0.0100	0.0116	0.0220
D-Pb	mg/L	0.00124	-	0.00248	-	55	1	<0.0000500	<0.0000500	<0.0000500	<0.0000500	0.000172
D-Mg	mg/L	-	-	-	-	55	55	0.0762	0.0839	0.130	0.234	0.601
D-Mn	mg/L	-	-	0.2	0.338	55	55	0.000160	0.000244	0.000440	0.00141	0.00186
D-Hg	mg/L	-	-		-	55	10	<0.000000500	0.000000736	<0.00000500	<0.00000500	<0.0000100
D-Mo	mg/L	-	-	-	-	55	55	0.000146	0.000262	0.000348	0.000629	0.000801
D-Ni	mg/L	0.0006	0.0092	-	-	55	5	0.0000940	<0.000500	<0.000500	<0.000500	<0.000500
D-Se	mg/L	-	-	-	-	55	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000100
D-Sr	mg/L	1.25	-	2.5	-	55	55	0.00331	0.00371	0.00512	0.00958	0.0154
D-Ag	mg/L	-	-	-	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
D-Tl	mg/L	-	-	-	-	55	1	<0.00000400	<0.0000100	<0.0000100	<0.0000100	<0.0000100
D-U	mg/L	-	-	-	-	55	55	0.0000170	0.0000806	0.000140	0.000174	0.000193
D-V	mg/L	-	-	-	-	55	0	<0.000400	<0.000500	<0.000500	<0.000500	<0.00100
D-Zn	mg/L	0.00595	0.00832	0.00209	0.00513	55	18	<0.00100	<0.00100	<0.00100	0.00142	**0.0120**
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	0.0058	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
Acridine [4]	mg/L	0.003	0.00005	0.0044	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
Anthracene [4]	mg/L	0.004	0.0001	0.000012	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Benz(a)anthracene [4]	mg/L	0.0001	0.0001	0.000018	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Benzo(a)pyrene	mg/L	0.00001	-	0.000015	-	55	0	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.0000100
Chrysene	mg/L	-	-	-	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
Fluoranthene [4]	mg/L	0.004	0.0002	0.00004	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000300
Fluorene	mg/L	0.012	-	0.003	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
1-methylnaphthalene	mg/L	-	-	-	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.000100
2-methylnaphthalene	mg/L	-	-	-	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.000100
Naphthalene	mg/L	0.001	0.001	0.0011	-	55	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000200
Phenanthrene	mg/L	0.0003	-	0.0004	-	55	0	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.000100
Pyrene [4]	mg/L	0.00002	0.00002	0.000025	-	55	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000200
Quinoline	mg/L	0.0034	-	0.0034	-	37	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000720
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.04	-	0.37	-	55	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.2	-	0.09	-	55	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
Methyl-tert-butyl-ether	mg/L	-	3.4	10	-	55	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
Styrene	mg/L	0.072	-	0.072	-	55	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
Toluene	mg/L	0.0005	-	0.002	-	55	0	<0.000400	<0.000400	<0.000400	<0.000400	<0.00100
Total Xylenes	mg/L	0.03	-	-	-	55	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00200
Chlorobenzene	mg/L	0.0013	-	0.0013	-	51	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
1-2-Dichlorobenzene	mg/L	0.0007	-	0.0007	-	51	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [5]	pg/L	-	-	-	-	30	30	0	0	0.00267	0.0347	0.0824
Upper Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	30	30	0.463	0.602	1.12	2.03	3.53
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	50	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	50	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	31	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	31	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:

Data presented is the statistics of the compiled dataset for the August 2018 to May 2025 monitoring period (Appendix 3.6-1); duplicate samples are not included.

B.C. WQG FWAL: British Columbia water quality guideline for the protection of freshwater aquatic life; CWQG FWAL: Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of freshwater aquatic life.

For parameters with variable water quality guidelines, values presented are based on median sample toxicity modifying factors (*e.g.*, dissolved organic carbon (DOC), pH, temperature) calculated from the Aug 2018 to May 2025 dataset.

Non-detect results are screened using the detection limit value.

Values shaded in light grey exceed the applicable long-term B.C. WQG FWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG FWAL.

Bolded values exceed the applicable long-term CWQG FWAL and underlined values exceed the applicable short-term CWQG FWAL.

[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment. Station SW-07 is a background station that does not receive discharge, therefore no WQG is established.

[2] The WQG for hexavalent chromium (Cr(IV)) is conservatively applied to total chromium results.

[3] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.

[4] The B.C. WQG-FWAL for acridine, anthracene, benz(a)anthracene, fluoranthene and pyrene applied are for photo-toxic freshwater environments.

[5] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.

[6] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-21:
Upstream Woodfibre Creek (SW-08) Surface Water Quality

Parameter	Unit	Provincial Guideline (BC WQG FWAL)		Federal Guideline (CWQG FWAL)		Upstream Woodfibre Creek (SW-08)						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	14	14	1.00	1.23	1.90	2.17	2.30
Conductivity (Field)	µS/cm	-	-	-	-	14	14	2.50	2.62	5.10	7.73	8.40
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	14	14	3.90	4.41	8.15	11.9	14.2
Dissolved Oxygen (Field)	mg/L	>=8	>=5	>=8	-	14	14	10.8	10.9	12.2	12.7	12.8
pH (Field)	s.u.	6.5 - 9.0	-	6.5 - 9.0	-	14	14	**5.63**	**5.66**	**5.82**	**6.20**	**6.49**
Salinity (Field)	ppt	-	-	-	-	13	13	0	0	0	0	0
Temperature	°C	-	-	-	-	14	14	3.40	3.92	6.15	9.48	10.6
Total Suspended Solids (TSS) [1]	mg/L	-[1]	-[1]	-	-	14	1	<3.00	<3.00	<3.00	<3.00	4.4
Total Hardness	mg/L	-	-	-	-	14	14	1.82	1.94	2.30	2.66	2.79
Turbidity (Field) [1]	NTU	-[1]	-[1]	-	-	14	14	0	0	0.155	1.59	1.80
Nutrients												
Total Ammonia (as N)	mg/L	1.92	26.5	15.3	-	14	0	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Bromide	mg/L	-	-	-	-	14	0	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Chloride	mg/L	150	600	120	640	14	7	<0.500	<0.500	0.520	0.617	0.640
Fluoride	mg/L	-	0.4	0.12	-	14	0	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200
Nitrate (as N)	mg/L	3	32.8	3	124	14	14	0.0120	0.0133	0.0313	0.0382	0.0409
Nitrite (as N)	mg/L	0.02	0.06	0.06	-	14	0	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Sulphate	mg/L	128	-	-	-	14	14	0.300	0.313	0.360	0.474	0.530
Total Organic Carbon (TOC)	mg/L	-	-	-	-	14	14	2.20	2.29	3.07	3.85	4.08
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	14	14	2.20	2.39	3.19	3.88	4.22
Total Metals												
T-Al	mg/L	0.0064	-	0.005	-	14	14	**0.111**	**0.122**	**0.155**	**0.179**	**0.198**
T-Sb	mg/L	0.074	0.25	-	-	14	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
T-As	mg/L	0.005	-	0.005	-	14	8	<0.000100	<0.000100	0.000105	0.000120	0.000160
T-Be	mg/L	0.00013	-	-	-	14	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
T-B	mg/L	1.2	-	1.5	29	14	0	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
T-Ba	mg/L	1	-	-	-	14	14	0.00127	0.00135	0.00165	0.00196	0.00205
T-Cd	mg/L	-	-	0.000036	0.000106	14	1	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
T-Ca	mg/L	-	-	-	-	14	14	0.613	0.661	0.775	0.894	0.938
T-Cr [2]	mg/L	0.0025	-	0.001	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Total Hexavalent Chromium	mg/L	0.0025	-	0.001	-	13	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Total Trivalent Chromium	mg/L	0.0089	-	0.0089	-	13	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
T-Co	mg/L	-	-	0.001	-	14	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
T-Cu	mg/L	-	-	0.002	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
T-Fe	mg/L	-	1	0.3	-	14	14	0.0280	0.0306	0.0435	0.0608	0.0700
T-Pb	mg/L	-	-	-	-	14	8	<0.0000500	<0.0000500	0.0000505	0.0000659	0.0000750
T-Mg	mg/L	-	-	-	-	14	14	0.0691	0.0709	0.0886	0.105	0.108
T-Mn	mg/L	0.62	0.57	-	-	14	14	0.00108	0.00110	0.00142	0.00258	0.00318
T-Hg [3]	mg/L	0.00002	-	-	-	14	0	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
Total Methylmercury	mg/L	0.0000001	-	0.000004	-	14	2	<0.0000000200	<0.0000000200	<0.0000000200	0.0000000454	<0.0000000800
T-Mo	mg/L	7.6	46	0.073	-	14	14	0.000150	0.000184	0.000239	0.000276	0.000374
T-Ni	mg/L	-	-	0.025	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
T-Se	mg/L	0.002	-	0.001	-	14	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
T-Sr	mg/L	-	-	-	-	14	14	0.00240	0.00246	0.00312	0.00381	0.00399
T-Ag	mg/L	0.00012	-	0.00025	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
T-Tl	mg/L	0.00003	-	0.0008	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
T-U	mg/L	0.0075	-	0.015	0.033	14	14	0.000485	0.000527	0.000596	0.000660	0.000698
T-V	mg/L	0.06	-	0.12	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
T-Zn	mg/L	-	-	-	-	14	0	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300
Dissolved Metals												
D-Al	mg/L	-	-	-	-	14	14	0.102	0.108	0.139	0.152	0.172
D-Sb	mg/L	-	-	-	-	14	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
D-As	mg/L	-	-	-	-	14	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
D-Be	mg/L	-	-	-	-	14	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
D-B	mg/L	-	-	-	-	14	1	<0.0100	<0.0100	<0.0100	<0.0100	0.0130
D-Ba	mg/L	-	-	-	-	14	14	0.00124	0.00131	0.00151	0.00182	0.00184
D-Cd	mg/L	0.0000176	0.000038	-	-	14	0	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
D-Ca	mg/L	-	-	-	-	14	14	0.654	0.676	0.758	0.912	0.963
D-Cr	mg/L	-	-	-	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	13	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dissolved Trivalent Chromium	mg/L	-	-	-	-	13	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
D-Co	mg/L	0.00039	-	-	-	14	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
D-Cu	mg/L	0.0002	0.0002	0.0002	-	14	1	<0.000200	<0.000200	<0.000200	<0.000200	**0.000510**
D-Fe	mg/L	-	0.35	-	-	14	14	0.0170	0.0210	0.0245	0.0301	0.0320
D-Pb	mg/L	0.00168	-	0.00335	-	14	1	<0.0000500	<0.0000500	<0.0000500	<0.0000500	0.0000560
D-Mg	mg/L	-	-	-	-	14	14	0.0802	0.0822	0.0918	0.126	0.176
D-Mn	mg/L	-	-	0.19	0.243	14	14	0.000480	0.000500	0.000620	0.000925	0.00104
D-Hg	mg/L	-	-	-	-	14	0	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
D-Mo	mg/L	-	-	-	-	14	14	0.000141	0.000170	0.000206	0.000268	0.000285
D-Ni	mg/L	0.0006	0.0105	-	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
D-Se	mg/L	-	-	-	-	14	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
D-Sr	mg/L	1.25	-	2.5	-	14	14	0.00257	0.00265	0.00298	0.00394	0.00401
D-Ag	mg/L	-	-	-	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
D-Tl	mg/L	-	-	-	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
D-U	mg/L	-	-	-	-	14	14	0.000447	0.000502	0.000556	0.000658	0.000660
D-V	mg/L	-	-	-	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
D-Zn	mg/L	0.00802	0.00995	0.0031	0.004474	14	1	<0.00100	<0.00100	<0.00100	<0.00100	0.00120
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	0.0058	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Acridine [4]	mg/L	0.003	0.00005	0.0044	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Anthracene [4]	mg/L	0.004	0.0001	0.000012	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Benz(a)anthracene [4]	mg/L	0.0001	0.0001	0.000018	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Benzo(a)pyrene	mg/L	0.00001	-	0.000015	-	14	0	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
Chrysene	mg/L	-	-	-	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Fluoranthene [4]	mg/L	0.004	0.0002	0.00004	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Fluorene	mg/L	0.012	-	0.003	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
1-methylnaphthalene	mg/L	-	-	-	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
2-methylnaphthalene	mg/L	-	-	-	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Naphthalene	mg/L	0.001	0.001	0.0011	-	14	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
Phenanthrene	mg/L	0.0003	-	0.0004	-	14	0	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
Pyrene [4]	mg/L	0.00002	0.00002	0.000025	-	14	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Quinoline	mg/L	0.0034	-	0.0034	-	7	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.04	-	0.37	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.2	-	0.09	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Methyl-tert-butyl-ether	mg/L	-	3.4	10	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Styrene	mg/L	0.072	-	0.072	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Toluene	mg/L	0.0005	-	0.002	-	14	0	<0.000400	<0.000400	<0.000400	<0.000400	<0.000400
Total Xylenes	mg/L	0.03	-	-	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Chlorobenzene	mg/L	0.0013	-	0.0013	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
1-2-Dichlorobenzene	mg/L	0.0007	-	0.0007	-	14	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [5]	pg/L	-	-	-	-	6	6	0	0	0.000456	0.0277	0.0343
Upper Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	6	6	0.551	0.750	1.12	2.35	2.43
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	14	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	14	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	6	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	6	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:

Data presented is the statistics of the compiled dataset for the August 2018 to May 2025 monitoring period (Appendix 3.6-1); duplicate samples are not included.

B.C. WQG FWAL: British Columbia water quality guideline for the protection of freshwater aquatic life; CWQG FWAL: Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of freshwater aquatic life.

For parameters with variable water quality guidelines, values presented are based on median sample toxicity modifying factors (*e.g.*, dissolved organic carbon (DOC), pH, temperature) calculated from the Aug 2018 to May 2025 dataset.

Non-detect results are screened using the detection limit value.

Values shaded in light grey exceed the applicable long-term B.C. WQG FWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG FWAL.

Bolded values exceed the applicable long-term CWQG FWAL and underlined values exceed the applicable short-term CWQG FWAL.

[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment. Station SW-08 is a background station that does not receive discharge, therefore no WQG is established.

[2] The WQG for hexavalent chromium (Cr(IV)) is conservatively applied to total chromium results.

[3] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.

[4] The B.C. WQG-FWAL for acridine, anthracene, benz(a)anthracene, fluoranthene and pyrene applied are for photo-toxic freshwater environments.

[5] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.

[6] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-22:
Upstream East Creek (SW-09) Surface Water Quality

Parameter	Unit	Provincial Guideline (BC WQG FWAL)		Federal Guideline (CWQG FWAL)		Upstream East Creek (SW-09)						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	24	24	3.60	4.23	6.75	9.15	11.1
Conductivity (Field)	µS/cm	-	-	-	-	24	24	7.80	8.75	12.5	30.6	78.6
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	24	24	12.7	12.9	17.5	47.0	115
Dissolved Oxygen (Field)	mg/L	>=8	>=5	>=8	-	24	24	9.48	10.0	11.3	12.0	13.4
pH (Field)	s.u.	6.5 - 9.0	-	6.5 - 9.0	-	23	23	**6.26**	**6.34**	6.92	7.10	7.38
Salinity (Field)	ppt	-	-	-	-	23	23	0	0	0.0100	0.0200	0.0500
Temperature	°C	-	-	-	-	24	24	4.15	6.73	9.12	13.1	16.0
Total Suspended Solids (TSS) [1]	mg/L	-[1]	-[1]	-	-	24	4	<3.00	<3.00	<3.00	5.78	42.5
Total Hardness	mg/L	-	-	-	-	24	24	4.20	4.91	6.75	8.56	10.7
Turbidity (Field) [1]	NTU	-[1]	-[1]	-	-	24	24	0	0	0.0450	2.07	125
Nutrients												
Total Ammonia (as N)	mg/L	1.86	22	10.3	-	24	1	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
Bromide	mg/L	-	-	-	-	24	0	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Chloride	mg/L	150	600	120	640	24	19	<0.500	<0.500	0.565	0.677	0.920
Fluoride	mg/L	-	0.4	0.12	-	24	8	<0.0200	<0.0200	<0.0200	0.0234	0.0280
Nitrate (as N)	mg/L	3	32.8	3	124	24	14	<0.00500	<0.00500	0.00640	0.0136	0.0579
Nitrite (as N)	mg/L	0.02	0.06	0.06	-	24	0	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Sulphate	mg/L	128	-	-	-	24	24	1.50	1.54	1.65	2.10	2.56
Total Organic Carbon (TOC)	mg/L	-	-	-	-	23	23	0.910	1.06	1.53	3.13	3.23
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	23	23	0.940	1.06	1.41	2.68	3.08
Total Metals												
T-Al	mg/L	0.0355	-	0.1	-	24	24	0.0299	0.0386	0.0588	**0.103**	**0.235**
T-Sb	mg/L	0.074	0.25	-	-	24	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
T-As	mg/L	0.005	-	0.005	-	24	17	<0.000100	<0.000100	0.000115	0.000167	0.000180
T-Be	mg/L	0.00013	-	-	-	24	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
T-B	mg/L	1.2	-	1.5	29	24	0	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
T-Ba	mg/L	1	-	-	-	24	24	0.00208	0.00223	0.00269	0.00335	0.00410
T-Cd	mg/L	-	-	0.0000364	0.000136	24	24	0.00000500	0.00000586	0.00000750	0.0000118	0.0000189
T-Ca	mg/L	-	-	-	-	24	24	1.44	1.69	2.33	2.97	3.69
T-Cr [2]	mg/L	0.0025	-	0.001	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Total Hexavalent Chromium	mg/L	0.0025	-	0.001	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Total Trivalent Chromium	mg/L	0.0089	-	0.0089	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
T-Co	mg/L	-	-	0.001	-	24	1	<0.000100	<0.000100	<0.000100	<0.000100	0.000130
T-Cu	mg/L	-	-	0.002	-	24	24	0.000520	0.000543	0.000710	0.00112	**0.00205**
T-Fe	mg/L	-	1	0.3	-	24	18	<0.0100	<0.0100	0.0135	0.0288	0.0880
T-Pb	mg/L	-	-	-	-	24	2	<0.0000500	<0.0000500	<0.0000500	<0.0000500	0.000130
T-Mg	mg/L	-	-	-	-	24	24	0.148	0.172	0.226	0.286	0.355
T-Mn	mg/L	0.63	0.61	-	-	24	24	0.000380	0.000595	0.000890	0.00223	0.00751
T-Hg [3]	mg/L	0.00002	-	-	-	24	0	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
Total Methylmercury	mg/L	0.0000001	-	0.000004	-	23	1	<0.0000000200	<0.0000000200	<0.0000000200	<0.0000000200	<0.0000000800
T-Mo	mg/L	7.6	46	0.073	-	24	24	0.000304	0.000325	0.000488	0.000652	0.000823
T-Ni	mg/L	-	-	0.025	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
T-Se	mg/L	0.002	-	0.001	-	24	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
T-Sr	mg/L	-	-	-	-	24	24	0.00799	0.00893	0.0122	0.0167	0.0201
T-Ag	mg/L	0.00012	-	0.00025	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
T-Tl	mg/L	0.00003	-	0.0008	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
T-U	mg/L	0.0075	-	0.015	0.033	24	24	0.0000910	0.000101	0.000127	0.000194	0.000247
T-V	mg/L	0.06	-	0.12	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
T-Zn	mg/L	-	-	-	-	24	0	<0.00300	<0.00300	<0.00300	<0.00300	<0.00300
Dissolved Metals												
D-Al	mg/L	-	-	-	-	24	24	0.0222	0.0247	0.0373	0.0937	0.124
D-Sb	mg/L	-	-	-	-	24	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
D-As	mg/L	-	-	-	-	24	7	<0.000100	<0.000100	<0.000100	0.000131	0.000160
D-Be	mg/L	-	-	-	-	24	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
D-B	mg/L	-	-	-	-	24	0	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
D-Ba	mg/L	-	-	-	-	24	24	0.00205	0.00224	0.00256	0.00327	0.00361
D-Cd	mg/L	0.000029	0.000038	-	-	24	20	<0.00000500	<0.00000500	0.00000710	0.00000948	0.0000102
D-Ca	mg/L	-	-	-	-	24	24	1.38	1.67	2.25	3.02	3.47
D-Cr	mg/L	-	-	-	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dissolved Trivalent Chromium	mg/L	-	-	-	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
D-Co	mg/L	0.00039	-	-	-	24	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
D-Cu	mg/L	0.0002	0.001081	0.0002	-	24	24	**0.000450**	**0.000476**	**0.000590**	**0.00103**	**0.00137**
D-Fe	mg/L	-	0.35	-	-	24	2	<0.0100	<0.0100	<0.0100	<0.0100	0.0300
D-Pb	mg/L	0.00139	-	0.002775	-	24	1	<0.0000500	<0.0000500	<0.0000500	<0.0000500	0.0000750
D-Mg	mg/L	-	-	-	-	24	24	0.156	0.171	0.222	0.280	0.326
D-Mn	mg/L	-	-	0.23	0.624	24	22	<0.000100	0.000123	0.000170	0.000332	0.00255
D-Hg	mg/L	-	-	-	-	24	1	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
D-Mo	mg/L	-	-	-	-	24	24	0.000282	0.000326	0.000468	0.000670	0.000829
D-Ni	mg/L	0.0006	0.0095	-	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
D-Se	mg/L	-	-	-	-	24	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
D-Sr	mg/L	1.25	-	2.5	-	24	24	0.00776	0.00885	0.0119	0.0165	0.0206
D-Ag	mg/L	-	-	-	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
D-Tl	mg/L	-	-	-	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
D-U	mg/L	-	-	-	-	24	24	0.0000770	0.0000860	0.000103	0.000169	0.000186
D-V	mg/L	-	-	-	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
D-Zn	mg/L	0.00415	0.00818	0.002556	0.009017	24	1	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	0.0058	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Acridine [4]	mg/L	0.003	0.00005	0.0044	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Anthracene [4]	mg/L	0.004	0.0001	0.000012	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Benz(a)anthracene [4]	mg/L	0.0001	0.0001	0.000018	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Benzo(a)pyrene	mg/L	0.00001	-	0.000015	-	24	0	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.00000500
Chrysene	mg/L	-	-	-	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Fluoranthene [4]	mg/L	0.004	0.0002	0.00004	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Fluorene	mg/L	0.012	-	0.003	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
1-methylnaphthalene	mg/L	-	-	-	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
2-methylnaphthalene	mg/L	-	-	-	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Naphthalene	mg/L	0.001	0.001	0.0011	-	24	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
Phenanthrene	mg/L	0.0003	-	0.0004	-	24	0	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.0000200
Pyrene [4]	mg/L	0.00002	0.00002	0.000025	-	24	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Quinoline	mg/L	0.0034	-	0.0034	-	17	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.04	-	0.37	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.2	-	0.09	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Methyl-tert-butyl-ether	mg/L	-	3.4	10	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Styrene	mg/L	0.072	-	0.072	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Toluene	mg/L	0.0005	-	0.002	-	24	0	<0.000400	<0.000400	<0.000400	<0.000400	<0.000400
Total Xylenes	mg/L	0.03	-	-	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Chlorobenzene	mg/L	0.0013	-	0.0013	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
1-2-Dichlorobenzene	mg/L	0.0007	-	0.0007	-	24	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [5]	pg/L	-	-	-	-	9	9	0	0	0.000357	0.305	1.40
Upper Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	9	9	0.799	0.865	1.39	1.72	2.01
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	24	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	24	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	10	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	10	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:

Data presented is the statistics of the compiled dataset for the August 2018 to May 2025 monitoring period (Appendix 3.6-1); duplicate samples are not included.

B.C. WQG FWAL: British Columbia water quality guideline for the protection of freshwater aquatic life; CWQG FWAL: Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of freshwater aquatic life.

For parameters with variable water quality guidelines, values presented are based on median sample toxicity modifying factors (*e.g.*, dissolved organic carbon (DOC), pH, temperature) calculated from the Aug 2018 to May 2025 dataset.

Non-detect results are screened using the detection limit value.

Values shaded in light grey exceed the applicable long-term B.C. WQG FWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG FWAL.

Bolded values exceed the applicable long-term CWQG FWAL and underlined values exceed the applicable short-term CWQG FWAL.

[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment. Station SW-09 is a background station that does not receive discharge, therefore no WQG is established.

[2] The WQG for hexavalent chromium (Cr(IV)) is conservatively applied to total chromium results.

[3] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.

[4] The B.C. WQG-FWAL for acridine, anthracene, benz(a)anthracene, fluoranthene and pyrene applied are for photo-toxic freshwater environments.

[5] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.

[6] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-23:
Non-Contact Water Quality from Diversion Ditches (OUT-01, OUT-02 OUT-06, SW-05 and SW-06)

Parameter	Unit	Provincial Guideline (BC WQG FWAL)		Federal Guideline (CWQG FWAL)		Non-Contact Water Diversion Ditch Outlets (OUT-01, OUT-02, OUT-06, SW-05, SW-06)						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	49	0	1.60	2.50	5.10	20.0	36.5
Conductivity (Field)	µS/cm	-	-	-	-	62	0	0.500	7.22	14.5	43.6	131
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	25	0	0.700	10.5	16.2	22.8	39.8
Dissolved Oxygen (Field)	mg/L	>=8	>=5	>=8	-	63	0	8.98	10.5	11.8	13.1	14.3
pH (Field)	s.u.	6.5 - 9.0	-	6.5 - 9.0	-	61	0	**5.60**	**6.09**	6.60	7.60	8.20
Salinity (Field)	ppt	-	-	-	-	57	0	0	0.0100	0.0100	0.0300	0.0900
Temperature	°C	-	-	-	-	64	0	1.90	4.24	8.15	12.1	15.9
Total Suspended Solids (TSS) [1]	mg/L	-[1]	-[1]	-	-	69	54	<2.00	<2.00	<3.00	4.14	15.6
Total Hardness	mg/L	-	-	-	-	69	0	3.16	3.88	6.35	20.2	35.0
Turbidity (Field) [1]	NTU	-[1]	-[1]	-	-	64	0	0	0	0.574	2.36	36.8
Nutrients												
Total Ammonia (as N)	mg/L	1.84	22.9	10.3	-	69	54	<0.00500	<0.00500	0.00620	<0.0500	0.0910
Bromide	mg/L	-	-	-	-	67	66	<0.0500	<0.0500	<0.0500	<0.100	<0.100
Chloride	mg/L	150	600	120	640	69	21	0.160	0.400	0.510	0.960	19.6
Fluoride	mg/L	-	0.4	0.12	-	69	69	<0.0200	<0.0200	<0.0200	<0.100	<0.100
Nitrate (as N)	mg/L	3	32.8	3	124	67	0	0.0140	0.0360	0.0770	0.220	0.430
Nitrite (as N)	mg/L	0.02	0.06	0.06	-	69	68	<0.00100	<0.00100	<0.00100	<0.0100	<0.0100
Sulphate	mg/L	128	-	-	-	69	0	1.10	1.30	1.77	2.86	7.83
Total Organic Carbon (TOC)	mg/L	-	-	-	-	43	0	2.04	2.79	4.53	6.64	10.4
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	69	0	1.83	2.64	3.97	5.99	7.82
Total Metals												
T-Al	mg/L	0.0631	-	0.1	-	69	0	0.0727	**0.108**	**0.174**	**0.375**	**1.30**
T-Sb	mg/L	0.074	0.25	-	-	69	57	<0.0000500	<0.0000500	<0.000100	<0.000200	0.000540
T-As	mg/L	0.005	-	0.005	-	69	15	<0.0000500	0.0000598	0.000120	<0.000500	0.000700
T-Be	mg/L	0.00013	-	-	-	69	68	<0.0000100	<0.0000100	<0.0000200	<0.000100	<0.000100
T-B	mg/L	1.2	-	1.5	29	69	45	0.00280	0.00378	<0.0100	<0.0500	<0.0500
T-Ba	mg/L	1	-	-	-	69	8	0.00179	0.00228	0.00362	0.00758	0.0155
T-Cd	mg/L	-	-	0.000036	0.00015	69	29	<0.00000200	0.00000332	0.00000530	0.0000108	0.0000280
T-Ca	mg/L	-	-	-	-	69	0	1.08	1.33	2.30	7.67	13.1
T-Cr [2]	mg/L	0.0025	-	0.001	-	69	48	0.000160	0.000220	<0.000500	<0.000500	0.000940
Total Hexavalent Chromium	mg/L	0.0025	-	0.001	-	26	25	<0.000500	<0.000500	<0.000500	<0.000500	0.000750
Total Trivalent Chromium	mg/L	0.0089	-	0.0089	-	2	2	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
T-Co	mg/L	-	-	0.001	-	69	39	0.0000210	0.0000390	<0.000100	0.000141	0.000420
T-Cu	mg/L	-	-	0.002	-	69	3	0.000380	0.000450	0.000730	0.00130	**0.00411**
T-Fe	mg/L	-	1	0.3	-	69	0	0.00950	0.0169	0.0360	0.145	**0.856**
T-Pb	mg/L	-	-	-	-	69	17	<0.0000500	<0.0000500	0.000123	0.000409	0.00293
T-Mg	mg/L	-	-	-	-	69	0	0.108	0.131	0.172	0.365	1.45
T-Mn	mg/L	0.64	0.62	-	-	69	0	0.000511	0.000864	0.00178	0.00743	0.0247
T-Hg [3]	mg/L	0.00002	-	-	-	68	37	0.00000138	0.00000259	<0.00000500	<0.0000100	0.0000172
Total Methylmercury	mg/L	0.0000001	-	0.000004	-	68	18	<0.0000000200	0.0000000220	0.0000000420	0.000000137	0.000000408
T-Mo	mg/L	7.6	46	0.073	-	69	0	0.000225	0.000290	0.000579	0.00127	0.00273
T-Ni	mg/L	-	-	0.025	-	69	48	0.000161	0.000208	<0.000500	<0.000500	0.000890
T-Se	mg/L	0.002	-	0.001	-	69	61	<0.0000500	<0.0000500	<0.0000500	<0.000500	<0.000500
T-Sr	mg/L	-	-	-	-	69	0	0.00470	0.00554	0.00972	0.0312	0.0505
T-Ag	mg/L	0.00012	-	0.00025	-	69	68	<0.0000100	<0.0000100	<0.0000100	<0.0000500	<0.0000500
T-Tl	mg/L	0.00003	-	0.0008	-	69	68	<0.00000400	<0.00000400	<0.0000100	<0.0000200	<0.0000200
T-U	mg/L	0.0075	-	0.015	0.033	69	0	0.0000228	0.0000280	0.0000910	0.000281	0.000701
T-V	mg/L	0.06	-	0.12	-	69	53	<0.000400	<0.000500	0.000610	<0.00500	<0.00500
T-Zn	mg/L	-	-	-	-	69	44	<0.00100	0.00110	<0.00300	0.00578	0.0460
Dissolved Metals												
D-Al	mg/L	-	-	-	-	69	0	0.0484	0.0902	0.143	0.216	0.264
D-Sb	mg/L	-	-	-	-	69	59	<0.0000500	<0.0000500	<0.000100	<0.000200	0.000520
D-As	mg/L	-	-	-	-	69	36	<0.0000500	<0.0000500	<0.000100	0.000356	0.000710
D-Be	mg/L	-	-	-	-	69	69	<0.0000100	<0.0000100	<0.0000200	<0.000100	<0.000100
D-B	mg/L	-	-	-	-	69	44	<0.00200	0.00320	<0.0100	0.0126	<0.0500
D-Ba	mg/L	-	-	-	-	69	6	0.00159	0.00197	0.00315	0.00651	0.00972
D-Cd	mg/L	0.000032	0.000042	-	-	69	40	<0.00000200	0.00000260	<0.00000500	<0.0000100	0.0000143
D-Ca	mg/L	-	-	-	-	69	0	1.07	1.24	2.22	7.49	13.0
D-Cr	mg/L	-	-	-	-	69	57	0.000120	0.000226	<0.000500	<0.000500	0.000600
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	25	25	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dissolved Trivalent Chromium	mg/L	-	-	-	-	2	2	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
D-Co	mg/L	0.00039	-	-	-	69	45	0.0000178	0.0000250	<0.000100	<0.000100	0.000420
D-Cu	mg/L	0.000274	0.001808	0.0002	-	71	1	**0.000310**	**0.000420**	**0.000680**	**0.00111**	**0.00160**
D-Fe	mg/L	-	0.35	-	-	69	4	0.00790	<0.0100	0.0140	0.0292	0.240
D-Pb	mg/L	0.00248	-	0.004962	-	69	38	<0.0000500	<0.0000500	0.0000520	0.000141	<0.000200
D-Mg	mg/L	-	-	-	-	69	0	0.110	0.131	0.162	0.342	1.46
D-Mn	mg/L	-	-	0.23	0.695	69	0	0.000326	0.000432	0.000830	0.00182	0.0102
D-Hg	mg/L	-	-	-	-	69	41	0.000000660	0.00000226	<0.00000500	<0.0000100	<0.0000100
D-Mo	mg/L	-	-	-	-	69	0	0.000183	0.000268	0.000505	0.00120	0.00267
D-Ni	mg/L	0.0008	0.0134	-	-	69	50	0.000140	0.000172	<0.000500	<0.000500	<0.000500
D-Se	mg/L	-	-	-	-	69	64	<0.0000500	<0.0000500	<0.0000500	<0.000100	<0.000500
D-Sr	mg/L	1.25	-	2.5	-	69	0	0.00485	0.00586	0.00897	0.0300	0.0490
D-Ag	mg/L	-	-	-	-	69	69	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
D-Tl	mg/L	-	-	-	-	69	67	<0.00000400	<0.00000400	<0.0000100	<0.0000100	<0.0000200
D-U	mg/L	-	-	-	-	69	0	0.0000210	0.0000258	0.0000760	0.000222	0.000348
D-V	mg/L	-	-	-	-	69	64	<0.000400	<0.000500	<0.000500	0.00102	<0.00500
D-Zn	mg/L	0.00697	0.0106	0.0048	0.013	69	35	<0.00100	<0.00100	0.00110	<0.00400	**0.0459**
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	0.0058	-	31	30	<0.0000100	<0.0000100	<0.0000500	<0.0000500	0.0000730
Acridine [4]	mg/L	0.003	0.00005	0.0044	-	31	31	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.0000500
Anthracene [4]	mg/L	0.004	0.0001	0.000012	-	31	31	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Benz(a)anthracene [4]	mg/L	0.0001	0.0001	0.000018	-	31	30	<0.0000100	<0.0000100	<0.0000100	<0.0000100	**0.0000220**
Benzo(a)pyrene	mg/L	0.00001	-	0.000015	-	31	30	<0.00000500	<0.00000500	<0.0000100	<0.0000100	**0.0000248**
Chrysene	mg/L	-	-	-	-	31	30	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.0000500
Fluoranthene [4]	mg/L	0.004	0.0002	0.00004	-	31	30	<0.0000100	<0.0000100	<0.0000300	<0.0000300	**0.0000460**
Fluorene	mg/L	0.012	-	0.003	-	31	30	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.0000500
1-methylnaphthalene	mg/L	-	-	-	-	31	30	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
2-methylnaphthalene	mg/L	-	-	-	-	31	30	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
Naphthalene	mg/L	0.001	0.001	0.0011	-	31	30	<0.0000500	<0.0000500	<0.000200	<0.000200	0.000255
Phenanthrene	mg/L	0.0003	-	0.0004	-	31	30	<0.0000200	<0.0000200	<0.000100	<0.000100	<0.000100
Pyrene [4]	mg/L	0.00002	0.00002	0.000025	-	31	30	<0.0000100	<0.0000100	<0.0000200	<0.0000200	**0.0000420**
Quinoline	mg/L	0.0034	-	0.0034	-	31	31	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000101
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.04	-	0.37	-	28	28	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.2	-	0.09	-	28	28	<0.000500	<0.00100	<0.00100	<0.00100	<0.00100
Methyl-tert-butyl-ether	mg/L	-	3.4	10	-	28	28	<0.000500	<0.00100	<0.00100	<0.00100	<0.00100
Styrene	mg/L	0.072	-	0.072	-	28	28	<0.000500	<0.00100	<0.00100	<0.00100	<0.00100
Toluene	mg/L	0.0005	-	0.002	-	28	28	<0.000400	<0.000500	<0.000500	<0.000500	<0.00100
Total Xylenes	mg/L	0.03	-	-	-	28	28	<0.000500	<0.00200	<0.00200	<0.00200	<0.00200
Chlorobenzene	mg/L	0.0013	-	0.0013	-	4	4	<0.000500	<0.000500	0.000750	<0.00100	<0.00100
1-2-Dichlorobenzene	mg/L	0.0007	-	0.0007	-	4	4	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [5]	pg/L	-	-	-	-	32	0	0	0	0.00508	0.0742	0.240
Upper Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	32	0	0.606	0.707	1.11	1.91	3.94
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	5	5	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	5	5	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	26	26	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	26	26	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:

Data presented is the statistics of the compiled dataset (OUT-01, OUT-02, OUT-06, SW-05, SW-06) for the August 2018 to May 2025 monitoring period (Appendix 3.6-1); duplicate samples are not included.

B.C. WQG FWAL: British Columbia water quality guideline for the protection of freshwater aquatic life; CWQG FWAL: Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of freshwater aquatic life.

For parameters with variable water quality guidelines, values presented are based on median sample toxicity modifying factors (*e.g.*, dissolved organic carbon (DOC), pH, temperature) calculated from the Aug 2018 to May 2025 dataset.

Non-detect results are screened using the detection limit value.

Values shaded in light grey exceed the applicable long-term B.C. WQG FWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG FWAL.

Bolded values exceed the applicable long-term CWQG FWAL and underlined values exceed the applicable short-term CWQG FWAL.

[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment. Non-contact water stations (OUT-01, OUT-02, OUT-06, SW-05, SW-06) do not receive discharge, therefore no WQG is established.

[2] The WQG for hexavalent chromium (Cr(IV)) is conservatively applied to total chromium results.

[3] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.

[4] The B.C. WQG-FWAL for acridine, anthracene, benz(a)anthracene, fluoranthene and pyrene applied are for photo-toxic freshwater environments.

[5] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.

[6] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

3.7 Hydrogeology

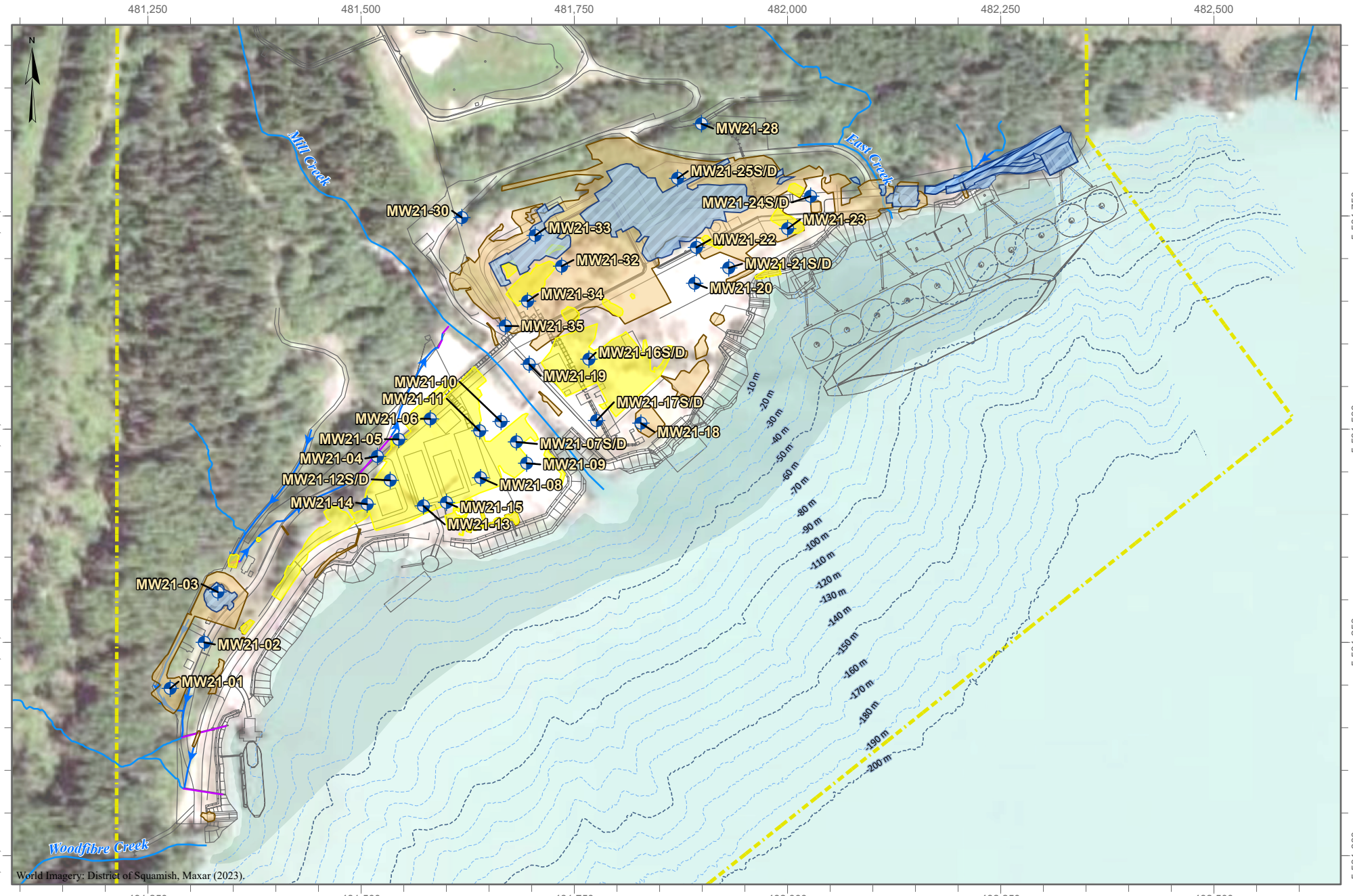
Hydrogeological conditions in the Project site were characterized prior to construction to establish baseline groundwater quality and groundwater quantity to inform the potential for groundwater inflows into open excavations, and to evaluate the potential for negative groundwater interaction associated with open excavations (Stantec, 2022a). The results of the monitoring program were presented in the technical assessment report for the construction WDA (Lorax, 2023) that supported the application for WDA Effluent Permit PE-111578. For completeness of this TAR, a brief description of the pre-construction (Stantec, 2022a) monitoring program is presented below.

The baseline hydrogeochemical assessment (Stantec, 2022a), included a physical and chemical hydrogeology program with the following components:

1) borehole advancement and subsurface soil characterization at 35 distinct locations and the installation of 38 monitoring wells across the development area (Figure 3-14);
2) quantification of hydraulic properties of subsurface materials through slug testing of 12 monitoring wells and constant rate pumping tests of six (6) wells; and,
3) completion of four (4) groundwater monitoring and sampling events to characterize baseline conditions, groundwater impacts and inform groundwater management during Construction.

Monitoring well installation and groundwater sampling were conducted in accordance with the B.C. Ministry of Environment and Climate Change Strategy (now known as B.C. Ministry of Environment and Parks) field sampling manual, and technical guidance on contaminated sites (Stantec, 2022a).

The assessment of physical hydrogeology included manual and automated groundwater level measurements and hydraulic testing (Stantec, 2022a). Manual water level measurements were collected during four monitoring events in February/March 2021, June 2021, November/December 2021, and March 2022. Groundwater was generally close to the ground surface (above ground to approximately 7 m below ground) across the Project site, with elevations that ranged approximately 0 to 43 meters above sea level (masl).



LEGEND

- Monitoring Well
- Cut and Demo - Soil Improv Excavation
- Overburden Excavation
- Rock Blasting
- Site Linework (Reduced)
- Certified Project Area
- Watercourse
- Non-Contact Ditch
- Culvert / Outfall
- Bathymetry Contour (Major: 50m)
- Bathymetry Contour (Minor: 10m)

Note: Overburden excavation and rock blasting areas are shown through January 2025.

DATE SAVED:	Jul 22, 2026
DRAWN BY:	DM
REVIEWED:	PM
VERSION:	1

Coordinate System: *NAD 1983 UTM Zone 10N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Metre*

1:6,000

0 100 200 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Pre-Construction Monitoring Wells

PROJECT #: A825-1

FIGURE: 3-14

P:\@202506\Woodfibre\Drafting Figures\APRX\TAR - Operations Phase - Groundwater\TAR - Operations Phase - Groundwater\TAR - Operations Phase - Groundwater.aprx Figure 3-14 Pre-Construction Monitoring Wells

Pressure transducers were deployed in 12 monitoring wells in 2021 to collect hourly water level, temperature, and specific conductance measurements. Groundwater hydrographs generated from pressure transducer data showed limited to no seasonal variation through the monitoring record; however, a direct relationship between precipitation events and groundwater elevation, indicative of groundwater recharge was observed in the hydrographs across most of the Project site (Stantec, 2022a). Tidal influence on groundwater levels was also evaluated using the pressure transducer data, whereby time series groundwater levels and specific conductivity showed that wells near the seashore were tidally influenced, with decreasing influence with distance from the shore. Groundwater wells in the upslope areas showed no sign of tidal influence, which suggested that these wells were disconnected from the water table in the lower deltaic deposits. Further details on groundwater level responses across the Project site are provided in Stantec (2022a).

Hydraulic testing (slug tests, constant head pumping tests) was completed in 2021 to evaluate the hydraulic properties of subsurface materials at the Project site. Slug tests and pumping tests were completed in wells screened in materials ranging mainly from silt to gravel. Hydraulic conductivity estimates were obtained from the slug tests and pumping test, with storage coefficients estimated from the pumping tests.

Groundwater quality samples were collected approximately quarterly between February 2021 and March 2022 from up to 37 monitoring wells (Stantec, 2022a). Low flow purging and sampling methods were employed in general agreement with procedures outlined in US EPA (2017). Groundwater quality samples were analyzed for BTEX, VPH, LEPH, HEPH, PAH, total metals, dissolved metals, and/or general chemistry. In March and/or June 2021, PCDD/Fs were also tested in groundwater sampled from three wells in the vicinity of the historic pulp mill weak liquor tanks and diffuser infrastructure where hydrocarbon staining, odour, and an oily black sheen and/or potential black liquor were observed on sampling equipment and/or soils intersected by these wells. A total of 140 groundwater samples, including 14 field duplicate samples, were collected.

Additional groundwater samples were collected during pumping tests (three samples per well) completed in January and February 2021. Pumping tests were completed at six wells installed within the vicinity of general excavation areas. The purpose of sampling during the pumping tests was to characterize groundwater quality and determine if groundwater chemistry changed during pumping which could indicate mobilization of unknown contaminants due to pumping/dewatering (Stantec, 2022a).

Groundwater quality results from the quarterly monitoring events are tabulated and compared to B.C. CSR Generic Numerical Water Quality Standards for the protection of

FWAL and MWAL in Appendix 3.7-1. A statistical summary of the groundwater quality results for key parameters across the Project site is provided in Table 3-24. Results below detection limits are screened using the detection limit value. Parameters reported above the standards for the protection of FWAL include chloride, nitrite (as N), LEPH, pyrene, dissolved copper and dissolved chromium in one to seven groundwater samples. Nitrite (as N), LEPH, pyrene, dissolved copper and dissolved chromium also exceed the standards for the protection of MWAL in one to five samples. The statistical summary shows that 90th percentile values for all analytical parameters are below the standards for the protection of FWAL and MWAL. Further details regarding groundwater quality results across the Project site are provided in Stantec (2022a).

Baseline monitoring wells were situated within or close to soil improvement, overburden excavation, and bedrock blasting areas (Figure 3-14). The monitoring well network is reported by WLNG to no longer exist because of civil construction activities at the Project site, with groundwater monitoring ceasing in March 2022.

The B.C. Water Resource Atlas, a mapping application that displays water-related data, was searched on December 16, 2025. According to the B.C. Water Resource Atlas, there are no registered aquifers and no registered wells within or immediately downgradient of the Project site. The closest registered aquifers are located at a distance greater than six kilometers from the Project site (*i.e.*, at Shannon Falls and in Squamish, across and at the end of Howe Sound, respectively). The closest registered water supply well is situated approximately three kilometers across Howe Sound, near Murrin Provincial Park. Groundwater uses downgradient and within one kilometer of the Project site include marine and estuarine aquatic life.

Table 3-24:
Project Site Groundwater Water Quality Summary (February 2021 to March 2022)

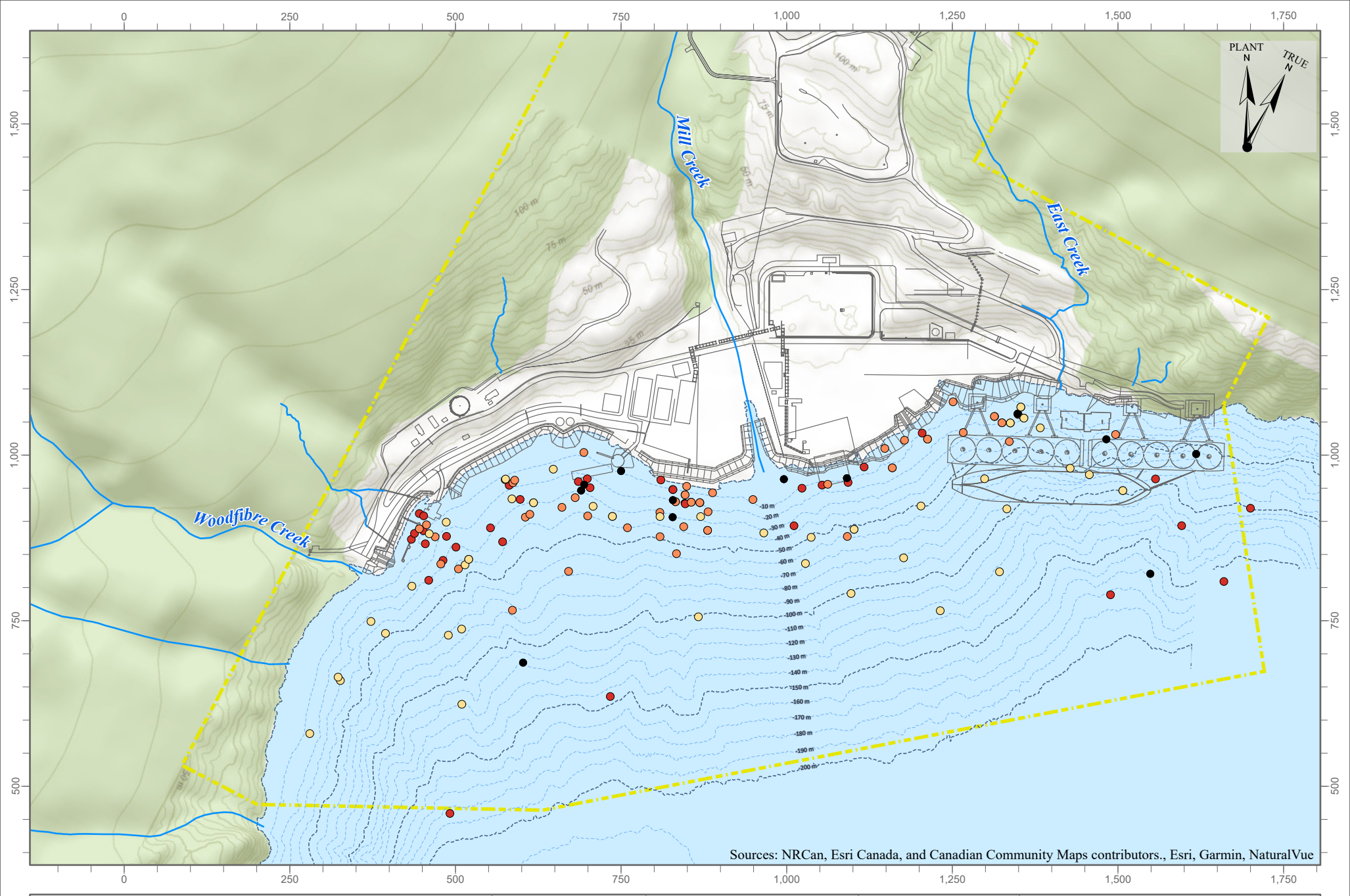
Parameter	Unit	BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters										
Total Alkalinity	mg/L	-	-	108	108	1.8	47.7	105	233	410
Conductivity (Lab)	µS/cm	-	-	108	108	11	117	270	686	6500
pH (Lab)	S.U.	-	-	108	108	5.92	6.88	7.465	9.043	11.5
Total Hardness	mg/L	-	-	109	109	4.6	35.08	79.4	218.2	770
Turbidity (Lab)	NTU	-	-	64	61	<0.1	0.25	1.6	16.4	4500
Nutrients										
Chloride	mg/L	1,500	-	107	74	<1	<1	2.3	63	1900
Fluoride[1]	mg/L	2 - 3[1]	15	64	25	<0.05	<0.05	<0.05	0.184	0.98
Nitrate (as N)	mg/L	400	400	109	77	<0.02	<0.02	0.092	0.5184	1.79
Nitrite (as N)[2]	mg/L	0.2 - 2[2]	0.2 - 2[2]	108	15	<0.005	<0.005	<0.005	0.00833	**3.32**
Sulphate[1]	mg/L	1,280 - 4,290[1]	1,280 - 4,290[1]	108	107	<1	4.07	17	70.6	320
Dissolved Organic Carbon (DOC)	mg/L	-	-	0	0	-	-	-	-	-
Total Metals										
T-Al	µg/L	-	-	109	109	4.7	23.98	141	2234	42100
T-Sb	µg/L	-	-	109	37	<0.5	<0.5	<0.5	2.074	42.1
T-As	µg/L	-	-	109	81	<0.1	<0.1	0.31	4.606	27.7
T-Be	µg/L	-	-	45	3	<0.1	<0.1	<0.1	0.148	<1
T-B	µg/L	-	-	109	40	<50	<50	<50	241.2	716
T-Ba	µg/L	-	-	109	108	<1	5.38	21.3	66.16	253
T-Cd	µg/L	-	-	109	58	<0.01	<0.01	0.011	0.0802	0.448
T-Ca	mg/L	-	-	109	109	1.63	13.02	27.5	78.78	104
T-Cr	µg/L	-	-	109	17	<1	<1	<1	4.76	41.9
T-Co	µg/L	-	-	109	55	<0.2	<0.2	0.23	1.466	12.3
T-Cu	µg/L	-	-	108	93	<0.2	0.377	0.815	5.083	66.2
T-Fe	µg/L	-	-	109	102	<5	11.9	182	3678	17200
T-Pb	µg/L	-	-	109	52	<0.2	<0.2	<0.2	1.912	56.9
T-Mg	mg/L	-	-	109	105	<0.05	0.3742	1.98	9.214	123
T-Mn	µg/L	-	-	109	97	<1	<1	24.5	399	1390
T-Hg	µg/L	-	-	109	22	<0.0019	<0.0019	<0.0019	0.0038	0.0245
T-Mo	µg/L	-	-	109	95	<1	<1	5	21.94	92
T-Ni	µg/L	-	-	109	16	<1	<1	<1	1.92	12.4
T-Se	µg/L	-	-	108	22	<0.1	<0.1	<0.1	0.284	5.03
T-Ag	µg/L	-	-	108	9	<0.02	<0.02	<0.02	0.0206	0.221
T-Tl	µg/L	-	-	45	23	<0.01	<0.01	0.014	0.036	0.159
T-U	µg/L	-	-	109	98	<0.1	0.116	0.88	16.84	55.1
T-V	µg/L	-	-	109	18	<5	<5	<5	7.42	71.9
T-Zn	µg/L	-	-	107	27	<5	<5	<5	16.5	80
Dissolved Metals										
D-Al	µg/L	-	-	109	100	<3	3.58	9.3	922.8	6220
D-Sb	µg/L	90	2500	109	34	<0.5	<0.5	<0.5	2.014	43.6
D-As	µg/L	50	125	109	73	<0.1	<0.1	0.21	3.614	28.3
D-Be	µg/L	1.5	1000	109	1	<0.1	<0.1	<0.1	<0.1	<0.5
D-B	µg/L	12000	12000	109	43	<50	<50	<50	245.2	752
D-Ba	µg/L	10000	5000	109	108	<1	4.44	18.4	47.22	87
D-Cd[1]	µg/L	0.5 - 4[1]	15	109	40	<0.01	<0.01	<0.01	0.0436	0.13
D-Ca	mg/L	-	-	109	109	1.41	11.9	26.3	70.48	107
D-Cr[3]	µg/L	10	15	109	11	<1	<1	<1	4.84	**29**
D-Co	µg/L	40	40	109	44	<0.2	<0.2	<0.2	0.944	2.56
D-Cu[1]	µg/L	20 - 90[1]	20	108	91	<0.2	<0.2	0.6	3.178	**32**
D-Fe	µg/L	-	-	109	68	<5	<5	12.9	1552	7580
D-Pb[1]	µg/L	40 - 160[1]	20	109	9	<0.2	<0.2	<0.2	0.304	2.17
D-Mg	mg/L	-	-	109	101	<0.05	0.2512	1.87	9.084	119
D-Mn	µg/L	-	-	109	77	<1	<1	9.5	394.4	984
D-Hg	µg/L	0.25	0.25	76	9	<0.0019	<0.0019	<0.0019	0.00215	0.0184
D-Mo	µg/L	10000	10000	109	94	<1	<1	5	21.82	101
D-Ni[1]	µg/L	250 - 1,500[1]	83	109	11	<1	<1	<1	1.32	<5
D-Se	µg/L	20	20	109	19	<0.1	<0.1	<0.1	0.29	5.17
D-Sr	µg/L	-	-	109	109	4.5	49.92	116	341	951
D-Ag[1]	µg/L	0.5 - 15[1]	15	109	0	<0.02	<0.02	<0.02	<0.02	<0.1
D-Tl	µg/L	3	3	109	28	<0.01	<0.01	<0.01	0.0182	<0.05
D-U	µg/L	85	85	109	89	<0.1	<0.1	0.56	14.68	53.8
D-V	µg/L	-	-	109	13	<5	<5	<5	6.76	73.4
D-Zn[1]	µg/L	75 - 2,400[1]	100	109	9	<5	<5	<5	5.56	38.9
Polycyclic Aromatic Hydrocarbons (PAHs)										
Acenaphthene	µg/L	60	60	107	7	<0.05	<0.05	<0.05	<0.05	0.14
Acridine	µg/L	0.5	0.5	108	1	<0.05	<0.05	<0.05	<0.05	0.087
Anthracene	µg/L	1	1	108	1	<0.01	<0.01	<0.01	<0.01	0.077
Benzo(a)anthracene	µg/L	1	1	108	3	<0.01	<0.01	<0.01	<0.01	0.13
Benzo(a)pyrene	µg/L	0.1	0.1	108	4	<0.005	<0.005	<0.005	<0.005	0.06
Chrysene	µg/L	1	1	108	3	<0.02	<0.02	<0.02	<0.02	0.28
Fluoranthene	µg/L	2	2	108	6	<0.02	<0.02	<0.02	<0.02	0.3
Fluorene	µg/L	120	120	108	6	<0.05	<0.05	<0.05	<0.05	0.16
1-methylnaphthalene	µg/L	-	-	108	2	<0.05	<0.05	<0.05	<0.05	0.12
2-methylnaphthalene	µg/L	-	-	108	0	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	µg/L	10	10	108	0	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	3	3	108	4	<0.05	<0.05	<0.05	<0.05	0.06
Pyrene	µg/L	0.2	0.2	108	12	<0.02	<0.02	<0.02	0.0246	**0.31**
Quinoline	µg/L	-	-	107	2	<0.02	<0.02	<0.02	<0.02	<0.08
Volatile Organic Compounds (VOCs)										
Benzene	µg/L	400	1000	83	0	<0.4	<0.4	<0.4	<0.4	<0.4
Ethylbenzene	µg/L	2000	2500	83	0	<0.4	<0.4	<0.4	<0.4	<0.4
Methyl-tert-butyl-ether	µg/L	34000	4400	83	0	<4	<4	<4	<4	<4
Styrene	µg/L	720	720	83	0	<0.4	<0.4	<0.4	<0.4	<0.4
Toluene	µg/L	5	2000	83	0	<0.4	<0.4	<0.4	<0.4	<0.4
Total Xylenes	µg/L	300	300	83	0	<0.4	<0.4	<0.4	<0.4	<0.4
Dioxins and Furans										
Lower Bound PCDD/F TEQ	pg/L	-	-	4	4	0.7	0.7	1.7	447	637
Upper Bound PCDD/F TEQ	pg/L	-	-	4	4	5.0	5.0	5.1	553	788
Extractable Petroleum Hydrocarbons (EPHs)										
LEPH[6]	mg/L	0.5	0.5	107	2	<0.2	<0.2	<0.2	<0.2	**1.8**
HEPH	mg/L	-	-	107	4	<0.2	<0.2	<0.2	<0.2	6.5
EPH (10-19)[4,5]	mg/L	5	5	107	2	<0.2	<0.2	<0.2	<0.2	1.8
EPH (19-32)	mg/L	-	-	107	4	<0.2	<0.2	<0.2	<0.2	6.5

Notes:
Shaded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect freshwater aquatic life.
Bolded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect marine and estuarine aquatic life.
Values preceded by < indicate a detection limit. Detection limits were included in statistics calculations using their full value.
[1] BC CSR standard is calculated based on mean water hardness calculated from 'dissolved' mineral content – Hardness, mg equivalent CaCO3/L. Hardness is for the aquatic receiving environment.
[2] The BC CSR standard for nitrite is calculated based on chloride concentration.
[3] The BC CSR standard for hexavalent chromium (Cr(IV)) is conservatively applied to dissolved chromium.
[4] BC CSR standard is applicable at all sites, irrespective of water use.
[5] EPH (10-19) – Extractable Petroleum Hydrocarbons (nC10-nC19) in water includes all the extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods, where approved methods are specified by a director's protocol.
[6] LEPH – Light Extractable Petroleum Hydrocarbons in water, is the sum of extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods minus the sum of naphthalene and phenanthrene, where approved methods are specified by a director's protocol.

3.8 Marine Sediments

This section describes marine sediment conditions within the Project boundaries to the end of August 2025. The Project boundary extends up to 460 m from the shoreline into the marine environment, as shown on Figure 3-15. Marine sediment quality within the Project boundaries has been impacted by historic industrial activities at the Woodfibre site that include the placement of fill in the foreshore environment, influence from woodchip piles located on the foreshore, and discharge of pulp mill effluent to Howe Sound (Keystone, 2014a). Marine sediments adjacent to the shoreline within the Project boundaries are managed under the B.C. CSR. Sediments contaminated with tributyltin or covered with woodchips were remediated in 2013 by dredging. Following the remediation, the residual concentrations of parameters of concern (*i.e.,* Cu, Pb, and PAHs) in sediments were determined to be low risk to ecological receptors (Keystone; 2014c and 2014d). The B.C. Ministry of Environment issued a CofC for the water lot (*i.e.*, marine sediments) portion of the Project site in December 2014 (refer to Section 1.2).

Water depth in the Project area ranges from zero at the shoreline to greater than 200 mas shown in Figure 3-15. Marine sediments in the Project area are predominantly fine-grained, composed mainly of clay, silt, and sand. This particle size distribution is consistent with the broad regional sediment facies (sandy silt, and silt) described by Syvitski and MacDonald (1981). Coarser-grained sediments are concentrated near west of Mill Creek and along the shoreline in the northeast portion of the marine area. Samples with very high (> 60 %) sand and gravel content are clustered around previously dredged areas.



LEGEND

- More that 75% of Parameters Measured Exceed Lowest Applicable Federal/Provincial Guideline
- 50% to 75% of Parameters Measured Exceed Lowest Applicable Federal/Provincial Guideline
- Up to 50% of Parameters Measured Exceed Lowest Applicable Federal/Provincial Guideline
- No Parameters Measured Exceed Lowest Applicable Federal/Provincial Guideline
- Site Linework (Reduced)
- Certified Project Area
- Watercourse
- Bathymetry Contour (Major: 50m)
- Bathymetry Contour (Minor: 10m)

DATE SAVED:	Jul 22, 2026
DRAWN BY:	DM
REVIEWED:	PM
VERSION:	1

Coordinate System: *WLNG Site Grid DGN FILES*
Projection: *Rectified Skew Orthomorphic Center*
Datum: *NAD 1983 2011*
Units: *Metre*

1:7,500

0 100 200 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Marine Sediment Monitoring Locations During Pre-Construction (2006-2023) and Construction (2024-2025) Periods

PROJECT #: A825-1

FIGURE: 3-15

P:\@202506\Woodfibre\Drafting Figures\APRX\WLNG Historic Dredging\WLNG Historic Dredging\WLNG Historic Dredging.aprx

Figure 3-15 WLNG CPA Sediment Sample Locations (2006-2025)

3.8.1 Marine Sediment Monitoring Programs

This section provides an overview of marine sediment sampling programs conducted from 2006 to 2025. A total of 152 samples collected from non-dredged areas are included in the sediment dataset. The monitoring programs and parameters tested are summarized in Table 3-25 and Table 3-26, respectively.

Table 3-25:
Summary of Marine Sampling Programs Included in the Sediment Dataset

Project Stage	Sampling Year	No. of Site Samples	No. of Reference Samples	Sampling Program(s)	Sampling Method
CSR Investigation	2006	36	3	Preliminary Site Investigation (PSI) Stage 2 / Detailed Site Investigation (DSI) (Keystone)	Grab and/or core sampler
	2007	12	0		Grab and/or core sampler
	2013	15	3	Supplementary Site Investigation (SSI) (Keystone)	Grab sampler
EA Application to Construction	2014	8	2	EA Baseline (Golder)	Grab sampler
	2019	11	0	Post-docks/piles removal sampling (Keystone)	Hand sampler
	2021	6	4	Pre-Construction Baseline (Keystone)	Grab sampler
	2022	7	0	Geotechnical sampling (Stantec)	Core sampler
	2023	13	0	Initial Dilution Zone (IDZ) Baseline (Keystone)	Grab sampler
Construction Monitoring	2024	10	2	IDZ Monitoring (Roe); Floatel monitoring (Keystone)	Grab sampler
	2025	34	4	IDZ monitoring (Roe); Floatel & site-wide monitoring (Keystone)	Grab Sampler

Notes:
Duplicate and triplicate samples were not included in the Number of Samples count.
Reference samples were collected outside the Project site boundary.
Hand samplers = samples collected by divers using scoops, spoons, or shovels; Grab sampler = Ponar and Van Veen samplers deployed on poles or lines from boats; Core samplers = gravity corers, poston corers, box corers, and vibracorers deployed from boats or barges

Table 3-26:
Parameters Analysed in Marine Sediments

Year	Total No. of Samples	No. of Samples Analyzed by Parameter						Analytical Laboratory
		Total Metals[1]	SEMs[1]	PAHs[2]	PCDD/F[3]	PCBs[4]	TBT	
2006	36	26	0	28	4	2	10	ALS, Pacific Rim
2007	12	0	0	12	0	0	0	ALS, Pacific Rim
2013	15	9	0	10	0	0	2	Maxxam, Pacific Rim
2014	8	8	8	8	4	8	0	ALS
2019	11	10	0	10	0	0	3	ALS
2021	6	6	6	6	6	0	6	BV
2022	7	7	0	7	0	0	2	BV
2023	13	13	5	13	8	13	0	ALS
2024	10	10	8	2	2	2	0	ALS
2025	34	34	22	25	25	12	13	ALS
Total	**152**	**123**	**43**	**121**	**49**	**37**	**36**	-

Notes:
ALS = ALS Environmental, Maxxam = Maxxam Analytical Laboratories, BV = Bureau Veritas, Pacific Rim = Pacific Rim Laboratories.
SEM = simultaneously extracted metals; PAH = polycyclic aromatic hydrocarbons; PCDD/F = polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans; PCB = polychlorinated biphenyls; TBT = tributyltin.
[1] Sample count based on total copper.
[2] Sample count based on acenaphthene.
[3] Sample count based on PCDD/F, lower bound TEQ.
[4] Sample count based on aroclor 1254.

3.8.2 Sediment Quality Results

Sediment quality is represented by marine sediment data from 152 samples collected from 2006 to 2025 (Table 3-26). Samples collected from areas that were subsequently dredged, or were collected from cores below 0.5 m depth are excluded from the dataset. The 0.5 m depth threshold reflects the maximum extent of bioturbation in marine sediments and aligns with the typical penetration depth of grab samplers (*e.g.*, Ponar, Van Veen). Surface grab and diver-collected hand samples are assumed to have a depth of 0 m unless otherwise specified. Tabulated sample results are presented in Appendix 3.8-1.

The marine sediment results are screened against the B.C. CSR Schedule 3.4 marine sediment standard for sensitive use, the B.C. Working Sediment Quality Guideline for the Protection of Benthic Aquatic Life in marine environments, and the CCME Sediment Quality Guidelines for the Protection of Marine Aquatic Life (interim sediment quality guideline and probable effects levels) as listed in Table 3-27. Summary statistics for

parameters with applicable guidelines are presented in Table 3-28. Where duplicate or triplicate samples are available, results are averaged for inclusion in the summary statistics. Marine sediment duplicates and triplicates show some variability, which reflects the heterogeneity of the sampling medium.

Marine sediment sampling locations are illustrated relative to key Project infrastructure in Figure 3-15. Sample locations are colour-coded according to the proportion of parameters that exceeded a guideline. This scheme is selected to compensate for varied analytical parameters across sampling programs (see Table 3-16). Sampling locations where more than 75% of measured parameters exceed the lowest applicable guideline are generally clustered in proximity to the shoreline.

Marine sediments in the Project area have elevated concentrations of metals, PAHs, PCDD/Fs, and PCBs with respect to reference standards and guidelines. The sediments exhibit strong heterogeneity with respect to all parameters, represented by the minimum and maximum concentrations (Table 3-28). Maximum values exceed one or more applicable guidelines for the majority of parameters. PAH and PCDD/F TEQ median values frequently exceed applicable guidelines.

Across the Project area, marine sediment quality is heterogeneous; samples collected south of Woodfibre Creek exhibit a lower proportion of guideline exceedances compared to samples collected between Woodfibre Creek and Mill Creek. Elevated concentrations of metals, PAHs, and PCDD/F TEQs are indicated at stations near the shoreline compared to those in deeper waters.

The sediment dataset provides broad spatial resolution of sediment data within the Project boundaries, including deep-water samples collected in 2006 and a high density of samples in the vicinity of Project infrastructure. There are no discernible trends that distinguish construction monitoring data (2024 to 2025) from pre-construction monitoring results.

Table 3-27:
Sediment Quality Guidelines

Category	Parameter	Units	Guidelines				
			CSR Sensitive Use [1]	CCME ISQG [2]	CCME PEL [3]	B.C. ENV Lower WSQG [4]	B.C. ENV Upper WSQG [5]
Total Metals	Arsenic (As)	mg/kg	26	7.24	41.6	7.24	41.6
	Cadmium (Cd)	mg/kg	2.6	0.7	4.2	0.7	4.2
	Chromium (Cr)	mg/kg	99	52.3	160	52.3	160
	Copper (Cu)	mg/kg	67	18.7	108	18.7	108
	Lead (Pb)	mg/kg	69	30.2	112	30.2	112
	Mercury (Hg)	mg/kg	0.43	0.13	0.7	0.13	0.7
	Nickel (Ni)	mg/kg	-	-	-	30	50
	Silver (Ag)	mg/kg	-	-	-	1	2.2
	Zinc (Zn)	mg/kg	170	124	271	124	271
SEMs	Cadmium (Cd)	mg/kg	2.6	0.7	4.2	0.7	4.2
	Copper (Cu)	mg/kg	67	18.7	108	18.7	108
	Nickel (Ni)	mg/kg	-	-	-	30	50
	Mercury (Hg)	mg/kg	0.43	0.13	0.7	0.13	0.7
	Nickel (Ni)	mg/kg	-	-	-	30	50
	Lead (Pb)	mg/kg	69	30.2	112	30.2	112
	Zinc (Zn)	mg/kg	170	124	271	124	271
PAHs	Acenaphthene	mg/kg	0.055	0.00671	0.0889	0.00671	0.0889
	Acenaphthylene	mg/kg	0.079	0.00587	0.128	0.00587	0.128
	Anthracene	mg/kg	0.15	0.0469	0.245	0.0469	0.245
	Benzo(a)anthracene	mg/kg	0.43	0.0748	0.693	0.0748	0.693
	Benzo(a)pyrene	mg/kg	0.47	0.0888	0.763	0.0888	0.763
	Benzo(b&j)fluoranthene	mg/kg	-	-	-	2.3	4.5
	Benzo(g,h,i)perylene	mg/kg	-	-	-	0.31	0.78
	Benzo(k)fluoranthene	mg/kg	-	-	-	2.3	4.5
	Chrysene	mg/kg	0.52	0.108	0.846	0.108	0.846
	Dibenz(a,h)anthracene	mg/kg	0.084	0.00622	0.135	0.00622	0.135
	Fluoranthene	mg/kg	0.93	0.113	1.494	0.113	1.494
	Fluorene	mg/kg	0.089	0.0212	0.144	0.0212	0.144
	Indeno (1,2,3-cd)pyrene	mg/kg	-	-	-	0.34	0.88
	2-Methylnaphthalene	mg/kg	0.12	0.02	0.202	0.02	0.202
	Naphthalene	mg/kg	0.24	0.0346	0.391	0.0346	0.391
	Phenanthrene	mg/kg	0.34	0.0867	0.544	0.0867	0.544
	Pyrene	mg/kg	0.87	0.153	1.398	0.153	1.398
VOCs	1-2-4-trichlorobenzene	mg/kg	-	-	-	-	0.018
	1-4-Dichlorobenzene	mg/kg	-	-	-	0.031	0.09
PCDD/Fs	Lower Bound PCDD/F TEQ	ng/kg	-	0.85	21.5	-	-
	Upper Bound PCDD/F TEQ	ng/kg	-	0.85	21.5	-	-
PCBs	Aroclor1254	mg/kg	-	0.0633	0.709	-	-
	Total PCBs	mg/kg	-	0.0215	0.189	3.7E-06	-

[1] Contaminated Sites Regulation marine sediment standard for sensitive use.
[2] Canadian Council of Ministers of the Environment (CCME) Sediment Quality Guidelines for the Protection of Aquatic Life Interim Sediment Quality Guidelines (ISQG).
[3] Canadian Council of Ministers of the Environment (CCME) Sediment Quality Guidelines for the Protection of Aquatic Life Probable Effects Levels (PEL).
[4] British Columbia Ministry of Environment lower working sediment quality guidelines for the protection of benthic aquatic life in marine environments (Lower WSQG).
[5] British Columbia Ministry of Environment upper working sediment quality guidelines for the protection of benthic aquatic life in marine environments (Upper WSQG).

Table 3-28:
Baseline (2006-2025) Marine Sediment Analytical Results

Category	Parameter	Units	Minimum	Median	Maximum	Number of Samples	Number of Samples Below DL	% of Samples Below DL
Total Metals	Arsenic (As)	mg/kg	1.2	5.6	35	95	8	8.4%
	Cadmium (Cd)	mg/kg	0.077	0.29	**1.6**	93	12	13%
	Chromium (Cr)	mg/kg	5.7	22	**58**	98	0	0.0%
	Copper (Cu)	mg/kg	8.4	**60**	**713**	123	0	0.0%
	Lead (Pb)	mg/kg	2.2	13	**407**	107	0	0.0%
	Mercury (Hg)	mg/kg	0.024	0.051	**0.82**	87	12	14%
	Nickel (Ni)	mg/kg	2.1	14	**57**	97	0	0.0%
	Silver (Ag)	mg/kg	0.050	0.13	**2.0**	84	15	18%
	Zinc (Zn)	mg/kg	19	86	233	115	0	0.0%
SEMs	Cadmium (Cd)	mg/kg	0.50	0.50	0.51	27	26	96%
	Copper (Cu)	mg/kg	0.16	7.0	**34**	43	0	0.0%
	Lead (Pb)	mg/kg	0.048	5.9	**43**	28	2	7.1%
	Mercury (Hg)	mg/kg	0.010	0.010	0.010	27	27	100%
	Nickel (Ni)	mg/kg	2.9	2.9	3.7	27	25	93%
	Zinc (Zn)	mg/kg	0.43	21	67	34	0	0.0%
PAHs	Acenaphthene	mg/kg	0.00053	**0.21**	**14**	121	16	13%
	Acenaphthylene	mg/kg	0.00050	**0.060**	**8.6**	119	23	19%
	Anthracene	mg/kg	0.0010	0.20	**33**	119	18	15%
	Benzo(a)anthracene	mg/kg	0.0012	**0.20**	**4.9**	47	12	26%
	Benzo(a)pyrene	mg/kg	0.001	**0.15**	**4.7**	117	17	15%
	Benzo(b+j)fluoranthene	mg/kg	0.0013	0.36	**8.0**	73	6	8.2%
	Benzo(g,h,i)perylene	mg/kg	0.0020	0.065	**1.8**	114	32	28%
	Benzo(k)fluoranthene	mg/kg	0.0010	0.11	**3.7**	116	23	20%
	Chrysene	mg/kg	0.0021	**0.34**	**12**	119	15	13%
	Dibenz(a,h)anthracene	mg/kg	0.00050	**0.050**	**0.50**	114	56	49%
	Fluoranthene	mg/kg	0.0090	**0.74**	**68**	126	6	5.5%
	Fluorene	mg/kg	0.0010	**0.17**	**21**	114	21	18%
	Indeno(1,2,3-cd)pyrene	mg/kg	0.0020	0.07	**2.5**	114	34	30%
	2-Methylnaphthalene	mg/kg	0.0010	**0.088**	**4.7**	119	25	21%
	Naphthalene	mg/kg	0.0010	0.32	**11**	127	18	14%
	Phenanthrene	mg/kg	0.0013	0.48	**107**	127	7	5.5%
	Pyrene	mg/kg	0.0065	**0.61**	**35**	123	8	6.5%
	1,2,3-trichlorobenzene	mg/kg	**0.050**	**0.050**	**0.050**	8	8	100%
	1,4-Dichlorobenzene	mg/kg	**0.050**	**0.050**	**0.050**	22	20	91%
PCDD/Fs	PCDD/F, Lower Bound TEQ	ng/kg	1.6	16	68	49	0	0.0%
	PCDD/F, Upper Bound TEQ	ng/kg	1.8	17	68	49	0	0.0%
PCBs	Aroclor 1254	mg/kg	0.0040	0.020	0.20	37	30	81%
	Total PCBs	mg/kg	**0.015**	**0.028**	**0.080**	23	20	87%

Notes:
Text and cell formatting illustrated guideline exceedances. Red text = CSR Sensitive Use; Light grey shading = CCME ISQG; Dark grey shading = CCME PEL; **Bold** = B.C. ENV Lower WSQG; Underlined = B.C. ENV Upper WSQG.
Values below detection limits are treated as the detection limit value for statistical summary calculations.

3.9 Marine Water Quality

The Howe Sound marine water quality is influenced by freshwater inputs from Squamish River. Freshwater is usually more buoyant than seawater, and therefore tends to form a buoyant surface layer that is a mixture of freshwater and marine water. The surface layer is usually isolated from the more saline deeper water at the Project site. Therefore, marine water quality is usually monitored at several depths to obtain representative samples from the surface layer and deeper waters.

Marine water quality within the Project boundaries and at nearby reference was intermittently monitored in 2006, and 2013 to 2015, and has been routinely monitored since May 2020. Prior to 2020, monitoring was conducted at a variety of locations and depths; however, since May 2020, monitoring has been conducted at the same stations and at two depths, with the addition of third depth in December 2023. The water quality results for the 2006, and 2013 to 2015 samples were comparable to samples collected since 2020 and the results were included in the technical assessment report for the construction WDA (Lorax, 2023) that supported the application for WDA Effluent Permit PE-111578. Approximately five years of monitoring has been conducted at the stations established in 2020, and the monitoring dataset is considered to be a comprehensive representation of water quality prior to operation of the Project, therefore only these results are summarized in this section. Monitoring is ongoing; however, results are presented for data that were available (May 2020 through May 2025) at the time the TAR preparation commenced.

Water quality data are presented for samples collected from the monitoring stations that were established in May 2020 (refer to Section 3.9.1). Marine water quality samples collected during construction to monitor the influence of in-marine works or construction effluent discharge have been excluded from the data assessment presented in this section, because they may be construction influenced and are not considered to be representative of background marine water quality within the Project boundaries.

3.9.1 Monitoring Program Summary

A total of 1,653 marine water quality monitoring samples were collected at a monthly and occasionally weekly frequency from May 2020 to May 2025 from four monitoring stations within the Project boundaries (WQ1, WQ2, WQ3 and WQ4) and at two reference stations established 500 m north (WQR1) and south (WQR2) of the northern and southern boundaries, respectively. The locations of the marine water monitoring stations are shown in Figure 3-13 and a description of the monitoring stations is provided in Table 3-29. A Van Dorn sampler was used to collect water samples from 2 m below the water surface

and 2 m above the seafloor, and since December 2023 at 0.5 m below the water surface. The marine water quality sampling programs are summarized below:

- Monthly sampling commenced May 2020 to monitor pre-construction conditions. Monthly monitoring has continued through the construction period.
- Weekly and monthly monitoring in accordance construction WDA Effluent Permit PE-111578 has been undertaken since April 2024. The monitoring program includes reference stations WQR1 and WQR1. Therefore, the data for these stations are included in the data assessment.

Table 3-29:
Marine Water Quality Monitoring Stations

Station	Latitude	Longitude	Description
WQ1	49.667750	-123.246200	East of East Creek and the historic chip unloading and barge berthing facilities, where the FSTs will be permanently moored.
WQ2	49.665917	-123.249700	Northeast of Mill Creek mouth and the historic timber wharf that has been removed, and between the future FSTs and material offloading facilities within the Project area.
WQ3	49.663833	-123.254533	Southwest of Mill Creek mouth, located within the Project area.
WQ4	49.659633	-123.258633	Southwest of Woodfibre Creek mouth at the site of the floating worker accommodations (Floatel 1), located within the Project area.
WQR1	49.669367	-123.236800	Reference site located northeast of East Creek 500 m northeast of the Project boundary.
WQR2	49.652817	-123.258517	Reference site located south of Woodfibre Creek and 500 m south of the Project boundary.

Water quality testing included field measurements (*i.e.,* temperature, turbidity, conductivity, salinity, pH and dissolved oxygen) and analytical testing at accredited laboratories for physical parameters (pH, turbidity, TSS, TDS), general parameters (nutrients and anions), total and dissolved metals, speciated metals (methylmercury, hexavalent and trivalent chromium), hydrocarbons, PAHs, VOCs, PCDD/Fs and *Escherichia coli* (E. coli).

Analytical testing was completed at CALA accredited laboratories. For most of the tested parameters, analytical detection limits have either decreased or remained the same with the change in analytical testing laboratories; therefore, higher detection limits are observed during the pre-construction baseline marine water quality monitoring.

3.9.2 Quality Assurance and Quality Control

Field quality control included the collection of field blanks, trip blanks, and field duplicates. A total of 342 QA/QC samples comprised of 187 blank samples (110 field blanks and 77 travel blanks) and 155 duplicate samples were collected representing 21% of the 1,653 monitoring samples collected during the May 2020 to May 2025 period.

The blank sample evaluation indicates that 2.5% of all parameters tested in blank samples showed concentrations above the detection limit value and 1.3% of detectable parameters show concentrations greater than two times the detection limit value. Metal species that were detected in more than five blank samples at comparable levels to the monitoring dataset include total Zn and dissolved Cu; however, these instances occur in less than 5% of all blank samples and do not meaningfully alter the interpretation of the data. Select PAHs (benz(a)anthracene and benzo(a)pyrene) and VOCs (toluene and chloroform) additionally show similar to higher rates of detection and magnitude of concentrations in blank samples compared to the monitoring dataset. It is noted that a field blank sample collected in November 2023 shows a benzo(a)pyrene concentration seven times greater than the long-term WQG (0.00001 mg/L). It is inferred that contamination associated with sample collection or testing may have contributed to the elevated parameter concentrations observed in blank samples and may have also influenced the concentrations detected in in monitoring samples. Therefore, monitoring results for benzo(a)pyrene, benz(a)anthracene and toluene reflect higher uncertainty than other parameters in the dataset. The source of chloroform contamination in blanks samples was determined to be from deionized water supplied by the laboratory containing trace levels of chloroform that was used to fill the blank sample bottles; therefore, the interpretation of the monitoring data is not affected because deionized water is not added to environmental samples.

Relative percent difference (RPD) calculated for field duplicate pairs demonstrates sufficient reproducibility as less than 2% of all duplicate parameter pairs show RPDs greater than 20% and less than 1% of all duplicate parameter pairs show RPDs greater than 50%. Parameters which show multiple instances of RPDs greater than 50% include TSS and total Al, Cu, Fe, Ni, Se, and Zn. These anomalies may reflect spatial variability of suspended particulate material. Although a degree of environmental variability is observed in the monitoring results, the variability is not expected to meaningfully alter the interpretation of the data as more than 98% of duplicate parameter pairs are shown to be highly reproducible.

3.9.3 Marine Water Quality Results

Overall, the May 2020 to May 2025 marine water quality dataset is considered representative of background marine water quality prior to operation of the LNG facility.

A summary of water quality results for key parameters at Project area stations at 0.5 and 2 m below the surface and 2 m above the seafloor are provided in Table 3-30, Table 3-31 and Table 3-32, respectively. A summary of water quality for key parameters at marine reference stations at 0.5 and 2 m below the surface and 2 m above the seafloor are provided in Table 3-33, Table 3-34 and Table 3-35, respectively.

Monitoring data are tabulated in Appendix 3.9-1 and are screened against Federal and B.C. WQG for the protection of MWAL. Results below detection limits are screened using the detection limit value. Observations and conclusions from the May 2020 to May 2025 marine water quality monitoring are described below. For the purpose of this discussion, shallow water describes samples collected at 0.5 and 2 m below the surface and deep water refers to samples collected at 2 m above the seafloor.

The water quality results for the marine baseline dataset are consistent with the understanding of stratification of the water column in the northern basin of Howe Sound and further described in Section 3.10. Water column stratification in Howe Sound is highly influenced by seasonal inputs from the Squamish River. Periods of high freshwater inputs in spring and summer reduce salinity concentrations in a shallow surface layer that extends from the mouth of Squamish River southward in Howe Sound waters and influences the shallow marine water quality within the Project area and at the reference stations. Water clarity and sediment loading are also influenced by seasonal freshwater inputs to Howe Sound with generally higher turbidity and TSS observed in spring and summer in the surface layer relative to the underlying oceanic layer within and outside the project boundary. Low concentrations of dissolved oxygen in deep water samples are comparable at stations within Project boundaries and at reference monitoring stations, indicating that low dissolved oxygen at depth is a background condition of marine water in Howe Sound. Dissolved oxygen concentrations in shallow marine water samples are lowest in winter months when the freshwater inputs from the Squamish River are at annual lows. Shallow water pH measurements show slight seasonal variability with minimum values generally measured in the winter months at both Project area and reference monitoring stations. In contrast, the deep water pH results are relatively stable throughout the year.

Marine water quality was evaluated by comparison with the Federal and B.C. WQG for the protection of MWAL. The WQG for the protection of MWAL were met for most parameters over the May 2020 to May 2025 monitoring period. Occasional exceedances were observed in deep and shallow water monitoring locations for pH, fluoride, and total metals (*i.e.*, Cd, Cr, Cu, Hg, Ni, Pb, Se, V and Zn) and more frequently for dissolved oxygen and total B.

Field pH is infrequently outside the range of the WQG (pH 7.0 to 8.7), showing values slightly below the lower limit primarily in shallow water samples collected at reference stations and values slightly above the upper limit primarily in shallow water samples collected at stations within Project boundaries. The pH values below the lower limit of the WQG were generally observed in fall and winter months while values above the upper limit of the WQG were observed in spring and summer months, reflecting seasonal variability in shallow marine water quality. The lower pH values may be associated with a relatively stronger local influence of low pH freshwater from local creeks in the shallow marine waters, when the influence from Squamish River outflows are less pronounced.

Dissolved oxygen is below the lower limit of the WQG (≥8 mg/L) in some shallow water samples and most deep water samples collected from both the Project area and reference monitoring stations. Similarly, total B exceeds the WQG in all deep water samples and in many shallow water samples at comparable frequencies at all stations. Low concentrations of dissolved oxygen and elevated concentrations of total B are inversely related to freshwater inputs from the Squamish River and local creeks, and are indicative of influence from the deeper saline waters in the northern basin of Howe Sound.

Occasional exceedances of WQGs for fluoride and total Cd, Cr, Hg, Ni and Se occur at comparable frequencies between Project area and reference stations indicating occasional presence above WQGs in marine water is a background condition in Howe Sound. The occasional exceedances of WQGs for total Cd, Cr and Se occur at a higher frequency in deep water samples relative to shallow water samples indicating the influence may originate in the deeper waters of Howe Sound, rather than surface inputs.

Exceedances of the WQGs for total Pb and Zn, although infrequent, occur at a slightly higher frequency in deep water samples collected at Project area stations than at reference stations while the frequency of WQG exceedances are comparable in shallow water samples collected in the Project area and reference monitoring stations. Many of the total Zn results were reported as non-detectable, and for some non-detectable results the detection limit value was well above the lowest reported detection limit (Table 3-30 through Table 3-35, and Appendix 3.9-1). Excluding elevated non-detectable results from the dataset (Appendix 3.9-1), the concentrations of total Zn in in Howe Sound surface waters at the Project area stations range from <0.0030 to 0.0064 mg/L, and <0.0010 to 0.0174 mg/L (0.5 m and 2.0 below surface, respectively), and at reference stations the total Zn concentrations range from <0.0030 to 0.0086 mg/L, and 0.0015 to 0.102 mg/L (0.5 m and 2.0 below surface, respectively). For reference, the long-term BC WQG is 0.01 mg/L.

Occasional WQG exceedances of total Cu are comparable between Project area and reference monitoring stations; however, the frequency of total Cu exceedances is higher in

shallow water relative to deep water monitoring locations. A few of the total Cu results for the reference stations were reported as non-detectable with some detection limit values well above the lowest reported non-detectable value (Table 3-33 through Table 3-35, Appendix 3.9-1). Excluding non-detectable results with elevated detection limits from the dataset (Appendix 3.9-1), the concentration of total Cu at the reference stations ranges from <0.0005 to 0.0044 mg/L (0.5 m depth), <0.0005 to 0.00974 mg/L (2 m depth), and <0.0005 to 0.00442 mg/L (2 m above seafloor). For reference, the long-term BC WQG is 0.002 mg/L.

Total V was infrequently detected above the Federal WQG (0.005 mg/L). Inconsistent elevated detection limits (<0.010, <0.025 and <0.050 mg/L) above the Federal WQG were reported from April 2022 to September 2023 and in October 2024 and are attributed to an analytical interference in the test method used by the laboratory.

Organic contaminants (*i.e.*, LEPH, HEPH, PAHs, VOCs and PCDD/Fs) are generally not detected in monitoring samples (Table 3-30 through Table 3-35). LEPH and HEPH are not detected in any monitoring samples. However, PAHs and VOCs are detected in some monitoring samples (<1% and <0.05%, respectively) and confirm occasional presence in the marine water column. The PAH parameter, benzo(a)pyrene, is occasionally detected above the WQG in some shallow water and deep water samples at Project area and reference monitoring stations and indicate benzo(a)pyrene may be present at trace concentrations in the marine waters within and outside the Project boundary. However, monitoring results for benzo(a)pyrene have a relatively higher uncertainty based on the field quality control evaluation (Section 3.9.2). Naphthalene is detected in one shallow water sample from within the Project area above the WQGs. PCDD/Fs are detected in some monitoring samples (<15%) at comparable frequencies in Project area and reference monitoring stations and confirm occasional presence in the marine water column across the Project area boundary. The range of lower and upper bound PCDD/F TEQ values is comparable between all stations at all depths.

Overall, parameter concentrations observed at Project area stations since construction commenced are within concentration ranges observed during the pre-construction monitoring period (*i.e.*, May 2020 to October 2023) or within background ranges observed at marine reference stations (May 2020 to May 2025). Generally comparable water quality is observed in samples collected from Project area and the reference stations. Trends observed in marine water quality at all monitoring stations are attributed to seasonal effects and the stratification of the water column in the northern basin of Howe Sound.

Table 3-30:
Summary of Marine Water Quality Within the Project Area (Stations WQ1, WQ2, WQ3 and WQ4) at 0.5 m Below Surface

Parameter	Unit	Provincial Guideline (BC WQG MWAL)		Federal Guideline (CWQG MWAL)		CPA Stations - 0.5 m Below Surface						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Paramters												
Total Alkalinity	mg/L	-	-	-	-	107	107	10.1	15.7	36.7	83.8	113
Conductivity (Field)	µS/cm	-	-	-	-	108	108	1010	3050	10400	21900	48800
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	108	108	1360	4360	14700	34100	66700
Dissolved Oxygen (Field)	mg/L	-	-	>=8	-	108	108	**7.25**	8.47	10.7	12	13.3
pH (Field)	s.u.	7.0 - 8.7				104	104	7.39	7.62	8.05	8.44	8.87
Salinity (Field)	ppt	-	-	-	-	100	100	0.700	2.31	8.41	20.3	27.1
Temperature	°C	-	-	-	-	108	108	4.83	6.20	9.46	13.9	16.6
Total Suspended Solids (TSS) [1]	mg/L	-[1]	-[1]	-	-	107	71	<2.00	<2.00	3.00	8.46	23.2
Total Hardness	mg/L	-	-	-	-	108	108	121	394	1420	3940	5320
Turbidity (Field) [1]	NTU	-[1]	-[1]	-	-	108	108	0	0	1.59	8.62	21.6
Nutrients												
Total Ammonia (as N) [2]	mg/L	2	13	-	-	108	75	<0.00500	<0.00500	0.00845	0.0155	<0.0500
Bromide	mg/L	-	-	-	-	108	89	<5.00	<5.00	12.9	40.8	<100
Chloride	mg/L	-	-	-	-	108	108	342	1220	4060	11800	14600
Fluoride	mg/L	-	1.5	-	-	108	4	0.732	<1.00	<1.00	<1.00	1.05
Nitrate (as N)	mg/L	3.7	-	45	339	108	5	0.309	<0.500	<0.500	<0.500	0.570
Nitrite (as N)	mg/L	-	-	-	-	108	1	<0.00500	<0.100	<0.100	<0.100	0.350
Sulphate	mg/L	-	-	-	-	108	108	41.0	134	521	1620	2020
Total Metals												
T-Al	mg/L	-	-	-	-	108	108	0.0123	0.0345	0.107	0.414	0.949
T-Sb [3]	mg/L	0.27	-	-	-	108	0	<0.000500	<0.00100	<0.00100	<0.00100	<0.00100
T-As	mg/L	-	0.0125	0.0125	-	108	86	<0.000400	<0.000400	0.000915	0.00157	0.00355
T-Be	mg/L	0.1	-	-	-	108	0	<0.000100	<0.000500	<0.000500	<0.000500	<0.000500
T-B	mg/L	1.2	-	-	-	108	102	<0.300	0.330	1.03	3.10	3.69
T-Ba	mg/L	-	-	-	-	108	108	0.00570	0.00740	0.00955	0.0162	0.0258
T-Cd	mg/L	0.00012	-	0.00012	-	108	62	<0.0000200	<0.0000200	0.0000240	0.0000603	0.0000731
T-Ca	mg/L	-	-	-	-	108	108	10.4	30.3	94.1	270	338
T-Cr [4]	mg/L	0.0015	-	0.0015	-	108	1	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
Total Hexavalent Chromium	mg/L	0.0015	-	0.0015	-	104	0	<0.00150	<0.00150	<0.00150	<0.00150	**<0.0250**
Total Trivalent Chromium	mg/L	0.056	-	0.056	-	102	1	<0.000500	<0.000500	<0.000500	<0.000500	<0.00179
T-Co	mg/L	-	-	-	-	108	108	0.0000520	0.0000727	0.000116	0.000240	0.000409
T-Cu	mg/L	0.002	0.003	-	-	108	104	<0.000500	0.000584	0.000910	0.00187	0.00532
T-Fe	mg/L	-	-	-	-	108	108	0.0330	0.0757	0.136	0.378	0.753
T-Pb	mg/L	0.002	0.14	-	-	108	21	<0.000100	<0.000100	<0.000100	0.000196	0.00225
T-Mg	mg/L	-	-	-	-	108	108	23.1	77.4	288	801	1110
T-Mn	mg/L	-	-	-	-	108	108	0.00393	0.00616	0.00862	0.0154	0.0279
T-Hg [5]	mg/L	0.000011	-	0.000016	-	108	3	<0.00000500	<0.00000500	<0.00000500	<0.00000500	0.0000150
Total Methylmercury	mg/L	-	-	-	-	104	22	<0.0000000200	<0.0000000200	<0.0000000200	<0.0000000800	<0.0000000200
T-Mo	mg/L	-	-	-	-	108	108	0.000590	0.00101	0.00260	0.00658	0.00933
T-Ni	mg/L	0.0083	-	-	-	108	7	<0.000400	<0.000500	<0.000500	<0.000500	0.00149
T-Se	mg/L	0.002	-	-	-	108	2	<0.000500	<0.000500	<0.000500	<0.000500	0.00152
T-Sr	mg/L	-	-	-	-	108	108	0.164	0.480	1.61	4.62	6.58
T-Ag	mg/L	0.0015	0.003	-	0.0075	108	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
T-Tl	mg/L	-	-	-	-	108	0	<0.0000400	<0.0000500	<0.0000500	<0.0000500	<0.0000500
T-U	mg/L	-	-	-	-	108	108	0.000122	0.000274	0.000734	0.00189	0.00252
T-V	mg/L	0.05	-	0.005	-	108	103	<0.000500	0.000700	0.00108	0.00145	<0.00400
T-Zn	mg/L	0.01	0.055	-	-	108	9	<0.00300	<0.00300	<0.00300	0.00336	<0.0100
Dissolved Metals												
D-Al	mg/L	-	-	-	-	108	100	<0.00500	0.00964	0.0270	0.0493	0.128
D-Sb	mg/L	-	-	-	-	108	0	<0.000500	<0.00100	<0.00100	<0.00100	<0.00100
D-As	mg/L	-	-	-	-	108	85	<0.000400	<0.000400	0.000800	0.00154	0.00349
D-Be	mg/L	-	-	-	-	108	0	<0.000100	<0.000500	<0.000500	<0.000500	<0.000500
D-B	mg/L	-	-	-	-	108	103	<0.300	0.348	1.01	2.74	3.99
D-Ba	mg/L	-	-	-	-	108	108	0.00540	0.00650	0.00805	0.0116	0.0163
D-Cd	mg/L	-	-	-	-	108	58	<0.0000200	<0.0000200	0.0000230	0.0000552	0.0000835
D-Ca	mg/L	-	-	-	-	108	108	10.1	30.2	89.2	256	325
D-Cr	mg/L	-	-	-	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00500
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	100	0	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150
Dissolved Trivalent Chromium	mg/L	-	-	-	-	98	0	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150
D-Co	mg/L	-	-	-	-	108	88	<0.0000500	<0.0000500	0.0000640	0.000112	0.000266
D-Cu	mg/L	-	-	-	-	108	69	<0.000500	<0.000500	0.000560	0.000806	0.00154
D-Fe	mg/L	-	-	-	-	108	71	<0.0100	<0.0100	<0.0200	0.0383	0.106
D-Pb	mg/L	-	-	-	-	108	2	<0.000100	<0.000100	<0.000100	<0.000100	<0.000500
D-Mg	mg/L	-	-	-	-	108	108	22.8	75.8	272	762	1250
D-Mn	mg/L	-	-	-	-	108	108	0.00338	0.00409	0.00591	0.00942	0.0158
D-Hg	mg/L	-	-	-	-	108	0	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.0000100
D-Mo	mg/L	-	-	-	-	108	108	0.000590	0.00103	0.00262	0.00644	0.00918
D-Ni	mg/L	-	-	-	-	108	1	<0.000400	<0.000500	<0.000500	<0.000500	<0.000800
D-Se	mg/L	-	-	-	-	108	4	<0.000500	<0.000500	<0.000500	<0.000500	0.00159
D-Sr	mg/L	-	-	-	-	108	108	0.159	0.486	1.57	4.54	6.23
D-Ag	mg/L	-	-	-	-	108	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
D-Tl	mg/L	-	-	-	-	108	0	<0.0000400	<0.0000500	<0.0000500	<0.0000500	<0.0000500
D-U	mg/L	-	-	-	-	108	108	0.000122	0.000247	0.000676	0.00182	0.00258
D-V	mg/L	-	-	-	-	108	73	<0.000500	<0.000500	0.000590	0.00110	<0.00400
D-Zn	mg/L	-	-	-	-	108	43	<0.00100	<0.00100	<0.00100	0.00233	<0.0100
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	-	-	108	6	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.000669
Acridine	mg/L	-	-	-	-	108	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
Anthracene	mg/L	-	-	-	-	108	2	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.0000840
Benz(a)anthracene	mg/L	-	-	-	-	108	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.0000110
Benzo(a)pyrene	mg/L	0.00001	-	-	-	108	0	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.0000100
Chrysene	mg/L	0.0001	-	-	-	108	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
Fluoranthene	mg/L	-	-	-	-	108	5	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.000266
Fluorene	mg/L	0.012	-	-	-	108	4	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.000596
1-methylnaphthalene	mg/L	0.001	-	-	-	108	3	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.000382
2-methylnaphthalene	mg/L	0.001	-	-	-	108	9	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.000438
Naphthalene	mg/L	0.001	-	0.0014	-	108	3	<0.0000500	<0.0000500	<0.0000500	<0.0000500	**0.00182**
Phenanthrene	mg/L	-	-	-	-	108	5	<0.0000200	<0.0000200	<0.0000200	<0.0000200	0.000960
Pyrene	mg/L	-	-	-	-	108	4	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.000126
Quinoline	mg/L	-	-	-	-	68	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.11	-	0.11	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.25	-	0.025	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
Methyl-tert-butyl-ether	mg/L	-	0.44	5	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
Styrene	mg/L	-	-	-	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
Toluene	mg/L	-	-	0.215	-	108	0	<0.000400	<0.000400	<0.000400	<0.000400	<0.00100
Total Xylenes	mg/L	-	-	-	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00200
Chlorobenzene	mg/L	-	-	-	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
1-2-Dichlorobenzene	mg/L	-	-	-	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	102	102	0	0	0.00166	0.0503	1.12
Upper Bound PCDD/F TEQ [7]	pg/L	-	-	-	-	102	102	0.503	0.653	1.12	2.01	4.95
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	104	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	104	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	104	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	104	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:
Compiled dataset for the May 2020 to May 2025 monitoring period (Appendix 3.9-1). Statistics of monitoring dataset; duplicate samples not included.
B.C. WQG MWAL = British Columbia water quality guidelines for the protection of marine aquatic life.
CWQG MWAL = Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of marine aquatic life.
Non-detect results are screened using the detection limit value.
Values shaded in light grey exceed the applicable long-term B.C. WQG MWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG MWAL.
Bolded values exceed the applicable long-term CWQG MWAL and underlined values exceed the applicable short-term CWQG MWAL.
[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment. The turbidity and TSS WQGs were not evaluated.
[2] The approved total ammonia nitrogen B.C. WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in B.C. WQG guidance document. The total ammonia nitrogen B.C. WQG was calculated based on median salinity, pH and temperature values for CPA stations collected at 0.5 m below surface.
[3] The working B.C. WQG for trivalent antimony [Sb(III)] is 0.27 mg/L and is applied to total antimony results.
[4] The WQG for hexavalent chromium (Cr(IV)) is applied to total chromium results.
[5] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.
[6] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.
[7] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-31:
Summary of Marine Water Quality Within the Project Area (Stations WQ1, WQ2, WQ3 and WQ4) at 2 m Below Surface

Parameter	Unit	Provincial Guideline (BC WQG MWAL)		Federal Guideline (CWQG MWAL)		CPA Stations - 2 m Below Surface						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	112	112	23.2	33.1	70.7	92.3	118
Conductivity (Field)	µS/cm	-	-	-	-	279	279	1180	3990	20100	28300	62200
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	247	247	1740	5790	30200	41200	88000
Dissolved Oxygen (Field)	mg/L	-	-	>=8	-	291	291	**5.52**	**7.65**	9.99	11.9	14.1
pH (Field)	s.u.	7.0 - 8.7				279	279	7.27	7.55	7.98	8.39	8.86
Salinity (Field)	ppt	-	-	-	-	267	267	0.887	2.77	16.3	26.0	30.7
Temperature	℃	-	-	-	-	295	295	1.16	6.92	9.90	14.9	16.8
Total Suspended Solids (TSS) [1]	mg/L	-[1]	-[1]	-	-	304	247	<2.00	<2.00	5.15	14.5	50.7
Total Hardness	mg/L	-	-	-	-	304	303	<0.100	435	2700	5030	6030
Turbidity (Field) [1]	NTU	-[1]	-[1]	-	-	291	291	0	0	1.23	9.58	21.4
Nutrients												
Total Ammonia (as N) [2]	mg/L	2.1	14	-	-	304	104	<0.00500	0.0053	<0.0500	<0.0500	0.425
Bromide	mg/L	-	-	-	-	196	118	7.30	16.1	43.7	<100	<100
Chloride	mg/L	-	-	-	-	196	196	1010	2060	9780	14100	15900
Fluoride	mg/L	-	1.5	-	-	196	36	0.0880	0.465	<1.00	<50.0	<100
Nitrate (as N)	mg/L	3.7	-	45	339	304	32	<0.0100	0.164	0.780	<5.00	14.8
Nitrite (as N)	mg/L	-	-	-	-	196	8	<0.00500	<0.0500	<0.100	<5.00	<10.0
Sulphate	mg/L	-	-	-	-	196	164	255	<500	1440	1950	2520
Total Metals												
T-Al	mg/L	-	-	-	-	304	291	<0.00200	<0.0200	0.0930	0.487	1.21
T-Sb [3]	mg/L	0.27	-	-	-	304	19	<0.0000500	0.000215	<0.000500	<0.00100	0.00333
T-As	mg/L	-	0.0125	0.0125	-	304	225	<0.0000500	<0.000500	0.00109	0.00199	0.00534
T-Be	mg/L	0.1	-	-	-	304	10	<0.0000100	<0.000100	<0.000200	<0.000500	<0.00100
T-B	mg/L	1.2	-	-	-	304	304	0.00240	0.371	1.94	3.59	4.98
T-Ba	mg/L	-	-	-	-	304	283	<0.000100	0.00820	0.0112	0.0184	<0.0500
T-Cd	mg/L	0.00012	-	0.00012	-	304	247	<0.00000200	<0.0000200	0.0000407	0.0000760	**0.000399**
T-Ca	mg/L	-	-	-	-	304	303	<0.04	30.5	178	318	382
T-Cr [4]	mg/L	0.0015	-	0.0015	-	304	25	0.000130	<0.000500	<0.00100	<0.00100	**<0.00500**
Total Hexavalent Chromium	mg/L	0.0015	-	0.0015	-	104	0	<0.00150	<0.00150	<0.00150	<0.00150	**<0.0250**
Total Trivalent Chromium	mg/L	0.056	-	0.056	-	102	2	<0.000500	<0.000500	<0.000500	<0.000500	0.00286
T-Co	mg/L	-	-	-	-	304	222	<0.00000500	0.0000649	0.000158	0.000290	<0.001
T-Cu	mg/L	0.002	0.003	-	-	304	196	<0.000200	0.000660	0.00125	0.00221	0.0097
T-Fe	mg/L	-	-	-	-	304	298	0.00760	0.0340	0.114	0.447	1.08
T-Pb	mg/L	0.002	0.14	-	-	304	87	<0.0000500	<0.000100	<0.000400	0.00122	0.0140
T-Mg	mg/L	-	-	-	-	304	303	<0.00500	86.9	549	1040	1240
T-Mn	mg/L	-	-	-	-	304	304	0.0000690	0.00435	0.00864	0.0194	0.0345
T-Hg [5]	mg/L	0.000011	-	0.000016	-	304	3	<0.00000500	<0.00000500	<0.0000100	<0.0000100	0.0000110
Total Methylmercury	mg/L	-	-	-	-	178	25	<0.0000000200	<0.0000000200	<0.0000000240	0.0000000793	<0.00000200
T-Mo	mg/L	-	-	-	-	304	304	0.0000150	0.00102	0.00495	0.00890	0.0187
T-Ni	mg/L	0.0083	-	-	-	304	76	<0.000200	<0.000400	<0.000500	<0.000800	0.127
T-Se	mg/L	0.002	-	-	-	304	38	<0.000100	<0.000500	<0.00100	<0.00100	0.00631
T-Sr	mg/L	-	-	-	-	304	303	<0.000100	0.532	3.17	5.89	7.09
T-Ag	mg/L	0.0015	0.003	-	0.0075	304	6	<0.0000100	<0.0000500	<0.000100	<0.000100	<0.000500
T-Tl	mg/L	-	-	-	-	304	30	<0.00000400	0.0000260	<0.0000400	<0.0000500	0.000521
T-U	mg/L	-	-	-	-	304	303	<0.00000100	0.000258	0.00131	0.00239	0.00284
T-V	mg/L	0.05	-	0.005	-	304	168	<0.000200	0.000860	<0.00200	**<0.010**	**<0.050**
T-Zn	mg/L	0.01	0.055	-	-	304	36	<0.00100	<0.00300	<0.00800	<0.010	<0.040
Dissolved Metals												
D-Al	mg/L	-	-	-	-	196	152	<0.00500	0.00645	0.0155	0.0399	0.239
D-Sb	mg/L	-	-	-	-	196	0	<0.0000500	<0.000500	<0.00100	<0.00100	<0.00200
D-As	mg/L	-	-	-	-	196	166	0.000191	<0.000500	0.00119	0.00221	0.00559
D-Be	mg/L	-	-	-	-	196	4	<0.0000100	<0.000100	<0.000500	<0.000500	<0.00100
D-B	mg/L	-	-	-	-	196	196	0.234	0.592	2.37	3.65	4.91
D-Ba	mg/L	-	-	-	-	196	180	0.00450	0.00688	<0.01	0.0130	<0.0500
D-Cd	mg/L	-	-	-	-	196	155	0.00000920	<0.0000200	0.0000455	0.0000751	<0.0001
D-Ca	mg/L	-	-	-	-	196	196	22.4	48	221	321	384
D-Cr	mg/L	-	-	-	-	196	0	<0.000500	<0.000500	<0.000500	<0.00500	<0.00500
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	100	0	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150
Dissolved Trivalent Chromium	mg/L	-	-	-	-	98	0	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150
D-Co	mg/L	-	-	-	-	196	118	0.0000326	<0.0000500	0.0000600	0.000199	<0.00100
D-Cu	mg/L	-	-	-	-	196	81	0.000450	<0.000500	0.000765	<0.00100	0.0151
D-Fe	mg/L	-	-	-	-	196	50	<0.00400	<0.0100	<0.0200	0.0225	0.235
D-Pb	mg/L	-	-	-	-	196	3	<0.0000500	<0.000100	<0.000100	<0.000500	<0.00200
D-Mg	mg/L	-	-	-	-	196	196	60.5	144	653	1060	1160
D-Mn	mg/L	-	-	-	-	196	196	0.000600	0.00263	0.00484	0.00893	0.0299
D-Hg	mg/L	-	-	-	-	196	0	<0.00000500	<0.00000500	<0.00000500	<0.0000100	<0.0000100
D-Mo	mg/L	-	-	-	-	196	196	0.000777	0.00146	0.00594	0.00862	0.00972
D-Ni	mg/L	-	-	-	-	196	24	0.0000920	<0.000400	<0.000500	0.000745	<0.00400
D-Se	mg/L	-	-	-	-	196	22	<0.000100	<0.000500	0.000825	<0.00100	<0.00500
D-Sr	mg/L	-	-	-	-	196	196	0.373	0.851	4.10	5.86	6.68
D-Ag	mg/L	-	-	-	-	196	3	<0.0000100	<0.000100	<0.000100	<0.000100	<0.000500
D-Tl	mg/L	-	-	-	-	196	7	0.00000430	<0.0000400	<0.0000500	<0.0000500	<0.000200
D-U	mg/L	-	-	-	-	196	196	0.000184	0.000392	0.00166	0.00241	0.00278
D-V	mg/L	-	-	-	-	196	98	<0.000500	0.000560	0.00122	<0.0100	<0.0500
D-Zn	mg/L	-	-	-	-	196	46	<0.00100	<0.00100	0.00215	<0.0100	<0.0400
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	-	-	300	6	<0.0000100	<0.0000100	<0.0000500	<0.0000500	0.0000880
Acridine	mg/L	-	-	-	-	300	1	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.000461
Anthracene	mg/L	-	-	-	-	300	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000210
Benz(a)anthracene	mg/L	-	-	-	-	300	4	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.0000460
Benzo(a)pyrene	mg/L	0.00001	-	-	-	300	7	<0.00000500	<0.00000500	<0.0000100	<0.0000100	0.0000660
Chrysene	mg/L	0.0001	-	-	-	300	2	<0.0000100	<0.0000100	<0.0000500	<0.0000500	0.0000660
Fluoranthene	mg/L	-	-	-	-	300	7	<0.0000100	<0.0000100	<0.0000300	<0.0000300	0.0000920
Fluorene	mg/L	0.012	-	-	-	300	6	<0.0000100	<0.0000100	<0.0000500	<0.0000500	0.000104
1-methylnaphthalene	mg/L	0.001	-	-	-	300	5	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
2-methylnaphthalene	mg/L	0.001	-	-	-	300	5	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
Naphthalene	mg/L	0.001	-	0.0014	-	300	4	<0.0000500	<0.0000500	<0.000200	<0.000200	<0.000200
Phenanthrene	mg/L	-	-	-	-	300	6	<0.0000200	<0.0000200	<0.000100	<0.000100	0.000384
Pyrene	mg/L	-	-	-	-	300	9	<0.0000100	<0.0000100	<0.0000200	<0.0000200	0.000437
Quinoline	mg/L	-	-	-	-	260	1	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000623
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.11	-	0.11	-	300	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.25	-	0.025	-	300	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Methyl-tert-butyl-ether	mg/L	-	0.44	5	-	300	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Styrene	mg/L	-	-	-	-	300	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Toluene	mg/L	-	-	0.215	-	300	0	<0.000400	<0.000400	<0.000500	<0.00100	<0.00100
Total Xylenes	mg/L	-	-	-	-	300	0	<0.000500	<0.000500	<0.00200	<0.00200	<0.00200
Chlorobenzene	mg/L	-	-	-	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
1-2-Dichlorobenzene	mg/L	-	-	-	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	238	238	0	0	0	0.0158	0.387
Upper Bound PCDD/F TEQ [7]	pg/L	-	-	-	-	238	238	0.501	0.822	5.30	5.30	5.50
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	104	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	104	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	104	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:
Compiled dataset for the May 2020 to May 2025 monitoring period (Appendix 3.9-1). Statistics of monitoring dataset; duplicate samples not included.
B.C. WQG MWAL = British Columbia water quality guidelines for the protection of marine aquatic life.
CWQG MWAL = Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of marine aquatic life.
Non-detect results are screened using the detection limit value.
Values shaded in light grey exceed the applicable long-term B.C. WQG MWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG MWAL.
Bolded values exceed the applicable long-term CWQG MWAL and underlined values exceed the applicable short-term CWQG MWAL.
[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment. The turbidity and TSS WQGs were not evaluated.
[2] The approved total ammonia nitrogen B.C. WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in B.C. WQG guidance document. The total ammonia nitrogen B.C. WQG was calculated based on median salinity, pH and temperature values for CPA stations collected at 2 m below surface.
[3] The working B.C. WQG for trivalent antimony [Sb(III)] is 0.27 mg/L and is applied to total antimony results.
[4] The WQG for hexavalent chromium (Cr(IV)) is applied to total chromium results.
[5] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.
[6] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.
[7] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-32:
Summary of Marine Water Quality Within the Project Area (Stations WQ1, WQ2, WQ3 and WQ4) at 2 m Above the Seafloor

Parameter	Unit	Provincial Guideline (BC WQG MWAL)		Federal Guideline (CWQG MWAL)		CPA Stations - 2 m Above Seafloor						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	112	112	70.3	104	106	110	121
Conductivity (Field)	µS/cm	-	-	-	-	279	279	15700	28500	31600	33100	66200
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	247	247	29800	36100	45600	47100	96400
Dissolved Oxygen (Field)	mg/L	-	-	>=8	-	290	290	**2.69**	**5.00**	**6.39**	**7.71**	9.90
pH (Field)	s.u.	7.0 - 8.7				279	279	7.17	7.38	7.52	7.68	7.87
Salinity (Field)	ppt	-	-	-	-	267	267	18.4	26.3	29.4	30.2	58.9
Temperature	°C	-	-	-	-	295	295	7.00	8.30	8.80	9.80	29.8
Total Suspended Solids (TSS) [1]	mg/L	-[1]	-[1]	-	-	303	210	<2.00	<2.00	3.4	17.1	121
Total Hardness	mg/L	-	-	-	-	304	304	1830	5080	5700	6240	8060
Turbidity (Field) [1]	NTU	-[1]	-[1]	-	-	289	289	0	0	0.350	1.89	545
Nutrients												
Total Ammonia (as N) [2]	mg/L	5.6	37	-	-	304	51	<0.00500	<0.00500	<0.0500	<0.0500	0.165
Bromide	mg/L	-	-	-	-	196	130	<25.0	<50.0	58.3	<100	<100
Chloride	mg/L	-	-	-	-	196	196	5290	15000	16600	17400	19500
Fluoride	mg/L	-	1.5	-	-	196	44	0.802	<1.00	<1.00	<50.0	<100
Nitrate (as N)	mg/L	3.7	-	45	339	304	63	0.292	0.474	<1.00	<5.00	<10.0
Nitrite (as N)	mg/L	-	-	-	-	196	11	<0.00500	<0.0500	<0.100	<5.00	<10.0
Sulphate	mg/L	-	-	-	-	196	196	1270	2050	2310	2520	3140
Total Metals												
T-Al	mg/L	-	-	-	-	304	276	<0.00500	0.0125	0.0240	0.0516	2.85
T-Sb [3]	mg/L	0.27	-	-	-	304	12	<0.000200	<0.000400	<0.000500	<0.00100	0.00493
T-As	mg/L	-	0.0125	0.0125	-	304	299	0.000598	0.00149	0.00178	0.00339	0.00625
T-Be	mg/L	0.1	-	-	-	304	3	<0.000100	<0.000100	<0.000200	<0.000500	<0.00200
T-B	mg/L	1.2	-	-	-	304	304	1.47	3.47	3.95	4.57	7.92
T-Ba	mg/L	-	-	-	-	304	292	0.00470	0.00920	0.0106	0.0126	<0.0500
T-Cd	mg/L	0.00012	-	0.00012	-	304	300	0.0000273	0.0000675	0.0000820	0.0000999	**0.000252**
T-Ca	mg/L	-	-	-	-	304	304	109	329	375	412	460
T-Cr [4]	mg/L	0.0015	-	0.0015	-	304	7	<0.000500	<0.000500	<0.00100	<0.00100	**<0.00500**
Total Hexavalent Chromium	mg/L	0.0015	-	0.0015	-	104	0	<0.00150	<0.00150	<0.00150	<0.00150	**<0.0250**
Total Trivalent Chromium	mg/L	0.056	-	0.056	-	102	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00179
T-Co	mg/L	-	-	-	-	304	140	<0.0000500	<0.0000500	0.0000800	<0.000200	0.00147
T-Cu	mg/L	0.002	0.003	-	-	304	77	<0.000400	<0.000500	0.000990	<0.00200	0.00841
T-Fe	mg/L	-	-	-	-	304	255	<0.0100	0.0180	0.0255	0.0520	3.84
T-Pb	mg/L	0.002	0.14	-	-	304	51	<0.000100	<0.000100	<0.000400	0.000595	0.00845
T-Mg	mg/L	-	-	-	-	304	304	380	1010	1150	1280	1690
T-Mn	mg/L	-	-	-	-	304	301	0.00108	0.00186	0.00368	0.0102	0.0793
T-Hg [5]	mg/L	0.000011	-	0.000016	-	304	4	<0.00000500	<0.00000500	<0.0000100	<0.0000100	**<0.000100**
Total Methylmercury	mg/L	-	-	-	-	180	33	<0.0000000200	<0.0000000200	<0.0000000240	<0.0000000800	<0.000000200
T-Mo	mg/L	-	-	-	-	304	304	0.00345	0.00891	0.00992	0.0109	0.0129
T-Ni	mg/L	0.0083	-	-	-	304	101	0.000216	<0.000400	<0.000500	<0.000800	<0.00400
T-Se	mg/L	0.002	-	-	-	304	42	<0.000500	<0.000500	<0.00100	0.00139	0.00664
T-Sr	mg/L	-	-	-	-	304	304	2.20	6.06	6.86	7.55	8.55
T-Ag	mg/L	0.0015	0.003	-	0.0075	304	20	<0.0000500	<0.000100	<0.000100	<0.000100	<0.000500
T-Tl	mg/L	-	-	-	-	304	10	<0.0000200	<0.0000400	<0.0000400	<0.0000500	0.000264
T-U	mg/L	-	-	-	-	304	304	0.000872	0.00244	0.00274	0.00302	0.00331
T-V	mg/L	0.05	-	0.005	-	304	166	0.000980	0.00144	<0.00200	**<0.0100**	**<0.0500**
T-Zn	mg/L	0.01	0.055	-	-	304	23	<0.00300	<0.00300	<0.00800	<0.0100	0.126
Dissolved Metals												
D-Al	mg/L	-	-	-	-	196	53	<0.00500	<0.00500	0.00750	0.0124	<0.0500
D-Sb	mg/L	-	-	-	-	196	0	<0.000400	<0.000500	<0.00100	<0.00100	<0.00200
D-As	mg/L	-	-	-	-	196	192	0.000566	0.00150	0.00178	0.00365	0.00646
D-Be	mg/L	-	-	-	-	196	4	<0.000100	<0.000100	<0.000500	<0.000500	<0.00100
D-B	mg/L	-	-	-	-	196	196	1.41	3.26	3.89	4.47	5.85
D-Ba	mg/L	-	-	-	-	196	188	0.00460	0.00890	0.0102	0.0116	<0.05
D-Cd	mg/L	-	-	-	-	196	191	<0.00002	0.0000654	0.0000777	0.0000993	0.000153
D-Ca	mg/L	-	-	-	-	196	196	96.2	333	373	397	450
D-Cr	mg/L	-	-	-	-	196	3	<0.000500	<0.000500	<0.000500	<0.00500	<0.00500
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	100	0	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150
Dissolved Trivalent Chromium	mg/L	-	-	-	-	98	0	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150
D-Co	mg/L	-	-	-	-	196	99	<0.0000500	<0.0000500	0.0000620	<0.000200	<0.00100
D-Cu	mg/L	-	-	-	-	196	18	<0.000500	<0.000500	0.000510	<0.00100	0.00747
D-Fe	mg/L	-	-	-	-	196	1	<0.0100	<0.0100	<0.0100	<0.0200	<0.100
D-Pb	mg/L	-	-	-	-	196	11	<0.000100	<0.000100	<0.000100	<0.000500	<0.00200
D-Mg	mg/L	-	-	-	-	196	196	342	1020	1150	1280	1540
D-Mn	mg/L	-	-	-	-	196	193	0.000510	0.000860	<0.00200	0.00796	0.0437
D-Hg	mg/L	-	-	-	-	196	0	<0.00000500	<0.00000500	<0.00000500	<0.0000100	<0.0000100
D-Mo	mg/L	-	-	-	-	196	196	0.00304	0.00873	0.00966	0.0103	0.0115
D-Ni	mg/L	-	-	-	-	196	48	<0.000400	<0.000400	<0.000500	<0.000800	<0.00400
D-Se	mg/L	-	-	-	-	196	32	<0.000500	<0.000500	<0.00100	0.00123	0.00558
D-Sr	mg/L	-	-	-	-	196	196	1.99	6.05	6.69	7.19	8.18
D-Ag	mg/L	-	-	-	-	196	8	<0.000100	<0.000100	<0.000100	<0.000100	<0.000500
D-Tl	mg/L	-	-	-	-	196	4	<0.0000400	<0.0000400	<0.0000500	<0.0000500	<0.000200
D-U	mg/L	-	-	-	-	196	196	0.000792	0.00238	0.00270	0.00300	0.00321
D-V	mg/L	-	-	-	-	196	110	0.00101	0.00132	0.00159	<0.0100	<0.0500
D-Zn	mg/L	-	-	-	-	196	54	<0.00100	<0.00100	0.00285	<0.0100	<0.0400
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	-	-	300	1	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.0000500
Acridine	mg/L	-	-	-	-	300	1	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.000605
Anthracene	mg/L	-	-	-	-	300	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000270
Benz(a)anthracene	mg/L	-	-	-	-	300	2	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000180
Benzo(a)pyrene	mg/L	0.00001	-	-	-	300	6	<0.00000500	<0.00000500	<0.0000100	<0.0000100	0.0000650
Chrysene	mg/L	0.0001	-	-	-	300	0	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.0000500
Fluoranthene	mg/L	-	-	-	-	300	2	<0.0000100	<0.0000100	<0.0000300	<0.0000300	0.0000310
Fluorene	mg/L	0.012	-	-	-	300	1	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.0000500
1-methylnaphthalene	mg/L	0.001	-	-	-	300	0	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
2-methylnaphthalene	mg/L	0.001	-	-	-	300	0	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
Naphthalene	mg/L	0.001	-	0.0014	-	300	0	<0.0000500	<0.0000500	<0.000200	<0.000200	<0.000200
Phenanthrene	mg/L	-	-	-	-	300	2	<0.0000200	<0.0000200	<0.000100	<0.000100	<0.000100
Pyrene	mg/L	-	-	-	-	300	3	<0.0000100	<0.0000100	<0.0000200	<0.0000200	<0.000100
Quinoline	mg/L	-	-	-	-	260	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000742
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.11	-	0.11	-	300	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.25	-	0.025	-	300	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Methyl-tert-butyl-ether	mg/L	-	0.44	5	-	300	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Styrene	mg/L	-	-	-	-	300	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Toluene	mg/L	-	-	0.215	-	300	1	<0.000400	<0.000400	<0.000500	<0.00100	<0.00100
Total Xylenes	mg/L	-	-	-	-	300	0	<0.000500	<0.000500	<0.00200	<0.00200	<0.00200
Chlorobenzene	mg/L	-	-	-	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
1-2-Dichlorobenzene	mg/L	-	-	-	-	108	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	238	238	0	0	0	0.0243	0.815
Upper Bound PCDD/F TEQ [7]	pg/L	-	-	-	-	238	238	0.490	0.782	5.30	5.30	5.30
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	104	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	104	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	104	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	104	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:
Compiled dataset for the May 2020 to May 2025 monitoring period (Appendix 3.9-1). Statistics of monitoring dataset; duplicate samples not included.
B.C. WQG MWAL = British Columbia water quality guidelines for the protection of marine aquatic life.
CWQG MWAL = Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of marine aquatic life.
Non-detect results are screened using the detection limit value.
Values shaded in light grey exceed the applicable long-term B.C. WQG MWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG MWAL.
Bolded values exceed the applicable long-term CWQG MWAL and underlined values exceed the applicable short-term CWQG MWAL.
[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment. The turbidity and TSS WQGs were not evaluated.
[2] The approved total ammonia nitrogen B.C. WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in B.C. WQG guidance document. The total ammonia nitrogen B.C. WQG was calculated based on median salinity, pH and temperature values for CPA stations collected at 2 m above the seafloor.
[3] The working B.C. WQG for trivalent antimony [Sb(III)] is 0.27 mg/L and is applied to total antimony results.
[4] The WQG for hexavalent chromium (Cr(IV)) is applied to total chromium results.
[5] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.
[6] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.
[7] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-33:
Summary of Marine Water Quality at Reference Stations (WQR1 and WQR2) at 0.5 m Below Surface

Parameter	Unit	Provincial Guideline (BC WQG MWAL)		Federal Guideline (CWQG MWAL)		Reference Stations - 0.5 m Below Surface						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	113	113	7.00	16.0	32.8	78.3	96.6
Conductivity (Field)	µS/cm	-	-	-	-	113	113	782	3040	8790	21100	45400
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	55	55	2230	4720	13100	34500	63400
Dissolved Oxygen (Field)	mg/L	-	-	>=8	-	113	113	**7.12**	9.27	10.9	11.8	13.2
pH (Field)	s.u.	7.0 - 8.7				111	111	6.30	7.30	7.92	8.32	8.64
Salinity (Field)	ppt	-	-	-	-	107	107	0.380	1.90	6.27	19.6	26.0
Temperature	°C	-	-	-	-	113	113	4.95	6.60	9.30	13.6	17.2
Total Suspended Solids (TSS) [1]	mg/L	-	-	-	-	117	78	<2.00	<2.00	3.30	13.6	47.4
Total Hardness	mg/L	-	-	-	-	117	117	60.4	412	1260	3690	5240
Turbidity (Field) [1]	NTU	-	-	-	-	111	111	0	0.0300	2.40	12.8	29.6
Nutrients												
Total Ammonia (as N) [2]	mg/L	2	13	-	-	113	83	<0.00500	<0.00500	0.00870	0.0155	<0.0500
Bromide	mg/L	-	-	-	-	113	91	<5.00	<5.00	12.0	37.5	<100
Chloride	mg/L	-	-	-	-	113	113	156	1350	3690	11100	15400
Fluoride	mg/L	-	1.5	-	-	113	2	0.729	<1.00	<1.00	<1.00	<2.00
Nitrate (as N)	mg/L	3.7	-	45	339	113	3	0.316	<0.500	<0.500	<0.500	3.13
Nitrite (as N)	mg/L	-	-	-	-	113	1	<0.00500	<0.100	<0.100	<0.100	<0.100
Sulphate	mg/L	-	-	-	-	113	112	<30.0	165	476	1490	2090
Total Metals												
T-Al	mg/L	-	-	-	-	117	117	0.0132	0.0350	0.128	0.624	1.42
T-Sb [3]	mg/L	0.27	-	-	-	117	0	<0.000500	<0.00100	<0.00100	<0.00100	<0.00200
T-As	mg/L	-	0.0125	0.0125	-	117	84	<0.000400	<0.000400	0.000750	0.00162	0.00465
T-Be	mg/L	0.1	-	-	-	117	0	<0.000100	<0.000500	<0.000500	<0.000500	<0.000500
T-B	mg/L	1.2	-	-	-	117	109	<0.300	0.348	0.900	2.66	3.82
T-Ba	mg/L	-	-	-	-	117	117	0.00610	0.00760	0.0102	0.0179	0.0340
T-Cd	mg/L	0.00012	-	0.00012	-	117	61	<0.0000200	<0.0000200	0.0000210	0.0000573	<0.000100
T-Ca	mg/L	-	-	-	-	117	117	6.20	30.1	82.3	240	368
T-Cr [4]	mg/L	0.0015	-	0.0015	-	117	8	<0.000500	<0.000500	<0.000500	<0.000500	**<0.0100**
Total Hexavalent Chromium	mg/L	0.0015	-	0.0015	-	108	1	<0.00150	<0.00150	<0.00150	<0.00150	**<0.0250**
Total Trivalent Chromium	mg/L	0.056	-	0.056	-	50	1	<0.000500	<0.000500	<0.000500	<0.000500	<0.00179
T-Co	mg/L	-	-	-	-	117	114	<0.0000500	0.0000818	0.000129	0.000289	<0.00200
T-Cu	mg/L	0.002	0.003	-	-	117	109	<0.000500	0.000586	0.000920	0.00198	<0.0100
T-Fe	mg/L	-	-	-	-	117	116	0.0290	0.0872	0.164	0.499	1.14
T-Pb	mg/L	0.002	0.14	-	-	117	23	<0.000100	<0.000100	<0.000100	0.000200	0.00719
T-Mg	mg/L	-	-	-	-	117	117	10.9	81.8	250	731	1050
T-Mn	mg/L	-	-	-	-	117	117	0.00357	0.00679	0.00966	0.0164	0.0412
T-Hg [5]	mg/L	0.000011	-	0.000016	-	117	1	<0.00000500	<0.00000500	<0.00000500	<0.00000500	0.0000110
Total Methylmercury (MeHg)	mg/L	-	-	-	-	104	26	<0.0000000200	<0.0000000200	<0.0000000200	<0.0000000400	<0.000000800
T-Mo	mg/L	-	-	-	-	117	117	0.000400	0.000966	0.00236	0.00619	0.00946
T-Ni	mg/L	0.0083	-	-	-	117	8	0.000431	<0.000500	<0.000500	<0.000500	<0.0100
T-Se	mg/L	0.002	-	-	-	117	1	<0.000500	<0.000500	<0.000500	<0.000500	0.00125
T-Sr	mg/L	-	-	-	-	117	117	0.0790	0.473	1.34	4.10	6.41
T-Ag	mg/L	0.0015	0.003	-	0.0075	117	1	<0.000100	<0.000100	<0.000100	<0.000100	0.000204
T-Tl	mg/L	-	-	-	-	117	0	<0.0000400	<0.0000500	<0.0000500	<0.0000500	<0.000200
T-U	mg/L	-	-	-	-	117	117	0.000109	0.000263	0.000636	0.00178	0.00260
T-V	mg/L	0.05	-	0.005	-	117	112	<0.000500	0.000730	0.00108	0.00187	**<0.0100**
T-Zn	mg/L	0.01	0.055	-	-	117	14	<0.00300	<0.00300	<0.00300	0.00384	<0.0600
Dissolved Metals												
D-Al	mg/L	-	-	-	-	114	109	<0.00500	0.00825	0.0275	0.0520	0.0743
D-Sb	mg/L	-	-	-	-	114	0	<0.000500	<0.00100	<0.00100	<0.00100	<0.00200
D-As	mg/L	-	-	-	-	114	77	<0.000400	<0.000400	0.000710	0.00166	0.00453
D-Be	mg/L	-	-	-	-	114	0	<0.000100	<0.000500	<0.000500	<0.000500	<0.000500
D-B	mg/L	-	-	-	-	114	109	<0.300	0.373	0.915	2.56	3.80
D-Ba	mg/L	-	-	-	-	114	114	0.00550	0.00660	0.00835	0.0128	0.0227
D-Cd	mg/L	-	-	-	-	114	57	<0.0000200	<0.0000200	0.0000210	0.0000570	<0.0001
D-Ca	mg/L	-	-	-	-	114	114	5.70	33.6	79.9	240	352
D-Cr	mg/L	-	-	-	-	114	1	<0.000500	<0.000500	<0.000500	<0.000500	<0.0100
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	106	1	<0.00150	<0.00150	<0.00150	<0.00150	0.00178
Dissolved Trivalent Chromium	mg/L	-	-	-	-	48	0	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150
D-Co	mg/L	-	-	-	-	114	94	<0.0000500	<0.0000500	0.0000670	0.000135	<0.00200
D-Cu	mg/L	-	-	-	-	114	71	<0.000500	<0.000500	0.000580	0.000917	0.00556
D-Fe	mg/L	-	-	-	-	114	81	<0.0100	<0.0100	<0.0200	0.0397	<0.200
D-Pb	mg/L	-	-	-	-	114	5	<0.000100	<0.000100	<0.000100	<0.000100	<0.00100
D-Mg	mg/L	-	-	-	-	114	114	9.80	91.5	253	676	1050
D-Mn	mg/L	-	-	-	-	114	114	0.00266	0.00443	0.00618	0.0103	0.0159
D-Hg	mg/L	-	-	-	-	114	0	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.0000100
D-Mo	mg/L	-	-	-	-	114	114	0.000440	0.00100	0.00222	0.00599	0.00949
D-Ni	mg/L	-	-	-	-	114	6	<0.000400	<0.000500	<0.000500	<0.000500	<0.0100
D-Se	mg/L	-	-	-	-	114	2	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
D-Sr	mg/L	-	-	-	-	114	114	0.0700	0.524	1.36	4.12	6.32
D-Ag	mg/L	-	-	-	-	114	0	<0.000100	<0.000100	<0.000100	<0.000100	<0.000200
D-Tl	mg/L	-	-	-	-	114	0	<0.0000400	<0.0000500	<0.0000500	<0.0000500	<0.000200
D-U	mg/L	-	-	-	-	114	114	0.0000770	0.000254	0.000600	0.00166	0.00254
D-V	mg/L	-	-	-	-	114	68	<0.000500	<0.000500	0.000535	0.00107	<0.0100
D-Zn	mg/L	-	-	-	-	114	34	<0.00100	<0.00100	<0.00100	<0.00200	<0.0200
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	-	-	112	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
Acridine	mg/L	-	-	-	-	112	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
Anthracene	mg/L	-	-	-	-	112	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.0000110
Benz(a)anthracene	mg/L	-	-	-	-	112	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Benzo(a)pyrene	mg/L	0.00001	-	-	-	112	0	<0.00000500	<0.00000500	<0.00000500	<0.00000500	<0.0000100
Chrysene	mg/L	0.0001	-	-	-	112	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
Fluoranthene	mg/L	-	-	-	-	112	2	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000300
Fluorene	mg/L	0.012	-	-	-	112	2	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000500
1-methylnaphthalene	mg/L	0.001	-	-	-	112	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.000100
2-methylnaphthalene	mg/L	0.001	-	-	-	112	5	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.000100
Naphthalene	mg/L	0.001	-	0.0014	-	112	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000200
Phenanthrene	mg/L	-	-	-	-	112	2	<0.0000200	<0.0000200	<0.0000200	<0.0000200	<0.000100
Pyrene	mg/L	-	-	-	-	112	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000200
Quinoline	mg/L	-	-	-	-	78	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.0000500
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.11	-	0.11	-	107	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.25	-	0.025	-	107	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
Methyl-tert-butyl-ether	mg/L	-	0.44	5	-	107	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
Styrene	mg/L	-	-	-	-	107	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
Toluene	mg/L	-	-	0.215	-	107	0	<0.000400	<0.000400	<0.000400	<0.000400	<0.00100
Total Xylenes	mg/L	-	-	-	-	107	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00200
Chlorobenzene	mg/L	-	-	-	-	107	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
1-2-Dichlorobenzene	mg/L	-	-	-	-	107	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	92	92	0	0	0.00165	0.0517	0.941
Upper Bound PCDD/F TEQ [7]	pg/L	-	-	-	-	92	92	0.506	0.678	1.01	1.81	4.88
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	110	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	110	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	110	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	110	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:
Compiled dataset for the May 2020 to May 2025 monitoring period (Appendix 3.9-1). Statistics of monitoring dataset; duplicate samples not included.
B.C. WQG MWAL = British Columbia water quality guidelines for the protection of marine aquatic life.
CWQG MWAL = Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of marine aquatic life.
Non-detect results are screened using the detection limit value.
Values shaded in light grey exceed the applicable long-term B.C. WQG MWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG MWAL.
Bolded values exceed the applicable long-term CWQG MWAL and underlined values exceed the applicable short-term CWQG MWAL.
[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment. Water quality from reference stations represents background conditions, therefore the turbidity and TSS WQGs were not evaluated. The salinity WQG was not evaluated.
[2] The approved total ammonia nitrogen B.C. WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in B.C. WQG guidance document. The total ammonia nitrogen B.C. WQG was calculated based on median salinity, pH and temperature values for marine water quality reference stations collected at 0.5 m below surface.
[3] The working B.C. WQG for trivalent antimony [Sb(III)] is 0.27 mg/L and is applied to total antimony results.
[4] The WQG for hexavalent chromium (Cr(IV)) is applied to total chromium results.
[5] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.
[6] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.
[7] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-34:
Summary of Marine Water Quality at Reference Stations (WQR1 and WQR2) at 2 m Below Surface

Parameter	Unit	Provincial Guideline (BC WQG MWAL)		Federal Guideline (CWQG MWAL)		Reference Stations - 2 m Below Surface						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	103	103	8.20	30.3	62.4	92.0	117
Conductivity (Field)	µS/cm	-	-	-	-	188	188	1050	4650	20600	28900	54300
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	124	124	1490	6330	30200	42000	137000
Dissolved Oxygen (Field)	mg/L	-	-	>=8	-	194	194	**5.66**	8.00	10.2	12.2	13.8
pH (Field)	s.u.	7.0 - 8.7				191	191	6.43	7.50	7.91	8.35	8.70
Salinity (Field)	ppt	-	-	-	-	182	182	0.580	3.47	17.3	26.4	28.5
Temperature	°C	-	-	-	-	196	196	5.50	7.19	10.2	14.6	17.7
Total Suspended Solids (TSS) [1]	mg/L	-	-	-	-	211	166	<2.00	<2.00	4.60	16.3	43.0
Total Hardness	mg/L	-	-	-	-	210	210	1.72	538	2720	4940	5800
Turbidity (Field) [1]	NTU	-	-	-	-	194	194	0	0	1.32	10.1	24.4
Nutrients												
Total Ammonia (as N) [2]	mg/L	2.1	14	-	-	207	84	<0.00500	<0.00500	<0.0500	<0.0500	0.157
Bromide	mg/L	-	-	-	-	153	105	<5.00	12.0	34.2	<100	<100
Chloride	mg/L	-	-	-	-	153	153	254	2640	9260	14700	17600
Fluoride	mg/L	-	1.5	-	-	153	19	0.111	0.972	<1.00	<50.0	<100
Nitrate (as N)	mg/L	3.7	-	45	339	207	24	<0.0100	0.305	<0.500	<2.50	11.0
Nitrite (as N)	mg/L	-	-	-	-	153	5	<0.00500	<0.0500	<0.100	4.50	<10.0
Sulphate	mg/L	-	-	-	-	153	141	<30.0	474	1320	2040	2740
Total Metals												
T-Al	mg/L	-	-	-	-	210	196	0.00750	<0.0200	0.0797	0.492	1.35
T-Sb [3]	mg/L	0.27	-	-	-	210	8	<0.0000500	<0.000400	<0.000500	<0.00100	<0.00500
T-As	mg/L	-	0.0125	0.0125	-	210	168	0.000191	0.000498	0.00112	0.00198	0.00569
T-Be	mg/L	0.1	-	-	-	210	3	<0.0000100	<0.000100	0.000350	<0.000500	<0.00200
T-B	mg/L	1.2	-	-	-	210	206	0.114	0.467	1.90	3.60	4.76
T-Ba	mg/L	-	-	-	-	210	202	0.00470	0.00800	0.0111	0.0183	<0.0500
T-Cd	mg/L	0.00012	-	0.00012	-	210	169	0.00000550	<0.0000200	0.0000415	0.0000741	**<0.000250**
T-Ca	mg/L	-	-	-	-	210	210	0.650	39.1	183	321	382
T-Cr [4]	mg/L	0.0015	-	0.0015	-	210	15	0.000310	<0.000500	<0.000500	<0.00100	**<0.0250**
Total Hexavalent Chromium	mg/L	0.0015	-	0.0015	-	98	1	<0.00150	<0.00150	<0.00150	<0.00150	**<0.0250**
Total Trivalent Chromium	mg/L	0.056	-	0.056	-	51	1	<0.000500	<0.000500	<0.000500	<0.000500	<0.00179
T-Co	mg/L	-	-	-	-	210	160	<0.0000500	0.0000607	0.000140	0.000270	<0.00500
T-Cu	mg/L	0.002	0.003	-	-	210	143	<0.000500	0.000560	0.00118	0.00230	<0.0250
T-Fe	mg/L	-	-	-	-	210	202	<0.0100	0.0358	0.108	0.438	1.08
T-Pb	mg/L	0.002	0.14	-	-	210	51	<0.0000500	<0.000100	0.000187	0.000946	0.0123
T-Mg	mg/L	-	-	-	-	210	210	0.0250	104	538	1010	1220
T-Mn	mg/L	-	-	-	-	210	207	<0.000400	0.00417	0.00838	0.0188	0.0388
T-Hg [5]	mg/L	0.000011	-	0.000016	-	210	1	<0.00000500	<0.00000500	<0.0000100	<0.0000100	0.0000110
Total Methylmercury	mg/L	-	-	-	-	141	24	<0.0000000200	<0.0000000200	0.0000000210	<0.0000000500	<0.000000160
T-Mo	mg/L	-	-	-	-	210	209	<0.000200	0.00127	0.00506	0.00872	0.0223
T-Ni	mg/L	0.0083	-	-	-	210	44	<0.000200	<0.000400	<0.000500	<0.000800	<0.0250
T-Se	mg/L	0.002	-	-	-	210	29	<0.000100	<0.000500	0.000665	0.00125	0.00734
T-Sr	mg/L	-	-	-	-	210	209	<0.00200	0.630	3.24	5.90	7.37
T-Ag	mg/L	0.0015	0.003	-	0.0075	210	5	<0.0000100	<0.000100	<0.000100	<0.000100	<0.000500
T-Tl	mg/L	-	-	-	-	210	13	0.00000440	<0.0000400	0.0000475	<0.0000500	<0.000500
T-U	mg/L	-	-	-	-	210	209	<0.0000400	0.000291	0.00134	0.00235	0.00275
T-V	mg/L	0.05	-	0.005	-	210	129	<0.000500	0.000850	0.00184	**<0.0100**	**<0.0500**
T-Zn	mg/L	0.01	0.055	-	-	210	28	0.00150	<0.00300	0.00355	<0.0100	<0.150
Dissolved Metals												
D-Al	mg/L	-	-	-	-	154	121	<0.00500	<0.00500	0.0158	0.0374	0.149
D-Sb	mg/L	-	-	-	-	154	1	<0.0000500	<0.000500	<0.00100	<0.00100	<0.00500
D-As	mg/L	-	-	-	-	154	129	0.000218	<0.000500	0.00123	0.00235	<0.00500
D-Be	mg/L	-	-	-	-	154	1	<0.0000100	<0.000100	<0.000500	<0.000500	<0.00100
D-B	mg/L	-	-	-	-	154	151	<0.300	0.713	2.32	3.75	4.69
D-Ba	mg/L	-	-	-	-	154	146	0.00430	0.00670	<0.01	0.0128	<0.0500
D-Cd	mg/L	-	-	-	-	154	121	0.0000110	<0.0000200	0.0000441	0.0000757	<0.000250
D-Ca	mg/L	-	-	-	-	154	154	8.10	63	209	324	390
D-Cr	mg/L	-	-	-	-	154	1	<0.000500	<0.000500	<0.000500	<0.00100	<0.0250
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	96	0	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150
Dissolved Trivalent Chromium	mg/L	-	-	-	-	49	0	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150
D-Co	mg/L	-	-	-	-	154	98	<0.0000500	<0.0000500	0.0000620	0.000154	<0.00500
D-Cu	mg/L	-	-	-	-	154	60	<0.000500	<0.000500	0.000640	<0.00100	<0.0100
D-Fe	mg/L	-	-	-	-	154	37	<0.0100	<0.0100	0.0158	0.0217	<0.500
D-Pb	mg/L	-	-	-	-	154	3	<0.0000500	<0.000100	<0.000100	<0.000500	<0.00250
D-Mg	mg/L	-	-	-	-	154	154	16.9	182	628	1050	1220
D-Mn	mg/L	-	-	-	-	154	154	0.00108	0.00264	0.00482	0.00914	0.0383
D-Hg	mg/L	-	-	-	-	154	0	<0.00000500	<0.00000500	<0.00000500	<0.0000100	<0.0000100
D-Mo	mg/L	-	-	-	-	154	154	0.000450	0.00180	0.00550	0.00890	0.0102
D-Ni	mg/L	-	-	-	-	154	28	0.000129	<0.000400	<0.000500	0.000771	<0.0250
D-Se	mg/L	-	-	-	-	154	13	<0.000100	<0.000500	<0.000500	<0.00100	<0.00500
D-Sr	mg/L	-	-	-	-	154	154	0.104	1.08	3.74	5.95	6.98
D-Ag	mg/L	-	-	-	-	154	4	<0.0000100	<0.000100	<0.000100	<0.000100	<0.000500
D-Tl	mg/L	-	-	-	-	154	4	0.00000420	<0.0000400	<0.0000500	<0.0000500	<0.000500
D-U	mg/L	-	-	-	-	154	154	0.0000870	0.000486	0.00151	0.00244	0.00267
D-V	mg/L	-	-	-	-	154	82	<0.000500	0.000506	0.00104	<0.0100	<0.0500
D-Zn	mg/L	-	-	-	-	154	21	<0.00100	<0.00100	<0.00100	<0.0100	<0.0500
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	-	-	204	1	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.000450
Acridine	mg/L	-	-	-	-	204	3	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.000557
Anthracene	mg/L	-	-	-	-	204	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000900
Benz(a)anthracene	mg/L	-	-	-	-	204	3	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000900
Benzo(a)pyrene	mg/L	0.00001	-	-	-	204	3	<0.00000500	<0.00000500	<0.0000100	<0.0000100	<0.0000900
Chrysene	mg/L	0.0001	-	-	-	204	1	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.000450
Fluoranthene	mg/L	-	-	-	-	204	3	<0.0000100	<0.0000100	<0.0000300	<0.0000300	<0.000270
Fluorene	mg/L	0.012	-	-	-	204	1	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.000450
1-methylnaphthalene	mg/L	0.001	-	-	-	204	1	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000900
2-methylnaphthalene	mg/L	0.001	-	-	-	204	1	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000900
Naphthalene	mg/L	0.001	-	0.0014	-	204	0	<0.0000500	<0.0000500	<0.000200	<0.000200	**<0.00180**
Phenanthrene	mg/L	-	-	-	-	204	2	<0.0000200	<0.0000200	<0.000100	<0.000100	<0.000900
Pyrene	mg/L	-	-	-	-	204	0	<0.0000100	<0.0000100	<0.0000200	<0.0000200	<0.000180
Quinoline	mg/L	-	-	-	-	170	0	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000930
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.11	-	0.11	-	203	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.25	-	0.025	-	203	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Methyl-tert-butyl-ether	mg/L	-	0.44	5	-	203	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Styrene	mg/L	-	-	-	-	203	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Toluene	mg/L	-	-	0.215	-	203	1	<0.000400	<0.000400	<0.000500	<0.00100	<0.00100
Total Xylenes	mg/L	-	-	-	-	203	0	<0.000500	<0.000500	<0.00200	<0.00200	<0.00200
Chlorobenzene	mg/L	-	-	-	-	99	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
1-2-Dichlorobenzene	mg/L	-	-	-	-	99	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	164	164	0	0	0	0.0193	2.64
Upper Bound PCDD/F TEQ [7]	pg/L	-	-	-	-	164	164	0.536	0.768	1.66	5.30	7.10
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	98	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	98	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	98	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	98	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:
Compiled dataset for the May 2020 to May 2025 monitoring period (Appendix 3.9-1). Statistics of monitoring dataset; duplicate samples not included.
B.C. WQG MWAL = British Columbia water quality guidelines for the protection of marine aquatic life.
CWQG MWAL = Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of marine aquatic life.
Non-detect results are screened using the detection limit value.
Values shaded in light grey exceed the applicable long-term B.C. WQG MWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG MWAL.
Bolded values exceed the applicable long-term CWQG MWAL and underlined values exceed the applicable short-term CWQG MWAL.
[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment. Water quality from reference stations represents background conditions, therefore the turbidity and TSS WQGs were not evaluated. The salinity WQG was not evaluated.
[2] The approved total ammonia nitrogen B.C. WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in B.C. WQG guidance document. The total ammonia nitrogen B.C. WQG was calculated based on median salinity, pH and temperature values for marine water quality reference stations collected at 2 m below surface.
[3] The working B.C. WQG for trivalent antimony [Sb(III)] is 0.27 mg/L and is applied to total antimony results.
[4] The WQG for hexavalent chromium (Cr(IV)) is applied to total chromium results.
[5] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.
[6] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.
[7] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

Table 3-35:
Summary of Marine Water Quality at Reference Stations (WQR1 and WQR2) at 2 m Above the Seafloor

Parameter	Unit	Provincial Guideline (BC WQG MWAL)		Federal Guideline (CWQG MWAL)		Reference Stations - 2 m Above Seafloor						
		Long-term	Short-term	Long-term	Short-term	Number of Samples	Number of Detectable Values	Min	P10	Median	P90	Max
Physical Parameters												
Total Alkalinity	mg/L	-	-	-	-	101	101	64.2	95.1	105	108	123
Conductivity (Field)	µS/cm	-	-	-	-	187	187	20600	28600	31600	33500	66200
Specific Conductivity (SPC-Field)	µS/cm	-	-	-	-	124	124	28800	35900	45500	47100	96300
Dissolved Oxygen (Field)	mg/L	-	-	>=8	-	192	192	**2.44**	**5.06**	**6.46**	8.45	12.1
pH (Field)	s.u.	7.0 - 8.7				190	190	6.90	7.33	7.51	7.70	8.20
Salinity (Field)	ppt	-	-	-	-	180	180	17.8	25.9	29.3	30.2	59.2
Temperature	°C	-	-	-	-	195	195	7.30	8.30	8.90	10.0	13.6
Total Suspended Solids (TSS) [1]	mg/L	-	-	-	-	209	139	<2.00	<2.00	<3.00	14.0	100
Total Hardness	mg/L	-	-	-	-	208	208	3090	5010	5630	6130	10200
Turbidity (Field) [1]	NTU	-	-	-	-	193	193	0	0	0.320	1.52	6.07
Nutrients												
Total Ammonia (as N) [2]	mg/L	5.6	37	-	-	206	65	<0.00500	<0.00500	<0.00500	<0.00500	0.148
Bromide	mg/L	-	-	-	-	151	114	<25.0	38.7	56.5	<100	<100
Chloride	mg/L	-	-	-	-	151	151	7860	14600	16300	17300	18200
Fluoride	mg/L	-	1.5	-	-	151	23	0.808	<1.00	<1.00	<50.0	<100
Nitrate (as N)	mg/L	3.7	-	45	339	205	40	0.235	0.489	<0.500	4.00	<10.0
Nitrite (as N)	mg/L	-	-	-	-	151	5	<0.00500	<0.0500	<0.100	<5.00	<10.0
Sulphate	mg/L	-	-	-	-	151	151	1080	1990	2280	2460	3810
Total Metals												
T-Al	mg/L	-	-	-	-	208	184	<0.00500	<0.0100	0.0214	0.0502	1.10
T-Sb [3]	mg/L	0.27	-	-	-	208	2	<0.000200	<0.000400	<0.000500	<0.00100	<0.00500
T-As	mg/L	-	0.0125	0.0125	-	208	202	0.000770	0.00149	0.00177	0.00367	0.00633
T-Be	mg/L	0.1	-	-	-	208	0	<0.000100	<0.000100	<0.000200	<0.000500	<0.00100
T-B	mg/L	1.2	-	-	-	208	208	1.90	3.26	3.91	4.55	8.38
T-Ba	mg/L	-	-	-	-	208	197	0.00700	0.00900	0.0105	0.0129	<0.0500
T-Cd	mg/L	0.00012	-	0.00012	-	208	204	0.0000460	0.0000656	0.0000810	0.0000975	**<0.000250**
T-Ca	mg/L	-	-	-	-	209	209	188	323	368	410	712
T-Cr [4]	mg/L	0.0015	-	0.0015	-	208	10	<0.000500	<0.000500	<0.00100	<0.00100	**<0.0250**
Total Hexavalent Chromium	mg/L	0.0015	-	0.0015	-	97	0	<0.00150	<0.00150	<0.00150	<0.00150	**<0.0250**
Total Trivalent Chromium	mg/L	0.056	-	0.056	-	51	3	<0.000500	<0.000500	<0.000500	<0.000500	<0.00179
T-Co	mg/L	-	-	-	-	208	118	<0.0000500	<0.0000500	0.0000789	<0.000200	<0.00500
T-Cu	mg/L	0.002	0.003	-	-	208	63	<0.000500	<0.000500	<0.000800	<0.00200	<0.0250
T-Fe	mg/L	-	-	-	-	208	167	<0.0100	0.0130	0.0230	0.0493	0.911
T-Pb	mg/L	0.002	0.14	-	-	208	37	<0.000100	<0.000100	<0.000400	0.000788	0.00375
T-Mg	mg/L	-	-	-	-	209	209	637	972	1140	1260	2040
T-Mn	mg/L	-	-	-	-	208	204	0.000980	0.00156	0.00331	0.0101	0.0478
T-Hg [5]	mg/L	0.000011	-	0.000016	-	207	2	<0.00000500	<0.00000500	<0.0000100	<0.0000100	0.0000140
Total Methylmercury	mg/L	-	-	-	-	141	24	<0.0000000200	<0.0000000200	<0.0000000230	<0.0000000800	<0.000000400
T-Mo	mg/L	-	-	-	-	208	208	0.00500	0.00865	0.00971	0.0109	0.0198
T-Ni	mg/L	0.0083	-	-	-	208	65	0.000237	<0.000400	<0.000500	0.00108	<0.0250
T-Se	mg/L	0.002	-	-	-	208	33	<0.000500	<0.000500	<0.00100	0.00140	0.00783
T-Sr	mg/L	-	-	-	-	208	208	3.21	5.91	6.70	7.40	14.4
T-Ag	mg/L	0.0015	0.003	-	0.0075	208	7	<0.0000500	<0.000100	<0.000100	<0.000100	0.000548
T-Tl	mg/L	-	-	-	-	208	6	<0.0000200	<0.0000400	<0.0000500	<0.0000500	<0.000500
T-U	mg/L	-	-	-	-	208	208	0.00137	0.00237	0.00270	0.00300	0.00535
T-V	mg/L	0.05	-	0.005	-	208	128	0.000980	0.00129	<0.00200	**<0.0100**	**<0.0500**
T-Zn	mg/L	0.01	0.055	-	-	208	18	<0.00300	<0.00300	<0.00800	<0.0100	<0.150
Dissolved Metals												
D-Al	mg/L	-	-	-	-	152	43	<0.00500	<0.00500	0.00610	0.0133	0.282
D-Sb	mg/L	-	-	-	-	152	0	<0.000400	<0.000500	<0.00100	<0.00100	<0.00500
D-As	mg/L	-	-	-	-	152	146	0.000850	0.00146	0.00181	0.00369	0.00648
D-Be	mg/L	-	-	-	-	152	2	<0.000100	<0.000100	<0.000500	<0.000500	<0.00100
D-B	mg/L	-	-	-	-	152	152	2.26	3.13	3.81	4.66	5.92
D-Ba	mg/L	-	-	-	-	152	147	0.00630	0.00860	0.0101	0.0123	<0.05
D-Cd	mg/L	-	-	-	-	152	149	0.0000320	0.0000601	0.0000760	0.0000965	<0.00025
D-Ca	mg/L	-	-	-	-	152	152	195	322	366	400	427
D-Cr	mg/L	-	-	-	-	152	1	<0.000500	<0.000500	<0.000500	<0.00100	<0.0250
Dissolved Hexavalent Chromium	mg/L	-	-	-	-	95	0	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150
Dissolved Trivalent Chromium	mg/L	-	-	-	-	49	0	<0.00150	<0.00150	<0.00150	<0.00150	<0.00150
D-Co	mg/L	-	-	-	-	152	95	<0.0000500	<0.0000500	0.0000625	<0.000200	<0.00500
D-Cu	mg/L	-	-	-	-	152	25	<0.000500	<0.000500	<0.000500	<0.00100	<0.0100
D-Fe	mg/L	-	-	-	-	152	4	<0.0100	<0.0100	<0.0100	<0.0200	<0.500
D-Pb	mg/L	-	-	-	-	152	3	<0.000100	<0.000100	<0.000100	<0.000500	<0.00250
D-Mg	mg/L	-	-	-	-	152	152	604	970	1140	1280	1460
D-Mn	mg/L	-	-	-	-	152	148	0.000380	0.000831	0.00177	0.00781	0.0469
D-Hg	mg/L	-	-	-	-	152	0	<0.00000500	<0.00000500	<0.00000500	<0.0000100	<0.0000100
D-Mo	mg/L	-	-	-	-	152	152	0.00513	0.00826	0.00945	0.0104	0.0126
D-Ni	mg/L	-	-	-	-	152	29	<0.000400	<0.000400	<0.000500	<0.000800	<0.0250
D-Se	mg/L	-	-	-	-	152	25	<0.000500	<0.000500	0.000675	0.00105	0.00587
D-Sr	mg/L	-	-	-	-	152	152	3.36	5.76	6.44	7.24	8.00
D-Ag	mg/L	-	-	-	-	152	7	<0.000100	<0.000100	<0.000100	<0.000100	<0.000500
D-Tl	mg/L	-	-	-	-	152	1	<0.0000400	<0.0000400	<0.0000500	<0.0000500	<0.000500
D-U	mg/L	-	-	-	-	152	152	0.00139	0.00229	0.00264	0.00292	0.00318
D-V	mg/L	-	-	-	-	152	96	0.00089	0.00114	0.00149	<0.0100	<0.0500
D-Zn	mg/L	-	-	-	-	152	39	<0.00100	<0.00100	0.00140	<0.0100	<0.0500
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	mg/L	0.006	-	-	-	203	0	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.0000500
Acridine	mg/L	-	-	-	-	203	0	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.000261
Anthracene	mg/L	-	-	-	-	203	0	<0.0000100	<0.0000100	<0.0000100	<0.0000100	<0.0000100
Benz(a)anthracene	mg/L	-	-	-	-	203	1	<0.0000100	<0.0000100	<0.0000100	<0.0000100	0.0000150
Benzo(a)pyrene	mg/L	0.00001	-	-	-	203	0	<0.00000500	<0.00000500	<0.0000100	<0.0000100	<0.0000100
Chrysene	mg/L	0.0001	-	-	-	203	0	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.0000500
Fluoranthene	mg/L	-	-	-	-	203	1	<0.0000100	<0.0000100	<0.0000300	<0.0000300	<0.0000300
Fluorene	mg/L	0.012	-	-	-	203	0	<0.0000100	<0.0000100	<0.0000500	<0.0000500	<0.0000500
1-methylnaphthalene	mg/L	0.001	-	-	-	203	0	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
2-methylnaphthalene	mg/L	0.001	-	-	-	203	0	<0.0000100	<0.0000100	<0.000100	<0.000100	<0.000100
Naphthalene	mg/L	0.001	-	0.0014	-	203	0	<0.0000500	<0.0000500	<0.000200	<0.000200	<0.000200
Phenanthrene	mg/L	-	-	-	-	203	0	<0.0000200	<0.0000200	<0.000100	<0.000100	<0.000100
Pyrene	mg/L	-	-	-	-	203	0	<0.0000100	<0.0000100	<0.0000200	<0.0000200	<0.0000200
Quinoline	mg/L	-	-	-	-	169	1	<0.0000500	<0.0000500	<0.0000500	<0.0000500	<0.000237
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.11	-	0.11	-	202	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Ethylbenzene	mg/L	0.25	-	0.025	-	202	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Methyl-tert-butyl-ether	mg/L	-	0.44	5	-	202	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Styrene	mg/L	-	-	-	-	202	0	<0.000500	<0.000500	<0.00100	<0.00100	<0.00100
Toluene	mg/L	-	-	0.215	-	202	0	<0.000400	<0.000400	<0.000500	<0.00100	<0.00100
Total Xylenes	mg/L	-	-	-	-	202	0	<0.000500	<0.000500	<0.00200	<0.00200	<0.00200
Chlorobenzene	mg/L	-	-	-	-	98	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.00100
1-2-Dichlorobenzene	mg/L	-	-	-	-	98	0	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
Dioxins and Furans												
Lower Bound PCDD/F TEQ [6]	pg/L	-	-	-	-	163	163	0	0	0	0.0244	0.423
Upper Bound PCDD/F TEQ [7]	pg/L	-	-	-	-	163	163	0.499	0.767	1.96	5.30	5.30
Extractable Petroleum Hydrocarbons (EPH)												
Heavy Extractable Petroleum Hydrocarbons (HEPH)	mg/L	-	-	-	-	97	0	<0.250	<0.250	<0.250	<0.250	<0.250
Light Extractable Petroleum Hydrocarbons (LEPH)	mg/L	-	-	-	-	97	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (10-19)	mg/L	-	-	-	-	97	0	<0.250	<0.250	<0.250	<0.250	<0.250
EPH (19-32)	mg/L	-	-	-	-	97	0	<0.250	<0.250	<0.250	<0.250	<0.250

Notes:
Compiled dataset for the May 2020 to May 2025 monitoring period (Appendix 3.9-1). Statistics of monitoring dataset; duplicate samples not included.
B.C. WQG MWAL = British Columbia water quality guidelines for the protection of marine aquatic life.
CWQG MWAL = Canadian (CCME) and Federal (ECCC) water quality guidelines for the protection of marine aquatic life.
Non-detect results are screened using the detection limit value.
Values shaded in light grey exceed the applicable long-term B.C. WQG MWAL and values shaded in dark grey exceed the applicable short-term B.C. WQG MWAL.
Bolded values exceed the applicable long-term CWQG MWAL and underlined values exceed the applicable short-term CWQG MWAL.
[1] Field turbidity and total suspended solids (TSS) B.C. WQGs are induced guidelines for change from background conditions arising from discharges to the aquatic environment. Water quality from reference stations represents background conditions, therefore the turbidity and TSS WQGs were not evaluated. The salinity WQG was not evaluated.
[2] The approved total ammonia nitrogen B.C. WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in B.C. WQG guidance document. The total ammonia nitrogen B.C. WQG was calculated based on median salinity, pH and temperature values for marine water quality reference stations collected at 2 m above the seafloor.
[3] The working B.C. WQG for trivalent antimony [Sb(III)] is 0.27 mg/L and is applied to total antimony results.
[4] The WQG for hexavalent chromium (Cr(IV)) is applied to total chromium results.
[5] The B.C. WQG for total mercury (T-Hg) is dependent on the total methylmercury concentration and was derived assuming methylmercury was 0.5% of the total mercury concentration.
[6] Lower-bound PCDD/F TEQ = Lower-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration of zero for results reported as not detected.
[7] Upper-bound PCDD/F TEQ = Upper-bound polychlorinated dibenzo-*p*-dioxin (PCDD) and polychlorinated dibenzofuran (PCDF) toxic equivalent (TEQ). Calculated assuming a concentration equal to the detection limit for results reported as not detected.

3.10 Oceanography

The Project is located on the shores of Howe Sound, a coastal fjord located in the Strait of Georgia. The fjord extends 42 km south from the mouth of the Squamish River to Burrard Inlet (Figure 1-1). Howe Sound is separated into two basins by a shallow underwater sill which crests at a depth of approximately 70 m below the surface. The sill was formed from a glacial moraine which extends from Defense Island to Porteau, approximately 11 km southwest of the Project site as indicated in Figure 3-16. North of this sill is the northern basin of Howe Sound which has a maximum depth of 285 m and is where the Project site is located (BCELUS, 1980; Golder, 2014).

The northern basin of Howe Sound is density stratified into three layers: a surface layer (between 0 and 10 m) that is influenced by surface processes, such as riverine runoff, wind, solar radiation, an intermediate layer (10 m – 70 m depth) that exchanges with the southern portion of Howe Sound above the sill, and a deep layer (70 m and below) that is contained north of the sill. Stratification in the upper layers varies seasonally, strengthening from May to August during freshet and with increased solar insolation and weakening from September through April with decreased river runoff and surface cooling. Stratification limits mixing between the surface and intermediate layers. Freshwater inputs from the Squamish River influence the salinity of the surface waters of the northern basin of Howe Sound. Variation in surface salinity is tied closely to the timing of freshwater inputs, where salinity is lowest during freshet and increases when freshwater inputs are reduced. Glacial melt flows from the Squamish River contribute high silt content and turbidity, especially during freshet. Mixing between the surface and intermediate layers is more likely enhanced in the winter months when stratification is weaker (Golder, 2015; BCELUCS, 1980).

In the northern basin, circulation in the upper two layers is estuarine-like due to outflow from the Squamish River, with a southward flowing current in the surface layer and a northward return flow in the intermediate layer (Thomson, 1981, Bell 1975). Currents in the surface layer are strongly influenced by wind (Buckley and Pond, 1976). Strong winds from inland are funneled down the Squamish Valley as discussed in Section 3.4.3. Tides in Howe Sound are semi-diurnal, with an average height difference of 3.2 m and a maximum height of 5 m, however they have little influence on surface circulation (Thomson, 1981). The general surface circulation pattern is shown in Figure 3-17, which notably bears resemblance to the silt patterns shown in the accompanying aerial photograph. Exchange with water in the southern extent of Howe Sound occurs on different timescales for each layer in the northern basin. In the intermediate layer, exchange with the Strait of Georgia occurs on the order of weeks and can be tidally modified near the sill (DFO, 2013). The deepest layer within the northern basin of Howe Sound exchanges with

water south of the sill periodically, approximately every 3-4 years (Bell, 1975). The deep water trapped in the basin can become strongly deoxygenated during its residence (Levings, 1980).

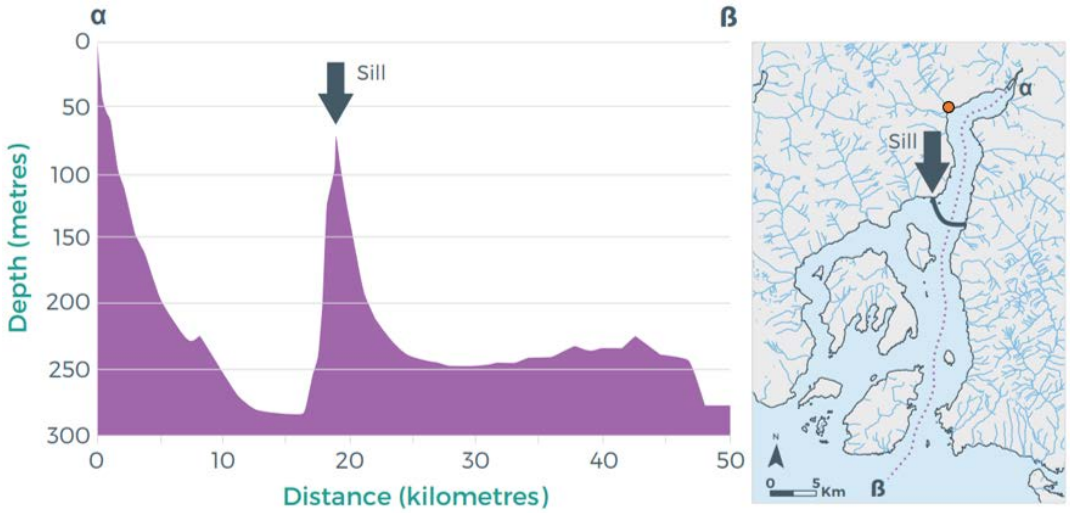


Figure 3-16: Cross-section of Howe Sound (left) along the north to south transect shown in the right figure. The approximate location of Woodfibre is indicated with an orange circle in the right figure. Figure modified from Ocean Watch (2017).

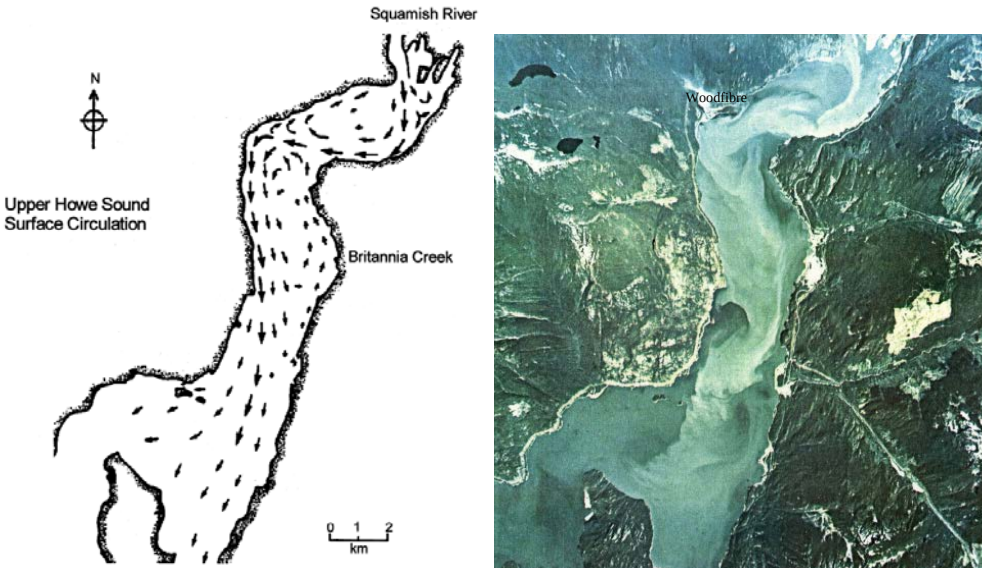


Figure 3-17: The current patterns of surface waters of the northern Howe Sound (left figure; Buckley & Pond, 1976). For comparison, the right figure shows the turbid outflow of the Squamish River waters in the northern extent of Howe Sound (August 7, 1972; Buckley, 1977).

Primary productivity in Howe Sound is relatively high compared to the Strait of Georgia, being highest to the south portion of the sound. This gradient in primary production is

largely influenced by down-fjord gradients in turbidity sourced from outflow of the Squamish River (Stockner, 1977). Further, primary production in Howe Sound has previously been limited near regions of anthropogenic influence. For example, increased turbidity from pulp mills (Stockner, 1976) and by acid mind drainage outflow (Levings, 2005) both limit primary productivity near the influence.

3.10.1 Water Column Study Results, 2013-2015

Studies on local current speed and direction, surface water elevation, and temperature through the marine water column in the Project area were conducted by Golder in 2014 and 2015 (Golder, 2015). A taut-line mooring was deployed May 2014 through May 2015 and was instrumented for the continuous measurement of currents, waves, conductivity and temperature. The mooring was located within the Project area, approximately 400 m southwest of Mill Creek (Figure 3-13). During the sampling period, the mooring was collected and re-deployed five times to service the instruments and remove entangled fishing equipment. The water column depth at the mooring was approximately 75 m to the seafloor. Typical current speeds were low in magnitude and typically less than 0.1 m/s with maximum current speeds measured at approximately 0.3 m/s. Local current direction is south-southwest during the ebb tide and north-northeast during the flood tide in the upper water column, approximately parallel to the shoreline.

In situ vertical water quality profiles were collected during the 2013 to 2015 monitoring programs (Golder, 2014 and 2015). Measured variables included temperature, specific conductance and conductivity, salinity, pH, oxidation reduction potential, dissolved oxygen, turbidity, and chlorophyll a. Vertical profile data was used to identify the depth of the pycnocline, which is the transitional layer between the freshwater influenced shallow and the deeper marine waters and is defined by a rapid change over depth in density, which is due to changes in temperature and/or salinity.

Water profiling showed evidence of stratification within the Project area, with higher turbidity and lower salinity shallow waters (up to 10 m depth) relative to higher salinity deeper waters (below 10 m depth). This is illustrated in Figure 3-18, which shows the July 2013 through May 2014 water column profiles southwest (stations WMB1, WMB4 and WMB7) and northeast (stations WMB9 and S-2) of Mill Creek (Golder, 2014). Water column stratification in Howe Sound is influenced by seasonal inputs from the Squamish River and nearby creeks, as previously described. Periods of high freshwater inputs in the summer reduce salinity and increase turbidity concentrations in a shallow surface layer, relative to depth, that extends from the mouth of Squamish River southward in Howe Sound waters and influences the shallow marine water quality within the Project boundaries southwest and northeast of Mill Creek as shown in the plots for May through September, 2014 (Figure 3-18).

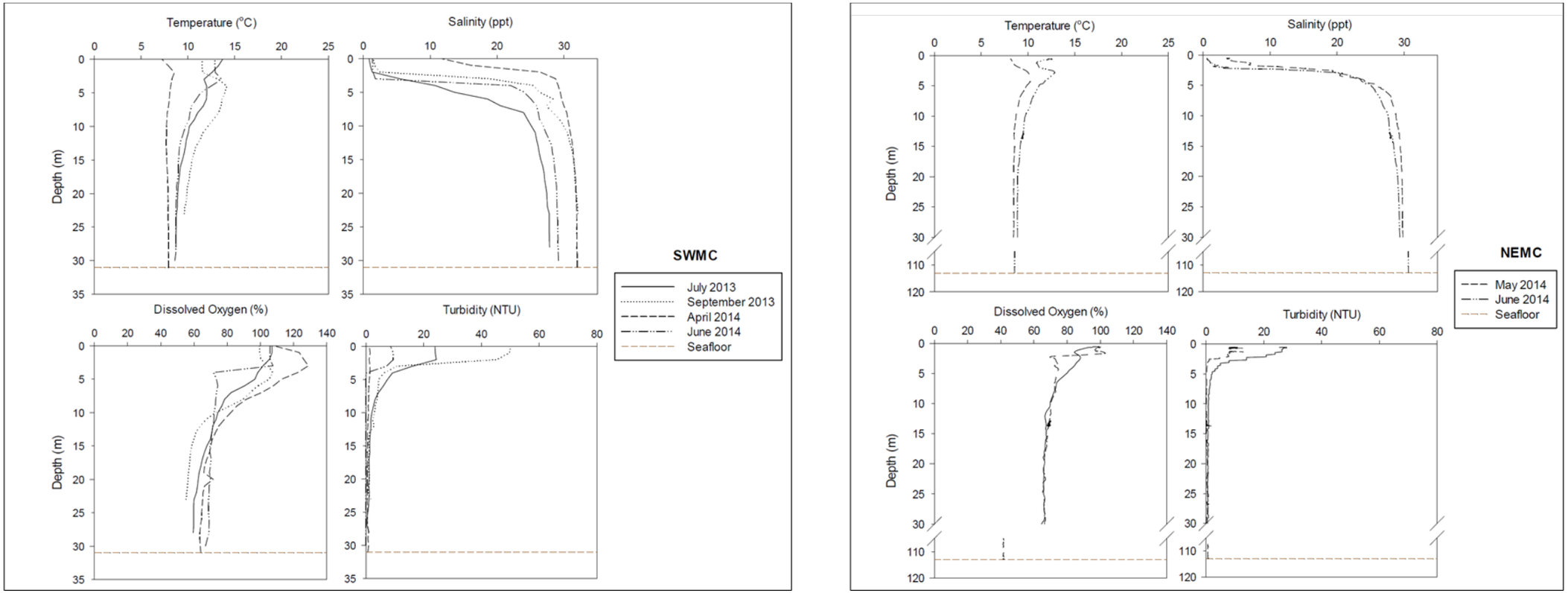


Figure 3-18: Marine Water Column Profiles for Temperature, Salinity, Dissolved Oxygen and Turbidity Southwest and Northeast of Mill Creek, SWMC and NEMC, respectively (from Golder, 2014).

3.10.2 Water Column Monitoring Results, 2022-2025

In situ water column profiling has been conducted alongside water quality sampling since February 2022. Profiling is conducted to record the structure of the water column at the time of sampling. Water column profiles of temperature, salinity, turbidity, dissolved oxygen, and pH were conducted using a YSI Sonde at one or more monitoring stations on a monthly basis from February 2022 to March 2024 and at a higher frequency (weekly to bi-weekly) from April 2024 onwards. The depth at the monitoring stations is between 15 to 30 m, and the upper 10 m of the water column is reliably captured in the monitoring program. Of the seven monitoring stations, five are located within the CPA (IDZ-W1, IDZ-W2, IDZ-E1, IDZ-E2, WQ1) and two are reference stations (WQR1 and WQR2) located approximately 500 m north and 500 m south of the CPA north and south boundaries. Heatmaps of in situ parameters were prepared to show seasonal changes to physical properties of the water column and are shown in Figure 3-19. Given the similar seasonal trends observed among stations located within the CPA and the marine reference stations, the heatmaps are an average of all water column profiles from all monitoring stations from February 2022 to October 2025. The data was averaged bi-weekly to highlight seasonal trends in the water column and only data in the upper 10 m of the water column are presented because of low data resolution below the 10 m depth.

This monitoring program provides insight into surface stratification and its seasonality in the ocean surrounding the Project site (Figure 3-19). The surface mixed layer, indicated by a large change in temperature or salinity near the surface, ranges from 5 to >10 m in depth depending on the season and is primarily influenced by seasonal variation of freshwater inputs. In the summertime the surface mixed layer is shallow (<5 m depth) and strongly stratified (having large a difference in salinity between the surface layer and the water column below it) owing to increased river runoff. The mixed layer deepens in the wintertime, increasing to an average of 7.5 m depth. This weakened wintertime stratification can allow for deeper vertical mixing in the upper water column.

The seasonal changes in salinity in the upper water column are largely dictated by riverine inputs to the region. During freshet, low salinity water (<20 ppt) occupies the upper 2 to 5 m of the water column, overlying saline water (20 to 32 ppt) below 5 m depth, consistent with the observations of Golder (2014). The deeper, saline layer is less seasonally affected compared to the surface mixed layer. Periods of low salinity in the upper water column are consistent with periods of high turbidity (30 NTU) in the upper 5 m of the water column. During periods of low Squamish River runoff, low salinity water remains only in the upper 2 m of the water column, and the water column becomes weakly stratified. Turbidity is typically low in the fall and winter when glacial melt ceases, except for heavy precipitation

events that increase riverine sediment loads (*e.g.* October 2024, Figure 3-19). As discussed above, high surface turbidity is a signature of runoff from the Squamish River (Figure 3-18 and Figure 3-19).

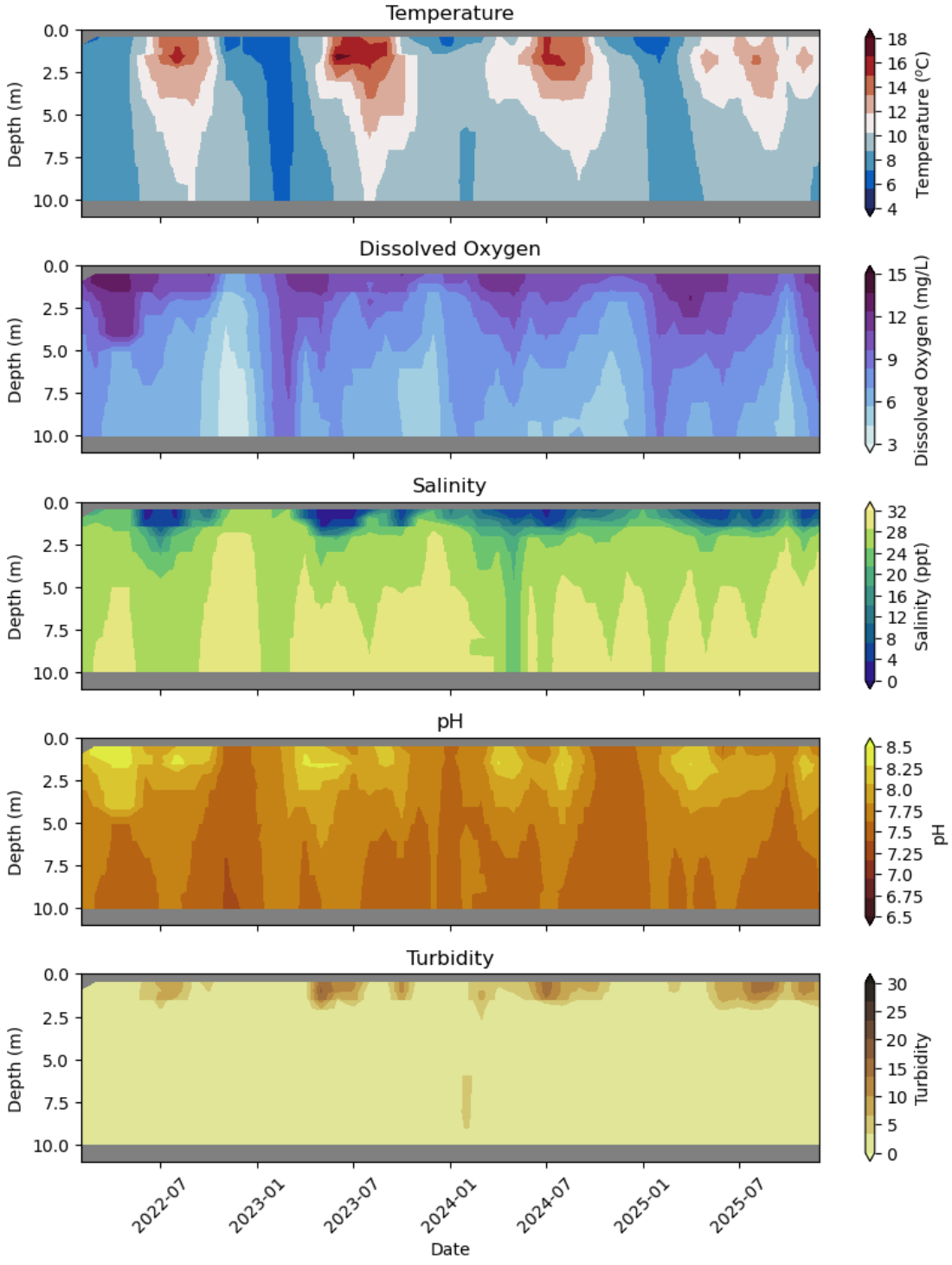


Figure 3-19: Heatmaps for Measured Variables at Stations Surrounding the CPA.

The results shown in Figure 3-19 also show seasonal trends in temperature, dissolved oxygen, and pH. Temperatures in the upper 10 m of the water column are largely influenced by solar radiation and, as such, vary seasonally. Surface mixed layer temperatures are highest in the summer, from May to September, reaching maximums of approximately 17^{o}C, and cool from October to March, reaching minimums of 6^{o}C. Water below the surface mixed layer is somewhat influenced by solar radiation but has less seasonal fluctuation. Surface dissolved oxygen concentrations vary inversely with temperature, due to solubility effects. Dissolved oxygen concentrations are highest in the late-winter and early spring, reaching maximums of 13 mg/L, and lowest in the summertime, reaching minimums of 8 mg/L in the surface mixed layer. The exception to this is the case of fall and winter upwelling events that can transport deeper, low oxygen waters to shallower depths in the water column (*e.g*. October and November 2022, Figure 3-19). There is slight seasonal variation in pH that pertains mostly to the surface mixed layer. In spring and summer, the surface layer has a slightly higher pH (8.0 on average) compared to below the surface layer (7.6 on average). In the winter months, the water column is well mixed and pH is circumneutral.

3.11 Marine Ecology

This section summarizes marine ecological conditions within the Project area. The Marine Fish and Fish Habitat Pre-Construction Baseline Report prepared by Keystone (2024a) summarizes field studies conducted from July 2013 to November 2023. These studies included marine riparian, intertidal, and subtidal surveys to document habitat type and use, substrate composition, and biota.

Since the start of construction in November 2023, monitoring has been carried out in accordance with the Marine Fish and Fish Habitat Environmental Effects Monitoring Plan (Keystone, 2025a). Results from the first year (*i.e*., 2024) of Environmental Effects Monitoring (EEM) are presented in Keystone (2025a). Marine ecology is further assessed as part of the Aquatic Effects Assessment for the Second Floating Worker Accommodation (Floatel #2) (Keystone, 2025b). Key findings from the above-mentioned reports are summarized herein to characterize conditions prior to operation of the LNG facility.

3.11.1 Biophysical Habitat

Biophysical surveys showed low abundance and diversity of marine biota in the intertidal and subtidal zones within the Project area boundaries (Keystone, 2024a). The intertidal zone is characterized by hard substrate and a band of rockweed occupying large boulders that are infrequently disturbed by wave actions. Below the rockweed band, sparse patches of sea lettuce and laminarian kelp were observed. Sightings of invertebrates (*e.g.*, acorn

barnacles, blue mussel, shore crabs) were infrequent and limited to riprap and boulders within the intertidal zone. The subtidal zone is characterized by soft sediment comprised of wood debris, sand, and silt. Compared to the intertidal zone, the subtidal zone was inhabited by less macroalgae (*e.g.*, kelp) but more benthic invertebrates (*e.g.*, anemones, sea urchin). The presence of an infauna community within the subtidal sediments was inferred from the observed invertebrate holes, fecal casings, and bivalve shells.

3.11.2 Pacific Herring and Lingcod Spawning

Pacific herring spawning dive surveys have been conducted for seven years over the 2015 to 2023 period and spawn was observed within the Project area in four of those years (2015, 2016, 2019, and 2021) (Keystone, 2024a). The 2015 and 2016 surveys found spawn on pilings that were removed prior to the 2019 survey. During construction in 2024, herring spawn was observed on rockweed and sugar kelp (Keystone, 2025a). Overall, the surveys determined that spawning habitat is marginal within the Project area, with spawn observations generally limited to a narrow band on rocky substrate that is covered by rockweed and kelp in the intertidal and shallow subtidal zones (Keystone, 2024a; Keystone, 2025a).

During herring dive surveys conducted since 2015, lingcod egg masses were also observed among boulder substrate and crevices between pilings within the Project area (Keystone, 2024a). Repeated observations of egg masses in the northeast corner of the Project area suggest this area is frequently used by lingcod for spawning.

3.11.3 Fish Presence and Migration

Fish presence surveys conducted within the marine area of the Project showed presence of Pacific salmonids, forage fish (*e.g.*, Pacific herring), and other demersal and pelagic fish (Keystone, 2024a). Sampling was focused on late spring and summer months, which showed prevalence of chum and pink salmon in late March, and chinook and coho salmon in June and July. However, the Pacific herring larvae that hatched in Howe Sound may disperse to the Project marine area from February to June. Sampling and anecdotal evidence suggest that Northern anchovy, a forage fish, may be present within and adjacent to the Project marine area from April to September, but have not been observed to spawn within in the Project area.

Mill Creek and Woodfibre Creek serve as spawning and rearing habitats for salmonids. Biennial migrations of pink salmon occur from August to October (peak in September), with higher number of spawners observed in Mill Creek than Woodfibre Creek. There were anecdotal observations of chum salmon spawners in Mill Creek in November 2022. Coho spawning was not observed during baseline monitoring. Mill Creek and Woodfibre Creek

host populations of juvenile chinook and coho salmon, rainbow trout, and sculpin. Mill Creek also supports populations of juvenile chum salmon.

3.11.4 Marine Mammals and Species at Risk

Howe Sound is regularly visited by marine mammals, including whales, dolphins, porpoises, sea lions, and harbour seals (Lorax, 2023). The presence of marine mammals and species at risk in the Project marine area was evaluated in Keystone (2025b) based on a desktop review of publicly accessible databases, published literature, and site-specific monitoring programs such as the Marine Mammal Management and Monitoring Plan (Stantec, 2023) and the Marine Mammal Observation Program Review for 2024–2025 MLRW (WLNG, 2025). The likelihood of aquatic species at risk (*e.g.*, bluntnose six gill shark, green sturgeon) to be present within the Project boundaries or surrounding area is considered low or low to moderate (Keystone, 2025b).

3.11.5 Aquatic Invasive Species

Surveys for aquatic invasive species were conducted in and adjacent to the Project area boundaries in 2022 and 2023 (Keystone, 2024a) to look for the presence of sessile invertebrates and European green crab that may be introduced through commercial shipping activities (*e.g.*, ballast water discharge). No occurrences of aquatic invasive species were reported within in the survey area during baseline monitoring.

3.11.6 Potential Project Influence

Potential project influence from construction activities is monitored via the EEM and is assessed using key performance indicators (KPIs), as defined in the Marine Fish and Fish Habitat Environmental Effects Monitoring Plan (Keystone, 2025a):

- KPI1: Change in fish behaviour – Pacific herring spawning
- KPI2: Change in fish abundance – presence and migration through the CPA
- KPI3: Change in fish behaviour – salmon spawning and outmigration from Mill Creek
- KPI4: Introduction of invasive species from ballast water exchange

Results from the first year (*i.e.*, 2024) of EEM are detailed in Keystone (2025a) and did not indicate discernable changes to KPIs compared to pre-construction conditions.

4. Effluent Discharges



4 Effluent Discharges

This section describes the water management and contact water treatment strategies that will be used during operation of the LNG facility. The implementation of the operations stormwater and contact water management system is outlined, including how construction water management will transition to the operations water management systems. The water balance, water quality, and receiving environment mixing models developed for the Project are presented. The models are used to simulate the expected quantity and quality of contact water and to characterize the mixing of contact water discharges in the Howe Sound receiving environment.

The water management approach, including the site hydrology model, water management system design, and system implementation are discussed in Section 4.1. The OWTS design is presented in Section 4.2, with a technical description of the treatment system components and how the OWTS will be operated. Section 4.3 describes modelling conducted to predict the quantity and quality of contact water discharges and presents the model results. The description and results of the receiving environment mixing model are provided in Section 4.4.

4.1 Water Management

The processes and facilities that will be used to manage water during commissioning and operation of the Project are described in this section. Stormwater is the primary source of water that will discharge from the site. A small amount of vehicle wash water will also be produced and will be managed within the water management system. The objectives of the water management system are to minimize the amount of stormwater that contacts Project facilities and ground surfaces, and to manage water conveyance and discharge in a manner that is safe for workers, prevents damage to Project infrastructure, and prevents harm to the receiving environment.

WLNG has developed an Operations Stormwater Drainage Management Program (SWDMP), which outlines the strategies for managing the stormwater drainage system during operations. The program includes descriptions of stormwater drainage management strategies and plans, OWTS operations and residuals management, contingency measures for non-compliant water or OWTS interruptions, episode management for natural events, trigger and response protocols for water quality exceedances, and an adaptive management approach to address uncertainties and ensure ongoing compliance. The SWDMP is provided as Appendix 4.1-1. A brief overview of each management plan is provided in the sub-sections below.

The SWDMP describes the water management infrastructure (*e.g.,* diversion ditches, sumps, outfalls) that will be in place during operations. In addition, the SWDMP summarizes the different categories of surface water runoff (*e.g.,* non-contact water and contact water) and outlines how each is managed to prevent project-related environmental impacts. This information is presented in Section 2.0 of the SWDMP (Appendix 4.1-1).

Water controlled by the water management system is classified into various water types that will be segregated and conveyed using a system of sumps, ditches, swales, trenches, pipelines and culverts prior to discharge to the Howe Sound and Mill Creek receiving environments. Mitigations will be implemented to identify water that is contaminated and requires containment. On-site treatment for TSS and extractable petroleum hydrocarbons (EPH) using Stormceptors, and an OWTS will also be implemented. The overall layout of the water management system is provided in Figure 2-1.

Water management conveyance structures are sized in accordance with District of Squamish Subdivision and Development Control Bylaw No. 2649, 2018 (Schedule B Design Criteria, Section 4.0 – Stormwater Management). Minor conveyance systems (*i.e.,* concrete trenches, underground stormwater pipes and catch basins) are sized for runoff from the 1-in-10 year return period, and major systems (*i.e.,* sheet flow on roads and walkways, diversion ditches, open channels and culverts) are sized for the 1-in-100 year return period (MDR 2026b or Appendix 4.1-2). The influences from rain-on-snow and climate change are accounted for in the rainfall values used for the design of water management facilities. Drawings showing the civil standards for ditches, swales, trenches and outfall headwalls are included in Appendix 4.1-3.

4.1.1 Water Type Classification

The water management system will intercept and convey stormwater that originates from outside of the Project site, stormwater that contacts the Project site, and water that is generated within the site during facility operations. Flows in the lower reaches of East Creek are managed through channels and culverts that were upgraded during construction. The various water types are classified based on the areas from which the water originates. The water type classification and definitions adapted from the SWDMP (Appendix 4.1-1) are provided in Table 4-1.

Table 4-1:
Water Type Definitions

Water Type	Definition
Stormwater	Water from precipitation that results in overland runoff outside and inside the Project site.
Non-Contact Water	Water generated from outside the footprint of the LNG Facility which does not come into contact with any part of the facility before entering the receiving environment. This also includes water originating from undeveloped / non-developable periphery areas of the site located along the creeks and Howe Sound shoreline, which drains directly to those water bodies.
Contact Water	Water generated from within the facility footprint either naturally or from facility operations. Contact water is further divided into three classifications as outlined below.
Contaminated Contact Water	Water originating from operational process areas, such as the amine unit, hydrocarbon loading/unloading stations, hydrocarbon storage areas, and any other areas surface runoff contacts oil drips from oily equipment base plates, lubrication skids, and piping drains.
Potentially Contaminated Contact Water	Water which potentially comes into contact with the LNG process and other process areas. This water is collected in the paved areas beneath the process modules and equipment.
Non-Contaminated Contact Water	Water originating from within the facility area which does not come into contact with any potential contaminant sources.

4.1.2 Parameters of Potential Concern (POPCs)

Parameters of potential concern (POPCs) have the potential to cause pollution in the receiving environment. The POPCs for the Project originate from process reagents and oil products that will be used in Project equipment and machinery, as well as from LNG and condensate that is produced by the Project, equipment wash water, and loose sediment particulates that may be present on infrastructure or ground surfaces. Stormwater may mobilize drips of reagent and oils within the LNG Processing Area (Figure 2-2), as well as loose sediment particles (*i.e.,* TSS) that may have settled on Project facilities and ground surfaces or be associated with equipment wash water. Oils are monitored using the EPH parameter (ENV, 2023); therefore, the POPC for oil products is identified as EPH. Planned management approaches for POPCs in contact water include secondary containment, evaporation, off-site disposal, on-site treatment with the OWTS, installation of surfacing materials that minimize sources of loose particulates, and the use of EPH and TSS traps (*i.e.*, stormceptors) in the contact water drainage system.

The SWDMP (Appendix 4.1-1) and the Operations Phase Best Achievable Technology Assessment (BATA) (MDR, 2026b; Appendix 4.2-1) identify sources of POPCs in contact water and explain how management approaches will be implemented for each POPC. A summary of POPCs and their associated management approaches are listed in Table 4-2.

Table 4-2:
Summary of Parameters of Potential Concern (POPCs) and Associated Management Approach

Source	Description	POPC	Management Approach
Diesel	Fuel for vehicles, firewater pump engines and essential generators.	EPH, PAHs	Secondary containment, off-site disposal
Heating Medium (Dowtherm Q)	Heat transfer fluid managed in the Process Utility Module (M09)	EPH	Secondary containment, off-site disposal
Lubricating oils, and greases	Oils and greases used in rotating equipment and lubricating skids throughout the LNG Processing Area	EPH	Secondary containment, treat with OWTS
Hydraulic oils	Oil used in hydraulic equipment in the Marine Terminal Area	EPH	Secondary containment, treat with OWTS
Dielectric oil	Oil used to cool electrical transformers within the Powerhouse Modules (M10/M11)	EPH	Secondary containment, off-site disposal, or treat with OWTS
Wash Water	Vehicle wash water and LNG Processing Area cleaning.	EPH, TSS, metals and detergents	Secondary containment, treat with OWTS. Use biodegradable, self de-emulsifying detergent.
LNG	LNG process product that is predominantly methane.	Trace amounts of volatile petroleum hydrocarbons and non-halogenated VOCs (BTEX)	Secondary containment, disperse by evaporation.
Condensate	Heavier natural gas components extracted before LNG is liquified. Primarily pentane and heavier volatile petroleum hydrocarbons.	Volatile petroleum hydrocarbons such as pentane, VH(C6-10), and non-halogenated VOCs (BTEX).	Secondary containment, disperse by evaporation or off-site disposal
Amine (OASE Purple)	Acid gas removal reagent (>70% methyldiethanolamine), used to remove carbon dioxide and other impurities from the natural gas feedstock in the Pre-Treatment Module (M01).	Amine (methyldiethanolamine)	Secondary containment, off-site disposal
Tempered water	Coolant (inhibited ethylene glycol, 40%) used to cool rotating equipment and compressors	Ethylene glycol	Secondary containment, off-site disposal
Chlorinator for fire water / service water	A basket-type chlorinator is located downstream of the Fire Water Tank.	Chlorine	Chlorine tablets are periodically used at dosages consistent with industry best practices to prevent algae growth in the Fire Water Tank.
Non-contaminated stormwater	TSS from gravel covered areas, as well as metals and PAHs that may be associated with TSS.	TSS, metals and PAHs	TSS controls. Use compacted gravels on level surfaces, rip-rap or vegetation on slopes, and Stormceptor oil/grit separators. Frequently trafficked areas are paved with asphalt or concrete.
	Low pH (*e.g.*, pH 5.5) is a natural condition in non-contact water and is expected to be similarly low in contact water runoff. Refer to Section 3.6.3.1.	pH	Not applicable – natural background condition.

The BATA (MDR, 2026b; Appendix 4.2-1) identified TSS and EPH as parameters of concern (POCs) that will be mitigated by on-site treatment. All other POPCs will be managed through off-site disposal (process reagents or products) or evaporation (volatile petroleum hydrocarbons and non-halogenated VOCs). During typical operation, there are no activities within the Project site that will produce TSS. There will be little to no traffic in gravelled areas, and properly graded rip-rap or compacted gravel will be used to minimize the risk of erosion in gravel covered areas that would cause TSS migration to stormwater. It is expected that TSS may settle in the Oily Water Storage Tank, primarily from wash water, and may be re-suspended when the pump to the OWTS is started. Therefore, to prevent the short-term discharge of effluent with elevated TSS concentrations, the OWTS is designed to manage TSS as described in Section 4.2.

Lubricating, hydraulic and dielectric oils are also referred to as petroleum hydrocarbons. These products are mixtures of organic compounds that typically contain hundreds of individual organic compounds. Testing for the presence of oil in environmental samples is commonly conducted by measuring the mixture as a single aggregate parameter. It is important to note the aggregate parameter for measuring oil in environmental samples is defined by a test procedure that varies slightly between regulatory jurisdictions. In B.C., the aggregate parameter for oil, EPH, is defined by the test methods for EPH in soil and water (ENV, 2023). Therefore, the aggregate parameter as defined in B.C. (*i.e.*, EPH) is identified as the POPC and POC for oil products that will be used at the Project site.

Alternative definitions for EPH include total petroleum hydrocarbons (TPH) (ENV, 2023), petroleum hydrocarbons (PHC) fraction 2 to fraction 4 (F2-F4) (CCME, 2008), and diesel range organics (DRO) (US EPA, 2003). The main difference between the various definitions is the range of individual compounds included in the aggregate parameter, although the presence or absence of certain steps in the test procedure (e.g., silica gel cleanup) will also affect the final concentration that is reported. Each of the compounds in an oil product can be defined by the number of carbon (C) atoms it contains. By convention, the aggregate parameter is bracketed by two specific compounds that contain a different number of C atoms. For example, EPH is bracketed by compounds that contain 10 and 32 C atoms, whereas F2-F4 and DRO are bracketed by compounds with 10 and 34 C atoms, and 10 and 28 C atoms, respectively. Therefore, although the various aggregate parameters are all suitable for detecting oil in environmental samples, there are differences in the compounds within the oil mixture that are included in the measured value for each aggregate parameter.

4.1.3 Outfall Catchments

Water management will be implemented for contact water and non-contact water. Contact and non-contact water will discharge through outfalls to Howe Sound or Mill Creek. Each of the outfalls is identified by the outfall code (OUT) and a unique number. Non-contact and non-contaminated contact water will discharge to the receiving environment through OUT-01, OUT-02, OUT-04, OUT-06, OUT-11, OUT-12, and OUT-13. Water contaminated with EPH and TSS will be treated in the OWTS prior to discharge at OUT- 10. Figure 4-1 and Figure 4-2 provide an overview of the water types within the catchment of each outfall. Figure 4-2 also illustrates how the OWTS is integrated into the management of water contaminated with EPH and TSS. The stormwater catchment areas for each outfall are derived in the Operations Phase Stormwater Drainage Hydrology and Hydraulics Model (Appendix 4.1-2) and the physical extent of the catchments are shown in Figure 4-3.

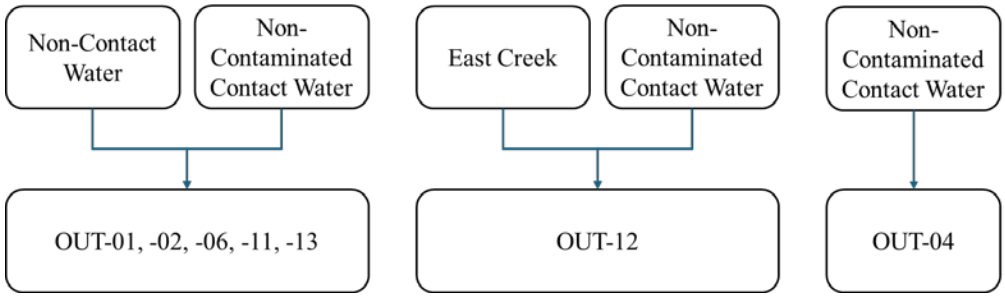


Figure 4-1: Conceptual Water Management Schematic for Non-Contact and Non-Contaminated Contact Water at all Culvert Outfalls within the Project Site Except OUT-10.

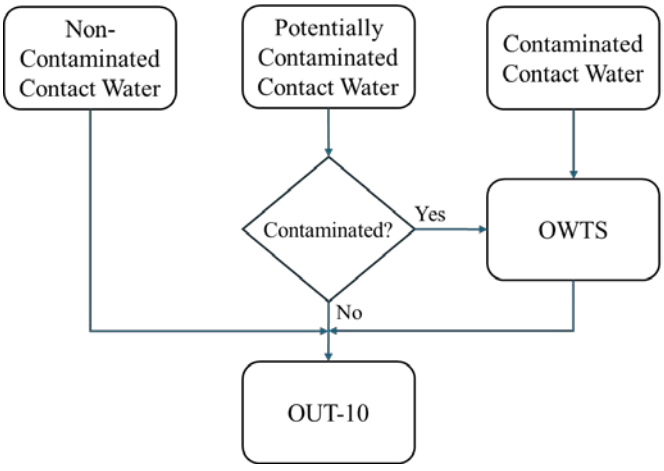
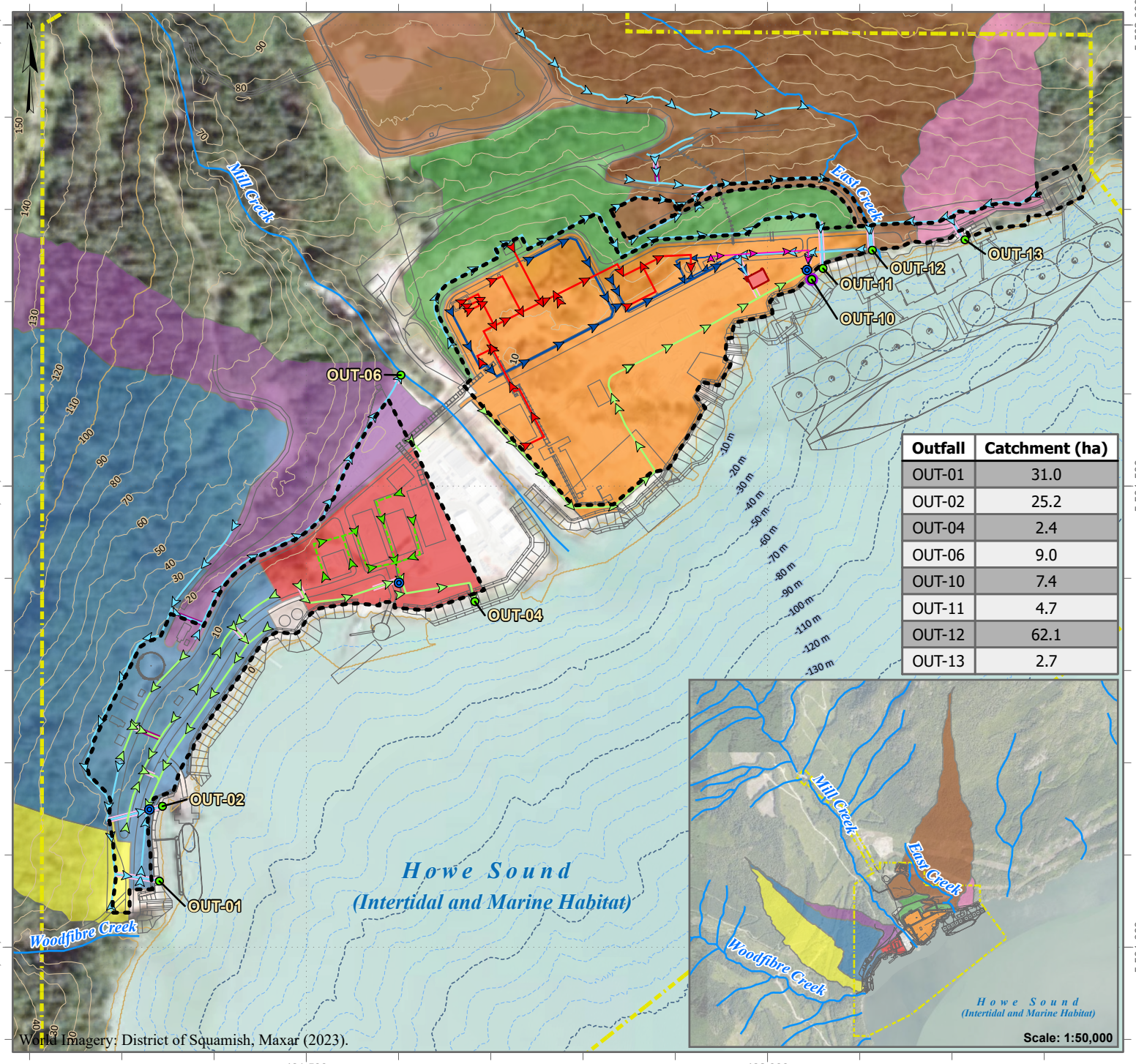


Figure 4-2: Conceptual Water Management Schematic for Culvert Outfall OUT-10.



Outfall	Catchment (ha)
OUT-01	31.0
OUT-02	25.2
OUT-04	2.4
OUT-06	9.0
OUT-10	7.4
OUT-11	4.7
OUT-12	62.1
OUT-13	2.7

World Imagery: District of Squamish, Maxar (2023).

LEGEND

- Stormceptor
- Outfall
- Outfall Compliance Point
- Diversion Box and First Flush Sump
- Project Contact Water Catchment Boundary
- Site Linework (Reduced)
- Certified Project Area
- Culvert
- RipRap Apron
- Non-Contact Water Ditch
- Non-Contaminated Contact Water Storm Sewer
- Non-Contaminated Contact Water Ditch
- Contaminated Contact Water Pipeline
- Potentially Contaminated Contact Water Trench
- Treated Contact Water Pipeline
- Watercourse
- Elevation Contour (Major: 50m)
- Elevation Contour (Minor: 10m)
- Bathymetry Contour (Major: 50m)
- Bathymetry Contour (Minor: 10m)

CATCHMENT

- OUT-01
- OUT-02
- OUT-04
- OUT-06
- OUT-10
- OUT-11
- OUT-12 (East Creek)
- OUT-13

Coordinate System: *NAD 1983 UTM Zone 10N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Metres*

1:6,000

0 100 200 Metres

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CLIENT:

Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT:

Woodfibre LNG Facility

TITLE:

Outfall Catchments and Project Contact Water Catchment Areas

PROJECT #: A825-1 *FIGURE:* 4-3

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Figure 4-03 Woodfibre LNG Site Catchments_V2

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The contact water catchment areas for the Project are within the black dashed boundary lines shown in Figure 4-3. Areas outside the dashed black boundary lines are defined as non-contact areas. The contact water catchments include roads, gravel covered areas, paved areas, concrete covered areas and the land-based Project facilities described in Section 2.1. High traffic roads within the contact water catchment areas are paved with asphalt. The LNG Processing Area, Refrigerant and Condensate Storage Area, and Industrial Area facilities (Figure 2-2) are underlain by impermeable surfaces such as asphalt or concrete. Slopes and areas not used for Project facilities, and infrequently used or inaccessible areas within the contact water catchments, are covered in gravel and crushed rock.

The catchment characteristics and water types discharged from each outfall are described in the stormwater drainage flow model (Appendix 4.1-2) and summarized below:

- OUT-01: Discharges through a 900 mm diameter culvert to Howe Sound. The 30.97 ha catchment is predominantly non-contact water from offsite forested areas (30.76 ha), with the small inputs of non-contaminated contact water from gravel and impervious surfaces (0.14 and 0.07 ha, respectively).
- OUT-02: Predominantly non-contact water from offsite forested areas (22.45 ha). Non-contaminated contact water from a relatively small catchment within the Industrial Area consisting of gravel and impervious surfacing (1.59 and 1.18 ha, respectively) is conveyed by trench drains, ditches and swales to this outfall. The Fire Water Tank water filtration system backflush is periodically discharged to the OUT-02 water management ditch immediately south of the tank. All the conveyed water passes through Stormceptor STC-01 prior to discharging to Howe Sound though a 900 mm diameter culvert. The total catchment area is 25.22 ha.
- OUT-04: The 2.37 ha catchment is entirely non-contaminated contact water (stormwater) from gravel and impervious surfaces (0.93 and 1.44 ha) within the Industrial Area. The stormwater is collected in a network of storm drains and pipes and passes through Stormceptor STC-02 prior to discharging to Howe Sound via a conveyance ditch and culvert.
- OUT-06: Primarily non-contact water from hillside forested areas (8.05 ha) and a small catchment of non-contaminated contact water (stormwater) from gravel and impervious surfaces (0.66 and 0.24 ha, respectively) located in the Industrial Area. Drainage from the total catchment area of 8.95 ha is conveyed by a diversion ditch to Mill Creek via a culvert.
- OUT-10: The catchment for this outfall includes contaminated and potentially contaminated water from the LNG Processing Area, the Refrigerant and Condensate Storage Area, and non-contaminated areas. The water management

system segregates the three types of contact water (non-contaminated, potentially contaminated and contaminated). The discharge to Howe Sound is non-contaminated contact water and OWTS treated effluent, both of which are conveyed via Stormceptor STC-03 to the discharge culvert. The total catchment area is 7.36 ha and is surfaced with gravel (4.36 ha) and impervious materials (3.00 ha).

- OUT-11: The majority of the 4.69 ha catchment is from hillside non-contact water (3.66 ha) and non-contaminated contact water from gravel and impervious surfaces (0.58 and 0.45 ha, respectively) that extend from the diversion ditch to approximately the centre of the LNG Processing Area perimeter road adjacent to the diversion ditch. The outfall culvert discharges to Howe Sound.
- OUT-12: East Creek discharges to Howe Sound through this outfall via two culverts. The creek catchment is predominantly non-contact water from forested areas (55.87 ha), and non-contaminated contact water from gravel roads and impervious surfaces (5.00 and 1.24 ha, respectively).
- OUT-13: Intercepts primarily non-contact water from forested areas (2.61 ha) and non-contaminated contact water from an access road (0.07 ha), and discharges to Howe Sound.

4.1.4 Stormwater Flow Modelling

Hydrology and hydraulic modelling for stormwater runoff was conducted for the Project site as described in the Operations Phase Stormwater Drainage Hydrology and Hydraulics Model (Appendix 4.1-2). The modelling results were used to inform the design specifications for the stormwater conveyance structures (i.e., ditches, culverts and outfalls). The Personal Computer Storm Water Management Model software was used for modeling stormwater drainage. The model incorporated Intensity-Duration-Frequency (IDF) curves presented in the Woodfibre Hydrometeorology Baseline Report (Stantec, 2020) that account for climate change and the influence of regional topography.

Three types of rainfall durations and distributions were evaluated, specifically:

1. The Soil Conservation Service Type 1A distribution with 24-hour duration;
2. The Atmospheric Environmental Service distribution with 2-hour duration; and
3. Atmospheric Environmental Service (AES) distribution with 2-hour duration.

Of these, the Soil Conservation Service Type 1A distribution with 24-hour duration combined with the rain-on-snow IDF curve yielded the highest flow rates and was therefore used for developing the design of the stormwater runoff conveyance facilities,

Stormceptors, and outfall structures (Table 4-3). The influence of climate change was accounted for by using the maximum value predicted by the following two approaches:

1) Precipitation depth estimated by the University of Western Ontario Computerized Tool for Development of IDF Curves Under a Changing Climate (Version 4.0) for the Squamish Airport under the moderate intensity scenario (RCP 4.5); and
2) Precipitation depth based on the historical IDF curve for Squamish Airport, plus 10%, in accordance with the Engineers and Geoscientist British Columbia Professional Practice Guidelines for Legislated Flood Assessments in a Changing Climate in B.C. (Version 2.1).

Table 4-3:
Intensity-Duration-Frequency Table for Mill Creek, Woodfibre Creek and East Creek Watershed with Climate Change Considerations (Stantec, 2020)

Duration	Return Period Precipitation Depth (mm)		
	2-year	10-year	100-year
5 minute	2.9	6.5	15.4
10 minute	4.1	8.3	17.8
15 minute	5.1	9.1	17.8
30 minute	7.8	11.6	18.7
1 hour	13.2	18.5	29.1
2 hour	21.3	28.8	41.3
6 hour	47.1	66.8	99.5
12 hour	78.1	112.2	148.5
24 hour	126.8	187.1	257.8
24 hour (rain on snow)	157.0	221.6	297.2

The final surfacing within the outfall catchments will consist of impervious surfaces (*i.e.*, concrete and asphalt), gravel, and forested areas. Ground infiltration is accounted for in the hydraulic model using the United States Natural Resources Conservation Service Curve Number method, which considers the effect of both land use, cover and soil type. The catchment for each outfall is subdivided into impermeable surfaces (*i.e.*, asphalt, concrete and buildings), gravel covered surfaces, and forested areas to account for ground infiltration. The total catchment area with a breakdown of the three surface types, and modelled peak flows for 10-year and 100-year return periods, are summarized in Table 4-4.

Table 4-4:
Modelled Catchment Areas and Flows for Stormwater Outfalls

	OUT-01	OUT-02	OUT-04	OUT-06	OUT-10	OUT-11	OUT-12	OUT-13
Catchment Characteristics								
Total Area (ha)	30.97	25.22	2.37	8.95	7.36	4.69	62.10	2.68
Forested Area (ha)	30.76	22.45	-	8.05	-	3.66	55.87	2.61
Graveled Area (ha)	0.14	1.59	0.93	0.66	4.36	0.58	5.00	-
Impervious Area (ha)	0.07	1.18	1.44	0.24	3.00	0.45	1.24	0.07 [1]
Discharge Location	Howe Sound	Howe Sound	Howe Sound	Mill Creek	Howe Sound	Howe Sound	Howe Sound	Howe Sound
Precipitation Scenario								
1-in-10 Year 24-Hour Peak Flow (m^3/s)	1.08	0.93	0.15	0.31	0.44	0.21	2.30	0.10
1-in-100 Year 24-Hour Peak Flow (m^3/s)	1.70	1.40	0.20	0.49	0.61	0.32	3.66	0.16

[1] The OUT-13 impervious area is a gravel access road, not an impervious surface as was assumed in the hydraulic model. This table is reproduced from the hydraulic model (Appendix 4.1-2). For consistency, the area assignment has not been altered.

4.1.5 Stormwater Management System

The stormwater water management system is designed to manage stormwater from outside and inside the Project site as outlined in the Storm Water Drainage Philosophy document (MDR, 2026a), the Unit 64 Effluent and Wastewater System Process Design Basis (MDR, 2025c; Appendix 4.2-2), and the SWDMP (Appendix 4.1-1). The approximate stormwater catchment areas managed by the system, as well as the boundary of the Project contact water areas, are shown in Figure 4-3. The water management system layouts east and west of Mill Creek are shown in Figure 4-4 and Figure 4-5, respectively. The water management process flow diagram is shown in Figure 4-6.

The water management infrastructure includes ditches, swales, trenches, storm sewers, culverts, sumps, a storage tank, a treatment system, and vacuum trucks. Non-contact water is intercepted and diverted around the Project site to Howe Sound and Mill Creek. Contact water is managed based on the risk of contamination associated with Project activities. Contact areas with low risk of contamination (because they are outside of areas where process liquids could be spilled) are considered non-contaminated, and those with a higher risk or known contamination are managed as potentially contaminated or contaminated areas, respectively. Therefore, stormwater collection and conveyance systems are established for each of the contact water sub-areas to achieve stormwater management and source control objectives:

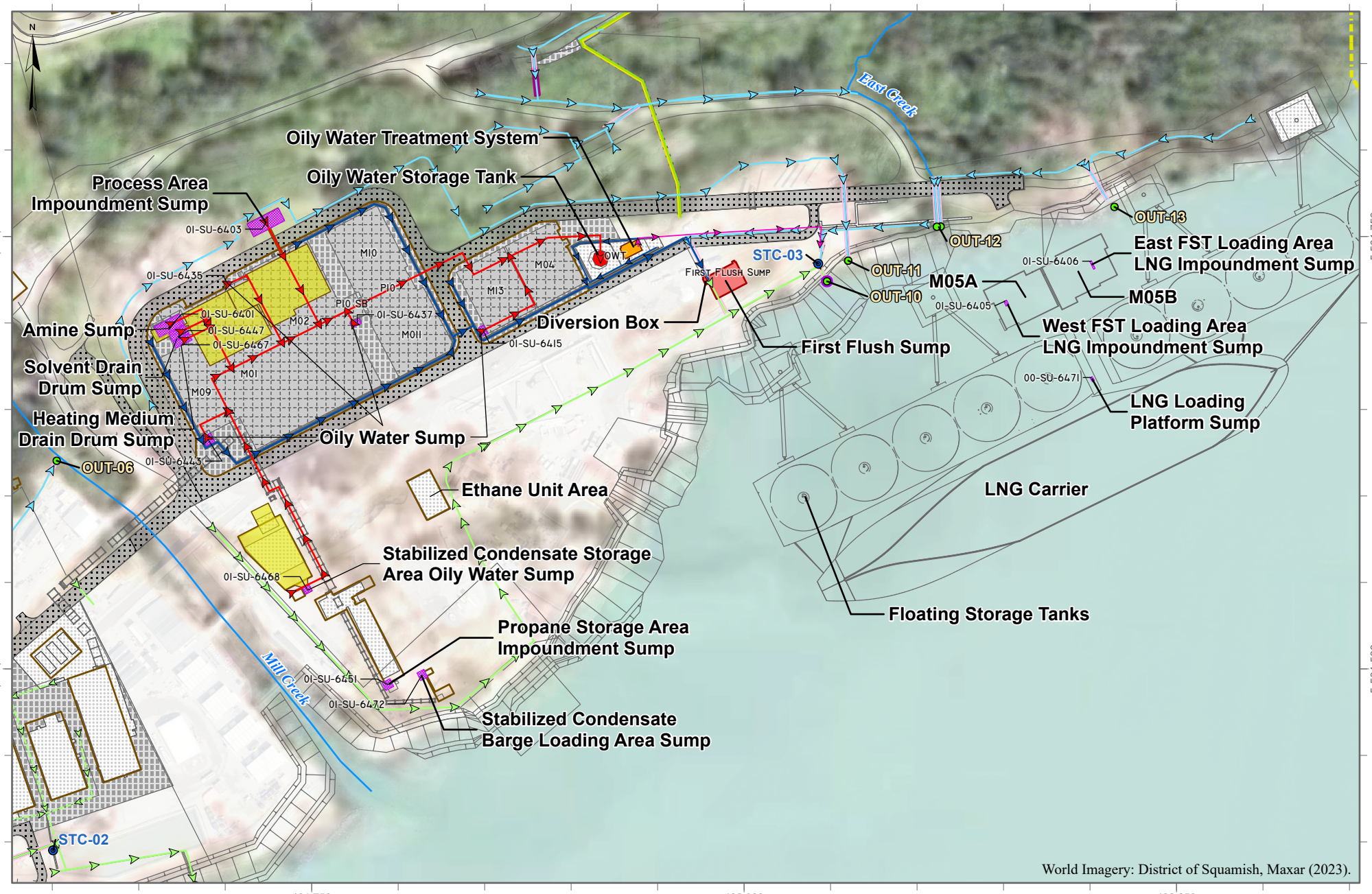
- Contaminated contact water system;
- Potentially contaminated contact water system; and
- Non-contaminated contact water systems.

Source control measures to detect and isolate process fluids that contain POPCs and POCs (Section 4.1.2) for appropriate disposal are integrated into each of the water collection systems. The contaminated contact water system is designed to collect and convey oily water to the OWTS for treatment. Secondary containment is implemented in areas where process fluids are used within the potentially contaminated and non-contaminated contact water systems. The contact water stored in secondary containment is evaluated for the presence of POCs and POPCs listed in Table 4-2 (Section 4.1.2), and if detected, the contact water is managed according to the type of POPC that is present:

- Oily water (lubrication oils, hydraulic oils) is directed to the Oily Water Storage Tank;
- Contaminated contact water that contains sources of POPCs that are flammable (ethane, propane, condensate, LNG) is held back to allow these products to safely disperse through evaporation prior to releasing the contact water to the water management system. Otherwise, these waters are collected by a vacuum truck for off-site disposal.
- Contaminated contact water containing other POPCs (amine, Dowtherm Q, ethylene glycol, diesel) is collected from containment areas by vacuum truck for off-site disposal.

4.1.5.1 Contaminated Contact Water System

The contaminated contact water system is located in the LNG Processing Area (refer to Figure 2-2) and is designed to manage contact water that can be treated for oil (*i.e.,* EPH). The system consists of oily water collection piping, containment areas, sumps, pumps, storage, and treatment. The system layout is shown in Figure 4-4. The sumps collect drainage from the oily water collection systems and containment areas, and the collected contact water is conveyed to the appropriate water management system based on the presence or absence of POCs or POPCs. Oily water from containment areas east of Mill Creek that are not connected to the contaminated contact water pipeline are transferred to the Oily Water Storage Tank by vacuum truck. Oily water from diesel fuel containment areas west of Mill Creek is collected for off-site disposal. The OWTS treats water from the Oily Water Storage Tank for oil (*i.e.,* EPH) and TSS, and discharges treated effluent to the non-contaminated contact water system which discharges to Howe Sound at OUT-10. A detailed description of the OWTS is provided in Section 4.2. Additional details for the sumps and collections systems are described below:



LEGEND

- Stormceptor
- Outfall
- Outfall Compliance Point
- Site Buildings
- Paved Road
- Ashphalt Paving
- Concrete Paving
- Module Concrete Pad
- Sump
- Sump Containment Area
- Oily Water Storage Tank
- Oily Water Treatment System
- Diversion Box and First Flush Sump
- Culvert
- RipRap Apron
- Fortis BC Main Gas Supply
- Site Linework (Reduced)
- Non-Contact Water
- Non-Contaminated Contact Water Storm Sewer
- Non-Contaminated Contact Water
- Contaminated Storm Water
- Potentially Contaminated Contact Water
- Treated Contact Water
- Watercourse

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Coordinate System: NAD 1983 UTM Zone 10N
Projection: Transverse Mercator
Datum: North American 1983
Units: Metre

1:3,000

0 50 100 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Water Management System Layout East of Mill Creek

PROJECT #: A825-1

FIGURE: 4-4

P:\@202506\Woodfibre\Drafting Figures\APRX\TAR - Operations Phase\TAR - Operations Phase\TAR - Operations Phase.aprx Figure 4-04 Water Mgmt System East of Mill Creek



LEGEND

- Stormceptor
- Outfall
- Outfall Complaince Point
- Site Linework (Reduced)
- Site Buildings
- Fire Water Tank
- Paved Road
- Ashphalt Paving
- Concrete Paving
- Sump
- Sump Containment Area
- Culvert
- RipRap Apron
- Non-Contact Water
- Non-Contaminated Contact Water Storm Sewer
- Non-Contaminated Contact Water
- Contaminated Storm Water
- Potentially Contaminated Contact Water
- Watercourse

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CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Water Management System Layout West of Mill Creek

PROJECT #: A825-1

FIGURE: 4-5

P:\@202506\Woodfibre\Drafting Figures\APRX\TAR - Operations Phase\TAR - Operations Phase\TAR - Operations Phase.aprx Figure 4-05 Water Mgmt System West of Mill Creek Printed by: DesMacDonald

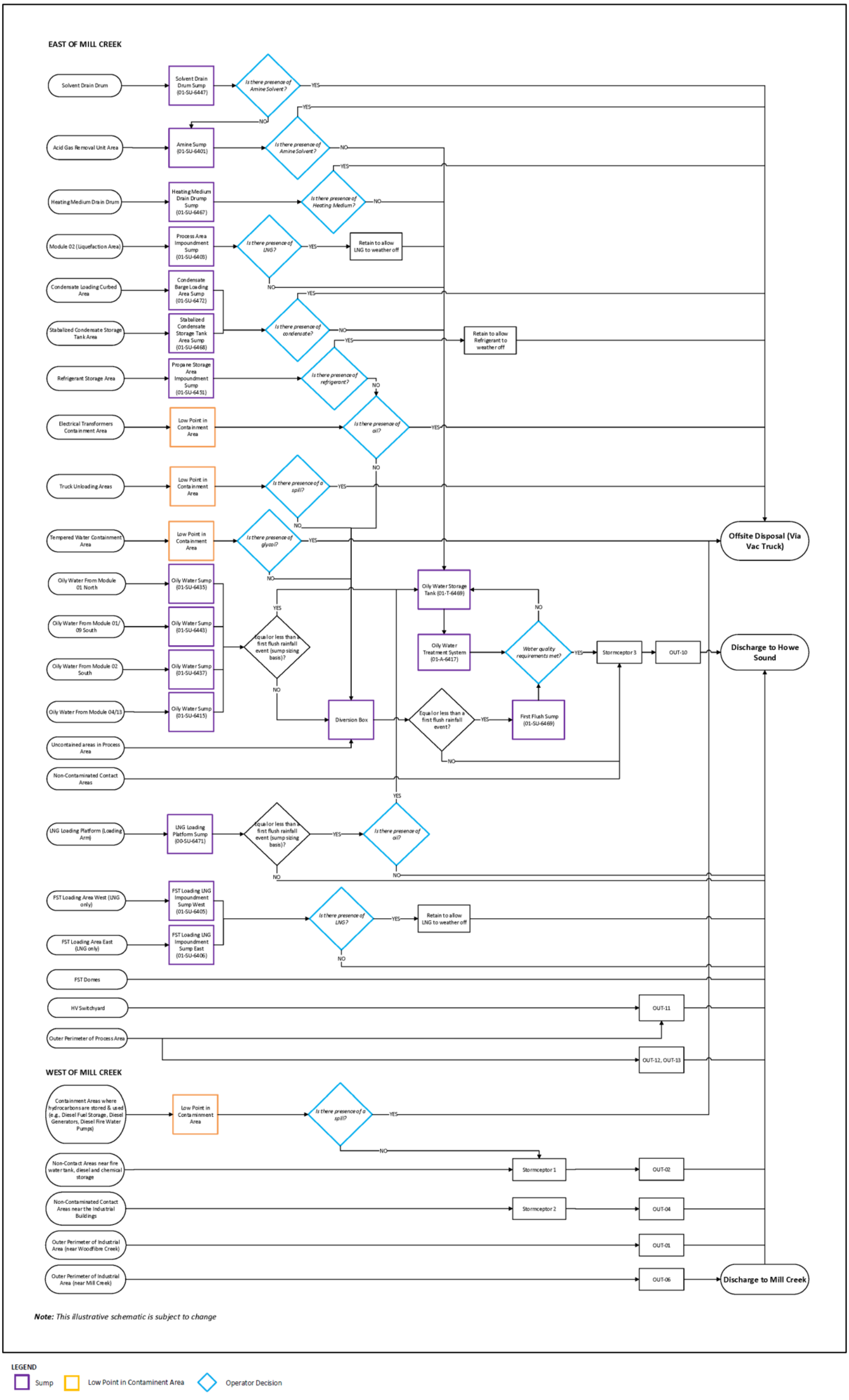


Figure 4-6: Water Management Process Flow Diagram (reproduced from the Operations Stormwater Drainage Management Program [Appendix 4.1-1]).

- **Oily water collection systems:** Designed to intercept drips of lubrication oils from rotating equipment. A system of collection pipes connected to drain drip trays are strategically located at locations where rotating equipment may drip lubrication oil. Stormwater in contact with oily equipment, oily drip collection pipes, and in curbed ground areas drains from the collection system to an Oily Water Sump.
- **Oily Water Sumps:** Located in the LNG Processing Area. Each sump collects drainage from an associated oily water collection system. The sumps will be covered and vented to a safe location and constructed in-ground of reinforced concrete. The oily water sumps are sized to accommodate the first 25 mm of runoff within the potentially contaminated area. Each sump is equipped with an under-weir designed to retain oily water and pneumatic sump pumps, each with a design flow rate of 5 m^3/h. The contents of the oily water sumps (up to the first 25 mm of rainfall) are pumped to the Oily Water Storage Tank:
    - Module 01 North Oily Water Sump (01-SU-6435);
    - Module 01/09 South Oily Water Sump (01-SU-6443);
    - Module 02 South Oily Water Sump (01-SU-6437); and
    - Module 04/13 Oily Water Sump (01-SU-6415).

  During larger rainfall events, stormwater in excess of the first flush rainfall (after the first 25 mm of rain) will discharge through an under-weir configuration into the potentially contaminated contact water system (Section 4.1.5.2).
- **Amine Sump and Containment Area**: Located at the Acid Gas Removal Unit (Module 01) where the amine solvent (OASE Purple) is used. The Amine Sump (01-SU-6401) is an in-ground reinforced concrete sump with the inner walls impermeable to the amine solvent. The oily water collection system for equipment that contains amine, as well as the truck unloading area and the containment area under amine-containing equipment, drain to this sump. The Solvent Drain Drum Sump is also pumped to the Amine Sump. The sump is sized to contain a 100-year, 24-hour storm event to allow for adequate storage if the water is contaminated with amine (for off-site disposal); otherwise, the sump is pumped to the Oily Water Storage Tank.
- **Solvent Drain Drum Sump:** Located at the Acid Gas Removal Unit (Module 01) where the amine solvent (OASE Purple) is used. Potential leaks of amine from equipment are collected by a closed drain system that gravity drains to the Solvent Drain Drum. The sump (01-SU-6447) provides secondary containment for the drum. The amine collected in the drum is recycled to the Acid Gas Removal Unit.

The sump collects stormwater that contacts amine-containing equipment. If the sump contains amine when it is at a high level, it will be emptied by vacuum truck for off-site disposal; otherwise, it will be pumped to the Amine Sump.

- **Heating Medium Drain Drum Sump:** Heating medium (Dowtherm Q) is distributed from the utilities module (M09). Potential leaks of heating medium are collected by a closed drain system that gravity drains to the Heating Medium Drain Drum, for which the sump (01-SU-6467) provides secondary containment. If the sump is at a high level and contains heating medium, it will be emptied by vacuum truck for off site disposal; otherwise, it will be pumped to the Oily Water Storage Tank.
- **Process Area Impoundment Sump:** The sump (01-SU-6405) is designed to contain the 10-year return 24-hour rainfall of 187.1 mm (359 m^3). Stormwater runoff from the LNG containment areas in Module 01 and Module 02 (Figure 4-4) accumulates in the sump and may contain oil from potentially contaminated areas. If oil is observed, the water will be pumped to the Oily Water Storage Tank. If LNG is present, it will be dispersed by evaporation. Runoff volumes exceeding the 10-year, 24-hour storm event will overflow by gravity through an under-weir configuration into the potentially contaminated contact water system (Section 4.1.5.2).
- **Stabilized Condensate Storage Tank Oily Water Sump:** The sump (01-SU-6468) collects drainage from an oily water collection system and stormwater runoff from the condensate storage containment area. If the sump is at a high level and contains condensate, it will be emptied by vacuum truck for off site disposal; otherwise, it will be pumped to the Oily Water Storage Tank.
- **Stabilized Condensate Barge Loading Area Sump:** The sump (01-SU-6472) collects condensate spills and stormwater runoff from the loading spill containment area drainage. If the sump is at a high level and contains condensate, it will be emptied by vacuum truck for off site disposal; otherwise, it transferred by vacuum truck to the Oily Water Storage Tank.
- **Propane Storage Area Impoundment Sump:** The propane (refrigerant) impoundment area drains to this sump (01-SU-6451). Stormwater will collect in the sump. When it reaches a high level, it will be evaluated for the presence of refrigerant or oil. If none are present, the sump will drain to the non-contaminated contact water ditch. Otherwise, it will be transferred to the Oily Water Storage Tank.

- **LNG Loading Platform Sump:** The LNG Loading Platform Sump (00-SU-6471) collects LNG leaks and spills from the associated containment area to facilitate safe evaporation and prevent discharge to Howe Sound. Drips and leaks of hydraulic fluid used in the LNG loading arms are also directed to the sump, as well as stormwater runoff from within the containment area. The sump is configured with an isolation valve. If LNG is present, collected water is retained until the LNG has evaporated. After the first flush volume is collected (*i.e.*, 25 mm rainfall) and conveyed to the Oily Water Storage Tank, collected water is discharged through an underflow weir to Howe Sound.
- **Oily Water Storage Tank**: The Oily Water Storage Tank (01-T-6469) has a 444 m^3 capacity and is used as a surge tank to allow for effective operation of the OWTS. The tank is configured with heating coils to maintain temperature, and a skimmer to remove any floating oil for off-site disposal. The contents of the tank are pumped the OWTS with a pump capacity rated for 30 m^3/hr. Further description is provided in Section 4.2.2.1.1.
- **Diesel Fuel Storage Areas**: Secondary containment is used at diesel storage tanks, essential electricity generators, and the fire water pumps to isolate potential leaks and spills from the non-contaminated contact water system in the Industrial Area. Each containment area is sized to contain 110% of the largest fuel storage volume plus the runoff from a 25-year 24-hour storm event. Contaminated water is removed by vacuum truck for off-site disposal.

4.1.5.2 Potentially Contaminated Contact Water System

The potentially contaminated contact water system, located in the LNG Processing Area, manages stormwater that is outside of the contaminated contact water system secondary containment areas and is typically free of POCs and POPCs. A trench drain collection system on the perimeter of the process modules conveys stormwater to the Diversion Box (Figure 4-4). In accordance with industry best practices, the Diversion Box directs the initial stormwater runoff from the first 25 mm of rainfall (i.e., the first flush) to the First Flush Sump. Once the First Flush Sump reaches capacity, the subsequent stormwater is assumed to have limited pollution potential (i.e., it is non-contaminated); therefore, the Diversion Box allows subsequent stormwater runoff to overflow into the non-contaminated contact water system. The contact water stored in the First Flush Sump is directed to the OWTS (if contaminated with oil) or the non-contaminated contact water system (if non-contaminated). Specific components of the potentially contaminated contact water system are described below:

- **First Flush Sump**: The First Flush Sump (01-SU-6469) has a capacity of 500 m^3 and is sized to accommodate the initial 25 mm of stormwater runoff (*i.e.*, the first flush volume) within the potentially contaminated area. The Diversion Box directs the initial 25 mm of runoff to the First Flush Sump where it is held for sampling and testing, followed by further treatment in the OWTS (if EPH is present) or controlled disposal if the water is non-contaminated. Water is pumped out of the sump to the OWTS or to the non-contaminated contact water system using pumps that can achieve a maximum flow of 30 m^3/hr.
- **Tempered Water Containment Area**: The cooling system located in Module 09 contains tempered water (*i.e.*, 40% ethylene glycol). Secondary containment surrounds the area under equipment that contains tempered water and is sloped towards a low point with normally closed isolation valves. Accumulated stormwater that contains glycol will be removed by a vacuum truck for offsite disposal; otherwise, the contact water will be allowed to drain to the non-contaminated contact water system.
- **Electrical Transformer Containment Areas**: Electrical transformers are located in curbed containment areas (sized to contain 110% of the dielectric oil within the largest transformer) that slope to a low point with normally closed isolation valves. Accumulated water that does not contain oil will be released to the non-contaminated contact water system via the manual valve. Contaminated water is removed by vacuum truck for off-site disposal or is transferred to the Oily Water Storage Tank.
- **Oily Water Storage Tank Containment Area**: The secondary containment for Oily Water Storage Tank and OWTS is bounded on three sides by trenches that drain to a low point that is configured with an isolation valve. If oil is observed in the contained water, the water will be transferred to the Oily Water Storage Tank; otherwise, the valve will be opened to drain the water to the potentially contaminated water system.

4.1.5.3 Non-contaminated Contact Water Systems

The non-contaminated contact water systems are located in contact water management areas outside of areas where facility leaks or spills may occur. These areas encompass the Industrial Area west of Mill Creek, areas east of Mill Creek outside of the LNG Processing Area and the Refrigerant and Condensate Storage Area, as well as the Marine Terminal Area. East of Mill Creek, stormwater from uncontained paved and unpaved non-contaminated areas will flow by gravity as sheet flow into open drainage ditches. West of Mill Creek, stormwater from non-contaminated and uncontained paved and unpaved areas,

including buildings, will be conveyed by gravity to concrete trenches, lined riprap ditches, or catch basins connected to a storm sewer network. All runoff is conveyed through a Stormceptor (*i.e.,* hydrodynamic oil/grit separator) before discharging to Howe Sound through outfalls OUT-02, OUT-04 and OUT-10. The layout of the non-contaminated contact water systems east and west of Mill Creek is shown in Figure 4-4 and Figure 4-5, respectively. Additional information on the land-based system is provided below:

- **Erosion Controls:** Non-contaminated area surfacing is completed using low-fines compacted gravels on level surfaces, rip-rap or vegetation on slopes. Frequently trafficked areas are paved with asphalt or concrete. Non-contaminated water passes through Stormceptor oil/grit separators prior to discharge.
- **Collection Ditches:** Ditches are sized for the 100-year return period rainfall event, are trapezoidal in shape with slopes of 2 to 1 (or flatter), and are lined with rip-rap to provide erosion protection and sediment control. There are also vertical-wall concrete trenches with grating covers in areas where space constraints prevent installation of a trapezoidal ditch.
- **Culverts and Outfalls**: Culverts are sized to convey the 100-year return period rainfall event. The minimum invert elevation of all outfall culverts is 2.0 m (above the 1.95 m Higher High-Water Level – Large Tide in the Squamish area) to maintain conveyance capacity during high tide periods.
- **Stormceptors**: The use of a Stormceptor is best practice for the management of stormwater from industrial settings. Therefore, non-contaminated contact water is routed through Stormceptors prior to discharge into Howe Sound. Stormceptors are equipped with oil/grit separators to remove sediments and surficial oil from smaller but more frequent rainfall events (Figure 4-7). The lower basin collects TSS, and oils are trapped by the weir and insert.

The Marine Terminal Area contains the FSTs and the FST Loading Area platform (Modules 05A and 05B). The uncontained areas on these facilities are not associated with hydrocarbon-handling equipment or contamination sources and stormwater discharges directly to Howe Sound. Contained areas include the LNG Loading Platform Sump (managed as described in Section 4.1.5.1), East and West FST Loading Area LNG Impoundment Sumps (01-SU-6405 and 01-SU-6406, respectively), and LNG Containment Platforms used for the FST manifolds, storage tanks and marine topsides. The containment facilities allow for evaporation of LNG prior to discharge of any contact water that has accumulated in the sumps to Howe Sound.

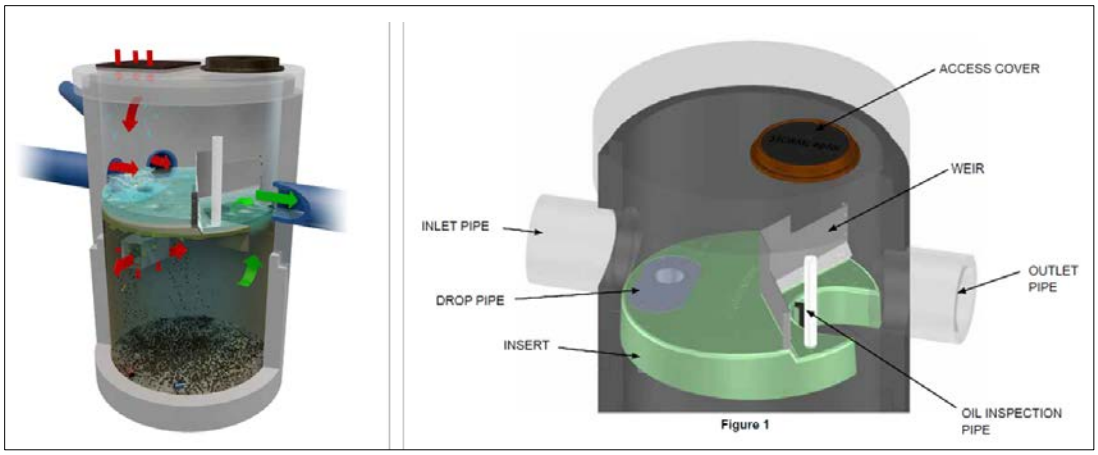


Figure 4-7: Stormceptor Oil-Grit Separator Operational Schematic

4.1.6 Trigger and Response Plan

The trigger and response procedures establish threshold values that trigger follow-up actions if monitoring data indicate a parameter concentration is approaching a WDA discharge limit. Threshold concentration values are established for OUT-10 discharge to Howe Sound in the SWDMP (Section 6.0 of Appendix 4.1-1). Field turbidity measurements will be used to estimate TSS concentrations for real-time evaluation of effluent quality, whereas laboratory test results will be evaluated upon receipt. The water quality results will be compared to threshold values that are set at 80% and 95% of the discharge limits specified in the WDA. If a threshold value is exceeded, the appropriate actions will be initiated to investigate and mitigate the concentration of a parameter that is above a threshold value. The typical actions described in the SWDMP (Appendix 4.1-1) are reproduced in Table 4-5 and Table 4-6 below.

Table 4-5:
Field Monitoring Management Trigger and Action Response Plan (reproduced from the Operations Stormwater Drainage Management Program [Appendix 4.1-1])

Response Level	Basis	Notification	Action
Level 1	Turbidity ≥80% of the WDA limit for TSS	Environment Manager (or approved designate)	• Repeat field measurement to verify value. • Investigate the potential source(s) contributing to the elevated measurement (*e.g.*, review of the monitoring data from outlet of the OWTS and undertake further monitoring at the First Flush Sump if warranted). • Identify and implement mitigation actions if there is potential for the concentration of the parameter to continue to increase. • Increase the monitoring frequency at OUT-10 until exceedance of WDA limits are no longer a concern (to be defined based on the potential source(s) and mitigation measures being implemented).
Level 2	Turbidity ≥95% of the WDA Limit for TSS	Environment Manager and Operations Manager	• Level 1 activities. • Implement contingency planning (where applicable) to cease or minimize discharge to Howe Sounds until there is a reduction in turbidity levels.

Table 4-6:
Laboratory Monitoring Management Trigger and Action Response Plan (reproduced from the Operations Stormwater Drainage Management Program [Appendix 4.1-1])

Response Level	Basis	Notification	Action
Level 1	80% of WDA limit for parameters with discharge limits	Environment Manager (or approved designate)	• Review laboratory certificate Quality Assurance/Quality Control (QA/QC) reports. Validate original result, or re-run sample within 24 hours if a laboratory error was identified. • Undertake confirmatory monitoring / sampling. • Investigate the potential source(s) contributing to the elevated parameters (*e.g.*, review the turbidity measurements, assess the OWTS). • Identify and implement mitigation actions if there is potential for the concentration of the parameter to continue to increase. • Increase the monitoring frequency at OUT-10 until exceedance of WDA limits are no longer a concern (to be defined based on the potential source(s) and mitigation measures being implemented).
Level 2	95% of WDA limit for parameters with discharge limits	Environment Manager and Operations Manager	• Level 1 activities. • Implement contingency planning (where applicable) to cease or minimize discharge to Howe Sounds until verification that the mitigation measures are addressing the elevated parameter concentrations. • If the event has potential to exceed permit limits, engage with a qualified professional (QP) for the evaluation of potential effects to aquatic resources, which will support non-compliance notifications to the BCER (if triggered).

4.1.7 Adaptive Management Plan

The adaptive management plan (Section 7.0 of Appendix 4.1-1) describes the approach for reducing uncertainty regarding the expected concentrations of POPCs and POCs in effluents that are discharged from the Project site. The adaptive management approach is an iterative process that includes problem assessment, planning, implementation of management actions, monitoring, evaluation and adjustment, with the cycle repeating until the identified uncertainties are sufficiently reduced. The contact water management system is designed to address the uncertainties for POPCs and POCs in effluents.

During operation of the Project, effluent quality and receiving environment water quality will be monitored. If the monitoring results indicate elevated uncertainty regarding the control of POCs and POPCs in Project effluents that cannot be addressed through operational adjustments, the adaptive management process will be initiated following the framework described in the SWDMP (Appendix 4.1-1) and the technical guidance provided in Development and Use of Adaptive Management Plans (ENV, 2022).

4.1.8 Contingency Plan

Contingency plans have been prepared for operational situations that interfere with the normal operation of one or more components of the water management system (Section 4.0 of Appendix 4.1-1). The contingency plans are designed to prevent the discharge of non-compliant effluent. A variety of scenarios are identified with examples of typical management responses. The situations that are addressed include power outages, blockages in the contaminated water collection system, equipment failure, and operator error. The contingency plans are presented in Table 4-7.

Table 4-7:
Contingency Scenarios and Management Actions (reproduced from the Operations Stormwater Drainage Management Program [Appendix 4.1-1])

Scenario	Management Actions
Contaminated Contact Water System	
Failure of the OWTS (due to equipment failure, power failure, blockages, unable to maintain minimal operating temperature, failure of flow meter *etc.*), therefore unable to remove the free and dispersed oil and settleable and suspended solids in the stormwater drainage effluent collected in the Oily Water Storage Tank.	• The discharge from the Oily Water Storage Tank to the OWTS will be stopped. • The effluent within the OWTS will either remain within the system (pending the type of failure) or be pumped back to the Oily Water Storage Tank if there is capacity. • When nearing the capacity of the Oily Water Storage Tank, the water will be pumped into temporary storage containers and either temporarily stored on site and/or sent offsite for disposal.
Failure of both oil in water (*i.e.*, EPH) analyzers in the OWTS therefore unable to verify if the discharge water meets the specification.	• Effluent will be recirculated back to the Oily Water Storage Tank, on the basis that if the water quality can not be verified, the effluent is deemed as not meeting the discharge specification.
Influent from the Oily Water Storage Tank exceeds the design specification for total suspended solids and/or free and dispersed oil (*i.e.*, EPH).	• Treatment process will continue; the effluent will be recirculated back to the Oily Water Storage Tank if it does not meet the discharge specification.
Failure of both inlet feed pumps (*i.e.*, the one in service and the spare failures) preventing discharge into the OWTS.	• Repair one of the two inlet feed pumps if possible, pending the failure. • Temporary pump solutions will be evaluated to pump the oily water from the Oily Water Storage Tank to the OWTS if one inlet feed pump cannot be brought back online in the timeframe needed to manage the water level within the Oily Water Storage Tank.
Oily Water Storage Tank overfills; resulting in the loss of containment and release of oily water to the contained area around the Oily Water Storage Tank.	• The released oily water would flow to the low spot within the containment area. • Internal incident event process will be triggered to manage the spill and undertake the required actions for reporting and cleanup.
Failure of a sump pump / level indicator in the contaminated contact water, resulting in the stormwater drainage being unable to be pumped to the Oily Water Storage Tank.	• The failed pump will be replaced by a spare pump (common warehouse spares are available for the 5 and 30 m^3/hr pumps). • Any excess oily water will remain within the containment area and subsequently be removed using the spare pump. • If required, the operator will use a vacuum truck to transfer the oily water from the sump to the Oily Water Storage Tank or offsite for disposal (pending quality).
Errors in the management of the amine sump, resulting in amine solvent being pumped to the Oily Water Storage Tank.	• Oily Water Storage Tank will be emptied using a vacuum truck and the contents disposed offsite at an approved facility after sampling has been completed.
Potentially Contaminated Contact Water System	
Failure in the First Flush Oily Water Sump Pump at the First Flush Sump, preventing the routing of the stormwater back to the Oily Water Storage Tank.	• The failed pump will be replaced by a spare pump (common warehouse spares are available for the 30 m^3/hr pumps). • If required, the operator will use a vacuum truck to transfer the oily water from the sump to the Oily Water Storage Tank or offsite for disposal (pending quality).
Errors in the management of the Tempered Cooling Water secondary containment area, resulting in glycol being pumped to the First Flush Sump.	• Effected chamber(s) of the First Flush Sump will be emptied using a vacuum truck and the contents disposed off site at an approved facility after sampling has been completed.

4.1.9 Episode Management Plan

Management plans for addressing environmental episodes such as spills, fire and flooding that may affect the performance or operation of the water management system are outlined in the SWDMP (Section 5.0 of Appendix 4.1-1). The plans for managing fires and floods will be described in the Emergency Response Program for the Project and will outline the operation of the water management system under those circumstances.

The water management system is designed to monitor for and contain spills of reagents and petroleum hydrocarbons. All spills will be contained, cleaned up and disposed of appropriately. Appropriate measures will be implemented to prevent or minimize the release of POCs and POPCs to contact water and to the terrestrial and aquatic receiving environments. Outside agencies will be notified in accordance with the operations WDA Effluent Permit, regulatory, and legal requirements. First Nations will be notified if a spill may or does enter the terrestrial or aquatic receiving environment.

4.1.10 Implementation Plan for Operations Water Management

As the Project construction nears completion, it will be necessary to commission and implement the operations water management program. Temporary infrastructure used solely to support construction activities are forecast to commence being systematically decommissioned in the second half of 2027 once no longer required for site water management, including the backfilling of the sedimentation ponds and demobilization of the construction wastewater treatment plants.

The construction contact water management program is designed to manage POPCs originating from historical soil contamination at the Project site, as well as elevated levels of TSS that are associated with construction activities (*e.g.,* site excavations and development). The operations water management program reflects the final completed configuration of the Project and the management of POPCs and POCs that are associated with LNG facility operation. This section outlines how the water management and monitoring programs will transition from the construction program to the operations program during commissioning of the Project.

4.1.10.1 Overview of Construction Water Management

The construction contact water management system for the Project is designed to manage TSS and other contaminants that are associated with civil works such as ground excavation, fill placement, concrete production and pouring, and installation of finished surfaces. The discharge of construction contact water to Howe Sound is regulated by WDA Effluent Permit PE-111578. The principal facilities for construction phase water management in use

as of April 2026 are shown in Figure 4-8 (at the end of Section 4.1.10.2). Non-contact water is intercepted and diverted around the construction areas to Howe Sound and Mill Creek. Stormwater runoff collected within the east and west catchment areas (7.12 and 5.92 ha, respectively) is managed as site contact water using a system of temporary berms, ditches, sumps and baker tanks for intermediate storage. The location of these facilities is adjusted as construction progresses. Water from potentially contaminated areas is conveyed to the East Wastewater Treatment Plant (WWTP) for treatment, whereas water from non-contaminated areas is directed to the East or West Sedimentation Ponds for settling of TSS prior to discharge.

Discharge from the East and West Sedimentation Ponds is controlled using pumps. Each of the ponds is configured to discharge to either OUT-04 (SP-W-OUT, West Sedimentation Pond) or OUT-10 (SP-E-OUT, East Sedimentation Pond). However, since mid-2025, all sedimentation pond effluent is pumped to a TSS settling system which uses sand filters to remove TSS prior to discharge to Howe Sound through OUT-04 (SP-W-OUT). The TSS settling system consists of six parallel treatment trains, each with an installed capacity of 2,450 m^3/day (yielding an overall capacity of 14,700 m^3/day) that is designed to process stormwater flows associated with a 24 hour 2-year return period storm event. Construction effluent discharge is associated with rainy periods and storm events and generally does not occur during dry periods, except for discharges associated with pond maintenance.

4.1.10.2 Transition to Operations Water Management

The water management infrastructure for operations is being upgraded or installed during construction. Sub-areas of the Project site will transition from temporary (*i.e.,* construction) to the permanent (*i.e.,* operations) water management facilities as components of the operations water management infrastructure are commissioned (refer to Section 4.1.10.3) and final grades and surfacing are completed. In general, drainage from these sub-areas will continue to be managed by the construction water management system until ground preparations are completed and the only remaining site preparation tasks are to decommission the construction sedimentation ponds and associated treatment systems. The transition of any drainage catchment to the permanent operational stormwater management system shall require documented verification that:

- temporary construction drainage controls are no longer required for the applicable area;
- permanent drainage infrastructure is mechanically complete and operational;
- sump pumps, level instrumentation, oil-in-water analyzers, diversion valves, alarms, and communications have been functionally tested;

- temporary construction-related sediment or contamination sources have been removed or isolated;
- associated commissioning activities have been reviewed for potential wastewater impacts; and
- discharge routing and contingency measures have been confirmed.

The initial operations drainage system sub-areas forecast to be ready for use by the end of Q2 2027 are non-contact and non-contaminated contact water catchments on the periphery of the site (OUT-01, OUT-02, OUT-06 and OUT-13), the East Creek outlet (OUT-12), the LNG Processing Area, the Refrigerant and Condensate Area, and inland portions of the Industrial Area. Runoff from non-contact and non-contaminated contact water catchments will drain to each outlet as shown in Figure 4-9. Runoff from potentially contaminated and contaminated areas that are discharged through SP-W-OUT and SP-E-OUT will continue to be managed under construction WDA Effluent Permit PE-111578 as described below:

- Secondary containment will be implemented in the LNG Processing Area to isolate potentially contaminated water. Temporary pumps will be installed in the Amine Sump and LNG Processing Area Sump. If water in the sumps and contained areas is non-contaminated (as confirmed by testing), it will be pumped to the potentially contaminated contact water collection trench; otherwise, it will be collected by vacuum truck for off-site disposal. The First Flush Sump will receive drainage runoff from the potentially contaminated contact water collection trench. If the water in the sump is non-contaminated (as confirmed by testing), a temporary pump will direct the water to the East Sedimentation Pond; otherwise, it will be collected by vacuum truck for off-site disposal. Any areas not completed shall have full secondary temporary containment installed until the entire system has been completed.
- Drainage from the contaminated contact water collection system (*i.e.*, oily water collection system) will accumulate in the Oily Water Storage Tank. If the water only contains oil (as confirmed by testing), it may be treated using the OWTS, otherwise it will be collected by vacuum truck for off-site disposal. OWTS treated water will be directed to the East Sedimentation Pond.
- The Refrigerant and Condensate Area sumps will be configured with temporary pumps. Not-contaminated water (as confirmed by testing) will be pumped to the East Sedimentation Pond.
- The sub-areas of the Industrial Area shown in Figure 4-9 are considered non-contaminated areas. Stormwater runoff from these areas will be directed to the West Sedimentation Pond.

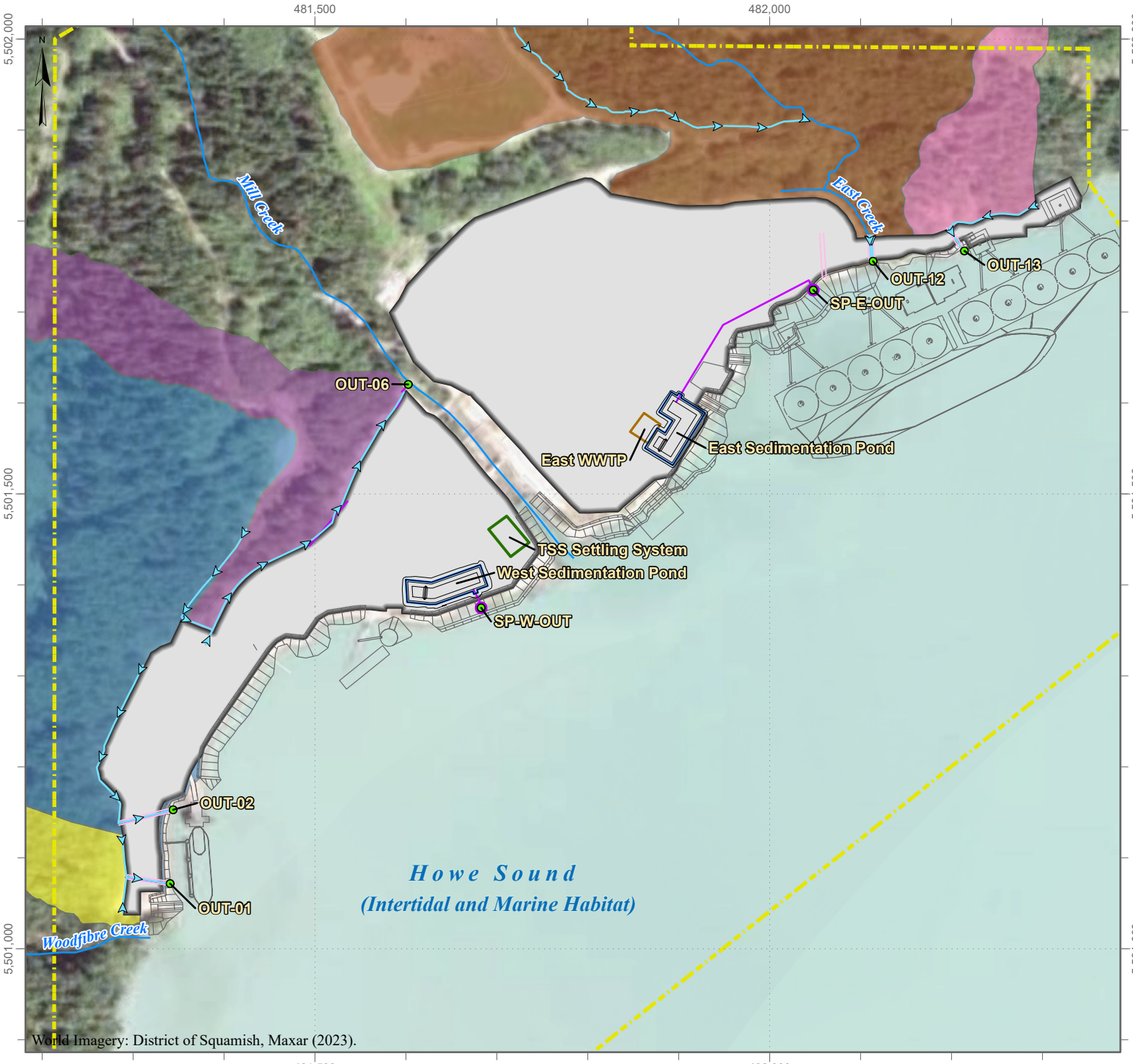
- The OWTS is scheduled to be commissioned for use in Q2 2027 (refer to Section 4.2.7). Treated effluent from the OWTS that meets minimum discharge objectives (MDOs) will be directed to the East WWTP.

The Industrial Area water management facilities are planned to be ready for use in Q3 2027. This will include installation of Stormceptors STC-01 and STC-02, connection of associated piping, final grading collection ditches, and completion of asphalt and gravel final surfacing. The current approach is to first complete the OUT-02 non-contaminated contact water catchment area, and then progress to the OUT-04 non-contaminated catchment area (subject to change as construction progresses). Construction water management will be implemented until each area is completed, at which point the West Sedimentation Pond will be backfilled and the TSS Settling System will be subsequently demobilized. Daily field and weekly analytical monitoring will be initiated at OUT-02 and OUT-04 after the operations non-contaminated contact water systems are commissioned for these outlets. This will be conducted under construction WDA PE-111578 and transitioned to the operations WDA once it comes into effect. The configuration of the water management system, as anticipated for the end of August 2027, is shown in Figure 4-10.

The operations water management system east of Mill Creek is planned to be ready for use by end of Q3 2027. Non-contaminated contact water will be directed to the East Sedimentation Pond, and clarified effluent will be discharged at SP-E-OUT (as shown in Figure 4-9) while construction activities are being executed. Similar to the Industrial Area, completion will include installation of Stormceptor STC-03 and associated connections to ditches and the OUT-10 (SP-W-OUT) outfall structure. Final grading of the ditch from the MOF to STC-03 will be completed, as well as final gravel surfacing of the remaining areas. The West Sedimentation Pond will then be emptied and backfilled, and the East WWTP will be decommissioned and removed from site. After the East WWTP is decommissioned and the operations water conveyance systems are connected to OUT-10, it is recommended that the operations WDA come into effect. Daily field and weekly analytical monitoring will be initiated at OUT-10 when it is connected to the operations water conveyance systems. The water management configuration forecast for the end of Q3 2027 is shown in Figure 4-11.

During periods of overlapping construction and operational activities, temporary isolation, diversion, or containment measures may be implemented to prevent construction-related wastewater from entering the permanent operational drainage system.

Under no circumstance shall untreated construction wastewater or known off-specification commissioning effluent be intentionally discharged through the operational OWTS discharge pathway to Howe Sound.



LEGEND

- Outfall
- Outfall Compliance Point
- TSS Settling System
- WWTP
- Sedimentation Pond
- Construction Contact Water Catchment
- Site Linework (Reduced)
- Certified Project Area
- Culvert
- Non-Contact Water Ditch
- Culvert / Outfall / Pipeline
- Watercourse

CATCHMENT

- OUT-01
- OUT-02
- OUT-06
- OUT-12 (East Creek)
- OUT-13

Coordinate System: *NAD 1983 UTM Zone 10N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Metres*

1:6,000

0 100 200 Metres

DATE SAVED:	Jul 22, 2026
DRAWN BY:	DM
REVIEWED:	PM
VERSION:	1

CLIENT:

Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT:

Woodfibre LNG Facility

TITLE:

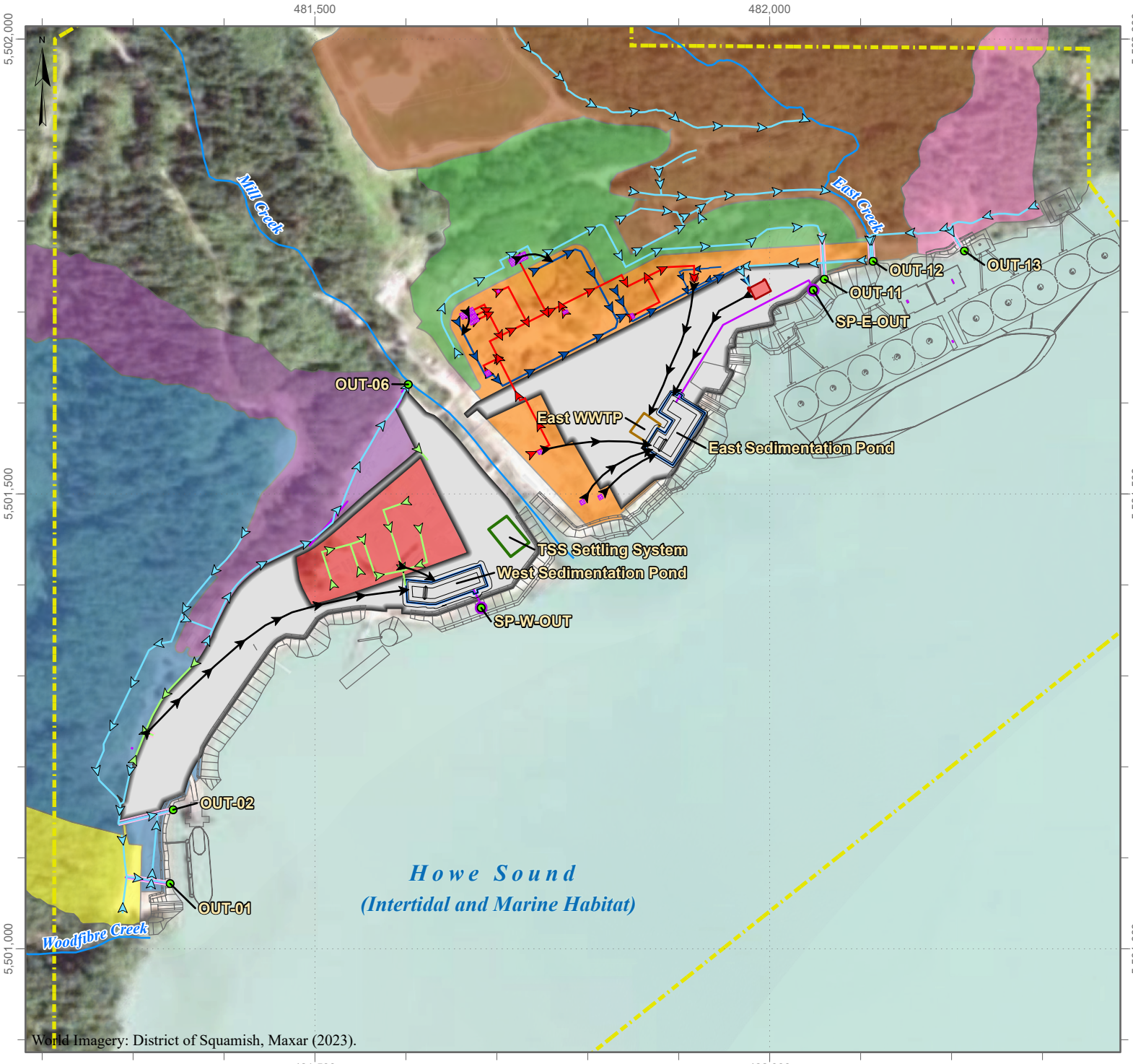
Construction Water Management Layout (April, 2026)

PROJECT #: A825-1 *FIGURE:* 4-8

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Figure 4-08 Construction Water Management Layout

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LEGEND

- Outfall
- Outfall Compliance Point
- Diversion Box and First Flush Sump
- TSS Settling System
- WWTP
- Sedimentation Pond
- Sump
- Construction Contact Water Catchment
- Site Linework (Reduced)
- Certified Project Area
- Culvert
- Temporary Water Diversion (Pumping)
- Non-Contact Water Ditch
- Non-Contaminated Contact Water Ditch
- Contaminated Contact Water Pipeline
- Potentially Contaminated Contact Water Trench
- Culvert / Outfall / Pipeline
- Watercourse

CATCHMENT

- OUT-01
- OUT-02
- OUT-04
- OUT-06
- OUT-10
- OUT-11
- OUT-12 (East Creek)
- OUT-13

Coordinate System: *NAD 1983 UTM Zone 10N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Metres*

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0 100 200 Metres

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CLIENT:

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LORAX ENVIRONMENTAL

PROJECT:

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TITLE:

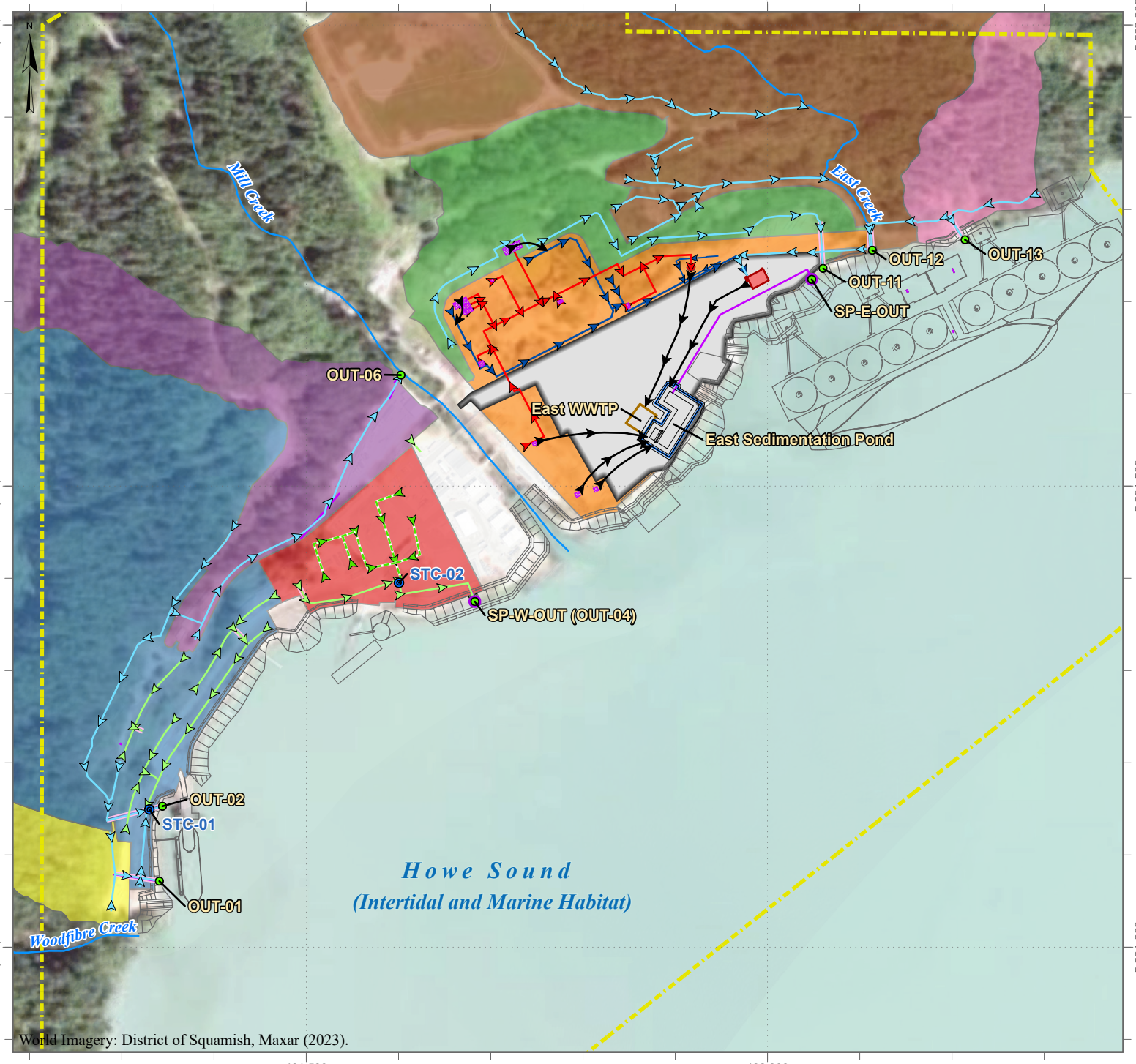
Water Management Catchments and Layout (End of June 2027)

PROJECT #:	A825-1	*FIGURE:*	4-9

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Figure 4-09 Construction Water Management Layout

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LEGEND

- Stormceptor
- Outfall
- Outfall Compliance Point
- Diversion Box and First Flush Sump
- WWTP
- Sedimentation Pond
- Sump
- Construction Contact Water Catchment
- Site Linework (Reduced)
- Certified Project Area
- Culvert
- Temporary Water Diversion (Pumping)
- Non-Contact Water Ditch
- Non-Contaminated Contact Water Storm Sewer
- Non-Contaminated Contact Water Ditch
- Potentially Contaminated Contact Water Trench
- Contaminated Contact Water Pipeline
- Culvert / Outfall / Pipeline
- Watercourse

CATCHMENT

- OUT-01
- OUT-02
- OUT-04
- OUT-06
- OUT-10
- OUT-11
- OUT-12 (East Creek)
- OUT-13

Coordinate System: *NAD 1983 UTM Zone 10N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Metres*

1:6,000

0 100 200 Metres

DATE SAVED:	Jul 22, 2026
DRAWN BY:	DM
REVIEWED:	PM
VERSION:	1

CLIENT:

Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT:

Woodfibre LNG Facility

TITLE:

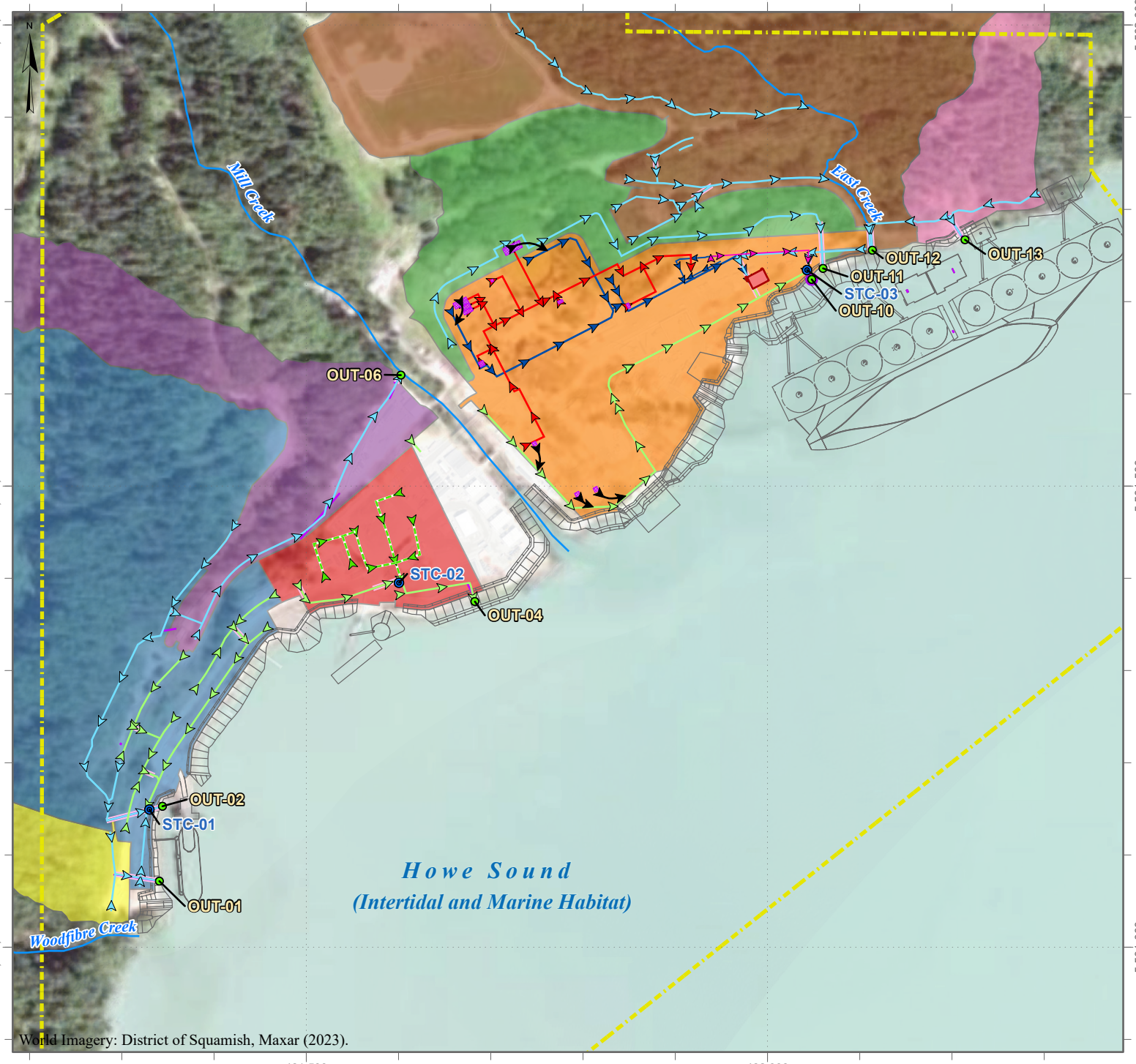
Water Management Catchments and Layout (End of August 2027)

PROJECT #:	A825-1	*FIGURE:*	4-10

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Figure 4-10 Construction Water Management Layout

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LEGEND

- Stormceptor
- Outfall
- Outfall Compliance Point
- Diversion Box and First Flush Sump
- Sump
- Oily Water Storage Tank
- Site Linework (Reduced)
- Certified Project Area
- Culvert
- Temporary Water Diversion (Pumping)
- Non-Contact Water Ditch
- Non-Contaminated Contact Water Storm Sewer
- Non-Contaminated Contact Water Ditch
- Potentially Contaminated Contact Water Trench
- Contaminated Contact Water Pipeline
- Treated Contact Water Pipeline
- Culvert / Outfall / Pipeline
- Watercourse

CATCHMENT

- OUT-01
- OUT-02
- OUT-04
- OUT-06
- OUT-10
- OUT-11
- OUT-12 (East Creek)
- OUT-13

Coordinate System: *NAD 1983 UTM Zone 10N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Metres*

1:6,000

0 100 200 Metres

DATE SAVED:	Jul 22, 2026
DRAWN BY:	DM
REVIEWED:	PM
VERSION:	1

CLIENT:

Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT:

Woodfibre LNG Facility

TITLE:

Water Management Catchments and Layout (End of September 2027)

PROJECT #: A825-1 *FIGURE:* 4-11

Printed by: DesMacDonald

Figure 4-11 Construction Water Management Layout

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4.1.10.3 Equipment Commissioning Protocols

The permanent (operations) stormwater management systems are planned to be commissioned and put into service ahead of the overall LNG facility commencing operations, and prior to the completion of construction activities. There will also be commissioning activities associated with the LNG equipment that will have an interface with the permanent stormwater management systems in service.

After equipment is verified to be mechanically complete, there are pre-commissioning and commissioning activities undertaken to test the systems before they obtain the status "ready for start up" and are subsequently put into operations. The intent is that the permanent stormwater management systems within each module/area will have completed commissioning activities prior to the LNG equipment and piping in that area being commissioned and prior to the commissioning of the OWTS (refer to Section 4.2.7).

Commissioning activities associated with systems connected to the permanent stormwater management and OWTS shall be executed under formal commissioning system boundaries and permit-to-work controls. Prior to introduction of hydrocarbons, chemicals, lubricants, or process fluids into a system, the applicable drainage collection systems, containment systems, sump pumps, monitoring instrumentation, diversion valves, and temporary containment measures shall be verified as operational and available for service.

During commissioning, any wastewater generated from flushing, cleaning, degreasing, hydrotesting additives, lubrication oil flushing, chemical cleaning, glycol systems, or other non-routine commissioning activities shall be segregated from the permanent stormwater drainage system unless specifically assessed and approved for treatment through the OWTS.

Formal handover of the permanent water management systems from construction to operations shall occur only after completion of:

- mechanical completion;
- pre-commissioning activities;
- functional testing;
- cause and effect verification;
- instrument calibration;
- diversion logic testing; and
- commissioning acceptance testing in accordance with approved procedures.

Commissioning activities for the permanent stormwater system include verification that the sumps and collection ditches are free of debris, and sump pumps, valves and associated instrumentation are performing correctly. Therefore, during commissioning of the permanent system, stormwater runoff in these areas will be managed in accordance with construction WDA Effluent Permit PE-111578, as described in Section 4.1.10.2.

The effluent generated from the commissioning of the OWTS will be routed back to the Oily Water Storage Tank if not in compliance with the operations WDA Effluent Permit discharge limits (refer to Section 6).

During commissioning of the equipment and piping in the LNG Processing Area, a range of commissioning fluids will be used, generated, and disposed. Examples include the lube oil flushing of all of the compressors (located in several modules) and the de-greasing of the acid gas removal unit in M01 using a mild detergent (*e.g.*, soda ash). Both of these activities will be performed as closed loop activities, with all fluids/detergent collected and removed from the site for appropriate disposal. Temporary bunds may be used to collect any potential leaks; otherwise, the leaks will be confined within the drainage sumps in those areas. Vacuum trucks will be used to removed accumulated fluids for off-site disposal at an appropriate facility.

4.2 Wastewater Treatment System

As described previously, an OWTS is proposed to provide treatment for contaminated and potentially contaminated contact water for operations. The purpose of the OWTS is to treat contaminated or potentially contaminated contact water to the established discharge criteria (Section 4.2.1.3).

This section includes a summary of the OWTS Best Available Technology Assessment (BATA), design basis, design criteria, treatment effectiveness, performance risks, operation and maintenance requirements, performance testing, estimated capital and operating costs, and the commissioning schedule. The information presented herein has relied upon documentation prepared for WLNG by the OWTS vendor, Cannon Artes, and McDermott, including the *Operations Phase Best Achievable Technology Assessment (BATA)* (MDR, 2026b; Appendix 4.2-1) and the *Unit 64 Effluent and Wastewater System – Process Design Basis* (MDR, 2025c; Appendix 4.2-2).

4.2.1 Best Achievable Technology Assessment

A BATA was completed by McDermott (MDR, 2026b; Appendix 4.2-1). The objective of the BATA is to select the best treatment approach for addressing all contaminated or potentially contaminated water such that only treated water which meets discharge

objectives is discharged into Howe Sound through the non-contaminated contact water system (Section 4.1.5.3). The following sections summarize the identified contamination sources and management approaches (Section 4.2.1.1), design basis (Section 4.2.1.2), and minimum discharge objectives (MDOs) (Section 4.2.1.3), as described in the BATA report (MDR, 2026b; Appendix 4.2-1).

4.2.1.1 Contamination Sources and Management Approach

The OWTS was selected based on expected POCs and POPCs that are listed in Table 4-2 (in Section 4.1.2). The BATA included an evaluation of feasible management options for each source of contaminated or potentially contaminated contact water. The evaluation considered treatment reliability, control-effectiveness and cost-effectiveness, and identified the best treatment approach for each potential contaminant source. Two primary approaches were identified: 1) on-site treatment of contaminated and potentially contaminated stormwater runoff, and 2) off-site disposal of drips, leaks, and spills of POPCs. The source of potential contamination and selected management approach for each POPC is summarized in Table 4-2 (Section 4.1.2).

4.2.1.2 Design Basis

This section presents the estimated OWTS influent volumes (Section 4.2.1.2.1) and quality (Section 4.2.1.2.1) that constitute the design basis for the OWTS.

4.2.1.2.1 Estimated OWTS Influent Volumes

The influent sources for the selected Best Available Technology (BAT) system consist of contaminated and potentially contaminated contact water generated within the facility. Influent volumes are based on historical precipitation data from the Squamish STP Central station (1981–2010), with November's peak average rainfall (391 mm) used as a conservative design basis. A potentially contaminated catchment area of 20,000 m^2 is conservatively assumed, recognizing not all runoff will require treatment. To accommodate peak flows and allow for maintenance, the system is designed for 50% utilization with a 10% contingency, resulting in a minimum required capacity of approximately 24 m^3/h.

4.2.1.2.2 Estimated OWTS Influent Quality

The BATA (MDR, 2026b; Appendix 4.2-1) identified EPH and TSS as the Parameters of Concern (POCs) to carry forward for on-site treatment (Section 4.2.1). The oily water collection system is designed such that any residual oil is contained within the system prior to being conveyed to the BAT treatment system. Precipitation will entrain oil and scour loose particulate from concrete surfaces; however, because most areas will be paved, the overall solids loading is expected to be low.

The following influent concentrations are assumed for the purposes of evaluating the BAT:

- Extractable Petroleum Hydrocarbons (EPH): approximately 50 mg/L; however, the treatment system is specified with an influent concentration of 200 mg/L EPH to provide a conservative operating envelope.
- Total Suspended Solids (TSS): approximately 100 mg/L; however, the treatment system is specified with an influent concentration of 200 mg/L TSS to provide a conservative operating envelope.

These values represent conservative design estimates under normal operating conditions and include allowance for possible, but unexpected, transient increases in EPH and TSS loading.

4.2.1.3 Minimum Discharge Objectives

The purpose of the OWTS is to treat contaminated or potentially contaminated contact water to the established discharge criteria, referred to as minimum discharge objectives (MDOs). MDOs are established for POPCs identified in the BATA based on the most conservative applicable Federal or B.C. water quality guidelines for MWAL, where available. Management strategies were also considered for POPCs without water quality guidelines.

In the absence of a WQG for EPH, applicable industry standards were reviewed, and the B.C. Petroleum Storage and Distribution Facilities Storm Water Regulation (≤15 mg/L) was adopted as the MDO, as it represents the most conservative and relevant specification available. In addition, discharges to Howe Sound fall under the *Fisheries Act*, including the Wastewater Systems Effluent Regulations, which set a monthly average TSS limit of ≤25 mg/L; this value is therefore adopted as the MDO for TSS. A summary of the MDOs is presented in Table 4-8.

Table 4-8:
Summary of Minimum Discharge Objectives for POCs

Parameter of Concern (POC)	Minimum Discharge Objective (MDO)	Rationale
EPH	≤15 mg/L	Adopted from B.C. *Environmental Management Act* Petroleum Storage and Distribution Facilities Storm Water Regulation, B.C. Reg. 177/2023 as most relevant and conservative discharge specification.
TSS	≤25 mg/L	Applied from *Fisheries Act* Wastewater Systems Effluent Regulations (SOR/2012-139).

4.2.1.4 BAT Selection

The BATA recommends a targeted treatment strategy using an on-site wastewater treatment system to address EPH and TSS concentrations from contaminated or potentially contaminated contact water. Several treatment options are evaluated, including vacuum truck removal with off-site disposal, filtration/adsorption, biological treatment, and oil-water solids separation. After considering feasibility, reliability, operational complexity, control effectiveness, and cost-effectiveness, the BATA selected an oil-water solids separation system (*i.e.*, the OWTS) as the best available technology for treating EPH and TSS.

4.2.2 Design Criteria

Physical removal by oil-water separation is commonly used to treat oil-contaminated water. This option uses physical forces (*i.e.,* gravity and buoyance) to separate suspended solids and oil in the contaminated water. The water enters a vessel which allows the suspended solids to settle (gravity) and the oil droplets to rise (buoyancy). The contaminants (*i.e.,* free oil and solids) are collected for transport to an offsite disposal facility. The operational complexity is low for oil-water separators that rely on physical forces. Because these systems rely primarily on gravity, they require very little power to operate. Coalescing media improves oil removal compared to conventional gravity separators. Media fouling over time requires cleaning or replacement.

Design criteria for the OWTS is summarized in the sub-sections below, including a system overview (Section 4.2.2.1), retention times (Section 4.2.2.2), instrumentation (Section 4.2.2.3), treatment residuals (Section 4.2.2.4), conveyance of OWTS influent (Section 4.2.2.5), and discharge of OWTS effluent (Section 4.2.2.6). Detailed OWTS design criteria are provided in the McDermott document: Unit 64 Effluent and Wastewater System – Process Design Basis (MDR, 2025c; Appendix 4.2-2).

4.2.2.1 Oily Water Treatment System Overview

This section provides an overview of the treatment components and processes used in the design of the OWTS (Appendix 4.2-2). The piping and instrumentation diagrams (P&IDs) for the Oily Water Storage Tank and OWTS are provided in Appendix 4.2-3, along with legends of piping and instrument symbology used on the P&IDs. The OWTS is located on the east side of Mill Creek (Figure 4-4, Section 4.1.5) and is adjacent to the operational process areas that represent the primary sources of EPH and TSS. The OWTS consists of:

- Two 30 m^3/hr inlet feed pumps (01-P-6417-21 A/B) (one operating; one in standby);

- One Corrugated Plate Interceptor (CPI) separator (01-H-6417-41);
- Two treated water forwarding pumps (01-P-6417-22 A/B) (one operating; one in standby); and
- Associated piping, wiring, instrumentation, and controls.

Feed pumps transfer contaminated water stored in the Oily Water Storage Tank to the OWTS. The OWTS operates in 12-hour batch cycles. Insulation and heat tracing are provided to maintain the minimum operating temperature of 10°C during winter and snowfall conditions.

The CPI separator is designed to remove oil droplets ≥60 microns at a maximum flow of 30 m^3/hr. It includes a CPI pack and a motorized belt skimmer. As oily water flows through the CPI pack, oil rises to the surface, while suspended solids settle to the bottom of the hopper. The skimmer operates continuously during OWTS operation, transferring recovered oil to the skimmed oil compartment, which is emptied periodically by vacuum truck (after approximately 10 batch cycles). The suspended solids present in the water are separated by gravity. Sludge collected in the hopper is removed after each batch for off-site disposal. Treated water overflows into the treated water compartment and is discharged via forwarding pumps to the non-contaminated contact water system through the outlet line.

Details of the Oily Water Storage Tank and the OWTS are further described in the sub-sections below. A conceptual schematic is provided in Figure 4-12.

4.2.2.1.1 Oily Water Storage Tank

The purpose of the Oily Water Storage Tank (01-T-6469) is to hold the incoming flow collected from the contaminated and potentially contaminated contact water collection systems (Section 4.1.5.1 and Section 4.1.5.2, respectively), allowing the downstream OWTS to operate in a stable condition. The Oily Water Storage Tank is an above-ground tank that is epoxy-lined with cathodic protection. The Tank is provided with heating coils to maintain temperature and floating oil skimming capabilities to skim any oil from the tank. Skimmed oil is sent offsite to appropriate waste management facilities. Oily water from Oily Water Storage Tank is pumped via the Oily Water Storage Tank Pump (01-P-6417-21A/B) to the downstream OWTS.

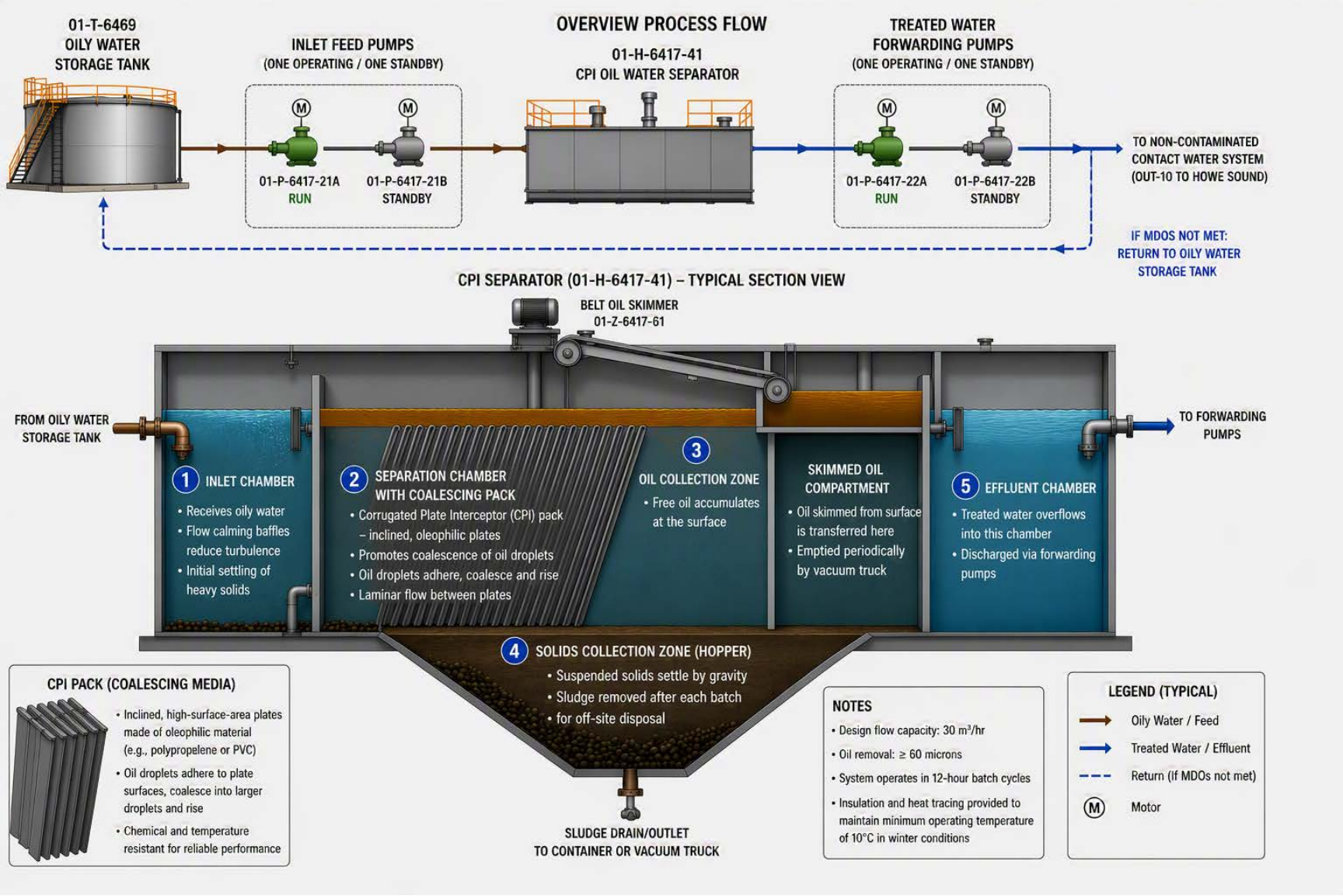
4.2.2.1.2 Oily Water Treatment System

The OWTS (01-A-6417) is installed above-ground and is designed to remove free oil (*i.e.*, EPH) and TSS from the water collected in the Oily Water Storage Tank. The system operates as a CPI separator, using gravity separation enhanced by coalescing media to

improve the removal of free oil and suspended solids from the water. Oil droplets, being less dense than water, naturally rise to the surface under gravity. The coalescing pack accelerates this process by promoting droplet collision and merging (coalescence), forming larger droplets that separate more efficiently. Key components include the:

1) Inlet Chamber: Receives oily water from the Oily Water Storage Tank. Flow is controlled to minimize turbulence and allow initial settling of heavy solids.
2) Separation Chamber with Coalescing Pack: A set of inclined, high-surface-area plates is installed within the Separation Chamber to promote laminar flow conditions. As water moves between these plates, small oil droplets collide with the plate surfaces and adhere due to surface tension. Over time, these droplets merge into larger ones through coalescence. Once the buoyant force acting on the enlarged droplets exceeds their adhesion to the plate surface, they detach and rise rapidly to the water's surface. CPI plates are constructed from oleophilic materials such as polypropylene or PVC, which promote strong molecular attraction between the plate surfaces and oil droplets. This allows the droplets to adhere to the plates more effectively than with conventional materials, which primarily trap droplets by obstructing their rise path. In addition, these materials offer excellent resistance to chemical agents and temperature variations, ensuring reliable performance under varying operating conditions.
3) Oil Collection Zone: Free oil accumulates at the top and is skimmed to the Skimmed Oil Compartment.
4) Solids Collection Zone: Suspended solids present in the water settle to the bottom forming sludge, which is periodically removed.
5) Effluent Chamber: Discharges treated water and is equipped with instrumentation for level and quality monitoring (refer to Section 4.2.2.1.3).

The separated oil and accumulated sludge collected within the OWTS will be periodically removed into suitable containers or vacuum trucks for off-site disposal.



Note: image generated by Microsoft Copilot, 2026. For illustrative purposes only. Refer to Appendix 4.2-3 for OWTS design drawings.

Figure 4-12: Conceptual Schematic of the Oily Water Treatment System and Associated Components.

4.2.2.1.3 Treated Effluent Discharge

Treated effluent from the OWTS that meets MDOs will be pumped through a pipeline (Figure 4-4, Section 4.1.5) to the non-contaminated contact water system (Section 4.1.5.3) which discharges to Howe Sound through OUT-10. Effluent from the OWTS that does not meet MDOs will be returned to the Oily Water Storage Tank for additional treatment until MDOs are achieved.

4.2.2.2 Retention Times

Retention times for the Oily Water Storage Tank and the OWTS are summarized in Table 4-9 below. Retention time in the Oily Water Storage Tank will vary with operational conditions, with a minimum requirement of approximately 15 minutes. However, the design allows for significantly longer retention if needed, given the nature of batch operations.

Table 4-9:
Retention Times of Oily Water Treatment Components

Treatment Component	Specification
Oily Water Storage Tank	
Tank size	7.5 m (I.D.) x 12 m (H)
Capacity (net working)	444 m^3
Retention time	> 30 minutes
CPI Separator Tank	
Tank size	6.2 m (L) x 2 m (W) x 3 m (H)
Capacity	37 m^3
Retention time	42 min

Note:
I.D. = inner diameter; H = height; L = length; W = width.

4.2.2.3 Instrumentation

Instrumentation will be used to support the operation of the Oily Water Storage Tank and the OWTS. A summary of the primary instruments is provided below, while more detailed information can be found in the McDermott document: *Control Philosophy and Logic Diagram* (MDR, 2024b; Appendix 4.2-6-3).

The Oily Water Storage Tank is monitored through level indicator in the control room, with alarms provided at high and high-high levels for operator intervention. To protect the inlet feed pumps, a low-level signal from the level indicator will automatically stop the feed pumps.

Within the CPI separator, flow is measured by a flow transmitter to ensure the maximum operating flow rate of 30 m³/hr is maintained. The motorized belt skimmer is monitored using motor run feedback, which triggers an interlock to close the inlet valve if the skimmer stops. Oil collected in the skimmed oil compartment is tracked by a guided wave radar level transmitter, supplemented by a local sight glass. A high-high level signal from the level transmitter will shut down the inlet feed pumps to prevent overflow. Sludge in the hopper cannot be detected by a transmitter due to its low concentration, so visual monitoring is provided via a sight glass.

Treated water flows into a dedicated compartment within the CPI separator, where a level transmitter controls the treated water forwarding pumps. Pump protection is provided by another level transmitter, which initiates a shutdown on low-low level. The discharge line includes two oil-in-water analyzers and two ON/OFF valves: one for the treated water line and one for the off-spec return line. To allow for operational buffer with the MDO (15 mg/L), if the EPH concentration exceeds 10.5 mg/L, the valves will automatically switch to redirect water back to the Oily Water Storage Tank for re-treatment. When the concentration returns to specification, the valves reverse to allow discharge to the non-contaminated contact water system.

For winterization, all pumps, piping, valves, and instruments are equipped with electric heat tracing and insulation to maintain a minimum temperature of 10°C. The CPI separator also includes two electrical heaters controlled by temperature transmitters, with activation and deactivation setpoints at 10°C and 38°C respectively.

Control of the OWTS is managed by a Programmable Logic Controller (PLC) based system located remotely and integrated with the Distributed Control System (DCS). The Unit Control Panel (UCP) supports automatic, manual, and off-line modes and includes a local Human-Machine Interface (HMI) panel for monitoring and operational adjustments. A local power distribution board within the OWTS package supplies all electrical components, including pumps, skimmer motor, heaters, heat tracing, and instrumentation.

4.2.2.4 Treatment Residuals

Residual waste from the Oily Water Storage Tank and the OWTS consists of two primary streams: recovered oil and sludge. Oil recovered from the CPI separator at approximately 70% concentration is stored in the skimmed oil compartment and removed periodically (typically every 10 batch cycles) using a vacuum truck. A safety margin allows for up to five additional cycles if removal is delayed. Each 12-hour batch is expected to produce approximately 0.1 m³ of residual oil. In addition, skimmed oil from the Oily Water Storage Tank is routed from the skimmer to temporary containment via piping prior to offsite disposal.

Sludge, collected in the CPI separator hopper at roughly 1% concentration, is removed after each batch using a vacuum truck and transferring into suitable containers for temporary storage onsite prior to offsite disposal. Each 12-hour batch is anticipated to generate approximately 2.7 m^3 of sludge. Because sludge cannot be detected by a transmitter, visual monitoring is provided via a sight glass, and an operator alarm is triggered every 12 hours. A six-hour safety margin is included to prevent sludge carryover into treated effluent if removal is delayed. Grab samples of the sludge will be analyzed for the parameters required by the waste disposal facility.

All residual waste will be transported to an off-site, provincially licensed facility. Facilities in the B.C. Lower Mainland that can accept treatment system residuals currently include (but not limited to): GFL Environmental (Squamish), Secure Energy (Richmond), Sumas Environmental (Burnaby), and Clean Harbours (Delta). Waste shipment frequency will depend on seasonal conditions, with the highest frequencies expected during periods of heavy rainfall. Wastes will be managed in accordance with the Operations Waste Management Plan, that will be developed in accordance with the EAC.

Further details on treatment residuals for the Project are outlined in Section 3.3 of the SWDMP (Appendix 4.1-1).

4.2.2.5 Conveyance of OWTS Influent

Contaminated and potentially contaminated contact water systems (Section 4.1.5.1 and Section 4.1.5.2, respectively) convey oily water to the Oily Water Storage Tank. The contents of the tank are pumped to the OWTS as described in Section 4.2.2.1. A sample port is installed between the Oily Water Storage Tank and the OWTS to allow for influent quality testing.

4.2.2.6 Discharge of OWTS Effluent

Treated effluent from the OWTS that meets all MDOs is discharged to the non-contaminated contact water system which discharges to Howe Sound at OUT-10, as described in Section 4.2.2.1. The treated water line for the OWTS is equipped with two oil-in-water (*i.e.,* EPH) analyzers for real-time monitoring that will be used to confirm that treated effluent meets the control specification (≤10.5 mg/L) used to provide operational buffer on the EPH MDO (15 mg/L), and to operate the effluent control valves described in Section 4.2.2.3. If oil concentration exceeds 10.5 mg/L EPH, the valves automatically switch to redirect water back to the storage tank for re-treatment. When the concentration returns to specification (≤10 mg/L EPH), the appropriate valve will open to allow discharge to the non-contaminated contact water system. The effluent line of the OWTS is equipped with a sample port connection for period sampling of effluent quality.

The TSS concentration in treated effluent is managed using field turbidity measurements. A turbidity-TSS relationship will be established as described in Section 6.2.5, and will be used to confirm that TSS meets the treatment specification (≤25 mg/L). A threshold turbidity value with a safety buffer set below the equivalent of 25 mg/L TSS will be established. This approach will enable personnel to estimate TSS in real time from turbidity readings and make conservative discharge decisions, given the time required to obtain TSS analysis results from a laboratory.

4.2.3 Treatment Effectiveness

The CPI separators are a proven and widely used technology for removing oil (*i.e.*, EPH) and TSS from industrial wastewater. Operating on gravity separation principles, CPI units use corrugated plates to enhance oil droplet coalescence and improve separation efficiency. This technology is recognized as reliable and robust, with decades of successful application in oil and gas, mining, and petrochemical industries. Its design and performance are well understood, ensuring predictable treatment outcomes when properly sized and maintained. The simplicity of the separation mechanism, combined with decades of proven application, provides a high level of confidence in treatment performance without the need for bench-scale validation. However, to provide additional assurance, the OWTS vendor, Cannon Artes, has issued a Process Guarantee (Appendix 4.2-4) confirming the system's capability of achieving MDOs. Cannon Artes has extensive experience designing and installing CPI systems worldwide. A list of Cannon Artes's project experience with CPI separators that are technically similar to WLNG's proposed treatment process and treated water discharge criteria is included in Appendix 4.2-5.

4.2.4 Primary Performance Risks and Mitigation

The overall objective of the OWTS is to sufficiently treat contaminated and potentially contaminated contact water generated within the facility and to produce discharge water that meets the MDOs. A variety of challenges that have the potential to impact the operation and effectiveness of the OWTS (if unmitigated) have been identified, including power outage, reagent supply interruption, and variable flow conditions. A summary of primary challenges for the OWTS and a high-level management approach for each is presented in the SWDMP (Appendix 4.1-1), along with relevant management plans (summarized in Sections 4.1.6, 4.1.7, 4.1.8, and 4.1.9).

4.2.5 Operation and Manual

The OWTS vendor, Cannon Artes, has provided a comprehensive Operating and Maintenance Manual (MDR, 2025a; Appendix 4.2-6-1). Supplemental information is

included in the following documents: Schedule of Manufacturer's Commissioning and Start-Up and 2 Years Operation Spares (MDR, 2025b; Appendix 4.2-6-2), Control Philosophy and Logic Diagram (MDR, 2024b; Appendix 4.2-6-3), and Cause and Effect Charts (MDR, 2024a; Appendix 4.2-6-4). The manual and supplementary documents include preventative maintenance programs, operator training requirements, inspection schedules, spare parts inventory, and alarm response protocols. Key information regarding OWTS maintenance, monitoring, and operator training is summarized below.

4.2.5.1 Maintenance

The OWTS operates in batch mode, allowing routine and corrective maintenance to be scheduled without impacting treatment performance. Preventative maintenance will include routine lubrication and inspection of all driven equipment, along with scheduled checks of safety valves and pressure, level, and flow control devices. A structured maintenance program will define routine tasks and trigger levels for unscheduled work. Regular inspections of all units, including verification of pressure, level and flow regulating equipment, are essential for reliable operation. A complete running log will be maintained to ensure accurate control and smooth plant performance.

4.2.5.2 Monitoring

A daily monitoring log will record key operating parameters such as pressure, flow rate, and turbidity. Normal operating conditions will be established and used as benchmarks to identify deviations that may indicate maintenance needs or troubleshooting requirements. Influent and effluent monitoring requirements are detailed in Section 6.2.1. Visual inspections of major components (*i.e.*, tanks, pumps) and the piping network (*i.e.*, valves, sampling ports) will also be conducted daily, with findings documented in the log.

4.2.5.3 Operator Training

The OWTS vendor, Cannon Artes, is responsible for training WLNG technical personnel at the Project site. This training ensures operators acquire the skills necessary to operate the system safely and efficiently, including responding to real-world and emergency situations without compromising personnel or OWTS safety.

Training is delivered by a qualified site supervisor and includes both theoretical instruction and practical exercises, such as simulated operations in the Unit Control Panel (UCP). Each session concludes with a question-and-answer segment. The training program covers the following topics: safety procedures, common terminology, chemical and physical process theory, unit description and system overview, design criteria, equipment operation, control philosophy and start-up procedures, troubleshooting and problem-solving, and

maintenance requirements. Upon completion, each participant receives a personal attendance certificate.

4.2.6 Performance Testing

As part of planned commissioning activities, the OWTS will undergo both functional and performance testing. All OWTS components, including instrumentation, analyzers, and operating and alarm set points, will be functionally tested using uncontaminated water. The system will be operated in recirculation mode for multiple cycles to verify successful overall functional performance.

Once the system has been confirmed to be functionally operating as designed, the system will be shut down to conduct a performance test. Performance testing of the OWTS shall be completed during commissioning prior to the system being placed into operational service and prior to authorization of routine discharge through OUT-10. Performance testing shall include:

- verification of hydraulic performance;
- calibration and verification of oil-in-water analyzers;
- verification of automatic diversion logic for off-specification effluent;
- verification of containment and recovery systems;
- confirmation of sludge and oil removal functionality;
- process upset simulations; and
- treated effluent quality testing.

Performance testing shall include a controlled challenge test utilizing a biodegradable test oil or equivalent environmentally acceptable hydrocarbon surrogate introduced into the system under controlled conditions to demonstrate the oil separation and diversion capabilities of the system. The challenge testing shall:

be conducted in a closed-loop or recirculation configuration where practicable;

- prevent uncontrolled discharge to Howe Sound during testing (outlet line to the non-contaminated contact water system will be blocked);
- include collection of influent and effluent analytical samples;
- verify operation of oil skimming and sludge handling systems;
- verify analyzer response and diversion valve operation during elevated oil concentration conditions; and
- demonstrate return to compliant operation following upset recovery.

Effluent generated during performance testing that does not meet discharge requirements shall be diverted back to the Oily Water Storage Tank, recycled within the system, or removed from site for appropriate disposal.

Once it has been confirmed that treated effluent consistently meets the discharge limits specified by the WDA, the system will be shut down, and the test water and recovered oil will be drained and disposed of in an appropriate manner. Upon successful completion and acceptance of the test, the OWTS will be refilled with uncontaminated water and restarted in recirculation mode. After verification of normal operation, the OWTS may be placed into service.

Final acceptance of the OWTS shall require successful completion of performance testing, operational readiness review, and confirmation that the system can achieve the applicable discharge objectives and permit requirements under anticipated operating conditions.

4.2.7 OWTS Commissioning Schedule

The proposed schedule for the commissioning of the OWTS is presented in Table 4-10 below (note, this is subject to change pending system readiness). Commissioning of the oily water collection system (including sumps, pumps, and piping) will occur prior to commissioning the OWTS, as described in Section 4.1.10.

Table 4-10:
Proposed OWTS Commissioning Schedule

Activity	Planned Start	Approximate Duration (days)
Commissioning of Oily Water Collection System	Q2 2027	11
Commissioning of Oily Water Treatment System	Q2 2027	4

The commissioning schedule for the OWTS is integrated with the overall LNG facility commissioning and start-up schedule. The intent is for the permanent drainage collection systems, sump systems, monitoring instrumentation, diversion systems, and OWTS to be commissioned and operational prior to introduction of hydrocarbons or other environmentally significant process fluids into the associated LNG process areas.

Hydrocarbon introduction into process systems connected to contaminated contact water drainage systems shall not proceed unless:

- the associated drainage collection systems are operational;
- diversion and containment systems are available;
- oil-in-water analyzers are calibrated and functional;
- off-specification routing has been verified; and

- the OWTS has successfully completed functional and performance testing.

Temporary measures, including vacuum truck support, temporary containment, temporary storage tanks, or temporary diversion arrangements, may be utilized during transitional commissioning phases where required to maintain environmental protection and regulatory compliance.

4.3 Effluent Model

A water balance and water quality model (the "effluent model") is developed for the Project to simulate the expected quantity and quality of contact water that will be generated. The effluent model is designed to predict flow and water quality for the OUT-10 node and to model water quality for untreated contact water (OWTS influent), OWTS treated effluent, non-contaminated contact water and non-contact water. Source terms are developed to predict the quality of these waters (refer to Section 4.3.2). Discharges via OUT-10 include:

- Treated effluent from the OWTS (which discharges into the non-contaminated contact water management system); and
- Stormwater from the potentially contaminated and non-contaminated contact water systems during storm events.

The effluent model accounts for planned water management activities and applies a mass balance approach to calculate OUT-10 discharge water quantity and quality during a 2 year 24-hour storm event. The model predictions are used to assess whether the expected effluent concentrations of any POCs and POPCs will potentially exceed applicable water quality guidelines and therefore may need to be included in a WDA pursuant to the B.C. *Environmental Management Act*.

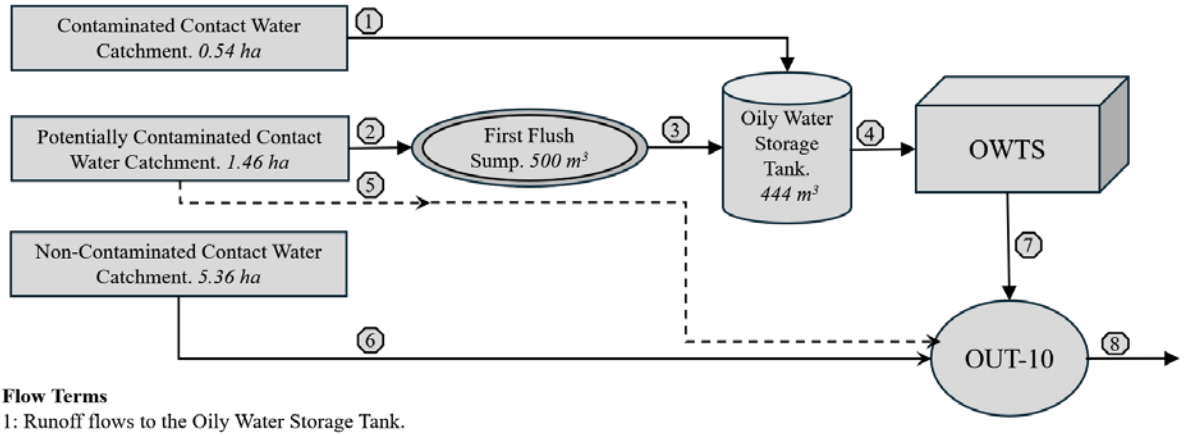
The other outfalls shown in Figure 2-1 will discharge non-contact water, non-contaminated contact water, and creek water as described in Section 4.1.3. The water quality discharged from OUT-01, OUT-02, OUT-04, OUT-06, OUT-11, OUT-12 or OUT-13 is expected to be similar to non-contact water quality presented in Section 3.6.3 (Table 3-23). East Creek discharges through OUT-12; during operations, water quality in East Creek is expected to remain within the historical ranges outlined in Section 3.6.3 (Table 3-19).

The effluent model predictions include results for two scenarios: expected case and extreme case. The two scenarios are differentiated by water quality source terms used in each scenario, whereby the median and 90th percentile statistics calculated from water quality monitoring data are applied to the expected and extreme case, respectively. The derivation of the expected and extreme case water quality source terms is described in Section 4.3.2.

The OUT-10 effluent model structure and processes are described in the following sections, with details specific to the water balance and water quality source terms included in Section 4.3.1 and Section 4.3.2, respectively. The effluent model predictions are presented in Section 4.3.3.

4.3.1 Effluent Model Water Balance

The effluent model water balance was developed from the site hydraulic model (Stantec, 2026a) for a 24 hour 2-year return period rain-on-snow storm event precipitation depth (157mm) to calculate the resultant discharge volumes at OUT-10. The water balance is a simplified version of the water management system described in Section 4.1.5. The simplified approach assumes all contaminated contact water is directed to the Oily Water Storage Tank, and does not account for storage that is available in contaminated contact water sumps located upstream of the tank, or for the portion of the contaminated contact water catchment that is redirected to the First Flush Sump Diversion Box after the first flush rainfall amount (*i.e.*, the first 25 mm of rainfall). The water balance assumes all treated water is suitable for discharge. Variations in hourly rainfall intensity that are typical of storms are accounted for using the Soil Conservation Service (SCS) Type 1A distribution with 24-hour duration, consistent with the approach used in Stantec (2026a). The conceptual water balance and hourly rainfall intensities are shown in Figure 4-13 and Figure 4-14, respectively.



Flow Terms
1: Runoff flows to the Oily Water Storage Tank.
2: Runoff flows to the First Flush Sump during first flush only (first 25mm precipitation). Flows stops at end of first flush period.
3: After flow stops, water stored in First Flush Sump is conveyed to Oily Water Storage Tank.
4: Actively managed flow to OWTS at 30 m^3/hr. Flow modelled to start one (1) hour after start of runoff.
5: Runoff flows after first flush report to OUT-10 via the non-contaminated contact water system.
6: Runoff from non-contaminated contact areas reports directly to OUT-10 via the non-contaminated contact water system.
7: OWTS treated effluent discharged to OUT-10 via the non-contaminated contact water system.
8: Discharge to Howe Sound from the non-contaminated contact water system.

Figure 4-13: Conceptual Effluent Model Water Balance (Simplified Version of the OUT-10 Water Management System Described in Section 4.1.5)

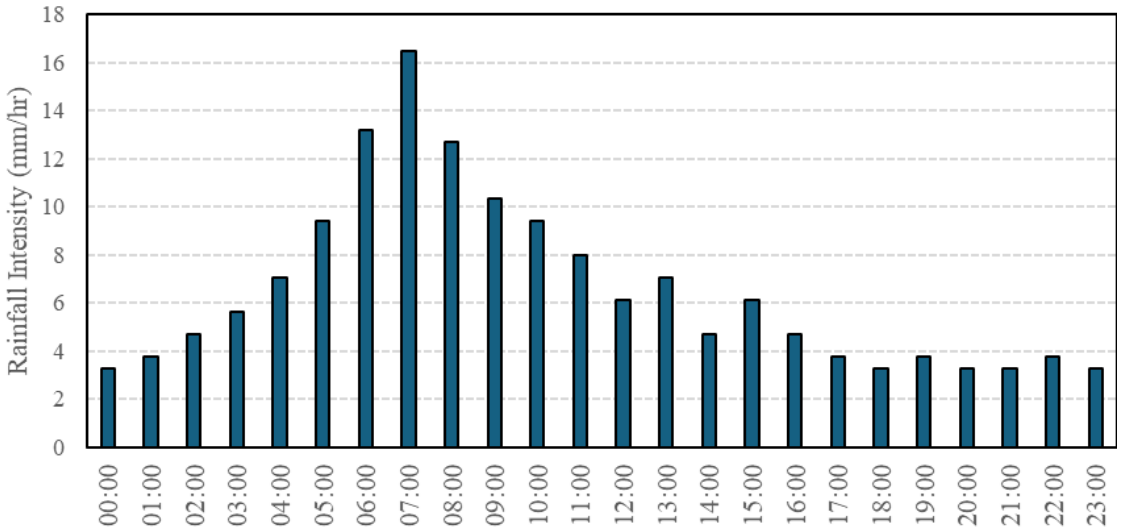


Figure 4-14: Hourly Precipitation Intensity for a 24 Hour 2-Year Return Period Storm Event with SCS Type 1A Distribution

The water balance incorporates storm event precipitation and runoff coefficients that were assigned to each discrete physical area delineated in the model. Precipitation is transformed into one-minute time step flows using the respective runoff coefficient for each catchment using the following equation:

$$Q = 1.66 \bullet A \bullet C \bullet I$$

where Q is the runoff rate (m^3/min), A = catchment area (ha), C = runoff coefficient (dimensionless) assigned to area A, and I = precipitation intensity (mm/hr). It is necessary to run the model at a one-minute time step to adequately quantify the filling and outflow from the First Flush Sump and the Oily Water Storage Tank. The overall catchment area for OUT-10 is shown in Figure 4-3 (Section 4.1.3) and the water management systems included in the water balance are described in Section 4.1.5. The contaminated contact area is estimated by summing the contaminated water system sump footprints and adjacent containment areas shown in Figure 4-4 (Section 4.1.5). The size and runoff coefficient assigned to each catchment area are presented in Table 4-11.

Table 4-11:
Catchment Areas and Runoff Coefficients Included in Effluent Model

Catchment	Land Type	Area (ha)	Runoff Coefficient[1]
Potentially Contaminated Contact Area	Impervious Area	1.46	1.00
Contaminated Contact Area	Impervious Area	0.54	1.00
Non-Contaminated Contact Area	Mostly Gravel Area	5.36	0.85

Notes: [1] Runoff coefficients sourced from Stantec (2026a).

Water quality parameters tracked by the model are treated as conservative tracers which are mixed at the OUT-10 model node (confluence) by the following equation:

$$C_r = \frac{\sum_i Q_i C_i}{\sum_i Q_i}$$

where C_r is the resultant concentration, $Q_i$are the source flows into the mixing point and $C_i$are the concentrations associated with the source flows.

A key objective of the effluent model is to incorporate the water management decision matrix for managing stormwater runoff from potentially contaminated areas as described in Section 4.1.5.2. The potentially contaminated water system directs potentially contaminated water to the Diversion Box, which directs water to the First Flush Sump or to the non-contaminated contact water system in larger storm events. As discussed in Section 4.1.5.2, initial runoff (*i.e.,* the first flush) from potentially contaminated areas is collected in the First Flush Sump and is monitored for POCs prior to discharge or treatment, based on monitoring results. It is expected that after the first 25 mm of rainfall, only non-contaminated water will be collected at the First Flush Sump, and the Diversion Box will overflow to the non-contaminated contact water system for discharge via OUT-10. Therefore, the water balance for OUT-10 assumes that initial flows to the Diversion Box are directed to the First Flush Sump, and after 25 mm of rainfall, the Diversion Box flows are redirected to OUT-10. The accumulation of the initial 25 mm of precipitation is modelled to occur, approximately, during the first five (5) hours of rainfall. The effluent model illustrates the condition where all sumps in the contaminated water system are directed to the Oily Water Storage Tank, and the following assumptions are made:

- Sumps upstream of the Diversion Box do not contain POCs that require off-site disposal or storage for dispersion by evaporation, and therefore do not store water.
- The First Flush Sump is assumed to be empty at the start of the model, and the first flush water volume is directed to the OWTS for treatment.
- The Oily Water Storage Tank is assumed to be empty at the start of the model. Water from the Tank is conveyed to the OWTS at a rate of 30 m^3/hour (8.3 L/s). To allow for the accumulation of water in the tank prior to treatment, transfer to the OWTS is initiated at 01:00 hour.
- The OWTS is assumed to have no storage capacity, and outflow rate is set to the inflow rate of 30 m^3/hour (8.3 L/s).
- The contaminated water catchment area (0.54 ha) is assumed to be equal to the sum of areas for the sump footprints and the bermed areas for Module 01, Module 02, and the Condensate Storage Area (Figure 4-4).

- The potentially contaminated catchment area (1.46 ha) is calculated as the difference between the 2.0 ha total area estimated in the BATA (MDR, 2026b; Appendix 4.2-1) for the contaminated and potentially contaminated contact water catchments, and the contaminated contact water catchment (0.54 ha) described above.
- The non-contaminated catchment area (5.6 ha) is equal the difference between the OUT-10 total catchment area (7.6 ha) and the contaminated and potentially contaminated contact water catchment areas (2.0 ha) the gravel covered areas.

4.3.2 Water Quality Source Terms

The water quality component of the effluent model follows the water balance schematic for the OUT-10 catchment (Figure 4-13). The concentration of 113 parameters are modelled, which include TSS, pH, nutrients, anions, total and dissolved metals, non-halogenated VOCs, PAHs and EPH. Parameters with WQGs for the protection of FWAL and MWAL, or flagged as POCs, were included in the model, as well as additional parameters that are generally useful for evaluating water quality. Water quality source terms are developed for untreated contact water (OWTS influent), OWTS treated effluent, non-contaminated contact water and non-contact water. The source terms are derived from Project water quality monitoring data, and from information provided in the BATA (MDR, 2026b; Appendix 4.2-1).

Two source term scenarios are modelled, the expected case and extreme case, to address the uncertainty associated with source term derivation. The expected case model source terms are set to the median values and are considered to represent the mid-point parameter concentrations under normal conditions. The extreme case model results are derived using the 90th percentile concentrations and represent an upper range of potential concentrations, which are considered significantly less likely to occur than expected case, and to occur infrequently.

For alkalinity, dissolved oxygen, pH and TDS, the 10th percentile value was used to model the extreme case. The 10th percentile was selected for pH and dissolved oxygen because these parameters have WQGs that are bounded by minimum values, and as discussed in Section 3.6.3.1, low pH is a natural condition of freshwater at the Project site. Therefore, the 10th percentile is more appropriate for modelling the extreme condition for dissolved oxygen and pH. Low pH values at the Project site are associated with low alkalinity and low TDS concentrations; therefore, the 10th percentile of these parameters is also selected for the extreme scenario.

4.3.2.1 Derivation Overview

The water quality source terms are derived from multiple sources. Water quality data from the Project non-contact diversion ditches are used to establish the background characteristics of stormwater runoff (refer to Section 4.3.2.2). The concentration of TSS in non-contact water is generally low and not suitable for modelling loadings of parameters that are typically associated with TSS. Therefore, non-contaminated construction contact water quality is used to calculate loading rates for particulate-bound forms of parameters associated with TSS, and the loadings are added to the background concentrations derived from non-contact water. The OWTS design specifications for EPH and TSS outlined in Appendix 4.2-1 are used as the source terms for EPH and TSS in the OWTS influent and effluent. Process reagents and petroleum hydrocarbons that are identified in Section 4.1.2 to be mitigated by source controls such as secondary containment followed by off-site disposal or weathering, are excluded from the effluent model.

4.3.2.2 Background Water Quality

Background water quality is derived from the non-contact water diversion ditch dataset described in Section 3.6.3. The diversion ditches intercept hillside runoff flowing towards the Project site, and during the dataset monitoring period (April 2022 to May 2025), significant sections of the ditches were unlined and constructed in alluvial gravel that have been flushed free of fine sediments. Considering that there are no activities (*i.e.,* civil works) during operations that are expected to produce TSS within the Project site, and that stormwater will flow on impermeable surfaces (*i.e.,* concrete or asphalt) or compacted gravel surfaces, the non-contact diversion ditch water quality is considered a proxy for background stormwater quality during operations.

The non-contact dataset consists of 77 samples that span the April 2022 to May 2025 period. In general, the diversion ditch water is clear with low concentrations of TSS and is not suitable for deriving loadings of parameters that are typically associated with TSS, such as total metals and organic compounds. Therefore, the median and 90th percentile statistics are used to represent expected case and extreme case background water quality for TSS, general parameters, nutrients, anions and dissolved metals.

For statistical calculations, non-detectable results are generally set equal to the reporting limit values. However, for some dissolved metal parameters (*i.e.,* Pb, Li, Hg, Ni, Se, Ti and V), a range of values are reported for non-detectable results, and the highest reporting limits are well above the highest detectable concentration. For other dissolved metals (*i.e.,* Ag, Be, Bi, Cr[VI], P, Sn and Tl), virtually all the results for a parameter are reported as non-detectable. Therefore, the following data filtering approach is used for non-detectable dissolved metal values:

- Statistical calculations are conducted on the subset of the dissolved metals data that only includes detectable results. For each parameter, the statistics from the subset are compared to the reporting limit value for each non-detectable result from the uncensored data.
- If greater than 5% of results are detectable, and the 95th percentile of the detectable result subset is greater than the highest reporting limit value, all non-detectable results are assigned the reporting limit value.
- If greater than 5% of results are detectable, and the 95th percentile of the detectable result subset is less than a reporting limit value, and the maximum of the detectable result subset is less than 2 times that same reporting limit, then all non-detectable results with that reporting limit value are excluded from source term dataset. Otherwise, non-detectable results are assigned the reporting limit value.
- If less than 5% of results are detectable all non-detectable results are assigned a zero value.

The screened dataset is used for statistical calculations, and the resulting statistics are tabulated in Appendix 4.3-1.

4.3.2.3 Parameters Associated with TSS

The modelled concentrations of parameters associated with TSS are derived using non-contaminated construction contact water monitoring results collected October 2025 to January 2026 from the Project site (Appendix 4.3-2). During this period the site was covered with fill or impermeable surfacing (*i.e.,* concrete) that had been placed from 2024 through 2025, and is similar to the materials for the final surfacing that will be in place during operations. The water quality samples were collected from influent to the West Sedimentation Pond (station SP-W-IN) and influent to the 2700 GPM TSS settling system (station 2700GPM-IN). Due to ongoing civil works, the TSS concentrations in construction contact water were elevated up to 497 mg/L. These elevated concentrations of TSS are not considered representative of the water quality expected during operations. However, the elevated concentrations of TSS allow for a derivation of loading rates that can be attributed to particle-bound forms of parameters that are strongly influenced by TSS. Considering that the TSS originates from the Project site, the composition of TSS in the non-contaminated construction contact water data set is a suitable proxy for the composition of TSS during operations.

For each sample in the dataset with a TSS concentration greater than 10 mg/L (*i.e.,* 29 out of a total of 34 samples), the concentration of total metals attributable to TSS is derived by subtracting the dissolved metal concentration from the corresponding total metal

concentration if the total metal is reported as detected; otherwise, that data point is omitted from further calculations. The reporting limits for non-detectable dissolved metals are low and consistent within the dataset; therefore, non-detectable dissolved metal results are assigned the reporting limit value for TSS loading rate calculations. Organic compounds (non-halogenated VOCs, PAHs and EPH) are assumed to be predominantly associated with TSS because they are generally hydrophobic and are likely to adhere to sediment particles. Therefore, the measured concentration is used for loading rate calculations and non-detectable results are set to zero. For each sample, the portion of the total metal or organic parameter concentration attributable to TSS is divided by the TSS concentration to calculate a parameter specific TSS loading rate. The parameter specific loading rates for each sample and the summary statistics are presented in Appendix 4.3-3.

The median and 90th percentile statistics for the TSS loading rates (expected and extreme case, respectively) are used to derive parameter specific loadings from TSS. The concentrations of parameters associated with TSS are calculated by multiplying the modelled TSS concentration with the parameter specific TSS loading rate. This calculation is conducted for the two source term scenarios (expected case and extreme case) modelled for each water type. The results of this calculation are combined with the background water quality to yield the source terms for non-contact and non-contaminated contact water. The source term concentration of each total metal is calculated by summing the TSS component concentration with the corresponding background dissolved metal concentration derived in Section 4.3.2.2. For organic parameters the source term concentration is set equal to the concentration calculated from the TSS loading rate.

4.3.2.4 EPH and TSS

The expected case and extreme case EPH and TSS source terms for non-contaminated contact water and non-contact water are derived from background water quality as described in Section 4.3.2.2 (TSS) and Section 4.3.2.3 (EPH).

The OWTS influent and effluent source terms for EPH and TSS are set equal to the OWTS specifications and objectives outlined in the BATA (MDR, 2026b; Appendix 4.2-1). The OWTS design specification indicates upper limits for influent concentrations of 200 mg/L EPH and 200 mg/L TSS. The discharge objectives for effluent are specified as 15 mg/L for EPH and 25 mg/L for TSS. These values are used as the source terms for OWTS influent and effluent. The same value is applied to both source term scenarios.

4.3.2.5 Source Terms

The median and 90th percentile statistics from background water quality (Section 4.3.2.2) parameter loadings from TSS (Section 4.3.2.3) are combined to form the expected and

extreme case water quality source terms for non-contaminated contact water and non-contact water (Appendix 4.3-4). There are no activities (*i.e.,* civil works) during operations that are expected to produce TSS within non-contaminated areas of the Project site, and stormwater will flow on impermeable surfacing or compacted gravel in these areas. The non-contact catchments are predominantly within vegetated areas, and non-contact water is typically clear flowing during storm events. Although the catchment characteristics differ, the same clear flowing water quality is expected from the non-contact and non-contaminated catchments. Therefore, the same source terms are applied to non-contaminated contact water and non-contact water.

The OWTS influent and effluent source terms are prepared by combining background water quality (Section 4.3.2.2) with the TSS and EPH concentrations (Section 4.3.2.4) and applying the TSS loadings (Section 4.3.2.3) based on the modelled TSS concentration. The median and 90th percentile statistics from the background and TSS loading datasets are used to model the expected and extreme case source term scenarios for most parameters. The 10th percentile values for dissolved oxygen, pH, alkalinity and TDS concentrations are used to represent the extreme scenario for these parameters. The TSS and EPH source terms are conservatively set at the same value for the expected and extreme cases. The source terms for OWTS influent and effluent are tabulated in Appendix 4.3-4.

4.3.3 Effluent Model Results

The modelled flows and water quality at OUT-10 are summarized in this section, as well as the quality of non-contaminated contact water and non-contact water. Discharges from OUT-01, OUT-02, OUT-04, OUT-06, OUT-11 and OUT-13 are stormwater runoff only which is represented by the non-contaminated contact water and non-contact water source term, therefore flows for these outfalls are not included in the effluent model. Untreated contaminated contact water (*i.e.,* OWTS influent) is evaluated against threshold values to conduct a supplementary assessment for POPCs. Predicted water quality discharged at outfalls is screened against federal and provincial WQGs for the protection of MWAL, as well as the no observable effects concentration (NOEC) for EPH that is defined in Section 5.4.5.2. The screening results are presented in summary tables at the end of each sub-section.

4.3.3.1 OUT-10 Flows

The modelled flows for the OUT-10 catchment are presented for each water source that will discharge to Howe Sound through this outfall. Treated contact water from the OWTS is only discharged via OUT-10. The OWTS is expected to be operated primarily during storm events when elevated stormwater flows of contaminated contact water are expected.

However, the OWTS will also be occasionally operated during dry conditions. For example, it may be necessary to empty the Oily Water Storage Tank following, or prior to a storm event, to ensure there is sufficient storage capacity within the tank.

The influence of water management in the OUT-10 catchment is accounted for in the effluent model (Section 4.3.1). Specifically, flows to OUT-10 are modelled for the OWTS effluent, the Diversion Box and the Non-Contaminated Contact Water sub-catchments. To account for the variation in water quality between dry and storm condition discharges at OUT-10, two flow conditions are considered for OUT-10, specifically, a dry condition when the OWTS is the only discharge source, and a storm event when stormwater runoff from non-contaminated and potentially contaminated areas are the dominant source of effluent at OUT-10. During dry conditions, operation of the OWTS the treated effluent is the only source of discharge at OUT-10, therefore a water balance is not established for the dry condition model scenario.

As discussed in Section 4.3.1, the effluent model water balance uses the return statistics for a 1:2-year, 24-hour rain-on-snow storm event (157 mm) to calculate flows to OUT-10 for the storm event scenario. Rainfall intensity over the 24 hour period is modelled using the SCS Type 1A distribution (Figure 4-14).

The modelled water balance for OUT-10 is conducted at an hourly time-step as shown in Figure 4-15. The Oily Water Storage Tank is assumed to be empty at the start of the storm, therefore OWTS is assumed to begin operating one hour after rainfall begins to allow sufficient water to accumulate for treatment. The OWTS treated effluent is modelled to discharge treated effluent to OUT-10 at the 30 m^3/h (8.3 L/s) maximum treatment rate. Potentially contaminated contact water intercepted at the Diversion Box is assumed to be contaminated and is directed to the First Flush Sump until the first flush rainfall amount (25 mm) is modelled to be reached, approximately five hours after rainfall begins. The model assumes that all the first flush water stored in the First Flush Sump is directed to the Oily Water Storage Tank at 30 m^3/h (8.3 L/s) rather than being held back for later treatment. After first flush is completed the flows to the Diversion Box are modelled to be non-contaminated and are added to the non-contaminated contact water discharge flows at OUT-10, with discharge rates of 22.5 to 112 L/s. Stormwater flows from non-contaminated areas range from 33.9 to 169 L/s and are always directed to OUT-10. The total rate of discharge from OUT-10 ranges from 33.9 to 290 L/s during the modelled storm event. The volume of OWTS treated effluent ranges from 2.9 to 17.7% of the total discharge flows, on an hourly basis.

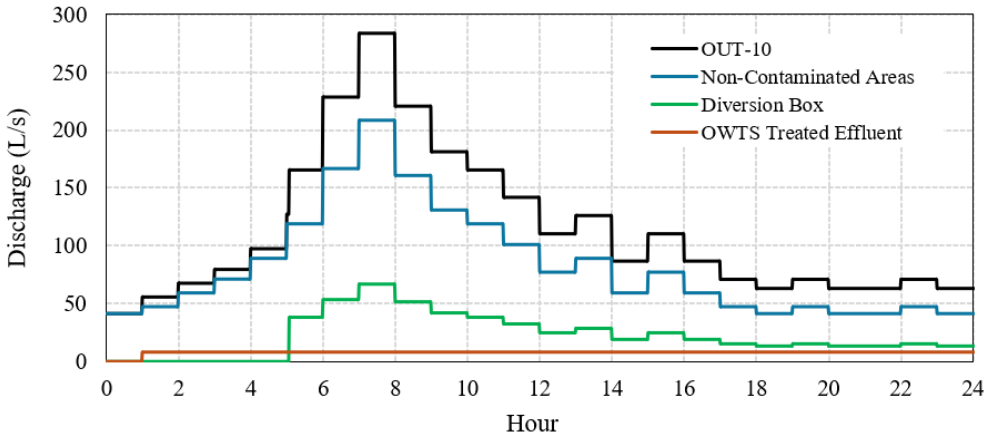


Figure 4-15: Hourly Breakdown of the OUT-10 Water Balance for the Modelled Storm Event.

4.3.3.2 OWTS Influent

The OWTS influent is contaminated or potentially contaminated contact water that is directed to the Oily Water Storage Tank for storage and subsequent treatment. The predicted OWTS influent quality is screened for POPCs to supplement the POPC assessment in the BATA (MDR, 2026b; Appendix 4.2-1). A POPC is defined as any parameter predicted to be greater than 80% of a relevant threshold in untreated effluent (ENV, 2024).

The TSS and EPH parameters identified as POCs in the BATA (MDR, 2026b; Appendix 4.2-1) and are therefore selected for screening. Parameters with a federal or provincial WQG for the protection of MWAL are also selected for screening. For all parameters with WQGs, the guideline values are selected as threshold values. The EPH threshold (2.12 mg/L) is set equal to the no observable effects concentration (NOEC) defined in Section 5.4.5.2 to assess environmental effects associated with EPH.

The OWTS influent expected case and extreme case source terms are screened against 80% of the lowest applicable federal and provincial WQG for the protection of MWAL, and 80% of the NOEC for EPH.

The screening results are presented in Table 4-12. For the expected case and extreme case source terms, the screening results identify EPH, pH, TSS, total cadmium (T-Cd), total copper (T-Cu), total lead (T-Pb), total manganese (T-Mn), total mercury (T-Hg), total vanadium (T-V), total zinc (T-Zn), and benzo(a)pyrene as POPCs. The metal and benzo(a)pyrene parameters are modelled to be associated with TSS and exceed the screening threshold due to elevated TSS concentration (200 mg/L) assigned to untreated contaminated contact water (Section 4.3.2.4). The POPCs carried forward for a POC assessment in Section 5.2. Results for all modelled parameters are tabulated in Appendix 4.3-4.

Table 4-12:
Summary of Predicted OWTS Influent Quality Screened for Parameters of Potential Concern (POPCs)

Parameters	Units	B.C. WQG		CWQG		Untreated Effluent (OWTS Influent First Flush)	
		Long-Term	Short-Term	Long-Term	Short-Term	Expected Case	Extreme Case
General Parameters							
Ammonia, Total (as N) [1,2]	mg/L	2	13	-	-	0.0062	0.050
Fluoride	mg/L	-	1.5	-	-	0.020	0.10
Nitrate as N	mg/L	3.7	-	45	339	0.077	0.22
pH	s.u.	7.0 - 8.7	-	-	-	**6.6**	**6.1**
Total Suspended Solids (TSS) [3]	mg/L	+5	+25	+5	+25	**200**	**200**
Total Metals							
Antimony, Total (T-Sb)	mg/L	0.27	-	-	-	0.00023	0.00053
Arsenic, Total (T-As)	mg/L	0.0125	-	0.0125	-	0.0018	0.0034
Beryllium, Total (T-Be)	mg/L	0.1	-	-	-	0.00017	0.00023
Boron, Total (T-B)	mg/L	1.2	-	-	-	0.0052	0.031
Cadmium, Total (T-Cd)	mg/L	0.00012	-	0.00012	-	**0.000097**	**0.00016**
Chromium, Total (T-Cr) [4]	mg/L	0.056	-	0.056	-	0.0039	0.0072
Chromium, Total Hexavalent (Cr[VI])	mg/L	0.0015	-	0.0015	-	0.00000	0.0001
Copper, Total (T-Cu)	mg/L	0.002	0.003	-	-	**0.012**	**0.020**
Lead, Total (T-Pb)	mg/L	0.002	0.14	-	-	**0.0075**	**0.0130**
Manganese, Total (T-Mn)	mg/L	0.1	-	-	-	**0.38**	**0.54**
Mercury, Total (T-Hg) [5]	mg/L	0.000016	-	0.000016	-	**0.000027**	**0.000047**
Nickel, Total (T-Ni)	mg/L	0.0083	-	-	-	0.0026	0.0039
Selenium, Total (T-Se)	mg/L	0.002	-	-	-	0.000082	0.00023
Silver, Total (T-Ag)	mg/L	0.0005	0.0037	-	0.0075	0.000015	0.000032
Vanadium, Total (T-V)	mg/L	0.005	-	0.005	-	**0.016**	**0.027**
Zinc, Total (T-Zn)	mg/L	0.01	0.055	-	-	**0.051**	**0.088**
Dissolved Metals							
Copper, Dissolved (D-Cu)	mg/L	-	-	-	-	0.00068	0.0011
Lead, Dissolved (D-Pb)	mg/L	-	-	-	-	0.000050	0.0001
Manganese, Dissolved (D-Mn)	mg/L	-	-	-	-	0.00083	0.0018
Mercury, Dissolved (D-Hg)	mg/L	-	-	-	-	0.0000026	0.000005
Vanadium, Dissolved (D-V)	mg/L	-	-	-	-	0.00050	0.0005
Zinc, Dissolved (D-Zn)	mg/L	-	-	-	-	0.0011	0.0040
Volatile Organic Compounds, Non-Halgentated							
Benzene	mg/L	0.11	-	0.59	6	0	0
Ethylbenzene	mg/L	0.25	-	0.07	1	0	0
Methyl tert-butyl ether (MTBE)	mg/L	-	0.44	5	-	0	0
Toluene	mg/L	-	-	0.03	0.3	0	0
Xylenes, Total	mg/L	-	-	0.07	1	0	0
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	0.006	-	-	-	0	0.000021
Benzo(a)pyrene	mg/L	0.00001	-	-	-	**0.000023**	**0.000057**
Chrysene	mg/L	0.0001	-	-	-	0.000023	0.000063
Fluorene	mg/L	0.012	-	-	-	0	0.0000056
1-Methylnaphthalene	mg/L	0.001	-	-	-	0	0.0000052
2-Methylnaphthalene	mg/L	0.001	-	-	-	0	0.000028
Naphthalene	mg/L	0.001	-	0.0014	-	0	0
Petroleum Hydrocarbons							
EPH(C10-C32)	mg/L	-	-	-	-	**200**	**200**

B.C. WQG = British Columbia working and approved water quality guidelines for the protection of marine aquatic life.
CWQG = Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) water quality guidelines for the protection of marine aquatic life. If a WQG for a parameter is provided by each agency, the lowest value is shown in the table.
Red values are greater than 80% of one or more of the B.C., CCME or ECCC WQGs, or the NOEC (2.12 mg/L) for EPH defined in Section 5.4.5.2.
are identified as a POC in the BATA (MDR, 2026b; Appendix 4.2-1). EPH and TSS are identified at POCs in the BATA.
[1] The approved total ammonia nitrogen B.C. WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in B.C. WQG guidance document. [2] The total ammonia nitrogen B.C. WQG was calculated based on median values for salinity (8.41 ppt), pH (8.05) and temperature (9.46 °C) for CPA stations collected at 0.5 m below surface.
[3] The WQGs for TSS are evaluated assuming the background TSS concentration = 3.0 mg/L (median value of CPA stations 0.5 m below surface).
[4] The B.C. WQG and CWQG for trivalent chromium [Cr(III)] is applied to total chromium results.
[5] The B.C. WQG for total mercury (T-Hg) is dependent on the methylmercury concentration and is derived assuming methylmercury is 0.64% of the total mercury concentration (median value from the non-contact diversion ditch dataset).

4.3.3.3 Storm Event Discharges

During storm events, treated OWTS effluent and non-contaminated contact water are both modelled to be discharged at OUT-10, therefore the modelled effluent is a blend of both water types. Non-contaminated contact water will be discharged through OUT-04, through the non-contact water outfalls OUT-01, OUT-02, OUT-06, OUT-11 and OUT-13, as well as the East Creek OUT-12 outfall (Figure 4-3, Section 4.1.3). The parameter concentrations predicted in discharge from OUT-10 are summarized in Table 4-13 and the predicted non-contaminated and non-contact water quality is shown Table 4-14. The results for all modelled parameters are tabulated in Appendix 4.3-4 (non-contaminated water and non-contact water) and Appendix 4.3-5 (OUT-10).

Results are presented for the expected case and extreme case source terms to illustrate the variation in soluble and particulate-bound parameters that are modelled for operations contact water. The parameter values for non-contaminated contact water and non-contact water are modelled to be constant concentrations. In contrast, the water quality at OUT-10 is influenced by the operation of the OWTS, and by the assumed variation rainfall intensity that alters the proportion of non-contaminated contact water in the OWTS effluent at OUT-10. This is illustrated in the model output for EPH plotted in Figure 4-16 that shows an increase in the EPH concentration at OUT-10 when the OWTS is turned on in the model. The influence of the variable rainfall intensity on the non-contaminated contact water flows is reflected in the fluctuating EPH concentrations during the modelled storm event.

The expected and extreme case water quality predictions at OUT-10, and for non-contaminated contact water and non-contact water, meet the federal and provincial WQGs for the protection of MWAL, except pH which exceeds the long-term WQ for the expected case and extreme case (Table 4-13 and Table 4-14). The EPH concentration is modelled to exceed the NOEC value (2.1.2 mg/L) defined in Section 5.4.5.2 during the second and third hours of the modelled storm event. The exceedance of the pH WQG at OUT-10 and for non-contaminated contact water and non-contact water is due to the background condition for non-contact diversion ditch water quality (Section 3.6.3.1) used to model stormwater runoff water quality (Section 4.3.2.2).

The water quality discharged from OUT-01, OUT-02, OUT-04, OUT-06, OUT-11 or OUT-13 is modelled to be similar to non-contact water quality presented in Section 3.6.3.2 (Table 3-23). As outlined in Section 3.6.3.2 (Table 3-19), East Creek discharges through OUT-12 and during operations, the water quality in East Creek is expected to remain within historical ranges.

Table 4-13:
Summary of OUT-10 Predicted Effluent Quality for the Modelled Storm Event

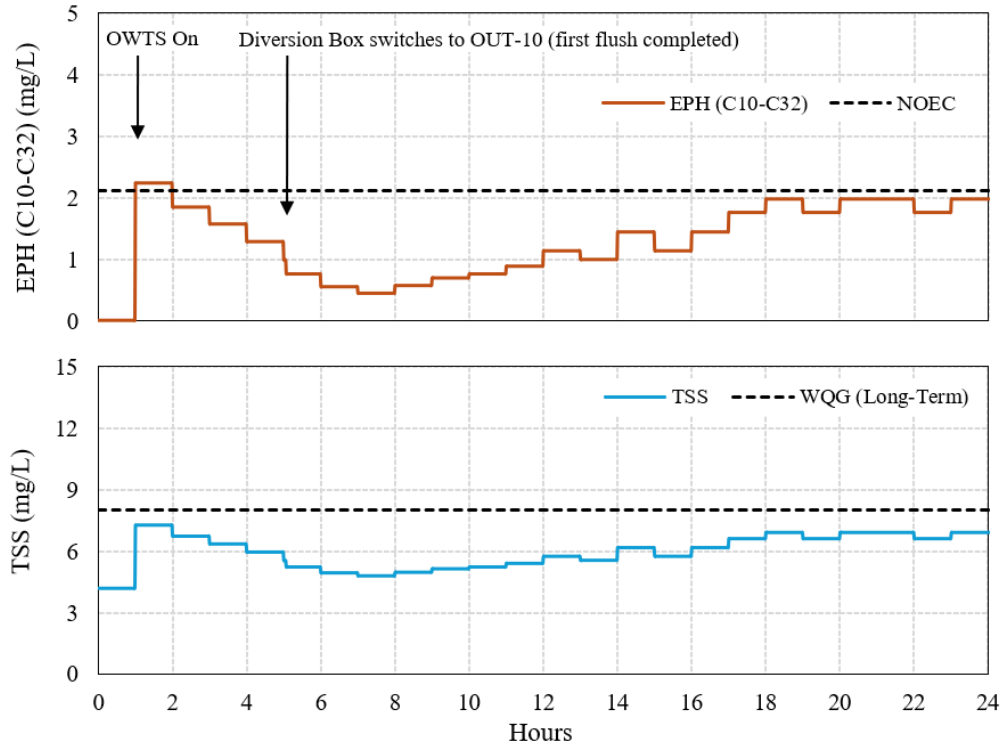
Parameters	Units	B.C. WQG		CWQG		OUT-10 (Expected Case)		OUT-10 (Extreme Case)	
		Long-Term	Short-Term	Long-Term	Short-Term	Min	Max	Min	Max
General Parameters									
Ammonia, Total (as N) [1,2]	mg/L	2	13	-	-	0.0062	0.0062	0.05	0.05
Fluoride	mg/L	-	1.5	-	-	0.020	0.020	0.10	0.10
Nitrate as N	mg/L	3.7	-	45	339	0.077	0.077	0.22	0.22
pH	s.u.	7.0 - 8.7	-	-	-	**6.6**	**6.6**	**6.1**	**6.1**
Total Suspended Solids (TSS) [3]	mg/L	+5	+25	+5	+25	3.0	6.3	4.2	7.3
Total Metals									
Antimony, Total (T-Sb)	mg/L	0.27	-	-	-	0.00010	0.00010	0.00021	0.00021
Arsenic, Total (T-As)	mg/L	0.0125	-	0.0125	-	0.00013	0.00015	0.00025	0.00030
Beryllium, Total (T-Be)	mg/L	1.0E-01	-	-	-	2.6E-06	5.4E-06	4.8E-06	8.3E-06
Boron, Total (T-B)	mg/L	1.2	-	-	-	0.0039	0.0039	0.012	0.012
Cadmium, Total (T-Cd)	mg/L	1.2E-04	-	1.2E-04	-	6.4E-06	7.9E-06	1.1E-05	1.4E-05
Chromium, Total (T-Cr) [4]	mg/L	0.056	-	0.056	-	0.00026	0.00032	0.00049	0.0006
Chromium, Total Hexavalent (Cr[VI])	mg/L	1.5E-03	-	1.5E-03	-	0	0	2.1E-06	3.7E-06
Copper, Total (T-Cu)	mg/L	0.002	0.003	-	-	0.00085	0.0010	0.0015	0.0018
Lead, Total (T-Pb)	mg/L	0.002	0.14	-	-	0.00016	0.00028	0.00038	0.00059
Manganese, Total (T-Mn)	mg/L	0.1	-	-	-	0.0065	0.013	0.013	0.021
Mercury, Total (T-Hg) [5]	mg/L	1.6E-05	-	1.6E-05	-	3.0E-06	3.4E-06	5.6E-06	6.3E-06
Nickel, Total (T-Ni)	mg/L	0.0083	-	-	-	0.00022	0.00026	0.0003	0.00036
Selenium, Total (T-Se)	mg/L	2.0E-03	-	-	-	5.0E-05	5.1E-05	5.7E-05	6.0E-05
Silver, Total (T-Ag)	mg/L	5.0E-04	3.7E-03	-	7.5E-03	2.2E-07	4.6E-07	6.6E-07	1.2E-06
Vanadium, Total (T-V)	mg/L	0.005	-	0.005	-	0.00073	0.0010	0.0011	0.0015
Zinc, Total (T-Zn)	mg/L	0.01	0.055	-	-	0.0019	0.0027	0.0058	0.0070
Dissolved Metals									
Copper, Dissolved (D-Cu)	mg/L	-	-	-	-	0.00068	0.00068	0.0011	0.0011
Lead, Dissolved (D-Pb)	mg/L	-	-	-	-	5.0E-05	5.0E-05	1.0E-04	1.0E-04
Manganese, Dissolved (D-Mn)	mg/L	-	-	-	-	0.00083	0.00083	0.0018	0.0018
Mercury, Dissolved (D-Hg)	mg/L	-	-	-	-	2.6E-06	2.6E-06	4.8E-06	4.8E-06
Vanadium, Dissolved (D-V)	mg/L	-	-	-	-	0.00050	0.00050	0.00054	0.00054
Zinc, Dissolved (D-Zn)	mg/L	-	-	-	-	0.0011	0.0011	0.0040	0.0040
Volatile Organic Compounds, Non-Halogenated									
Benzene	mg/L	0.11	-	0.59	6	0	0	0	0
Ethylbenzene	mg/L	0.25	-	0.07	1	0	0	0	0
Methyl tert-butyl ether (MTBE)	mg/L	-	0.44	5	-	0	0	0	0
Toluene	mg/L	-	-	0.03	0.3	0	0	0	0
Xylenes, Total	mg/L	-	-	0.07	1	0	0	0	0
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	mg/L	6.0E-03	-	-	-	0	0	4.3E-07	7.5E-07
Benzo(a)pyrene	mg/L	1.0E-05	-	-	-	3.4E-07	7.1E-07	1.2E-06	2.1E-06
Chrysene	mg/L	1.0E-04	-	-	-	3.4E-07	7.2E-07	1.3E-06	2.3E-06
Fluorene	mg/L	1.2E-02	-	-	-	0	0	1.2E-07	2.1E-07
1-Methylnaphthalene	mg/L	1.0E-03	-	-	-	0	0	1.1E-07	1.9E-07
2-Methylnaphthalene	mg/L	1.0E-03	-	-	-	0	0	6.0E-07	1.0E-06
Naphthalene	mg/L	0.001	-	0.0014	-	0	0	0	0
Petroleum Hydrocarbons									
EPH(C10-C32)	mg/L	-	-	-	-	0	2.2	0	2.2

B.C. WQG = British Columbia working and approved water quality guidelines for the protection of marine aquatic life.
CWQG = Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) water quality guidelines for the protection of marine aquatic life. If a WQG for a parameter is provided by each agency, the lowest value is shown in the table.
Bold values exceed one or more of the corresponding B.C., ECCC or CCME long-term WQGs.
Underlined values exceed one or more of the corresponding B.C., ECCC or CCME short-term WQGs.
Grey highlighted values exceed the NOEC (2.12 mg/L) for EPH defined in Section 5.4.5.2.
[1] The approved total ammonia nitrogen B.C. WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in B.C. WQG guidance document. [2] The total ammonia nitrogen B.C. WQG was calculated based on median values for salinity (8.41 ppt), pH (8.05) and temperature (9.46 °C) for CPA stations collected at 0.5 m below surface.
[3] The WQGs for TSS are evaluated assuming the background TSS concentration = 3.0 mg/L (median value of CPA stations 0.5 m below surface).
[4] The B.C. WQG and CWQG for trivalent chromium [Cr(III)] is applied to total chromium results.
[5] The B.C. WQG for total mercury (T-Hg) is dependent on the methylmercury concentration and is derived assuming methylmercury is 0.64% of the total mercury concentration (median value from the non-contact diversion ditch dataset).

Table 4-14:
Summary of Non-Contaminated Contact Water and Non-Contact Water Predicted Water Quality for the Modelled Storm Event

Parameters	Units	B.C. WQG		CWQG		Non-Contaminated Contact Water and Non-Contact Water	
		Long-Term	Short-Term	Long-Term	Short-Term	Expected Case	Extreme Case
General Parameters							
Ammonia, Total (as N) [1,2]	mg/L	2	13	-	-	0.006	0.050
Fluoride	mg/L	-	1.5	-	-	0.020	0.10
Nitrate as N	mg/L	3.7	-	45	339	0.077	0.22
pH	s.u.	7.0 - 8.7	-	-	-	**6.6**	**6.1**
Total Suspended Solids (TSS) [3]	mg/L	+5	+25	+5	+25	3.0	4.2
Total Metals							
Antimony, Total (T-Sb)	mg/L	0.27	-	-	-	0.0001	0.00021
Arsenic, Total (T-As)	mg/L	0.0125	-	0.0125	-	0.00013	0.00025
Beryllium, Total (T-Be)	mg/L	0.1	-	-	-	0.000003	0.000005
Boron, Total (T-B)	mg/L	1.2	-	-	-	0.0039	0.012
Cadmium, Total (T-Cd)	mg/L	0.00012	-	0.00012	-	0.0000064	0.000011
Chromium, Total (T-Cr) [4]	mg/L	0.056	-	0.056	-	0.00026	0.00049
Chromium, Total Hexavalent (Cr[VI])	mg/L	0.0015	-	0.0015	-	0.00000	0.0000021
Copper, Total (T-Cu)	mg/L	0.002	0.003	-	-	0.00085	0.0015
Lead, Total (T-Pb)	mg/L	0.002	0.14	-	-	0.00016	0.00038
Manganese, Total (T-Mn)	mg/L	0.1	-	-	-	0.0065	0.013
Mercury, Total (T-Hg) [5]	mg/L	0.000016	-	0.000016	-	0.000003	0.0000056
Nickel, Total (T-Ni)	mg/L	0.0083	-	-	-	0.00022	0.0003
Selenium, Total (T-Se)	mg/L	0.002	-	-	-	0.00005	0.000057
Silver, Total (T-Ag)	mg/L	0.0005	0.0037	-	0.0075	0.000000	0.00000066
Vanadium, Total (T-V)	mg/L	0.005	-	0.005	-	0.00073	0.0011
Zinc, Total (T-Zn)	mg/L	0.01	0.055	-	-	0.0019	0.006
Dissolved Metals							
Copper, Dissolved (D-Cu)	mg/L	-	-	-	-	0.00068	0.0011
Lead, Dissolved (D-Pb)	mg/L	-	-	-	-	0.000050	0.0001
Manganese, Dissolved (D-Mn)	mg/L	-	-	-	-	0.00083	0.0018
Mercury, Dissolved (D-Hg)	mg/L	-	-	-	-	0.0000026	0.0000048
Vanadium, Dissolved (D-V)	mg/L	-	-	-	-	0.0005	0.00054
Zinc, Dissolved (D-Zn)	mg/L	-	-	-	-	0.0011	0.0040
Volatile Organic Compounds, Non-Halogenated							
Benzene	mg/L	0.11	-	0.59	6	0	0
Ethylbenzene	mg/L	0.25	-	0.07	1	0	0
Methyl tert-butyl ether (MTBE)	mg/L	-	0.44	5	-	0	0
Toluene	mg/L	-	-	0.03	0.3	0	0
Xylenes, Total	mg/L	-	-	0.07	1	0	0
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	0.006	-	-	-	0	0.00000043
Benzo(a)pyrene	mg/L	0.00001	-	-	-	0.00000034	0.0000012
Chrysene	mg/L	0.0001	-	-	-	0.00000034	0.0000013
Fluorene	mg/L	0.012	-	-	-	0	0.00000012
1-Methylnaphthalene	mg/L	0.001	-	-	-	0	0.00000011
2-Methylnaphthalene	mg/L	0.001	-	-	-	0	0.0000006
Naphthalene	mg/L	0.001	-	0.0014	-	0	0
Petroleum Hydrocarbons							
EPH(C10-C32)	mg/L	-	-	-	-	0	0

B.C. WQG = British Columbia working and approved water quality guidelines for the protection of marine aquatic life.
CWQG = Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) water quality guidelines for the protection of marine aquatic life. If a WQG for a parameter is provided by each agency, the lowest value is shown in the table.
Bold values exceed one or more of the corresponding B.C., ECCC or CCME long-term WQGs.
Underlined values exceed one or more of the corresponding B.C., ECCC or CCME short-term WQGs.
Grey highlighted values exceed the NOEC (2.12 mg/L) for EPH defined in Section 5.4.5.2.
[1] The approved total ammonia nitrogen B.C. WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in B.C. WQG guidance document. [2] The total ammonia nitrogen B.C. WQG was calculated based on median values for salinity (8.41 ppt), pH (8.05) and temperature (9.46 °C) for CPA stations collected at 0.5 m below surface.
[3] The WQGs for TSS are evaluated assuming the background TSS concentration = 3.0 mg/L (median value of CPA stations 0.5 m below surface).
[4] The B.C. WQG and CWQG for trivalent chromium [Cr(III)] is applied to total chromium results.
[5] The B.C. WQG for total mercury (T-Hg) is dependent on the methylmercury concentration and is derived assuming methylmercury is 0.64% of the total mercury concentration (median value from the non-contact diversion ditch dataset).



Notes: The NOEC for EPH is defined in Section 5.4.5.2. The long-term WQG for TSS assumes background TSS = 3.0 mg/L (the median value of CPA stations 0.5 m below surface).

Figure 4-16: Predicted Concentration Profile of EPH (C10-C32) and TSS at OUT-10 for the Storm Event Model Condition.

4.3.3.4 Dry Condition Discharge

The OWTS may occasionally be operated during dry conditions to empty the Oily Water Storage Tank to provide storage capacity for a forecast storm event or for routine maintenance. A single 12-hour batch cycle operation is anticipated for these purposes. Under these circumstances, OUT-10 discharge will consist entirely of treated OWTS effluent; therefore, OUT-10 water quality is set equal to OWTS effluent quality source terms. Predicted effluent quality at OUT-10 during dry conditions is summarized in Table 4-15. Outfalls OUT-01, OUT-02, OUT-04, OUT-06, OUT-11 or OUT-13 are not expected to discharge during dry conditions. The OWTS effluent quality for all modelled parameters is tabulated in Appendix 4.3-4.

The predicted OUT-10 effluent quality for the dry condition meets the federal and provincial WQGs except pH and T-Cu in the expected case, and pH, T-Cu and T-Zn in the extreme case. The T-Cu and T-Zn exceedances are due to the modelled loading of particulate-bound metals associated with a TSS concentration of 25 mg/L. The exceedance of the pH WQG is due the background condition of diversion ditch water quality used to model dissolved parameters in stormwater runoff (Section 3.6.3.1 and Section 4.3.2.2).

Table 4-15:
Summary of OUT-10 Predicted Effluent Quality for Dry Condition Discharge

Parameters	Units	B.C. WQG		CWQG		OUT-10	
		Long-Term	Short-Term	Long-Term	Short-Term	Expected Case	Extreme Case
General Parameters							
Ammonia, Total (as N)	mg/L	2	13	-	-	0.0062	0.05
Fluoride	mg/L	-	1.5	-	-	0.02	0.1
Nitrate as N	mg/L	3.7	-	45	339	0.077	0.22
pH	s.u.	7.0 - 8.7	-	-	-	**6.6**	**6.1**
Total Suspended Solids (TSS)	mg/L	+5	+25	+5	+25	25	25
Total Metals							
Antimony, Total (T-Sb)	mg/L	0.27	-	-	-	0.00012	0.00024
Arsenic, Total (T-As)	mg/L	0.0125	-	0.0125	-	0.00031	0.00058
Beryllium, Total (T-Be)	mg/L	0.1	-	-	-	0.000022	0.000028
Boron, Total (T-B)	mg/L	1.2	-	-	-	0.0041	0.014
Cadmium, Total (T-Cd)	mg/L	0.00012	-	0.00012	-	0.000016	0.000027
Chromium, Total (T-Cr)	mg/L	0.056	-	0.056	-	0.00067	0.0012
Chromium, Total Hexavalent (Cr[VI])	mg/L	0.0015	-	0.0015	-	0	0.000013
Copper, Total (T-Cu)	mg/L	0.002	0.003	-	-	**0.0021**	**<u>0.0034</u>**
Lead, Total (T-Pb)	mg/L	0.002	0.14	-	-	0.0010	0.0018
Manganese, Total (T-Mn)	mg/L	0.1	-	-	-	0.048	0.069
Mercury, Total (T-Hg)	mg/L	0.000016	-	0.000016	-	0.0000057	0.000010
Nickel, Total (T-Ni)	mg/L	0.0083	-	-	-	0.00048	0.00069
Selenium, Total (T-Se)	mg/L	0.002	-	-	-	0.000054	0.000075
Silver, Total (T-Ag)	mg/L	0.0005	0.0037	-	0.0075	0.0000018	0.0000039
Vanadium, Total (T-V)	mg/L	0.005	-	0.005	-	0.0024	0.0038
Zinc, Total (T-Zn)	mg/L	0.01	0.055	-	-	0.0074	**0.014**
Dissolved Metals							
Copper, Dissolved (D-Cu)	mg/L	-	-	-	-	0.00068	0.0011
Lead, Dissolved (D-Pb)	mg/L	-	-	-	-	0.000050	0.0001
Manganese, Dissolved (D-Mn)	mg/L	-	-	-	-	0.00083	0.0018
Mercury, Dissolved (D-Hg)	mg/L	-	-	-	-	0.0000026	0.0000048
Vanadium, Dissolved (D-V)	mg/L	-	-	-	-	0.0005	0.00054
Zinc, Dissolved (D-Zn)	mg/L	-	-	-	-	0.0011	0.0040
Volatile Organic Compounds, Non-Halogenated							
Benzene	mg/L	0.11	-	0.59	6	0	0
Ethylbenzene	mg/L	0.25	-	0.07	1	0	0
Methyl tert-butyl ether (MTBE)	mg/L	-	0.44	5	-	0	0
Toluene	mg/L	-	-	0.03	0.3	0	0
Xylenes, Total	mg/L	-	-	0.07	1	0	0
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	0.006	-	-	-	0	0.0000026
Benzo(a)pyrene	mg/L	0.00001	-	-	-	0.0000028	0.0000071
Chrysene	mg/L	0.0001	-	-	-	0.0000029	0.0000079
Fluorene	mg/L	0.012	-	-	-	0	0.00000070
1-Methylnaphthalene	mg/L	0.001	-	-	-	0	0.00000065
2-Methylnaphthalene	mg/L	0.001	-	-	-	0	0.0000035
Naphthalene	mg/L	0.001	-	0.0014	-	0	0
Petroleum Hydrocarbons							
EPH(C10-C32)	mg/L	-	-	-	-	15	15

B.C. WQG = British Columbia working and approved water quality guidelines for the protection of marine aquatic life.
CWQG = Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) water quality guidelines for the protection of marine aquatic life. If a WQG for a parameter is provided by each agency, the lowest value is shown in the table.
Bold values exceed one or more of the corresponding B.C., ECCC or CCME long-term WQGs.
<u>Underlined</u> values exceed one or more of the corresponding B.C., ECCC or CCME short-term WQGs.
Grey highlighted values exceed the NOEC (2.12 mg/L) for EPH defined in Section 5.4.5.2.
[1] The approved total ammonia nitrogen B.C. WQG is salinity, pH and temperature dependent; see Tables 26E and 26F in B.C. WQG guidance document. [2] The total ammonia nitrogen B.C. WQG was calculated based on median values for salinity (8.41 ppt), pH (8.05) and temperature (9.46 °C) for CPA stations collected at 0.5 m below surface.
[3] The WQGs for TSS are evaluated assuming the background TSS concentration = 3.0 mg/L (median value of CPA stations 0.5 m below surface).
[4] The B.C. WQG and CWQG for trivalent chromium [Cr(III)] is applied to total chromium results.
[5] The B.C. WQG for total mercury (T-Hg) is dependent on the methylmercury concentration and is derived assuming methylmercury is 0.64% of the total mercury concentration (median value from the non-contact diversion ditch dataset).

4.3.3.5 Conclusions

The POPC screening conducted on OWTS influent identified EPH, pH, TSS, T-Cd, T-Cu, T-Pb, T-Mn, T-Hg, T-V, T-Zn, and benzo(a)pyrene as POPCs. These parameters are carried forward to the POC assessment conducted in Section 5.2.

The lower WQG for pH is exceeded in the modelled expected and extreme conditions for discharges from OUT-01, OUT-02, OUT-04, OUT-06, OUT-10, OUT-11 and OUT-13. This is consistent with the low pH values observed in the monitoring data for non-contact water and creek water quality (Section 3.6.3.1, Table 3-15) at the Project site. Although low pH is a natural condition in freshwater at the site, it is flagged as a POPC and is therefore carried forward to the POC assessment conducted in Section 5.2.

East Creek discharges from OUT-12; the water quality at OUT-12 is expected to be similar to background water quality in East Creek (Table 3-22). Therefore, OUT-12 water quality is not included in the effluent model and is not evaluated for potential environmental effects.

Effluent quality from OUT-10 during dry conditions is predicted to be entirely OWTS effluent and to only occur when the OWTS is occasionally operated. Under these circumstances, the OUT-10 effluent is predicted to meet WQGs or NOEC except EPH, TSS, pH, and T-Cu for the expected and extreme case source terms, and T-Zn for the extreme case (Table 4-16). The T-Cu and T-Zn exceedances are due to the modelled loading of particulate-bound metals associated with a TSS concentration of 25 mg/L. In contrast, during the modelled storm event, OUT-10 effluent is a mixture of OWTS effluent and non-contaminated contact water, and maximum predicted parameter concentrations meet WQGs or NOEC except for EPH. Based on these results, the OUT-10 effluent results that exceed a WQG or NOEC for EPH, TSS, T-Cu or T-Zn are carried forward to the mixing model in Section 4.4 to characterize the OUT-10 initial dilution zone (IDZ) in Howe Sound.

Table 4-16:
Summary of OUT-10 Effluent Quality Maximum Predicted Concentrations for Parameters that Exceed a Threshold Value in One or More Model Scenarios

Parameter	Units	B.C. WQG		CWQG		Dry Condition		Storm Event	
		Long-Term	Short-Term	Long-Term	Short-Term	Expected Case	Extreme Case	Expected Case (Max.)	Extreme Case (Max.)
pH [1]	s.u.	7.0 - 8.7	-	-	-	**6.6**	**6.1**	**6.6**	**6.1**
Total Suspended Solids (TSS)	mg/L	+5	+25	+5	+25	**25**	**25**	6.9	7.3
Total Copper (T-Cu)	mg/L	0.002	0.003	-	-	**0.0021**	**<u>0.0034</u>**	0.0011	0.0018
Total Zinc (T-Zn)	mg/L	0.01	0.055	-	-	0.0074	**0.014**	0.0028	0.0070
EPH (C10-C32)	mg/L	-	-	-	-	15	15	2.2	2.2

B.C. WQG = British Columbia water quality guidelines for the protection of marine aquatic life.
CWQG = Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) water quality guidelines for the protection of marine aquatic life. If a WQG for a parameter is provided by each agency, the lowest value is shown in the table.
Bold values exceed one or more of the corresponding B.C., ECCC or CCME long-term WQGs.
<u>Underlined</u> values exceed one or more of the corresponding B.C., ECCC or CCME short-term WQGs.
Grey highlighted values exceed the NOEC (2.12 mg/L) for EPH defined in Section 5.4.5.2.
The TSS WQGs are evaluated assuming the background TSS concentration = 3.0 mg/L (median value of CPA stations 0.5 m below surface).

4.4 Howe Sound Mixing Model

This section presents the development and results of a mixing model to characterize the OUT-10 effluent mixing zone in Howe Sound. Water quality within the mixing zone is modelled for parameters in OUT-10 effluent that are predicted to exceed threshold values listed in Table 4-17 (*i.e.*, EPH, TSS, T-Cu and T-Zn). Previous analysis conducted in support of the construction WDA application indicates effluent from the Project site rapidly mixes and dilutes in Howe Sound surface waters, and forms the basis for modelling the mixing zone for effluent discharges from OUT-10 during operations.

The mixing model is constructed following the guidance outlined in B.C. Technical Guidance 11, Environmental Management Act, Development and Use of Initial Dilution Zones in Effluent Discharge Authorizations (ENV, 2019). The IDZ is the portion of the mixing zone where WQGs may be exceeded due to the influence from effluent quality. Technical Guidance 11 indicates that "at the edge of an IDZ, the effluent should not cause chronic toxicity in the receiving environment". The mixing model results are combined with the environmental effects assessment in Section 5 to establish the distance from OUT-10 to the edge of the IDZ for the modelled effluent flow scenarios.

4.4.1 Mixing Model Overview

The mixing zone model utilized for this assessment is CORMIX (v.11). The CORMIX model is a software system for the analysis, prediction, and design of aqueous toxic or conventional pollutant discharges into diverse water bodies (Doneker and Jirka, 2021), and is recognized and accepted by professionals and regulators as appropriate for characterizing the initial dilution zone (IDZ) of receiving waterbodies. The major emphasis of the system is on the geometry and dilution characteristics of the initial mixing zone, including compliance with regulatory constraints as well as to predict the behavior of the discharge plume at larger distances. CORMIX is selected as the modelling platform based on the recommendations provided in Appendix C of Technical Guidance 11 (ENV, 2019). The modelling is conducted with a steady state model which assumes steady tidal and ambient current velocities, as well as constant and continuous effluent discharge flow rates. The steady state model quantifies an equilibrated effluent plume, whereby the spatial distribution and effluent concentrations do not vary with time.

The influence of the FSTs at the Marine Storage Facility on the mixing of the effluent plume is also taken into consideration. CORMIX allows for two lateral boundary (bank) conditions to characterize the receiving channel: 1) bounded, referring to a channel that is constrained on both sides by a bank such as rivers, streams or other narrow watercourses, or 2) unbounded, referring to water bodies which are, for practical purposes, constrained only on one side such as lakes, wide estuaries, and coastal areas. The FST, located approximately 100 m from the shoreline onto which OUT-10 discharges, is expected to behave as a lateral boundary for the water intermediate to the shoreline and length of the facility. This is illustrated in Figure 4-17. The ambient current is modelled to flow from the northeast to the southwest based on findings by Buckley (1977), which also show that the current direction by depth may be affected by estuarine circulation system pattern of outflowing surface layer compensatory inflow. Additionally, the current direction may also be temporarily reversed due to tidal currents.

Based on the location of OUT-10 relative to the FST, the bounded section is approximately 100 m as shown in Figure 4-17. Once the plume has travelled more than 100 m, it is no longer constrained by the lateral boundary formed by the FST and is thereafter assumed to behave as if under unbounded channel conditions. To represent this specific configuration, OUT-10 discharge is modelled using a bounded condition for the first 100 m from OUT-10 and an unbounded condition beyond that distance. If the ambient current direction reverses due to tidal currents, the lateral boundary (*i.e.*, the bounded channel) becomes approximately 300 m in length.



Figure 4-17: Bounded and Unbounded Mixing Zone Sections for OUT-10 Discharge.

4.4.2 Mixing Model Scenarios

The mixing model evaluates the plume characteristics and effluent concentration in the Howe Sound mixing zone for two scenarios: 1) during a storm event when peak discharge rates are expected to be encountered, and 2) during dry conditions when the only input to OUT-10 discharge is treated effluent from the OWTS. The storm event scenario is based on the peak discharge rate (290 L/s) during a 1:2 year 24-hour storm event from OUT-10 (Section 4.3.3.1), when outflows are dominated by stormwater runoff from non-contaminated areas relative to OWTS discharge. In contrast, the dry condition scenario represents discharge when there is no stormwater runoff and the OWTS is the only source of effluent at OUT-10. This occurs when the OWTS is operated to reduce the volume of water stored in the Oily Water Storage Tank. The mixing model assumes OUT-10 flows during the dry conditions will equal the maximum OWTS treatment flow rate of 8.3 L/s.

In addition to the two effluent flow scenarios, modelling is also undertaken using three wind speeds: low (2 m/s), moderate (5 m/s) and high (10 m/s). Previous analysis and modelling (Lorax, 2024a) demonstrates that wind speed is a sensitive model parameter that significantly influences mixing and plume characteristics. Given the sensitivity of wind speed in the mixing model, the low, moderate and high wind speeds are coupled with the discharge rates from each of the effluent flow scenarios to evaluate and bound the effects of wind on mixing model predictions.

4.4.3 Mixing Model Inputs

CORMIX requires numerous inputs defining the physical and chemical properties of the receiving environment (Howe Sound), the discharge rate, current velocity, effluent water quality, and the geometry of the discharge outlet structure. The list of mixing model inputs and associated values are provided in Table 4-17. The data analysis conducted for parameter estimation, along with a detailed description of each parameter, are documented in Lorax (2026).

The median Howe Sound water quality collected from CPA stations at 0.5 m below surface (Table 3-30) were used as background water quality. The effluent concentrations of TSS, EPH, T-Cu and T-Zn shown in Table 4-16 are used as inputs for the storm event and dry condition effluent quality.

Table 4-17:
Summary of CORMIX Model Inputs

Source	Model Parameter	Value
Howe Sound (Receiving Environment)	Average Depth	45 m
	Pycnocline Depth	10 m
	Water Density Above Pycnocline	1011.4 kg/m^3
	Water Density Below Pycnocline	1023.21 kg/m^3
	Background Salinity	15 PSU (above pycnocline)
		30 PSU (below pycnocline)
	Manning's Coefficient	0.025
	Appearance	Uniform
	Wind Speed	2, 5 or 10 m/s
	Depth at Discharge Location	0 m
	Ambient Current Velocity	1.5 cm/s
	TSS Concentrations	3 mg/L
Effluent and Discharge Channel Parameters	Water Temperature	10 ºC
	Discharge Channel Width	1 m
	Discharge Channel Depth	0.5 m
	Discharge Channel Bottom Slope	18º
	Channel Angle to Howe Sound	90º
OUT-10 Discharge Flow Rate	Discharge Flow Rate (Storm Event)	290 L/s (peak flow)
	Discharge Flow Rate (Dry Condition)	8.3 L/s (OWTS maximum)

4.4.4 Mixing Model Results

The results of the steady state mixing model predictions for storm event and dry condition discharges from OUT-10 are presented in this section. The model assumes steady state (*i.e.*, constant) effluent discharge characteristics, receiving environment and climate conditions. As discussed in Section 4.4.1, the mixing of OUT-10 discharge to Howe Sound is modelled to reflect the expected influence of the FST on the receiving channel conditions (Figure 4-17). Therefore, the mixing model accounts for the conditions produced by the physical infrastructure. Additionally, for each effluent flow scenario, effluent mixing and water quality predictions are generated for low (2 m/s), moderate (5 m/s) and high (10 m/s) wind cases given the sensitivity of the steady state model to wind speed and the variability expressed in measured wind speed data (Lorax, 2026). Figures illustrating the mixing model results are shown at the end of Section 4.4.4.1 and the end of Section 4.4.4.2.

4.4.4.1 Storm Event Discharge

The predicted OUT-10 effluent mixing in Howe Sound during the modelled storm event is presented as a mixing ratio in Figure 4-18. The mixing ratio prediction represents the relative volume of Howe Sound water that mixes with a unit volume of effluent along the axis of maximum concentration as the plume extends away from the OUT-10 discharge location. The axis of maximum concentration defines the point of highest concentration within the effluent plume at any given distance from the outfall. The lowest mixing ratio values and highest concentrations occur along the axis of maximum concentration. Lateral effluent dispersion away from the axis of maximum concentration increases the volume of Howe Sound water relative to the volume of effluent, resulting in lower parameter concentrations relative to concentrations modelled for the axis. The mixing model combines the mixing ratio with effluent and background water quality to calculate a parameter concentration as a function of distance from OUT-10, and accounts for lateral dispersion from the axis of maximum concentration when applying the mixing ratio.

In general, the mixing ratio is expected to increase with distance in an unbounded receiving environment due to plume spreading induced by the ambient current and wind turbulence. However, under bounded conditions, the dilution ratio may be limited when the plume becomes fully mixed between the shore and lateral boundary. The effect of the FST bounded channel (100 m from OUT-10 outlet) on effluent mixing is shown in Figure 4-18, whereby the mixing ratio is constant between approximately 55 to 100 m from the OUT-10 outlet. This indicates that the effluent plume exhibits complete transverse lateral mixing within the bounded channel at approximately 55 m from the outlet. Additionally, the plume depth ranges from 0.75 m to 0.85 within the bounded section for all wind cases. The low and moderate wind case plumes remain isolated to the upper 1 m deep surface layer in the

unbounded far-field region, whereas the high wind exhibits additional vertical mixing, with plume mixed downwards to a 2 m depth.

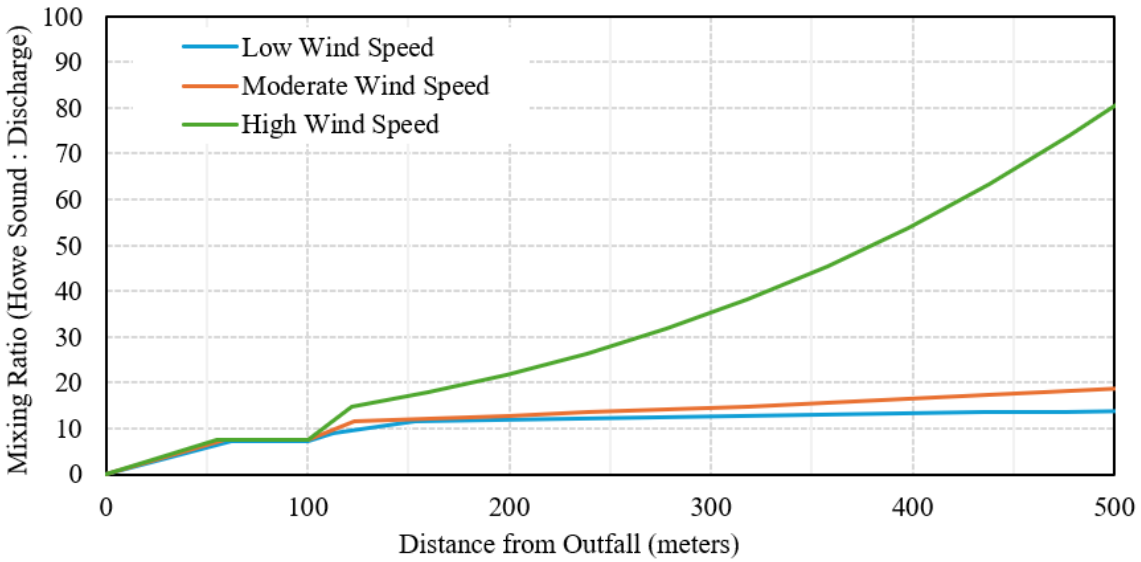


Figure 4-18: Volume Mixing Ratio for the Storm Event OUT-10 Effluent Discharge Rate Under Low, Moderate and High Wind Speeds.

During temporary current reversal, the effluent mixing ratio in the upstream bounded channel (from 55 m upstream to 300 m upstream) will be similar to the constant ratio expressed in the 55 m to 100 m downstream bounded section as shown in Figure 4-18. The plume is expected to reach complete lateral mixing within 55 m of the bounded channel regardless of current direction. Once complete lateral mixing is achieved, the mixing ratio will remain a constant value until the plume exits to an unbounded section.

The mixing ratio within the unbounded channel for high wind case is considerably larger than the low and moderate wind cases. This is related to the greater plume dispersion due to increased wind turbulence, which causes the effluent to mix with a greater volume of water in Howe Sound.

While varying wind speeds exhibit substantially different mixing ratios in the unbounded receiving environment, the mixing ratio for all wind cases is similar in the bounded section. This is likely because wind has lesser effect in near-field mixing but critically affects plume behavior in the far field (Doneker and Jirka, 2021). Near-field is the region of a receiving water where the discharge momentum flux, buoyancy and outlet geometry are the dominant influence on the trajectory and mixing of effluent, whereas far-field is the region of the receiving water where buoyant spreading motions, wind-induced turbulent mixing and passive diffusion control the trajectory and mixing of the effluent plume (Doneker and Jirka, 2021). Since the plume source characteristics are the same for all wind speeds, the

plume mixes similarly under all wind cases within the near-field given the marginal influence of wind speed in this region.

As illustrated in Figure 4-19 and Figure 4-20, predicted effluent plume concentrations for the storm event expected and extreme case effluent quality meet WQGs at the point of discharge for TSS, T-Cu and T-Zn, whereas the EPH concentration is slightly above the NOEC value. The concentrations of all parameters decrease sharply in response to dilution from the Howe Sound background ambient waters until the plume is completely mixed within the bounded section, approximately 50 to 60 m from OUT-10. After the plume exits the bounded section and enters the unbounded receiving environment, the predicted concentrations begin to decrease again, although more gradually compared to the initial rate of decrease exhibited within the first 50 to 60 m of the bounded section.

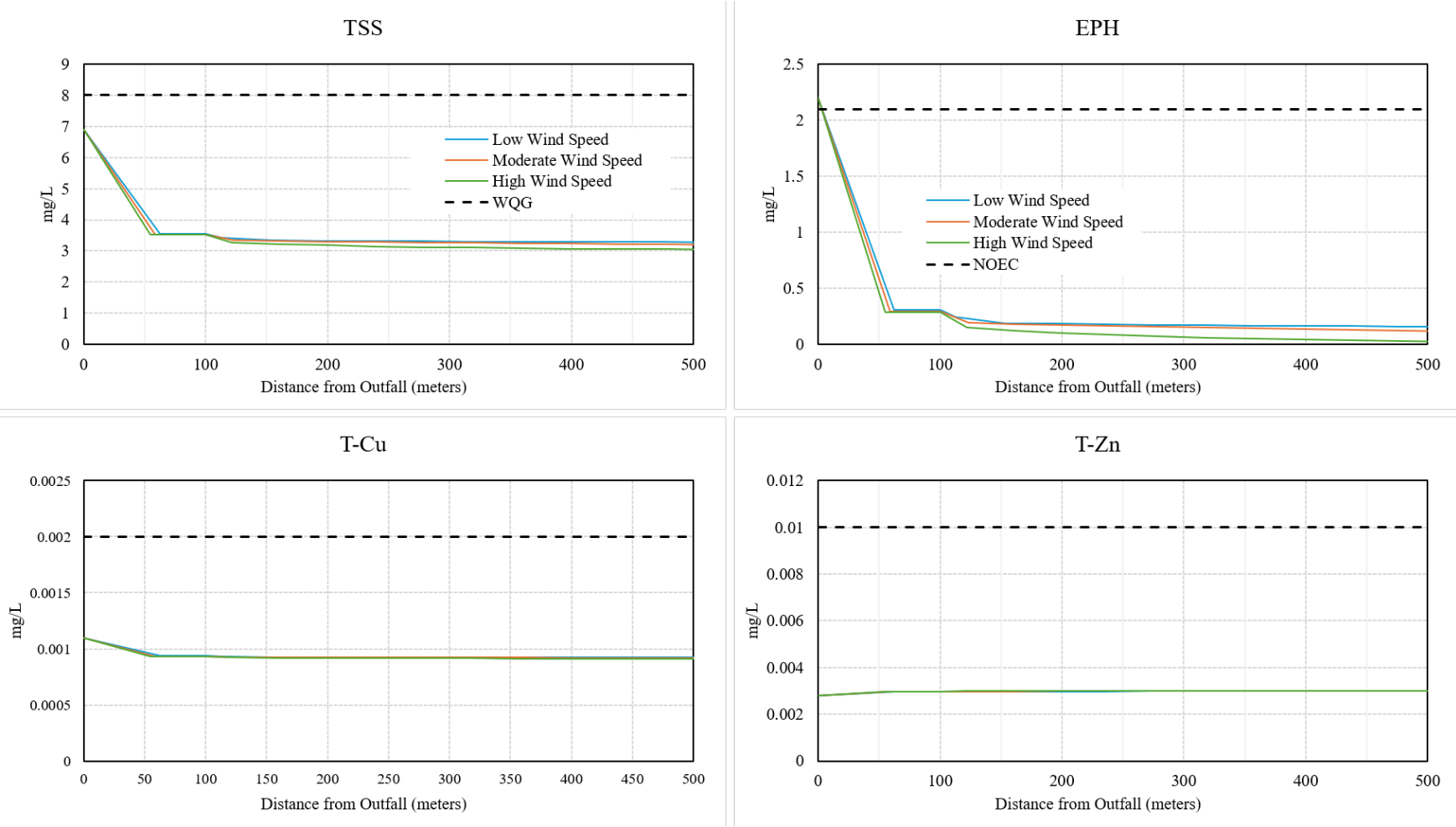


Figure 4-19: Predicted Concentrations of TSS, EPH, T-Cu and T-Zn along the Effluent Plume Axis of Maximum Concentration as a Function of Distance from OUT-10 for Storm Event Expected Case Effluent Quality and Discharge Rate (100 m Bounded Channel).

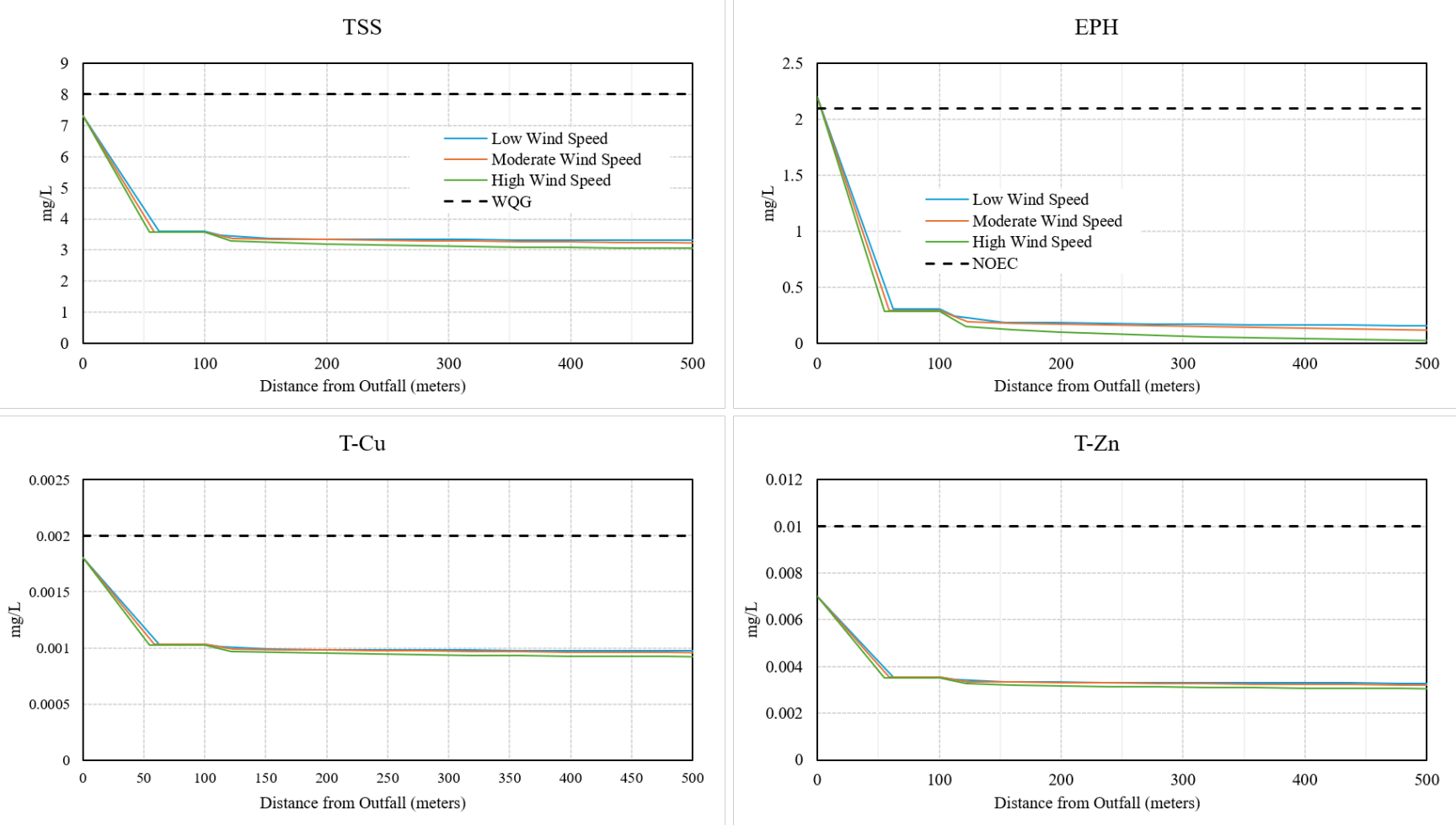


Figure 4-20: Predicted Concentrations of TSS, EPH, T-Cu and T-Zn along the Effluent Plume Axis of Maximum Concentration as a Function of Distance from OUT-10 for Storm Event Extreme Case Effluent Quality and Discharge Rate (100 m Bounded Channel).

4.4.4.2 Dry Condition Discharge

The effluent model assumes that dry condition discharges from OUT-10 will consist entirely of OWTS effluent. The effluent concentrations of EPH, TSS and T-Cu for the expected and extreme case source terms, and T-Zn for the extreme case (Table 4-16) are predicted to exceed WQGs and the NOEC for EPH (Table 4-16). Therefore, the mixing zone for these parameters is evaluated. The Howe Sound mixing model assumes dry condition OUT-10 effluent will be discharged at 8.3 L/s, the maximum flow from the OWTS. Graphs referenced in the following discussion are presented at the end of this section (Figure 4-21 through Figure 4-26).

The predicted effluent mixing ratios increase with distance from the point of discharge, and, as shown in Figure 4-21, moderate (5 m/s) and high (10 m/s) winds result in higher mixing ratios compared to the low wind case (2 m/s) along the entire axis of the effluent plume. This difference in mixing ratios is due to an increase in the effluent plume transverse lateral dispersion and vertical mixing depth at the top of the Howe Sound water column as a function of wind speed, and this in turn increases the total volume of Howe Sound water that is available for mixing with effluent. The mixing ratio profile along the axis of maximum concentration indicates that the effluent plume does not achieve complete lateral mixing (*i.e.* uniform mixing ratio between FST and shoreline) within the bounded channel (100 m). However, the high wind speed case, lateral mixing is nearly complete at the edge of the bounded section.

The rate and depth of vertical mixing vary for each wind speed in the dry condition model scenario. In the low wind case, the rate of vertical mixing is less than in moderate or high wind cases. The predicted plume thicknesses vary based on wind speed, ranging from 0.2 to 3.9 m within a near-field mixing zone that range from 105 to 245 m from the discharge location (refer to Table 4-18). The plume is completely mixed to the top of the pycnocline (*i.e.,* 10 m depth) within the far-field for the moderate and high wind cases but remains isolated to the surface layer in the low wind scenario.

Table 4-18:
Mixing Model Results for the Extent and Thickness of the Effluent Plume in the Near-Field for the 2, 5, and 10 m/s Wind Cases

Wind Speed (m/s)	Near-Field Extent (m)	Near-Field Plume Thickness (m)
2	215	0.2
5	245	1.4
10	105	3.9

In a current reversal scenario, the bounded channel is 300 m long, and the effluent plume achieves complete transverse lateral mixing at 200 m and 250 m, for the low and moderate wind speed cases, respectively. This is illustrated in Figure 4-22. Under these conditions, the effluent mixing ratio and plume concentrations would remain constant from the point of complete lateral mixing (200 m, 250 m, and 100 m, for low, moderate and high wind) to the end of the bounded section (*i.e.*, approximately 300 m from the OUT-10. The respective plume thickness for low, moderate and high wind cases within the bounded section is approximately 0.2 m, 3.33 m and 5.3 m. Thereafter, when the plume enters the unbounded channel, mixing with Howe Sound resumes and the axis of maximum concentration slowly declines with distance from the outfall.

The influence of wind induced mixing is reflected in the predicted effluent plume concentrations. This is shown in Figure 4-23 (expected case) and Figure 4-24 (extreme case) for the 100 m bounded channel. The concentration profiles for current reversal with the 300 m bounded channels are shown in Figure 4-25 (expected case) and Figure 4-26 (extreme case). For the 100 m and 300 m bounded channels, the effluent plume axis of maximum concentration predicted for the moderate and high wind cases approach Howe Sound background concentrations less than 100 m from OUT-10, compared to less than 500 m for the low wind speed case. For all modelled wind speeds, the concentrations of EPH, TSS, T-Cu and T-Zn decrease rapidly with distance from the outfall, and all parameters meet WQGs or NOEC along the axis of maximum concentration within approximately 80 m of OUT-10, for the expected and extreme case effluent quality.

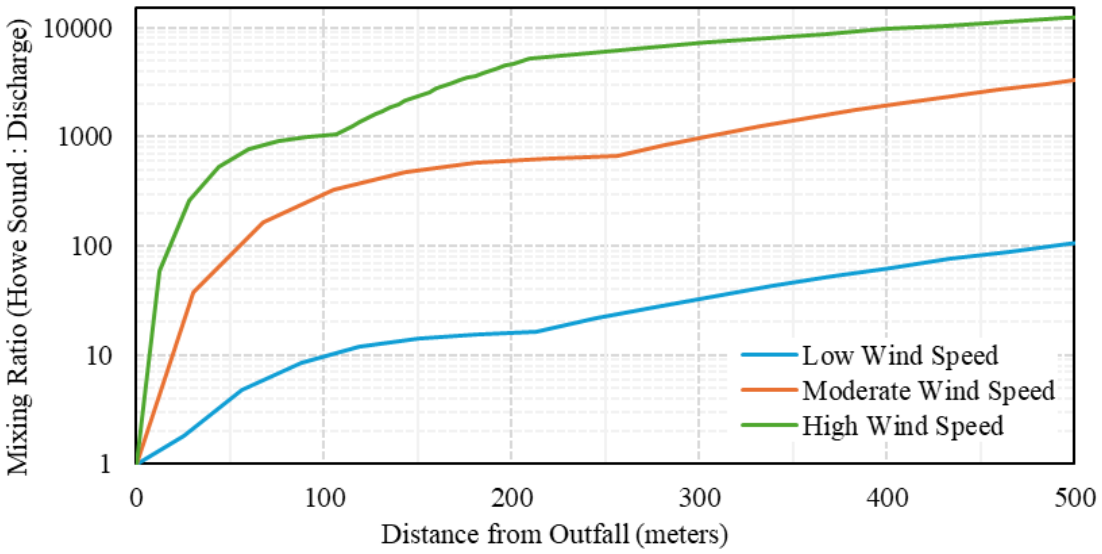


Figure 4-21: Volume Mixing Ratio for the Dry Condition OUT-10 Effluent Discharge Rate Under Low, Moderate and High Wind Speeds (Y-axis is log scale).

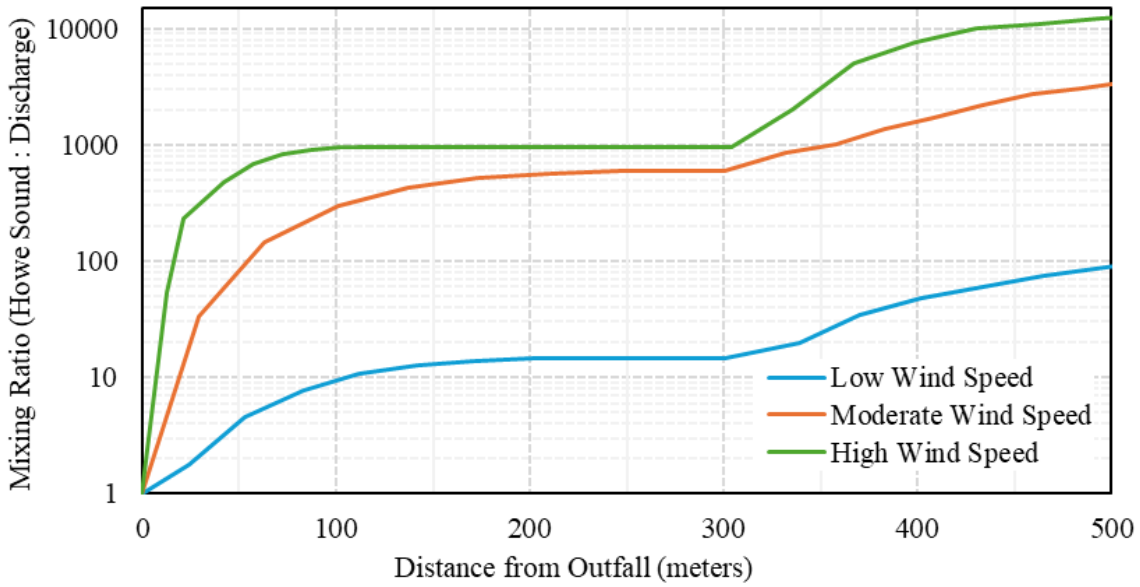


Figure 4-22: Volume Mixing Ratio for the Dry Condition OUT-10 Effluent Discharge Rate During Current Reversal Scenario Under Low, Moderate and High Wind Speeds (Y-axis is log scale).

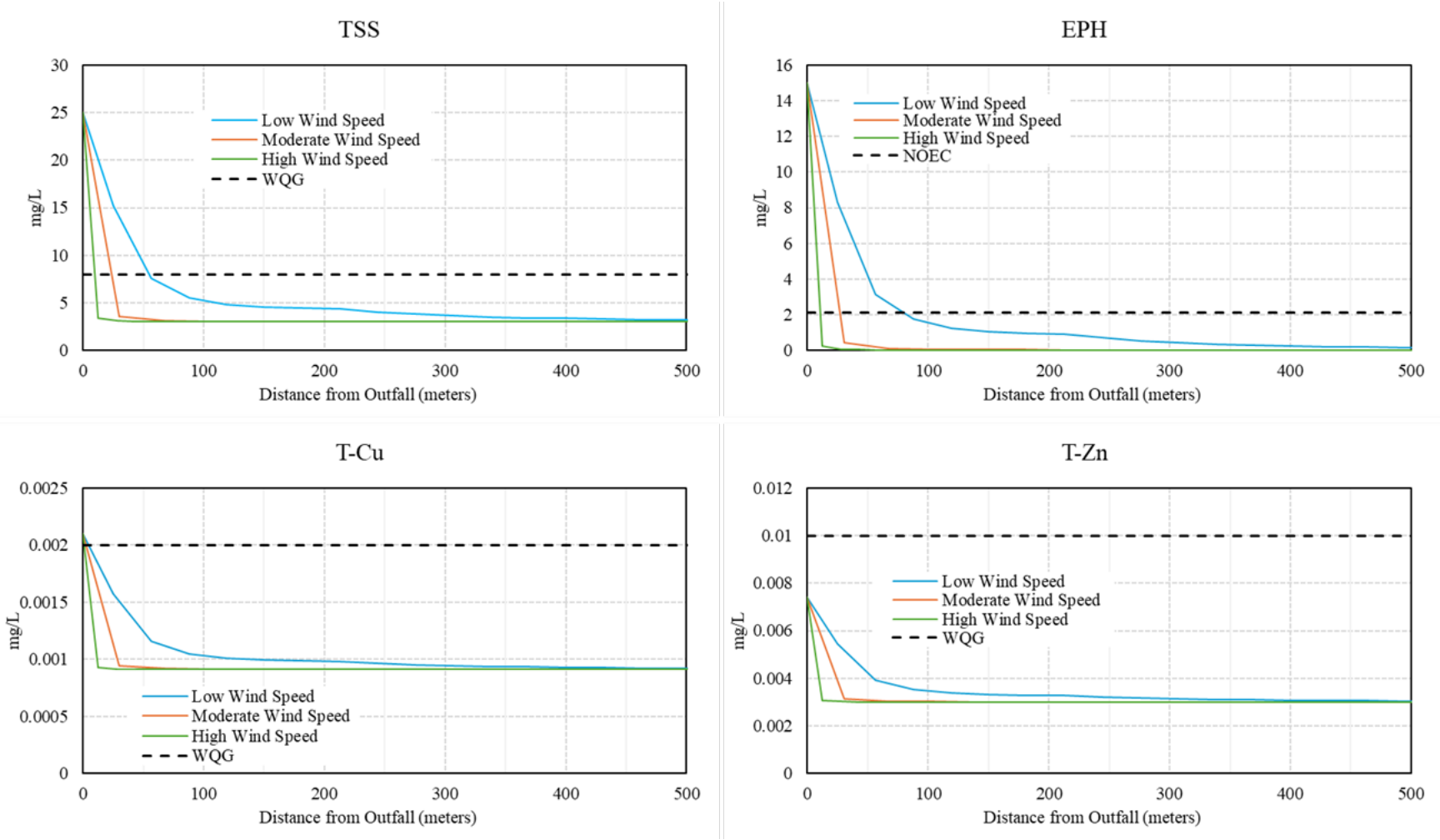


Figure 4-23: Predicted Concentrations of TSS, EPH, T-Cu and T-Zn along the Effluent Plume Axis of Maximum Concentration as a Function of Distance from OUT-10 for Dry Condition Expected Case Effluent Quality and Discharge Rate (100 m Bounded Channel).

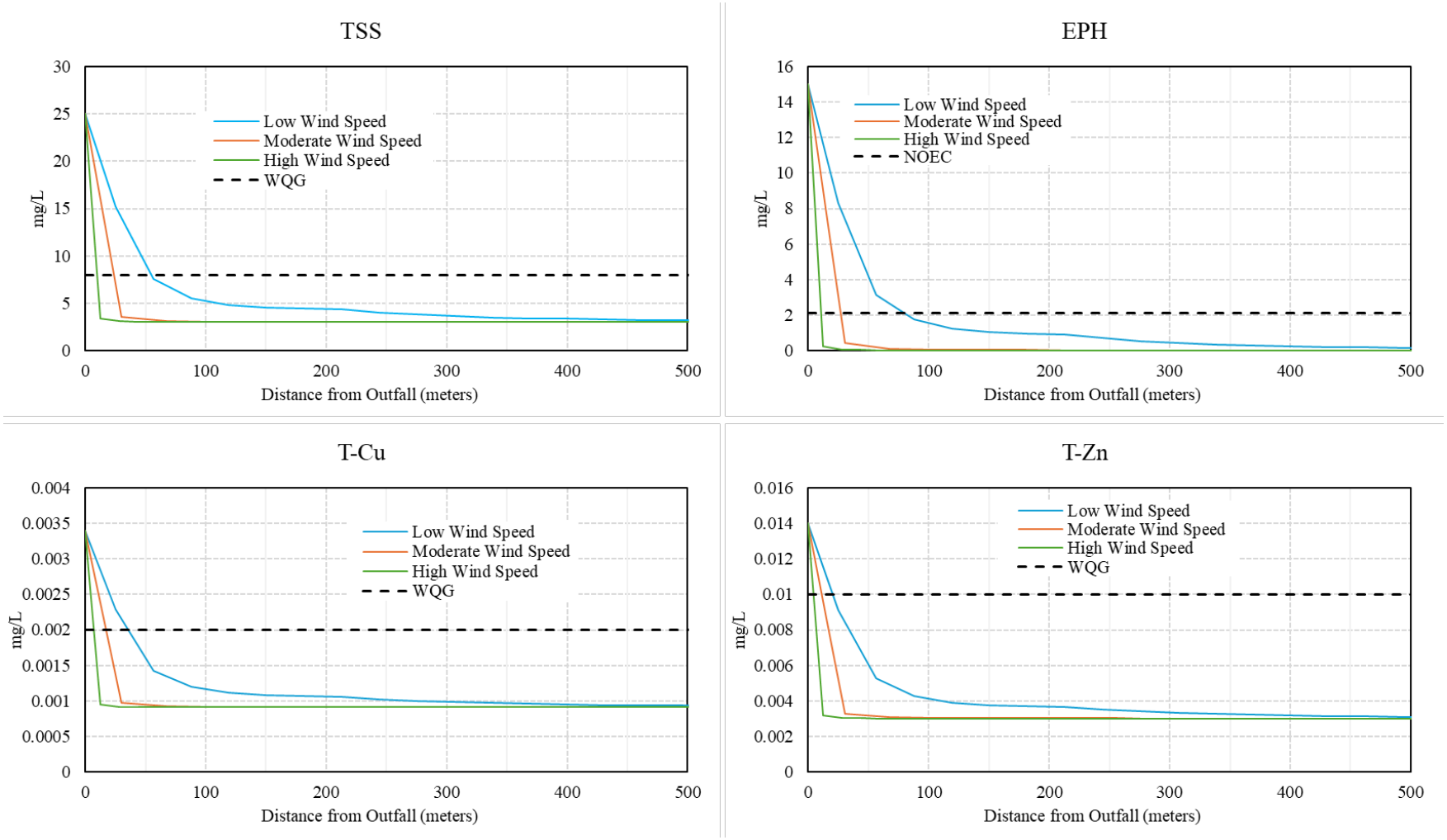


Figure 4-24: Predicted Concentrations of TSS, EPH, T-Cu and T-Zn along the Effluent Plume Axis of Maximum Concentration as a Function of Distance from OUT-10 for the Dry Condition Extreme Case Effluent Quality and Discharge Rate (100 m Bounded Channel).

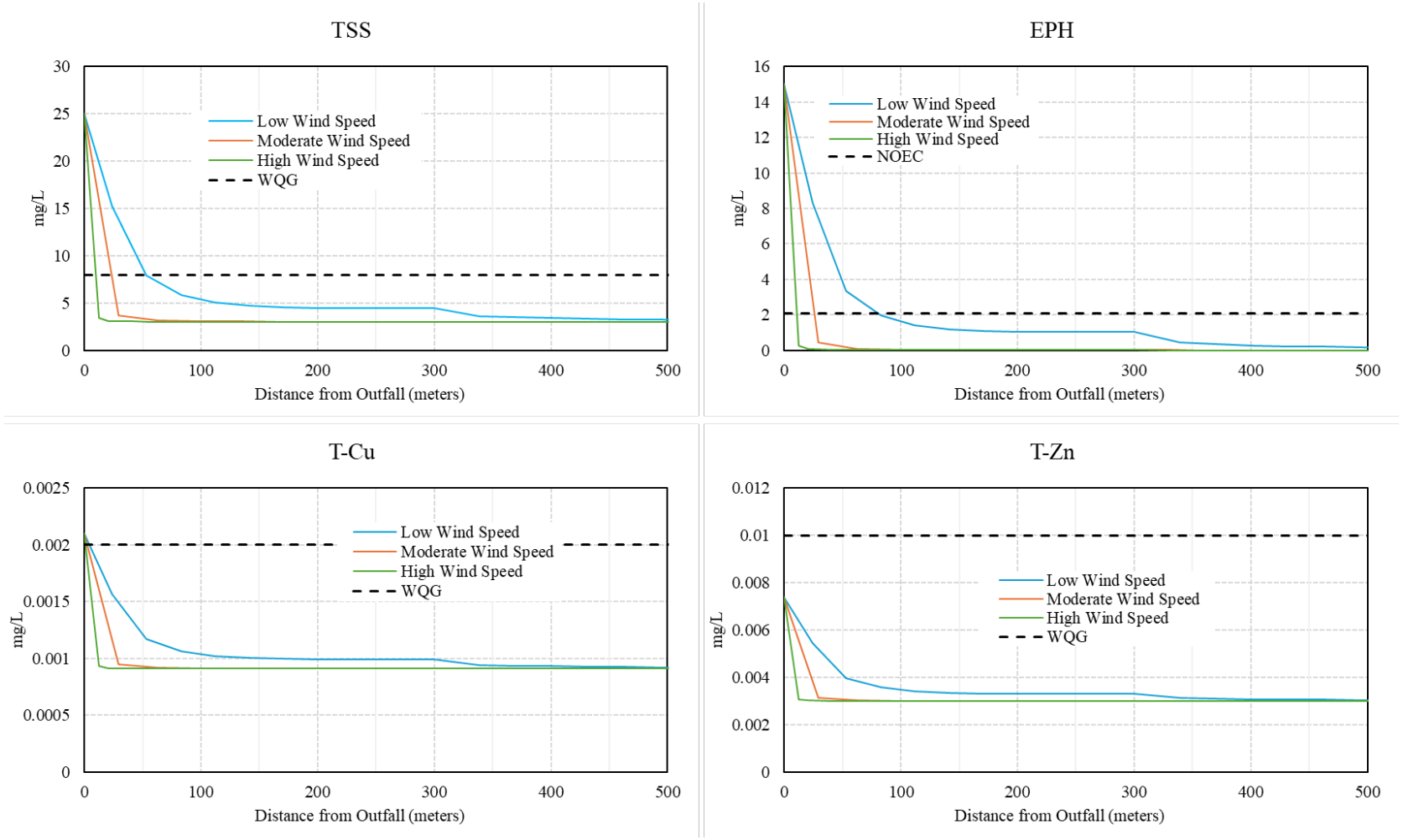


Figure 4-25: Predicted Concentrations of TSS, EPH, T-Cu and T-Zn along the Effluent Plume Axis of Maximum Concentration as a Function of Distance from OUT-10 for Dry Condition Expected Case Effluent Quality and Discharge Rate (Current Reversal, 300 m Bounded Channel).

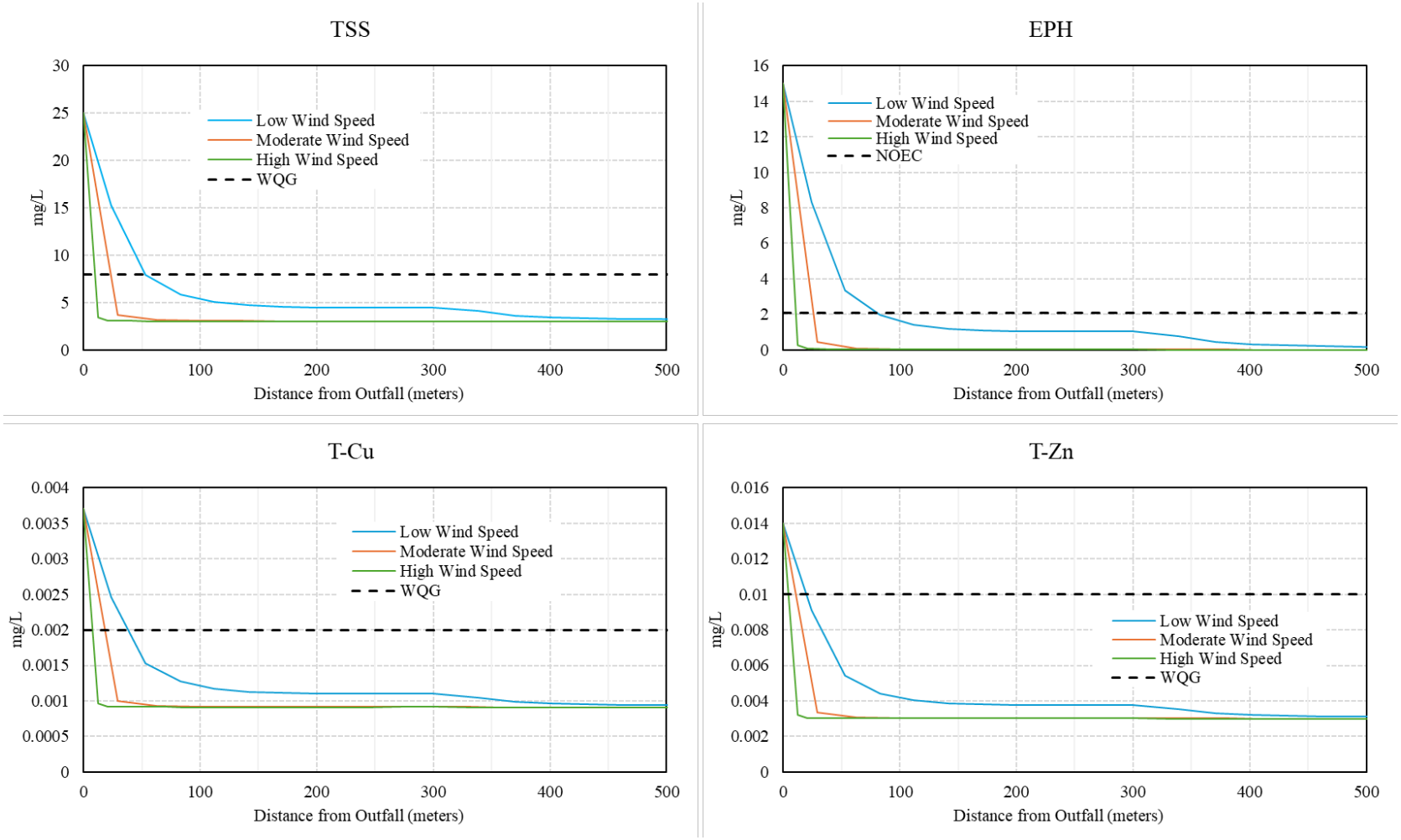


Figure 4-26: Predicted Concentrations of TSS, EPH, T-Cu and T-Zn along the Effluent Plume Axis of Maximum Concentration as a Function of Distance from OUT-10 for the Dry Condition Extreme Case Effluent Quality and Discharge Rate (Current Reversal, 300 m Bounded Channel).

4.4.5 Conclusions

The CORMIX steady state mixing model predicts the OUT-10 mixing zone is a shallow effluent plume that mixes with Howe Sound surface waters. The extent of the plume is predicted to vary with wind speed and effluent velocity. Effluent discharge from OUT-10 is primarily associated with rainfall (*i.e.*, stormwater runoff) or OWTS maintenance (*i.e.*, OWTS effluent only) and is therefore intermittent rather than continuous.

The effluent mixing ratios for the dry condition discharge (Figure 4-21) are considerably greater than the storm event (Figure 4-18) for all wind cases. This is related to the difference in discharge rates between the two scenarios. The higher discharge rate modelled for the storm event (290 L/s compared to 8.3 L/s for dry conditions) results in a lower mixing ratio due to the significantly larger volume of effluent that is discharged. As a consequence of the channel boundary imposed the FST, the storm event mixing model predicts full mixing across the channel width occurs at approximately 50 to 60 m from OUT-10, and the effluent plume remains fully mixed to approximately 0.75 m to 0.85 m depth until the unbounded channel is reached, approximately 100 m from OUT-10, or approximately 300 m in a reverse current condition.

The dry condition effluent plumes for all modelled wind speeds do not attain a fully mixed condition across the 100 m channel width within the FST bounded section (Figure 4-17). Within the bounded section, the plume depth is 0.2 m, 1.44 m and 3.90 m for the low, moderate and high wind cases, respectively. However, if the current is reversed, the low, moderate and high wind case plumes attain complete lateral mixing at 200 m, 250 m and 105 m, respectively, from the OUT-10. Additionally, under current reversal conditions, the mixing depth within the bounded channel (300 m) ranges from approximately 0.2 m to 5.3 m, with deeper mixing occurring as wind speed increases.

The predicted water quality along the effluent plume axis of maximum concentration is used to estimate the extent of the overall mixing zone for three wind speeds, two effluent flow rates, and two sets of effluent quality. The model results indicate the distance from OUT-10 to an effluent plume concentration threshold value that is protective of chronic effects to MWAL ranges from approximately 20 to 80 m for various modelled scenarios, regardless of current direction (Figure 4-23 through Figure 4-26). Based on these results, it is recommended the edge of the IDZ be set to 100 m from OUT-10 (Figure 4-23 and Figure 4-24).

5. Environmental Effects



5 Environmental Effects

5.1 Introduction

This section provides an assessment of potential effects from modelled effluent discharge at OUT-10 to potential receptors in Howe Sound (Figure 5-1). Aquatic life is the most sensitive receptor to changes in water quality, as reflected by the more stringent B.C. WQGs for the protection of aquatic life compared to those for wildlife and livestock. It is unlikely that terrestrial wildlife will use Howe Sound as a source of drinking water, while aquatic life is directly exposed to marine water quality. Therefore, the effects assessment focuses on aquatic life as the most likely receptor for potential adverse effects from changes to water quality.

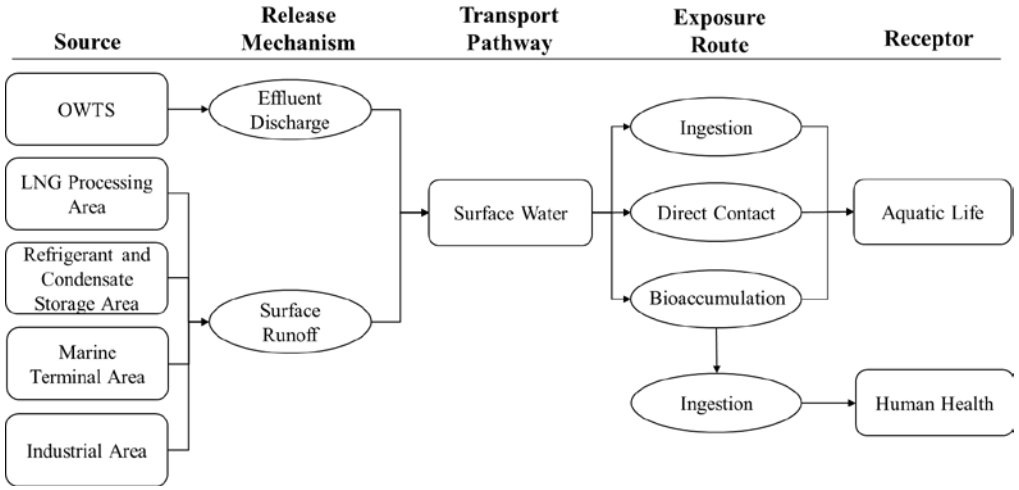


Figure 5-1: Conceptual Site Model of Aqueous Contaminant Transport to Receptors

Treated contact water from the OWTS will be discharged from OUT-10 through the non-contaminated contact water system, along with stormwater runoff from non-contaminated areas. The discharge volumes will vary depending primarily on precipitation and associated stormwater runoff. Two precipitation conditions are modelled for OUT-10 in the effluent and mixing models (Section 4.3 and Section 4.4, respectively): 1) during a 2-year return period, 24-hour storm event, and 2) when the OWTS is operated during dry conditions (*i.e.*, no precipitation). While the OWTS is designed to treat stormwater, it will be batch operated infrequently for maintenance or to empty the Oily Water Storage Tank in advance of a rainfall event. Under dry conditions, OUT-10 effluent is modelled to be composed of 100% OWTS treated effluent. During storm events, OUT-10 effluent is modelled to be a mixture of OWTS treated effluent and non-contaminated contact water.

At OUT-10, the model scenario for dry conditions (*i.e.*, 100% OWTS treated effluent) is evaluated first since it has higher effluent predictions and higher potential to cause adverse effects in the receiving environment than the storm event modelled concentrations. Effluent quality at OUT-10 during a storm event is only evaluated if potential adverse effects are identified under dry conditions.

The effects assessment evaluates two source term scenarios incorporated in the Effluent Model (as described in Section 4.3.2):

1) source terms derived from the median concentrations from water quality monitoring results (expected case); and
2) source terms derived from the 90th percentile concentrations from water quality monitoring results (extreme case).

The effects assessment evaluates three mixing scenarios incorporated in the IDZ receiving environment model (as described in Section 4.4):

1) high wind speed (10 m/s);
2) moderate wind speed (5 m/s); and
3) low wind speed (2 m/s).

5.2 Parameters of Concern

As described in Section 4.3.3.2, water quality model results are screened to identify POPCs and POCs to aquatic life in the marine receiving environment. A POPC is defined as any parameter predicted to be greater than 80% of a threshold value in untreated effluent, while a POC is a POPC that requires further assessment to determine its risk to the environment (ENV, 2024). The lowest applicable federal or B.C. WQGs for the protection of MWAL are used to screen the expected case and extreme case model results. Parameters with the potential to occur from site operations, including those without WQGs (*e.g.*, EPH) are categorized as POPCs based on the BATA (MDR, 2026b or Appendix 4.2-1) and included in the effects assessment.

The screening of operations model results for untreated effluent quality at OUT-10 (Table 4-12, Section 4.3.3.2) identified the following POPCs: EPH, pH, TSS, T-Cd, T-Cu, T-Pb, T-Mn, T-Hg, T-V, T-Zn, and benzo(a)pyrene for the expected case and extreme case scenarios. These POPCs are modelled to be associated with TSS except for pH, which reflects natural background conditions. As a conservative approach, the above-mentioned POPCs at OUT-10 are all considered POCs in the water quality model and carried forward to an effects assessment.

5.3 Effects Assessment Approach

Effects assessments are conducted for the POCs identified in Section 5.2 using both expected case and extreme case model predictions to address the uncertainty associated with source term derivation (Section 4.3.2). The expected case represents the mid-point parameter concentrations under normal conditions. An upper range of potential concentrations is represented by the extreme case and is considered significantly less likely to occur than expected case, and to occur infrequently.

Both long-term (chronic) and short-term (acute) WQGs are considered for the effects assessment. Concentrations that are greater than a WQG do not imply that unacceptable risks are present, but that the potential for adverse effects may be increased and additional investigation and monitoring may be warranted.

Definitions and criteria outlined in the B.C. Environmental Assessment Office's Effects Assessment Policy (EAO, 2020) are followed for the effects assessment. Residual effects, defined as those effects remaining after the implementation of mitigation measures, are assessed for POCs identified in the modelled effluent discharged from OUT-10. Residual effects are characterized based on the ecological context, magnitude, spatial extent, duration, frequency, and reversibility of an effect. These criteria are used to determine the likelihood of OUT-10 effluent to cause potential adverse effects to aquatic life in the marine receiving environment.

The Howe Sound mixing model (Section 4.4) predicts the characteristics and extent of the OUT-10 effluent mixing zone in Howe Sound. The effluent plume is predicted to mix within the freshwater influenced surface layer of Howe Sound as it extends from OUT-10. The edge of the IDZ is defined to extend up to approximately 80 m from the outlet. As noted in Section 4.4.5, the edge of the IDZ is recommended to be set to 100 m. Therefore, the size of the IDZ is set to 100 m for the effects assessment.

Ecological context of the receiving environment is characterized as low, medium, or high based on the aquatic habitat and species that may be exposed to elevated concentrations of POCs.

- Low: no unique attributes or low ecological value.
- Medium: sensitive habitats or species with some ecological value.
- High: sensitive habitats or species with high ecological value.

Magnitude is characterized as low, medium, or high based on the modelled concentrations of POCs in the receiving environment relative to long-term WQGs for the protection of marine aquatic life. The following characterization of magnitude is based on the method

generally used to develop marine WQGs, which applies a factor of 2 to 10 to a toxicity value to establish guidelines that are protective of all marine life.

- Low: concentrations less than or equal to the long-term WQG at the edge of the IDZ.
- Medium: concentrations greater than the long-term WQG but less than or equal to two times the guideline at the edge of the IDZ.
- High: concentrations greater than two times the long-term WQG at the edge of the IDZ.

Spatial extent is characterized as local or regional.

- Local: effluent discharge is predicted to result in parameter concentrations that are greater than WQGs only within the IDZ.
- Regional: effluent discharge is predicted to result in parameter concentrations that are greater than WQGs beyond the IDZ.

Duration is characterized as short-term, medium-term, or long-term.

- Short-term: an effect that lasts less than or equal to 96 hours.
- Medium-term: an effect that lasts more than 96 hours and less than 30 days.
- Long-term: an effect that lasts 30 days or more.

Frequency is characterized as rare, sporadic, or continuous based on how often marine aquatic life is expected to be exposed to concentrations that are greater than long-term WQGs.

- Rare: an effect that occurs once a year during operations.
- Sporadic: an effect that occurs intermittently during operations.
- Regular: an effect that occurs regularly during operations.

Reversibility is characterized by the length of time that it would take for POC concentration increases to be reversed after effluent discharge is ceased.

- Reversible short-term: concentration decreases to below its long-term WQG relatively quickly (*i.e.,* days).
- Reversible long-term: concentration decreases to below its long-term WQG after months or years.
- Irreversible: concentration permanently remains above it long-term WQG.

Confidence and uncertainties associated with the residual effects characterization are discussed for each POC.

5.4 Residual Effects Assessment

5.4.1 pH

The modelled pH in effluent discharged from OUT-10 is outside of the long-term WQG range (7.0 – 8.7) for the expected case (pH 6.6) and extreme case (pH 6.1) scenarios (Table 4-16). The low modelled pH represents background conditions for non-contact diversion ditch water quality, which was used to model stormwater runoff water quality. As discussed in Section 3.6.3.1, pH is mildly acidic to circumneutral at creek background water quality stations and in non-contact water that discharge to Howe Sound from diversion ditches. Given the natural background conditions observed in Woodfibre Creek (pH 5.63 to 6.49), Mill Creek (pH 5.25 to 8.40), East Creek (pH 6.26 to 7.38), and non-contact water (pH 5.60 to 8.20), the modelled pH in OUT-10 effluent (6.6 for expected case and 6.1 for extreme case) is not expected to have adverse residual effects on the receiving environment.

5.4.2 Mitigated Parameters of Concern

Parameters of concern are identified from untreated effluent quality model results (Section 4.3.3.2). Among the POCs carried forward for effects assessment, the following parameters are modelled to meet WQGs in treated effluent discharged from OUT-10 under both the expected case and extreme case scenarios (Table 4-15):

- T-Cd;
- T-Pb;
- T-Mn;
- T-Hg;
- T-V; and
- Benzo(a)pyrene.

The OWTS is designed to treat EPH and TSS, and the treatment process is expected to reduce concentrations of total metals (*e.g.,* T-Mn) and organic contaminants (*e.g.*, benzo(a)pyrene) bound to particulates that will settle into the treatment sludge. Model predictions for the above-listed POCs are below WQGs in the OUT-10 effluent. Therefore, after implementation of OWTS treatment, the modelled concentrations of these POCs in effluent are not expected to have adverse residual effects on the receiving environment.

5.4.3 TSS

The MDO for TSS in OWTS treated effluent is 25 mg/L (Section 4.2.1.3). It is expected that there will be periods (*i.e.,* during dry conditions) when the OWTS treated effluent is the only source of water being discharged at OUT-10 (Section 5.1). Therefore, the residual effects associated with the modelled effluent discharge of 25 mg/L TSS (expected and extreme case scenarios) from OUT-10 to the marine receiving environment are presented below.

5.4.3.1 Ecological Context

The Project foreshore serves as habitat for a wide variety of marine biota, including intertidal communities, fish, and marine mammals (Section 3.11), indicating that the marine receiving environment for effluent discharge has a **high ecological context**.

This rating reflects the possible presence of sensitive habitats or species with high ecological value in the receiving environment as the project continues to improve legacy site conditions. Pre-construction baseline biophysical surveys showed the intertidal and subtidal zones within the Project area consisted of marginal quality habitat (Keystone, 2024a). The intertidal zone was characterized by hard substrate and a band of rockweed occupying large boulders that are infrequently disturbed by wave actions. Below the rockweed band, sparse patches of sea lettuce and laminarian kelp were observed. The subtidal zone was characterized mostly by soft sediment comprised of wood debris, sand, and silt; where the lack of a hard substrate limits the diversity and abundance of sessile invertebrates. Dive surveys determined that although the Project area supports herring spawning, suitable spawning habitat has been limited in spatial extent, with observed spawn generally confined to a narrow band of rocky substrate supporting rockweed and kelp in the intertidal and shallow subtidal zones near the southwest corner of the Project area boundary since removal of legacy creosote piles (Keystone, 2024a; Keystone, 2025a). Proposed habitat offsetting as outlined in the *Fisheries Act* authorization for the Project includes placement of a combination of hard and soft substrates to improve the overall ecological health in the Project area. The habitat offsetting is planned for marine areas outside of the 100 m IDZ for OUT-10 that is proposed in Section 4.4.5.

5.4.3.2 Magnitude

B.C. has established WQGs for TSS that are protective of marine life from adverse effects, such as inhibiting photosynthesis due to decreased light penetration, physically smothering benthic communities, interfering with food intake, and clogging or abrasion of gills. The B.C. short-term marine WQG for TSS in clear water is an increase from background of 25 mg/L for a duration of 24 hours. The B.C. long-term WQG for TSS is an increase of

5 mg/L above background for a duration of 30 days. For the purpose of this assessment, the background TSS in the receiving environment is 3 mg/L based on the median value measured at 0.5 m below the surface in marine CPA stations from May 2020 to May 2025 (Table 3-30, Section 3.6). This indicates that OUT-10 effluent with 25 mg/L TSS will always be below the short-term WQG of 28 mg/L (25 mg/L plus 3 mg/L background), and that some dilution in the receiving environment will be required to bring effluent with 25 mg/L TSS to below the long-term WQG (8 mg/L; 5 mg/L plus 3 mg/L background) for the protection of MWAL.

Mixing zone modelling (Section 4.4) was conducted to derive concentrations of POCs at various distances from the point of discharge at OUT-10. Results of the mixing zone modelling show rapid dilution of TSS as effluent mixes with receiving environment waters. The axis of maximum concentration of the effluent plume is predicted to have TSS concentrations below the long-term WQG within 60 m of the outfall under all modelled wind conditions (low, medium and high wind) for the expected and extreme case scenarios (Figure 5-2). Since the modelled TSS concentration is less than the long-term WQG at the edge of the IDZ, the magnitude of TSS increases due to OUT-10 effluent discharge is characterized as low for both model scenarios.

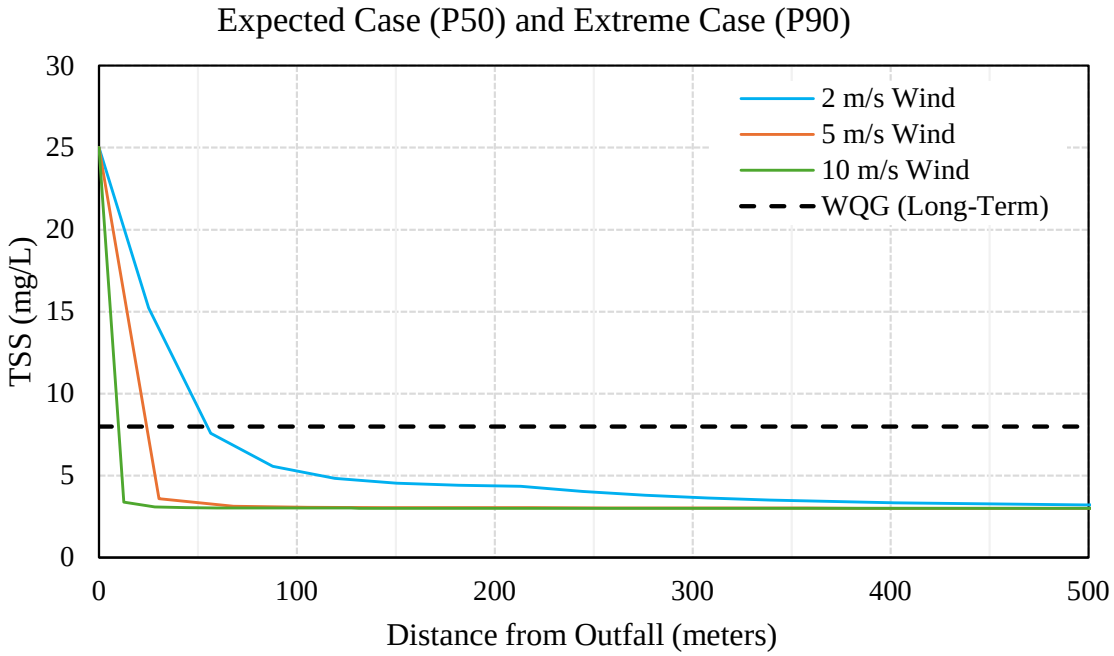


Figure 5-2: Total suspended solids (TSS) effluent plume predictions for both expected case and extreme case model scenarios. Modelled TSS concentration in effluent discharged from OUT-10 (25 mg/L) reflects 100% treated OWTS effluent under dry conditions.

5.4.3.3 Spatial Extent

All modelled TSS concentrations in the receiving environment are less than the short-term WQG. Modelled TSS concentrations are greater than the long-term WQG only within the IDZ (100 m from the outfall; Figure 5-2), for the expected and extreme case scenarios. Since TSS concentration is modelled to be below the long-term WQG at the edge of the IDZ, the spatial extent is characterized as **local**.

5.4.3.4 Duration

As discussed in Section 4.2.2.1, the OWTS operates in 12-hour batch cycles; therefore, the duration of increased TSS levels in the receiving environment associated with OUT-10 effluent discharge is characterized as **short-term**.

5.4.3.5 Frequency

As discussed in Section 5.1, the OWTS will be operated infrequently during dry conditions (approximately once or twice per month) for maintenance or to empty the Oily Water Storage Tank in advance of a rainfall event. Therefore, the frequency of increased TSS levels in the receiving environment associated with OUT-10 effluent discharge is characterized as **sporadic.**

5.4.3.6 Reversibility

After the discharge of OUT-10 effluent is stopped, it is expected that TSS concentration in the receiving environment will decrease to background levels within 1 to 2 days (Section 4.4); therefore, the reversibility is characterized as **reversible short-term**.

5.4.3.7 Summary of Potential Residual Effects

The residual effects characterizations from TSS in effluent discharged at OUT-10 are summarized in Table 5-1. Given the low magnitude, local spatial extent, short-term duration, sporadic frequency, and short-term reversibility of the residual effects characterization, **it is unlikely that the modelled TSS in OUT-10 effluent will have an adverse effect on aquatic life in the receiving environment.** The confidence in this assessment is considered high given: 1) it is expected that the OWTS will be operated as designed and will produce effluent with ≤25 mg/L TSS; 2) TSS predictions are lower than the long-term WQG at the edge of IDZ under all wind conditions (low, medium and high wind) modelled for both expected and extreme case scenarios; and, 3) the long-term WQG is based on a 30-day duration, whereas the dry condition model scenario is based on infrequent operation of the OWTS (*i.e.*, approximately once or twice per month).

Therefore, it is unlikely that the discharge from the OWTS alone during dry conditions would be sustained long enough to exceed the long-term WQG over a 30-day period.

Table 5-1:
Effect Assessment Ratings for Total Suspended Solids (TSS)

Category	Expected/Extreme Case
Ecological context	High
Magnitude	Low
Spatial extent	Local
Duration	Short-term
Frequency	Sporadic
Reversibility	Reversible short-term

5.4.4 T-Cu and T-Zn

Marine WQGs for total metals have been established in B.C. to protect the most sensitive species and life stages against acute toxicity (*e.g.*, mortality) over a defined short-term exposure period (*e.g.,* 96 hours), and against chronic toxicity (*e.g.*, growth inhibition) from long-term exposures. Of the total metals modelled, T-Cu and T-Zn have model predictions greater than their respective WQGs in effluent discharged from OUT-10 (Table 5-2). Specifically:

- The modelled T-Cu concentration in the OUT-10 effluent is greater than the long-term WQG in the expected case and greater than the long-term and short-term WQGs in the extreme case. The modelled T-Cu concentration in the OUT-10 effluent is primarily associated with the particulate fraction (68% for both expected case and extreme case). The source of particulate-bound Cu at OUT-10 is the 25 mg/L of TSS modelled for OWTS treated effluent. It is expected that there will be periods during dry conditions when the OWTS treated effluent is the only source being discharged at OUT-10 (Section 5.1).
- Modelled concentrations of T-Zn are greater than the long-term WQG at OUT-10 for the extreme case only. Similar to T-Cu, the modelled T-Zn is primarily associated with the particulate fraction (71% for extreme case).

Assessment of residual effects associated with the modelled discharge of T-Cu and T-Zn from OUT-10 to the marine receiving environment are presented below.

Table 5-2:
Modelled Copper and Zinc Concentrations in Site Effluent Discharged at OUT-10 during Dry Conditions

Modelled Parameter	Effluent Concentration (mg/L)		Particulate Fraction (%)		B.C. WQG (mg/L)	
	Expected Case	Extreme Case	Expected Case	Extreme Case	Long-Term	Short-Term
T-Cu	***0.0021***	***0.0034***	68	68	0.002	0.003
D-Cu	0.00068	0.0011			-	-
T-Zn	0.0074	***0.014***	85	71	0.01	0.055
D-Zn	0.0011	0.0040			-	-

Notes:
Values ***underlined in bold italics*** are above the B.C. long-term WQG for the protection of marine water aquatic life. Values shaded are above the B.C. short-term WQG for the protection of marine water aquatic life.

5.4.4.1 Ecological Context

The Project foreshore serves as habitat for a wide variety of marine biota, including intertidal communities, fish, and marine mammals (Section 3.11), indicating that the marine receiving environment for effluent discharge has a **high ecological context**.

This rating reflects the possible presence of sensitive habitats or species with high ecological value in the receiving environment as the project continues to improve legacy site conditions. Pre-construction baseline biophysical surveys showed the intertidal and subtidal zones within the Project area consisted of marginal quality habitat (Keystone, 2024a). The intertidal zone was characterized by hard substrate and a band of rockweed occupying large boulders that are infrequently disturbed by wave actions. Below the rockweed band, sparse patches of sea lettuce and laminarian kelp were observed. The subtidal zone was characterized mostly by soft sediment comprised of wood debris, sand, and silt; where the lack of a hard substrate limits the diversity and abundance of sessile invertebrates. Dive surveys determined that although the Project area supports herring spawning, suitable spawning habitat has been limited in spatial extent, with observed spawn generally confined to a narrow band of rocky substrate supporting rockweed and kelp in the intertidal and shallow subtidal zones near the southwest corner of the CPA since removal of legacy creosote piles (Keystone, 2024a; Keystone, 2025a). Proposed habitat offsetting as outlined in the *Fisheries Act* authorization for the Project includes placement of a combination of hard and soft substrates to improve the overall ecological health in the Project area. The habitat offsetting is planned for marine areas outside of the 100 m IDZ for OUT-10 that is proposed in Section 4.4.5.

5.4.4.2 Magnitude

Modelled T-Cu concentrations at OUT-10 are up to 1.7 times the long-term WQG (0.002 mg/L) based on the dry condition extreme case scenario (Table 5-2). The maximum T-Cu concentration modelled at OUT-10 is also above the short-term WQG (0.003 mg/L) for the dry condition extreme case scenario. For context, T-Cu concentrations in marine water samples collected within the Project area ranged from <0.0005 to 0.00532 mg/L (0.5 m below surface; Table 3-30) and at reference stations the T-Cu concentration ranged from <0.0005 to 0.00442 mg/L (0.5 m below surface, Section 3.9.3 and Appendix 3.9-1). The modelled T-Cu concentrations at OUT-10 are within the range observed under existing conditions. Additionally, the modelled T-Cu concentration in OUT-10 effluent is mostly associated with the particulate fraction, which has relevance to the magnitude rating since particulate-bound Cu is less bioavailable than the D-Cu fraction. Comparison of the readily bioavailable D-Cu fraction to the T-Cu WQGs shows that the D-Cu fraction is lower than the long-term WQG in undiluted OUT-10 effluent (Table 5-2).

Results of the mixing zone modelling for T-Cu are shown in Figure 5-3 for the dry condition. The OUT-10 effluent plume is modelled to have T-Cu concentrations below the short-term WQG at the point of discharge (expected case) and within 25 m (extreme case) of the outfall; and T-Cu predictions are below the long-term WQG near the point of discharge (expected case) and within 40 m (extreme case) of OUT-10. Since modelled T-Cu concentrations at OUT-10 are less than the long-term WQG at the edge of the IDZ, the magnitude of T-Cu increases due to effluent discharge is characterized as **low** for both model scenarios.

Results of the mixing zone modelling for T-Zn are shown in Figure 5-4 for the dry condition. Modelled concentrations of T-Zn in the OUT-10 effluent plume meet the long-term WQG at the point of discharge (expected case) and within 25 m from the outfall (extreme case). As with T-Cu, the magnitude rating is characterized as **low** for T-Zn since the modelled concentrations of these total metals at OUT-10 are less than their long-term WQGs at the edge of the IDZ.

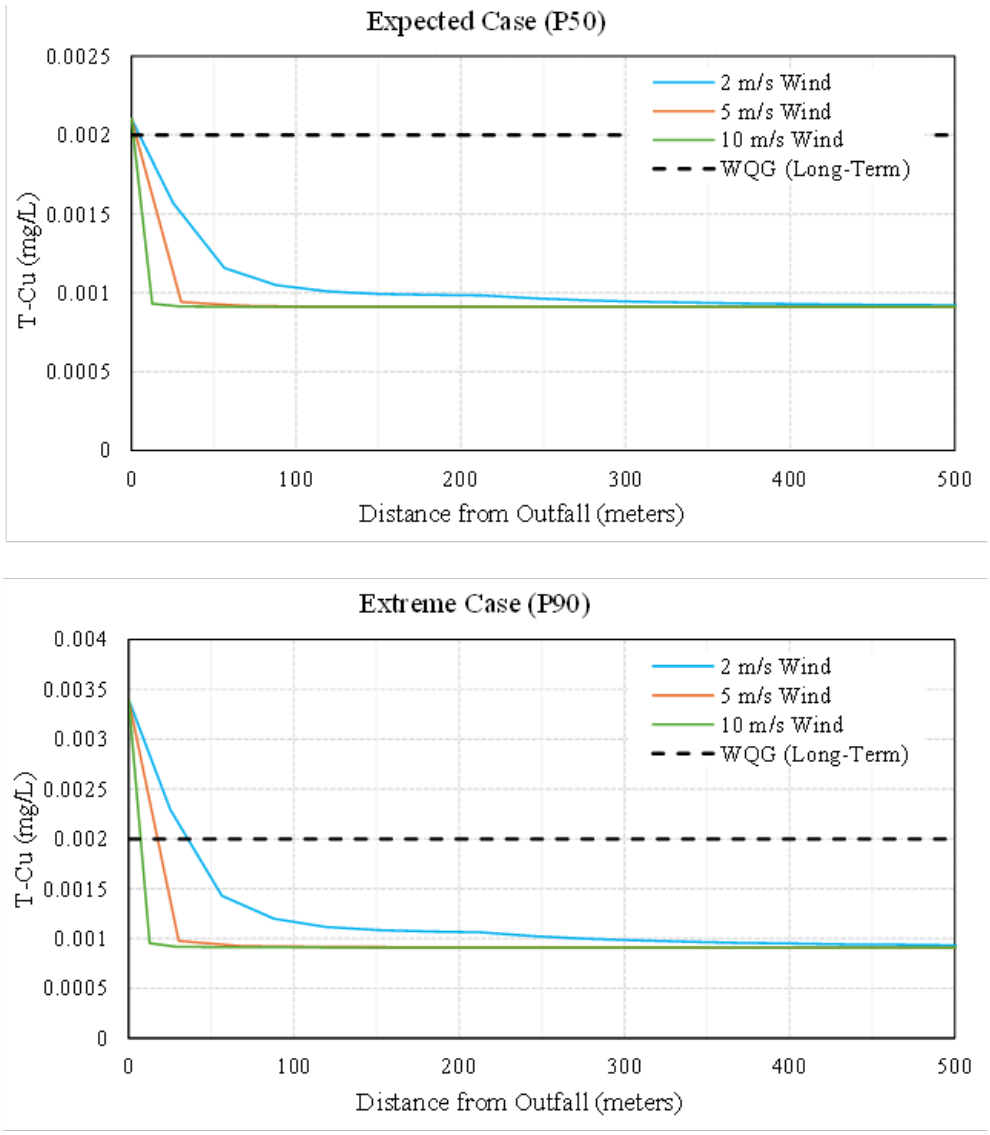


Figure 5-3: Modelled total copper (T-Cu) effluent plume predictions for the expected case (upper plot) and extreme case (lower plot) model scenarios. Modelled concentrations in effluent discharged from OUT-10 reflect 100% treated OWTS effluent under dry conditions.

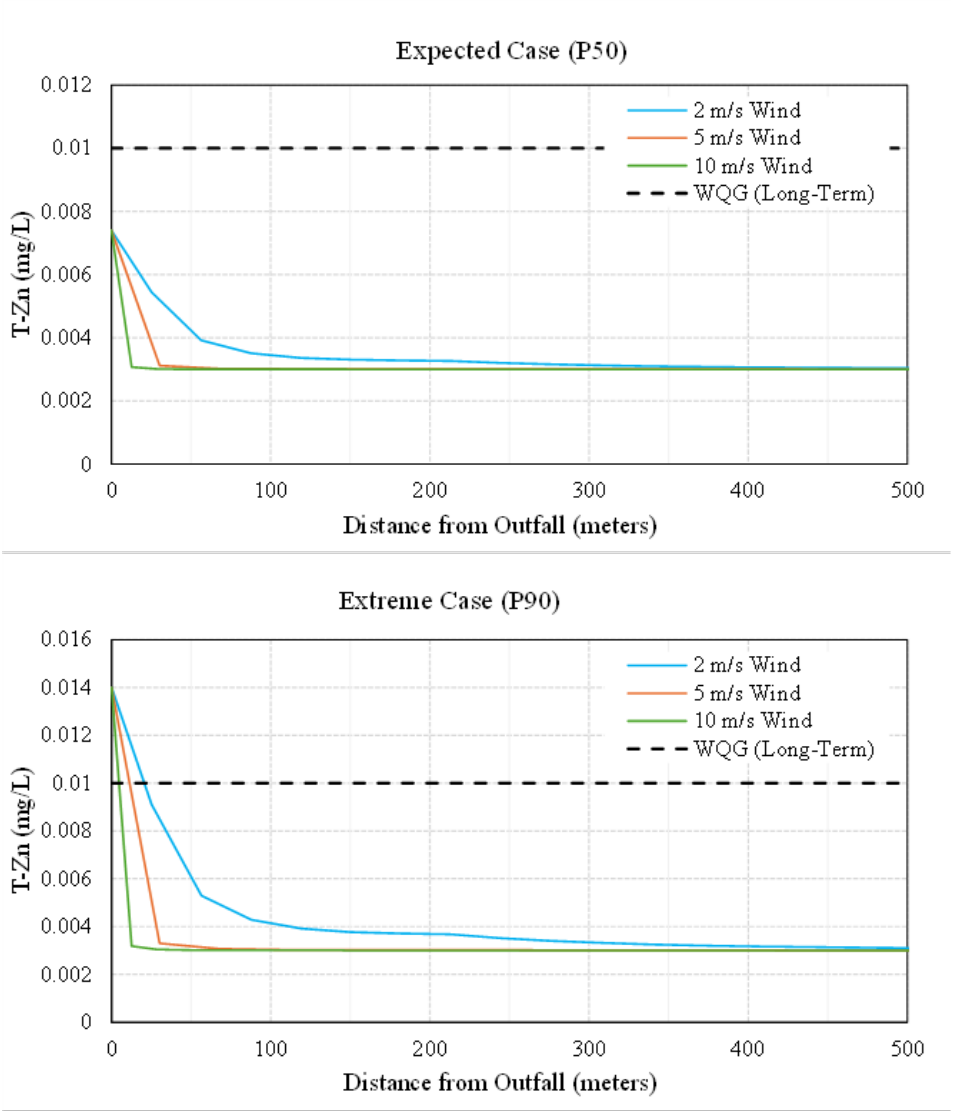


Figure 5-4: Modelled total zinc (T-Zn) effluent plume predictions for the expected case (upper plot) and extreme case (lower plot) model scenarios. Modelled concentrations in effluent discharged from OUT-10 reflect 100% treated OWTS effluent under dry conditions.

5.4.4.3 Spatial Extent

Under dry conditions, all modelled total metal concentrations in OUT-10 effluent are less than the short-term WQG except for T-Cu (extreme case only). Mixing of effluent with marine water is expected to reduce total metal concentrations to below the short-term and long-term WQGs at the edge of the IDZ from OUT-10 under all wind conditions modelled for the expected and extreme case models; therefore, the spatial extent is characterized as **local**.

5.4.4.4 Duration

As discussed in Section 4.2.2.1, the OWTS operates in 12-hour batch cycles; therefore, the duration of increased total metal concentrations in the receiving environment associated with OUT-10 effluent discharge is characterized as **short-term**.

5.4.4.5 Frequency

As discussed in Section 5.1, the OWTS will be operated infrequently during dry conditions (approximately once or twice per month) for maintenance or to empty the Oily Water Storage Tank in advance of a rainfall event. Therefore, the frequency of increased total metal concentrations in the receiving environment associated with OUT-10 effluent discharge is characterized as **sporadic.**

5.4.4.6 Reversibility

After the discharge of OUT-10 effluent is stopped, it is expected that total metal concentrations in the receiving environment will decrease to below the long-term WQGs or return to background conditions; therefore, the reversibility is characterized as **reversible short-term**.

5.4.4.7 Summary of Potential Residual Effects

The residual effects characterizations from modelled T-Cu and T-Zn in effluent discharged at OUT-10 are summarized in Table 5-3 and Table 5-4, respectively for dry conditions. Given the low magnitude, local spatial extent, short-term duration, sporadic frequency, and short-term reversibility of the residual effects characterization, **it is unlikely that the modelled total metal concentrations in OUT-10 effluent will have an adverse effect on aquatic life in the receiving environment.** The confidence in this assessment is considered high since the modelled concentrations are lower than their respective long-term WQGs at the edge of IDZ from OUT-10 under all wind conditions (low, medium and high wind) for both expected and extreme case scenarios. A high confidence rating is further supported by the characteristics of metals in the modelled effluent, which are predominantly in the particulate phase. Metals bound to particulates generally exhibit low bioavailability. Dissolved metal concentrations are more representative of the bioavailable fraction of total metals, and the modelled dissolved metal concentrations in the effluent are below long-term WQGs.

Table 5-3:
Effect Assessment Ratings for Total Copper (T-Cu) Modelled at OUT-10

Category	OUT-10	
	Expected Case	**Extreme Case**
Ecological context	High	High
Magnitude	Low	Low
Spatial extent	Local	Local
Duration	Short-term	Short-term
Frequency	Sporadic	Sporadic
Reversibility	Reversible short-term	Reversible short-term

Table 5-4:
Effect Assessment Ratings for Total Zinc (T-Zn) Modelled at OUT-10

Category	Expected Case	Extreme Case
Ecological context	High	High
Magnitude	Low	Low
Spatial extent	Not applicable[1]	Local
Duration	Not applicable[1]	Short-term
Frequency	Not applicable[1]	Sporadic
Reversibility	Not applicable[1]	Reversible short-term

Note:
[1] Not applicable indicates modelled concentrations in effluent are below long-term water quality guidelines, hence no rating is assigned.

5.4.5 EPH

The MDO for EPH in OWTS treated effluent is 15 mg/L (Section 4.2.1.3). It is expected that there will be periods during dry conditions when the OWTS treated effluent is the only source being discharged at OUT-10 (Section 5.1). Therefore, the residual effects associated with the discharge of modelled effluent with 15 mg/L EPH (expected and extreme cases) from OUT-10 to the marine receiving environment are assessed below.

5.4.5.1 Ecological Context

The Project foreshore serves as habitat for a wide variety of marine biota, including intertidal communities, fish, and marine mammals (Section 3.11), indicating that the marine receiving environment for effluent discharge has a **high ecological context**.

This rating reflects the possible presence of sensitive habitats or species with high ecological value in the receiving environment as the project continues to improve legacy

site conditions. Pre-construction baseline biophysical surveys showed the intertidal and subtidal zones within the Project area consisted of marginal quality habitat (Keystone, 2024a). The intertidal zone was characterized by hard substrate and a band of rockweed occupying large boulders that are infrequently disturbed by wave actions. Below the rockweed band, sparse patches of sea lettuce and laminarian kelp were observed. The subtidal zone was characterized mostly by soft sediment comprised of wood debris, sand, and silt; where the lack of a hard substrate limits the diversity and abundance of sessile invertebrates. Dive surveys determined that although the Project area supports herring spawning, suitable spawning habitat has been limited in spatial extent, with observed spawn generally confined to a narrow band of rocky substrate supporting rockweed and kelp in the intertidal and shallow subtidal zones near the southwest corner of the CPA since removal of legacy creosote piles (Keystone, 2024a; Keystone, 2025a). Proposed habitat offsetting as outlined in the *Fisheries Act* authorization for the Project includes placement of a combination of hard and soft substrates to improve the overall ecological health in the Project area. The habitat offsetting is planned for marine areas outside of the 100 m IDZ for OUT-10 that is proposed in Section 4.4.5.

5.4.5.2 Magnitude

This effects assessment evaluates effluent discharge from an LNG facility that is operated as designed, with effective mitigation measures and management plans implemented. The potential effects of incidents (*e.g.*, oil spills) on the receiving environment are not evaluated. Under normal operating conditions, stormwater that is potentially contaminated with EPH will be collected in curbed areas and conveyed to the OWTS for treatment. In the conveyance and treatment process, some degree of weathering (*e.g.,* evaporation, photo-oxidation, adsorption/settling) of EPH may occur prior to being discharged at OUT-10.

There are no B.C. or federal (CCME/ECCC) numeric WQGs established for EPH for the protection of aquatic life. While there are no Canadian WQGs for EPH, the Washington State Department of Ecology developed effects-based concentrations for weathered DRO that are considered protective of aquatic life in the marine and freshwater environment (Hobbs, Eickhoff, & Lee, 2020). Oil products are a mixture of organic compounds that can be chemically extracted from environmental samples (*e.g.*, water, soil, sediment). A detailed explanation of parameters that are used to measure oil in water is provided in Section 4.1.2. Commonly used parameter names include EPH, TPH, F2-F4 and DRO. The oil concentrations values reported by Hobbs, Eickhoff, & Lee (2020) are expressed as the DRO parameter, and is assumed to be directly comparable to results expressed using the EPH parameter defined in Section 4.1.2.

It is noted that Hobbs, Eickhoff, & Lee (2020) used contaminated groundwater from a well in the vicinity of underground diesel fuel tanks and waste oil tanks to prepare test solutions. Whereas lubricating, hydraulic and dielectric oils are expected to constitute the EPH in OWTS effluent. Although the oil sources are different, the results for weathered DRO are used to establish a reference value for evaluating EPH discharged from OUT-10.

The test organisms used in the marine studies conducted by Hobbs, Eickhoff, & Lee (2020). were topsmelt (Atherinops affinis) and sea urchin (Strongylocentrotus purpuratus), which are relevant to the Howe Sound receiving environment. The study showed no measurable chronic effects to the sea urchin from exposure to weathered DRO at the maximum concentration tested (2.71 mg/L). The study determined a no-observable effects concentration (NOEC) of 2.12 mg/L for the growth of topsmelt. In the absence of Canadian WQGs for EPH, this NOEC of 2.12 mg/L is used to characterize the magnitude of modelled changes to EPH concentration from OUT-10 effluent discharge.

Results of the mixing zone modelling for the dry condition show rapid dilution of EPH as OUT-10 effluent mixes with receiving environment waters. Under moderate wind (5 m/s) and high wind (10 m/s) conditions, modelled EPH concentrations decrease to less than the NOEC within 30 m from OUT-10 (Figure 5-5). Under low wind conditions (2 m/s), the modelled EPH concentration decreases from 15 mg/L in the OUT-10 effluent to 3 mg/L at approximately 56 m from the outfall, and to the NOEC (2.12 mg/L; Hobbs, Eickhoff, & Lee, 2020) at approximately 80 m from the outfall. Based on the above, the magnitude of EPH concentration increases due to OUT-10 effluent discharge is characterized as low for both model scenarios.

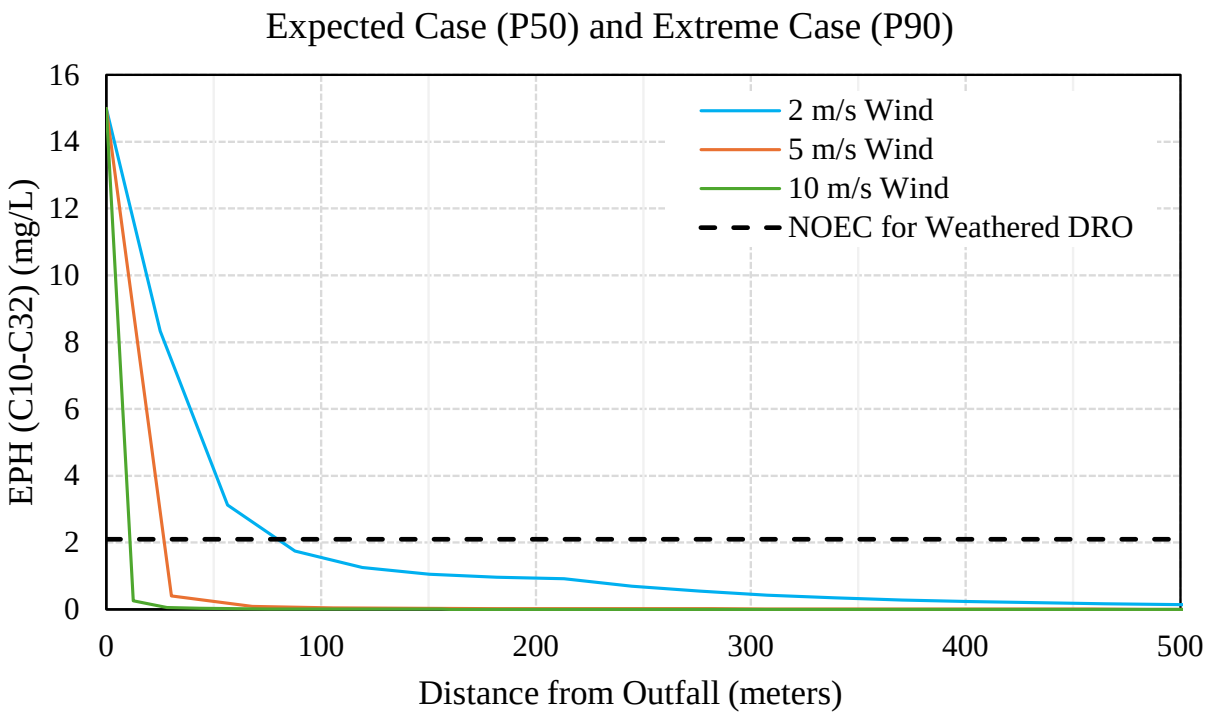


Figure 5-5: Extractable petroleum hydrocarbons (EPH) effluent plume predictions for both expected case and extreme case model scenarios. Modelled EPH concentration in effluent discharged from OUT-10 (15 mg/L) reflects 100% treated OWTS effluent under dry conditions.

5.4.5.3 Spatial Extent

Mixing of effluent with marine water is expected to reduce EPH concentrations to below the no-effects threshold (2.12 mg/L; Hobbs, Eickhoff, & Lee, 2020) at the edge of the IDZ from OUT-10 under all wind conditions modelled for the expected and extreme case models; therefore, the spatial extent is characterized as **local**.

5.4.5.4 Duration

As discussed in Section 4.2.2.1, the OWTS operates in 12-hour batch cycles; therefore, the duration of increased EPH concentrations in the receiving environment associated with OUT-10 effluent discharge is characterized as **short-term**.

5.4.5.5 Frequency

As discussed in Section 5.1, the OWTS will be operated infrequently (approximately once or twice per month) during dry conditions, for maintenance or to empty the Oily Water Storage Tank in advance of a rainfall event. Therefore, the frequency of increased EPH concentrations in the receiving environment associated with OUT-10 effluent discharge is characterized as **sporadic.**

5.4.5.6 Reversibility

After the discharge of OUT-10 effluent is stopped, it is expected that EPH concentration in the receiving environment will decrease to levels below the no-effects threshold (2.12 mg/L; Hobbs, Eickhoff, & Lee, 2020); therefore, the reversibility is characterized as **reversible short-term**.

5.4.5.7 Summary of Potential Residual Effects

The characterizations of changes to EPH concentration in the receiving environment from discharge of effluent at OUT-10 are summarized in Table 5-5. Given the characterization as low magnitude, local spatial extent, short-term duration, sporadic frequency, and short-term reversibility, **it is unlikely that the modelled EPH in OUT-10 effluent will have an adverse effect on aquatic life in the receiving environment.**

Table 5-5:
Effect Assessment Ratings for Extractable Petroleum Hydrocarbons (EPH)

Category	Expected/Extreme Case
Ecological context	High
Magnitude	Low
Spatial extent	Local
Duration	Short-term
Frequency	Sporadic
Reversibility	Reversible short-term

The confidence in this assessment is moderate. Key uncertainties pertain to the composition and extent of weathering of EPH in OUT-10 effluent, both of which have bearing on aquatic toxicity. Monitoring of water quality will be implemented (according to the program described in Section 6.2) to determine the concentration of EPH in OUT-10 effluent and the receiving environment. Acute and chronic toxicity testing will be conducted to assess the potential for toxic effects of effluent discharge on aquatic life.

5.4.6 Summary

Contact water from the Project site is expected to be discharged during stormwater events, and occasionally (approximately once or twice per month) when the Oily Water Storage Tank is emptied during dry conditions. Effluent quality at OUT-10 was modelled for two source term scenarios (expected case and extreme case). Modelled concentrations under dry conditions, when the OUT-10 discharge consists solely of treated effluent from the OWTS, were higher than those predicted for stormwater conditions. As a conservative approach, modelled concentrations of POCs in the OUT-10 discharge under dry conditions

(TSS, T-Cu, T-Zn, and EPH) were assessed for potential residual effects on aquatic life in the marine environment.

A mixing model was used to estimate concentrations of POCs in the receiving environment under low, moderate, and high wind speeds. The modelled concentrations in the receiving environment were used to characterize the magnitude and spatial extent of changes to water quality from the discharge of treated effluent. The ecological context of the receiving environment, as well as the duration, frequency, and reversibility of changes to water quality from the discharge of effluent, were also characterized. The ratings were consistent across the four POCs assessed (Table 5-6). The marine receiving environment of Howe Sound is rated high ecological context, with marginal quality habitat in the intertidal and subtidal zones within the Project area. Given the low magnitude, local spatial extent, short-term duration, sporadic frequency, and reversible short-term ratings, it was concluded that the modelled discharge of OUT-10 effluent is unlikely to cause adverse effects to aquatic life in the receiving environment.

Table 5-6:
Summary of Effect Assessment Ratings for Parameters of Concern

Category	TSS	T-Cu and T-Zn	EPH
Ecological context	High	High	High
Magnitude	Low	Low	Low
Spatial extent	Local	Local	Local
Duration	Short-term	Short-term	Short-term
Frequency	Sporadic	Sporadic	Sporadic
Reversibility	Reversible short-term	Reversible short-term	Reversible short-term

The confidence in the ratings was determined to be high for TSS, T-Cu, and T-Zn, and moderate for EPH. The lower confidence in the EPH rating reflects greater uncertainty in the composition and extent of weathering of EPH in the effluent compared to TSS and total metals.

5.5 Cumulative Effects

This section discusses the potential for receiving environment water quality to be affected by past, present, and future effluents discharged within the Project area boundaries, thereby contributing to cumulative effects on aquatic life from changes to water quality. The current and planned effluent discharges within the Project area boundaries are summarized in Table 5-7. The foreseeable effluent discharges during Project operations will originate from the Landfill Leachate Treatment Plant, the Sewage Treatment Plant, and the OWTS. Construction related discharges from the East and West Sedimentation Ponds to Howe

Sound, and from the Fortis-led Eagle Mountain Woodfibre Gas Pipeline Project to East Creek, are planned to cease when construction is completed. Cumulative effects from pre-construction and construction effluent discharges in the Howe Sound receiving environment, within Project boundaries, are considered to be accounted for in the monitoring results presented in Section 3. The residual effects assessment (Section 5.4) indicates that the modelled OWTS discharge from OUT-10 is unlikely to cause adverse effects to aquatic life in the receiving environment.

During operations, effluent from OUT-10 will discharge from the shoreline to the Howe Sound surface waters, whereas the Sewage Treatment Plant and the Landfill Leachate Treatment Plant will discharge to deeper waters underlying the surface layer (Table 5-7). As discussed in Section 3.10, mixing between the surface and deeper waters is limited by water column stratification. The mixing model (Section 4.4) indicates that the OUT-10 effluent will form a buoyant plume that mixes with the surface layer of Howe Sound. Due to water column stratification and the spatial separation of the discharge locations (Table 5-7), discharges of treated domestic wastewater and treated leachate effluent to the deep water are unlikely to mix with the surface discharge from OUT-10; therefore, cumulative effects of these effluents are unlikely and not assessed in this TAR.

Table 5-7:
Summary of Effluent Discharges Within Project Area Boundaries

Effluent Source	Effluent Permit Number	Discharge Period	Description of Discharge
Landfill Leachate Treatment Plant	1239	P, C, O	Underwater discharge of treated landfill leachate to Howe Sound at approximately 22 m depth and approximately 220 m southwest of OUT-10.
Sewage Treatment Plant	2334	P, O	Underwater discharge to Howe Sound at approximately 25 m depth and approximately 770 m southwest of OUT-10. Treated domestic wastewater has not been discharged during most of construction because the wastewater was collected and disposed off-site at a licenced domestic wastewater treatment facility. Discharge is forecast to resume just before or during early operations.
West Sedimentation Pond	111578	C	Shoreline discharge of non-contaminated construction contact water to Howe Sound from SP-W-OUT (OUT-04), located approximately 530 m southwest of OUT-10. Sedimentation pond discharge is forecast to cease when the transition from the construction to operations water management system is completed (Section 4.1.10.2).
East Sedimentation Pond	111578	C	Shoreline discharge of non-contaminated construction contact water to Howe Sound from SP-E-OUT (OUT-10). This is the same outfall as OUT-10. Sedimentation pond discharge is forecast to cease when the transition from the construction to operations water management system is completed (Section 4.1.10.2).
Eagle Mountain – Woodfibre Gas Pipeline Project (FortisBC)	110163	C	The Eagle Mountain Woodfibre Gas Pipeline Project is operated by FortisBC. The Woodfibre side of the tunnel construction effluent is discharged to East Creek, which in turn discharges to the Howe Sound shoreline from OUT-12, approximately 70 m northeast of OUT-10. It is understood that effluent discharge is planned to cease when construction is completed.
OWTS Effluent and Stormwater Runoff (OUT-10)	WDA Permit application in progress	O	Treated OWTS effluent and non-contaminated stormwater runoff discharged to Howe Sound from OUT-10. Comingled OWTS effluent and stormwater runoff discharge is forecast to commence when the transition from the construction to operations water management system is completed (Section 4.1.10.2).

Discharge period notes: P = pre-construction, C = construction, O = operations

6. Proposed Discharge Limits and Monitoring Plan



6 Proposed Discharge Limits and Monitoring Plan

This section outlines the proposed discharge limits and monitoring plan to support WLNG's request for authorization to discharge treated effluent from the OWTS to the adjacent waters of Howe Sound.

6.1 Discharge Limits

Proposed discharge limits are intended to establish maximum allowable discharge concentrations for parameters directly influenced by Project operations (*i.e.*, TSS and EPH). The effluent model (Section 4.3) predicts that TSS, T-Cu, T-Zn and pH concentrations discharged at OUT-10 may exceed WQGs for the protection of MWAL, and EPH concentrations may exceed the NOEC value derived for the growth of topsmelt. However, the mixing model (Section 4.4) predicts effluent will be rapidly diluted in Howe Sound within the IDZ. Based on these results, the effects assessment (Section 5) concluded that the predicted concentrations of TSS, T-Cu, T-Zn, pH, and EPH are unlikely to result in adverse effects to the receiving environment, even under the dry condition extreme case model scenario.

The highest predicted T-Cu and T-Zn concentrations are attributed to the particulate-bound fractions of the metals, which are considered less bioavailable than their dissolved forms. The dissolved fraction concentrations of these metals (*i.e.*, D-Cu and D-Zn) are predicted to be below the corresponding T-Cu and T-Zn WQGs for the protection of MWAL. The effects assessment concluded that the predicted concentrations of T-Cu and T-Zn in OUT-10 effluent are unlikely to result in adverse effects to the receiving environment. These parameters do not originate from the LNG manufacturing process and instead are associated with TSS that may accumulate in the LNG Processing Area from windblown sources or from vehicle traffic. Additionally, the maximum predicted concentrations of T-Cu and T-Zn in OUT-10 effluent are within the range of observed conditions for Howe Sound waters, with maximum observed values of 0.00974 mg/L for T-Cu, and 0.102 mg/L for T-Zn (Section 3.9.3). Based on the preceding considerations, discharge limits for T-Cu and T-Zn are not proposed.

The effluent model predicts that pH in effluent discharged from OUT-10 will exceed the WQG for the protection of MWAL. However, the effects assessment concluded that the lowest modelled pH for contact and non-contact water reflects natural background conditions in creek and non-contact water within the Project area and is therefore not

expected to result in adverse residual effects on the receiving environment. Therefore, a discharge limit for pH is not proposed.

In consideration of the predicted effluent quality for OUT-10, the results of the effects assessment, and the observed water quality of Howe Sound, it is proposed that the WDA discharge limits at OUT-10 be set equal to the dry condition predicted values for TSS and EPH that are shown in Table 6-1 and described in Section 4.3.3.4.

Table 6-1:
Proposed Discharge Limits for OUT-10 Discharge to Howe Sound

Parameter	Discharge Limit
TSS	25 mg/L
EPH (C10-C32)	15 mg/L

6.2 Monitoring Plan

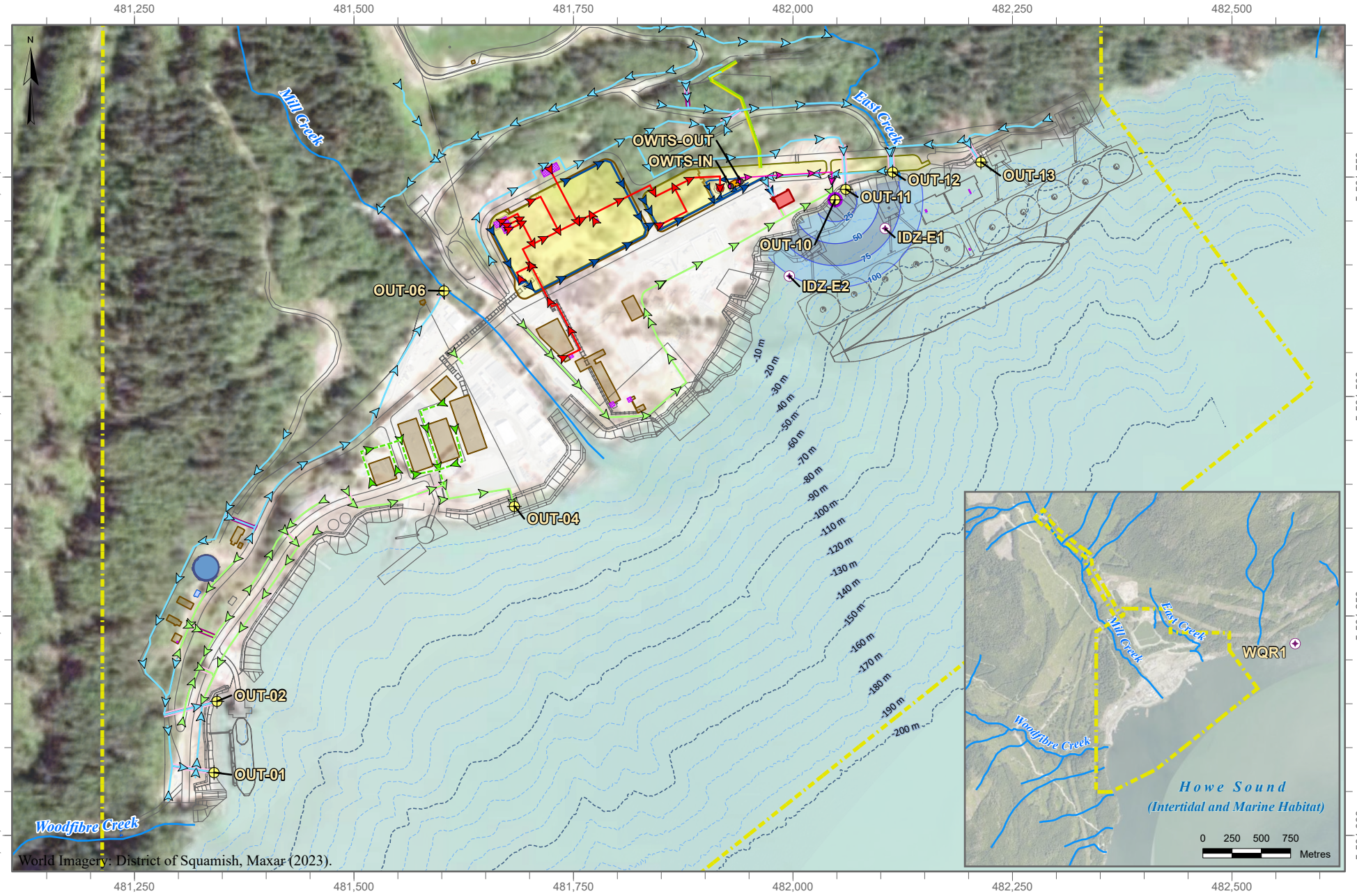
This section describes the proposed water quality monitoring program to support the requested WDA discharge limits described in Section 6.1. Contaminated or potentially contaminated contact water that has been assessed as suitable for on-site treatment will be directed to the OWTS (Section 4.1.5). Monitoring will be conducted to confirm the treatment performance of the OWTS and to confirm that the discharge quality meets WDA limits. The receiving environment near the OWTS discharge outfall location (OUT-10) will also be monitored.

The monitoring program encompasses three key components of the effluent management system:

1) the OWTS;
2) the outfalls; and
3) the receiving environment.

The monitoring plan for each is described below (Sections 6.2.1, 6.2.2, and 6.2.3, respectively), along with quality assurance and quality control (Section 6.2.4). TSS compliance at OUT-10 will be evaluated through a turbidity-TSS relationship, as discussed in Section 6.2.5. Proposed monitoring locations are presented in Figure 6-1.

All field water quality monitoring and sampling will be completed by trained personnel in accordance with the British Columbia Field Sampling Manual (Clark, 2013). Monitoring samples will be submitted for analytical testing to a laboratory qualified under the B.C. Environmental Data Quality Assurance Regulation, and following the procedures described the British Columbia Environmental Laboratory Manual (ENV, 2023).



LEGEND

- Oily Water Treatment System (OWTS) Monitoring Station
- Marine Water Monitoring Station
- Outfall Monitoring Station
- Outfall Compliance Point
- Site Linework (Reduced)
- Site Buildings
- LNG Facility
- Fire Water Tank
- Raw Water Intake / Filter
- Sump
- Oily Water Storage Tank
- Oily Water Treatment System
- Certified Project Area
- Culvert
- RipRap Apron
- Fortis BC Main Gas Supply Pipeline
- Non-Contact Water Ditch
- Non-Contaminated Contact Water Storm Sewer
- Non-Contaminated Contact Water Ditch
- Contaminated Contact Water Pipeline
- Potentially Contaminated Contact Water Trench
- Treated Contact Water Pipeline
- Watercourse
- Bathymetry Contour (Major: 50m)
- Bathymetry Contour (Minor: 10m)

DATE SAVED:	Jul 22, 2026
DRAWN BY:	DM
REVIEWED:	PM
VERSION:	2

Coordinate System: *NAD 1983 UTM Zone 10N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Metre*

1:6,000

0 50 100 150
Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT:

Woodfibre LNG Facility

TITLE: Proposed WDA Water Quality Monitoring and Compliance Locations

PROJECT #: A825-1

FIGURE: 6-1

6.2.1 OWTS Monitoring

The objectives of the OWTS monitoring program are to:

a) assess efficacy of the treatment process for the OWTS; and

b) monitor the water quality and volume of treated effluent from the OWTS being discharged to Howe Sound.

A sampling port for the influent to the OWTS (OWTS-IN) will be located on the influent pipe from the Oily Water Storage Tank. Treated effluent will be monitored on the treated effluent line from the OWTS, at station OWTS-OUT (Figure 6-1).

Monitoring locations, frequencies, and parameter groups to be analyzed are presented in Table 6-2. Detailed parameter lists for each parameter group are presented in Appendix 6.1-1. The routine monitoring plan encompasses daily to monthly sampling, depending on parameter group (Table 6-2). Field parameters and flows will be monitored daily, while the full suite of analytical parameters (*i.e.,* physical and general parameters, BTEX and VH, EPHs and PAHs, and total and dissolved metals) will be monitored monthly.

6.2.2 Outfall Monitoring

Monitoring will be conducted at the outfalls that route non-contact and non-contaminated stormwater runoff to the receiving environment. A total of eight stormwater runoff discharges are included in the outfall monitoring plan, including OUT-10, which also discharges treated effluent from the OWTS. The objectives of the outfall monitoring program are to:

a) assess compliance with the conditions of the WDA; and

b) monitor the water quality of stormwater runoff, including stormwater comingled with treated OWTS effluent at OUT-10, discharged to the receiving environment.

At outfalls OUT-01, OUT-06, OUT-11, OUT-12, OUT-13 (Figure 6-1), field parameters will be monitored monthly, while the complete analytical suite (*i.e.,* physical and general parameters, BTEX & VH, EPHs and PAHs, and total and dissolved metals) will be monitored on a quarterly basis during the first year of operations to confirm the effectiveness of the stormwater diversion measures. Following this verification period, monitoring at these outfalls will be discontinued.

Monitoring at OUT-02 and OUT-04 (Figure 6-1) will be conducted monthly for field parameters and quarterly for full analytical suite to verify water quality at outfalls that receive a significant amount of non-contaminated contact water from the Project site.

Table 6-2:
Monitoring Plan for the Oily Water Treatment System

Station Name	Sample Type	Description	Coordinates [1]		Flow Rate	Field Parameters	Physical Parameters	General Chemistry	VH & BTEX	EPHs & PAHs	Metals – Total & Dissolved
			Latitude	Longitude							
OWTS-IN	Influent	Influent to the OWTS from the Oily Water Storage Tank.	49.6680º	-123.2504º	D	D	M	M	M	M	M
OWTS-OUT	Effluent	Effluent from the OWTS.	49.6680º	-123.2503º	D	D	M	M	M	M	M

Notes:
[1] Coordinates are approximate and subject to revision based on final as-built conditions. All coordinates are in UTM Zone 10 U.
D = daily M = monthly
Sampling will only be conducted when the OWTS is operational and actively treating/discharging water.
Sampling of field and physical parameters at OWTS-OUT will be synchronized to produce paired field turbidity and laboratory TSS data, enabling development of a turbidity-TSS relationship (refer to Section 6.2.5).

At OUT-10 (Figure 6-1), field parameters will be monitored daily (when there is a rainfall event and/or a OWTS batch operation), while analytical parameters will be monitored monthly. In addition, quarterly acute toxicity testing will be conducted in effluent discharged at OUT-10.

A summary of the proposed sampling locations, sampling frequencies, and parameter groups for outfall water samples is presented in Table 6-3. A list of water quality parameters to be analyzed for each parameter group is provided in Appendix 6.1-1.

6.2.3 Receiving Environment Monitoring

The objectives of the receiving environment monitoring program are to:

a) assess compliance with the conditions of the WDA;

b) detect change and long-term trends in the receiving environment; and

c) identify any potential environmental effects associated with discharge from the Project site.

Receiving environment water quality will be evaluated considering reference station water quality conditions and applicable regulatory guidelines (*i.e.*, Federal and B.C. WQGs) and/or WDA discharge limits.

The marine receiving environment monitoring program has been designed to monitor water quality in the mixing zone immediately downstream of the OUT-10 discharge. The water column will be sampled at two IDZ monitoring stations (IDZ-E1 and IDZ-E2) located approximately 50 to 100 m from the OUT-10 contact water discharge outfall, and at a nearshore reference site located approximately 500 m northeast of the Project site (WQR1) (Figure 6-1). Field measurements and testing for the full suite of analytical parameters (*i.e.*, physical parameters, general parameters, BTEX & VH, EPHs & PAHs, total and dissolved metals) will be conducted monthly for the first year of operations, followed by quarterly sampling thereafter. In addition, chronic toxicity testing will be conducted quarterly.

A summary of the proposed sampling locations, sampling frequencies, and parameter groups for freshwater and marine water samples is presented in Table 6-4. A list of water quality parameters to be analyzed for each parameter group is provided in Appendix 6.1-1.

Table 6-3:
Monitoring Plan for Outfalls

Station Name	Sample Type	Description	Coordinates		Field Parameters	Physical Parameters	General Parameters	BTEX & VH	EPHs & PAHs	Metals[1]	Acute Toxicity[2]
			Latitude	Longitude							
Stormwater Runoff / Treated Effluent Discharge											
OUT-10	Effluent	Discharge of non-contaminated and treated contaminated/potentially contaminated contact water from the East side of Mill Creek to Howe Sound.	49.6678º	-123.2488º	D [4]	M	M	M	M	M	Q
Stormwater Runoff Discharges											
OUT-01 [3]	Freshwater	Discharge of predominantly non-contact water, with small inputs of non-contaminated contact water, from the West side of Mill Creek to Howe Sound.	49.6619º	-123.2585º	M	Q	Q	Q	Q	Q	-
OUT-02	Freshwater	Discharge of predominantly non-contact water, with small inputs of non-contaminated contact water, from the West side of Mill Creek to Howe Sound, and from periodic backflushing of the Fire Water Tank filtration system.	49.6626º	-123.2585º	M	Q	Q	Q	Q	Q	-
OUT-04	Freshwater	Discharge of non-contaminated contact water from the West side of Mill Creek to Howe Sound.	49.6646º	-123.2538º	M	Q	Q	Q	Q	Q	-
OUT-06 [3]	Freshwater	Discharge of predominantly non-contact water, with small inputs of non-contaminated contact water, from the West side of Mill Creek to Mill Creek.	49.6668º	-123.2549º	M	Q	Q	Q	Q	Q	-
OUT-11 [3]	Freshwater	Discharge of non-contact water and non-contaminated contact water from East side of Mill Creek to Howe Sound.	49.6679º	-123.2486º	M	Q	Q	Q	Q	Q	-
OUT-12 [3]	Freshwater	Discharge of East Creek (containing predominantly non-contact water, with small inputs of non-contaminated contact water) to Howe Sound.	49.6681º	-123.2479º	M	Q	Q	Q	Q	Q	-
OUT-13 [3]	Freshwater	Discharge of predominantly non-contact water, with small inputs of non-contaminated contact water, from the East side of Mill Creek to Howe Sound.	49.6682º	-123.2465º	M	Q	Q	Q	Q	Q	-

All coordinates are in UTM zone 10 U. Coordinates for the outfall are at the point of discharge; actual monitoring locations will be finalized when the facilities are constructed.
D = daily
M = monthly
Q = quarterly
Sampling will be conducted only when discharge flow occurs during the specified monitoring period.
Sampling of field and physical parameters at OUT-10 will be synchronized to produce paired field turbidity and laboratory TSS data, enabling development of a turbidity-TSS relationship (refer to Section 6.2.5).
[1] Water quality samples will be tested for dissolved and total metals
[2] Acute Toxicity testing will be conducted with 100% effluent using a fish species and an invertebrate species.
[3] After the first year of monitoring, monitoring requirements at select outfalls (OUT-01, OUT-06, OUT-11, OUT-12 and OUT-13) will be discontinued.
[4] Field measurements will be taken daily at OUT-10 when there is a rainfall event and/or a OWTS batch operation.

Table 6-4:
Monitoring Plan for Receiving Environment

Station Name	Sample Type	Description	Coordinates		Field Parameters	Physical Parameters	General Parameters	BTEX & VH	EPHs & PAHs	Metals[1]	Chronic Toxicity[2]
			Latitude	Longitude							
WQR1[3]	Marine Water	Reference site located northeast of East Creek 500 m northeast of the Project boundary.	49.6694º	-123.2368º	Q (M)	Q (M)	Q (M)	Q (M)	Q (M)	Q (M)	Q
IDZ-E1	Marine Water	IDZ monitoring station at approximately 50 to 100 m southeast of OUT-10.	49.6674	-123.2480	Q (M)	Q (M)	Q (M)	Q (M)	Q (M)	Q (M)	Q
IDZ-E2	Marine Water	IDZ monitoring station at approximately 50 to 100 m southwest of OUT-10.	49.6670	-123.2495	Q (M)	Q (M)	Q (M)	Q (M)	Q (M)	Q (M)	Q

All coordinates are in UTM zone 10 U.
M = monthly
Q = quarterly
Q (M) = monthly for the first year, then quarterly thereafter.
Marine water samples will be collected at 3 depths: 2 m above the seafloor, 2 m below water surface, and 0.5 m below water surface.
[1] Water quality samples will be tested for dissolved and total metals.
[2] Chronic Toxicity testing will be conducted on the marine water sample collected from 0.5 m below the water surface, and will be tested using a fish species and an invertebrate species.
[3] Reference station WQR1 was established in 2021 (Keystone, 2021d and Lorax, 2022b).

6.2.4 Quality Assurance and Quality Control (QA/QC)

A QA/QC program will be implemented to verify the integrity of the collected monitoring data. Quality control samples (*e.g.*, field duplicate, field blank and trip blank) will be collected to assess data quality and can be used to estimate sampling error and variance. The field QA/QC program will be conducted in accordance with the B.C. Field Sampling Manual – Part A: Quality Control and Quality Assurance (Clark, 2013). Laboratory testing will follow the laboratory QA/QC protocols described in the B.C. Environmental Laboratory Manual – Section A Laboratory Quality Assurance / Quality Control (ENV, 2023).

6.2.5 Turbidity-TSS Relationship

A site-specific turbidity-TSS relationship will be established using field measurements paired with laboratory TSS analyses. This relationship will enable personnel to estimate TSS in real time from on-site turbidity measurements for field level evaluation of water quality. The initial relationship will be developed from the construction contact water dataset and will be updated with operations data as they are obtained.

Once the operations contact water turbidity-TSS relationship is established, ongoing compliance with the TSS discharge limit will rely primarily on turbidity measurements interpreted through the site-specific turbidity-TSS curves. Laboratory confirmation sampling will continue at reduced frequencies to validate and refine these relationships at OUT-10 and OWTS-OUT.

Additional information regarding the operational aspects of the turbidity-TSS relationship is available in the Stormwater Drainage Management Plan (Appendix 4.1-1).

7. Closure



7 Closure

This report has been prepared for the exclusive use of WLNG and has been prepared solely for the purpose of supporting an application for a WDA pursuant to the B.C. *Environmental Management Act* for commissioning and operations of the Project. Apart from review and use by the BCER in connection with the above-noted application, the report should not be relied upon by any other party or for any other purpose. Any unauthorized use or reliance on this report by other parties, and any decisions made based on it, are the responsibility of such parties. Lorax accepts no responsibility for any damages that may be suffered by other parties as a result of decisions made or actions based on this report.

Lorax has relied in good faith on information provided by WLNG and its consultants has prepared this technical assessment report in accordance with the level of care and diligence normally exercised by professionals working in environmental science, practicing under similar circumstances in the area, and at the time of the performance of the work. Lorax assumes no responsibility for the completeness or accuracy of the information provided, or for any deficiency in the technical assessment that may have resulted from any inaccuracy or omission in this information. No other warranty is expressed or implied.

Qualified professional declarations of competency and conflict of interest forms are provided in Appendix 7.1-1.

Yours sincerely,

LORAX ENVIRONMENTAL SERVICES LTD.

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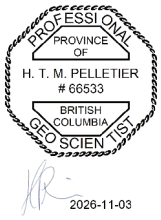
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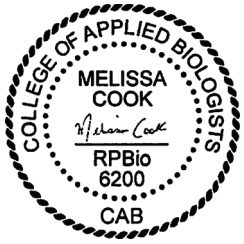
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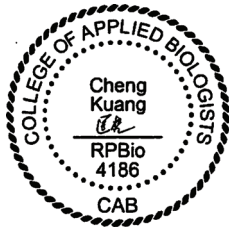
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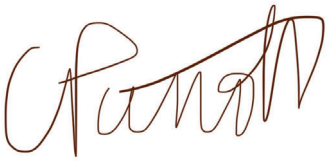
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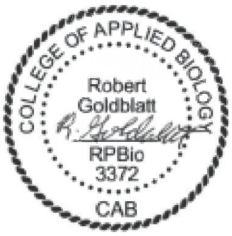


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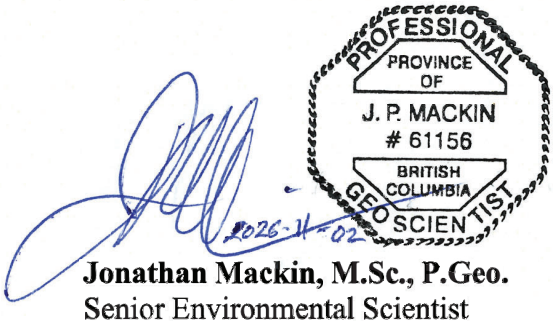


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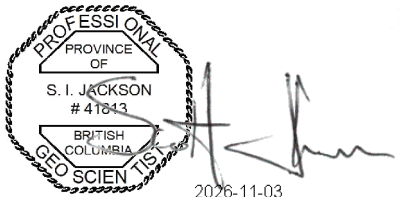
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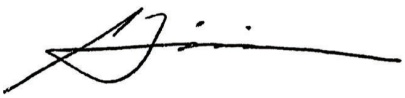
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List of Appendices

LORAX ENVIRONMENTAL

Appendix 1.1: Information Requirements

1.1-1: Information Requirements Table of Concordance

Item No.	Information	Requirements	Location in Final Application
1	**1 PROJECT DESCRIPTION**		
1.1	1.1 Describe the project including proposed facilities, products, processes and discharges. Indicate the maximum intended operating duration (*i.e* ., hours per day, days or months per year).	Required ☑	Section 2.1
1.2	1.2 Provide a detailed map of the project location including facilities and discharges. Identify surrounding land and water uses, and potential environmental receptors.	Required ☑	Figure 1-1, Figure 2-1, Figure 4-4, Figure 4-5
1.3	1.3 Describe the project permitting history and list related reports.	Required ☑	Section 1.2
1.4	1.4 Describe major activities, infrastructure and waste management related to:	Required ☑	Section 2
1.4.1	1.4.1 Site preparation and construction	Required ☑	Section 3.2 and Section 3.3.2
1.4.2	1.4.2 Operations	Required ☑	Section 2.1
1.4.3	1.4.3 Closure and post-closure	Required ☑	Section 2.3
1.5	1.5 Describe specific before and after conditions for permit amendment applications.	Required ☐	Not applicable (this is not an amendment to the existing Construction-phase WDA).
1.6	1.6 List of Qualified Professionals and signed Conflict of Interest & Declaration of Competency.	Required ☑	Appendix 7-1
2	**2 ENVIRONMENTAL SETTINGS:** This section provides information regarding the environmental setting before proposed activities occur. Please follow the British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, BC Ministry of Water, Land and Air Protection, 2013 (or the most recent version) when designing and completing these environmental setting assessments. If environmental settings data collection design and methods differ from the manual, please provide a rationale and discuss with ENV staff at the pre-application stage.		
2.1	2.1 Meteorology and Climate		
2.1.1	2.1.1 Provide a **baseline meteorology and climate assessment** of the project area. The assessment should:		Section 3.4 (Summary)
2.1.1.1	2.1.1.1 Provide a detailed map showing the location of all site-specific and regional meteorological stations in relation to project facilities.	Required ☑	Figure 3-4
2.1.1.2	2.1.1.2 Describe relevant meteorological and climate information sources for parameters such as precipitation, temperature and evaporation.	Required ☑	Section 3.4 (Summary) Stantec, 2020. Woodfibre Hydrometeorology Baseline Report (to be provided upon request).
2.1.1.3	2.1.1.3 Submit all climate data in an appendix (electronic preferred) including site photos, precipitation, temperature, snow water equivalent, *etc* . and provide monthly and annual summaries of relevant climatic parameters.	Required ☑	Section 3.4 Electronic climate data available upon request.
2.1.1.4	2.1.1.4 Identify information gaps and describe site-specific meteorological data collection methods proposed to augment existing regional data.	Required ☑	Section 3.4
2.2	2.2 Surface Water Hydrology		
2.2.1	2.2.1 Provide a **baseline hydrological assessment** of key surface drainages near the project area, to define seasonal flow regimes of local drainages. The assessment should:		Section 3.5 (Summary)
2.2.1.1	2.2.1.1 Provide monthly and annual stream flow/runoff summaries and critical low flow metrics.	Required ☑	Section 3.5.3 and 3.5.4
2.2.1.2	2.2.1.2 Describe the baseline assessment design, methods of hydrometric station installation, monitoring methods and quality control procedures, which should follow guidance in the Resource and Inventory Standards Committee (RISC) Manual of British Columbia Hydrometric Standards (most recent version).	Required ☑	Section 3.5.2 Stantec, 2020 to be provided upon request.
2.2.1.3	2.2.1.3 Provide detailed hydrologic analysis of key surface drainages within the project area to define seasonal flow regimes of local drainages. Include monthly and annual stream flow/runoff summaries and critical low flow metrics.	Required ☑	Section 3.5 Stantec, 2020 to be provided upon request.
2.2.1.4	2.2.1.4 Provide maps showing all drainage basins (local and regional) that will be affected by the proposed project, areas of groundwater discharge, wetlands and notable topographic features.	Required ☑	Figure 3-1, Figure 4-3
2.2.1.5	2.2.1.5 Provide hydrological data in an appendix (electronic preferred), including rating curves, manual measurements, plots of site-specific discharge, site photos, etc.	Required ☑	Stantec, 2020 to be provided upon request.
2.2.1.6	2.2.1.6 Describe spatial or temporal gaps in the database, and provide record periods for all gauging stations (regional and project specific).	Required ☑	Section 3.5.2, 3.5.3 and 3.5.4
2.3	2.3 Hydrogeology		
2.3.1	2.3.1 Provide a **baseline hydrogeological assessment** of the groundwater system around the project. The assessment should:		Section 3.7 (Summary)
2.3.1.1	2.3.1.1 Summarize groundwater information from the provincial databases related to aquifers, and their geology, demand and vulnerability.	Required ☑	Stantec, 2022a. Hydrogeochemical Assessment in Support of Effluent Discharge Permitting (EDP), Rev. G (to be provided upon request).
2.3.1.2	2.3.1.2 Describe the baseline groundwater assessment design, monitoring, analysis and quality control procedures. The baseline assessment must be sufficiently robust to assist with future monitoring and detect potential groundwater changes as a result of the project.	Required ☑	Section 3.7
2.3.1.3	2.3.1.3 Describe aquifers and aquitards below and downgradient of the project, including gradients, storativity, hydraulic conductivity and groundwater flux.	Required ☑	Section 3.7
2.3.1.4	2.3.1.4 Provide a map with groundwater monitoring locations, seepage areas, proposed or existing discharges to ground.	Required ☑	Figure 3-14
2.3.1.5	2.3.1.5 Submit a minimum of one year of groundwater levels and water quality data collected at a quarterly frequency.	Required ☑	Table 3-24 Stantec, 2022a to be provided upon request.
2.3.1.6	2.3.1.6 Describe the monitoring schedule and parameters, monitoring methods and data analysis, including quality controls.	Required ☑	Section 3.7
2.3.1.7	2.3.1.7 Submit water level contour maps, with seasonal variations, depicting groundwater flow direction (both horizontal and vertical, as may be applicable).	Required ☑	Stantec, 2022a to be provided upon request.
2.3.1.8	2.3.1.8 Provide well logs, hydraulic test results, drill core and test pit pictures, monitoring well installation details and hydrostratigraphic cross sections.	Required ☑	Stantec, 2022a to be provided upon request.
2.3.1.9	2.3.1.9 Describe all downgradient groundwater users (e.g. aquatic life, drinking water, etc.) within one kilometer of the project.	Required ☑	Section 3.7

Item No.	Information	Requirements	Location in Final Application
2.3.1.10	2.3.1.10 Describe surface water groundwater interactions downgradient of the project.	Required ☑	Section 3.7
2.3.1.11	2.3.1.11 Develop a conceptual hydrogeological model that synthesizes all relevant information to describe the source-transport-receptor linkages associated with the project.	Required ☑	Not applicable - no discharge to ground.
2.3.1.12	2.3.1.12 For discharges to ground, the groundwater baseline should include assessment of local hydrogeological conditions including, but not limited to, stratigraphy, soil classification, water table elevations, fluctuation and flow direction, soil and aquifer hydraulics including field-saturated hydraulic conductivity, groundwater flux, and subsurface travel times in both unsaturated and saturated zones.	Required ☐	Not applicable - no discharge to ground.
2.4	2.4 Surface Water Quality		
2.4.1	2.4.1 Provide a **baseline surface water quality assessment** for the project. The assessment should include:		Section 3.6 (Summary)
2.4.1.1	2.4.1.1 Identify potential downstream receptor groups (including applicable aquatic life, wildlife, livestock, irrigation, humans) for surface water in relation to proposed project related activities and discharges.	Required ☑	Section 3.11 and Section 5.1
2.4.1.2	2.4.1.2 Describe and justify baseline study design, methods, sampling sites and periods, analysed parameters and QA/QC procedures.	Required ☑	Section 3.6
2.4.1.3	2.4.1.3 Provide a detailed figure with sampling locations in relation to proposed or existing discharge locations, areas of disturbance and distribution of receptors.	Required ☑	Figure 3-13
2.4.1.4	2.4.1.4 Provide data summaries (using appropriate statistics) that characterize spatial and temporal variations and identify location, frequency, seasonality, duration and magnitude of applicable standards exceedances or environmental quality guideline exceedances.	Required ☑	Section 3.6.3
2.4.1.5	2.4.1.5 Provide all raw data in a tabulated form, including applicable method detection limits (in appendices – and Excel compatible electronic files).	Required ☑	Appendix 3.6-1 Electronic files to be provided upon request.
2.4.1.6	2.4.1.6 Identify certified laboratories that conducted sample analysis.	Required ☑	Section 3.6.1
2.4.1.7	2.4.1.7 Identify and discuss QA/QC concerns related to the data.	Required ☑	Section 3.6.2
2.4.1.8	2.4.1.8 Identify and assess spatial or temporal data gaps and uncertainties.	Required ☑	Section 3.6
2.4.1.9	2.4.1.9 For lakes, provide limnological characterizations at a representative deep station for each basin. Sampling design should be adequate to support determination of trophic status.	Required ☐	Not applicable - no lakes at project site.
2.4.1.10	2.4.1.10 Demonstrate that the baseline aquatic life monitoring program is sufficiently robust to assist future monitoring in detecting a significant predetermined change.	Required ☑	Section 3.6
2.5	2.5 Sediment Quality		
2.5.1	2.5.1 Provide a **baseline sediment quality assessment** near the project. The assessment should:		
2.5.1.1	2.5.1.1 Identify potential downstream receptor groups (including applicable aquatic life, wildlife, livestock, irrigation, humans) for sediment in relation to proposed project related activities and discharges.	Required ☑	Section 3.8 (Summary)
2.5.1.2	2.5.1.2 Describe and justify baseline study design, methods, sampling sites and periods, analysed parameters and QA/QC procedures.	Required ☑	Section 3.8
2.5.1.3	2.5.1.3 Provide a detailed figure with sampling locations in relation to proposed or existing discharge locations, areas of disturbance and distribution of receptors.	Required ☑	Figure 3-15
2.5.1.4	2.5.1.4 Provide data summaries (using appropriate statistics) that characterize spatial and temporal variations and identify location, frequency, seasonality, duration and magnitude of applicable standards exceedances or environmental quality guideline exceedances.	Required ☑	Section 3.8.2
2.5.1.5	2.5.1.5 Provide all raw data in a tabulated form, including applicable method detection limits (in appendices – and Excel compatible electronic files).	Required ☑	Appendix 3.8-1 Electronic file to be provided upon request.
2.5.1.6	2.5.1.6 Identify certified laboratories that conducted sample analysis.	Required ☑	Section 3.8.1
2.5.1.7	2.5.1.7 Identify and discuss QA/QC concerns related to the data.	Required ☑	Section 3.8.2
2.5.1.8	2.5.1.8 Identify and assess spatial or temporal data gaps and uncertainties.	Required ☑	Section 3.8
2.5.1.9	2.5.1.9 Demonstrate that the baseline monitoring program is sufficiently robust to assist future monitoring in detecting a significant predetermined change.	Required ☑	Section 3.8
2.6	2.6 Aquatic Life		
2.6.1	2.6.1 Provide a **baseline aquatic life assessment** near the project. The assessment should:		
2.6.1.1	2.6.1.1 Describe and justify baseline study design, methods, sampling sites and periods, analysed parameters and QA/QC procedures.	Required ☑	Section 3.9 and 3.11
2.6.1.2	2.6.1.2 Provide a detailed figure with sampling locations in relation to proposed or existing discharge locations, areas of disturbance and distribution of receptors.	Required ☑	Figure 3-13 and Figure 3-15
2.6.1.3	2.6.1.3 Provide data summaries (using appropriate statistics) that characterize spatial and temporal variations and identify location, frequency, seasonality, duration and magnitude of applicable standards exceedances or environmental quality guideline exceedances.	Required ☑	Section 3.9.3
2.6.1.4	2.6.1.4 Provide all raw data in a tabulated form, including applicable method detection limits (in appendices – and Excel compatible electronic files).	Required ☑	Appendix 3.9-1 Electronic files to be provided upon request.
2.6.1.5	2.6.1.5 Identify certified laboratories that conducted sample analysis.	Required ☑	Section 3.9.1
2.6.1.6	2.6.1.6 Identify and discuss QA/QC concerns related to the data.	Required ☑	Section 3.9.2
2.6.1.7	2.6.1.7 Identify and assess spatial or temporal data gaps and uncertainties.	Required ☑	Section 3.9
2.6.1.8	2.6.1.8 Demonstrate that the baseline aquatic life monitoring program is sufficiently robust to assist future monitoring in detecting a biologically significant predetermined change.	Required ☑	Section 3.9 and Section 3.11

Item No.	Information	Requirements	Location in Final Application
2.7	2.7 Oceanography		
2.7.1.1	2.7.1 Provide **a baseline oceanographic assessment** of key factors that may influence mixing and dispersion of the discharge in the marine or estuarine environment. The analysis must:	Required ☑	Section 3.10 and Figure 3-15
2.7.1.2	2.7.1.2 Identify estuaries and inflows and delineation of their zone of influence.	Required ☑	Section 3.1 and Section 3.10
2.7.1.3	2.7.1.3 Submit maps and analysis of bathymetric features.	Required ☑	Section 3.10 and Figure 3-15
2.7.1.4	2.7.1.4 Identify normal wind direction, tidal influences and marine/stream currents.	Required ☑	Section 3.4.3 and Section 3.10
2.7.1.5	2.7.1.5 Submit inventory receiving water uses including recreational uses, fisheries resources, shellfish areas, water intakes and foreshore uses.	Required ☑	Section 3.11 and Section 5
2.7.1.6	2.7.1.6 Provide drogue studies at proposed outfall terminus location(s) to determine the influence of thermal or physical/chemical stratification characteristics, normal currents over a complete tidal cycle and whether currents are directed shoreward or toward important fisheries or recreational resources.	Required ☑	Section 3.10 Golder, 2015. Metocean Data Analysis Study (to be provided upon request)
2.7.1.7	2.7.1.7 Complete and submit one month of current meter readings (at bottom, and at stratification level).	Required ☑	Golder, 2015 to be provided upon request.
2.7.1.8	2.7.1.8 Complete and submit conductivity/temperature/depth (CTD) profiles during most critical periods to establish stratification levels.	Required ☑	Section 3.10 Golder, 2015 (to be provided upon request).
2.7.1.9	2.7.1.9 Identify and assess spatial and temporal data gaps and uncertainties.	Required ☑	Section 3.10
3	**3 EFFLUENT DISCHARGES, MITIGATION, MANAGEMENT AND/OR TREATMENT**		
3.1	3.1 Provide a process flow diagram showing the waste streams.	Required ☑	Figure 4-1 and Figure 4-2
3.2	3.2 Provide full characterization of all effluent sources from the site. Indicate their source, maximum and average quality,quantity and frequency. Describe the methodology used for characterization.	Required ☑	Section 4.1
3.3	3.3 Provide a detailed site plan that includes locations and coordinates for each discharge location (coordinates must be in decimal degrees to the fourth decimal place).	Required ☑	Figure 2-1, Figure 4-4, Figure 4-5, Figure 6-1, Section 6.1.2
3.4	3.4 Describe mitigation measures to be used to limit discharge rates and contaminant concentrations.	Required ☑	Section 4.1 and 4.2
3.5	3.5 If untreated effluent concentrations at the source are predicted to exceed acute BC Water Quality Gudelines (BCWQG) undertake and submit a Best Achievable Technology Review by a Qualified Professional (QP) (see current *Fact Sheet Waste Discharges – Best Achievable Technology*). Note: Where needed, an Initial Dilution Zone (IDZ) may typically only be considered after implementation of BAT.	Required ☑	Section 4.2.1 and Appendix 4.2-1
3.6	3.6 If treatment is proposed, provide the following information:		
3.6.1	3.6.1 Specify the treatment design criteria including treatment capacity, retention times, and input and output water quantity and quality.	Required ☑	Section 4.2.1.2 and 4.2.2
3.6.2	3.6.2 Provide treatment system detailed design drawings including discharge works, certified, signed and stamped by a qualified professional.	Required ☑	Appendix 4.1-3 and Appendix 4.2-3
3.6.3	3.6.3 Provide rationale for expected treatment effectiveness (*e.g.,* examples with similar conditions, bench scale tests, pilot tests), including an evaluation of effectiveness under potential variable operating conditions (*e.g* ., flood or storm events).	Required ☑	Section 4.2.3
3.6.4	3.6.4 Describe all treatment process by-products (liquid, solid and gaseous), including quantity and quality, and provide a management plan for each, including sludge management plan if applicable.	Required ☑	Section 4.2.2.4 and Appendix 4.1-1
3.7	3.7 Propose effluent discharge limits for contaminants of potential concern that can be shown to be protective of the receiving environment and its receptors.	Required ☑	Section 6.2
3.8	3.8 Describe the proposed sampling and flow measuring facilities at discharge points.	Required ☑	Section 6.1
3.9	3.9 Describe the storm water management system and provide detailed design for proposed storm water works.	Required ☑	Section 4.1.5 and Appendix 4.1-3
3.10	3.10 Certification by Qualified Professionals - QP sign-off certifying that the wastewater facility as designed and/or as-constructed is capable of meeting the proposed discharge requirements.	Required ☑	Appendix 4.2-4
3.11	3.11 Provide project and treatment system construction and commissioning schedule and related notification requirements.	Required ☑	Section 2.2 and Section 4.1.10
3.12	3.12 Provide a detailed description of any use of reclaimed water (effluent), including: o A detailed description of the intended use. o Planned or potential public and/or worker exposure. o An evaluation of the implications for effluent quality based on potential exposure and user safety.	Required ☐	Not applicable - reclaimed water use is not planned.
4	**4 ENVIRONMENTAL EFFECTS PREDICTION AND IMPACT ASSESSMENT**		
4.1	4.1 Identify the receptors and/or environmental values that may be at risk due to project related activities.	Required ☑	Section 5.1 and Section 5.4
4.2	4.2 Provide a figure, identify and justify spatial and temporal boundaries for effects predictions.	Required ☑	Section 4.4, Section 5 and Figure 6-1
4.3	4.3 Develop and submit a Conceptual Site Model. Describe and illustrate graphically the contaminant source, transport pathways from source to receptors. Estimate probabilities of occurrence and the risk, and develop a risk management matrix.	Required ☑	Section 4.3.1, Figure 4-12 Section 5, Figure 5-1
4.4	4.4 Describe the size and edge of the Initial Dilution Zone (IDZ) at which point the BCWQG must be met. Please refer to the ENV Interim Technical Guidance 11: Development and Use of Initial Dilution Zones in Effluent Discharge Authorizations.	Required ☑	Section 4.4 and Section 6.1
4.5	4.5 Identify by location and receptor groups, potential for effects as well as frequency, seasonality, magnitude and reversibility of the effects. Provide rationale for the effects assessment. Demonstrate through a weight of evidence approach that effluent and non-point source discharges will not cause toxicity within the IDZ (acute) and outside of the IDZ (acute or chronic). Identify any residual effects.	Required ☑	Section 5

Item No.	Information	Requirements	Location in Final Application
4.6	4.6 Provide predicted incremental changes (*e.g* . monthly/annually) over existing receiving environment water, sediment quality and/or tissue quality at critical points downstream (*e.g.* within IDZ, edge of IDZ, near field and far field, sensitive habitat) and during critical time periods (*e.g.* low dilution 7Q10, high flows, spawning, hatching, *etc.*) This should be included for all project phases.	Required ☑	Section 4.3 and Section 4.4
4.7	4.7 Identify all locations, parameters, time periods, magnitude, frequency and seasonality for which exceedances of BCWQGs, Sediment Quality Guidelines, tissue guidelines, or applicable standards are predicted to occur in water, sediment or tissue quality.	Required ☑	Section 4.3 and Section 5
4.8	4.8 Describe predicted effects of project related activities, including all effluent and non-point discharges on the water balance, flows and water levels.	Required ☑	Section 4.3, Section 4.4 and Section 5
4.9	4.9 Explain and justify assessment (*e.g* ., drinking water quality, recreation, aquatic life, wildlife, livestock, irrigation) and measurement endpoints (chemical, toxicological or biological) to identify expected and realistic worst case seasonal effects and trends.	Required ☑	Section 4.3
4.10	4.10 Describe and discuss the potential for bioaccumulation or bioconcentration of contaminants, and the associated risk to assessment endpoints (*i.e.* , fish health, fish reproduction, consumers of fish, *etc.*).	Required ☑	Section 5
4.11	4.11 Predict changes in aquatic receptors at species, community and/or ecosystem levels as appropriate due to water quality and water quantity changes due to the project, other anthropogenic activities and considering climate change.	Required ☑	Section 5
4.12	4.12 Identify risks to non-aquatic receptors, including wildlife, livestock and human health.	Required ☑	Section 5.1
4.13	4.13 Validate proposed effluent quality requirements based on a thorough assessment of discharge loading, and the effects assessment.	Required ☑	Section 4.3 and Section 5
4.14	4.14 Identify data gaps, uncertainties and risk and describe how they will be reduced and/or addressed in adaptive management and environmental monitoring programs.	Required ☑	Section 4.1 and Appendix 4.1-1
4.15	4.15 Where **models** are used:		
4.15.1	4.15.1 Conduct sensitivity analysis for the **water quality** model to identify the input parameters of most consequence to the model output. Consider the widest reasonable range of model inputs including but not limited to: o hydro-climatic - wet and dry events representative of the streamflow variability in the project area o hydrogeologic – groundwater recharge, water levels and hydraulic conductivity o water quality - address uncertainty with regards to attenuation, water treatment, source terms, etc.	Required ☑	Section 4.3
4.15.2	4.15.2 Describe and justify receiving environment modelling approaches. Describe the models type, its assumptions, inputs and outputs.	Required ☑	Section 4.3
4.15.3	4.15.3 Provide calibration/validation statistics and plots for the models used.	Required ☑	Section 4.3
4.15.4	4.15.4 Identify data gaps, assumptions and uncertainty in the models used, and how they will be addressed.	Required ☑	Section 4.3
4.16	4.16 For impact assessment related to discharge to ground provide:		Not applicable - no discharge to ground.
4.16.1	4.16.1 Summary of the baseline hydrogeological setting and downgradient groundwater users (e.g. aquatic life, drinking water).	Required ☐	Not applicable - no discharge to ground.
4.16.2	4.16.2 Description of the infiltration system, including its design and operation, maintenance and equipment monitoring.	Required ☐	Not applicable - no discharge to ground.
4.16.3	4.16.3 Description of the effluent treatment method, quantity and quality.	Required ☐	Not applicable - no discharge to ground.
4.16.4	4.16.4 Description of the 3-dimensional size of the IDZ zone, including its edge where the groundwater standards must be met. Describe the location of the edge of the IDZ in relation to the property boundary, the nearest water supply well or surface water.	Required ☐	Not applicable - no discharge to ground.
4.16.5	4.16.5 Estimation of the size of the groundwater mound from the proposed discharge and whether the mound or the discharge may extent to or daylight at ground surface.	Required ☐	Not applicable - no discharge to ground.
4.17	4.17 Methods and outcomes to predict effects from the proposed discharge on groundwater, including results and assumptions of modelling efforts (e.g. water balance, mass balance, numerical flow, contaminant transport).	Required ☐	Not applicable - no discharge to ground.
4.18	4.18 Identify data gaps, assumptions and uncertainty in the models, and how they will be addressed.	Required ☐	Not applicable - no discharge to ground.
5	**5 DISCHARGE AND ENVIRONMENTAL MONITORING PROGRAMS**		
5.1	5.1 For all programs identify the objectives, and describe and justify the proposed study design/plan.	Required ☑	Section 6.1
5.2	5.2 Discharge Monitoring Program – describe how you will monitor the effluent discharge including location, frequency, parameters, QA/QC measures, and comparison to proposed discharge limits.	Required ☑	Section 6.1
5.3	5.3 Receiving environment monitoring programs - describe the pathway and receptor linkages:		
5.3.1	5.3.1 Groundwater Monitoring Program - include the number of monitoring wells to measure the background and receiving groundwater levels and quality, and maps depicting the monitoring sites. The program should summarize the monitoring well installation details, such as geographical coordinates of all wells, installation depth, screen interval and geology, and water levels. The plan should detail the sampling methods, monitoring parameters, frequency, and the applicable BC Contaminated Sites Regulation standards that will be met at the edge of the initial dilution zone.	Required ☐	Not applicable - no discharge to ground.
5.3.2	5.3.2 Surface Water Monitoring Program - include a plan to validate model predictions, where applicable the program may also include IDZ monitoring. The program should be developed to detect change and impacts.	Required ☐	Not applicable - no treated water will be discharged to freshwater.
5.3.3	5.3.3 Marine Water Monitoring Program - include a plan to validate model predictions, assess water quality guidelines are being met and detect change and impacts to the receiving environment. The program should include at least: one control sampling station located outside the influence of the IDZ, a sampling station at the end of pipe, 3 sampling stations at the IDZ. Samples should be taken at the modelled trapping depth, surface and at depth. Sampling frequency should be 5 weekly samples in 30 days.	Required ☑	Section 6.1
5.3.4	5.3.4 Aquatic / Environmental Effects Monitoring Program – include weight of evidence assessment and cumulative effects monitoring in areas that may potentially be affected by anthropogenic activities. Demonstrate that the monitoring program is sufficiently robust to assist in detecting a biologically significant predetermined change.	Required ☑	Section 5 and Section 6.1
5.4	5.4 Describe and justify proposed data assessment techniques and reporting, including frequency and content, and notification requirements.	Required ☑	Section 6.1
5.5	5.5 Describe and justify quality assurance/quality control procedures.	Required ☑	Section 6.1.4

Item No.	Information	Requirements	Location in Final Application
6	**6 MANAGEMENT PLANS**		
6.1	6.1 Operations and Maintenance Manual – Detailed operational procedures and preventative maintenance program, operator training and qualifications, inspection schedule, inventory of replacement parts, description of automated systems, warnings and alarms, including response and notification procedures.	Required ☑	Section 4.2.5 and Appendix 4.2-6
6.2	6.2 Treatment Residuals Management Plan - Provide a plan for disposing of treatment residuals in a manner approved under the *Environmental Management Act.*	Required ☑	Section 4.2.2.4 and Appendix 4.1-1
6.3	6.3 Commissioning Plan - Contains the notification, operational procedures and monitoring required to commission the facility.	Required ☑	Section 2.2, Section 4.2.6 and Section 4.1.10
6.4	6.4 Contingency Plan - Describes emergency procedures for the facility, stand-by or emergency power requirements, procedures for notifying a health officer when necessary, actions to take if the effluent fails to meet quality requirements, and alternate disposal or storage options (for reclaimed water when use is not possible).	Required ☑	Section 4.1.8 and Appendix 4.1-1
6.5	6.5 Episode Management Plan – Includes spills, nuisance, litter, odour, fire, flooding.	Required ☑	Section 4.1.9 and Appendix 4.1-1
6.6	6.6 Erosion and Sediment Control Plan – Contains planning and actions to mitigate erosion and sediment runoff during the project development and operation.	Required ☑	Table 4-2, Section 4.1.3, Section 4.1.5, and Appendix 4.1-3
6.7	6.7 Trigger and Response Plan – Describes monitoring triggers, responses, including confirmatory monitoring and mitigation strategies and implementation in the event that environmental benchmarks in the receiving environment, such as water guidelines, groundwater standards, and toxicology failures, are exceeded.	Required ☑	Section 4.1.6 and Appendix 4.1-1
6.8	6.8 Adaptive Management Plan – Describes and addresses outstanding key uncertainties of potential effects of the discharge following a cyclical process.	Required ☑	Section 4.1.7 and Appendix 4.1-1
6.9	6.9 Irrigation Plan - Documents the timing of reclaimed water use, maximum application rate and growing season based on the crop or vegetation, site specific loading, and nutrient and metals limits.	Required ☐	Not applicable - irrigation is not planned.
6.10	6.10 Odour Control Plan – Contains planning and actions to mitigate odour generation during the project construction and operation.	Required ☐	Not required - nuisance odours are not expected in relation to the water management systems.
6.11	6.11 Closure Plan - In the case of a temporary treatment system, details decommissioning procedures for the facility.	Required ☐	Not applicable - system is not temporary.
7	**7 SEWAGE DISPOSAL** (Not required if a Municipal Wastewater Regulation (MWR) registration is being pursued or if connected to an authorized system. May ONLY be included in effluent permit if the sewage discharge is combined with subject effluent and is <10% of that combined flow as per section 5(1)(b) of the MWR prior to discharge)		Not applicable - sewage treatment system is a separate permit & separate outfall from the stormwater effluent systems.
7.1	7.1 Describe treatment and disposal plan for sewage generated on-site including the maximum volume.	Required ☐	Not applicable.
7.2	7.2 Provide a copy of the design drawings for the sewage treatment facility, signed and stamped by a qualified professional.	Required ☐	Not applicable.
7.3	7.3 Provide Commissioning, Operating and Contingency Plans as per MWR Part 2: Division 4.	Required ☐	Not applicable.
7.4	7.4 Provide sewage treatment facility classification (or pre-classification) under the Environmental Operators Certification Program (EOCP).	Required ☐	Not applicable.
7.5	7.5 Provide operator qualifications and certification under the Environmental Operators Certification Program (EOCP).	Required ☐	Not applicable.
7.6	7.6 Provide an effluent flow and quality monitoring plan.	Required ☐	Not applicable.

Appendix 3.2: Soil Quality Results

3.2-1: Soil Quality Monitoring Results – Upland

Table 1: Soil Quality Monitoring Results

Table 2: Soil Sample Field Duplicate Quality Control Evaluation

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Moisture	pH, Soluble (2:1)	% Saturation	Chloride, Soluble	Chloride, Extractable	Bromobenzene	Bromodichloromethane	Bromoform	Bromomethane	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform
				%	pH units	%	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-1-1	CID582	2024/01/26 00:00	M	27	9.43				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-1-2	CID583	2024/01/26 00:00	M	18	10.1				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-2-1	CJF026	2024/02/14 00:00	M	12	9.18				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-2-2	CJF027	2024/02/14 00:00	M	11	9.04				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-3-1	CJN250	2024/02/20 00:00	M	16	9.06				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-3-1	CJN254	2024/02/20 00:00	D	15	9.21				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-3-2	CJN251	2024/02/20 00:00	M	12	9.95				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-3-3	CJN252	2024/02/20 00:00	M	11	9.56				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-3-4	CJN253	2024/02/20 00:00	M	16	9.22				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-4-1	CJN255	2024/02/20 00:00	M	15	9.08				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-4-2	CJN256	2024/02/20 00:00	M	9.3	9.45				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-4-3	CJN257	2024/02/20 00:00	M	18	8.46				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-4-4	CJN258	2024/02/20 00:00	M	14	9.52				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-5-4	CLB108	2024/03/19 00:00	M	13	8.76				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-5-5	CLB109	2024/03/19 00:00	M	13	8.75				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-5-5	CLB123	2024/03/19 00:00	D	13	8.75				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-5-6	CLB110	2024/03/19 00:00	M	14	8.77				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-6-2	CLB112	2024/03/19 00:00	M	11	8.64				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-6-5	CLB115	2024/03/19 00:00	M	11	8.78				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-6-6	CLB116	2024/03/19 00:00	M	11	8.79				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-7-1	CLB117	2024/03/19 00:00	M	9.1	8.68				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-7-3	CLB119	2024/03/19 00:00	M	13	8.74				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-7-6	CLB122	2024/03/19 00:00	M	12	8.85				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-10-2	CLC462	2024/03/21 00:00	M	8.8	9.24				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-10-4	CLC464	2024/03/21 00:00	M	12	9.06				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-10-6	CLC466	2024/03/21 00:00	M	8.8	9.08				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-8-1	CLC449	2024/03/21 00:00	M	13	8.64				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-8-5	CLC453	2024/03/21 00:00	M	13	8.81				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-8-6	CLC454	2024/03/21 00:00	M	12	8.75				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-9-2	CLC456	2024/03/21 00:00	M	11	8.78				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-9-2	CLC468	2024/03/21 00:00	D	14	8.77				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-9-4	CLC458	2024/03/21 00:00	M	11	8.74				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-9-6	CLC460	2024/03/21 00:00	M	13	8.68				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-11-1	CLI555	2024/03/26 00:00	M	10	9.82				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-11-3	CLI557	2024/03/26 00:00	M	9.1	9.89				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-12-1	CLN841	2024/04/01 00:00	M	39	6.29				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-13-1	CMS260	2024/04/28 00:00	M	6.9	8.60				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-13-2	CMS262	2024/04/28 00:00	M	16	7.24				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-14	CNJ764	2024/05/10 00:00	M	9.8	8.10				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
CS24-1	CPP974	2024/06/18 00:00	M	93	7.25	117	399	342								
CS24-1	CPP975	2024/06/18 00:00	D	92	7.27	117	407	349								
SP24-15-1	CPP966	2024/06/18 00:00	M	8.9	8.67				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-15-2	CPP967	2024/06/18 00:00	M	11	9.08				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-16-1	CRW681	2024/07/22 00:00	M	7.4	7.77				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-16-2	CRW682	2024/07/22 00:00	M	10	7.60				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-16-6	CRW686	2024/07/22 00:00	M	9.6	7.43				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-17-4	CRW690	2024/07/22 00:00	M	6.9	7.05				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-17-5	CRW691	2024/07/22 00:00	M	8.4	7.95				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-17-6	CRW692	2024/07/22 00:00	M	8.8	7.46				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-18-1	CRW693	2024/07/22 00:00	M	10	7.83				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-18-3	CRW695	2024/07/22 00:00	M	9.0	7.13				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-18-6	CRW698	2024/07/22 00:00	M	8.4	7.50				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-18-6	CRW705	2024/07/22 00:00	D	8.8	7.43				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-19-2	CRW700	2024/07/22 00:00	M	11	7.28				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-19-5	CRW703	2024/07/22 00:00	M	10	7.22				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-19-6	CRW704	2024/07/22 00:00	M	10	7.60				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Moisture	pH, Soluble (2:1)	% Saturation	Chloride, Soluble	Chloride, Extractable	Bromobenzene	Bromodichloromethane	Bromoform	Bromomethane	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform
				%	pH units	%	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-19-6	CRW706	2024/07/22 00:00	D	8.2	7.72				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-20-1	CRW710	2024/07/23 00:00	M	6.5	8.35				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-20-1	CRW716	2024/07/23 00:00	D	6.6	8.37				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-20-5	CRW714	2024/07/23 00:00	M	7.2	8.43				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-20-6	CRW715	2024/07/23 00:00	M	7.0	8.31				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-21-1	CSB706	2024/07/24 00:00	M	7.6	8.08				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-21-2	CSB707	2024/07/24 00:00	M	7.6	8.08				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-21-6	CSB711	2024/07/24 00:00	M	8.1	8.09				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-22-1	CSB713	2024/07/24 00:00	M	8.1	8.10				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-22-2	CSB714	2024/07/24 00:00	M	8.0	8.14				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-23-1	CVZ638	2024/09/20 00:00	M	12	7.36				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-23-2	CVZ639	2024/09/20 00:00	M	11	7.66				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-24-1	CWO971	2024/09/27 00:00	M	10	8.67				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-24-2	CWO972	2024/09/27 00:00	M	11	9.10				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-24-3	CWO973	2024/09/27 00:00	M	15	9.59				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-24-4	CWO974	2024/09/27 00:00	M	8.6	9.39				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP24-25	CWO975	2024/09/27 00:00	M	18	8.92				<0.20	<0.050	<0.050	<0.30	<0.020	<0.020	<0.10	<0.020
SP25-1-1	DSW744	2025/09/14 00:00	M	9.9	8.00											
SP25-1-2	DSW745	2025/09/14 00:00	M	12	7.90											
SP25-1-2	DSW762	2025/09/14 00:00	D	12	7.89											
SP25-1-3	DSW746	2025/09/14 00:00	M	11	7.92											
SP25-1-4	DSW747	2025/09/14 00:00	M	12	7.88											
SP25-1-5	DSW748	2025/09/14 00:00	M	9.1	7.96											
SP25-2-1	DSW749	2025/09/14 00:00	M	12	7.88											
SP25-2-2	DSW750	2025/09/14 00:00	M	17	7.90											
SP25-2-3	DSW751	2025/09/14 00:00	M	13	7.93											
SP25-2-4	DSW752	2025/09/14 00:00	M	11	7.91											
SP25-2-5	DSW753	2025/09/14 00:00	M	6.7	7.84											
SP25-3-1	DSW754	2025/09/14 00:00	M	11	9.37											
SP25-3-2	DSW755	2025/09/14 00:00	M	12	10.1											
SP25-3-3	DSW756	2025/09/14 00:00	M	10	10.2											
SP25-3-4	DSW757	2025/09/14 00:00	M	7.9	9.92											
SP25-3-5	DSW758	2025/09/14 00:00	M	14	7.88											
SP25-3-5	DSW763	2025/09/14 00:00	D	14	7.86											
SP25-4-1	DSW759	2025/09/14 00:00	M	11	7.79											
SP25-4-2	DSW760	2025/09/14 00:00	M	19	7.76											
SP25-4-3	DSW761	2025/09/14 00:00	M	14	7.94											
SP25-5-1	DSW765	2025/09/14 00:00	M	11	9.16											
SP25-5-2	DSW766	2025/09/14 00:00	M	11	9.39											
SP25-5-2	DSW764	2025/09/14 00:00	D	8.4	9.52											
SP25-5-3	DSW767	2025/09/14 00:00	M	12	8.09											

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Chloromethane	Dibromochloromethane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Dichlorodifluoromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-1-1	CID582	2024/01/26 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-1-2	CID583	2024/01/26 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-2-1	CJF026	2024/02/14 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-2-2	CJF027	2024/02/14 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-3-1	CJN250	2024/02/20 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-3-1	CJN254	2024/02/20 00:00	D	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-3-2	CJN251	2024/02/20 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-3-3	CJN252	2024/02/20 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-3-4	CJN253	2024/02/20 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-4-1	CJN255	2024/02/20 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-4-2	CJN256	2024/02/20 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-4-3	CJN257	2024/02/20 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-4-4	CJN258	2024/02/20 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-5-4	CLB108	2024/03/19 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-5-5	CLB109	2024/03/19 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-5-5	CLB123	2024/03/19 00:00	D	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-5-6	CLB110	2024/03/19 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-6-2	CLB112	2024/03/19 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-6-5	CLB115	2024/03/19 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-6-6	CLB116	2024/03/19 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-7-1	CLB117	2024/03/19 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-7-3	CLB119	2024/03/19 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-7-6	CLB122	2024/03/19 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-10-2	CLC462	2024/03/21 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-10-4	CLC464	2024/03/21 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-10-6	CLC466	2024/03/21 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-8-1	CLC449	2024/03/21 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-8-5	CLC453	2024/03/21 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-8-6	CLC454	2024/03/21 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-9-2	CLC456	2024/03/21 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-9-2	CLC468	2024/03/21 00:00	D	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-9-4	CLC458	2024/03/21 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-9-6	CLC460	2024/03/21 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-11-1	CLI555	2024/03/26 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-11-3	CLI557	2024/03/26 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-12-1	CLN841	2024/04/01 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-13-1	CMS260	2024/04/28 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-13-2	CMS262	2024/04/28 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-14	CNJ764	2024/05/10 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
CS24-1	CPP974	2024/06/18 00:00	M										
CS24-1	CPP975	2024/06/18 00:00	D										
SP24-15-1	CPP966	2024/06/18 00:00	M	0.29	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-15-2	CPP967	2024/06/18 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-16-1	CRW681	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-16-2	CRW682	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-16-6	CRW686	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-17-4	CRW690	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-17-5	CRW691	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-17-6	CRW692	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-18-1	CRW693	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-18-3	CRW695	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-18-6	CRW698	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-18-6	CRW705	2024/07/22 00:00	D	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-19-2	CRW700	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-19-5	CRW703	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-19-6	CRW704	2024/07/22 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Chloromethane	Dibromochloromethane	1,2-Dibromoethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Dichlorodifluoromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-19-6	CRW706	2024/07/22 00:00	D	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-20-1	CRW710	2024/07/23 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-20-1	CRW716	2024/07/23 00:00	D	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-20-5	CRW714	2024/07/23 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-20-6	CRW715	2024/07/23 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-21-1	CSB706	2024/07/24 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-21-2	CSB707	2024/07/24 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-21-6	CSB711	2024/07/24 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-22-1	CSB713	2024/07/24 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-22-2	CSB714	2024/07/24 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-23-1	CVZ638	2024/09/20 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-23-2	CVZ639	2024/09/20 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-24-1	CWO971	2024/09/27 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-24-2	CWO972	2024/09/27 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-24-3	CWO973	2024/09/27 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-24-4	CWO974	2024/09/27 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP24-25	CWO975	2024/09/27 00:00	M	<0.050	<0.050	<0.020	<0.020	<0.020	<0.020	<0.20	<0.025	<0.020	<0.025
SP25-1-1	DSW744	2025/09/14 00:00	M										
SP25-1-2	DSW745	2025/09/14 00:00	M										
SP25-1-2	DSW762	2025/09/14 00:00	D										
SP25-1-3	DSW746	2025/09/14 00:00	M										
SP25-1-4	DSW747	2025/09/14 00:00	M										
SP25-1-5	DSW748	2025/09/14 00:00	M										
SP25-2-1	DSW749	2025/09/14 00:00	M										
SP25-2-2	DSW750	2025/09/14 00:00	M										
SP25-2-3	DSW751	2025/09/14 00:00	M										
SP25-2-4	DSW752	2025/09/14 00:00	M										
SP25-2-5	DSW753	2025/09/14 00:00	M										
SP25-3-1	DSW754	2025/09/14 00:00	M										
SP25-3-2	DSW755	2025/09/14 00:00	M										
SP25-3-3	DSW756	2025/09/14 00:00	M										
SP25-3-4	DSW757	2025/09/14 00:00	M										
SP25-3-5	DSW758	2025/09/14 00:00	M										
SP25-3-5	DSW763	2025/09/14 00:00	D										
SP25-4-1	DSW759	2025/09/14 00:00	M										
SP25-4-2	DSW760	2025/09/14 00:00	M										
SP25-4-3	DSW761	2025/09/14 00:00	M										
SP25-5-1	DSW765	2025/09/14 00:00	M										
SP25-5-2	DSW766	2025/09/14 00:00	M										
SP25-5-2	DSW764	2025/09/14 00:00	D										
SP25-5-3	DSW767	2025/09/14 00:00	M										

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Dichloromethane	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Hexachlorobutadiene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-1-1	CID582	2024/01/26 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-1-2	CID583	2024/01/26 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-2-1	CJF026	2024/02/14 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-2-2	CJF027	2024/02/14 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-3-1	CJN250	2024/02/20 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-3-1	CJN254	2024/02/20 00:00	D	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-3-2	CJN251	2024/02/20 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-3-3	CJN252	2024/02/20 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-3-4	CJN253	2024/02/20 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-4-1	CJN255	2024/02/20 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-4-2	CJN256	2024/02/20 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-4-3	CJN257	2024/02/20 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-4-4	CJN258	2024/02/20 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-5-4	CLB108	2024/03/19 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-5-5	CLB109	2024/03/19 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-5-5	CLB123	2024/03/19 00:00	D	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-5-6	CLB110	2024/03/19 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-6-2	CLB112	2024/03/19 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-6-5	CLB115	2024/03/19 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-6-6	CLB116	2024/03/19 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-7-1	CLB117	2024/03/19 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-7-3	CLB119	2024/03/19 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-7-6	CLB122	2024/03/19 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-10-2	CLC462	2024/03/21 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-10-4	CLC464	2024/03/21 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-10-6	CLC466	2024/03/21 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-8-1	CLC449	2024/03/21 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-8-5	CLC453	2024/03/21 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-8-6	CLC454	2024/03/21 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-9-2	CLC456	2024/03/21 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-9-2	CLC468	2024/03/21 00:00	D	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-9-4	CLC458	2024/03/21 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-9-6	CLC460	2024/03/21 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-11-1	CLI555	2024/03/26 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-11-3	CLI557	2024/03/26 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-12-1	CLN841	2024/04/01 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-13-1	CMS260	2024/04/28 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-13-2	CMS262	2024/04/28 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-14	CNJ764	2024/05/10 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
CS24-1	CPP974	2024/06/18 00:00	M									
CS24-1	CPP975	2024/06/18 00:00	D									
SP24-15-1	CPP966	2024/06/18 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-15-2	CPP967	2024/06/18 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-16-1	CRW681	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-16-2	CRW682	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-16-6	CRW686	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-17-4	CRW690	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-17-5	CRW691	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-17-6	CRW692	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-18-1	CRW693	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-18-3	CRW695	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-18-6	CRW698	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-18-6	CRW705	2024/07/22 00:00	D	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-19-2	CRW700	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-19-5	CRW703	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-19-6	CRW704	2024/07/22 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Dichloromethane	1,2-Dichloropropane	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Hexachlorobutadiene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-19-6	CRW706	2024/07/22 00:00	D	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-20-1	CRW710	2024/07/23 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-20-1	CRW716	2024/07/23 00:00	D	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-20-5	CRW714	2024/07/23 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-20-6	CRW715	2024/07/23 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-21-1	CSB706	2024/07/24 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-21-2	CSB707	2024/07/24 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-21-6	CSB711	2024/07/24 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-22-1	CSB713	2024/07/24 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-22-2	CSB714	2024/07/24 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-23-1	CVZ638	2024/09/20 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-23-2	CVZ639	2024/09/20 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-24-1	CWO971	2024/09/27 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-24-2	CWO972	2024/09/27 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-24-3	CWO973	2024/09/27 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-24-4	CWO974	2024/09/27 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP24-25	CWO975	2024/09/27 00:00	M	<0.030	<0.030	<0.080	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020
SP25-1-1	DSW744	2025/09/14 00:00	M									
SP25-1-2	DSW745	2025/09/14 00:00	M									
SP25-1-2	DSW762	2025/09/14 00:00	D									
SP25-1-3	DSW746	2025/09/14 00:00	M									
SP25-1-4	DSW747	2025/09/14 00:00	M									
SP25-1-5	DSW748	2025/09/14 00:00	M									
SP25-2-1	DSW749	2025/09/14 00:00	M									
SP25-2-2	DSW750	2025/09/14 00:00	M									
SP25-2-3	DSW751	2025/09/14 00:00	M									
SP25-2-4	DSW752	2025/09/14 00:00	M									
SP25-2-5	DSW753	2025/09/14 00:00	M									
SP25-3-1	DSW754	2025/09/14 00:00	M									
SP25-3-2	DSW755	2025/09/14 00:00	M									
SP25-3-3	DSW756	2025/09/14 00:00	M									
SP25-3-4	DSW757	2025/09/14 00:00	M									
SP25-3-5	DSW758	2025/09/14 00:00	M									
SP25-3-5	DSW763	2025/09/14 00:00	D									
SP25-4-1	DSW759	2025/09/14 00:00	M									
SP25-4-2	DSW760	2025/09/14 00:00	M									
SP25-4-3	DSW761	2025/09/14 00:00	M									
SP25-5-1	DSW765	2025/09/14 00:00	M									
SP25-5-2	DSW766	2025/09/14 00:00	M									
SP25-5-2	DSW764	2025/09/14 00:00	D									
SP25-5-3	DSW767	2025/09/14 00:00	M									

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
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Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Tetrachloroethene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichlorofluoromethane	1,1,2-Trichloro-1,2,2-trifluoroethane	Vinyl Chloride	Acetone	Benzene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-1-1	CID582	2024/01/26 00:00	M	<0.010	0.042	0.13	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-1-2	CID583	2024/01/26 00:00	M	<0.010	0.043	0.13	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-2-1	CJF026	2024/02/14 00:00	M	<0.010	<0.030	0.051	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	0.0054
SP24-2-2	CJF027	2024/02/14 00:00	M	<0.010	<0.030	0.050	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	0.011
SP24-3-1	CJN250	2024/02/20 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-3-1	CJN254	2024/02/20 00:00	D	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-3-2	CJN251	2024/02/20 00:00	M	<0.010	0.060	0.17	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-3-3	CJN252	2024/02/20 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-3-4	CJN253	2024/02/20 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-4-1	CJN255	2024/02/20 00:00	M	<0.010	<0.030	0.036	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-4-2	CJN256	2024/02/20 00:00	M	<0.010	<0.030	0.055	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-4-3	CJN257	2024/02/20 00:00	M	<0.010	0.058	0.17	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-4-4	CJN258	2024/02/20 00:00	M	<0.010	<0.030	0.053	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-5-4	CLB108	2024/03/19 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-5-5	CLB109	2024/03/19 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-5-5	CLB123	2024/03/19 00:00	D	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-5-6	CLB110	2024/03/19 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-6-2	CLB112	2024/03/19 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-6-5	CLB115	2024/03/19 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-6-6	CLB116	2024/03/19 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-7-1	CLB117	2024/03/19 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-7-3	CLB119	2024/03/19 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-7-6	CLB122	2024/03/19 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-10-2	CLC462	2024/03/21 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-10-4	CLC464	2024/03/21 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-10-6	CLC466	2024/03/21 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-8-1	CLC449	2024/03/21 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-8-5	CLC453	2024/03/21 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-8-6	CLC454	2024/03/21 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-9-2	CLC456	2024/03/21 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-9-2	CLC468	2024/03/21 00:00	D	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-9-4	CLC458	2024/03/21 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-9-6	CLC460	2024/03/21 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-11-1	CLI555	2024/03/26 00:00	M	<0.010	<0.030	0.050	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-11-3	CLI557	2024/03/26 00:00	M	<0.010	<0.030	0.034	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-12-1	CLN841	2024/04/01 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	0.0063
SP24-13-1	CMS260	2024/04/28 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-13-2	CMS262	2024/04/28 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-14	CNJ764	2024/05/10 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
CS24-1	CPP974	2024/06/18 00:00	M											
CS24-1	CPP975	2024/06/18 00:00	D											
SP24-15-1	CPP966	2024/06/18 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-15-2	CPP967	2024/06/18 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-16-1	CRW681	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-16-2	CRW682	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-16-6	CRW686	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-17-4	CRW690	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-17-5	CRW691	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-17-6	CRW692	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-18-1	CRW693	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-18-3	CRW695	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-18-6	CRW698	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-18-6	CRW705	2024/07/22 00:00	D	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-19-2	CRW700	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-19-5	CRW703	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-19-6	CRW704	2024/07/22 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Tetrachloroethene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethene	Trichlorofluoromethane	1,1,2-Trichloro-1,2,2-trifluoroethane	Vinyl Chloride	Acetone	Benzene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-19-6	CRW706	2024/07/22 00:00	D	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-20-1	CRW710	2024/07/23 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-20-1	CRW716	2024/07/23 00:00	D	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-20-5	CRW714	2024/07/23 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-20-6	CRW715	2024/07/23 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-21-1	CSB706	2024/07/24 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-21-2	CSB707	2024/07/24 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-21-6	CSB711	2024/07/24 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-22-1	CSB713	2024/07/24 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-22-2	CSB714	2024/07/24 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-23-1	CVZ638	2024/09/20 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-23-2	CVZ639	2024/09/20 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-24-1	CWO971	2024/09/27 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-24-2	CWO972	2024/09/27 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-24-3	CWO973	2024/09/27 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-24-4	CWO974	2024/09/27 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP24-25	CWO975	2024/09/27 00:00	M	<0.010	<0.030	<0.030	<0.020	<0.020	<0.0090	<0.20	<0.20	<0.040	<5.0	<0.0050
SP25-1-1	DSW744	2025/09/14 00:00	M											
SP25-1-2	DSW745	2025/09/14 00:00	M											
SP25-1-2	DSW762	2025/09/14 00:00	D											
SP25-1-3	DSW746	2025/09/14 00:00	M											
SP25-1-4	DSW747	2025/09/14 00:00	M											
SP25-1-5	DSW748	2025/09/14 00:00	M											
SP25-2-1	DSW749	2025/09/14 00:00	M											
SP25-2-2	DSW750	2025/09/14 00:00	M											
SP25-2-3	DSW751	2025/09/14 00:00	M											
SP25-2-4	DSW752	2025/09/14 00:00	M											
SP25-2-5	DSW753	2025/09/14 00:00	M											
SP25-3-1	DSW754	2025/09/14 00:00	M											
SP25-3-2	DSW755	2025/09/14 00:00	M											
SP25-3-3	DSW756	2025/09/14 00:00	M											
SP25-3-4	DSW757	2025/09/14 00:00	M											
SP25-3-5	DSW758	2025/09/14 00:00	M											
SP25-3-5	DSW763	2025/09/14 00:00	D											
SP25-4-1	DSW759	2025/09/14 00:00	M											
SP25-4-2	DSW760	2025/09/14 00:00	M											
SP25-4-3	DSW761	2025/09/14 00:00	M											
SP25-5-1	DSW765	2025/09/14 00:00	M											
SP25-5-2	DSW766	2025/09/14 00:00	M											
SP25-5-2	DSW764	2025/09/14 00:00	D											
SP25-5-3	DSW767	2025/09/14 00:00	M											

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	1,3-Butadiene	2-Butanone (MEK)	n-Decane	Ethylbenzene	Isopropylbenzene	Methylcyclohexane	4-Methyl-2-Pentanone (MIBK)	Methyl Tert-Butyl Ether (MTBE)	Styrene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Toluene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-1-1	CID582	2024/01/26 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-1-2	CID583	2024/01/26 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-2-1	CJF026	2024/02/14 00:00	M	<0.080	<15	<2.0	0.020	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-2-2	CJF027	2024/02/14 00:00	M	<0.080	<15	<2.0	0.017	<0.20	<0.20	<0.50	<0.10	0.17	<0.20	<0.20	<0.050
SP24-3-1	CJN250	2024/02/20 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-3-1	CJN254	2024/02/20 00:00	D	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-3-2	CJN251	2024/02/20 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-3-3	CJN252	2024/02/20 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-3-4	CJN253	2024/02/20 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-4-1	CJN255	2024/02/20 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-4-2	CJN256	2024/02/20 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-4-3	CJN257	2024/02/20 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-4-4	CJN258	2024/02/20 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-5-4	CLB108	2024/03/19 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-5-5	CLB109	2024/03/19 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-5-5	CLB123	2024/03/19 00:00	D	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	0.049	<0.20	<0.20	<0.050
SP24-5-6	CLB110	2024/03/19 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-6-2	CLB112	2024/03/19 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-6-5	CLB115	2024/03/19 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-6-6	CLB116	2024/03/19 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-7-1	CLB117	2024/03/19 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-7-3	CLB119	2024/03/19 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-7-6	CLB122	2024/03/19 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-10-2	CLC462	2024/03/21 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-10-4	CLC464	2024/03/21 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-10-6	CLC466	2024/03/21 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-8-1	CLC449	2024/03/21 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-8-5	CLC453	2024/03/21 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-8-6	CLC454	2024/03/21 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-9-2	CLC456	2024/03/21 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-9-2	CLC468	2024/03/21 00:00	D	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-9-4	CLC458	2024/03/21 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-9-6	CLC460	2024/03/21 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-11-1	CLI555	2024/03/26 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	0.039	<0.20	<0.20	<0.050
SP24-11-3	CLI557	2024/03/26 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-12-1	CLN841	2024/04/01 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-13-1	CMS260	2024/04/28 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-13-2	CMS262	2024/04/28 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-14	CNJ764	2024/05/10 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
CS24-1	CPP974	2024/06/18 00:00	M												
CS24-1	CPP975	2024/06/18 00:00	D												
SP24-15-1	CPP966	2024/06/18 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-15-2	CPP967	2024/06/18 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-16-1	CRW681	2024/07/22 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-16-2	CRW682	2024/07/22 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-16-6	CRW686	2024/07/22 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-17-4	CRW690	2024/07/22 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-17-5	CRW691	2024/07/22 00:00	M	<0.080	<15	<2.0	0.015	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-17-6	CRW692	2024/07/22 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-18-1	CRW693	2024/07/22 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-18-3	CRW695	2024/07/22 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-18-6	CRW698	2024/07/22 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-18-6	CRW705	2024/07/22 00:00	D	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-19-2	CRW700	2024/07/22 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-19-5	CRW703	2024/07/22 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-19-6	CRW704	2024/07/22 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	1,3-Butadiene	2-Butanone (MEK)	n-Decane	Ethylbenzene	Isopropylbenzene	Methylcyclohexane	4-Methyl-2-Pentanone (MIBK)	Methyl Tert-Butyl Ether (MTBE)	Styrene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Toluene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-19-6	CRW706	2024/07/22 00:00	D	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-20-1	CRW710	2024/07/23 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-20-1	CRW716	2024/07/23 00:00	D	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-20-5	CRW714	2024/07/23 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-20-6	CRW715	2024/07/23 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-21-1	CSB706	2024/07/24 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-21-2	CSB707	2024/07/24 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-21-6	CSB711	2024/07/24 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-22-1	CSB713	2024/07/24 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-22-2	CSB714	2024/07/24 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-23-1	CVZ638	2024/09/20 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-23-2	CVZ639	2024/09/20 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-24-1	CWO971	2024/09/27 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-24-2	CWO972	2024/09/27 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-24-3	CWO973	2024/09/27 00:00	M	<0.080	<15	<2.0	0.014	<0.20	<0.20	<0.50	<0.10	0.26	<0.20	<0.20	<0.050
SP24-24-4	CWO974	2024/09/27 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP24-25	CWO975	2024/09/27 00:00	M	<0.080	<15	<2.0	<0.010	<0.20	<0.20	<0.50	<0.10	<0.030	<0.20	<0.20	<0.050
SP25-1-1	DSW744	2025/09/14 00:00	M												
SP25-1-2	DSW745	2025/09/14 00:00	M												
SP25-1-2	DSW762	2025/09/14 00:00	D												
SP25-1-3	DSW746	2025/09/14 00:00	M												
SP25-1-4	DSW747	2025/09/14 00:00	M												
SP25-1-5	DSW748	2025/09/14 00:00	M												
SP25-2-1	DSW749	2025/09/14 00:00	M												
SP25-2-2	DSW750	2025/09/14 00:00	M												
SP25-2-3	DSW751	2025/09/14 00:00	M												
SP25-2-4	DSW752	2025/09/14 00:00	M												
SP25-2-5	DSW753	2025/09/14 00:00	M												
SP25-3-1	DSW754	2025/09/14 00:00	M												
SP25-3-2	DSW755	2025/09/14 00:00	M												
SP25-3-3	DSW756	2025/09/14 00:00	M												
SP25-3-4	DSW757	2025/09/14 00:00	M												
SP25-3-5	DSW758	2025/09/14 00:00	M												
SP25-3-5	DSW763	2025/09/14 00:00	D												
SP25-4-1	DSW759	2025/09/14 00:00	M												
SP25-4-2	DSW760	2025/09/14 00:00	M												
SP25-4-3	DSW761	2025/09/14 00:00	M												
SP25-5-1	DSW765	2025/09/14 00:00	M												
SP25-5-2	DSW766	2025/09/14 00:00	M												
SP25-5-2	DSW764	2025/09/14 00:00	D												
SP25-5-3	DSW767	2025/09/14 00:00	M												

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	m+p-Xylene	o-Xylene	Xylenes, Total	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	Chrysene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-1-1	CID582	2024/01/26 00:00	M	<0.040	<0.040	<0.040	0.081	0.018	0.21	0.45	0.47	0.37	0.58	0.34	0.20	0.53
SP24-1-2	CID583	2024/01/26 00:00	M	<0.040	<0.040	<0.040	0.082	0.011	0.19	0.44	0.45	0.38	0.56	0.33	0.17	0.53
SP24-2-1	CJF026	2024/02/14 00:00	M	0.10	0.049	0.15	0.025	0.013	0.048	0.092	0.092	0.080	0.12	0.062	0.040	0.11
SP24-2-2	CJF027	2024/02/14 00:00	M	0.081	0.043	0.12	0.040	0.016	0.059	0.099	0.096	0.077	0.12	0.064	0.042	0.12
SP24-3-1	CJN250	2024/02/20 00:00	M	<0.040	<0.040	<0.040	0.080	0.029	0.092	0.12	0.12	0.094	0.15	0.086	0.056	0.20
SP24-3-1	CJN254	2024/02/20 00:00	D	<0.040	<0.040	<0.040	0.32	0.031	0.11	0.15	0.14	0.11	0.17	0.095	0.061	0.21
SP24-3-2	CJN251	2024/02/20 00:00	M	<0.040	<0.040	<0.040	0.094	0.053	0.11	0.17	0.16	0.13	0.20	0.12	0.072	0.23
SP24-3-3	CJN252	2024/02/20 00:00	M	<0.040	<0.040	<0.040	0.17	<0.0050	0.12	0.13	0.10	0.092	0.14	0.068	0.049	0.15
SP24-3-4	CJN253	2024/02/20 00:00	M	<0.040	<0.040	<0.040	0.16	0.020	0.072	0.11	0.12	0.089	0.13	0.092	0.050	0.16
SP24-4-1	CJN255	2024/02/20 00:00	M	<0.040	<0.040	<0.040	0.26	0.025	0.11	0.15	0.14	0.11	0.17	0.090	0.059	0.23
SP24-4-2	CJN256	2024/02/20 00:00	M	<0.040	<0.040	<0.040	0.20	0.024	0.086	0.18	0.16	0.13	0.21	0.12	0.085	0.27
SP24-4-3	CJN257	2024/02/20 00:00	M	<0.040	<0.040	<0.040	2.4	<0.0050	0.66	0.52	0.17	0.20	0.30	0.067	0.10	0.53
SP24-4-4	CJN258	2024/02/20 00:00	M	<0.040	<0.040	<0.040	0.11	0.053	0.14	0.28	0.25	0.21	0.32	0.17	0.12	0.33
SP24-5-4	CLB108	2024/03/19 00:00	M	<0.040	<0.040	<0.040	0.27	0.059	0.20	0.32	0.29	0.20	0.27	0.25	0.041	0.77
SP24-5-5	CLB109	2024/03/19 00:00	M	<0.040	<0.040	<0.040	1.9	0.12	2.5	3.4	3.4	2.5	4.0	2.5	1.4	4.3
SP24-5-5	CLB123	2024/03/19 00:00	D	<0.040	<0.040	<0.040	0.11	0.024	0.12	0.21	0.23	0.15	0.21	0.18	0.049	0.26
SP24-5-6	CLB110	2024/03/19 00:00	M	<0.040	<0.040	<0.040	0.20	0.032	0.24	0.38	0.40	0.29	0.42	0.31	0.11	0.52
SP24-6-2	CLB112	2024/03/19 00:00	M	<0.040	<0.040	<0.040	0.087	0.019	0.12	0.28	0.35	0.25	0.35	0.30	0.084	0.31
SP24-6-5	CLB115	2024/03/19 00:00	M	<0.040	<0.040	<0.040	0.11	0.013	0.13	0.25	0.27	0.20	0.29	0.22	0.076	0.29
SP24-6-6	CLB116	2024/03/19 00:00	M	<0.040	<0.040	<0.040	0.11	0.022	0.13	0.23	0.27	0.21	0.29	0.22	0.059	0.26
SP24-7-1	CLB117	2024/03/19 00:00	M	<0.040	<0.040	<0.040	0.059	0.0062	0.086	0.17	0.19	0.14	0.21	0.15	0.053	0.20
SP24-7-3	CLB119	2024/03/19 00:00	M	<0.040	<0.040	<0.040	0.056	0.0099	0.079	0.19	0.22	0.17	0.24	0.18	0.056	0.25
SP24-7-6	CLB122	2024/03/19 00:00	M	<0.040	<0.040	<0.040	0.051	0.0066	0.087	0.17	0.19	0.14	0.20	0.15	0.063	0.16
SP24-10-2	CLC462	2024/03/21 00:00	M	<0.040	<0.040	<0.040	0.067	<0.0050	0.13	0.22	0.23	0.18	0.28	0.19	0.088	0.24
SP24-10-4	CLC464	2024/03/21 00:00	M	<0.040	<0.040	<0.040	0.073	<0.0050	0.12	0.21	0.23	0.17	0.26	0.18	0.084	0.22
SP24-10-6	CLC466	2024/03/21 00:00	M	<0.040	<0.040	<0.040	0.070	<0.0050	0.15	0.25	0.25	0.21	0.31	0.20	0.11	0.29
SP24-8-1	CLC449	2024/03/21 00:00	M	<0.040	<0.040	<0.040	0.074	0.0092	0.10	0.21	0.25	0.18	0.27	0.20	0.085	0.27
SP24-8-5	CLC453	2024/03/21 00:00	M	<0.040	<0.040	<0.040	0.11	0.0091	0.17	0.29	0.32	0.23	0.35	0.24	0.11	0.26
SP24-8-6	CLC454	2024/03/21 00:00	M	<0.040	<0.040	<0.040	0.078	<0.0050	0.14	0.23	0.24	0.20	0.29	0.19	0.088	0.26
SP24-9-2	CLC456	2024/03/21 00:00	M	<0.040	<0.040	<0.040	0.085	<0.0050	0.14	0.20	0.21	0.17	0.26	0.17	0.078	0.22
SP24-9-2	CLC468	2024/03/21 00:00	D	<0.040	<0.040	<0.040	0.052	<0.0050	0.090	0.12	0.14	0.11	0.16	0.12	0.053	0.15
SP24-9-4	CLC458	2024/03/21 00:00	M	<0.040	<0.040	<0.040	0.12	<0.0050	0.27	0.45	0.38	0.30	0.46	0.27	0.16	0.59
SP24-9-6	CLC460	2024/03/21 00:00	M	<0.040	<0.040	<0.040	0.31	<0.0050	0.55	0.79	0.70	0.51	0.80	0.48	0.30	0.94
SP24-11-1	CLI555	2024/03/26 00:00	M	<0.040	<0.040	<0.040	0.11	0.0079	0.18	0.36	0.38	0.27	0.42	0.30	0.14	0.52
SP24-11-3	CLI557	2024/03/26 00:00	M	<0.040	<0.040	<0.040	0.14	0.0092	0.24	0.44	0.42	0.31	0.48	0.30	0.15	0.62
SP24-12-1	CLN841	2024/04/01 00:00	M	<0.040	<0.040	<0.040	4.5	0.15	1.5	2.2	1.1	1.1	1.7	0.34	0.63	1.8
SP24-13-1	CMS260	2024/04/28 00:00	M	<0.040	<0.040	<0.040	0.041	<0.0050	0.029	0.047	0.042	0.043	0.043	<0.050	<0.020	0.068
SP24-13-2	CMS262	2024/04/28 00:00	M	<0.040	<0.040	<0.040	0.051	0.021	0.070	0.13	0.099	0.089	0.14	0.057	0.052	0.15
SP24-14	CNJ764	2024/05/10 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	0.023	0.033	0.066	0.044	0.044	0.54	<0.020	0.14
CS24-1	CPP974	2024/06/18 00:00	M				<0.064	<0.064	<0.051	<0.25	<0.25	<0.25	<0.25	<0.64	<0.25	<0.25
CS24-1	CPP975	2024/06/18 00:00	D				<0.063	<0.063	<0.050	<0.25	<0.25	<0.25	<0.25	<0.63	<0.25	<0.25
SP24-15-1	CPP966	2024/06/18 00:00	M	<0.040	<0.040	<0.040	0.016	<0.0050	0.0088	0.021	0.023	0.026	0.026	<0.050	<0.020	0.025
SP24-15-2	CPP967	2024/06/18 00:00	M	<0.040	<0.040	<0.040	0.017	0.0057	0.024	0.067	0.075	0.072	0.11	0.058	0.037	0.089
SP24-16-1	CRW681	2024/07/22 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP24-16-2	CRW682	2024/07/22 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP24-16-6	CRW686	2024/07/22 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP24-17-4	CRW690	2024/07/22 00:00	M	<0.040	<0.040	<0.040	0.023	<0.0050	0.017	0.044	0.034	0.024	0.024	<0.050	<0.020	0.14
SP24-17-5	CRW691	2024/07/22 00:00	M	0.075	<0.040	0.075	0.066	0.013	0.069	0.20	0.14	0.10	0.12	0.071	<0.020	0.28
SP24-17-6	CRW692	2024/07/22 00:00	M	<0.040	<0.040	<0.040	0.012	<0.0050	0.017	0.035	0.027	0.021	0.021	<0.050	<0.020	0.054
SP24-18-1	CRW693	2024/07/22 00:00	M	<0.040	<0.040	<0.040	0.026	<0.0050	0.037	0.065	0.048	0.036	0.036	<0.050	<0.020	0.093
SP24-18-3	CRW695	2024/07/22 00:00	M	<0.040	<0.040	<0.040	0.013	<0.0050	0.020	0.046	0.035	0.026	0.026	<0.050	<0.020	0.071
SP24-18-6	CRW698	2024/07/22 00:00	M	<0.040	<0.040	<0.040	0.016	<0.0050	0.020	0.040	0.030	0.022	0.022	<0.050	<0.020	0.059
SP24-18-6	CRW705	2024/07/22 00:00	D	<0.040	<0.040	<0.040	0.014	<0.0050	0.020	0.036	0.026	<0.020	<0.020	<0.050	<0.020	0.055
SP24-19-2	CRW700	2024/07/22 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP24-19-5	CRW703	2024/07/22 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP24-19-6	CRW704	2024/07/22 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	m+p-Xylene	o-Xylene	Xylenes, Total	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	Chrysene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-19-6	CRW706	2024/07/22 00:00	D	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP24-20-1	CRW710	2024/07/23 00:00	M	<0.040	<0.040	<0.040	0.071	0.012	0.11	0.23	0.19	0.14	0.18	0.15	0.034	0.15
SP24-20-1	CRW716	2024/07/23 00:00	D	<0.040	<0.040	<0.040	0.066	0.012	0.13	0.24	0.22	0.15	0.20	0.17	0.029	0.18
SP24-20-5	CRW714	2024/07/23 00:00	M	<0.040	<0.040	<0.040	0.046	0.0067	0.083	0.18	0.17	0.13	0.18	0.12	0.042	0.11
SP24-20-6	CRW715	2024/07/23 00:00	M	<0.040	<0.040	<0.040	0.041	0.0052	0.078	0.18	0.17	0.13	0.19	0.14	0.048	0.17
SP24-21-1	CSB706	2024/07/24 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	0.033	0.026	0.024	0.024	<0.050	<0.020	0.053
SP24-21-2	CSB707	2024/07/24 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP24-21-6	CSB711	2024/07/24 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	0.021
SP24-22-1	CSB713	2024/07/24 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP24-22-2	CSB714	2024/07/24 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	<0.0040	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP24-23-1	CVZ638	2024/09/20 00:00	M	<0.040	<0.040	<0.040	0.038	<0.0050	0.0077	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP24-23-2	CVZ639	2024/09/20 00:00	M	<0.040	<0.040	<0.040	0.038	<0.0050	0.0089	0.039	0.052	0.039	0.039	0.13	<0.020	0.038
SP24-24-1	CWO971	2024/09/27 00:00	M	<0.040	<0.040	<0.040	<0.0050	<0.0050	0.0049	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP24-24-2	CWO972	2024/09/27 00:00	M	<0.040	<0.040	<0.040	0.0094	<0.0050	0.011	0.029	0.023	0.022	0.022	<0.050	<0.020	0.035
SP24-24-3	CWO973	2024/09/27 00:00	M	<0.040	<0.040	<0.040	0.022	<0.0050	0.026	0.081	0.069	0.062	0.094	<0.050	0.029	0.093
SP24-24-4	CWO974	2024/09/27 00:00	M	<0.040	<0.040	<0.040	0.029	0.0050	0.045	0.098	0.082	0.069	0.11	<0.050	0.033	0.11
SP24-25	CWO975	2024/09/27 00:00	M	<0.040	<0.040	<0.040	0.0070	<0.0050	0.016	0.039	0.027	0.028	0.028	<0.050	<0.020	0.047
SP25-1-1	DSW744	2025/09/14 00:00	M				0.012	<0.0050	0.012	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP25-1-2	DSW745	2025/09/14 00:00	M				0.021	<0.0050	0.018	0.020	<0.020	<0.020	<0.020	<0.050	<0.020	0.021
SP25-1-2	DSW762	2025/09/14 00:00	D				0.020	<0.0050	0.014	<0.020	<0.020	0.021	0.021	<0.050	<0.020	0.020
SP25-1-3	DSW746	2025/09/14 00:00	M				0.015	<0.0050	0.011	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP25-1-4	DSW747	2025/09/14 00:00	M				0.023	0.0059	0.024	0.052	0.044	0.058	0.081	<0.050	<0.020	0.059
SP25-1-5	DSW748	2025/09/14 00:00	M				0.036	0.0061	0.037	0.052	0.023	0.034	0.034	<0.050	<0.020	0.046
SP25-2-1	DSW749	2025/09/14 00:00	M				0.038	<0.0050	0.025	0.025	<0.020	0.023	0.023	<0.050	<0.020	0.027
SP25-2-2	DSW750	2025/09/14 00:00	M				0.15	0.0060	0.097	0.057	0.027	0.042	0.042	<0.050	<0.020	0.062
SP25-2-3	DSW751	2025/09/14 00:00	M				0.046	0.0055	0.033	0.030	<0.020	0.023	0.023	<0.050	<0.020	0.032
SP25-2-4	DSW752	2025/09/14 00:00	M				0.0096	0.0054	0.014	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	0.020
SP25-2-5	DSW753	2025/09/14 00:00	M				0.012	<0.0050	0.016	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.020
SP25-3-1	DSW754	2025/09/14 00:00	M				0.084	0.0084	0.072	0.069	0.037	0.049	0.049	<0.050	<0.020	0.074
SP25-3-2	DSW755	2025/09/14 00:00	M				0.047	<0.0050	0.032	0.028	<0.020	<0.020	<0.020	<0.050	<0.020	0.027
SP25-3-3	DSW756	2025/09/14 00:00	M				0.043	<0.0050	0.021	0.032	0.024	0.029	0.029	<0.050	<0.020	0.034
SP25-3-4	DSW757	2025/09/14 00:00	M				0.083	0.0070	0.037	0.039	0.024	0.028	0.028	<0.050	<0.020	0.035
SP25-3-5	DSW758	2025/09/14 00:00	M				0.063	0.0087	0.051	0.054	0.038	0.045	0.045	<0.050	<0.020	0.059
SP25-3-5	DSW763	2025/09/14 00:00	D				0.085	0.011	0.064	0.057	0.049	0.051	0.072	0.056	<0.020	0.085
SP25-4-1	DSW759	2025/09/14 00:00	M				0.029	<0.0050	0.015	0.021	<0.020	<0.020	<0.020	<0.050	<0.020	0.025
SP25-4-2	DSW760	2025/09/14 00:00	M				0.039	0.0067	0.026	0.031	0.027	0.030	0.030	<0.050	<0.020	0.039
SP25-4-3	DSW761	2025/09/14 00:00	M				0.031	0.0068	0.019	0.026	<0.020	0.022	0.022	<0.050	<0.020	0.029
SP25-5-1	DSW765	2025/09/14 00:00	M				0.12	0.0063	0.056	0.049	0.035	0.040	0.040	<0.050	<0.020	0.070
SP25-5-2	DSW766	2025/09/14 00:00	M				0.11	0.0067	0.10	0.060	0.033	0.042	0.042	<0.050	<0.020	0.087
SP25-5-2	DSW764	2025/09/14 00:00	D				0.062	<0.0050	0.039	0.033	0.021	0.026	0.026	<0.050	<0.020	0.047
SP25-5-3	DSW767	2025/09/14 00:00	M				0.038	0.0067	0.029	0.028	0.023	0.024	0.024	<0.050	<0.020	0.040

Notes:
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Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-1-1	CID582	2024/01/26 00:00	M	0.071	1.2	0.086	0.26	0.064	0.074	0.082	1.0	1.1	<0.050	16800	1.31	7.94	125	0.27
SP24-1-2	CID583	2024/01/26 00:00	M	0.073	1.1	0.066	0.27	<0.050	0.034	0.021	0.84	1.1	<0.050	16200	2.39	7.13	125	0.23
SP24-2-1	CJF026	2024/02/14 00:00	M	<0.020	0.21	0.034	0.049	0.072	0.091	0.062	0.20	0.19	<0.050	11500	5.26	5.66	141	0.35
SP24-2-2	CJF027	2024/02/14 00:00	M	<0.020	0.25	0.050	0.050	0.072	0.087	0.064	0.27	0.22	<0.050	11400	4.27	5.91	129	0.26
SP24-3-1	CJN250	2024/02/20 00:00	M	<0.020	0.31	0.21	0.065	0.69	0.88	0.057	0.88	0.38	<0.050	15200	1.83	5.79	114	0.29
SP24-3-1	CJN254	2024/02/20 00:00	D	0.022	0.36	0.23	0.077	0.77	0.85	0.061	0.91	0.41	<0.050	16400	5.49	6.81	116	0.71
SP24-3-2	CJN251	2024/02/20 00:00	M	0.023	0.41	0.22	0.089	0.79	1.1	0.10	0.95	0.44	<0.050	12700	0.66	4.91	86.8	0.23
SP24-3-3	CJN252	2024/02/20 00:00	M	<0.020	0.41	0.17	0.058	0.077	0.13	0.072	0.57	0.32	<0.050	12400	0.55	4.72	76.1	<0.20
SP24-3-4	CJN253	2024/02/20 00:00	M	<0.020	0.29	0.11	0.068	0.40	0.30	0.046	0.53	0.32	<0.050	15400	1.08	6.10	109	0.28
SP24-4-1	CJN255	2024/02/20 00:00	M	0.021	0.38	0.23	0.071	0.59	0.85	0.13	0.70	0.44	<0.050	14800	1.00	6.02	93.3	0.25
SP24-4-2	CJN256	2024/02/20 00:00	M	0.027	0.43	0.15	0.093	0.34	0.50	0.090	0.57	0.49	<0.050	13800	0.76	5.15	86.1	0.24
SP24-4-3	CJN257	2024/02/20 00:00	M	<0.020	3.3	2.3	0.060	0.95	2.0	5.3	6.6	2.1	<0.050	22100	1.46	5.18	105	0.43
SP24-4-4	CJN258	2024/02/20 00:00	M	0.036	0.73	0.15	0.14	0.48	0.055	0.049	0.81	0.69	<0.050	14100	1.46	5.69	98.0	0.21
SP24-5-4	CLB108	2024/03/19 00:00	M	0.046	0.40	0.34	0.093	0.79	0.096	0.031	1.2	0.96	<0.14	16700	0.78	7.89	102	0.31
SP24-5-5	CLB109	2024/03/19 00:00	M	0.60	11	1.7	2.0	1.2	1.7	3.3	18	10	<0.050	17500	0.61	7.78	82.2	0.33
SP24-5-5	CLB123	2024/03/19 00:00	D	0.042	0.47	0.15	0.091	<0.050	0.048	0.047	0.37	0.62	<0.050	19400	0.78	9.01	84.0	0.37
SP24-5-6	CLB110	2024/03/19 00:00	M	0.068	0.95	0.21	0.18	0.070	0.040	0.055	0.84	1.1	<0.064	17400	1.10	7.63	91.5	0.31
SP24-6-2	CLB112	2024/03/19 00:00	M	0.052	0.63	0.11	0.16	0.051	0.036	0.014	0.40	0.89	<0.070	18700	0.75	8.62	89.7	0.37
SP24-6-5	CLB115	2024/03/19 00:00	M	0.039	0.60	0.10	0.13	<0.050	0.026	0.029	0.58	0.69	<0.050	17700	0.74	7.85	83.0	0.29
SP24-6-6	CLB116	2024/03/19 00:00	M	0.038	0.52	0.13	0.11	0.14	0.073	0.058	0.50	0.69	<0.050	17800	0.68	7.92	84.8	0.30
SP24-7-1	CLB117	2024/03/19 00:00	M	0.035	0.41	0.057	0.089	<0.050	<0.020	0.020	0.34	0.46	<0.050	19400	0.67	8.73	81.5	0.37
SP24-7-3	CLB119	2024/03/19 00:00	M	0.037	0.42	0.059	0.093	<0.050	<0.020	0.024	0.27	0.52	<0.050	19000	0.74	8.80	81.8	0.36
SP24-7-6	CLB122	2024/03/19 00:00	M	0.030	0.36	0.039	0.089	<0.050	<0.020	0.022	0.32	0.42	<0.050	18200	0.76	8.31	85.2	0.32
SP24-10-2	CLC462	2024/03/21 00:00	M	0.041	0.56	0.056	0.12	<0.050	<0.020	0.023	0.55	0.63	<0.050	12100	0.92	5.29	92.2	0.25
SP24-10-4	CLC464	2024/03/21 00:00	M	0.040	0.51	0.054	0.11	<0.050	<0.020	0.025	0.49	0.58	<0.050	14000	0.97	6.23	96.8	0.31
SP24-10-6	CLC466	2024/03/21 00:00	M	0.048	0.62	0.055	0.13	<0.050	<0.020	0.025	0.57	0.72	<0.050	13400	3.60	5.92	94.5	0.27
SP24-8-1	CLC449	2024/03/21 00:00	M	0.043	0.42	0.087	0.13	0.056	0.029	0.031	0.40	0.51	<0.050	16600	0.73	8.47	89.9	0.36
SP24-8-5	CLC453	2024/03/21 00:00	M	0.052	0.66	0.11	0.16	0.073	0.049	0.039	0.70	0.74	<0.050	16200	0.95	8.00	92.8	0.49
SP24-8-6	CLC454	2024/03/21 00:00	M	0.044	0.58	0.070	0.12	<0.050	<0.020	0.038	0.54	0.69	<0.050	15200	0.95	7.32	90.2	0.31
SP24-9-2	CLC456	2024/03/21 00:00	M	0.039	0.50	0.085	0.10	<0.050	0.029	0.047	0.51	0.60	<0.050	16500	0.83	7.95	91.0	0.34
SP24-9-2	CLC468	2024/03/21 00:00	D	0.024	0.29	0.051	0.063	<0.050	<0.020	0.017	0.26	0.38	<0.050	16800	0.80	9.19	88.8	0.36
SP24-9-4	CLC458	2024/03/21 00:00	M	0.070	1.2	0.085	0.19	<0.050	0.033	0.058	1.2	1.3	<0.050	17100	0.90	8.99	90.2	0.38
SP24-9-6	CLC460	2024/03/21 00:00	M	0.11	2.1	0.28	0.35	0.078	0.069	0.078	2.6	2.1	<0.050	15500	0.67	7.69	83.4	0.35
SP24-11-1	CLI555	2024/03/26 00:00	M	0.068	0.78	0.11	0.22	<0.050	0.046	0.072	0.95	0.81	<0.050	12900	1.21	5.61	104	<0.20
SP24-11-3	CLI557	2024/03/26 00:00	M	0.071	0.95	0.15	0.23	0.057	0.062	0.096	1.2	1.0	<0.050	12600	1.18	6.92	105	<0.20
SP24-12-1	CLN841	2024/04/01 00:00	M	0.14	9.0	3.2	0.39	1.7	2.9	14	9.8	7.0	<0.050	14900	1.34	8.36	147	0.28
SP24-13-1	CMS260	2024/04/28 00:00	M	<0.020	0.16	0.035	0.022	<0.050	<0.020	<0.010	0.11	0.13	<0.050	9490	0.61	2.78	79.6	<0.20
SP24-13-2	CMS262	2024/04/28 00:00	M	<0.020	0.43	0.066	0.050	<0.050	0.041	0.13	0.25	0.36	<0.050	15800	1.41	6.53	137	0.25
SP24-14	CNJ764	2024/05/10 00:00	M	<0.020	0.051	<0.020	<0.020	<0.050	<0.020	<0.010	0.021	0.13	<0.050	13300	0.27	4.32	61.3	<0.20
CS24-1	CPP974	2024/06/18 00:00	M	<0.25	<0.25	<0.25	<0.25	<0.64	<0.25	<0.13	<0.13	<0.25	<0.64	15400	1.21	18.3	501	<0.20
CS24-1	CPP975	2024/06/18 00:00	D	<0.25	<0.25	<0.25	<0.25	<0.63	<0.25	<0.13	<0.13	<0.25	<0.63	16200	1.21	18.4	531	<0.20
SP24-15-1	CPP966	2024/06/18 00:00	M	<0.020	0.054	<0.020	<0.020	<0.050	0.043	0.035	0.033	0.050	<0.050	9160	0.66	4.92	75.6	<0.20
SP24-15-2	CPP967	2024/06/18 00:00	M	<0.020	0.17	<0.020	0.043	<0.050	0.021	0.014	0.077	0.16	<0.050	12900	6.67	4.38	117	<0.20
SP24-16-1	CRW681	2024/07/22 00:00	M	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.010	<0.010	<0.020	<0.050	11400	0.15	2.60	74.6	<0.20
SP24-16-2	CRW682	2024/07/22 00:00	M	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.010	<0.010	<0.020	<0.050	11500	0.15	2.54	90.4	<0.20
SP24-16-6	CRW686	2024/07/22 00:00	M	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.010	<0.010	<0.020	<0.050	11900	0.15	2.88	76.0	<0.20
SP24-17-4	CRW690	2024/07/22 00:00	M	<0.020	0.054	0.040	<0.020	<0.050	<0.020	<0.010	0.050	0.13	<0.050	11700	0.14	2.92	74.8	<0.20
SP24-17-5	CRW691	2024/07/22 00:00	M	<0.020	0.21	0.14	0.030	<0.050	<0.020	0.012	0.14	0.59	<0.17	11300	0.23	3.07	71.8	<0.20
SP24-17-6	CRW692	2024/07/22 00:00	M	<0.020	0.064	0.020	<0.020	<0.050	<0.020	<0.010	0.031	0.097	<0.050	11500	0.19	2.86	76.0	<0.20
SP24-18-1	CRW693	2024/07/22 00:00	M	<0.020	0.086	0.044	<0.020	<0.050	<0.020	<0.010	0.060	0.18	<0.050	11700	0.20	2.80	78.3	<0.20
SP24-18-3	CRW695	2024/07/22 00:00	M	<0.020	0.054	0.023	<0.020	<0.050	<0.020	<0.010	0.024	0.13	<0.050	11300	0.13	2.73	71.6	<0.20
SP24-18-6	CRW698	2024/07/22 00:00	M	<0.020	0.049	0.027	<0.020	<0.050	<0.020	<0.010	0.027	0.11	<0.050	11800	0.18	2.86	74.9	<0.20
SP24-18-6	CRW705	2024/07/22 00:00	D	<0.020	0.042	0.026	<0.020	<0.050	<0.020	<0.010	0.025	0.10	<0.050	12600	0.20	3.01	81.0	<0.20
SP24-19-2	CRW700	2024/07/22 00:00	M	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.010	<0.010	<0.020	<0.050	13100	0.17	2.94	77.2	<0.20
SP24-19-5	CRW703	2024/07/22 00:00	M	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.010	<0.010	<0.020	<0.050	10600	0.14	2.60	71.4	<0.20
SP24-19-6	CRW704	2024/07/22 00:00	M	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.010	<0.010	<0.020	<0.050	12100	0.25	3.10	70.1	<0.20

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-19-6	CRW706	2024/07/22 00:00	D	<0.020	<0.020	<0.020	<0.020	<0.050	<0.020	<0.010	<0.010	<0.020	<0.050	10700	0.15	2.60	65.2	<0.20
SP24-20-1	CRW710	2024/07/23 00:00	M	0.033	0.31	0.13	0.056	<0.050	0.027	0.014	0.22	0.69	<0.37	12700	0.34	3.86	71.7	<0.20
SP24-20-1	CRW716	2024/07/23 00:00	D	0.038	0.36	0.15	0.065	<0.050	0.022	0.030	0.29	0.75	<0.15	9450	0.25	2.86	62.0	<0.20
SP24-20-5	CRW714	2024/07/23 00:00	M	0.022	0.38	0.077	0.059	<0.050	<0.020	0.016	0.20	0.55	<0.13	11300	0.30	3.34	70.0	<0.20
SP24-20-6	CRW715	2024/07/23 00:00	M	0.028	0.40	0.066	0.071	<0.050	<0.020	0.016	0.26	0.54	<0.060	11300	0.30	3.40	64.7	<0.20
SP24-21-1	CSB706	2024/07/24 00:00	M	<0.020	0.048	<0.020	<0.020	<0.050	<0.020	<0.010	<0.010	0.081	<0.050	13200	0.15	4.33	89.3	<0.20
SP24-21-2	CSB707	2024/07/24 00:00	M	<0.020	0.030	<0.020	<0.020	<0.050	<0.020	<0.010	0.015	0.034	<0.050	13600	0.17	4.89	95.4	<0.20
SP24-21-6	CSB711	2024/07/24 00:00	M	<0.020	0.026	<0.020	<0.020	<0.050	<0.020	<0.010	<0.010	0.033	<0.050	13900	0.18	5.18	96.7	<0.20
SP24-22-1	CSB713	2024/07/24 00:00	M	<0.020	0.025	<0.020	<0.020	<0.050	<0.020	<0.010	0.011	0.029	<0.050	12200	0.20	4.26	79.6	<0.20
SP24-22-2	CSB714	2024/07/24 00:00	M	<0.020	0.028	<0.020	<0.020	<0.050	<0.020	<0.010	0.014	0.032	<0.050	13300	0.16	4.52	86.3	<0.20
SP24-23-1	CVZ638	2024/09/20 00:00	M	<0.020	<0.020	0.063	<0.020	<0.050	<0.020	<0.010	0.10	0.041	<0.050	21400	0.26	4.07	57.0	0.20
SP24-23-2	CVZ639	2024/09/20 00:00	M	<0.020	0.092	0.064	0.025	<0.050	0.026	<0.010	0.10	0.11	<0.080	15900	1.19	4.25	57.4	0.23
SP24-24-1	CWO971	2024/09/27 00:00	M	<0.020	0.027	<0.020	<0.020	<0.050	<0.020	<0.010	0.012	0.029	<0.050	12500	0.60	3.16	85.5	<0.20
SP24-24-2	CWO972	2024/09/27 00:00	M	<0.020	0.074	<0.020	<0.020	<0.050	<0.020	<0.010	0.037	0.064	<0.050	11900	0.64	3.30	110	0.25
SP24-24-3	CWO973	2024/09/27 00:00	M	<0.020	0.17	0.021	0.033	<0.050	<0.020	<0.010	0.097	0.14	<0.050	11400	1.05	3.16	110	0.23
SP24-24-4	CWO974	2024/09/27 00:00	M	<0.020	0.22	0.035	0.039	<0.050	0.025	0.023	0.22	0.20	<0.050	11600	0.61	3.12	105	0.22
SP24-25	CWO975	2024/09/27 00:00	M	<0.020	0.098	<0.020	<0.020	<0.050	<0.020	<0.010	0.039	0.081	<0.050	12400	0.61	3.34	111	<0.20
SP25-1-1	DSW744	2025/09/14 00:00	M	<0.020	0.054	<0.020	<0.020	<0.050	<0.020	<0.010	0.034	0.041	<0.050	9150	1.08	4.30	60.9	<0.20
SP25-1-2	DSW745	2025/09/14 00:00	M	<0.020	0.067	0.022	<0.020	<0.050	<0.020	0.013	0.051	0.050	<0.050	10800	1.66	6.22	74.8	<0.20
SP25-1-2	DSW762	2025/09/14 00:00	D	<0.020	0.064	0.025	<0.020	<0.050	<0.020	0.016	0.048	0.045	<0.050	11400	1.66	6.19	84.8	<0.20
SP25-1-3	DSW746	2025/09/14 00:00	M	<0.020	0.050	<0.020	<0.020	<0.050	<0.020	0.012	0.041	0.040	<0.050	11400	1.39	5.21	97.4	<0.20
SP25-1-4	DSW747	2025/09/14 00:00	M	<0.020	0.15	0.028	0.026	<0.050	0.022	0.019	0.10	0.11	<0.050	11700	1.23	6.76	123	<0.20
SP25-1-5	DSW748	2025/09/14 00:00	M	<0.020	0.20	0.050	<0.020	<0.050	0.027	0.021	0.20	0.13	<0.050	10800	1.39	4.89	87.4	<0.20
SP25-2-1	DSW749	2025/09/14 00:00	M	<0.020	0.089	0.037	<0.020	<0.050	0.021	0.017	0.073	0.064	<0.050	11700	1.54	7.06	87.3	<0.20
SP25-2-2	DSW750	2025/09/14 00:00	M	<0.020	0.23	0.17	<0.020	<0.050	0.069	0.11	0.32	0.14	<0.050	13200	1.84	7.01	103	<0.20
SP25-2-3	DSW751	2025/09/14 00:00	M	<0.020	0.12	0.051	<0.020	<0.050	<0.020	0.018	0.082	0.081	<0.050	10600	1.19	4.65	71.2	<0.20
SP25-2-4	DSW752	2025/09/14 00:00	M	<0.020	0.060	<0.020	<0.020	<0.050	<0.020	0.011	0.031	0.044	<0.050	10700	1.16	5.50	69.0	<0.20
SP25-2-5	DSW753	2025/09/14 00:00	M	<0.020	0.057	0.021	<0.020	<0.050	<0.020	<0.010	0.044	0.042	<0.050	12500	1.42	5.60	71.3	<0.20
SP25-3-1	DSW754	2025/09/14 00:00	M	<0.020	0.25	0.10	<0.020	<0.050	<0.020	0.016	0.18	0.16	<0.050	12900	3.24	10.8	78.6	<0.20
SP25-3-2	DSW755	2025/09/14 00:00	M	<0.020	0.10	0.066	<0.020	<0.050	0.020	0.019	0.13	0.065	<0.050	12600	4.09	9.75	83.3	<0.20
SP25-3-3	DSW756	2025/09/14 00:00	M	<0.020	0.089	0.045	<0.020	<0.050	<0.020	0.011	0.089	0.066	<0.050	11300	2.28	7.54	80.9	<0.20
SP25-3-4	DSW757	2025/09/14 00:00	M	<0.020	0.15	0.090	<0.020	<0.050	0.025	0.025	0.18	0.096	<0.050	11300	4.21	8.39	80.2	<0.20
SP25-3-5	DSW758	2025/09/14 00:00	M	<0.020	0.17	0.074	0.021	<0.050	<0.020	0.019	0.15	0.12	<0.050	12600	4.18	10.0	102	<0.20
SP25-3-5	DSW763	2025/09/14 00:00	D	<0.020	0.21	0.088	0.028	<0.050	0.029	0.024	0.19	0.15	<0.050	12800	4.55	13.0	94.1	<0.20
SP25-4-1	DSW759	2025/09/14 00:00	M	<0.020	0.067	0.027	<0.020	<0.050	<0.020	0.012	0.057	0.052	<0.050	13400	2.20	7.05	139	0.21
SP25-4-2	DSW760	2025/09/14 00:00	M	<0.020	0.080	0.036	<0.020	<0.050	0.030	0.019	0.079	0.079	<0.050	14000	1.84	6.28	211	0.26
SP25-4-3	DSW761	2025/09/14 00:00	M	<0.020	0.089	0.031	<0.020	<0.050	0.026	0.015	0.065	0.070	<0.050	10500	1.31	4.72	98.8	<0.20
SP25-5-1	DSW765	2025/09/14 00:00	M	<0.020	0.17	0.11	<0.020	<0.050	0.023	0.023	0.18	0.12	<0.050	12800	22.7	9.75	90.3	<0.20
SP25-5-2	DSW766	2025/09/14 00:00	M	<0.020	0.25	0.14	<0.020	<0.050	<0.020	0.013	0.28	0.17	<0.050	10600	1.53	5.58	72.6	<0.20
SP25-5-2	DSW764	2025/09/14 00:00	D	<0.020	0.13	0.063	<0.020	<0.050	<0.020	<0.010	0.10	0.087	<0.050	12000	2.02	7.01	90.6	<0.20
SP25-5-3	DSW767	2025/09/14 00:00	M	<0.020	0.10	0.038	<0.020	<0.050	<0.020	0.012	0.084	0.074	<0.050	12100	3.56	10.3	89.1	<0.20

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Boron (B)	Cadmium (Cd)	Chromium(Cr)	Cobalt (Co)	Copper (Cu)	Copper (Cu)-TCLP	Iron (Fe)	Lead (Pb)	Lead (Pb)-TCLP	Lithium (Li)	Manganese (Mn)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-1-1	CID582	2024/01/26 00:00	M	11.1	0.442	25.6	8.15	58.6		23900	67.1		16.6	499	2.75	2.15	22.2	<0.50
SP24-1-2	CID583	2024/01/26 00:00	M	14.6	0.481	27.5	7.63	53.5		24900	98.4		12.7	472	4.41	2.32	16.5	<0.50
SP24-2-1	CJF026	2024/02/14 00:00	M	17.5	0.638	28.4	6.08	52.4		25400	235		9.03	489	0.189	2.08	18.9	<0.50
SP24-2-2	CJF027	2024/02/14 00:00	M	14.1	0.517	29.2	6.45	51.6		25300	155		8.88	465	0.158	2.26	20.5	<0.50
SP24-3-1	CJN250	2024/02/20 00:00	M	6.1	0.343	16.6	7.83	42.4		21400	119		21.3	359	0.175	1.79	10.7	<0.50
SP24-3-1	CJN254	2024/02/20 00:00	D	6.9	0.379	18.4	8.54	48.2		24600	275		22.3	391	0.188	1.94	11.6	<0.50
SP24-3-2	CJN251	2024/02/20 00:00	M	8.7	0.302	17.5	5.99	33.4		19600	31.1		14.1	313	0.267	1.57	11.0	<0.50
SP24-3-3	CJN252	2024/02/20 00:00	M	4.9	0.153	17.0	6.35	33.5		19800	16.2		13.4	299	0.071	1.70	9.92	<0.50
SP24-3-4	CJN253	2024/02/20 00:00	M	7.9	0.431	18.7	7.40	49.7		24800	54.7		17.2	477	0.263	1.91	12.4	<0.50
SP24-4-1	CJN255	2024/02/20 00:00	M	6.2	0.247	16.6	7.16	53.8		21500	36.1		19.5	313	0.142	1.92	9.95	<0.50
SP24-4-2	CJN256	2024/02/20 00:00	M	5.4	0.176	17.5	6.44	29.3		20300	21.1		15.7	298	0.135	1.91	9.25	<0.50
SP24-4-3	CJN257	2024/02/20 00:00	M	9.5	0.279	20.3	8.03	32.4		22400	48.3		22.0	441	0.291	6.64	13.1	<0.50
SP24-4-4	CJN258	2024/02/20 00:00	M	7.2	0.519	17.7	7.09	32.4		20000	38.6		14.7	311	0.108	1.88	10.1	<0.50
SP24-5-4	CLB108	2024/03/19 00:00	M	8.6	0.280	17.9	7.54	32.1		24800	21.2		17.6	400	0.131	2.01	12.4	<0.50
SP24-5-5	CLB109	2024/03/19 00:00	M	6.3	0.287	17.7	7.46	32.8		21100	17.1		17.8	417	0.116	1.70	11.5	<0.50
SP24-5-5	CLB123	2024/03/19 00:00	D	6.3	0.306	20.1	8.04	35.3		22800	18.2		19.2	445	0.091	1.92	12.1	<0.50
SP24-5-6	CLB110	2024/03/19 00:00	M	8.6	0.326	17.8	7.43	31.9		21200	18.6		17.9	418	0.164	1.82	11.7	<0.50
SP24-6-2	CLB112	2024/03/19 00:00	M	9.0	0.314	18.5	7.88	206		21700	21.5		18.4	435	0.141	1.89	13.5	<0.50
SP24-6-5	CLB115	2024/03/19 00:00	M	7.7	0.290	17.9	7.25	31.6		21200	19.0		18.4	407	0.144	1.81	13.9	<0.50
SP24-6-6	CLB116	2024/03/19 00:00	M	7.7	0.306	19.1	7.32	34.6		21100	26.4		17.2	414	0.139	1.88	14.5	<0.50
SP24-7-1	CLB117	2024/03/19 00:00	M	6.8	0.285	19.0	7.51	33.6		22400	49.1		19.5	411	0.104	2.17	13.1	<0.50
SP24-7-3	CLB119	2024/03/19 00:00	M	6.9	0.389	19.6	7.54	34.6		22600	22.0		18.6	426	0.106	2.01	14.2	<0.50
SP24-7-6	CLB122	2024/03/19 00:00	M	7.5	0.289	22.2	7.44	35.9		22100	25.9		19.4	413	0.135	2.08	17.7	<0.50
SP24-10-2	CLC462	2024/03/21 00:00	M	8.7	0.261	24.5	7.07	35.0		20500	37.8		14.7	429	0.228	3.17	48.4	<0.50
SP24-10-4	CLC464	2024/03/21 00:00	M	9.2	0.262	28.5	6.91	36.2		22200	32.8		16.6	433	0.191	2.95	37.4	<0.50
SP24-10-6	CLC466	2024/03/21 00:00	M	9.0	0.294	26.1	6.74	40.9		21500	31.1		15.7	430	0.245	2.94	35.5	<0.50
SP24-8-1	CLC449	2024/03/21 00:00	M	5.9	0.315	17.0	7.29	37.2		21200	24.6		18.1	434	0.108	2.38	16.6	<0.50
SP24-8-5	CLC453	2024/03/21 00:00	M	6.8	0.424	21.7	7.66	35.9		23500	30.1		18.3	474	0.329	2.77	24.6	<0.50
SP24-8-6	CLC454	2024/03/21 00:00	M	7.6	0.311	25.8	7.42	36.7		22600	56.9		17.7	472	0.150	2.89	26.0	<0.50
SP24-9-2	CLC456	2024/03/21 00:00	M	5.9	0.310	19.8	7.72	32.3		21500	21.3		17.8	424	0.101	2.06	18.0	<0.50
SP24-9-2	CLC468	2024/03/21 00:00	D	6.1	1.10	21.5	7.93	36.2		21800	21.8		19.0	456	0.546	2.26	18.9	<0.50
SP24-9-4	CLC458	2024/03/21 00:00	M	6.7	0.341	19.4	7.61	35.5		22000	20.6		19.2	430	0.097	2.23	15.9	<0.50
SP24-9-6	CLC460	2024/03/21 00:00	M	6.0	0.373	17.2	6.78	30.8		20600	19.5		17.5	402	0.104	2.13	14.6	<0.50
SP24-11-1	CLI555	2024/03/26 00:00	M	17.0	0.282	32.7	7.47	52.7		25200	92.0		14.8	453	0.421	4.14	39.1	<0.50
SP24-11-3	CLI557	2024/03/26 00:00	M	15.9	0.331	29.4	7.29	40.9		21600	55.4		13.9	439	0.349	2.96	35.8	<0.50
SP24-12-1	CLN841	2024/04/01 00:00	M	10.4	0.500	15.5	6.12	54.7		20400	121		11.9	438	0.211	2.05	13.5	<0.50
SP24-13-1	CMS260	2024/04/28 00:00	M	3.9	0.154	22.2	4.82	23.4		15300	56.2		8.89	251	0.053	1.26	9.49	<0.50
SP24-13-2	CMS262	2024/04/28 00:00	M	7.9	0.332	16.1	6.26	38.4		20900	65.7		12.7	416	0.086	2.22	10.9	<0.50
SP24-14	CNJ764	2024/05/10 00:00	M	4.9	0.140	12.8	5.43	18.6		18200	13.7		11.8	261	<0.050	2.21	6.62	<0.50
CS24-1	CPP974	2024/06/18 00:00	M	22.5	0.651	134	5.70	74.5		68500	9.20		1.21	4630	0.702	5.16	52.5	2.45
CS24-1	CPP975	2024/06/18 00:00	D	22.8	0.700	139	6.02	96.9		69300	12.8		1.35	4720	0.756	5.24	55.0	2.65
SP24-15-1	CPP966	2024/06/18 00:00	M	9.5	0.106	15.4	5.22	23.0		19200	25.8		8.39	294	<0.050	1.65	8.75	<0.50
SP24-15-2	CPP967	2024/06/18 00:00	M	10.8	0.236	17.2	6.81	32.1		22200	35.4		11.5	404	0.087	2.04	10.7	<0.50
SP24-16-1	CRW681	2024/07/22 00:00	M	2.0	<0.050	11.9	5.41	16.8		17000	3.28		15.7	239	<0.050	2.14	5.51	<0.50
SP24-16-2	CRW682	2024/07/22 00:00	M	1.4	<0.050	11.2	5.72	17.1		16800	3.15		17.3	229	<0.050	2.33	5.40	<0.50
SP24-16-6	CRW686	2024/07/22 00:00	M	1.2	<0.050	13.6	5.46	17.5		17400	3.58		16.9	221	<0.050	2.41	5.57	<0.50
SP24-17-4	CRW690	2024/07/22 00:00	M	1.3	<0.050	14.7	5.72	19.0		18300	4.06		17.5	224	<0.050	2.48	5.68	<0.50
SP24-17-5	CRW691	2024/07/22 00:00	M	1.6	0.068	12.6	6.02	18.2		19200	6.83		15.6	246	<0.050	2.07	5.67	<0.50
SP24-17-6	CRW692	2024/07/22 00:00	M	1.5	<0.050	12.4	5.50	18.1		17300	3.69		16.1	226	<0.050	2.50	5.60	<0.50
SP24-18-1	CRW693	2024/07/22 00:00	M	1.6	0.051	13.2	5.60	24.2		17900	5.39		17.3	255	<0.050	2.73	5.92	<0.50
SP24-18-3	CRW695	2024/07/22 00:00	M	1.2	<0.050	12.8	5.40	18.0		17600	4.03		17.7	228	<0.050	2.71	5.30	<0.50
SP24-18-6	CRW698	2024/07/22 00:00	M	1.3	<0.050	12.8	5.66	18.9		17400	4.09		17.2	239	<0.050	2.65	5.82	<0.50
SP24-18-6	CRW705	2024/07/22 00:00	D	1.4	<0.050	14.8	5.87	20.2		18500	4.86		17.0	236	<0.050	2.90	6.10	<0.50
SP24-19-2	CRW700	2024/07/22 00:00	M	1.1	0.053	16.3	6.08	20.7		21100	3.47		19.8	248	<0.050	3.42	5.82	<0.50
SP24-19-5	CRW703	2024/07/22 00:00	M	1.0	<0.050	11.7	5.03	16.2		15500	2.69		14.6	210	<0.050	2.28	5.04	<0.50
SP24-19-6	CRW704	2024/07/22 00:00	M	1.2	<0.050	13.3	5.58	21.0		17400	3.69		17.2	242	<0.050	2.91	5.80	<0.50

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Boron (B)	Cadmium (Cd)	Chromium(Cr)	Cobalt (Co)	Copper (Cu)	Copper (Cu)-TCLP	Iron (Fe)	Lead (Pb)	Lead (Pb)-TCLP	Lithium (Li)	Manganese (Mn)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-19-6	CRW706	2024/07/22 00:00	D	<1.0	<0.050	11.4	4.97	17.4		15000	2.99		15.0	199	<0.050	2.21	5.35	<0.50
SP24-20-1	CRW710	2024/07/23 00:00	M	2.1	0.091	17.8	6.33	22.5		20000	8.39		16.5	279	0.050	2.97	17.2	<0.50
SP24-20-1	CRW716	2024/07/23 00:00	D	1.9	0.071	12.0	4.62	17.1		14300	6.14		13.0	210	<0.050	2.17	12.9	<0.50
SP24-20-5	CRW714	2024/07/23 00:00	M	2.4	0.063	15.1	5.71	21.0		17900	8.18		15.4	245	<0.050	2.52	14.7	<0.50
SP24-20-6	CRW715	2024/07/23 00:00	M	2.1	0.075	14.8	5.84	20.1		17800	6.73		15.0	244	<0.050	2.62	15.1	<0.50
SP24-21-1	CSB706	2024/07/24 00:00	M	2.1	0.094	17.1	6.09	21.2		18100	5.33		14.9	260	<0.050	2.70	7.35	<0.50
SP24-21-2	CSB707	2024/07/24 00:00	M	2.5	0.078	14.4	6.26	22.6		18300	5.52		15.6	267	<0.050	3.06	6.99	<0.50
SP24-21-6	CSB711	2024/07/24 00:00	M	2.0	0.077	18.6	6.76	24.5		19900	16.9		16.1	290	<0.050	3.19	7.47	<0.50
SP24-22-1	CSB713	2024/07/24 00:00	M	3.1	0.080	14.1	5.70	20.8		16900	6.92		13.6	243	<0.050	2.60	6.63	<0.50
SP24-22-2	CSB714	2024/07/24 00:00	M	2.5	0.089	13.3	6.02	21.7		17500	5.87		15.0	265	<0.050	3.65	6.73	<0.50
SP24-23-1	CVZ638	2024/09/20 00:00	M	6.7	<0.050	12.9	5.66	14.9		19100	3.64		11.5	249	0.076	1.29	6.16	<0.50
SP24-23-2	CVZ639	2024/09/20 00:00	M	3.6	0.093	15.1	5.97	18.7		19700	11.9		13.2	269	0.060	1.82	7.18	<0.50
SP24-24-1	CWO971	2024/09/27 00:00	M	3.6	0.098	13.6	5.73	24.1		18100	59.4		9.19	298	0.071	2.52	8.17	<0.50
SP24-24-2	CWO972	2024/09/27 00:00	M	5.2	0.161	14.3	5.97	24.7		19800	15.8		12.1	350	<0.050	2.26	7.30	<0.50
SP24-24-3	CWO973	2024/09/27 00:00	M	6.3	0.160	14.1	5.05	23.4		17600	19.2		11.1	319	0.061	2.43	7.36	<0.50
SP24-24-4	CWO974	2024/09/27 00:00	M	4.9	0.125	12.9	5.48	25.0		18500	18.3		11.7	341	<0.050	2.90	7.01	<0.50
SP24-25	CWO975	2024/09/27 00:00	M	4.2	0.119	12.2	5.23	24.0		18300	16.0		12.6	343	<0.050	4.33	5.82	<0.50
SP25-1-1	DSW744	2025/09/14 00:00	M	6.7	0.237	11.4	4.66	29.3		15000	189		7.84	261	0.100	1.49	6.87	<0.50
SP25-1-2	DSW745	2025/09/14 00:00	M	7.2	0.249	14.7	4.86	36.5		17100	258		9.19	298	0.115	1.71	7.76	<0.50
SP25-1-2	DSW762	2025/09/14 00:00	D	8.2	0.319	14.8	5.44	39.9		17600	295		9.83	296	0.109	1.75	8.27	<0.50
SP25-1-3	DSW746	2025/09/14 00:00	M	12.4	0.230	13.5	5.09	43.8		16600	118		11.0	371	0.094	1.36	9.33	<0.50
SP25-1-4	DSW747	2025/09/14 00:00	M	20.0	0.303	15.6	5.39	65.1		17400	184		10.5	370	0.116	1.47	11.3	<0.50
SP25-1-5	DSW748	2025/09/14 00:00	M	8.1	0.203	15.9	4.99	46.2		17900	165		9.09	418	0.120	1.41	10.1	<0.50
SP25-2-1	DSW749	2025/09/14 00:00	M	8.8	0.178	15.3	5.21	46.2		18400	154		11.1	345	0.094	1.61	9.54	<0.50
SP25-2-2	DSW750	2025/09/14 00:00	M	10.9	0.263	17.7	8.66	59.5		20100	236		10.4	406	0.199	2.06	11.2	<0.50
SP25-2-3	DSW751	2025/09/14 00:00	M	5.3	0.235	12.8	4.76	40.0		17000	191		8.44	307	0.095	1.60	7.56	<0.50
SP25-2-4	DSW752	2025/09/14 00:00	M	3.8	0.192	12.8	5.06	28.2		16300	162		10.2	252	0.073	1.41	7.17	<0.50
SP25-2-5	DSW753	2025/09/14 00:00	M	4.8	0.203	14.1	5.49	36.0		17700	123		11.8	296	0.092	1.77	7.63	<0.50
SP25-3-1	DSW754	2025/09/14 00:00	M	5.9	0.290	18.2	6.57	49.2		21100	373		12.7	292	0.163	2.61	10.6	<0.50
SP25-3-2	DSW755	2025/09/14 00:00	M	6.3	0.284	19.2	6.14	50.6		22800	392		11.4	323	0.118	2.14	10.2	<0.50
SP25-3-3	DSW756	2025/09/14 00:00	M	6.6	0.205	13.4	5.05	2300	<0.10	17900	228		9.42	267	0.091	1.52	7.95	<0.50
SP25-3-4	DSW757	2025/09/14 00:00	M	7.0	0.234	17.1	5.36	40.9		19000	635		9.90	259	0.087	1.72	8.88	<0.50
SP25-3-5	DSW758	2025/09/14 00:00	M	14.8	0.367	25.4	6.60	72.2		23700	571		10.1	333	0.164	2.86	14.8	<0.50
SP25-3-5	DSW763	2025/09/14 00:00	D	12.2	0.475	24.7	7.22	81.7		25600	637		10.8	353	0.212	3.16	15.4	<0.50
SP25-4-1	DSW759	2025/09/14 00:00	M	17.5	0.329	19.1	6.31	207		20500	255		11.5	537	0.127	2.04	14.9	<0.50
SP25-4-2	DSW760	2025/09/14 00:00	M	40.8	0.309	19.5	6.54	85.3		19100	1070	0.12	12.1	629	0.159	2.10	18.7	<0.50
SP25-4-3	DSW761	2025/09/14 00:00	M	12.3	0.232	16.2	4.76	58.0		17800	265		7.64	452	0.163	1.51	10.3	<0.50
SP25-5-1	DSW765	2025/09/14 00:00	M	11.9	0.347	18.4	6.25	87.3		22200	637		11.3	339	0.154	2.41	11.5	<0.50
SP25-5-2	DSW766	2025/09/14 00:00	M	5.0	0.155	12.0	4.92	31.8		16200	147		10.4	282	0.061	1.69	7.62	<0.50
SP25-5-2	DSW764	2025/09/14 00:00	D	7.2	0.229	15.3	5.74	53.3		20000	209		11.7	352	0.123	1.92	9.28	<0.50
SP25-5-3	DSW767	2025/09/14 00:00	M	10.2	0.267	17.9	5.79	58.5		22300	381		10.6	343	0.134	2.24	11.7	<0.50

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Silver (Ag)	Sodium (Na)	Sodium (Na)-Extractable	Strontium (Sr)	Thallium (Tl)	Tin (Sn)	Titanium (Ti)	Tungsten (W)	Uranium (U)	Vanadium (V)	Zinc (Zn)	VH (C6-10)	VPH	EPH (C10-19)	EPH (C19-32)	LEPH	HEPH
				mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-1-1	CID582	2024/01/26 00:00	M	0.117			96.7	<0.050	2.43	976	0.75	8.53	62.1	112	<10	<10	130	560	130	550
SP24-1-2	CID583	2024/01/26 00:00	M	0.119			127	0.101	3.26	956	0.71	5.45	59.4	148	<10	<10	290	660	290	660
SP24-2-1	CJF026	2024/02/14 00:00	M	0.088			122	0.070	2.18	725	<0.50	1.55	46.5	303	11	11	<100	240	<100	240
SP24-2-2	CJF027	2024/02/14 00:00	M	0.075			118	0.073	2.25	705	<0.50	1.44	49.3	218	11	11	<100	380	<100	380
SP24-3-1	CJN250	2024/02/20 00:00	M	0.140			77.9	0.119	1.89	882	0.62	8.13	53.9	89.4	<10	<10	460	210	460	210
SP24-3-1	CJN254	2024/02/20 00:00	D	0.145			67.3	0.114	2.96	970	0.64	7.80	58.8	91.3	<10	<10	500	250	500	240
SP24-3-2	CJN251	2024/02/20 00:00	M	0.092			73.2	0.099	1.14	796	0.56	4.51	45.4	69.5	<10	<10	400	270	400	270
SP24-3-3	CJN252	2024/02/20 00:00	M	0.066			55.0	0.083	1.28	759	<0.50	2.52	50.6	59.6	<10	<10	<100	<100	<100	<100
SP24-3-4	CJN253	2024/02/20 00:00	M	0.119			78.6	0.106	2.49	915	1.51	6.86	61.7	91.5	<10	<10	250	190	250	190
SP24-4-1	CJN255	2024/02/20 00:00	M	0.103			55.2	0.104	5.58	873	0.55	7.51	53.1	72.9	<10	<10	560	250	560	250
SP24-4-2	CJN256	2024/02/20 00:00	M	0.089			58.1	0.102	0.78	746	0.69	5.18	54.4	58.9	<10	<10	390	190	390	190
SP24-4-3	CJN257	2024/02/20 00:00	M	0.098			81.3	0.106	2.19	964	0.69	18.8	53.9	135	<10	<10	<100	<100	<100	<100
SP24-4-4	CJN258	2024/02/20 00:00	M	0.099			71.9	0.115	0.96	838	0.51	3.60	49.2	75.7	<10	<10	240	160	240	160
SP24-5-4	CLB108	2024/03/19 00:00	M	0.110			67.9	0.073	1.00	991	17.5	10.3	57.9	70.1	10	10	1400	1200	1400	1200
SP24-5-5	CLB109	2024/03/19 00:00	M	0.110			38.2	0.057	0.79	939	0.85	12.0	58.1	66.1	<10	<10	740	810	720	790
SP24-5-5	CLB123	2024/03/19 00:00	D	0.132			46.4	0.122	0.81	1010	0.72	14.1	61.4	68.7	<10	<10	700	660	700	650
SP24-5-6	CLB110	2024/03/19 00:00	M	0.117			46.1	<0.050	0.81	982	0.77	12.0	56.6	66.6	<10	<10	840	770	840	770
SP24-6-2	CLB112	2024/03/19 00:00	M	0.128			50.1	0.064	10.6	1020	0.79	13.3	61.0	74.3	<10	<10	1200	1000	1200	1000
SP24-6-5	CLB115	2024/03/19 00:00	M	0.114			47.6	0.092	0.77	948	0.75	11.3	56.9	69.5	<10	<10	430	520	430	520
SP24-6-6	CLB116	2024/03/19 00:00	M	0.115			50.3	0.052	0.98	920	0.72	11.5	58.8	73.2	<10	<10	660	660	660	660
SP24-7-1	CLB117	2024/03/19 00:00	M	0.131			43.1	0.119	1.17	976	0.79	13.6	61.5	73.0	<10	<10	230	340	230	340
SP24-7-3	CLB119	2024/03/19 00:00	M	0.121			46.7	0.120	0.82	954	0.73	13.9	63.1	76.6	<10	<10	330	480	330	480
SP24-7-6	CLB122	2024/03/19 00:00	M	0.111			51.7	0.118	1.13	974	0.77	12.6	63.1	76.9	<10	<10	270	390	270	390
SP24-10-2	CLC462	2024/03/21 00:00	M	0.103			64.4	0.119	1.31	689	0.72	4.24	90.0	85.3	<10	<10	130	320	130	320
SP24-10-4	CLC464	2024/03/21 00:00	M	0.086			70.1	0.112	1.06	858	0.78	5.59	90.9	83.9	<10	<10	150	330	150	330
SP24-10-6	CLC466	2024/03/21 00:00	M	0.093			70.0	0.108	1.13	797	0.87	5.17	92.6	83.0	<10	<10	180	400	180	400
SP24-8-1	CLC449	2024/03/21 00:00	M	0.114			50.5	0.119	1.91	927	0.77	11.7	62.8	74.9	<10	<10	280	410	280	410
SP24-8-5	CLC453	2024/03/21 00:00	M	0.120			54.7	0.134	0.98	975	0.92	10.6	81.0	81.4	<10	<10	310	470	310	470
SP24-8-6	CLC454	2024/03/21 00:00	M	0.105			55.8	0.126	1.11	893	0.97	8.69	78.2	136	<10	<10	250	440	250	440
SP24-9-2	CLC456	2024/03/21 00:00	M	0.106			49.5	0.115	0.91	955	0.72	11.2	63.0	69.0	<10	<10	260	370	260	370
SP24-9-2	CLC468	2024/03/21 00:00	D	0.134			50.4	0.130	0.83	964	0.72	11.9	65.9	72.3	<10	<10	220	300	220	290
SP24-9-4	CLC458	2024/03/21 00:00	M	0.129			48.4	0.126	1.06	965	0.76	13.0	61.9	70.1	<10	<10	240	360	240	360
SP24-9-6	CLC460	2024/03/21 00:00	M	0.100			44.8	0.114	0.73	845	0.75	10.9	59.1	64.0	<10	<10	220	350	220	350
SP24-11-1	CLI555	2024/03/26 00:00	M	0.083			95.9	0.101	2.07	795	0.78	3.58	72.2	92.8	<10	<10	140	420	140	420
SP24-11-3	CLI557	2024/03/26 00:00	M	0.081			95.8	0.104	1.31	774	1.06	3.47	80.5	130	<10	<10	200	470	200	470
SP24-12-1	CLN841	2024/04/01 00:00	M	0.130			74.2	0.095	4.52	711	0.60	3.10	45.9	144	<10	<10	120	390	100	380
SP24-13-1	CMS260	2024/04/28 00:00	M	0.063			38.2	0.091	1.13	601	<0.50	0.831	38.5	55.8	<10	<10	<100	270	<100	270
SP24-13-2	CMS262	2024/04/28 00:00	M	0.092			72.7	0.099	2.58	758	0.61	3.20	55.3	94.8	<10	<10	<100	150	<100	150
SP24-14	CNJ764	2024/05/10 00:00	M	0.050			22.6	0.087	0.57	670	0.60	5.25	46.7	45.3	<10	<10	230	300	230	300
CS24-1	CPP974	2024/06/18 00:00	M	0.181	595	509	566	0.119	2.69	538	7.08	1.22	60.3	193			<140	420	<140	420
CS24-1	CPP975	2024/06/18 00:00	D	0.190	530	454	572	0.129	4.06	562	6.99	1.22	61.7	228			140	580	140	580
SP24-15-1	CPP966	2024/06/18 00:00	M	<0.050			50.8	0.076	0.99	685	0.50	1.64	41.8	57.7	<10	<10	<100	<100	<100	<100
SP24-15-2	CPP967	2024/06/18 00:00	M	0.072			91.3	0.090	21.4	883	0.63	2.61	49.4	555	<10	<10	<100	<100	<100	<100
SP24-16-1	CRW681	2024/07/22 00:00	M	<0.050			28.6	0.095	0.30	657	<0.50	2.17	46.0	35.4	<10	<10	<100	<100	<100	<100
SP24-16-2	CRW682	2024/07/22 00:00	M	<0.050			27.5	0.102	0.23	748	<0.50	2.53	47.5	33.4	<10	<10	<100	<100	<100	<100
SP24-16-6	CRW686	2024/07/22 00:00	M	<0.050			29.7	0.091	0.36	676	<0.50	2.54	51.8	33.5	<10	<10	<100	<100	<100	<100
SP24-17-4	CRW690	2024/07/22 00:00	M	<0.050			27.5	0.102	0.43	714	<0.50	2.63	54.5	34.6	<10	<10	170	170	170	170
SP24-17-5	CRW691	2024/07/22 00:00	M	<0.050			27.6	0.098	0.33	695	<0.50	2.65	54.9	39.7	<10	<10	600	650	600	650
SP24-17-6	CRW692	2024/07/22 00:00	M	<0.050			31.4	0.099	0.27	681	<0.50	2.29	49.4	33.6	<10	<10	<100	<100	<100	<100
SP24-18-1	CRW693	2024/07/22 00:00	M	0.056			30.0	0.097	0.31	731	<0.50	2.46	52.3	42.6	<10	<10	160	170	160	170
SP24-18-3	CRW695	2024/07/22 00:00	M	<0.050			24.8	0.097	0.39	699	<0.50	2.63	49.4	34.1	<10	<10	120	140	120	140
SP24-18-6	CRW698	2024/07/22 00:00	M	<0.050			28.5	0.096	0.32	702	<0.50	2.36	52.1	38.2	<10	<10	110	120	100	120
SP24-18-6	CRW705	2024/07/22 00:00	D	<0.050			30.0	0.101	0.30	699	<0.50	2.79	54.6	35.7	<10	<10	100	120	100	120
SP24-19-2	CRW700	2024/07/22 00:00	M	<0.050			30.8	0.101	0.36	802	0.52	2.71	63.4	36.0	<10	<10	<100	<100	<100	<100
SP24-19-5	CRW703	2024/07/22 00:00	M	<0.050			26.6	0.093	0.22	609	<0.50	2.34	44.7	30.8	<10	<10	<100	<100	<100	<100
SP24-19-6	CRW704	2024/07/22 00:00	M	0.055			29.2	0.113	0.29	702	<0.50	2.51	49.0	36.6	<10	<10	<100	<100	<100	<100

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Silver (Ag)	Sodium (Na)	Sodium (Na)-Extractable	Strontium (Sr)	Thallium (Tl)	Tin (Sn)	Titanium (Ti)	Tungsten (W)	Uranium (U)	Vanadium (V)	Zinc (Zn)	VH (C6-10)	VPH	EPH (C10-19)	EPH (C19-32)	LEPH	HEPH
				mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SP24-19-6	CRW706	2024/07/22 00:00	D	<0.050			25.6	0.078	0.22	606	<0.50	2.05	44.0	29.3	<10	<10	<100	<100	<100	<100
SP24-20-1	CRW710	2024/07/23 00:00	M	<0.050			29.9	0.103	0.50	795	0.58	3.49	69.5	47.6	<10	<10	570	970	570	970
SP24-20-1	CRW716	2024/07/23 00:00	D	<0.050			27.8	0.086	0.36	541	<0.50	2.54	46.9	35.0	<10	<10	500	850	500	850
SP24-20-5	CRW714	2024/07/23 00:00	M	<0.050			29.7	0.092	0.43	710	0.52	2.86	54.8	41.5	<10	<10	330	560	330	560
SP24-20-6	CRW715	2024/07/23 00:00	M	<0.050			26.6	0.096	0.40	662	0.55	3.06	58.1	40.1	<10	<10	220	410	220	400
SP24-21-1	CSB706	2024/07/24 00:00	M	0.050			36.1	0.125	0.28	759	<0.50	2.60	51.7	38.6	<10	<10	<100	<100	<100	<100
SP24-21-2	CSB707	2024/07/24 00:00	M	<0.050			38.7	0.105	0.31	812	0.54	2.93	51.2	40.0	<10	<10	<100	<100	<100	<100
SP24-21-6	CSB711	2024/07/24 00:00	M	0.055			39.1	0.098	0.31	847	0.56	2.84	54.9	63.8	<10	<10	<100	<100	<100	<100
SP24-22-1	CSB713	2024/07/24 00:00	M	0.051			37.1	0.097	0.44	665	0.50	2.74	48.4	36.3	<10	<10	<100	<100	<100	<100
SP24-22-2	CSB714	2024/07/24 00:00	M	0.061			35.4	0.116	0.31	715	0.54	2.84	48.8	38.1	<10	<10	<100	<100	<100	<100
SP24-23-1	CVZ638	2024/09/20 00:00	M	<0.050			16.8	0.091	0.31	723	0.53	1.61	51.7	36.5	<10	<10	290	130	290	130
SP24-23-2	CVZ639	2024/09/20 00:00	M	0.055			19.7	0.086	0.48	794	0.68	3.71	51.3	42.6	<10	<10	420	410	420	410
SP24-24-1	CWO971	2024/09/27 00:00	M	0.055			48.5	0.058	1.00	827	0.50	1.73	48.1	66.0	<10	<10	<100	<100	<100	<100
SP24-24-2	CWO972	2024/09/27 00:00	M	0.052			61.0	0.106	1.28	882	1.21	2.28	44.2	64.5	<10	<10	<100	<100	<100	<100
SP24-24-3	CWO973	2024/09/27 00:00	M	0.073			75.9	0.101	2.05	891	1.07	2.10	39.3	76.1	<10	<10	<100	<100	<100	<100
SP24-24-4	CWO974	2024/09/27 00:00	M	0.061			60.2	0.119	2.08	961	1.43	1.96	40.0	56.6	<10	<10	<100	<100	<100	<100
SP24-25	CWO975	2024/09/27 00:00	M	0.056			59.2	0.140	1.01	957	1.06	1.96	38.4	54.1	<10	<10	<100	<100	<100	<100
SP25-1-1	DSW744	2025/09/14 00:00	M	0.087			32.9	0.072	1.62	468	<0.50	1.16	37.6	63.1			<100	<100	<100	<100
SP25-1-2	DSW745	2025/09/14 00:00	M	0.075			42.0	0.088	2.34	544	<0.50	1.25	42.7	76.9			<100	<100	<100	<100
SP25-1-2	DSW762	2025/09/14 00:00	D	0.070			56.2	0.085	2.63	557	0.51	1.41	41.3	93.4			<100	<100	<100	<100
SP25-1-3	DSW746	2025/09/14 00:00	M	0.101			63.6	0.086	6.73	574	<0.50	1.47	41.2	72.3			<100	<100	<100	<100
SP25-1-4	DSW747	2025/09/14 00:00	M	0.073			96.7	0.084	3.11	566	<0.50	1.57	43.6	90.4			<100	140	<100	140
SP25-1-5	DSW748	2025/09/14 00:00	M	0.063			56.4	0.073	4.98	513	0.57	1.29	46.4	64.5			<100	130	<100	130
SP25-2-1	DSW749	2025/09/14 00:00	M	<0.050			58.5	0.085	3.65	617	<0.50	1.69	47.1	67.9			<100	<100	<100	<100
SP25-2-2	DSW750	2025/09/14 00:00	M	0.061			70.9	0.084	5.04	671	0.90	1.62	50.0	86.7			<100	100	<100	100
SP25-2-3	DSW751	2025/09/14 00:00	M	<0.050			42.8	0.073	2.48	537	<0.50	1.20	40.7	57.7			<100	<100	<100	<100
SP25-2-4	DSW752	2025/09/14 00:00	M	<0.050			37.5	0.085	1.46	557	<0.50	1.30	40.0	63.6			<100	<100	<100	<100
SP25-2-5	DSW753	2025/09/14 00:00	M	<0.050			37.7	0.084	2.33	594	0.57	1.53	45.1	63.4			<100	<100	<100	<100
SP25-3-1	DSW754	2025/09/14 00:00	M	0.069			57.6	0.086	3.19	670	0.66	2.04	48.7	96.6			<100	<100	<100	<100
SP25-3-2	DSW755	2025/09/14 00:00	M	<0.050			66.1	0.083	4.45	703	0.63	1.90	51.9	86.1			<100	<100	<100	<100
SP25-3-3	DSW756	2025/09/14 00:00	M	0.344			73.7	0.073	2.55	584	<0.50	1.33	40.7	67.4			<100	<100	<100	<100
SP25-3-4	DSW757	2025/09/14 00:00	M	<0.050			66.0	0.074	2.54	590	0.50	1.46	46.5	86.1			<100	<100	<100	<100
SP25-3-5	DSW758	2025/09/14 00:00	M	0.058			79.4	0.075	5.60	616	0.77	1.93	45.4	130			<100	200	<100	200
SP25-3-5	DSW763	2025/09/14 00:00	D	0.105			73.6	0.084	6.47	613	0.65	2.05	49.0	151			<100	230	<100	230
SP25-4-1	DSW759	2025/09/14 00:00	M	0.114			110	0.076	12.7	630	0.65	1.81	51.5	133			<100	<100	<100	<100
SP25-4-2	DSW760	2025/09/14 00:00	M	0.064			194	0.073	9.79	665	0.70	1.73	48.1	105			<100	180	<100	180
SP25-4-3	DSW761	2025/09/14 00:00	M	0.106			67.1	0.068	5.00	486	0.62	1.22	46.2	69.8			<100	130	<100	130
SP25-5-1	DSW765	2025/09/14 00:00	M	0.065			67.2	0.084	55.2	702	0.55	1.81	49.9	107			<100	100	<100	100
SP25-5-2	DSW766	2025/09/14 00:00	M	<0.050			44.0	0.075	1.85	586	<0.50	1.34	38.8	57.2			<100	<100	<100	<100
SP25-5-2	DSW764	2025/09/14 00:00	D	0.052			57.7	0.084	3.58	651	0.54	1.55	48.2	74.0			<100	<100	<100	<100
SP25-5-3	DSW767	2025/09/14 00:00	M	<0.050			78.9	0.074	5.37	602	0.60	1.76	47.9	101			<100	<100	<100	<100

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 2: Soil Sample Field Duplicate Quality Control Evaluation

Parameter	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]
Sample Date	2025-09-14	2025-09-14		2025-09-14	2025-09-14		2025-09-14	2025-09-14		2024-07-23	2024-07-23		2024-07-22	2024-07-22	
Station Number	SP25-5-2	SP25-5-2		SP25-3-5	SP25-3-5		SP25-1-2	SP25-1-2		SP24-20-1	SP24-20-1		SP24-19-6	SP24-19-6	
Sample Number	DSW766	DSW764		DSW758	DSW763		DSW745	DSW762		CRW710	CRW716		CRW704	CRW706	
Moisture	11	8.4	26.8%	14	14	0.0%	12	12	0.0%	6.5	6.6	1.5%	10	8.2	19.8%
pH, soluble (2:1)	9.39	9.52	1.4%	7.88	7.86	0.3%	7.9	7.89	0.1%	8.35	8.37	0.2%	7.6	7.72	1.6%
Chloride, soluble			-			-			-			-			-
Chloride, soluble-Extractable			-			-			-			-			-
% Saturation			-			-			-			-			-
Bromobenzene			-			-			-	<0.20	<0.20	-	<0.20	<0.20	-
Bromodichloromethane			-			-			-	<0.050	<0.050	-	<0.050	<0.050	-
Bromoform			-			-			-	<0.050	<0.050	-	<0.050	<0.050	-
Bromomethane			-			-			-	<0.30	<0.30	-	<0.30	<0.30	-
Carbon Tetrachloride			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
Chlorobenzene			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
Chloroethane			-			-			-	<0.10	<0.10	-	<0.10	<0.10	-
Chloroform			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
Chloromethane			-			-			-	<0.050	<0.050	-	<0.050	<0.050	-
Dibromochloromethane			-			-			-	<0.050	<0.050	-	<0.050	<0.050	-
1,2-Dibromoethane			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
1,2-Dichlorobenzene			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
1,3-Dichlorobenzene			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
1,4-Dichlorobenzene			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
Dichlorodifluoromethane			-			-			-	<0.20	<0.20	-	<0.20	<0.20	-
1,1-Dichloroethane			-			-			-	<0.025	<0.025	-	<0.025	<0.025	-
1,2-Dichloroethane			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
1,1-Dichloroethene			-			-			-	<0.025	<0.025	-	<0.025	<0.025	-
cis-1,2-Dichloroethene			-			-			-	<0.030	<0.030	-	<0.030	<0.030	-
trans-1,2-Dichloroethene			-			-			-	<0.030	<0.030	-	<0.030	<0.030	-
Dichloromethane			-			-			-	<0.080	<0.080	-	<0.080	<0.080	-
1,2-Dichloropropane			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
cis-1,3-Dichloropropene			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
trans-1,3-Dichloropropene			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
Hexachlorobutadiene			-			-			-	<0.20	<0.20	-	<0.20	<0.20	-
1,1,1,2-Tetrachloroethane			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
1,1,2,2-Tetrachloroethane			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
Tetrachloroethene			-			-			-	<0.010	<0.010	-	<0.010	<0.010	-
1,2,3-Trichlorobenzene			-			-			-	<0.030	<0.030	-	<0.030	<0.030	-
1,2,4-Trichlorobenzene			-			-			-	<0.030	<0.030	-	<0.030	<0.030	-
1,1,1-Trichloroethane			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
1,1,2-Trichloroethane			-			-			-	<0.020	<0.020	-	<0.020	<0.020	-
1,1,2-Trichloro-1,2,2-trifluoroethane			-			-			-	<0.20	<0.20	-	<0.20	<0.20	-
Trichloroethene			-			-			-	<0.0090	<0.0090	-	<0.0090	<0.0090	-
Trichlorofluoromethane			-			-			-	<0.20	<0.20	-	<0.20	<0.20	-
Vinyl Chloride			-			-			-	<0.040	<0.040	-	<0.040	<0.040	-
Acetone			-			-			-	<5.0	<5.0	-	<5.0	<5.0	-
Benzene			-			-			-	<0.0050	<0.0050	-	<0.0050	<0.0050	-
1,3-Butadiene			-			-			-	<0.080	<0.080	-	<0.080	<0.080	-
2-Butanone (MEK)			-			-			-	<15	<15	-	<15	<15	-
n-Decane			-			-			-	<2.0	<2.0	-	<2.0	<2.0	-
Ethylbenzene			-			-			-	<0.010	<0.010	-	<0.010	<0.010	-
Isopropylbenzene			-			-			-	<0.20	<0.20	-	<0.20	<0.20	-
Methylcyclohexane			-			-			-	<0.20	<0.20	-	<0.20	<0.20	-
4-Methyl-2-Pentanone (MIBK)			-			-			-	<0.50	<0.50	-	<0.50	<0.50	-
Methyl Tert-Butyl Ether (MTBE)			-			-			-	<0.10	<0.10	-	<0.10	<0.10	-
Styrene			-			-			-	<0.030	<0.030	-	<0.030	<0.030	-
1,2,4-Trimethylbenzene			-			-			-	<0.20	<0.20	-	<0.20	<0.20	-
1,3,5-Trimethylbenzene			-			-			-	<0.20	<0.20	-	<0.20	<0.20	-
Toluene			-			-			-	<0.050	<0.050	-	<0.050	<0.050	-
m+p-Xylene			-			-			-	<0.040	<0.040	-	<0.040	<0.040	-
o-Xylene			-			-			-	<0.040	<0.040	-	<0.040	<0.040	-
Xylenes, Total			-			-			-	<0.040	<0.040	-	<0.040	<0.040	-
Acenaphthene	0.11	0.062	55.8%	0.063	0.085	29.7%	0.021	0.02	-	0.071	0.066	7.3%	<0.0050	<0.0050	-

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 2: Soil Sample Field Duplicate Quality Control Evaluation

Parameter	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]
Sample Date	2025-09-14	2025-09-14		2025-09-14	2025-09-14		2025-09-14	2025-09-14		2024-07-23	2024-07-23		2024-07-22	2024-07-22	
Station Number	SP25-5-2	SP25-5-2		SP25-3-5	SP25-3-5		SP25-1-2	SP25-1-2		SP24-20-1	SP24-20-1		SP24-19-6	SP24-19-6	
Sample Number	DSW766	DSW764		DSW758	DSW763		DSW745	DSW762		CRW710	CRW716		CRW704	CRW706	
Acenaphthylene	0.0067	<0.0050	-	0.0087	0.011	-	<0.0050	<0.0050	-	0.012	0.012	-	<0.0050	<0.0050	-
Anthracene	0.1	0.039	87.8%	0.051	0.064	22.6%	0.018	0.014	-	0.11	0.13	16.7%	<0.0040	<0.0040	-
Benz(a)anthracene	0.06	0.033	-	0.054	0.057	-	0.02	<0.020	-	0.23	0.24	4.3%	<0.020	<0.020	-
Benzo(a)pyrene	0.033	0.021	-	0.038	0.049	-	<0.020	<0.020	-	0.19	0.22	14.6%	<0.020	<0.020	-
Benzo(b)fluoranthene	0.042	0.026	-	0.045	0.051	-	<0.020	0.021	-	0.14	0.15	6.9%	<0.020	<0.020	-
Benzo(b+j)fluoranthene	0.042	0.026	-	0.045	0.072	-	<0.020	0.021	-	0.18	0.2	10.5%	<0.020	<0.020	-
Benzo(g-h-i)perylene	<0.050	<0.050	-	<0.050	0.056	-	<0.050	<0.050	-	0.15	0.17	-	<0.050	<0.050	-
Benzo(k)fluoranthene	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-	0.034	0.029	-	<0.020	<0.020	-
Chrysene	0.087	0.047	-	0.059	0.085	-	0.021	0.02	-	0.15	0.18	18.2%	<0.020	<0.020	-
Dibenz(a-h)anthracene	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-	0.033	0.038	-	<0.020	<0.020	-
Fluoranthene	0.25	0.13	63.2%	0.17	0.21	21.1%	0.067	0.064	-	0.31	0.36	14.9%	<0.020	<0.020	-
Fluorene	0.14	0.063	75.9%	0.074	0.088	-	0.022	0.025	-	0.13	0.15	14.3%	<0.020	<0.020	-
Indeno(1,2,3-cd)pyrene	<0.020	<0.020	-	0.021	0.028	-	<0.020	<0.020	-	0.056	0.065	-	<0.020	<0.020	-
1-Methylnaphthalene	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-
2-Methylnaphthalene	<0.020	<0.020	-	<0.020	0.029	-	<0.020	<0.020	-	0.027	0.022	-	<0.020	<0.020	-
Naphthalene	0.013	<0.010	-	0.019	0.024	-	0.013	0.016	-	0.014	0.03	-	<0.010	<0.010	-
Phenanthrene	0.28	0.1	94.7%	0.15	0.19	23.5%	0.051	0.048	6.1%	0.22	0.29	27.5%	<0.010	<0.010	-
Pyrene	0.17	0.087	64.6%	0.12	0.15	22.2%	0.05	0.045	-	0.69	0.75	8.3%	<0.020	<0.020	-
Quinoline	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.37	<0.15	-	<0.050	<0.050	-
Aluminum (Al)	10600	12000	12.4%	12600	12800	1.6%	10800	11400	5.4%	12700	9450	29.3%	12100	10700	12.3%
Antimony (Sb)	1.53	2.02	27.6%	4.18	4.55	8.5%	1.66	1.66	0.0%	0.34	0.25	30.5%	0.25	0.15	50.0%
Arsenic (As)	5.58	7.01	22.7%	10	13	26.1%	6.22	6.19	0.5%	3.86	2.86	29.8%	3.1	2.6	17.5%
Barium (Ba)	72.6	90.6	22.1%	102	94.1	8.1%	74.8	84.8	12.5%	71.7	62	14.5%	70.1	65.2	7.2%
Beryllium (Be)	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
Boron (B)	5	7.2	36.1%	14.8	12.2	19.3%	7.2	8.2	13.0%	2.1	1.9	10.0%	1.2	<1.0	-
Cadmium (Cd)	0.155	0.229	-	0.367	0.475	25.7%	0.249	0.319	24.6%	0.091	0.071	-	<0.050	<0.050	-
Chromium (Cr)	12	15.3	24.2%	25.4	24.7	2.8%	14.7	14.8	0.7%	17.8	12	38.9%	13.3	11.4	15.4%
Cobalt (Co)	4.92	5.74	15.4%	6.6	7.22	9.0%	4.86	5.44	11.3%	6.33	4.62	31.2%	5.58	4.97	11.6%
Copper (Cu)	31.8	53.3	50.5%	72.2	81.7	12.3%	36.5	39.9	8.9%	22.5	17.1	27.3%	21	17.4	18.8%
Copper (Cu)-TCLP			-			-			-			-			-
Iron (Fe)	16200	20000	21.0%	23700	25600	7.7%	17100	17600	2.9%	20000	14300	33.2%	17400	15000	14.8%
Lead (Pb)	147	209	34.8%	571	637	10.9%	258	295	13.4%	8.39	6.14	31.0%	3.69	2.99	21.0%
Lithium (Li)	10.4	11.7	11.8%	10.1	10.8	6.7%	9.19	9.83	6.7%	16.5	13	23.7%	17.2	15	13.7%
Manganese (Mn)	282	352	22.1%	333	353	5.8%	298	296	0.7%	279	210	28.2%	242	199	19.5%
Mercury (Hg)	0.061	0.123	-	0.164	0.212	-	0.115	0.109	-	0.05	<0.050	-	<0.050	<0.050	-
Molybdenum (Mo)	1.69	1.92	12.7%	2.86	3.16	10.0%	1.71	1.75	2.3%	2.97	2.17	31.1%	2.91	2.21	27.3%
Nickel (Ni)	7.62	9.28	19.6%	14.8	15.4	4.0%	7.76	8.27	6.4%	17.2	12.9	28.6%	5.8	5.35	8.1%
Selenium (Se)	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-
Silver (Ag)	<0.050	0.052	-	0.058	0.105	-	0.075	0.07	-	<0.050	<0.050	-	0.055	<0.050	-
Sodium (Na)			-			-			-			-			-
Sodium (Na)-Extractable			-			-			-			-			-
Strontium (Sr)	44	57.7	26.9%	79.4	73.6	7.6%	42	56.2	28.9%	29.9	27.8	7.3%	29.2	25.6	13.1%
Thallium (Tl)	0.075	0.084	-	0.075	0.084	-	0.088	0.085	-	0.103	0.086	-	0.113	0.078	-
Tin (Sn)	1.85	3.58	63.7%	5.6	6.47	14.4%	2.34	2.63	11.7%	0.5	0.36	32.6%	0.29	0.22	27.5%
Titanium (Ti)	586	651	10.5%	616	613	0.5%	544	557	2.4%	795	541	38.0%	702	606	14.7%
Tungsten (W)	<0.50	0.54	-	0.77	0.65	-	<0.50	0.51	-	0.58	<0.50	-	<0.50	<0.50	-
Uranium (U)	1.34	1.55	14.5%	1.93	2.05	6.0%	1.25	1.41	12.0%	3.49	2.54	31.5%	2.51	2.05	20.2%
Vanadium (V)	38.8	48.2	21.6%	45.4	49	7.6%	42.7	41.3	3.3%	69.5	46.9	38.8%	49	44	10.8%
Zinc (Zn)	57.2	74	25.6%	130	151	14.9%	76.9	93.4	19.4%	47.6	35	30.5%	36.6	29.3	22.2%
VH (C6-10)			-			-			-	<10	<10	-	<10	<10	-
VPH			-			-			-	<10	<10	-	<10	<10	-
EPH (C10-19)	<100	<100	-	<100	<100	-	<100	<100	-	570	500	13.1%	<100	<100	-
EPH (C19-32)	<100	<100	-	200	230	-	<100	<100	-	970	850	13.2%	<100	<100	-
LEPH	<100	<100	-	<100	<100	-	<100	<100	-	570	500	13.1%	<100	<100	-
HEPH	<100	<100	-	200	230	-	<100	<100	-	970	850	13.2%	<100	<100	-

Empty cells indicate no result was reported for that parameter.
1: Relative Percent Difference is calculated only if one or both values are greater than 5x the detection limit
2: RPDs exceeding 20% are flagged in light grey
3: RPDs exceeding 50% are flagged in dark grey

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 2: Soil Sample Field Duplicate Quality Control Evaluation

Parameter	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]
Sample Date	2024-07-22	2024-07-22		2024-06-18	2024-06-18		2024-03-21	2024-03-21		2024-03-19	2024-03-19		2024-02-20	2024-02-20	
Station Number	SP24-18-6	SP24-18-6		CS24-1	CS24-1		SP24-9-2	SP24-9-2		SP24-5-5	SP24-5-5		SP24-3-1	SP24-3-1	
Sample Number	CRW698	CRW705		CPP974	CPP975		CLC456	CLC468		CLB109	CLB123		CJN250	CJN254	
Moisture	8.4	8.8	4.7%	93	92	1.1%	11	14	24.0%	13	13	0.0%	16	15	6.5%
pH, soluble (2:1)	7.5	7.43	0.9%	7.25	7.27	0.3%	8.78	8.77	0.1%	8.75	8.75	0.0%	9.06	9.21	1.6%
Chloride, soluble			-	399	407	2.0%			-			-			-
Chloride, soluble-Extractable			-	342	349	2.0%			-			-			-
% Saturation			-	117	117	0.0%			-			-			-
Bromobenzene	<0.20	<0.20	-			-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
Bromodichloromethane	<0.050	<0.050	-			-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-
Bromoform	<0.050	<0.050	-			-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-
Bromomethane	<0.30	<0.30	-			-	<0.30	<0.30	-	<0.30	<0.30	-	<0.30	<0.30	-
Carbon Tetrachloride	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
Chlorobenzene	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
Chloroethane	<0.10	<0.10	-			-	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-
Chloroform	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
Chloromethane	<0.050	<0.050	-			-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-
Dibromochloromethane	<0.050	<0.050	-			-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-
1,2-Dibromoethane	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
1,2-Dichlorobenzene	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
1,3-Dichlorobenzene	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
1,4-Dichlorobenzene	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
Dichlorodifluoromethane	<0.20	<0.20	-			-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
1,1-Dichloroethane	<0.025	<0.025	-			-	<0.025	<0.025	-	<0.025	<0.025	-	<0.025	<0.025	-
1,2-Dichloroethane	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
1,1-Dichloroethene	<0.025	<0.025	-			-	<0.025	<0.025	-	<0.025	<0.025	-	<0.025	<0.025	-
cis-1,2-Dichloroethene	<0.030	<0.030	-			-	<0.030	<0.030	-	<0.030	<0.030	-	<0.030	<0.030	-
trans-1,2-Dichloroethene	<0.030	<0.030	-			-	<0.030	<0.030	-	<0.030	<0.030	-	<0.030	<0.030	-
Dichloromethane	<0.080	<0.080	-			-	<0.080	<0.080	-	<0.080	<0.080	-	<0.080	<0.080	-
1,2-Dichloropropane	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
cis-1,3-Dichloropropene	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
trans-1,3-Dichloropropene	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
Hexachlorobutadiene	<0.20	<0.20	-			-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
1,1,1,2-Tetrachloroethane	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
1,1,2,2-Tetrachloroethane	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
Tetrachloroethene	<0.010	<0.010	-			-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
1,2,3-Trichlorobenzene	<0.030	<0.030	-			-	<0.030	<0.030	-	<0.030	<0.030	-	<0.030	<0.030	-
1,2,4-Trichlorobenzene	<0.030	<0.030	-			-	<0.030	<0.030	-	<0.030	<0.030	-	<0.030	<0.030	-
1,1,1-Trichloroethane	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
1,1,2-Trichloroethane	<0.020	<0.020	-			-	<0.020	<0.020	-	<0.020	<0.020	-	<0.020	<0.020	-
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.20	<0.20	-			-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
Trichloroethene	<0.0090	<0.0090	-			-	<0.0090	<0.0090	-	<0.0090	<0.0090	-	<0.0090	<0.0090	-
Trichlorofluoromethane	<0.20	<0.20	-			-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
Vinyl Chloride	<0.040	<0.040	-			-	<0.040	<0.040	-	<0.040	<0.040	-	<0.040	<0.040	-
Acetone	<5.0	<5.0	-			-	<5.0	<5.0	-	<5.0	<5.0	-	<5.0	<5.0	-
Benzene	<0.0050	<0.0050	-			-	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-
1,3-Butadiene	<0.080	<0.080	-			-	<0.080	<0.080	-	<0.080	<0.080	-	<0.080	<0.080	-
2-Butanone (MEK)	<15	<15	-			-	<15	<15	-	<15	<15	-	<15	<15	-
n-Decane	<2.0	<2.0	-			-	<2.0	<2.0	-	<2.0	<2.0	-	<2.0	<2.0	-
Ethylbenzene	<0.010	<0.010	-			-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
Isopropylbenzene	<0.20	<0.20	-			-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
Methylcyclohexane	<0.20	<0.20	-			-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
4-Methyl-2-Pentanone (MIBK)	<0.50	<0.50	-			-	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-
Methyl Tert-Butyl Ether (MTBE)	<0.10	<0.10	-			-	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-
Styrene	<0.030	<0.030	-			-	<0.030	<0.030	-	<0.030	0.049	-	<0.030	<0.030	-
1,2,4-Trimethylbenzene	<0.20	<0.20	-			-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
1,3,5-Trimethylbenzene	<0.20	<0.20	-			-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
Toluene	<0.050	<0.050	-			-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-
m+p-Xylene	<0.040	<0.040	-			-	<0.040	<0.040	-	<0.040	<0.040	-	<0.040	<0.040	-
o-Xylene	<0.040	<0.040	-			-	<0.040	<0.040	-	<0.040	<0.040	-	<0.040	<0.040	-
Xylenes, Total	<0.040	<0.040	-			-	<0.040	<0.040	-	<0.040	<0.040	-	<0.040	<0.040	-
Acenaphthene	0.016	0.014	-	<0.064	<0.063	-	0.085	0.052	48.2%	1.9	0.11	178.1%	0.08	0.32	120.0%

Notes:
Empty cells indicate no result was reported for that parameter.
Values above BC Contaminated Sites Regulations for industrial land use are shaded in grey.
Values beginning with < indicates a detection limit.
Sample class M is a monitoring sample; sample class D is a duplicate sample.

Appendix 3.2-1 Soil Quality Monitoring Results - Upland

Table 2: Soil Sample Field Duplicate Quality Control Evaluation

Parameter	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]
Sample Date	2024-07-22	2024-07-22		2024-06-18	2024-06-18		2024-03-21	2024-03-21		2024-03-19	2024-03-19		2024-02-20	2024-02-20	
Station Number	SP24-18-6	SP24-18-6		CS24-1	CS24-1		SP24-9-2	SP24-9-2		SP24-5-5	SP24-5-5		SP24-3-1	SP24-3-1	
Sample Number	CRW698	CRW705		CPP974	CPP975		CLC456	CLC468		CLB109	CLB123		CJN250	CJN254	
Acenaphthylene	<0.0050	<0.0050	-	<0.064	<0.063	-	<0.0050	<0.0050	-	0.12	0.024	133.3%	0.029	0.031	6.7%
Anthracene	0.02	0.02	-	<0.051	<0.050	-	0.14	0.09	43.5%	2.5	0.12	181.7%	0.092	0.11	17.8%
Benz(a)anthracene	0.04	0.036	-	<0.25	<0.25	-	0.2	0.12	50.0%	3.4	0.21	176.7%	0.12	0.15	22.2%
Benzo(a)pyrene	0.03	0.026	-	<0.25	<0.25	-	0.21	0.14	40.0%	3.4	0.23	174.7%	0.12	0.14	15.4%
Benzo(b)fluoranthene	0.022	<0.020	-	<0.25	<0.25	-	0.17	0.11	42.9%	2.5	0.15	177.4%	0.094	0.11	15.7%
Benzo(b+j)fluoranthene	0.022	<0.020	-	<0.25	<0.25	-	0.26	0.16	47.6%	4	0.21	180.0%	0.15	0.17	12.5%
Benzo(g-h-i)perylene	<0.050	<0.050	-	<0.64	<0.63	-	0.17	0.12	-	2.5	0.18	173.1%	0.086	0.095	-
Benzo(k)fluoranthene	<0.020	<0.020	-	<0.25	<0.25	-	0.078	0.053	-	1.4	0.049	186.5%	0.056	0.061	-
Chrysene	0.059	0.055	-	<0.25	<0.25	-	0.22	0.15	37.8%	4.3	0.26	177.2%	0.2	0.21	4.9%
Dibenz(a-h)anthracene	<0.020	<0.020	-	<0.25	<0.25	-	0.039	0.024	-	0.6	0.042	173.8%	<0.020	0.022	-
Fluoranthene	0.049	0.042	-	<0.25	<0.25	-	0.5	0.29	53.2%	11	0.47	183.6%	0.31	0.36	14.9%
Fluorene	0.027	0.026	-	<0.25	<0.25	-	0.085	0.051	-	1.7	0.15	167.6%	0.21	0.23	9.1%
Indeno(1,2,3-cd)pyrene	<0.020	<0.020	-	<0.25	<0.25	-	0.1	0.063	-	2	0.091	182.6%	0.065	0.077	-
1-Methylnaphthalene	<0.050	<0.050	-	<0.64	<0.63	-	<0.050	<0.050	-	1.2	<0.050	-	0.69	0.77	11.0%
2-Methylnaphthalene	<0.020	<0.020	-	<0.25	<0.25	-	0.029	<0.020	-	1.7	0.048	189.0%	0.88	0.85	3.5%
Naphthalene	<0.010	<0.010	-	<0.13	<0.13	-	0.047	0.017	-	3.3	0.047	194.4%	0.057	0.061	6.8%
Phenanthrene	0.027	0.025	-	<0.13	<0.13	-	0.51	0.26	64.9%	18	0.37	191.9%	0.88	0.91	3.4%
Pyrene	0.11	0.1	9.5%	<0.25	<0.25	-	0.6	0.38	44.9%	10	0.62	176.6%	0.38	0.41	7.6%
Quinoline	<0.050	<0.050	-	<0.64	<0.63	-	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	<0.050	-
Aluminum (Al)	11800	12600	6.6%	15400	16200	5.1%	16500	16800	1.8%	17500	19400	10.3%	15200	16400	7.6%
Antimony (Sb)	0.18	0.2	10.5%	1.21	1.21	0.0%	0.83	0.8	3.7%	0.61	0.78	24.5%	1.83	5.49	100.0%
Arsenic (As)	2.86	3.01	5.1%	18.3	18.4	0.5%	7.95	9.19	14.5%	7.78	9.01	14.7%	5.79	6.81	16.2%
Barium (Ba)	74.9	81	7.8%	501	531	5.8%	91	88.8	2.4%	82.2	84	2.2%	114	116	1.7%
Beryllium (Be)	<0.20	<0.20	-	<0.20	<0.20	-	0.34	0.36	-	0.33	0.37	-	0.29	0.71	-
Boron (B)	1.3	1.4	7.4%	22.5	22.8	1.3%	5.9	6.1	3.3%	6.3	6.3	0.0%	6.1	6.9	12.3%
Cadmium (Cd)	<0.050	<0.050	-	0.651	0.7	7.3%	0.31	1.1	112.1%	0.287	0.306	6.4%	0.343	0.379	10.0%
Chromium (Cr)	12.8	14.8	14.5%	134	139	3.7%	19.8	21.5	8.2%	17.7	20.1	12.7%	16.6	18.4	10.3%
Cobalt (Co)	5.66	5.87	3.6%	5.7	6.02	5.5%	7.72	7.93	2.7%	7.46	8.04	7.5%	7.83	8.54	8.7%
Copper (Cu)	18.9	20.2	6.6%	74.5	96.9	26.1%	32.3	36.2	11.4%	32.8	35.3	7.3%	42.4	48.2	12.8%
Copper (Cu)-TCLP			-			-			-			-			-
Iron (Fe)	17400	18500	6.1%	68500	69300	1.2%	21500	21800	1.4%	21100	22800	7.7%	21400	24600	13.9%
Lead (Pb)	4.09	4.86	17.2%	9.2	12.8	32.7%	21.3	21.8	2.3%	17.1	18.2	6.2%	119	275	79.2%
Lithium (Li)	17.2	17	1.2%	1.21	1.35	10.9%	17.8	19	6.5%	17.8	19.2	7.6%	21.3	22.3	4.6%
Manganese (Mn)	239	236	1.3%	4630	4720	1.9%	424	456	7.3%	417	445	6.5%	359	391	8.5%
Mercury (Hg)	<0.050	<0.050	-	0.702	0.756	7.4%	0.101	0.546	137.6%	0.116	0.091	-	0.175	0.188	-
Molybdenum (Mo)	2.65	2.9	9.0%	5.16	5.24	1.5%	2.06	2.26	9.3%	1.7	1.92	12.2%	1.79	1.94	8.0%
Nickel (Ni)	5.82	6.1	4.7%	52.5	55	4.7%	18	18.9	4.9%	11.5	12.1	5.1%	10.7	11.6	8.1%
Selenium (Se)	<0.50	<0.50	-	2.45	2.65	7.8%	<0.50	<0.50	-	<0.50	<0.50	-	<0.50	<0.50	-
Silver (Ag)	<0.050	<0.050	-	0.181	0.19	-	0.106	0.134	-	0.11	0.132	-	0.14	0.145	-
Sodium (Na)			-	595	530	11.6%			-			-			-
Sodium (Na)-Extractable			-	509	454	11.4%			-			-			-
Strontium (Sr)	28.5	30	5.1%	566	572	1.1%	49.5	50.4	1.8%	38.2	46.4	19.4%	77.9	67.3	14.6%
Thallium (Tl)	0.096	0.101	-	0.119	0.129	-	0.115	0.13	-	0.057	0.122	-	0.119	0.114	-
Tin (Sn)	0.32	0.3	6.5%	2.69	4.06	40.6%	0.91	0.83	9.2%	0.79	0.81	2.5%	1.89	2.96	44.1%
Titanium (Ti)	702	699	0.4%	538	562	4.4%	955	964	0.9%	939	1010	7.3%	882	970	9.5%
Tungsten (W)	<0.50	<0.50	-	7.08	6.99	1.3%	0.72	0.72	-	0.85	0.72	-	0.62	0.64	-
Uranium (U)	2.36	2.79	16.7%	1.22	1.22	0.0%	11.2	11.9	6.1%	12	14.1	16.1%	8.13	7.8	4.1%
Vanadium (V)	52.1	54.6	4.7%	60.3	61.7	2.3%	63	65.9	4.5%	58.1	61.4	5.5%	53.9	58.8	8.7%
Zinc (Zn)	38.2	35.7	6.8%	193	228	16.6%	69	72.3	4.7%	66.1	68.7	3.9%	89.4	91.3	2.1%
VH (C6-10)	<10	<10	-			-	<10	<10	-	<10	<10	-	<10	<10	-
VPH	<10	<10	-			-	<10	<10	-	<10	<10	-	<10	<10	-
EPH (C10-19)	110	100	-	<140	140	-	260	220	-	740	700	5.6%	460	500	-
EPH (C19-32)	120	120	-	420	580	32.0%	370	300	-	810	660	20.4%	210	250	-
LEPH	100	100	-	<140	140	-	260	220	-	720	700	2.8%	460	500	-
HEPH	120	120	-	420	580	32.0%	370	290	-	790	650	19.4%	210	240	-

Empty cells indicate no result was reported for that parameter.
1: Relative Percent Difference is calculated only if one or both values are greater than 5x
2: RPDs exceeding 20% are flagged in light grey
3: RPDs exceeding 50% are flagged in dark grey

3.2-2: Soil Quality Monitoring Results – Foreshore

Table 1: Soil Quality Monitoring Results

Table 2: Soil Sample Field Duplicate Quality Control Evaluation

Appendix 3.2-2: Soil Quality Monitoring Results - Foreshore

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Moisture	pH, Soluble (2:1)	% Saturation	Chloride, Soluble	Acridine	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(b+j+k)fluoranthene	Benzo(g-h-i)perylene
				%	pH units	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
008_Barge_Spoils	VA24C6513-001	2024-10-04 13:30	M	9.99	8.34	31.1	417	0.062	0.810	0.0235	1.58	0.361	0.206	0.267	0.366	0.071
008_Barge_Spoils	VA24C6513-002	2024-10-04 13:30	D	8.68	8.32	31.4	446	0.090	1.06	0.0278	3.32	0.469	0.242	0.358	0.503	0.092
D09-A	VA24C4108-001	2024-09-13 10:39	M	28.0	7.26	38.4	1100	0.172	2.10	0.0777	1.30	1.35	0.489	0.731	1.02	0.174
D09-A	VA24C4108-002	2024-09-13 10:39	D	23.4	7.22	47.3	1820	0.202	1.86	0.336	2.30	2.19	1.34	1.68	2.35	0.672
D09-B	VA24C4108-003	2024-09-13 10:39	M	19.0	7.40	33.4	948	0.130	2.04	0.0763	1.57	2.54	0.835	1.27	1.86	0.233
D09-C	VA24C4108-004	2024-09-13 10:39	M	23.0	6.99	53.1	2240	0.089	1.11	0.0746	0.702	0.625	0.290	0.604	0.878	0.161
D10-A	VA24C4191-001	2024-09-14 10:43	M	25.2	7.47	50.3	1130	0.460	10.9	0.191	5.46	5.33	1.67	2.63	3.65	0.358
D10-A	VA24C4191-002	2024-09-14 10:43	D	23.4	7.55	47.0	1060	0.448	2.91	0.0826	2.48	2.56	0.761	1.20	1.71	0.187
D11-A	VA24C4213-001	2024-09-15 13:39	M	16.0	8.04	42.4	1090	0.333	4.21	0.0760	2.86	2.12	0.660	1.02	1.38	0.191
D11-A	VA24C4213-002	2024-09-15 13:39	D	18.0	8.07	35.5	902	0.761	17.5	0.299	11.4	9.17	2.68	4.30	5.80	0.578
D12-A	VA24C4310-001	2024-09-16 10:24	M	23.3	8.47	34.1	1060	0.356	4.96	0.108	3.73	2.92	0.896	1.36	1.96	0.246
D12-A	VA24C4310-002	2024-09-16 10:24	D	18.5	8.33	35.8	1040	0.324	5.09	0.108	3.51	2.47	0.804	1.25	1.75	0.207
SP-13A	VA24C4904-001	2024-09-19 14:10	M	14.4	8.09	29.6	1050	<0.183	2.41	0.0648	1.72	0.873	0.377	0.544	0.743	0.158
SP-13A	VA24C4904-002	2024-09-19 14:10	D	11.5	8.04	32.0	1110	<0.202	2.66	0.0584	2.08	0.946	0.390	0.568	0.762	0.151
SP-14A	VA24C5017-001	2024-09-20 15:10	M	16.1	7.94	37.6	1640	0.466	4.51	0.135	3.40	3.06	0.884	1.48	1.99	0.206
SP-14A	VA24C5017-002	2024-09-20 15:12	D	16.2	7.91	35.0	1250	0.413	5.12	0.103	2.62	2.40	0.562	0.989	1.32	0.120
SP-14B	VA24C5017-003	2024-09-20 15:13	M	23.0	7.54	56.0	2910	0.750	7.18	0.190	4.68	4.36	1.24	2.07	2.76	0.295
SP-15A	VA24C5077-001	2024-09-22 15:17	M	20.0	8.39	32.3	1380	<0.250	2.52	0.0662	2.63	2.33	0.728	1.19	1.58	0.152
SP-15A	VA24C5077-002	2024-09-22 15:17	D	19.2	8.44	29.7	1260	<0.137	1.66	0.0454	1.58	1.38	0.454	0.720	0.966	0.108
SP-16A	VA24C5709-001	2024-09-26 10:00	M	5.02	8.96	29.4	237	0.108	0.452	0.0182	0.451	0.371	0.151	0.220	0.286	0.039
SP-16B	VA24C5709-002	2024-09-26 10:05	M	6.24	9.08	31.1	279	0.072	0.788	0.0253	0.792	0.644	0.319	0.388	0.518	0.113
SP-16B	VA24C5709-003	2024-09-26 10:10	D	6.47	9.09	29.0	328	0.113	1.33	0.0376	0.934	0.669	0.239	0.336	0.452	0.055
SP-17A	VA24C5868-001	2024-09-27 15:10	M	10.4	9.22	39.8	617	<0.050	0.996	0.0194	0.471	0.283	0.105	0.164	0.230	0.027
SP-17B	VA24C5868-002	2024-09-27 15:15	M	8.10	9.13	28.1	385	<0.059	0.642	0.0196	0.811	0.188	0.068	0.109	0.150	0.018
SP-17B	VA24C5868-003	2024-09-27 15:15	D	8.86	9.03	29.3	419	<0.059	0.729	0.0144	0.583	0.323	0.153	0.212	0.303	0.048
SP-18A	VA24C5868-004	2024-09-27 15:20	M	7.06	9.61	26.4	220	<0.074	1.24	0.0229	0.651	0.410	0.146	0.233	0.325	0.040
SP-18B	VA24C5868-006	2024-09-27 15:20	D	7.34	9.10	26.2	249	<0.090	1.66	0.0257	0.613	0.401	0.139	0.211	0.296	0.038
SP-18B	VA24C5868-005	2024-09-27 15:25	M	7.52	9.37	33.2	277	<0.150	2.54	0.0488	1.12	0.744	0.267	0.405	0.580	0.060
SP-2A	VA24C1640-001	2024-08-23 8:15	M	8.86	8.36	25.6	824	0.107	0.579	0.0610	0.875	1.42	0.517	0.857	1.14	0.168
SP-2B	VA24C1640-002	2024-08-23 8:15	M	10.5	8.01	33.9	1300	0.085	3.37	0.0540	1.63	0.770	0.228	0.361	0.496	0.062
SP-2C	VA24C1640-003	2024-08-23 8:15	M	8.24	8.21	29.6	873	<0.010	0.132	0.0056	0.182	0.094	0.046	0.074	0.104	0.022
SP-2D	VA24C1640-004	2024-08-23 8:15	M	10.4	8.06	33.9	1230	0.027	0.195	0.0910	0.890	0.649	0.330	1.04	1.43	0.140
SP-2D	VA24C1640-005	2024-08-23 8:15	D	9.55	8.06	36.5	1390	0.030	0.242	0.0248	0.284	0.268	0.184	0.294	0.390	0.067
SP-4A	VA24C1834-001	2024-08-26 16:25	M	16.3	8.40	30.8	527	0.178	1.47	0.0396	1.46	0.948	0.269	0.416	0.574	0.070
SP-4A	VA24C1834-002	2024-08-26 16:25	D	18.9	8.83	31.0	329	<0.015	0.260	0.0227	0.120	0.127	0.072	0.110	0.153	0.040
SP-4B	VA24C1834-003	2024-08-26 16:25	M	25.3	9.00	33.4	250	<0.023	0.274	0.0260	0.152	0.154	0.086	0.132	0.178	0.048
SS-01A	VA24C1117-002	2024-08-20 14:00	D	17.6	8.43	31.5	1050	<0.038	0.174	0.0158	0.388	0.260	0.168	0.244	0.338	0.082
SS-01A	VA24C1117-001	2024-08-20 14:10	M	13.3	8.44	27.5	718	<0.032	0.238	0.0250	0.628	0.295	0.190	0.285	0.398	0.080
SS-01B	VA24C1117-003	2024-08-20 14:15	M	10.0	8.65	28.3	625	<0.150	3.94	0.0710	6.63	0.979	0.369	0.595	0.825	0.132

Notes:
Values above BC Contaminated Sites Regulation for Industrial Land use are shaded in grey
Values beginning with < indicates a detection limit
Sample class M is a monitoring sample; sample class D is a duplicate sample

Appendix 3.2-2: Soil Quality Monitoring Results - Foreshore

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Benzo(k)fluoranthene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Aluminum (Al)	Antimony (Sb)	Arsenic (As)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
008_Barge_Spoils	VA24C6513-001	2024-10-04 13:30	M	0.099	0.401	0.0218	2.01	0.853	0.079	0.193	0.158	0.334	2.91	1.32	0.013	8740	0.38	2.37
008_Barge_Spoils	VA24C6513-002	2024-10-04 13:30	D	0.145	0.488	0.0243	2.46	1.42	0.116	0.284	0.347	0.765	4.58	1.71	0.016	9170	0.68	9.12
D09-A	VA24C4108-001	2024-09-13 10:39	M	0.284	1.30	0.0438	8.26	1.68	0.173	0.656	0.802	1.68	5.67	5.69	0.044	34200	5.32	6.48
D09-A	VA24C4108-002	2024-09-13 10:39	D	0.670	2.75	0.134	9.39	2.18	0.681	0.615	0.747	1.34	8.69	6.83	0.072	41000	4.21	6.88
D09-B	VA24C4108-003	2024-09-13 10:39	M	0.593	2.71	0.0767	7.27	1.76	0.261	0.690	0.881	1.68	5.55	4.53	0.044	38200	5.50	8.09
D09-C	VA24C4108-004	2024-09-13 10:39	M	0.274	0.961	0.0316	5.57	0.931	0.151	0.377	0.430	0.988	3.10	3.74	0.028	38900	4.29	6.72
D10-A	VA24C4191-001	2024-09-14 10:43	M	1.02	5.13	0.125	29.1	11.4	0.421	2.42	0.430	0.802	37.9	20.4	0.041	34800	3.99	6.01
D10-A	VA24C4191-002	2024-09-14 10:43	D	0.510	3.09	0.0596	15.3	2.95	0.204	0.744	0.582	1.10	9.78	10.3	0.045	34500	5.82	7.50
D11-A	VA24C4213-001	2024-09-15 13:39	M	0.365	2.21	0.0553	11.1	3.78	0.191	1.07	0.725	1.09	10.6	7.62	<0.031	23200	8.74	6.09
D11-A	VA24C4213-002	2024-09-15 13:39	D	1.50	9.83	0.215	43.7	19.1	0.700	5.95	7.07	5.88	58.7	29.7	<0.046	24500	311	10.0
D12-A	VA24C4310-001	2024-09-16 10:24	M	0.596	3.18	0.0699	14.6	4.97	0.268	1.59	1.71	2.34	14.9	10.4	0.056	19600	4.91	7.63
D12-A	VA24C4310-002	2024-09-16 10:24	D	0.503	2.46	0.0692	13.6	5.21	0.218	1.42	1.32	2.26	15.9	9.59	0.069	19800	2.95	4.46
SP-13A	VA24C4904-001	2024-09-19 14:10	M	0.199	1.08	0.0430	7.30	1.69	0.147	0.697	0.589	1.44	4.49	4.86	<0.010	19200	0.85	4.75
SP-13A	VA24C4904-002	2024-09-19 14:10	D	0.194	1.33	0.0451	7.48	1.99	0.149	0.888	0.794	1.88	5.32	5.01	<0.010	14100	1.07	3.56
SP-14A	VA24C5017-001	2024-09-20 15:10	M	0.508	3.34	0.0792	16.8	4.46	0.226	0.978	0.616	2.49	13.6	11.4	0.065	18200	2.38	5.65
SP-14A	VA24C5017-002	2024-09-20 15:12	D	0.330	2.37	0.0471	15.4	3.71	0.130	1.03	0.636	2.42	9.13	10.3	0.084	20600	5.40	6.37
SP-14B	VA24C5017-003	2024-09-20 15:13	M	0.688	4.69	0.112	27.7	6.33	0.321	1.66	1.00	2.74	19.1	18.4	0.122	24600	8.50	10.9
SP-15A	VA24C5077-001	2024-09-22 15:17	M	0.395	2.36	0.0562	11.6	2.61	0.186	0.659	0.501	0.904	8.97	8.24	0.028	17400	4.35	4.07
SP-15A	VA24C5077-002	2024-09-22 15:17	D	0.246	1.48	0.0372	6.90	1.56	0.124	0.509	0.466	0.938	5.61	4.85	0.022	15800	1.91	4.59
SP-16A	VA24C5709-001	2024-09-26 10:00	M	0.066	0.273	0.0150	2.26	0.520	0.044	0.089	0.065	0.088	1.41	1.55	<0.010	13600	0.50	1.89
SP-16B	VA24C5709-002	2024-09-26 10:05	M	0.130	0.636	0.0331	3.19	0.883	0.125	0.147	0.112	0.111	2.76	2.17	<0.010	12300	2.20	3.15
SP-16B	VA24C5709-003	2024-09-26 10:10	D	0.116	0.625	0.0215	4.06	1.38	0.064	0.322	0.219	0.265	3.86	2.75	<0.010	12400	0.57	2.34
SP-17A	VA24C5868-001	2024-09-27 15:10	M	0.066	0.343	0.0092	1.69	0.876	0.030	0.275	0.194	0.186	2.35	1.13	<0.010	14400	0.63	2.83
SP-17B	VA24C5868-002	2024-09-27 15:15	M	0.041	0.212	0.0059	1.43	0.895	0.018	0.200	0.200	0.151	2.33	0.912	<0.010	12400	0.48	3.20
SP-17B	VA24C5868-003	2024-09-27 15:15	D	0.091	0.343	0.0128	1.85	0.818	0.051	0.200	0.223	0.178	2.61	1.26	<0.010	15200	0.51	2.88
SP-18A	VA24C5868-004	2024-09-27 15:20	M	0.092	0.426	0.0128	2.30	1.18	0.039	0.510	0.660	0.717	3.18	1.58	<0.010	14100	0.55	2.38
SP-18B	VA24C5868-006	2024-09-27 15:20	D	0.085	0.434	0.0120	2.52	1.40	0.039	0.625	0.826	1.06	3.82	1.71	<0.023	13200	0.57	2.72
SP-18B	VA24C5868-005	2024-09-27 15:25	M	0.175	0.897	0.0213	4.08	2.19	0.071	1.23	1.16	1.66	5.84	2.82	<0.010	13800	0.60	2.44
SP-2A	VA24C1640-001	2024-08-23 8:15	M	0.279	1.00	0.0576	6.64	0.691	0.197	0.173	0.172	0.137	2.80	4.30	<0.010	9360	0.50	5.72
SP-2B	VA24C1640-002	2024-08-23 8:15	M	0.135	0.718	0.0185	5.67	3.51	0.074	1.47	2.09	2.40	11.6	3.69	0.012	9020	0.19	2.14
SP-2C	VA24C1640-003	2024-08-23 8:15	M	0.030	0.115	0.0076	0.581	0.153	0.024	0.035	0.023	0.031	0.588	0.391	<0.010	8570	0.35	3.13
SP-2D	VA24C1640-004	2024-08-23 8:15	M	0.388	2.06	0.0364	9.16	0.298	0.181	0.059	0.086	0.136	1.70	7.00	<0.010	9600	0.47	4.03
SP-2D	VA24C1640-005	2024-08-23 8:15	D	0.096	<0.330	0.0199	2.03	0.244	0.077	0.072	0.078	0.174	0.878	1.69	<0.010	9850	0.66	5.01
SP-4A	VA24C1834-001	2024-08-26 16:25	M	0.158	0.992	0.0193	4.92	1.59	0.070	0.436	0.368	0.493	5.14	3.54	<0.010	16600	2.92	7.25
SP-4A	VA24C1834-002	2024-08-26 16:25	D	0.043	<0.115	0.0093	0.612	0.224	0.038	0.120	0.183	0.212	0.598	0.418	<0.010	12200	2.40	6.96
SP-4B	VA24C1834-003	2024-08-26 16:25	M	0.046	<0.170	0.0112	0.695	0.241	0.042	0.125	0.194	0.213	0.651	0.494	<0.010	14800	1.27	5.19
SS-01A	VA24C1117-002	2024-08-20 14:00	D	0.094	0.314	0.0250	1.27	0.178	0.082	0.059	0.063	0.181	0.670	0.960	<0.010	8420	0.66	3.31
SS-01A	VA24C1117-001	2024-08-20 14:10	M	0.113	0.354	0.0236	1.45	0.207	0.088	0.088	0.082	0.334	0.847	1.10	<0.010	7800	0.83	4.91
SS-01B	VA24C1117-003	2024-08-20 14:15	M	0.230	0.968	0.0388	6.03	4.32	0.143	1.88	2.34	4.86	14.5	3.92	<0.010	5850	0.32	2.49

Notes:
Values above BC Contaminated Sites Regulation for Industrial Land use are shaded in grey
Values beginning with < indicates a detection limit
Sample class M is a monitoring sample; sample class D is a duplicate sample

Appendix 3.2-2: Soil Quality Monitoring Results - Foreshore

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Barium (Ba)	Beryllium (Be)	Bismuth (Bi)	Boron (B)	Cadmium (Cd)	Calcium (Ca)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Lithium (Li)	Magnesium (Mg)	Manganese (Mn	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Phosphorus (P)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
008_Barge_Spoils	VA24C6513-001	2024-10-04 13:30	M	61.6	<0.10	<0.20	<5.0	0.066	3200	8.87	3.69	26.2	17900	29.8	15.3	4620	276	0.109	1.65	4.92	291
008_Barge_Spoils	VA24C6513-002	2024-10-04 13:30	D	65.0	<0.10	<0.20	<5.0	0.064	4020	10.8	4.33	23.4	21700	30.0	15.6	4620	273	0.109	2.02	6.47	317
D09-A	VA24C4108-001	2024-09-13 10:39	M	929	0.74	<0.20	198	0.513	32700	33.8	9.26	178	32700	144	28.1	8810	804	<0.0500	6.02	59.8	2600
D09-A	VA24C4108-002	2024-09-13 10:39	D	1310	0.96	<0.20	276	0.277	42300	37.9	14.8	222	33600	123	35.8	9800	1010	0.0760	5.64	200	3230
D09-B	VA24C4108-003	2024-09-13 10:39	M	970	0.84	<0.20	244	0.233	38200	37.1	10.9	212	44800	102	30.7	10600	890	<0.0500	7.32	59.7	2940
D09-C	VA24C4108-004	2024-09-13 10:39	M	1190	0.93	<0.20	259	0.342	38200	35.0	10.8	198	38900	118	32.4	9150	1010	<0.0500	6.12	57.9	3420
D10-A	VA24C4191-001	2024-09-14 10:43	M	984	0.80	<0.20	228	0.129	33500	32.3	11.2	139	36100	90.1	34.5	8120	722	<0.0500	5.71	48.2	2680
D10-A	VA24C4191-002	2024-09-14 10:43	D	957	0.74	<0.20	205	0.162	34000	35.9	11.0	190	40000	122	30.8	9040	796	<0.0500	9.33	54.5	2880
D11-A	VA24C4213-001	2024-09-15 13:39	M	643	0.56	0.52	133	0.161	25400	25.2	8.05	677	35400	440	23.4	7490	658	<0.0500	6.32	39.3	1850
D11-A	VA24C4213-002	2024-09-15 13:39	D	583	0.48	0.60	125	0.218	24000	28.4	9.47	237	33000	1900	23.9	7860	748	0.0794	7.62	54.3	1980
D12-A	VA24C4310-001	2024-09-16 10:24	M	422	0.36	<0.20	63.6	0.227	17900	36.4	8.75	152	32400	104	20.8	8040	812	<0.0500	5.83	32.2	1480
D12-A	VA24C4310-002	2024-09-16 10:24	D	417	0.38	0.22	76.7	0.156	18700	21.0	6.64	96.6	21000	84.6	19.2	7120	729	<0.0500	4.04	29.3	1470
SP-13A	VA24C4904-001	2024-09-19 14:10	M	410	0.29	<0.20	60.1	0.093	12200	13.6	7.86	50.7	20700	32.9	20.8	6320	440	<0.0500	4.12	103	1030
SP-13A	VA24C4904-002	2024-09-19 14:10	D	240	0.23	<0.20	43.8	0.127	9980	13.9	5.11	45.6	19100	36.4	18.2	5260	355	<0.0500	4.59	15.1	832
SP-14A	VA24C5017-001	2024-09-20 15:10	M	341	0.36	<0.20	82.7	0.122	25100	17.5	5.94	81.0	22200	91.1	22.2	5690	410	<0.0500	6.96	22.6	1430
SP-14A	VA24C5017-002	2024-09-20 15:12	D	346	0.38	<0.20	78.5	0.142	32900	18.2	6.90	141	28900	65.2	25.6	6640	543	<0.0500	8.84	33.8	1400
SP-14B	VA24C5017-003	2024-09-20 15:13	M	363	0.57	<0.20	97.4	0.273	26600	29.4	9.10	272	35000	238	29.1	7690	825	0.182	10.4	59.6	2010
SP-15A	VA24C5077-001	2024-09-22 15:17	M	357	0.31	<0.20	49.3	0.088	12200	19.6	7.07	66.6	28300	69.7	19.3	6230	558	<0.0500	5.21	22.1	1260
SP-15A	VA24C5077-002	2024-09-22 15:17	D	304	0.27	<0.20	46.2	0.100	12000	18.9	6.26	70.0	25300	63.3	19.4	6420	612	<0.0500	5.76	21.4	1230
SP-16A	VA24C5709-001	2024-09-26 10:00	M	173	0.16	<0.20	22.6	0.057	7910	10.2	4.51	19.7	17300	13.3	15.2	5170	386	<0.0500	1.14	9.29	640
SP-16B	VA24C5709-002	2024-09-26 10:05	M	151	0.15	<0.20	18.2	0.070	8270	11.2	4.88	26.0	19000	37.3	14.6	4880	425	2.78	1.88	8.83	631
SP-16B	VA24C5709-003	2024-09-26 10:10	D	182	0.16	<0.20	27.8	0.059	8490	11.8	4.87	86.4	20300	17.2	16.3	5290	431	<0.0500	1.18	9.19	703
SP-17A	VA24C5868-001	2024-09-27 15:10	M	168	0.19	<0.20	27.3	0.294	11900	17.7	13.8	24.0	20600	18.0	14.7	5690	396	<0.0500	1.02	10.1	685
SP-17B	VA24C5868-002	2024-09-27 15:15	M	162	0.16	<0.20	25.5	0.051	9900	9.73	3.97	21.7	16800	15.3	14.4	4750	364	<0.0500	1.23	8.32	639
SP-17B	VA24C5868-003	2024-09-27 15:15	D	252	0.26	<0.20	39.2	0.052	12800	19.2	6.72	23.5	19400	36.1	15.7	6060	491	<0.0500	1.97	35.8	836
SP-18A	VA24C5868-004	2024-09-27 15:20	M	170	0.17	<0.20	26.4	0.061	11000	11.8	4.65	24.1	18900	13.4	15.7	5710	395	<0.0500	1.50	10.4	642
SP-18B	VA24C5868-006	2024-09-27 15:20	D	155	0.16	<0.20	21.7	0.072	10600	14.2	4.72	27.4	18800	14.2	14.1	5700	452	<0.0500	1.97	11.4	751
SP-18B	VA24C5868-005	2024-09-27 15:25	M	203	0.18	<0.20	28.1	0.061	10400	13.3	5.41	24.9	24800	17.5	16.3	5920	492	<0.0500	1.28	10.8	771
SP-2A	VA24C1640-001	2024-08-23 8:15	M	53.5	<0.10	<0.20	<5.0	0.106	3920	16.2	4.67	21.7	18400	25.7	12.7	3810	248	0.143	3.59	6.04	288
SP-2B	VA24C1640-002	2024-08-23 8:15	M	44.8	<0.10	<0.20	5.4	0.054	2890	10.3	4.08	11.6	13800	5.79	14.5	4150	242	0.107	3.56	3.76	238
SP-2C	VA24C1640-003	2024-08-23 8:15	M	49.9	<0.10	<0.20	<5.0	0.059	2200	26.4	4.55	21.4	17100	5.99	14.5	4290	230	0.0541	3.60	9.64	280
SP-2D	VA24C1640-004	2024-08-23 8:15	M	69.4	0.12	<0.20	<5.0	0.108	4910	19.4	6.16	30.1	21600	23.6	13.1	5290	286	0.100	3.45	15.0	360
SP-2D	VA24C1640-005	2024-08-23 8:15	D	89.7	0.13	<0.20	7.0	0.123	6230	22.5	6.94	47.8	24700	32.9	14.5	5820	314	0.183	3.26	18.3	397
SP-4A	VA24C1834-001	2024-08-26 16:25	M	332	0.28	<0.20	42.5	0.162	13000	21.4	7.74	125	29600	87.2	21.4	7360	1010	<0.0500	3.76	31.0	1550
SP-4A	VA24C1834-002	2024-08-26 16:25	D	129	0.15	<0.20	15.0	0.175	12900	27.0	6.69	60.0	28800	77.1	16.6	6670	1160	<0.0500	3.83	15.0	791
SP-4B	VA24C1834-003	2024-08-26 16:25	M	258	0.22	<0.20	30.7	0.166	13600	16.1	5.41	49.1	21200	48.4	19.6	5980	901	<0.0500	3.05	14.4	1050
SS-01A	VA24C1117-002	2024-08-20 14:00	D	50.0	<0.10	<0.20	<5.0	0.072	3520	12.7	4.52	30.0	17000	36.9	12.2	4080	239	0.246	2.89	6.46	294
SS-01A	VA24C1117-001	2024-08-20 14:10	M	46.8	<0.10	0.25	5.6	0.442	3820	15.8	4.70	36.8	25300	73.3	11.1	3850	284	0.250	2.64	8.72	316
SS-01B	VA24C1117-003	2024-08-20 14:15	M	37.6	<0.10	<0.20	<5.0	0.046	2970	8.35	3.24	13.3	12100	24.8	8.2	2930	161	0.111	1.03	4.44	186

Notes:
Values above BC Contaminated Sites Regulation for Industrial Land use are shaded in grey
Values beginning with < indicates a detection limit
Sample class M is a monitoring sample; sample class D is a duplicate sample

Appendix 3.2-2: Soil Quality Monitoring Results - Foreshore

Table 1: Soil Quality Monitoring Results

Station ID	Lab ID	Sample Date/Time	Sample Class	Potassium (K)	Selenium (Se)	Silver (Ag)	Sodium (Na)	Strontium (Sr)	Sulfur (S)	Thallium (Tl)	Tin (Sn)	Titanium (Ti)	Tungsten (W)	Uranium (U)	Vanadium (V)	Zinc (Zn)	Zirconium (Zr)	EPH (C10-19)	EPH (C19-32)	HEPH	LEPH
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
008_Barge_Spoils	VA24C6513-001	2024-10-04 13:30	M	1750	<0.20	<0.10	1210	33.8	2100	0.078	<2.0	564	<0.50	0.700	32.9	42.8	<1.0	<200	<200	<200	<200
008_Barge_Spoils	VA24C6513-002	2024-10-04 13:30	D	2020	<0.20	<0.10	1160	32.6	2700	0.097	<2.0	475	<0.50	0.636	29.4	40.2	<1.0	<200	<200	<200	<200
D09-A	VA24C4108-001	2024-09-13 10:39	M	2770	0.23	<0.10	4790	1450	4000	0.062	8.8	1300	0.84	3.09	101	94.8	9.7	<200	<200	<200	<200
D09-A	VA24C4108-002	2024-09-13 10:39	D	3170	0.26	<0.10	5810	1790	3600	<0.050	8.4	1520	0.72	3.27	139	74.0	11.3	<200	<200	<200	<200
D09-B	VA24C4108-003	2024-09-13 10:39	M	3330	0.21	<0.10	5960	1540	7000	0.051	10.8	1500	1.07	3.07	97.2	89.9	13.4	<200	<200	<200	<200
D09-C	VA24C4108-004	2024-09-13 10:39	M	2700	0.27	<0.10	5320	1880	3700	<0.050	6.8	1350	0.84	3.10	96.9	76.5	13.4	<200	<200	<200	<200
D10-A	VA24C4191-001	2024-09-14 10:43	M	2850	<0.20	<0.10	4800	1560	3400	<0.050	7.2	1340	0.62	2.70	87.0	66.4	11.2	<200	<200	<200	<200
D10-A	VA24C4191-002	2024-09-14 10:43	D	2790	0.27	<0.10	4640	1500	5100	0.058	10.6	1290	0.90	2.72	92.2	70.0	11.8	<200	<200	<200	<200
D11-A	VA24C4213-001	2024-09-15 13:39	M	2150	0.28	0.50	3030	896	5800	0.052	144	1010	<0.50	2.38	72.1	71.6	10.4	<200	220	210	<200
D11-A	VA24C4213-002	2024-09-15 13:39	D	2220	0.30	0.24	3520	786	6500	0.062	73.0	1050	0.70	2.51	90.8	86.4	11.0	300	450	400	240
D12-A	VA24C4310-001	2024-09-16 10:24	M	2430	<0.20	<0.10	2890	472	3700	0.075	19.3	1100	0.81	2.24	71.4	91.1	7.4	<200	370	350	<200
D12-A	VA24C4310-002	2024-09-16 10:24	D	2690	<0.20	<0.10	3520	528	2500	0.073	7.2	889	<0.50	1.95	57.3	72.6	7.4	<200	200	<200	<200
SP-13A	VA24C4904-001	2024-09-19 14:10	M	3070	<0.20	<0.10	2840	410	5100	0.109	3.1	915	<0.50	2.30	56.1	61.3	5.7	<200	<200	<200	<200
SP-13A	VA24C4904-002	2024-09-19 14:10	D	1870	<0.20	<0.10	2060	313	6300	0.065	3.5	689	<0.50	1.70	42.3	50.1	6.0	<200	<200	<200	<200
SP-14A	VA24C5017-001	2024-09-20 15:10	M	1990	0.23	<0.10	3180	668	7100	0.070	6.8	913	<0.50	3.19	49.8	46.0	8.5	<200	<200	<200	<200
SP-14A	VA24C5017-002	2024-09-20 15:12	D	2080	0.25	<0.10	3250	643	9200	0.072	8.2	873	<0.50	3.75	59.2	63.5	9.4	<200	<200	<200	<200
SP-14B	VA24C5017-003	2024-09-20 15:13	M	2200	0.62	0.12	4820	758	11500	0.073	24.2	1120	0.71	4.38	95.3	101	11.5	<200	260	230	<200
SP-15A	VA24C5077-001	2024-09-22 15:17	M	2170	<0.20	<0.10	2520	419	2400	0.076	18.0	890	0.58	1.60	57.5	52.6	6.1	<200	<200	<200	<200
SP-15A	VA24C5077-002	2024-09-22 15:17	D	2080	<0.20	<0.10	2520	346	3100	0.076	8.3	907	0.75	1.72	57.6	70.4	6.4	<200	<200	<200	<200
SP-16A	VA24C5709-001	2024-09-26 10:00	M	1870	<0.20	<0.10	1360	170	<1000	0.068	<2.0	570	<0.50	1.16	40.5	38.0	2.7	<200	<200	<200	<200
SP-16B	VA24C5709-002	2024-09-26 10:05	M	1700	<0.20	<0.10	1370	138	<1000	0.057	8.9	589	<0.50	1.23	44.7	39.4	3.0	<200	<200	<200	<200
SP-16B	VA24C5709-003	2024-09-26 10:10	D	1840	<0.20	<0.10	1380	187	<1000	0.066	<2.0	662	<0.50	0.962	46.5	42.0	3.0	<200	<200	<200	<200
SP-17A	VA24C5868-001	2024-09-27 15:10	M	1780	<0.20	<0.10	1450	177	<1000	0.066	<2.0	794	1.11	0.969	54.9	81.2	4.2	<200	<200	<200	<200
SP-17B	VA24C5868-002	2024-09-27 15:15	M	1790	<0.20	<0.10	1340	203	<1000	0.061	<2.0	715	<0.50	0.980	39.2	37.8	3.7	<200	<200	<200	<200
SP-17B	VA24C5868-003	2024-09-27 15:15	D	2290	<0.20	<0.10	1960	269	<1000	0.068	<2.0	850	<0.50	1.20	96.8	38.2	4.2	<200	<200	<200	<200
SP-18A	VA24C5868-004	2024-09-27 15:20	M	2120	<0.20	<0.10	1260	178	<1000	0.081	<2.0	813	<0.50	0.983	45.4	41.2	3.8	<200	<200	<200	<200
SP-18B	VA24C5868-006	2024-09-27 15:20	D	1840	<0.20	<0.10	1510	172	<1000	0.066	<2.0	803	<0.50	1.14	45.5	42.3	3.8	<200	<200	<200	<200
SP-18B	VA24C5868-005	2024-09-27 15:25	M	2340	<0.20	<0.10	1340	211	<1000	0.089	<2.0	877	<0.50	1.12	50.2	42.7	3.5	<200	<200	<200	<200
SP-2A	VA24C1640-001	2024-08-23 8:15	M	1470	<0.20	<0.10	1460	30.2	3500	0.079	2.2	695	<0.50	0.965	48.1	32.4	1.3	<200	<200	<200	<200
SP-2B	VA24C1640-002	2024-08-23 8:15	M	1520	<0.20	<0.10	1630	25.5	3800	0.085	<2.0	593	<0.50	0.864	32.5	29.3	<1.0	<200	<200	<200	<200
SP-2C	VA24C1640-003	2024-08-23 8:15	M	1970	<0.20	<0.10	1320	24.8	2800	0.087	<2.0	504	<0.50	0.914	33.1	32.5	<1.0	<200	<200	<200	<200
SP-2D	VA24C1640-004	2024-08-23 8:15	M	1470	<0.20	<0.10	1300	34.3	4000	0.076	<2.0	747	<0.50	0.755	40.8	45.5	2.5	<200	<200	<200	<200
SP-2D	VA24C1640-005	2024-08-23 8:15	D	1490	<0.20	<0.10	1540	41.1	4400	0.076	<2.0	698	0.51	1.03	40.7	56.4	3.1	<200	<200	<200	<200
SP-4A	VA24C1834-001	2024-08-26 16:25	M	2000	<0.20	<0.10	1880	371	<1000	0.078	11.0	831	0.90	2.14	80.7	73.5	5.5	<200	<200	<200	<200
SP-4A	VA24C1834-002	2024-08-26 16:25	D	1860	0.20	<0.10	1260	111	1800	0.084	17.8	739	0.82	1.64	65.7	88.3	2.4	<200	370	370	<200
SP-4B	VA24C1834-003	2024-08-26 16:25	M	1860	<0.20	<0.10	1400	302	<1000	0.079	4.4	759	0.83	1.40	48.8	68.4	4.1	<200	410	410	<200
SS-01A	VA24C1117-002	2024-08-20 14:00	D	1490	<0.20	<0.10	1220	26.8	1800	0.079	<2.0	644	<0.50	1.00	36.2	42.3	1.3	<200	<200	<200	<200
SS-01A	VA24C1117-001	2024-08-20 14:10	M	1280	<0.20	<0.10	965	28.4	1400	0.076	2.3	588	0.52	1.09	33.3	48.9	1.4	<200	<200	<200	<200
SS-01B	VA24C1117-003	2024-08-20 14:15	M	1000	<0.20	<0.10	800	20.0	<1000	<0.050	<2.0	574	<0.50	0.652	29.5	23.7	1.1	<200	<200	<200	<200

Notes:
Values above BC Contaminated Sites Regulation for Industrial Land use are shaded in grey
Values beginning with < indicates a detection limit
Sample class M is a monitoring sample; sample class D is a duplicate sample

Appendix 3.2-2: Soil Quality Monitoring Results - Foreshore

Table 2: Soil Sample Field Duplicate Quality Control Evaluation

Parameter	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]
Sample Date	2024-10-04	2024-10-04		2024-09-13	2024-09-13		2024-09-14	2024-09-14		2024-09-15	2024-09-15		2024-09-16	2024-09-16	
Station Number	008_Barge_Spoils	008_Barge_Spoils		D09-A	D09-A		D10-A	D10-A		D11-A	D11-A		D12-A	D12-A	
Sample Number	VA24C6513-001	VA24C6513-002		VA24C4108-001	VA24C4108-002		VA24C4191-001	VA24C4191-002		VA24C4213-001	VA24C4213-002		VA24C4310-001	VA24C4310-002	
Moisture	9.99	8.68	14.0%	28	23.4	17.9%	25.2	23.4	7.4%	16	18	11.8%	23.3	18.5	23.0%
pH, soluble (2:1)	8.34	8.32	0.2%	7.26	7.22	0.6%	7.47	7.55	1.1%	8.04	8.07	0.4%	8.47	8.33	1.7%
Chloride, soluble	417	446	6.7%	1100	1820	49.3%	1130	1060	6.4%	1090	902	18.9%	1060	1040	1.9%
Chloride, soluble-Extractable	<0.10	<0.10	-	0.74	0.96	25.9%	0.8	0.74	7.8%	0.56	0.48	15.4%	0.36	0.38	-
% Saturation	31.1	31.4	1.0%	38.4	47.3	20.8%	50.3	47	6.8%	42.4	35.5	17.7%	34.1	35.8	4.9%
Acridine	0.062	0.09	36.8%	0.172	0.202	16.0%	0.46	0.448	2.6%	0.333	0.761	78.2%	0.356	0.324	9.4%
Acenaphthene	0.81	1.06	26.7%	2.1	1.86	12.1%	10.9	2.91	115.7%	4.21	17.5	122.4%	4.96	5.09	2.6%
Acenaphthylene	0.0235	0.0278	16.8%	0.0777	0.336	124.9%	0.191	0.0826	79.2%	0.076	0.299	118.9%	0.108	0.108	0.0%
Anthracene	1.58	3.32	71.0%	1.3	2.3	55.6%	5.46	2.48	75.1%	2.86	11.4	119.8%	3.73	3.51	6.1%
Benz(a)anthracene	0.361	0.469	26.0%	1.35	2.19	47.5%	5.33	2.56	70.2%	2.12	9.17	124.9%	2.92	2.47	16.7%
Benzo(a)pyrene	0.206	0.242	16.1%	0.489	1.34	93.1%	1.67	0.761	74.8%	0.66	2.68	121.0%	0.896	0.804	10.8%
Benzo(b+j)fluoranthene	0.267	0.358	29.1%	0.731	1.68	78.7%	2.63	1.2	74.7%	1.02	4.3	123.3%	1.36	1.25	8.4%
Benzo(b+j+k)fluoranthene	0.366	0.503	31.5%	1.02	2.35	78.9%	3.65	1.71	72.4%	1.38	5.8	123.1%	1.96	1.75	11.3%
Benzo(g-h-i)perylene	0.071	0.092	25.8%	0.174	0.672	117.7%	0.358	0.187	62.8%	0.191	0.578	100.7%	0.246	0.207	17.2%
Benzo(k)fluoranthene	0.099	0.145	37.7%	0.284	0.67	80.9%	1.02	0.51	66.7%	0.365	1.5	121.7%	0.596	0.503	16.9%
Chrysene	0.401	0.488	19.6%	1.3	2.75	71.6%	5.13	3.09	49.6%	2.21	9.83	126.6%	3.18	2.46	25.5%
Dibenz(a-h)anthracene	0.0218	0.0243	10.8%	0.0438	0.134	101.5%	0.125	0.0596	70.9%	0.0553	0.215	118.2%	0.0699	0.0692	1.0%
Fluoranthene	2.01	2.46	20.1%	8.26	9.39	12.8%	29.1	15.3	62.2%	11.1	43.7	119.0%	14.6	13.6	7.1%
Fluorene	0.853	1.42	49.9%	1.68	2.18	25.9%	11.4	2.95	117.8%	3.78	19.1	133.9%	4.97	5.21	4.7%
Indeno(1,2,3-cd)pyrene	0.079	0.116	37.9%	0.173	0.681	119.0%	0.421	0.204	69.4%	0.191	0.7	114.3%	0.268	0.218	20.6%
1-Methylnaphthalene	0.193	0.284	38.2%	0.656	0.615	6.5%	2.42	0.744	105.9%	1.07	5.95	139.0%	1.59	1.42	11.3%
2-Methylnaphthalene	0.158	0.347	74.9%	0.802	0.747	7.1%	0.43	0.582	30.0%	0.725	7.07	162.8%	1.71	1.32	25.7%
Phenanthrene	2.91	4.58	44.6%	5.67	8.69	42.1%	37.9	9.78	118.0%	10.6	58.7	138.8%	14.9	15.9	6.5%
Pyrene	1.32	1.71	25.7%	5.69	6.83	18.2%	20.4	10.3	65.8%	7.62	29.7	118.3%	10.4	9.59	8.1%
Quinoline	0.013	0.016	-	0.044	0.072	48.3%	0.041	0.045	-	<0.031	<0.046	-	0.056	0.069	20.8%
Aluminum (Al)	8740	9170	4.8%	34200	41000	18.1%	34800	34500	0.9%	23200	24500	5.5%	19600	19800	1.0%
Antimony (Sb)	0.38	0.68	56.6%	5.32	4.21	23.3%	3.99	5.82	37.3%	8.74	311	189.1%	4.91	2.95	49.9%
Arsenic (As)	2.37	9.12	117.5%	6.48	6.88	6.0%	6.01	7.5	22.1%	6.09	10	48.6%	7.63	4.46	52.4%
Barium (Ba)	61.6	65	5.4%	929	1310	34.0%	984	957	2.8%	643	583	9.8%	422	417	1.2%
Bismuth (Bi)	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-	0.52	0.6	-	<0.20	0.22	-
Boron (B)	<5.0	<5.0	-	198	276	32.9%	228	205	10.6%	133	125	6.2%	63.6	76.7	18.7%
Cadmium (Cd)	0.066	0.064	3.1%	0.513	0.277	59.7%	0.129	0.162	22.7%	0.161	0.218	30.1%	0.227	0.156	37.1%
Calcium (Ca)	3200	4020	22.7%	32700	42300	25.6%	33500	34000	1.5%	25400	24000	5.7%	17900	18700	4.4%
Chromium (Cr)	8.87	10.8	19.6%	33.8	37.9	11.4%	32.3	35.9	10.6%	25.2	28.4	11.9%	36.4	21	53.7%
Cobalt (Co)	3.69	4.33	16.0%	9.26	14.8	46.1%	11.2	11	1.8%	8.05	9.47	16.2%	8.75	6.64	27.4%
Copper (Cu)	26.2	23.4	11.3%	178	222	22.0%	139	190	31.0%	677	237	96.3%	152	96.6	44.6%
Iron (Fe)	17900	21700	19.2%	32700	33600	2.7%	36100	40000	10.2%	35400	33000	7.0%	32400	21000	42.7%
Lead (Pb)	29.8	30	0.7%	144	123	15.7%	90.1	122	30.1%	440	1900	124.8%	104	84.6	20.6%
Lead (Pb)-TCLP	4620	4620	0.0%	8810	9800	10.6%	8120	9040	10.7%	7490	7860	4.8%	8040	7120	12.1%
Lithium (Li)	15.3	15.6	1.9%	28.1	35.8	24.1%	34.5	30.8	11.3%	23.4	23.9	2.1%	20.8	19.2	8.0%
Manganese (Mn)	276	273	1.1%	804	1010	22.7%	722	796	9.7%	658	748	12.8%	812	729	10.8%
Mercury (Hg)	0.109	0.109	-	<0.0500	0.076	-	<0.0500	<0.0500	-	<0.0500	0.0794	-	<0.0500	<0.0500	-
Molybdenum (Mo)	1.65	2.02	20.2%	6.02	5.64	6.5%	5.71	9.33	48.1%	6.32	7.62	18.7%	5.83	4.04	36.3%
Nickel (Ni)	4.92	6.47	27.2%	59.8	200	107.9%	48.2	54.5	12.3%	39.3	54.3	32.1%	32.2	29.3	9.4%
Phosphorus (P)	291	317	8.6%	2600	3230	21.6%	2680	2880	7.2%	1850	1980	6.8%	1480	1470	0.7%
Potassium (K)	1750	2020	14.3%	2770	3170	13.5%	2850	2790	2.1%	2150	2220	3.2%	2430	2690	10.2%
Selenium (Se)	<0.20	<0.20	-	0.23	0.26	-	<0.20	0.27	-	0.28	0.3	-	<0.20	<0.20	-
Silver (Ag)	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-	0.5	0.24	-	<0.10	<0.10	-
Sodium (Na)-Extractable	<200	<200	-	<200	<200	-	<200	<200	-	<200	240	-	<200	<200	-
Strontium (Sr)	33.8	32.6	3.6%	1450	1790	21.0%	1560	1500	3.9%	896	786	13.1%	472	528	11.2%
Sulfur (S)	2100	2700	-	4000	3600	-	3400	5100	40.0%	5800	6500	11.4%	3700	2500	-
Thallium (Tl)	0.078	0.097	-	0.062	<0.050	-	<0.050	0.058	-	0.052	0.062	-	0.075	0.073	-
Tin (Sn)	<2.0	<2.0	-	8.8	8.4	-	7.2	10.6	38.2%	144	73	65.4%	19.3	7.2	91.3%
Titanium (Ti)	564	475	17.1%	1300	1520	15.6%	1340	1290	3.8%	1010	1050	3.9%	1100	889	21.2%
Tungsten (W)	<0.50	<0.50	-	0.84	0.72	-	0.62	0.9	-	<0.50	0.7	-	0.81	<0.50	-
Uranium (U)	0.7	0.636	9.6%	3.09	3.27	5.7%	2.7	2.72	0.7%	2.38	2.51	5.3%	2.24	1.95	13.8%
Vanadium (V)	32.9	29.4	11.2%	101	139	31.7%	87	92.2	5.8%	72.1	90.8	23.0%	71.4	57.3	21.9%
Zinc (Zn)	42.8	40.2	6.3%	94.8	74	24.6%	66.4	70	5.3%	71.6	86.4	18.7%	91.1	72.6	22.6%
Zirconium (Zr)	<1.0	<1.0	-	9.7	11.3	15.2%	11.2	11.8	5.2%	10.4	11	5.6%	7.4	7.4	0.0%
EPH (C10-19)	<200	<200	-	<200	<200	-	<200	<200	-	<200	300	-	<200	<200	-
EPH (C19-32)	<200	<200	-	<200	<200	-	<200	<200	-	220	450	-	370	200	-
HEPH (C19-32)	<200	<200	-	<200	<200	-	<200	<200	-	210	400	-	350	<200	-

1: Relative Percent Difference is calculated only if one or both values are greater than 5x the detection limit
2: RPDs exceeding 20% are flagged in light grey
3: RPDs exceeding 50% are flagged in dark grey

Appendix 3.2-2: Soil Quality Monitoring Results - Foreshore

Table 2: Soil Sample Field Duplicate Quality Control Evaluation

Parameter	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]	Monitoring Sample	Duplicate Sample	RPD[1]
Sample Date	2024-09-19	2024-09-19		2024-09-22	2024-09-22		2024-09-27	2024-09-27		2024-08-23	2024-08-23		2024-08-26	2024-08-26	
Station Number	SP-13A	SP-13A		SP-15A	SP-15A		SP-17B	SP-17B		SP-2D	SP-2D		SP-4A	SP-4A	
Sample Number	VA24C4904-001	VA24C4904-002		VA24C5077-001	VA24C5077-002		VA24C5868-002	VA24C5868-003		VA24C1640-004	VA24C1640-005		VA24C1834-001	VA24C1834-002	
Moisture	14.4	11.5	22.4%	20	19.2	4.1%	8.1	8.86	9.0%	10.4	9.55	8.5%	16.3	18.9	14.8%
pH, soluble (2:1)	8.09	8.04	0.6%	8.39	8.44	0.6%	9.13	9.03	1.1%	8.06	8.06	0.0%	8.4	8.83	5.0%
Chloride, soluble	1050	1110	5.6%	1380	1260	9.1%	385	419	8.5%	1230	1390	12.2%	527	329	46.3%
Chloride, soluble-Extractable	0.29	0.23	-	0.31	0.27	-	0.16	0.26	-	0.12	0.13	-	0.28	0.15	-
% Saturation	29.6	32	7.8%	32.3	29.7	8.4%	28.1	29.3	4.2%	33.9	36.5	7.4%	30.8	31	0.6%
Acridine	<0.183	<0.202	-	<0.250	<0.137	-	<0.059	<0.059	-	0.027	0.03	-	0.178	<0.015	-
Acenaphthene	2.41	2.66	9.9%	2.52	1.66	41.1%	0.642	0.729	12.7%	0.195	0.242	21.5%	1.47	0.26	139.9%
Acenaphthylene	0.0648	0.0584	10.4%	0.0662	0.0454	37.3%	0.0196	0.0144	30.6%	0.091	0.0248	114.3%	0.0396	0.0227	54.3%
Anthracene	1.72	2.08	18.9%	2.63	1.58	49.9%	0.811	0.583	32.7%	0.89	0.284	103.2%	1.46	0.12	169.6%
Benz(a)anthracene	0.873	0.946	8.0%	2.33	1.38	51.2%	0.188	0.323	52.8%	0.649	0.268	83.1%	0.948	0.127	152.7%
Benzo(a)pyrene	0.377	0.39	3.4%	0.728	0.454	46.4%	0.068	0.153	76.9%	0.33	0.184	56.8%	0.269	0.072	115.5%
Benzo(b+j)fluoranthene	0.544	0.568	4.3%	1.19	0.72	49.2%	0.109	0.212	64.2%	1.04	0.294	111.8%	0.416	0.11	116.3%
Benzo(b+j+k)fluoranthene	0.743	0.762	2.5%	1.58	0.966	48.2%	0.15	0.303	67.5%	1.43	0.39	114.3%	0.574	0.153	115.8%
Benzo(g-h-i)perylene	0.158	0.151	4.5%	0.152	0.108	33.8%	0.018	0.048	90.9%	0.14	0.067	70.5%	0.07	0.04	54.5%
Benzo(k)fluoranthene	0.199	0.194	2.5%	0.395	0.246	46.5%	0.041	0.091	75.8%	0.388	0.096	120.7%	0.158	0.043	114.4%
Chrysene	1.08	1.33	20.7%	2.36	1.48	45.8%	0.212	0.343	47.2%	2.06	<0.330	-	0.992	<0.115	-
Dibenz(a-h)anthracene	0.043	0.0451	4.8%	0.0562	0.0372	40.7%	0.0059	0.0128	73.8%	0.0364	0.0199	58.6%	0.0193	0.0093	69.9%
Fluoranthene	7.3	7.48	2.4%	11.6	6.9	50.8%	1.43	1.85	25.6%	9.16	2.03	127.4%	4.92	0.612	155.7%
Fluorene	1.69	1.99	16.3%	2.61	1.56	50.4%	0.895	0.818	9.0%	0.298	0.244	19.9%	1.59	0.224	150.6%
Indeno(1,2,3-cd)pyrene	0.147	0.149	1.4%	0.186	0.124	40.0%	0.018	0.051	95.7%	0.181	0.077	80.6%	0.07	0.038	59.3%
1-Methylnaphthalene	0.697	0.888	24.1%	0.659	0.509	25.7%	0.2	0.2	0.0%	0.059	0.072	19.8%	0.436	0.12	113.7%
2-Methylnaphthalene	0.589	0.794	29.6%	0.501	0.466	7.2%	0.2	0.223	10.9%	0.086	0.078	9.8%	0.368	0.183	67.2%
Phenanthrene	4.49	5.32	16.9%	8.97	5.61	46.1%	2.33	2.61	11.3%	1.7	0.878	63.8%	5.14	0.598	158.3%
Pyrene	4.86	5.01	3.0%	8.24	4.85	51.8%	0.912	1.26	32.0%	7	1.69	122.2%	3.54	0.418	157.8%
Quinoline	<0.010	<0.010	-	0.028	0.022	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
Aluminum (Al)	19200	14100	30.6%	17400	15800	9.6%	12400	15200	20.3%	9600	9850	2.6%	16600	12200	30.6%
Antimony (Sb)	0.85	1.07	22.9%	4.35	1.91	78.0%	0.48	0.51	6.1%	0.47	0.66	33.6%	2.92	2.4	19.5%
Arsenic (As)	4.75	3.56	28.6%	4.07	4.59	12.0%	3.2	2.88	10.5%	4.03	5.01	21.7%	7.25	6.96	4.1%
Barium (Ba)	410	240	52.3%	357	304	16.0%	162	252	43.5%	69.4	89.7	25.5%	332	129	88.1%
Bismuth (Bi)	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-
Boron (B)	60.1	43.8	31.4%	49.3	46.2	6.5%	25.5	39.2	42.3%	<5.0	7	-	42.5	15	95.7%
Cadmium (Cd)	0.093	0.127	30.9%	0.088	0.1	12.8%	0.051	0.052	1.9%	0.108	0.123	13.0%	0.162	0.175	7.7%
Calcium (Ca)	12200	9980	20.0%	12200	12000	1.7%	9900	12800	25.6%	4910	6230	23.7%	13000	12900	0.8%
Chromium (Cr)	13.6	13.9	2.2%	19.6	18.9	3.6%	9.73	19.2	65.5%	19.4	22.5	14.8%	21.4	27	23.1%
Cobalt (Co)	7.86	5.11	42.4%	7.07	6.26	12.2%	3.97	6.72	51.4%	6.16	6.94	11.9%	7.74	6.69	14.6%
Copper (Cu)	50.7	45.6	10.6%	66.6	70	5.0%	21.7	23.5	8.0%	30.1	47.8	45.4%	125	60	70.3%
Iron (Fe)	20700	19100	8.0%	28300	25300	11.2%	16800	19400	14.4%	21600	24700	13.4%	29600	28800	2.7%
Lead (Pb)	32.9	36.4	10.1%	69.7	63.3	9.6%	15.3	36.1	80.9%	23.6	32.9	32.9%	87.2	77.1	12.3%
Lead (Pb)-TCLP	6320	5260	18.3%	6230	6420	3.0%	4750	6060	24.2%	5290	5820	9.5%	7360	6670	9.8%
Lithium (Li)	20.8	18.2	13.3%	19.3	19.4	0.5%	14.4	15.7	8.6%	13.1	14.5	10.1%	21.4	16.6	25.3%
Manganese (Mn)	440	355	21.4%	558	612	9.2%	364	491	29.7%	286	314	9.3%	1010	1160	13.8%
Mercury (Hg)	<0.0500	<0.0500	-	<0.0500	<0.0500	-	<0.0500	<0.0500	-	0.1	0.183	-	<0.0500	<0.0500	-
Molybdenum (Mo)	4.12	4.59	10.8%	5.21	5.76	10.0%	1.23	1.97	46.3%	3.45	3.26	5.7%	3.76	3.83	1.8%
Nickel (Ni)	103	15.1	148.9%	22.1	21.4	3.2%	8.32	35.8	124.6%	15	18.3	19.8%	31	15	69.6%
Phosphorus (P)	1030	832	21.3%	1260	1230	2.4%	639	836	26.7%	360	397	9.8%	1550	791	64.8%
Potassium (K)	3070	1870	48.6%	2170	2080	4.2%	1790	2290	24.5%	1470	1490	1.4%	2000	1860	7.3%
Selenium (Se)	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	<0.20	-	<0.20	0.2	-
Silver (Ag)	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-	<0.10	<0.10	-
Sodium (Na)-Extractable	<200	<200	-	<200	<200	-	<200	<200	-	<200	<200	-	<200	<200	-
Strontium (Sr)	410	313	26.8%	419	346	19.1%	203	269	28.0%	34.3	41.1	18.0%	371	111	107.9%
Sulfur (S)	5100	6300	21.1%	2400	3100	-	<1000	<1000	-	4000	4400	-	<1000	1800	-
Thallium (Tl)	0.109	0.065	-	0.076	0.076	-	0.061	0.068	-	0.076	0.076	-	0.078	0.084	-
Tin (Sn)	3.1	3.5	-	18	8.3	73.8%	<2.0	<2.0	-	<2.0	<2.0	-	11	17.8	47.2%
Titanium (Ti)	915	689	28.2%	890	907	1.9%	715	850	17.3%	747	698	6.8%	831	739	11.7%
Tungsten (W)	<0.50	<0.50	-	0.58	0.75	-	<0.50	<0.50	-	<0.50	0.51	-	0.9	0.82	-
Uranium (U)	2.3	1.7	30.0%	1.6	1.72	7.2%	0.98	1.2	20.2%	0.755	1.03	30.8%	2.14	1.64	26.5%
Vanadium (V)	56.1	42.3	28.0%	57.5	57.6	0.2%	39.2	96.8	84.7%	40.8	40.7	0.2%	80.7	65.7	20.5%
Zinc (Zn)	61.3	50.1	20.1%	52.6	70.4	28.9%	37.8	38.2	1.1%	45.5	56.4	21.4%	73.5	88.3	18.3%
Zirconium (Zr)	5.7	6	5.1%	6.1	6.4	4.8%	3.7	4.2	-	2.5	3.1	-	5.5	2.4	78.5%
EPH (C10-19)	<200	<200	-	<200	<200	-	<200	<200	-	<200	<200	-	<200	<200	-
EPH (C19-32)	<200	<200	-	<200	<200	-	<200	<200	-	<200	<200	-	<200	370	-
HEPH (C19-32)	<200	<200	-	<200	<200	-	<200	<200	-	<200	<200	-	<200	370	-

1: Relative Percent Difference is calculated only if one or both values are greater than 5x the detection limit
2: RPDs exceeding 20% are flagged in light grey
3: RPDs exceeding 50% are flagged in dark grey

Appendix 3.3: Geochemistry

3.3-1: Confirmatory Geochemical Results

Table 1: Acid Base Accounting Analytical Results for Confirmatory Samples

Table 2: Metals Analytical Results for Confirmatory Samples

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

Appendix 3.3-1: Confirmatory Geochemical Results

Table 1: Acid Base Accounting Analytical Results for Confirmatory Samples

Construction Area	Material	Date Received at Lab	Sample ID	Paste pH	Fizz Rating	Total Carbon	Total Inorganic C	$CaCO_3$ Equivalents	Total Sulphur	Sulphate Sulphur	Sulphide Sulphur	Non-Extractable Sulphur	AP	Modified ABA NP	NNP	NPR	CaNPR	Siderite Corrected NP
			Units:	**pH Units**	**-**	**wt %**	**wt %**	**kg CaCO3/tonne**	**wt %**	**wt %**	**wt %**	**wt %**	**kg CaCO3/tonne**	**kg CaCO3/tonne**	**kg CaCO3/tonne**	**kg CaCO3/tonne**	**kg CaCO3/tonne**	**kg CaCO3/tonne**
			Reported Detection Limit:	***0.1***		***0.02***	***0.02***	***1.7***	***0.01***	***0.01***	***0.01***	***0.01***	**0.3**	***0.5***				***0.5***
Overburden	Overburden	2024-03-05	1200 West Transect	6.08	None	1.31	0.05	4.17	0.07	<0.01	0.04	0.03	1.3	1.2	-0.05	1.0	3.3	6.5
	Overburden	2024-03-05	1200 East Transect	6.06	None	1.49	<0.02	<1.7	0.07	<0.01	0.03	0.04	0.9	1.6	0.6625	1.7	1.8	6.1
	Overburden	2024-03-05	1100 West Transect	8.68	Slight	0.42	0.13	10.83	0.04	0.02	0.02	<0.01	0.6	21.1	20.475	33.8	17.3	32.6
	Overburden	2024-03-05	1100 East Transect	10.29	Slight	0.16	0.07	5.83	0.09	0.02	0.02	0.05	0.6	16.4	15.775	26.2	9.3	28.4
	Overburden	2024-03-05	1200 South Transect	7.66	None	0.6	<0.02	<1.7	0.04	0.03	0.02	<0.01	0.6	2.6	1.975	4.16	2.7	8.8
	Overburden	2024-03-11	1200 East Hill Transect	6.44	None	3.96	0.08	6.67	0.11	<0.01	0.06	0.05	1.9	16	14.125	8.5	3.6	27.9
1200 Area	Bedrock	2024-06-26	1200 ABC-01	8.28	None	0.06	<0.02	<1.7	0.01	<0.01	<0.01	0.01	<0.3	2.3	6.1	7.7	5.7	6.1
	Bedrock	2024-06-26	1200 ABC-02	8.5	None	<0.01	<0.02	<1.7	0.02	0.01	<0.01	0.01	<0.3	2.6	6.4	8.7	5.7	6.4
	Bedrock	2024-06-26	1200 ABC-03	8.72	None	<0.01	<0.02	<1.7	0.02	0.02	<0.01	<0.01	<0.3	1.7	5.7	5.7	5.7	5.7
	Bedrock	2024-06-26	1200 ABC-04	9.04	None	<0.01	<0.02	<1.7	0.02	0.02	<0.01	<0.01	<0.3	2.3	5.8	7.7	5.7	5.8
	Bedrock	2024-06-26	1200 ABC-05	9.19	None	0.06	<0.02	<1.7	0.01	0.01	<0.01	<0.01	<0.3	4.1	9.5	13.7	5.7	9.5
	Bedrock	2024-06-26	1200 ABC-06	8.35	None	<0.01	<0.02	<1.7	0.02	<0.01	<0.01	0.02	<0.3	4.3	10.6	14.3	5.7	10.6
	Bedrock	2024-06-26	1200 ABC-07	7.98	None	<0.01	<0.02	<1.7	0.04	0.02	<0.01	0.02	<0.3	6	13	20.0	5.7	13
	Bedrock	2024-06-26	1200 ABC-08	7.89	None	0.01	<0.02	<1.7	0.04	<0.01	<0.01	0.04	<0.3	6.6	7.9	22.0	5.7	7.9
	Bedrock	2024-06-26	1200 ABC-09	8.26	None	0.01	<0.02	<1.7	0.02	0.01	<0.01	0.01	<0.3	2.8	7.9	9.3	5.7	7.9
	Bedrock	2024-06-26	1200 ABC-10	7.97	None	<0.01	<0.02	<1.7	0.01	0.02	<0.01	<0.01	<0.3	3.1	7.8	10.3	5.7	7.8
	Bedrock	2024-06-26	1200 ABC-11	8.9	None	<0.01	<0.02	<1.7	0.02	0.02	<0.01	<0.01	<0.3	1.7	6.8	5.7	5.7	6.8
	Bedrock	2024-06-26	1200 ABC-12	8.68	None	0.01	<0.02	<1.7	0.01	<0.01	<0.01	0.01	<0.3	1	5.2	3.3	5.7	5.2
	Bedrock	2024-06-26	1200 ABC-13	8.67	None	0.02	<0.02	<1.7	0.04	0.02	<0.01	0.02	<0.3	2.1	7.7	7.0	5.7	7.7
	Bedrock	2024-06-26	1200 ABC-14	8.49	None	0.02	<0.02	<1.7	0.02	<0.01	<0.01	0.02	<0.3	2.4	8.4	8.0	5.7	8.4
	Bedrock	2024-06-26	1200 ABC-15	8.05	None	0.01	<0.02	<1.7	0.03	0.01	<0.01	0.02	<0.3	2.7	9.4	9.0	5.7	9.4
	Bedrock	2024-07-12	1200D - 28 May 2024	7.99	None	0.24	<0.02	<1.7	0.02	0.03	<0.01	<0.01	<0.3	3.1	6.5	10.3	5.7	6.5
	Bedrock	2024-07-26	1200D - Composite Day-2 - Day 10	7.49	None	0.36	<0.02	<1.7	0.04	0.02	<0.01	0.02	<0.3	3.2	8.3	10.7	5.7	8.3
	Bedrock	2024-07-05	1200D - Composite Day-11 - Day 25	8.03	None	0.23	<0.02	<1.7	0.03	0.01	0.01	0.01	0.3125	0.7	0.3875	2.24	5.4	5.3
	Bedrock	2024-08-08	Comp 1200D - D26 - D40	8.21	None	0.21	<0.02	<1.7	0.04	0.02	<0.01	0.02	<0.3	3.1	9.5	10.3	5.7	9.5
	Bedrock	2024-08-12	1200D-1	8.98	None	0.08	<0.02	<1.7	0.02	0.02	<0.01	<0.01	<0.3	1.9	8.2	6.3	5.7	8.2
	Bedrock	2024-08-12	1200D-2	8.96	None	0.05	<0.02	<1.7	0.03	0.02	<0.01	0.01	<0.3	2.9	8.9	9.7	5.7	8.9
	Bedrock	2024-08-12	1200D-3	7.95	None	0.13	<0.02	<1.7	0.03	0.02	<0.01	0.01	<0.3	2.3	7.8	7.7	5.7	7.8
	Bedrock	2024-08-12	1200D-4	8.22	None	<0.02	<0.02	<1.7	0.03	0.02	<0.01	0.01	<0.3	2	8.9	6.7	5.7	8.9
	Bedrock	2024-08-12	1200D-5	7.29	None	0.12	<0.02	<1.7	0.02	0.02	<0.01	<0.01	<0.3	3.2	8.6	10.7	5.7	8.6
	Bedrock	2024-08-12	1200D-6	7.69	None	0.08	<0.02	<1.7	0.03	0.02	<0.01	0.01	<0.3	2.4	10.5	8.0	5.7	10.5
	Bedrock	2024-08-12	1200D-7	7.24	None	0.05	0.05	4.17	0.03	0.02	<0.01	0.01	<0.3	3.3	7.9	11.0	13.9	7.9
	Bedrock	2024-08-12	1200D-8	8.93	None	<0.02	0.06	5.00	0.04	0.02	<0.01	0.02	<0.3	2.9	9.1	9.7	16.7	9.1
	Bedrock	2024-08-12	1200D-9	8.95	None	0.02	<0.02	<1.7	0.04	0.03	<0.01	0.01	<0.3	2.8	10.5	9.3	5.7	10.5
	Bedrock	2024-08-12	1200D-10	7.95	None	<0.02	<0.02	<1.7	0.03	0.01	<0.01	0.02	<0.3	2.3	7.7	7.7	5.7	7.7
1100 Area	Bedrock	2024-05-15	1100-Pre Blast	9.53	None	0.27	0.026	2.17	0.04	0.02	0.01	0.01	0.3	11.5	13.29	37.1	7.0	13.6
	Bedrock	2024-05-15	1100-Post Blast	9.94	None	0.07	0.020	1.68	0.02	0.02	0.01	<0.01	0.3	8.7	14.59	28.1	5.4	14.9
	Bedrock	2024-08-22	1100-1	8.9	None	0.14	<0.02	<1.7	0.05	0.01	<0.01	0.04	<0.3	6.6	12.8	22.0	5.7	12.8
	Bedrock	2024-08-22	1100-2	8.8	None	<0.02	<0.02	<1.7	0.04	0.01	<0.01	0.03	<0.3	5	13.2	16.7	5.7	13.2
	Bedrock	2024-08-22	1100-3	8.6	None	0.04	<0.02	<1.7	0.03	<0.01	<0.01	0.03	<0.3	4.5	11.7	15.0	5.7	11.7
	Bedrock	2024-08-22	1100-4	8.7	None	0.04	<0.02	<1.7	0.03	<0.01	<0.01	0.03	<0.3	10.2	16.2	34.0	5.7	16.2
	Bedrock	2024-08-22	1100-5	8.7	None	<0.02	<0.02	<1.7	0.02	<0.01	<0.01	0.02	<0.3	3.8	9.9	12.7	5.7	9.9
	Bedrock	2024-08-22	1100-6	8.9	None	<0.02	<0.02	<1.7	0.03	<0.01	<0.01	0.03	<0.3	4.6	10.1	15.3	5.7	10.1
	Bedrock	2024-08-22	1100-7	8.7	None	<0.02	<0.02	<1.7	0.02	0.01	<0.01	0.01	<0.3	3.2	10	10.7	5.7	10
	Bedrock	2024-08-22	1100-8	9.0	None	<0.02	<0.02	<1.7	0.03	0.01	<0.01	0.02	<0.3	3.8	9.4	12.7	5.7	9.4
	Bedrock	2024-08-22	1100-9	8.8	None	0.04	<0.02	<1.7	0.03	<0.01	<0.01	0.03	<0.3	5.1	12.5	17.0	5.7	12.5
	Bedrock	2024-08-22	1100-10	8.9	None	0.02	<0.02	<1.7	0.03	<0.01	<0.01	0.03	<0.3	6.1	12.9	20.3	5.7	12.9

Appendix 3.3-1: Confirmatory Geochemical Results

Table 1: Acid Base Accounting Analytical Results for Confirmatory Samples

Construction Area	Material	Date Received at Lab	Sample ID	Paste pH	Fizz Rating	Total Carbon	Total Inorganic C	$CaCO_3$ Equivalents	Total Sulphur	Sulphate Sulphur	Sulphide Sulphur	Non-Extractable Sulphur	AP	Modified ABA NP	NNP	NPR	CaNPR	Siderite Corrected NP
			Units:	**pH Units**	**-**	**wt %**	**wt %**	**kg CaCO3/tonne**	**wt %**	**wt %**	**wt %**	**wt %**	**kg CaCO3/tonne**	**kg CaCO3/tonne**	**kg CaCO3/tonne**	**kg CaCO3/tonne**	**kg CaCO3/tonne**	**kg CaCO3/tonne**
			Reported Detection Limit:	***0.1***		***0.02***	***0.02***	***1.7***	***0.01***	***0.01***	***0.01***	***0.01***	**0.3**	***0.5***				***0.5***
4100 Area	Bedrock	2024-03-05	4100 Bedrock	8.41	None	0.373	<0.02	<1.7	0.04	0.01	0.03	<0.01	0.9	5.5	4.5625	5.9	1.8	8.6
FST Area 4	Bedrock	2024-09-13	FST4-01	8.66	None	0.15	<0.02	<1.7	0.05	0.02	0.02	0.01	0.63	3.5	4.57	5.6	2.7	5.2
	Bedrock	2024-09-13	FST4-02	8.92	None	0.08	0.0304	2.5	0.04	0.01	<0.01	0.03	<0.3	3.2	3.2	11	8.4	6.4
	Bedrock	2024-09-13	FST4-03	8.99	None	0.09	0.0323	2.7	0.05	0.02	<0.01	0.03	<0.3	5.1	5.1	17	9.0	8.4
	Bedrock	2024-09-13	FST4-04	8.74	None	0.05	<0.02	<1.7	0.04	0.01	<0.01	0.03	<0.3	3.3	3.3	11	5.7	5.2
	Bedrock	2024-09-13	FST4-05	8.88	None	0.06	<0.02	<1.7	0.04	0.01	<0.01	0.03	<0.3	2.8	2.8	9.3	5.7	4.3
	Bedrock	2024-09-13	FST4-06	8.79	None	0.06	<0.02	<1.7	0.04	0.01	0.02	0.01	0.63	2.8	3.77	4.4	2.7	4.4
	Bedrock	2024-09-13	FST4-07	8.88	None	0.03	<0.02	<1.7	0.04	0.01	<0.01	0.03	<0.3	3.0	3.0	10	5.7	5.9
	Bedrock	2024-09-13	FST4-08	8.54	None	0.09	<0.02	<1.7	0.04	0.02	<0.01	0.02	<0.3	2.9	2.9	9.7	5.7	5.7
	Bedrock	2024-09-13	FST4-09	8.98	None	0.11	0.0398	3.3	0.04	0.01	<0.01	0.03	<0.3	2.3	2.3	7.7	11.1	4.4
	Bedrock	2024-09-13	FST4-10	7.68	None	0.32	<0.02	<1.7	0.09	0.02	0.03	0.04	0.94	6.4	8.46	6.8	1.8	9.4
	Bedrock	2025-06-30	C1.1	8.14	None	0.02	<0.02	<1.7	0.05	<0.01	<0.01	0.05	<0.3	1.3	1.3	4.3	5.7	4.7
	Bedrock	2025-06-30	C1.2	8.33	None	<0.01	<0.02	<1.7	0.05	<0.01	<0.01	0.05	<0.3	2.4	2.4	8.0	5.7	6.9
	Bedrock	2025-06-30	C1.3	8.59	None	<0.01	<0.02	<1.7	0.05	<0.01	<0.01	0.05	<0.3	1.6	1.6	5.3	5.7	6.5
	Bedrock	2025-06-30	C1.4	8.63	None	<0.01	<0.02	<1.7	0.05	<0.01	<0.01	0.05	<0.3	2.5	2.5	8.3	5.7	5.4
	Bedrock	2025-06-30	C1.5	8.68	None	<0.01	<0.02	<1.7	0.05	<0.01	<0.01	0.05	<0.3	1.8	1.8	6.0	5.7	5.8
	Bedrock	2025-06-30	C1.6	8.40	None	<0.01	<0.02	<1.7	0.05	<0.01	<0.01	0.05	<0.3	3	3	10.0	5.7	4.6
	Bedrock	2025-06-30	C1.7	8.30	None	<0.01	<0.02	<1.7	0.05	<0.01	<0.01	0.05	<0.3	1.9	1.9	6.3	5.7	6.2
	Bedrock	2025-06-30	C1.8	8.28	None	<0.01	<0.02	<1.7	0.05	<0.01	<0.01	0.05	<0.3	2.1	2.1	7.0	5.7	5.5
	Bedrock	2025-06-30	C1.9	8.39	None	<0.01	<0.02	<1.7	0.05	<0.01	<0.01	0.05	<0.3	1.9	1.9	6.3	5.7	6.8
	Bedrock	2025-06-30	C1.10	8.49	None	<0.01	<0.02	<1.7	0.05	<0.01	<0.01	0.05	<0.3	3.4	3.4	11.3	5.7	7.4
	Bedrock	2025-07-21	C2.1	8.48	None	0.05	<0.02	<1.7	0.02	0.01	0.01	<0.01	0.31	1.4	1.09	4.5	5.5	2.7
	Bedrock	2025-07-21	C2.2	8.61	None	0.05	<0.02	<1.7	0.01	0.01	<0.01	<0.01	<0.3	3.1	3.1	10.3	5.7	3.7
	Bedrock	2025-07-21	C2.3	8.38	None	0.04	<0.02	<1.7	0.02	0.01	<0.01	0.01	<0.3	2	2	6.7	5.7	4.1
	Bedrock	2025-07-21	C2.4	7.88	None	0.03	<0.02	<1.7	0.01	0.01	<0.01	<0.01	<0.3	2.2	2.2	7.3	5.7	4.2
	Bedrock	2025-07-21	C2.5	8.61	None	0.03	<0.02	<1.7	0.02	0.01	<0.01	0.01	<0.3	1.9	1.9	6.3	5.7	3.9
	Bedrock	2025-07-21	C2.6	7.99	None	0.03	<0.02	<1.7	0.02	0.01	<0.01	0.01	<0.3	1.5	1.5	5.0	5.7	2.3
	Bedrock	2025-07-21	C2.7	8.54	None	0.03	<0.02	<1.7	0.01	0.01	<0.01	<0.01	<0.3	1.5	1.5	5.0	5.7	1.6
	Bedrock	2025-07-21	C2.8	8.60	None	0.03	0.03	2.5	0.01	0.01	0.01	<0.01	0.31	2.7	2.39	8.7	8.1	3.5
	Bedrock	2025-07-21	C2.9	8.66	None	0.03	<0.02	<1.7	0.01	0.01	<0.01	<0.01	<0.3	2.1	2.1	7.0	5.7	2.8
	Bedrock	2025-07-21	C2.10	7.84	None	0.03	<0.02	<1.7	0.01	0.01	<0.01	<0.01	<0.3	2	2	6.7	5.7	3.1
	Bedrock	2025-07-21	C3.1	7.16	None	0.03	<0.02	<1.7	0.02	<0.01	0.02	<0.01	0.63	1.6	0.97	2.5	2.7	3.2
	Bedrock	2025-07-21	C3.2	7.38	None	0.02	<0.02	<1.7	0.01	<0.01	<0.01	0.01	<0.3	1.4	1.4	4.7	5.7	2.3
	Bedrock	2025-07-21	C3.3	8.58	None	0.01	<0.02	<1.7	0.01	<0.01	<0.01	0.01	<0.3	1.3	1.3	4.3	5.7	3.4
	Bedrock	2025-07-21	C3.4	8.66	None	0.01	<0.02	<1.7	0.01	<0.01	<0.01	0.01	<0.3	1.8	1.8	6.0	5.7	2.2
	Bedrock	2025-07-21	C3.5	7.68	None	0.02	<0.02	<1.7	0.01	<0.01	<0.01	0.01	<0.3	1.4	1.4	4.7	5.7	3.4
	Bedrock	2025-07-21	C3.6	8.60	None	0.02	<0.02	<1.7	0.01	<0.01	<0.01	0.01	<0.3	1.2	1.2	4.0	5.7	2.5
	Bedrock	2025-07-21	C3.7	8.20	None	0.02	<0.02	<1.7	0.01	<0.01	<0.01	0.01	<0.3	1.5	1.5	5.0	5.7	3.1
	Bedrock	2025-07-21	C3.8	8.29	None	0.02	<0.02	<1.7	0.01	<0.01	0.01	<0.01	0.31	1	0.69	3.2	5.5	3.3
	Bedrock	2025-07-21	C3.9	8.15	None	0.01	<0.02	<1.7	0.01	<0.01	<0.01	0.01	<0.3	0.9	0.9	3.0	5.7	2.2
	Bedrock	2025-07-21	C3.10	8.50	None	0.01	<0.02	<1.7	0.01	<0.01	<0.01	0.01	<0.3	2.1	2.1	7.0	5.7	4.5

Notes:
Values shaded in red are NPR <2
AP = Acid Potential = Sulphide S x 31.25 kg CaCO3/tonne
Carbonate NP = Carbonate Neutralization Potential = Total Inorganic Carbon x 100.09/12.01 x 10
Modified NP = Modified Sobek Neutralization Potential, mc
NPR = Modified NP/AP
CaNPR = Carbonate NP/AP

Appendix 3.3-1: Confirmatory Geochemical Results

Table 2: Metals Analytical Results for Confirmatory Samples

Parameter				Silver (Ag)	Aluminum (Al)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Bismuth (Bi)	Calcium (Ca)	Cadmium (Cd)	Cerium (Ce)	Cobalt (Co)	Chromium (Cr)	Cesium (Cs)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)
Unit				ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm
Reported Detection Limit				**0.01**	**0.01**	**0.2**	**10**	**0.05**	**0.01**	**0.01**	**0.02**	**0.02**	**0.1**	**1**	**0.05**	**0.2**	**0.01**	**0.05**	**0.05**
ACA					**7.2**	**1.5**			**0.01**		**0.13**		**1**	**4.1**		**10**	**14**		
Construction Area	**Sample ID**	**Sample Type**	**Date Samples Received at Lab**																
1200	1200 West Transect	Overburden	2024-03-05	0.06	8.01	6.4	659	0.94	**0.23**	2.91	0.13	23.82	**10.8**	**78**	1.33	24	3.12	15.74	<0.05
	1200 East Transect	Overburden	2024-03-05	0.08	7.97	8.2	631	1	**0.43**	2.71	0.15	33.86	7.7	**81**	1.26	24.3	2.74	15.12	0.07
	1200 South Transect	Overburden	2024-03-05	0.07	7.86	5	669	1	**0.23**	2.91	0.12	27.62	9.4	**71**	1.41	23.2	3.15	16.16	0.08
	1200 East Hill Transect	Overburden	2024-03-11	0.09	7.78	6.3	700	1.01	**0.46**	3.21	0.33	25.12	**10.4**	**95**	1.53	62.5	3.58	15.52	0.08
1100	1100 West Transect	Overburden	2024-03-05	0.06	7.96	4.1	633	0.98	**0.19**	3.4	0.13	25.83	8.7	**75**	1.59	21.7	3.19	16.12	0.07
	1100 East Transect	Overburden	2024-03-05	0.06	7.91	3.2	662	1.04	**0.2**	3.3	0.13	29.29	9.3	**83**	1.18	27.7	3.03	16.37	0.08
1200	1200 ABC-01	Bedrock	2024-06-26	0.03	6.24	2.1	953	1.23	0.06	0.82	0.04	40.25	2.6	**115**	1.66	6.3	1.08	12.32	<0.05
	1200 ABC-02	Bedrock	2024-06-26	0.02	6.53	0.7	997	1.26	0.03	1.04	0.04	28.92	2.9	**131**	2.41	6	1.44	13.49	0.06
	1200 ABC-03	Bedrock	2024-06-26	0.03	6.77	1.6	970	1.37	0.06	1.16	0.04	30.44	2.9	**125**	2.46	5.2	1.55	14.27	0.07
	1200 ABC-04	Bedrock	2024-06-26	0.01	6.46	<0.2	1047	1.13	0.02	1.06	<0.02	34.26	2.6	**102**	1.99	3.3	1.33	12.95	0.1
	1200 ABC-05	Bedrock	2024-06-26	0.02	6.55	1.6	1003	1.04	0.02	1.25	0.04	30.09	2.8	**104**	1.28	5.1	1.4	13.19	0.08
	1200 ABC-06	Bedrock	2024-06-26	0.04	6.87	2.8	856	1.26	0.04	1.47	0.12	28.7	3.4	**100**	2.33	14.8	1.94	14.98	0.14
	1200 ABC-07	Bedrock	2024-06-26	0.1	7.13	7.1	906	1.19	0.06	1.73	0.14	33.17	6.3	**101**	2.43	53	2.93	15.21	0.17
	1200 ABC-08	Bedrock	2024-06-26	0.03	6.85	1.1	1041	1.17	0.04	1.28	0.05	33.47	3.5	**101**	2.15	17.8	1.77	14.8	0.19
	1200 ABC-09	Bedrock	2024-06-26	0.01	6.78	1.7	976	1.37	0.02	1.15	0.04	39.65	3.4	**115**	3.08	2.7	1.91	14.33	0.15
	1200 ABC-10	Bedrock	2024-06-26	0.02	6.68	1.7	997	1.16	0.02	1.23	0.04	29.36	3.1	**92**	2.57	4.4	1.68	13.92	0.1
	1200 ABC-11	Bedrock	2024-06-26	0.01	6.69	1.5	916	1.24	0.02	1.08	0.03	36.05	2.4	**107**	2.2	2.9	1.4	13.18	0.11
	1200 ABC-12	Bedrock	2024-06-26	0.02	6.28	1	967	1.23	0.02	0.7	0.05	45.64	1.7	**89**	1.6	2.8	0.93	13.03	0.13
	1200 ABC-13	Bedrock	2024-06-26	0.04	6.65	<0.2	976	0.96	0.04	1.27	0.06	29.21	3.1	**95**	1.8	13.5	1.68	13.04	0.18
	1200 ABC-14	Bedrock	2024-06-26	0.02	6.79	0.9	890	1.24	0.06	1.31	0.06	35.35	3.3	**113**	2.01	7.3	1.75	14.29	0.2
	1200 ABC-15	Bedrock	2024-06-26	0.04	6.62	1.1	901	1.18	0.07	1.37	0.07	19.1	3.3	**113**	1.96	28	1.72	13.66	0.19
	1200D - Composite Day-11 - Day 25	Bedrock	2024-07-05	0.02	6.57	<0.2	1013	1.13	0.07	1.1	0.05	36.72	2.6	**103**	1.65	7.3	1.31	13.49	0.11
	1200D - 28 May 2024	Bedrock	2024-07-12	0.02	6.58	0.8	1007	1.22	0.03	1.05	0.06	36	2.1	**137**	1.67	5.0	1.26	12.87	<0.05
	1200D - Composite Day-2 - Day 10	Bedrock	2024-07-26	0.07	6.55	0.9	1131	1.03	0.04	1.11	0.04	34.72	2.3	**123**	1.71	8.5	1.27	12.91	<0.05
	Comp 1200D - D26 - D40	Bedrock	2024-08-08	0.04	6.59	0.9	1046	1.07	0.03	1.01	0.04	35.27	2.2	**172**	1.46	11.8	1.30	11.76	<0.05
	1200D-1	Bedrock	2024-08-12	0.04	6.39	0.5	1057	1.13	0.05	1.03	0.09	32.46	2.3	**126**	1.11	7.7	1.19	12.40	<0.05
	1200D-2	Bedrock	2024-08-12	0.05	6.47	0.7	1028	1.17	0.03	1.00	0.07	31.64	2.6	**133**	1.39	5.3	1.25	13.17	<0.05
	1200D-3	Bedrock	2024-08-12	0.03	6.43	1.5	1042	1.13	0.02	0.99	0.04	34.73	2.7	**166**	1.68	7.6	1.29	12.60	<0.05
	1200D-4	Bedrock	2024-08-12	0.03	6.31	0.6	1019	1.16	0.03	0.96	0.04	34.59	2.6	**145**	1.60	9.2	1.24	12.87	<0.05
	1200D-5	Bedrock	2024-08-12	0.02	6.32	0.7	1078	1.12	0.02	0.93	0.08	32.67	2.4	**138**	1.65	4.5	1.23	12.47	<0.05
	1200D-6	Bedrock	2024-08-12	0.03	6.31	1.5	1034	1.21	0.04	0.89	0.1	34.98	2.5	**158**	1.52	7.9	1.23	13.11	0.07
	1200D-7	Bedrock	2024-08-12	0.02	6.43	0.6	1018	1.09	0.03	1.07	0.05	34.32	2.6	**131**	1.40	5.5	1.26	12.73	0.05
	1200D-8	Bedrock	2024-08-12	0.03	6.59	0.8	1023	1.11	0.03	1.07	0.03	39.21	2.9	**152**	2.29	11.6	1.35	13.75	0.06
	1200D-9	Bedrock	2024-08-12	0.03	6.51	0.6	983	1.04	0.03	1.15	0.04	37.3	2.5	**155**	1.86	11.9	1.29	12.97	<0.05
	1200D-10	Bedrock	2024-08-12	0.04	6.55	1.2	920	1.07	0.04	1.11	0.13	28.6	2.8	**127**	1.71	10.4	1.44	13.13	<0.05
1100	1100-Pre Blast	Bedrock	2024-05-15	0.06	7	3.2	732	1.02	**0.2**	2.28	0.1	25.78	6.3	**98**	1.5	15.4	2.27	14.85	<0.05
	1100-Post Blast	Bedrock	2024-05-15	0.06	7.4	2.3	511	1.36	**0.15**	2.61	0.11	33.6	7.8	**78**	2.92	14.6	3.11	17.06	0.05
	1100-1	Bedrock	2024-08-22	0.05	7.38	1.9	778	1.03	**0.13**	2.10	0.08	39.59	7.3	**156**	1.56	11.7	2.62	14.32	<0.05
	1100-2	Bedrock	2024-08-22	0.04	5.73	1.4	764	0.97	**0.21**	1.31	0.05	27.19	3.8	**89**	1.59	8.7	1.64	11.46	<0.05
	1100-3	Bedrock	2024-08-22	0.04	6.80	1.8	967	1.18	0.10	1.35	0.08	32.57	3.7	**147**	2.19	10.5	1.71	13.36	<0.05
	1100-4	Bedrock	2024-08-22	0.05	7.08	1.7	786	1.30	**0.11**	1.73	0.1	30.86	4.9	**132**	2.05	4.5	2.33	14.71	<0.05
	1100-5	Bedrock	2024-08-22	0.05	6.39	1.2	988	1.15	**0.14**	1.11	0.08	30.26	2.9	**128**	1.76	4.1	1.45	12.89	0.05
	1100-6	Bedrock	2024-08-22	0.21	6.51	1.5	1079	1.08	0.06	1.03	0.49	34.5	2.7	**116**	1.12	7.6	1.39	12.53	<0.05
	1100-7	Bedrock	2024-08-22	0.03	6.32	1.0	997	1.28	0.03	1.13	0.1	33.76	2.8	**115**	1.57	2.0	1.41	13.46	0.07
	1100-8	Bedrock	2024-08-22	0.03	4.65	1.0	746	0.78	0.03	0.76	0.05	26.14	1.9	**95**	1.03	7.1	0.96	9.18	<0.05
	1100-9	Bedrock	2024-08-22	0.05	7.27	1.7	788	1.34	0.08	1.79	0.06	34.9	5.2	**116**	2.51	6.0	2.46	15.58	0.07
	1100-10	Bedrock	2024-08-22	0.08	6.74	1.5	758	1.31	**0.12**	1.58	0.17	29.06	3.8	**121**	2.83	3.5	2.00	14.29	0.08
4100	4100 Bedrock	Bedrock	2024-03-05	0.11	7.51	1.5	754	1.07	**0.13**	2.29	0.08	20.45	7.3	**72**	1.29	19.1	2.28	14.76	0.16

Appendix 3.3-1: Confirmatory Geochemical Results

Table 2: Metals Analytical Results for Confirmatory Samples

Parameter				Silver (Ag)	Aluminum (Al)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Bismuth (Bi)	Calcium (Ca)	Cadmium (Cd)	Cerium (Ce)	Cobalt (Co)	Chromium (Cr)	Cesium (Cs)	Copper (Cu)	Iron (Fe)	Gallium (Ga)	Germanium (Ge)
Unit				ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm
Reported Detection Limit				**0.01**	**0.01**	**0.2**	**10**	**0.05**	**0.01**	**0.01**	**0.02**	**0.02**	**0.1**	**1**	**0.05**	**0.2**	**0.01**	**0.05**	**0.05**
ACA					**7.2**	**1.5**			**0.01**		**0.13**		**1**	**4.1**		**10**	**14**		
Construction Area	**Sample ID**	**Sample Type**	**Date Samples Received at Lab**																
FST4	FST4-01	Bedrock	2024-09-13	0.02	7.00	1.2	1039	1.18	0.03	1.30	0.03	33.06	3.3	**123**	1.70	9.3	1.42	13.54	0.08
	FST4-02	Bedrock	2024-09-13	0.03	6.55	0.8	996	1.15	0.02	1.17	0.03	33.7	3.1	**87**	1.77	11.6	1.25	12.91	0.08
	FST4-03	Bedrock	2024-09-13	0.03	7.38	1.1	720	1.23	0.03	2.14	0.04	24.44	6.1	**96**	3.55	12.0	2.66	14.95	0.09
	FST4-04	Bedrock	2024-09-13	0.03	6.72	1.3	929	1.21	0.02	1.17	0.03	35.64	2.9	**105**	1.93	5.5	1.34	13.11	0.08
	FST4-05	Bedrock	2024-09-13	0.03	6.78	1.5	1030	0.95	0.03	1.16	0.03	37.52	3.0	**98**	1.94	8.4	1.38	13.34	0.08
	FST4-06	Bedrock	2024-09-13	0.02	6.91	1.2	1044	1.14	0.02	1.23	0.03	38.83	3.1	**100**	2.09	5.1	1.33	13.59	0.09
	FST4-07	Bedrock	2024-09-13	0.03	6.51	1.2	930	1.23	0.03	1.03	0.03	36.04	2.8	**81**	1.81	12.2	1.11	12.61	0.09
	FST4-08	Bedrock	2024-09-13	0.03	6.93	1.2	1014	1.12	0.02	1.15	0.03	33.44	2.8	**107**	1.94	8.6	1.35	13.06	0.09
	FST4-09	Bedrock	2024-09-13	0.03	6.64	1.3	1003	1.09	0.03	1.02	0.02	38.75	2.3	**93**	1.60	4.3	1.01	12.38	0.08
	FST4-10	Bedrock	2024-09-13	0.08	7.85	1.8	537	1.52	0.08	3.13	0.07	23.72	**13.2**	**81**	3.86	48.6	5.38	17.76	0.10
	C1.1	Bedrock	2025-06-30	0.03	6.79	0.7	1021	1.10	0.03	1.16	0.04	34.06	2.4	**97**	1.76	8.3	1.27	12.78	<0.05
	C1.2	Bedrock	2025-06-30	0.03	6.79	0.9	1116	1.10	0.03	1.19	0.04	35.71	2.5	**84**	2.18	5.5	1.33	12.84	<0.05
	C1.3	Bedrock	2025-06-30	0.03	6.71	0.6	1125	1.09	0.03	1.20	0.04	28.35	2.6	**83**	2.06	7.9	1.28	12.53	0.06
	C1.4	Bedrock	2025-06-30	0.04	6.76	1.1	988	1.20	0.03	1.24	0.06	37.72	3.2	**83**	2.63	17.2	1.60	13.32	0.06
	C1.5	Bedrock	2025-06-30	0.02	7.43	0.6	1161	1.05	0.02	1.37	0.03	38.17	2.7	**116**	2.42	2.7	1.44	13.04	0.05
	C1.6	Bedrock	2025-06-30	0.03	7.27	0.8	1339	1.01	0.03	1.22	0.04	28.93	2.3	**103**	2.31	8.2	1.31	12.35	0.06
	C1.7	Bedrock	2025-06-30	0.02	6.86	1.2	968	1.08	0.03	1.21	0.07	34.22	2.6	**98**	2.22	5.2	1.26	13.18	0.06
	C1.8	Bedrock	2025-06-30	0.03	6.81	0.9	1254	1.11	0.03	1.14	0.04	34.93	2.5	**93**	2.51	9.0	1.36	13.01	0.05
	C1.9	Bedrock	2025-06-30	0.06	7.38	1.2	1341	1.13	0.08	1.43	0.12	37.76	2.8	**98**	2.11	10.3	1.49	13.83	0.05
	C1.10	Bedrock	2025-06-30	0.02	6.64	1.4	1568	1.06	0.04	1.11	0.05	35.59	3.2	**81**	2.41	2.6	1.78	12.73	<0.05
	C2.1	Bedrock	2025-07-21	0.02	6.29	0.9	992	1.33	0.02	1.01	0.03	31.86	1.9	**67**	1.73	5.3	0.94	12.07	<0.05
	C2.2	Bedrock	2025-07-21	0.02	6.81	0.3	1221	1.12	0.02	1.22	0.04	36.42	2.3	**74**	2.26	4.9	1.31	12.70	<0.05
	C2.3	Bedrock	2025-07-21	0.03	6.81	0.8	1456	0.98	0.02	1.25	0.03	27.02	3.5	**73**	2.36	11.8	1.66	13.72	<0.05
	C2.4	Bedrock	2025-07-21	0.02	6.82	0.3	1122	1.13	0.07	1.36	0.03	35.18	2.9	**65**	2.63	5.1	1.53	14.44	<0.05
	C2.5	Bedrock	2025-07-21	0.03	6.78	0.7	1208	1.03	0.02	1.21	0.04	45.36	2.3	**63**	1.92	8.3	1.23	12.72	<0.05
	C2.6	Bedrock	2025-07-21	0.02	6.59	0.9	1033	1.25	0.02	1.04	0.02	32.33	2.0	**62**	1.53	12.5	0.97	12.40	<0.05
	C2.7	Bedrock	2025-07-21	0.02	6.78	0.7	1167	1.17	0.02	1.05	0.02	28.72	1.9	**73**	1.79	3.8	1.13	11.59	<0.05
	C2.8	Bedrock	2025-07-21	0.01	7.20	0.6	1125	1.18	0.01	1.41	0.03	30.08	2.6	**83**	2.30	2.0	1.43	13.82	<0.05
	C2.9	Bedrock	2025-07-21	0.01	6.89	0.5	1100	1.12	0.02	1.30	0.03	29.9	2.3	**80**	2.11	2.2	1.29	12.58	<0.05
	C2.10	Bedrock	2025-07-21	0.01	6.55	0.6	966	1.09	0.01	1.24	0.03	38.86	2.4	**71**	2.39	1.9	1.29	13.78	<0.05
	C3.1	Bedrock	2025-07-21	0.04	6.63	0.3	888	1.01	0.03	1.06	0.02	37.08	2.6	**58**	2.06	20.7	1.26	12.91	0.06
	C3.2	Bedrock	2025-07-21	0.05	6.95	0.6	1069	1.30	0.02	1.15	<0.02	25.29	3.0	**62**	2.42	4.9	1.55	13.87	0.06
	C3.3	Bedrock	2025-07-21	0.02	6.75	0.7	950	1.34	0.02	1.20	0.02	31.87	2.8	**82**	2.27	4.9	1.43	13.60	0.06
	C3.4	Bedrock	2025-07-21	0.01	6.82	0.3	866	1.09	0.01	1.26	<0.02	32.74	2.5	**65**	2.29	2.0	1.35	12.76	0.05
	C3.5	Bedrock	2025-07-21	0.02	7.85	0.5	1087	1.41	0.02	1.45	0.02	44.17	2.4	**77**	2.19	7.0	1.68	11.82	<0.05
	C3.6	Bedrock	2025-07-21	0.03	6.59	1.0	1113	1.12	0.02	1.02	<0.02	38.11	2.3	**75**	2.15	2.3	1.20	11.71	<0.05
	C3.7	Bedrock	2025-07-21	0.02	7.53	0.6	1038	1.30	0.01	1.40	0.04	39.62	2.3	**99**	2.12	8.8	1.55	11.26	<0.05
	C3.8	Bedrock	2025-07-21	0.03	6.68	0.8	894	1.09	0.02	1.03	<0.02	36.3	2.2	**79**	2.13	4.4	1.16	12.55	<0.05
	C3.9	Bedrock	2025-07-21	0.03	7.04	1.3	935	1.23	0.03	1.00	0.02	41.68	2.2	**81**	2.28	2.4	1.29	12.14	<0.05
	C3.10	Bedrock	2025-07-21	0.03	7.61	1.0	1086	1.20	0.02	1.29	0.03	29.55	2.0	**77**	2.07	4.1	1.42	11.01	<0.05

Notes:
ACA: average crustal abundance.
Values greater than 10x ACA are indicated with **bold font**.

Appendix 3.3-1: Confirmatory Geochemical Results

Table 2: Metals Analytical Results for Confirmatory Samples

Parameter				Hafnium (Hf)	Indium (In)	Potassium (K)	Lanthanum (La)	Lithium (Li)	Magnesium (Mg)	Manganese (Mn)	Molybdenum (Mo)	Sodium (Na)	Niobium (Nb)	Nickel (Ni)	Phosphorous (P)	Lead (Pb)	Rubidium (Rb)	Rhenium (Re)
Unit				ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
Reported Detection Limit				0.1	0.005	0.01	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1	0.002
ACA								40	1.6	390	1.3			4.5		19		
Construction Area	**Sample ID**	**Sample Type**	**Date Samples Received at Lab**															
1200	1200 West Transect	Overburden	2024-03-05	0.9	0.07	1.44	11.2	12	1.21	732	1.6	2.43	3.5	17.9	509	8.4	35	<0.002
	1200 East Transect	Overburden	2024-03-05	1	0.076	1.39	15.9	12.9	0.91	765	1.59	2.58	3.7	16.8	559	11.8	33.5	<0.002
	1200 South Transect	Overburden	2024-03-05	1	0.08	1.49	12.8	13.3	0.98	760	2.07	2.55	3.7	14.6	528	21.4	36.2	<0.002
	1200 East Hill Transect	Overburden	2024-03-11	1.1	0.09	1.32	12.1	22	0.98	1218	2.76	2.3	3.7	36.8	1076	75.7	36.6	<0.002
1100	1100 West Transect	Overburden	2024-03-05	0.9	0.076	1.56	12	12.8	1.09	781	1.8	2.63	4.2	13.9	487	11	38.9	<0.002
	1100 East Transect	Overburden	2024-03-05	1.1	0.079	1.43	13.8	11	0.99	805	1.8	2.79	4.1	14.2	506	9.2	30.7	<0.002
1200	1200 ABC-01	Bedrock	2024-06-26	1.5	0.014	3.5	19.4	10.6	0.21	205	1.46	2.29	5.7	3.8	134	11.1	87.9	<0.002
	1200 ABC-02	Bedrock	2024-06-26	1.1	0.009	2.99	14	15.6	0.23	287	1.09	2.56	5.6	3	170	9.1	85.8	<0.002
	1200 ABC-03	Bedrock	2024-06-26	1	0.011	2.75	14.6	16.5	0.25	303	1.66	2.82	5.6	2.6	217	9.2	79.3	0.002
	1200 ABC-04	Bedrock	2024-06-26	0.9	<0.005	2.92	16.6	12.5	0.2	238	2.11	2.63	5.4	2.3	136	9.1	78.7	<0.002
	1200 ABC-05	Bedrock	2024-06-26	1	0.01	2.74	14.6	12.7	0.23	299	0.79	2.62	4.7	3.1	156	12	72.1	<0.002
	1200 ABC-06	Bedrock	2024-06-26	0.8	0.015	2.17	13.7	16.9	0.33	421	1.44	2.76	5.3	2.6	352	7.1	64.2	<0.002
	1200 ABC-07	Bedrock	2024-06-26	0.9	0.037	2.35	15.6	23.6	0.57	735	2.93	2.56	5.2	3.2	370	8.5	68.7	0.002
	1200 ABC-08	Bedrock	2024-06-26	0.9	0.013	2.82	16.3	15.2	0.3	367	9.57	2.66	5.3	2.6	235	8.6	74.7	0.003
	1200 ABC-09	Bedrock	2024-06-26	1	0.01	2.79	19	17.1	0.34	352	0.86	2.68	6.5	2.5	325	8.3	87.1	<0.002
	1200 ABC-10	Bedrock	2024-06-26	0.9	0.012	2.53	14.4	15.2	0.27	333	0.74	2.63	4.7	2.2	242	7.9	67.9	<0.002
	1200 ABC-11	Bedrock	2024-06-26	1.1	0.009	3.01	17.6	14.4	0.24	257	3.8	2.62	6	2.3	196	8.8	81.5	<0.002
	1200 ABC-12	Bedrock	2024-06-26	1.7	0.007	3.63	22.2	9.7	0.14	181	0.78	2.35	4.9	2.2	102	10.6	86.7	<0.002
	1200 ABC-13	Bedrock	2024-06-26	0.8	0.011	2.76	14.5	13.1	0.27	338	5.61	2.55	4.4	2.2	218	8.2	65.6	0.01
	1200 ABC-14	Bedrock	2024-06-26	0.9	0.012	2.65	16.9	12.5	0.27	333	1.46	2.7	5	2.5	267	8.1	71.6	<0.002
	1200 ABC-15	Bedrock	2024-06-26	0.7	0.014	2.35	9.5	13.4	0.28	331	1.7	2.63	4.6	2.6	269	7.6	64.2	<0.002
	1200D - Composite Day-11 - Day 25	Bedrock	2024-07-05	1	0.012	2.95	18.2	15.3	0.21	328	2.09	2.69	5.3	3.1	170	9.8	78.8	<0.002
	1200D - 28 May 2024	Bedrock	2024-07-12	0.90	0.009	2.90	17.4	12.9	0.18	269	1.59	3	5.00	3.3	145	10.2	78.3	<0.002
	1200D - Composite Day-2 - Day 10	Bedrock	2024-07-26	0.80	0.012	2.74	17.7	11.3	0.2	286	1.56	3	4.70	3.8	158	11.3	69.1	<0.002
	Comp 1200D - D26 - D40	Bedrock	2024-08-08	0.90	0.011	2.94	17.6	11.6	0.2	308	11.45	2.66	4.80	4.1	155	9.3	74.3	<0.002
	1200D-1	Bedrock	2024-08-12	1.00	0.012	2.78	16.3	11.3	0.18	318	4.63	3	4.60	2.5	147	9.7	76.3	<0.002
	1200D-2	Bedrock	2024-08-12	0.80	0.009	2.81	15.6	12.0	0.19	315	3.37	3	5.10	2.4	145	9.6	80.6	<0.002
	1200D-3	Bedrock	2024-08-12	0.80	0.008	2.82	17.7	12.6	0.19	262	4.19	3	4.70	3.3	157	8.7	78.6	<0.002
	1200D-4	Bedrock	2024-08-12	0.90	0.009	2.78	17.7	11.8	0.18	263	4.51	3	4.80	2.9	142	9.6	79.3	<0.002
	1200D-5	Bedrock	2024-08-12	1.00	0.008	2.79	16.5	11.6	0.19	295	**22.50**	3	5.00	2.5	152	8.6	80.4	<0.002
	1200D-6	Bedrock	2024-08-12	1.20	0.009	2.82	17.8	12.3	0.18	310	3.74	3	5.10	3.0	150	9.6	81.1	<0.002
	1200D-7	Bedrock	2024-08-12	1.00	0.010	2.79	17.3	11.8	0.2	284	4.14	3	4.50	2.7	155	9.0	76.1	<0.002
	1200D-8	Bedrock	2024-08-12	0.90	0.009	2.84	19.6	13.5	0.2	245	3.81	3	5.00	2.7	163	8.8	82.4	<0.002
	1200D-9	Bedrock	2024-08-12	1.00	0.008	2.69	18.9	11.4	0.19	237	5.45	3	4.70	3.5	163	8.4	75.3	<0.002
	1200D-10	Bedrock	2024-08-12	0.90	0.013	2.48	14.0	16.3	0.22	415	5.94	3	4.70	2.3	193	10.4	71.1	<0.002
1100	1100-Pre Blast	Bedrock	2024-05-15	1	0.049	1.8	12.4	13.6	0.64	574	2.09	2.51	4.4	7.9	365	13	43.5	<0.002
	1100-Post Blast	Bedrock	2024-05-15	1	0.08	1.33	14.3	27.9	0.76	905	1.58	2.91	4.5	5.3	634	6.7	47	<0.002
	1100-1	Bedrock	2024-08-22	1.60	0.040	2.09	19.3	10.7	0.75	547	4.35	2.90	4.3	7.2	427	6.8	50.8	<0.002
	1100-2	Bedrock	2024-08-22	0.80	0.019	2.06	13.2	10.4	0.33	337	3.03	2.26	3.4	3.5	252	5.7	52.0	<0.002
	1100-3	Bedrock	2024-08-22	0.90	0.016	2.67	16.3	14.4	0.3	373	4.12	2.66	4.1	3.4	261	7.1	70.1	<0.002
	1100-4	Bedrock	2024-08-22	1.00	0.037	2.42	14.2	16.4	0.48	666	3.49	2.81	4.6	2.7	474	8.3	65.2	<0.002
	1100-5	Bedrock	2024-08-22	1.00	0.010	2.96	14.9	13.2	0.26	337	3.69	2.69	4.8	2.6	207	10.0	70.6	<0.002
	1100-6	Bedrock	2024-08-22	1.00	0.011	3.08	17.2	10.7	0.22	590	**62.69**	2.58	4.7	2.7	168	**259.9**	70.9	<0.002
	1100-7	Bedrock	2024-08-22	1.10	0.011	2.85	16.9	12.9	0.24	297	3.73	2.67	5.3	2.5	169	9.9	68.4	<0.002
	1100-8	Bedrock	2024-08-22	0.70	0.006	2.18	13.2	9.1	0.15	222	2.37	1.89	3.4	2.0	104	8.5	52.0	<0.002
	1100-9	Bedrock	2024-08-22	0.80	0.022	2.17	16.8	18.0	0.48	647	3.60	2.92	4.4	2.8	463	8.4	65.1	<0.002
	1100-10	Bedrock	2024-08-22	0.60	0.024	2.18	13.7	13.5	0.4	679	5.51	2.72	3.6	2.8	285	18.6	57.9	0.003
4100	4100 Bedrock	Bedrock	2024-03-05	0.9	0.055	2.03	9.7	27.7	0.75	569	2.79	2.67	4.4	10.5	429	9.1	46.9	<0.002

Appendix 3.3-1: Confirmatory Geochemical Results

Table 2: Metals Analytical Results for Confirmatory Samples

Parameter				Hafnium (Hf)	Indium (In)	Potassium (K)	Lanthanum (La)	Lithium (Li)	Magnesium (Mg)	Manganese (Mn)	Molybdenum (Mo)	Sodium (Na)	Niobium (Nb)	Nickel (Ni)	Phosphorous (P)	Lead (Pb)	Rubidium (Rb)	Rhenium (Re)
Unit				ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm
Reported Detection Limit				0.1	0.005	0.01	0.5	0.2	0.01	5	0.05	0.01	0.1	0.2	10	0.5	0.1	0.002
ACA								40	1.6	390	1.3			4.5		19		
Construction Area	**Sample ID**	**Sample Type**	**Date Samples Received at Lab**															
FST4	FST4-01	Bedrock	2024-09-13	1.00	0.013	2.75	16.6	12.6	0.22	280	3.29	2.92	4.5	2.7	181	10.0	64.0	<0.002
	FST4-02	Bedrock	2024-09-13	1.40	0.014	2.79	16.7	12.2	0.19	257	3.01	2.70	4.3	1.7	191	8.5	66.1	<0.002
	FST4-03	Bedrock	2024-09-13	1.00	0.054	2.13	11.3	16.5	0.63	765	2.99	2.96	4.2	2.5	334	6.5	65.1	<0.002
	FST4-04	Bedrock	2024-09-13	1.20	0.010	2.80	17.8	13.8	0.22	304	2.19	2.78	4.8	1.9	184	8.7	69.5	<0.002
	FST4-05	Bedrock	2024-09-13	1.00	0.013	2.93	19.3	14.8	0.23	288	2.25	2.74	4.4	2.4	193	8.8	72.3	<0.002
	FST4-06	Bedrock	2024-09-13	0.90	0.010	2.81	19.5	14.0	0.23	247	2.13	2.85	4.9	2.0	202	8.7	74.6	<0.002
	FST4-07	Bedrock	2024-09-13	1.10	0.011	2.98	18.1	12.9	0.18	233	2.05	2.62	4.3	1.8	151	8.7	77.3	<0.002
	FST4-08	Bedrock	2024-09-13	1.00	0.011	3.04	17.0	14.6	0.22	271	2.56	2.80	4.6	2.1	175	9.1	78.3	<0.002
	FST4-09	Bedrock	2024-09-13	1.20	0.008	3.13	19.7	11.8	0.16	209	2.07	2.70	3.8	1.7	139	9.2	77.2	<0.002
	FST4-10	Bedrock	2024-09-13	0.90	0.119	1.89	10.6	23.9	1.33	1794	3.77	2.79	6.0	3.8	564	8.6	78.6	<0.002
	C1.1	Bedrock	2025-06-30	0.90	0.009	2.82	17.2	13.3	0.2	237	3.07	2.74	4.8	1.8	163	8.9	73.7	<0.002
	C1.2	Bedrock	2025-06-30	0.80	0.008	2.83	18.0	16.0	0.22	272	2.36	2.67	5.2	1.5	177	8.7	79.9	<0.002
	C1.3	Bedrock	2025-06-30	0.70	0.008	2.86	14.7	12.4	0.22	361	2.70	2.69	4.8	1.6	173	9.1	74.5	<0.002
	C1.4	Bedrock	2025-06-30	0.70	0.012	2.44	19.2	15.6	0.25	305	2.84	2.79	4.9	1.7	178	7.9	77.1	<0.002
	C1.5	Bedrock	2025-06-30	0.90	0.007	3.01	19.4	15.7	0.25	258	2.90	2.94	4.8	1.8	206	8.3	82.1	<0.002
	C1.6	Bedrock	2025-06-30	0.80	0.008	3.28	14.8	14.6	0.2	329	2.42	2.74	3.9	1.7	158	9.4	80.9	<0.002
	C1.7	Bedrock	2025-06-30	0.70	0.015	2.79	17.4	16.6	0.22	430	2.63	2.71	4.5	2.7	178	8.8	80.2	<0.002
	C1.8	Bedrock	2025-06-30	0.90	0.011	2.99	17.5	17.4	0.21	277	3.14	2.61	4.5	1.7	170	8.4	82.2	<0.002
	C1.9	Bedrock	2025-06-30	0.80	0.015	2.67	19.0	17.2	0.26	426	2.63	3.01	4.6	1.7	218	8.6	70.4	<0.002
	C1.10	Bedrock	2025-06-30	0.90	0.014	2.91	18.1	20.9	0.32	525	2.30	2.57	7.4	1.5	317	9.8	82.9	<0.002
	C2.1	Bedrock	2025-07-21	1.10	0.005	2.92	15.1	9.6	0.14	178	1.77	2.54	4.3	1.2	96	8.2	73.0	<0.002
	C2.2	Bedrock	2025-07-21	1.10	0.007	2.89	18.3	11.7	0.2	236	2.05	2.72	4.8	1.4	148	7.6	76.6	<0.002
	C2.3	Bedrock	2025-07-21	0.90	0.011	2.91	13.2	15.5	0.29	314	2.00	2.73	5.0	1.6	233	7.7	82.9	<0.002
	C2.4	Bedrock	2025-07-21	0.70	0.007	2.53	17.9	13.9	0.27	274	2.00	2.77	5.6	1.4	192	7.1	80.3	<0.002
	C2.5	Bedrock	2025-07-21	0.90	0.008	2.93	23.2	11.2	0.2	251	2.41	2.66	3.9	1.4	176	8.1	74.1	<0.002
	C2.6	Bedrock	2025-07-21	0.90	0.006	2.97	16.1	8.9	0.13	177	2.50	2.58	4.8	1.4	101	8.1	74.4	<0.002
	C2.7	Bedrock	2025-07-21	0.90	0.006	3.10	14.2	9.9	0.17	212	1.93	2.60	4.7	1.3	130	8.4	79.5	<0.002
	C2.8	Bedrock	2025-07-21	1.00	0.006	2.71	14.4	13.6	0.24	263	2.02	2.87	5.1	1.5	183	7.4	77.6	<0.002
	C2.9	Bedrock	2025-07-21	0.60	0.006	2.76	14.7	10.4	0.22	246	2.01	2.77	4.2	1.4	167	7.3	74.1	<0.002
	C2.10	Bedrock	2025-07-21	0.70	<0.005	2.63	19.3	12.4	0.21	235	2.19	2.66	3.9	1.4	162	7.2	79.5	<0.002
	C3.1	Bedrock	2025-07-21	1.10	0.006	3.10	18.7	10.8	0.19	221	2.92	2.49	4.1	1.3	165	8.3	74.2	<0.002
	C3.2	Bedrock	2025-07-21	1.10	0.008	2.98	12.4	14.1	0.24	287	2.77	2.69	6.6	1.4	205	8.4	76.0	<0.002
	C3.3	Bedrock	2025-07-21	0.90	0.006	2.79	16.0	12.2	0.22	247	2.35	2.63	5.0	1.7	173	7.7	71.2	<0.002
	C3.4	Bedrock	2025-07-21	0.80	<0.005	2.58	16.7	10.7	0.21	236	1.95	2.75	4.2	1.4	162	7.4	68.2	<0.002
	C3.5	Bedrock	2025-07-21	0.80	0.005	2.87	21.8	11.9	0.27	298	3.51	2.96	5.1	1.3	231	6.7	70.4	<0.002
	C3.6	Bedrock	2025-07-21	0.90	0.005	3.13	18.6	12.1	0.18	236	2.18	2.52	3.4	1.2	155	8.0	79.0	<0.002
	C3.7	Bedrock	2025-07-21	0.70	0.005	2.80	19.8	12.7	0.25	275	2.04	2.95	4.3	1.3	202	6.3	68.0	<0.002
	C3.8	Bedrock	2025-07-21	0.90	0.005	2.98	18.1	12.8	0.17	223	2.00	2.61	4.2	1.3	134	8.3	77.9	<0.002
	C3.9	Bedrock	2025-07-21	1.00	<0.005	3.39	21.1	10.8	0.2	245	2.35	2.63	5.1	1.4	144	8.7	86.9	<0.002
	C3.10	Bedrock	2025-07-21	0.70	0.006	3.14	15.1	10.7	0.23	289	1.99	2.88	3.5	1.3	175	7.3	70.0	<0.002

Notes:
ACA: average crustal abundance.
Values greater than 10x ACA are indicated with **bold font**.

Appendix 3.3-1: Confirmatory Geochemical Results

Table 2: Metals Analytical Results for Confirmatory Samples

Parameter				Sulphur (S)	Antimony (Sb)	Scandium (Sc)	Selenium (Se)	Tin (Sn)	Stronium (Sr)	Tantalum (Ta)	Tellurium (Te)	Thorium (Th)	Titanium (Ti)	Thallium (Tl)	Uranium (U)	Vandium (V)	Tungsten (W)	Yttrium (Y)	Zinc (Zn)	Zirconium (Zr)
Unit				%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Reported Detection Limit				0.01	0.5	0.1	1	0.2	0.2	0.05	0.05	0.2	0.01	0.02	0.1	1	0.1	0.1	2	0.5
ACA					0.2		0.05								3	44			39	
Construction Area	**Sample ID**	**Sample Type**	**Date Samples Received at Lab**																	
1200	1200 West Transect	Overburden	2024-03-05	0.03	0.6	12.5	<1	1.3	342.1	0.33	0.09	3.2	0.27	0.26	1.9	86	0.9	14.7	58	24
	1200 East Transect	Overburden	2024-03-05	0.04	0.7	11	<1	1.8	366.9	0.33	0.13	4.3	0.28	0.26	2.9	75	1.2	16.1	64	27.8
	1200 South Transect	Overburden	2024-03-05	0.01	0.9	12.1	<1	1.6	373.2	0.32	0.1	4.9	0.29	0.3	2.4	90	1.3	15.9	63	29.1
	1200 East Hill Transect	Overburden	2024-03-11	0.05	2	12.9	<1	6.3	448.9	0.29	0.12	3.7	0.26	0.26	2.4	103	1.3	15.9	145	29
1100	1100 West Transect	Overburden	2024-03-05	0.02	0.7	12.7	<1	1.6	357.5	0.34	0.08	3.2	0.29	0.32	2.1	89	1.1	16.1	62	24.5
	1100 East Transect	Overburden	2024-03-05	0.06	0.6	12	<1	1.3	395.8	0.35	0.11	3.3	0.28	0.26	1.6	85	0.9	15.4	63	29.9
1200	1200 ABC-01	Bedrock	2024-06-26	<0.01	<0.5	5.2	<1	0.5	103.6	0.83	<0.05	10.1	0.1	0.66	3.6	16	3.6	15.1	16	37
	1200 ABC-02	Bedrock	2024-06-26	<0.01	<0.5	5.5	<1	0.6	160.3	0.57	<0.05	6.9	0.13	0.65	2.6	15	1.3	14.3	18	28.8
	1200 ABC-03	Bedrock	2024-06-26	<0.01	<0.5	6	<1	0.6	146.2	0.55	<0.05	6.5	0.14	0.63	2.6	16	1	15.5	21	23.8
	1200 ABC-04	Bedrock	2024-06-26	<0.01	<0.5	4.9	<1	0.5	131.3	0.54	<0.05	7.4	0.12	0.68	3.8	12	2.8	15.9	13	24.6
	1200 ABC-05	Bedrock	2024-06-26	<0.01	<0.5	5	<1	0.7	154.3	0.43	<0.05	6.4	0.12	0.54	1.9	14	1.7	14.8	22	25.4
	1200 ABC-06	Bedrock	2024-06-26	<0.01	<0.5	7.9	<1	0.9	207	0.44	<0.05	5.1	0.17	0.41	1.8	20	1.2	20.9	31	21.1
	1200 ABC-07	Bedrock	2024-06-26	0.03	<0.5	10.4	<1	1.2	206.7	0.46	0.05	5.8	0.24	0.44	2.3	57	1.6	25.7	41	22.7
	1200 ABC-08	Bedrock	2024-06-26	0.03	<0.5	6.9	<1	0.7	173.3	0.48	0.06	6	0.16	0.48	2.8	19	3.1	16.7	27	24.6
	1200 ABC-09	Bedrock	2024-06-26	<0.01	<0.5	7.5	<1	0.7	144.8	0.58	<0.05	7.9	0.17	0.76	2.3	21	1.1	21.2	21	27.4
	1200 ABC-10	Bedrock	2024-06-26	<0.01	<0.5	6.2	<1	0.7	178.4	0.46	<0.05	5.9	0.15	0.59	1.9	18	2.9	16	22	22.4
	1200 ABC-11	Bedrock	2024-06-26	<0.01	<0.5	5.6	<1	0.6	130.5	0.59	<0.05	8	0.13	0.7	1.8	16	1.1	17.5	16	28
	1200 ABC-12	Bedrock	2024-06-26	<0.01	<0.5	4.7	<1	0.5	90.2	0.63	<0.05	11.4	0.09	0.73	3	9	11.5	22.1	12	43.3
	1200 ABC-13	Bedrock	2024-06-26	0.03	<0.5	5.5	<1	0.6	165	0.4	<0.05	5.4	0.15	0.39	1.8	16	2.5	13	26	24.3
	1200 ABC-14	Bedrock	2024-06-26	<0.01	<0.5	6.3	<1	0.8	171.2	0.49	0.05	6.4	0.15	0.53	2.2	16	2.9	17.8	23	25.5
	1200 ABC-15	Bedrock	2024-06-26	0.02	<0.5	6.3	<1	0.8	173.8	0.4	<0.05	5.4	0.15	0.48	2.2	19	2	15.6	24	17.9
	1200D - Composite Day-11 - Day 25	Bedrock	2024-07-05	0.01	<0.5	4.8	<1	0.7	129	0.51	<0.05	8.5	0.12	0.46	2.7	14	1.6	16.3	21	25.2
	1200D - 28 May 2024	Bedrock	2024-07-12	<0.01	<0.5	4.4	<1	0.7	129.3	0.62	<0.05	8.1	0.1	0.42	3.1	12	0.20	14.90	21	21.3
	1200D - Composite Day-2 - Day 10	Bedrock	2024-07-26	0.01	<0.5	4.5	<1	0.7	133.8	0.45	<0.05	7.5	0.11	0.44	3.1	13	1.40	15.90	21	22.5
	Comp 1200D - D26 - D40	Bedrock	2024-08-08	0.01	<0.5	4.2	<1	0.6	119.5	0.46	<0.05	7.7	0.11	0.41	2.5	12	1.40	14.80	23	22.8
	1200D-1	Bedrock	2024-08-12	<0.01	<0.5	4.3	<1	0.5	124.1	0.54	<0.05	7.1	0.11	0.37	2.7	11	1.20	15.00	35	24.4
	1200D-2	Bedrock	2024-08-12	<0.01	<0.5	5	<1	0.6	133.4	0.52	<0.05	7.2	0.11	0.41	2.3	11	1.30	15.40	21	21.9
	1200D-3	Bedrock	2024-08-12	<0.01	<0.5	4.5	<1	0.6	140.1	0.49	<0.05	7.4	0.11	0.55	2.9	12	0.80	15.50	17	22.3
	1200D-4	Bedrock	2024-08-12	<0.01	<0.5	4.5	<1	0.5	129.2	0.48	<0.05	7.4	0.1	0.54	2.6	11	0.90	15.30	17	23.8
	1200D-5	Bedrock	2024-08-12	<0.01	<0.5	4.7	<1	0.6	142.2	0.51	<0.05	7.2	0.11	0.45	2.2	11	0.60	16.10	19	26.9
	1200D-6	Bedrock	2024-08-12	<0.01	<0.5	4.6	<1	0.6	139.1	0.56	<0.05	8.2	0.1	0.47	2.5	11	1.30	18.30	24	29.1
	1200D-7	Bedrock	2024-08-12	<0.01	<0.5	4.7	<1	0.6	133.8	0.5	<0.05	7.9	0.11	0.42	2.5	13	1.80	15.20	19	25.5
	1200D-8	Bedrock	2024-08-12	0.02	<0.5	5.1	<1	0.7	142.6	0.51	<0.05	7.8	0.11	0.57	3	12	1.10	15.70	16	26.5
	1200D-9	Bedrock	2024-08-12	0.03	<0.5	4.9	<1	0.6	148.9	0.48	<0.05	7.6	0.11	0.45	2.2	12	0.50	12.60	16	28.0
	1200D-10	Bedrock	2024-08-12	<0.01	<0.5	5.7	<1	0.6	151.5	0.47	<0.05	6.4	0.13	0.4	2.1	14	1.40	16.50	38	26.7
1100	1100-Pre Blast	Bedrock	2024-05-15	0.03	0.7	9.2	<1	1.9	292.5	0.53	<0.05	4.5	0.23	0.31	2.5	54	0.8	15.9	54	25.4
	1100-Post Blast	Bedrock	2024-05-15	0.01	<0.5	14.1	<1	2	291.6	0.34	0.06	3.2	0.33	0.35	3.5	58	1.5	27.6	44	26.5
	1100-1	Bedrock	2024-08-22	0.02	0.70	10.5	<1	0.9	229.4	1.18	0.05	5.1	0.23	0.35	1.5	66	1.9	16.9	40	33.9
	1100-2	Bedrock	2024-08-22	0.02	<0.5	5.7	<1	0.7	158.8	0.41	<0.05	4.6	0.14	0.33	1.5	27	1.9	14.2	23	22.1
	1100-3	Bedrock	2024-08-22	0.01	<0.5	5.7	<1	0.8	199.3	0.46	<0.05	6	0.14	0.47	1.7	21	2.2	16.0	30	24.3
	1100-4	Bedrock	2024-08-22	<0.01	<0.5	8.7	<1	0.9	198.6	0.52	<0.05	6.2	0.2	0.41	1.6	28	2.1	21.0	41	27.3
	1100-5	Bedrock	2024-08-22	<0.01	<0.5	5.2	<1	0.7	133.1	0.55	<0.05	6.5	0.13	0.47	1.9	16	1.8	12.5	26	27.6
	1100-6	Bedrock	2024-08-22	<0.01	0.60	4.5	<1	0.6	127.5	0.52	0.06	7.3	0.12	0.46	2.4	15	2.1	16.0	208	27.6
	1100-7	Bedrock	2024-08-22	<0.01	<0.5	5.4	<1	0.6	141.1	0.58	<0.05	7.2	0.12	0.43	1.7	18	1.5	14.1	24	28.5
	1100-8	Bedrock	2024-08-22	<0.01	<0.5	3.2	<1	0.4	90.3	0.37	<0.05	5.4	0.08	0.35	1.2	9	1.2	10.3	19	19.0
	1100-9	Bedrock	2024-08-22	<0.01	0.60	9.5	<1	1.2	219.2	0.43	<0.05	5.4	0.21	0.47	2.3	34	3.7	21.0	56	22.0
	1100-10	Bedrock	2024-08-22	<0.01	0.80	7.9	<1	0.9	183	0.39	<0.05	5.4	0.16	0.39	1.9	34	1.3	22.9	59	16.2
4100	4100 Bedrock	Bedrock	2024-03-05	0.02	<0.5	9.7	<1	1	334.8	0.5	0.05	4.6	0.22	0.31	8.3	56	0.5	15.1	46	25.5

Appendix 3.3-1: Confirmatory Geochemical Results

Table 2: Metals Analytical Results for Confirmatory Samples

Parameter				Sulphur (S)	Antimony (Sb)	Scandium (Sc)	Selenium (Se)	Tin (Sn)	Stronium (Sr)	Tantalum (Ta)	Tellurium (Te)	Thorium (Th)	Titanium (Ti)	Thallium (Tl)	Uranium (U)	Vandium (V)	Tungsten (W)	Yttrium (Y)	Zinc (Zn)	Zirconium (Zr)
Unit				%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Reported Detection Limit				0.01	0.5	0.1	1	0.2	0.2	0.05	0.05	0.2	0.01	0.02	0.1	1	0.1	0.1	2	0.5
ACA					0.2		0.05								3	44			39	
Construction Area	**Sample ID**	**Sample Type**	**Date Samples Received at Lab**																	
FST4	FST4-01	Bedrock	2024-09-13	0.01	<0.5	5.6	<1	0.7	157.4	0.43	<0.05	7.1	0.12	0.42	3	15	2.9	14.4	20	26.1
	FST4-02	Bedrock	2024-09-13	<0.01	<0.5	5.2	<1	0.6	141.5	0.48	<0.05	7.8	0.11	0.46	3.1	12	9.4	17.3	18	33.9
	FST4-03	Bedrock	2024-09-13	0.02	<0.5	11.6	<1	1.3	198.4	0.39	<0.05	5.5	0.21	0.53	2.3	48	20.2	19.1	32	26.0
	FST4-04	Bedrock	2024-09-13	<0.01	<0.5	5.8	<1	0.6	143.3	0.5	<0.05	7.6	0.11	0.47	2.3	14	5.1	17.3	21	31.2
	FST4-05	Bedrock	2024-09-13	<0.01	<0.5	5.8	<1	0.6	142.9	0.36	<0.05	6.9	0.12	0.57	1.8	14	4.6	14.9	20	28.2
	FST4-06	Bedrock	2024-09-13	<0.01	<0.5	5.8	<1	0.6	147.5	0.48	<0.05	8.2	0.12	0.6	2.5	14	6.2	16.6	16	23.4
	FST4-07	Bedrock	2024-09-13	<0.01	<0.5	5	<1	0.6	137.1	0.47	<0.05	8.6	0.09	0.6	2.4	11	5.5	17.7	18	27.5
	FST4-08	Bedrock	2024-09-13	<0.01	<0.5	5.8	<1	0.6	144.7	0.45	<0.05	7.4	0.12	0.62	2.1	14	2.5	17.8	20	25.5
	FST4-09	Bedrock	2024-09-13	<0.01	<0.5	4.7	<1	0.5	127.9	0.43	<0.05	8.6	0.09	0.61	2	10	4.6	16.8	16	30.0
	FST4-10	Bedrock	2024-09-13	0.06	<0.5	22.5	<1	3.2	277.3	0.4	<0.05	3.3	0.4	0.82	1.5	124	9.6	21.8	97	19.5
	C1.1	Bedrock	2025-06-30	<0.01	<0.5	5.1	<1	0.7	149	0.59	<0.05	7.4	0.11	0.54	2.1	13	0.4	16.3	17	22.6
	C1.2	Bedrock	2025-06-30	<0.01	<0.5	5	<1	0.6	156.6	0.47	<0.05	7.5	0.12	0.66	1.7	14	0.3	15.7	18	20.9
	C1.3	Bedrock	2025-06-30	<0.01	<0.5	5	<1	0.6	149.8	0.48	<0.05	5.9	0.13	0.55	1.5	13	0.4	15.0	23	18.3
	C1.4	Bedrock	2025-06-30	<0.01	<0.5	5	<1	0.8	164.2	0.5	<0.05	7.7	0.13	0.64	1.7	14	0.8	18.7	24	18.2
	C1.5	Bedrock	2025-06-30	<0.01	<0.5	5.1	<1	0.6	178.5	0.41	<0.05	7.5	0.13	0.7	1.4	15	0.3	13.0	15	21.9
	C1.6	Bedrock	2025-06-30	<0.01	<0.5	4.5	<1	0.6	160.9	0.42	<0.05	6.4	0.11	0.66	1.4	13	0.3	14.8	23	19.3
	C1.7	Bedrock	2025-06-30	<0.01	<0.5	5	<1	0.6	163.9	0.38	<0.05	6.6	0.11	0.59	1.2	14	0.9	16.4	35	16.8
	C1.8	Bedrock	2025-06-30	<0.01	<0.5	4.8	<1	0.6	149.5	0.42	<0.05	7.5	0.11	0.67	1.7	14	0.9	14.9	21	22.4
	C1.9	Bedrock	2025-06-30	<0.01	<0.5	5.5	<1	0.7	187	0.4	<0.05	7	0.13	0.52	2.7	16	0.3	15.0	37	20.2
	C1.10	Bedrock	2025-06-30	<0.01	<0.5	6.5	<1	0.9	133.7	0.51	<0.05	6.3	0.18	0.61	2.3	19	2.0	19.0	36	25.0
	C2.1	Bedrock	2025-07-21	<0.01	<0.5	4	<1	0.5	123.5	0.6	<0.05	9.1	0.08	0.55	3.0	9	0.2	17.0	13	23.5
	C2.2	Bedrock	2025-07-21	<0.01	<0.5	4.9	<1	0.6	142.8	0.4	<0.05	7.8	0.11	0.61	1.6	12	0.2	13.8	15	27.0
	C2.3	Bedrock	2025-07-21	0.01	<0.5	5.9	<1	0.8	164.2	0.37	<0.05	5.5	0.15	0.6	2	19	0.3	14.6	20	24.6
	C2.4	Bedrock	2025-07-21	<0.01	<0.5	6.1	<1	0.7	179.5	0.46	<0.05	7.3	0.14	0.65	2.1	15	0.7	15.0	15	16.7
	C2.5	Bedrock	2025-07-21	0.01	<0.5	4.6	<1	0.6	147	0.37	<0.05	9.8	0.11	0.51	2	12	0.2	14.9	17	24.6
	C2.6	Bedrock	2025-07-21	<0.01	<0.5	4.4	<1	0.5	129.8	0.55	<0.05	8.4	0.08	0.48	3.2	8	0.3	16.4	12	21.3
	C2.7	Bedrock	2025-07-21	<0.01	<0.5	4.3	<1	0.6	120.8	0.55	<0.05	6.7	0.09	0.57	1.8	9	0.2	14.8	17	20.8
	C2.8	Bedrock	2025-07-21	<0.01	<0.5	5.3	<1	0.7	174.4	0.48	<0.05	7.3	0.12	0.59	1.7	15	0.2	17.3	15	22.5
	C2.9	Bedrock	2025-07-21	<0.01	<0.5	4.5	<1	0.6	152.5	0.4	<0.05	6.2	0.12	0.55	1.3	14	0.3	14.9	15	13.9
	C2.10	Bedrock	2025-07-21	<0.01	<0.5	4.9	<1	0.7	173.1	0.4	<0.05	8.9	0.11	0.61	1.6	12	0.2	14.6	15	16.0
	C3.1	Bedrock	2025-07-21	0.01	<0.5	5	<1	0.6	140.2	0.42	<0.05	8.5	0.1	0.61	2.8	11	0.2	15.4	14	25.1
	C3.2	Bedrock	2025-07-21	<0.01	<0.5	6.2	<1	0.7	142.8	0.7	<0.05	6	0.13	0.64	2.3	14	0.3	17.6	18	24.4
	C3.3	Bedrock	2025-07-21	<0.01	<0.5	5.4	<1	0.6	156.4	0.62	<0.05	7.6	0.11	0.61	2.4	13	0.2	19.0	14	19.0
	C3.4	Bedrock	2025-07-21	<0.01	<0.5	4.6	<1	0.6	153.6	0.4	<0.05	6.7	0.11	0.6	1.6	12	0.2	14.4	13	18.6
	C3.5	Bedrock	2025-07-21	<0.01	<0.5	5	<1	0.6	185.6	0.5	<0.05	10.3	0.14	0.54	3.1	17	0.2	16.3	17	18.4
	C3.6	Bedrock	2025-07-21	<0.01	<0.5	4	<1	0.6	121	0.34	<0.05	8.7	0.1	0.65	1.8	12	0.2	19.0	15	21.2
	C3.7	Bedrock	2025-07-21	<0.01	<0.5	4.4	<1	0.6	182.4	0.38	<0.05	9.1	0.13	0.55	1.6	15	0.2	11.9	15	17.5
	C3.8	Bedrock	2025-07-21	<0.01	<0.5	4.3	<1	0.6	124.6	0.41	<0.05	8.1	0.09	0.6	1.8	10	0.2	15.8	17	25.0
	C3.9	Bedrock	2025-07-21	<0.01	<0.5	5	<1	0.5	109.3	0.54	<0.05	9.8	0.11	0.67	3.5	11	0.2	18.0	16	25.4
	C3.10	Bedrock	2025-07-21	<0.01	<0.5	4.1	<1	0.6	122.9	0.35	<0.05	6.2	0.11	0.51	1.7	14	0.2	13.7	20	16.7

Notes:
ACA: average crustal abundance.
Values greater than 10x ACA are indicated with **bold font**.

Appendix 3.3-1: Confirmatory Geochemical Results

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

						Overburden						1200 Area	
					Sample Type	Overburden	Overburden	Overburden	Overburden	Overburden	Overburden	Bedrock	Bedrock
					Location	1200 West Transect	1200 East Transect	1100 West Transect	1100 East Transect	1200 South Transect	1200 East Hill Transect	1200 ABC-01	1200 ABC-02
					Shake Flask Extract ID	24C1614-01	24C1614-02	24C1614-03	24C1614-04	24C1614-05	24C1758-01	24G1552-01	24G1552-02
					Date Received at Lab	2024-03-05	2024-03-05	2024-03-05	2024-03-05	2024-03-05	2024-03-11	2024-06-26	2024-06-26
Parameter	**Unit**	**RDL**	**Federal WQG**	**BCWQG Short Term**	**BCWQG Long Term**								
pH	pH units	0.01	-	-	-	6.08	6.01	6.43	7.07	6.55	6.29	5.51	5.78
EC	µS/cm	1	n/v	n/v	n/v	19.16	15.5	48.5	100.9	35.7	35.5	12.58	12.11
Acidity (to pH 8.3)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	14.01	14.31	20.95	19.86	12.04	13.82	11.81	10.18
Alkalinity (to pH 4.5)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	3.49	2.32	22.18	36.37	11.3	8.44	4.06	5.12
Sulphate	mg/L	1	n/v	n/v	n/v	6.118	5.176	2.594	11.124	4.324	3.632	2.08	2.07
Chloride	mg/L	0.1	n/v	n/v	n/v	0.33	0.41	0.2	0.34	0.44	1.97	2.76	1.52
Fluoride	mg/L	0.1	n/v	n/v	n/v	<0.10	<0.10	0.11	0.12	<0.10	<0.10	0.21	0.13
Nitrate	mg/L	0.01	n/v	n/v	n/v	0.455	0.339	0.015	0.022	<0.010	0.845	0.068	0.031
Nitrite	mg/L	0.01	n/v	n/v	n/v	<0.010	<0.010	0.031	0.033	<0.010	0.03	<0.01	<0.01
Total Organic Carbon	mg/L	0.5	n/v	n/v	n/v	25.3	17.5	9.17	7.92	11.7	21.7	1.19	0.53
Dissolved Metals Analysis by ICP-MS:													
Dissolved Hardness (as $CaCO_3$)	mg/L	0.125	n/v	n/v	n/v	3.75	2.91	22.9	41.3	14.2	13.5	0.817	1.02
Aluminum Dissolved	mg/L	0.001	n/v	n/v	n/v	0.361	0.304	0.0751	0.559	0.0781	0.0826	0.104	0.0377
Antimony Dissolved	mg/L	0.00005	n/v	0.27	n/v	0.000078	0.000119	0.000318	0.000439	0.00126	0.000482	0.000087	<0.00005
Arsenic Dissolved	mg/L	0.00005	0.0125	0.0125	n/v	0.00051	0.000725	0.000478	0.00198	0.000383	0.00078	0.00179	0.000998
Barium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00329	0.00296	0.00486	0.00422	0.00272	0.00864	0.00189	0.00036
Beryllium Dissolved	mg/L	0.00001	n/v	n/v	0.1	0.000011	0.000012	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron Dissolved	mg/L	0.002	n/v	n/v	1.2	0.0087	0.0092	0.0087	0.0488	0.0123	0.0127	0.0085	0.0078
Cadmium Dissolved	mg/L	0.000002	0.00012	n/v	n/v	0.0000246	0.0000266	0.0000035	<0.000002	0.0000093	0.0000123	<0.000004	<0.000004
Calcium Dissolved	mg/L	0.05	n/v	n/v	n/v	1.17	0.93	8.97	16.3	5.11	4.49	0.251	0.316
Chromium Dissolved	mg/L	0.0005	n/v	n/v	n/v	<0.0005	<0.0005	<0.0005	0.00334	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt Dissolved	mg/L	0.000005	n/v	n/v	n/v	0.000367	0.000174	0.0000239	0.0000715	0.000115	0.0000452	0.0000381	0.0000296
Copper Dissolved	mg/L	0.0001	n/v	0.003	0.002	**0.00684**	**0.00562**	**0.0022**	**0.00331**	**0.0038**	**0.0059**	0.00051	0.00021
Iron Dissolved	mg/L	0.002	n/v	n/v	n/v	0.0997	0.0519	0.0133	0.005	0.0363	0.0447	0.0219	0.0093
Lead Dissolved	mg/L	0.00005	n/v	0.14	0.002	0.000097	0.00031	<0.00005	<0.00005	0.000187	0.000713	0.00009	0.000055
Lithium Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.000342	0.000227	0.000066	0.00005	0.000099	0.000172	0.000754	0.00132
Magnesium Dissolved	mg/L	0.005	n/v	n/v	n/v	0.197	0.143	0.111	0.121	0.345	0.538	0.046	0.0565
Manganese Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.0179	0.0116	0.00199	0.00114	0.0121	0.00319	0.00125	0.00423
Mercury Dissolved	mg/L	0.00002	0.000016	n/v	n/v	***<u>0.00002</u>***	***<u>0.00002</u>***	***<u>0.00002</u>***	***<u>0.00002</u>***	***<u>0.00002</u>***	***<u>0.00002</u>***	***<u>0.00002</u>***	***<u>0.000022</u>***
Molybdenum Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.000513	0.000334	0.00229	0.00303	0.00313	0.000671	0.0042	0.00359
Nickel Dissolved	mg/L	0.00004	n/v	n/v	0.0083	0.000986	0.000624	0.000155	0.000303	0.000453	0.00123	0.000045	<0.00004
Phosphorus Dissolved	mg/L	0.01	n/v	n/v	n/v	0.083	0.022	<0.01	0.049	<0.01	0.14	<0.01	<0.01
Potassium Dissolved	mg/L	0.02	n/v	n/v	n/v	2.25	2.14	1.29	1.53	1.21	1.91	0.867	0.749
Selenium Dissolved	mg/L	0.0001	n/v	n/v	0.002	0.00044	<0.0001	0.00015	0.00031	<0.0001	<0.0001	<0.0001	<0.0001
Silicon Dissolved	mg/L	0.1	n/v	n/v	n/v	1.08	1	1.41	1.65	1.71	1.53	1.5	1.3
Silver Dissolved	mg/L	0.00001	0.0075	0.0037	0.0005	0.000038	0.000034	0.000015	0.000015	0.000038	0.000112	<0.00001	0.000023
Sodium Dissolved	mg/L	0.02	n/v	n/v	n/v	0.654	0.43	0.455	2.14	1.17	0.511	2.6	2.34
Strontium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00525	0.00434	0.0274	0.0667	0.0206	0.0212	0.00163	0.0015
Sulphur Dissolved	mg/L	1	n/v	n/v	n/v	<1	<1	<1	3.63	<1	<1	<1	<1
Tellurium Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thallium Dissolved	mg/L	0.000004	n/v	n/v	n/v	0.0000148	0.0000272	0.0000084	<0.000004	0.0000059	0.0000043	<0.000004	<0.000004
Thorium Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.000147	0.000111	0.000012	<0.00001	0.000026	<0.00001	0.000012	<0.00001
Tin Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000086	<0.00005	<0.00005
Titanium Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00152	0.0014	0.00068	0.00036	0.00236	0.00139	0.00159	0.00071
Tungsten Dissolved	mg/L	0.0002	n/v	n/v	n/v	<0.0002	<0.0002	0.00043	0.0008	0.00053	<0.0002	0.0292	0.00414
Uranium Dissolved	mg/L	0.000001	n/v	n/v	n/v	0.000467	0.000641	0.00053	0.00447	0.000306	0.0000697	0.000271	0.000122
Vanadium Dissolved	mg/L	0.001	0.005	n/v	n/v	0.00143	<0.001	0.00141	***<u>0.00763</u>***	0.00124	***<u>0.00627</u>***	0.00177	0.00106
Zinc Dissolved	mg/L	0.001	n/v	0.055	0.01	0.0023	0.0027	0.0031	0.0013	0.0031	0.0072	0.0017	<0.001
Zirconium Dissolved	mg/L	0.00002	n/v	n/v	n/v	0.000519	0.000513	0.000112	0.000113	0.000353	0.000147	0.000053	0.000067

Notes:
EC = Electrical Conductivity
IC = Ion Chromatography
mg/L = Milligrams per Litre
n/v = no value
RDL= reported detection limit
Federal WQG = Federal, Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) Marine Aquatic Life Guideline
BC WQG = British Columbia Marine Aquatic Life Guideline
Values in red font are above the long-term BC WQG
Values shaded in grey are above the short-term BC WQG
Values italicized and underlined are above the Federal WQG

Appendix 3.3-1: Confirmatory Geochemical Results

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

						1200 Area							
					Sample Type	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
					Location	1200 ABC-03	1200 ABC-04	1200 ABC-05	1200 ABC-06	1200 ABC-07	1200 ABC-08	1200 ABC-09	1200 ABC-10
					Shake Flask Extract ID	24G1552-03	24G1552-04	24G1552-05	24G1552-06	24G1552-07	24G1552-08	24G1552-09	24G1552-10
					Date Received at Lab	2024-06-26	2024-06-26	2024-06-26	2024-06-26	2024-06-26	2024-06-26	2024-06-26	2024-06-26
Parameter	**Unit**	**RDL**	**Federal WQG**	**BCWQG Short Term**	**BCWQG Long Term**								
pH	pH units	0.01	-	-	-	5.48	5.51	5.93	5.81	5.65	5.47	5.97	5.75
EC	µS/cm	1	n/v	n/v	n/v	25.5	38.5	40.7	10.16	15.81	33	9.67	11.51
Acidity (to pH 8.3)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	24.84	37.97	39.03	14.75	20.47	14.29	12.12	15.64
Alkalinity (to pH 4.5)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	9.97	6	21.99	6.14	6.22	4.95	5.15	4.07
Sulphate	mg/L	1	n/v	n/v	n/v	1.77	2.09	2.71	2.22	2.5	4.77	1.91	2.31
Chloride	mg/L	0.1	n/v	n/v	n/v	3.9	10.9	2.24	1.2	1.69	4.68	1.66	1.98
Fluoride	mg/L	0.1	n/v	n/v	n/v	0.28	0.44	<0.1	0.21	0.23	0.12	0.2	0.27
Nitrate	mg/L	0.01	n/v	n/v	n/v	0.04	<0.01	0.011	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Organic Carbon	mg/L	0.5	n/v	n/v	n/v	0.84	0.58	1.16	0.69	0.75	1.35	1.13	1.41
Dissolved Metals Analysis by ICP-MS:													
Dissolved Hardness (as $CaCO_3$)	mg/L	0.125	n/v	n/v	n/v	5.79	2.98	15.1	0.573	2.21	5.01	0.757	0.86
Aluminum Dissolved	mg/L	0.001	n/v	n/v	n/v	0.112	0.13	0.159	0.0711	0.0652	0.0424	0.038	0.0581
Antimony Dissolved	mg/L	0.00005	n/v	0.27	n/v	0.000083	<0.00005	0.000852	<0.00005	0.000053	<0.00005	<0.00005	<0.00005
Arsenic Dissolved	mg/L	0.00005	0.0125	0.0125	n/v	0.000841	0.000818	0.00173	0.00468	0.00353	0.000523	0.00113	0.00066
Barium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00107	0.00411	0.00173	0.00061	0.00053	0.00229	0.00049	0.00083
Beryllium Dissolved	mg/L	0.00001	n/v	n/v	0.1	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron Dissolved	mg/L	0.002	n/v	n/v	1.2	0.0077	0.0065	0.0078	0.003	0.0047	0.0053	0.005	0.0052
Cadmium Dissolved	mg/L	0.000002	0.00012	n/v	n/v	0.0000083	0.0000064	<0.000004	<0.000008	<0.000006	0.0000132	<0.000006	<0.000006
Calcium Dissolved	mg/L	0.05	n/v	n/v	n/v	2	1.12	5.77	0.191	0.803	1.76	0.206	0.282
Chromium Dissolved	mg/L	0.0005	n/v	n/v	n/v	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt Dissolved	mg/L	0.000005	n/v	n/v	n/v	0.0000382	0.000252	0.0000259	0.0000109	0.0000162	0.000101	0.0000192	0.0000341
Copper Dissolved	mg/L	0.0001	n/v	0.003	0.002	0.00023	0.00019	0.00082	0.00024	0.00019	0.0007	0.00022	0.00093
Iron Dissolved	mg/L	0.002	n/v	n/v	n/v	0.0075	0.02	0.0053	0.023	0.0123	0.0144	0.017	0.0196
Lead Dissolved	mg/L	0.00005	n/v	0.14	0.002	0.000098	0.000077	<0.00005	<0.00005	<0.00005	0.000068	<0.00005	<0.00005
Lithium Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00365	0.00421	0.00195	0.000418	0.00231	0.00332	0.000782	0.000392
Magnesium Dissolved	mg/L	0.005	n/v	n/v	n/v	0.193	0.043	0.164	0.0232	0.05	0.147	0.0586	0.0376
Manganese Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.0024	0.00214	0.00158	0.0029	0.00495	0.0134	0.00578	0.00691
Mercury Dissolved	mg/L	0.00002	0.000016	n/v	n/v	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***
Molybdenum Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.00359	0.000761	0.00152	0.0105	0.00992	0.0103	0.00737	0.004
Nickel Dissolved	mg/L	0.00004	n/v	n/v	0.0083	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
Phosphorus Dissolved	mg/L	0.01	n/v	n/v	n/v	0.011	<0.01	0.015	0.022	<0.01	<0.01	0.031	<0.01
Potassium Dissolved	mg/L	0.02	n/v	n/v	n/v	1.9	4.87	2.18	0.34	0.678	2.17	0.642	0.713
Selenium Dissolved	mg/L	0.0001	n/v	n/v	0.002	0.0002	<0.0001	<0.0001	<0.0001	0.00116	0.00066	<0.0001	<0.0001
Silicon Dissolved	mg/L	0.1	n/v	n/v	n/v	2.04	3.13	3.23	1.93	1.92	1.39	1.6	1.71
Silver Dissolved	mg/L	0.00001	0.0075	0.0037	0.0005	0.00001	0.00001	0.000029	0.000019	<0.00001	0.000011	0.000019	0.000013
Sodium Dissolved	mg/L	0.02	n/v	n/v	n/v	3.34	5.41	3.54	2.43	2.82	4.75	1.93	2.33
Strontium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00374	0.00314	0.0193	0.00076	0.00287	0.00907	0.00151	0.00234
Sulphur Dissolved	mg/L	1	n/v	n/v	n/v	<1	<1	<1	<1	<1	2.76	<1	<1
Tellurium Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thallium Dissolved	mg/L	0.000004	n/v	n/v	n/v	0.0000065	0.0000157	0.0000051	<0.000004	<0.000004	0.0000078	<0.000004	<0.000004
Thorium Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.000014	0.000018	0.000012	0.000016	<0.00001	0.000013	<0.00001	0.000012
Tin Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	0.000098	0.000064	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Titanium Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.0005	0.0016	0.00038	0.00131	0.00077	0.00065	0.00072	0.0015
Tungsten Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00561	0.0164	0.00507	0.00561	0.00503	0.00379	0.00331	0.00726
Uranium Dissolved	mg/L	0.000001	n/v	n/v	n/v	0.000548	0.00105	0.000212	0.000128	0.000197	0.000658	0.0000921	0.00012
Vanadium Dissolved	mg/L	0.001	0.005	n/v	n/v	<0.001	<0.001	0.00159	0.00184	0.00242	<0.001	0.00124	0.00155
Zinc Dissolved	mg/L	0.001	n/v	0.055	0.01	<0.001	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium Dissolved	mg/L	0.00002	n/v	n/v	n/v	<0.00002	<0.00002	<0.00002	0.000046	<0.00002	<0.00002	<0.00002	0.000023

Notes:
EC = Electrical Conductivity
IC = Ion Chromatography
mg/L = Milligrams per Litre
n/v = no value
RDL= reported detection limit
Federal WQG = Federal, Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) Marine Aquatic Life Guideline
BC WQG = British Columbia Marine Aquatic Life Guideline
Values in red font are above the long-term BC WQG
Values shaded in grey are above the short-term BC WQG
Values italicized and underlined are above the Federal WQG

Appendix 3.3-1: Confirmatory Geochemical Results

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

						1200 Area							
					Sample Type	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
					Location	1200 ABC-11	1200 ABC-12	1200 ABC-13	1200 ABC-14	1200 ABC-15	1200D - Composite Day-11 - Day 25	1200D - 28 May 2024	1200D - Composite Day-2 - Day 10
					Shake Flask Extract ID	24G1552-11	24G1552-12	24G1552-13	24G1552-14	24G1552-15	24G1552-15	24F2495-01	24F2293-01
					Date Received at Lab	2024-06-26	2024-06-26	2024-06-26	2024-06-26	2024-06-26	2024-07-05	2024-07-12	2024-07-26
Parameter	**Unit**	**RDL**	**Federal WQG**	**BCWQG Short Term**	**BCWQG Long Term**								
pH	pH units	0.01	-	-	-	5.72	5.67	5.68	5.85	5.56	5.53	5.86	5.78
EC	µS/cm	1	n/v	n/v	n/v	13.9	16.45	39.7	23.1	30.3	32.1	24.5	16.23
Acidity (to pH 8.3)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	10.43	16.32	34.12	11.48	22.8	19	10.62	16.02
Alkalinity (to pH 4.5)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	5.54	5.63	9.97	9.01	4.72	7	5.73	6.11
Sulphate	mg/L	1	n/v	n/v	n/v	1.9	2.12	2.78	2.34	7.68	3.52	3.06	2.63
Chloride	mg/L	0.1	n/v	n/v	n/v	2.73	3.43	7.08	4.1	2.64	4.46	3.27	2.41
Fluoride	mg/L	0.1	n/v	n/v	n/v	0.18	0.23	0.25	0.25	0.14	0.38	0.25	0.14
Nitrate	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	0.036	0.028	0.021
Nitrite	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Organic Carbon	mg/L	0.5	n/v	n/v	n/v	1.07	0.58	0.66	0.97	2.8	3.67	1.79	3.08
Dissolved Metals Analysis by ICP-MS:													
Dissolved Hardness (as $CaCO_3$)	mg/L	0.125	n/v	n/v	n/v	0.853	0.801	4.47	2.1	6.25	1.66	0.5	1.77
Aluminum Dissolved	mg/L	0.001	n/v	n/v	n/v	0.049	0.0459	0.141	0.0766	0.032	0.058	0.127	0.0455
Antimony Dissolved	mg/L	0.00005	n/v	0.27	n/v	<0.00005	<0.00005	0.000172	0.00005	<0.00005	0.000574	0.000312	0.000314
Arsenic Dissolved	mg/L	0.00005	0.0125	0.0125	n/v	0.000491	0.001	0.00228	0.00113	0.000582	0.000427	0.000236	0.000349
Barium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00054	0.00062	0.00307	0.00089	0.00225	0.00134	0.00196	0.00122
Beryllium Dissolved	mg/L	0.00001	n/v	n/v	0.1	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron Dissolved	mg/L	0.002	n/v	n/v	1.2	0.0048	0.0068	0.0105	0.0045	0.0057	0.0086	0.0053	0.008
Cadmium Dissolved	mg/L	0.000002	0.00012	n/v	n/v	<0.000004	0.0000047	0.0000079	<0.000006	0.0000221	0.0000066	<0.000004	0.0000068
Calcium Dissolved	mg/L	0.05	n/v	n/v	n/v	0.252	0.256	1.61	0.726	2.21	0.529	0.132	0.581
Chromium Dissolved	mg/L	0.0005	n/v	n/v	n/v	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt Dissolved	mg/L	0.000005	n/v	n/v	n/v	0.0000229	0.0000288	0.0000472	0.000178	0.000182	0.0000727	0.0000225	0.000106
Copper Dissolved	mg/L	0.0001	n/v	0.003	0.002	0.00024	0.00017	0.00035	0.0006	0.00042	0.00106	0.00137	0.00111
Iron Dissolved	mg/L	0.002	n/v	n/v	n/v	0.0093	0.0088	0.0598	0.0332	0.0107	0.0131	0.0323	0.013
Lead Dissolved	mg/L	0.00005	n/v	0.14	0.002	<0.00005	<0.00005	0.000173	<0.00005	<0.00005	0.000109	0.000335	0.000114
Lithium Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00199	0.00146	0.00485	0.000709		0.00318	0.00229	0.00194
Magnesium Dissolved	mg/L	0.005	n/v	n/v	n/v	0.0541	0.0393	0.11	0.0693	0.178	0.0816	0.0409	0.0765
Manganese Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00226	0.00338	0.00423	0.00467	0.0266	0.00929	0.00497	0.0102
Mercury Dissolved	mg/L	0.00002	0.000016	n/v	n/v	***<0.00002***	***0.000025***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***0.000046***
Molybdenum Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.00421	0.00399	0.00508	0.00603	0.00797	0.00341	0.00263	0.00179
Nickel Dissolved	mg/L	0.00004	n/v	n/v	0.0083	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	0.000126	0.000124	0.000171
Phosphorus Dissolved	mg/L	0.01	n/v	n/v	n/v	<0.01	0.016	0.012	0.03	<0.01	0.019	0.023	0.028
Potassium Dissolved	mg/L	0.02	n/v	n/v	n/v	1.31	1.45	4.16	1.45	1.66	2.51	1.47	1.63
Selenium Dissolved	mg/L	0.0001	n/v	n/v	0.002	<0.0001	<0.0001	0.00024	0.00017	0.00106	0.00011	<0.0001	<0.0001
Silicon Dissolved	mg/L	0.1	n/v	n/v	n/v	1.3	1.61	3.09	1.95	1.88	1.43	1.2	1.03
Silver Dissolved	mg/L	0.00001	0.0075	0.0037	0.0005	0.000057	0.00002	0.000024	0.000011	<0.00001	0.000014	0.000016	<0.00001
Sodium Dissolved	mg/L	0.02	n/v	n/v	n/v	2.61	3.15	5.82	4.46	3.56	5.57	4.07	3.11
Strontium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.0015	0.00134	0.00737	0.00439	0.0129	0.00228	0.00072	0.00247
Sulphur Dissolved	mg/L	1	n/v	n/v	n/v	<1	<1	<1	<1	3.26	1	<1	<1
Tellurium Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thallium Dissolved	mg/L	0.000004	n/v	n/v	n/v	<0.000004	0.0000046	0.0000076	<0.000004	0.0000074	0.0000064	0.0000047	0.0000062
Thorium Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	0.000017	0.000041	0.000013	<0.00001	0.000031	0.000045	0.00013
Tin Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000071
Titanium Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00065	0.00049	0.00441	0.00099	0.00055	0.00064	0.00202	0.00056
Tungsten Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.0037	0.0308	0.0154	0.0137	0.00231	0.00329	0.0003	0.00195
Uranium Dissolved	mg/L	0.000001	n/v	n/v	n/v	0.000102	0.000169	0.000974	0.000272	0.000186	0.000279	0.000216	0.000263
Vanadium Dissolved	mg/L	0.001	0.005	n/v	n/v	<0.001	0.00147	0.00129	0.00165	<0.001	0.00115	<0.001	0.00129
Zinc Dissolved	mg/L	0.001	n/v	0.055	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	0.0016	0.0013	0.0013
Zirconium Dissolved	mg/L	0.00002	n/v	n/v	n/v	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.000033

Notes:
EC = Electrical Conductivity
IC = Ion Chromatography
mg/L = Milligrams per Litre
n/v = no value
RDL= reported detection limit
Federal WQG = Federal, Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) Marine Aquatic Life Guideline
BC WQG = British Columbia Marine Aquatic Life Guideline
Values in red font are above the long-term BC WQG
Values shaded in grey are above the short-term BC WQG
Values italicized and underlined are above the Federal WQG

Appendix 3.3-1: Confirmatory Geochemical Results

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

						1200 Area							
					Sample Type	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
					Location	Comp 1200D - D26 -	1200D-1	1200D-2	1200D-3	1200D-4	1200D-5	1200D-6	1200D-7
					Shake Flask Extract ID	24H1803-01	24H2961-01	24H2961-02	24H2961-03	24H2961-04	24H2961-05	24H2961-06	24H2961-07
					Date Received at Lab	2024-08-08	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-12	2024-08-12
Parameter	**Unit**	**RDL**	**Federal WQG**	**BCWQG Short Term**	**BCWQG Long Term**								
pH	pH units	0.01	-	-	-	5.26	5.54	5.87	5.69	5.65	5.68	5.69	5.82
EC	µS/cm	1	n/v	n/v	n/v	19.12	30.6	16.01	17.97	17.2	14.62	18.48	55.7
Acidity (to pH 8.3)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	19.26	26.77	11.56	16.62	24.94	15.69	14.91	37.13
Alkalinity (to pH 4.5)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	4.75	8.12	4.52	3.54	3.56	2.77	3.42	18.75
Sulphate	mg/L	1	n/v	n/v	n/v	2.41	2.55	2.17	2.92	2.54	2.35	3.02	3.69
Chloride	mg/L	0.1	n/v	n/v	n/v	1.9	3.5	2.13	1.72	1.5	1.43	1.16	3.75
Fluoride	mg/L	0.1	n/v	n/v	n/v	0.32	0.31	0.16	0.21	0.2	0.16	0.17	0.21
Nitrate	mg/L	0.01	n/v	n/v	n/v	0.051	0.021	0.018	0.018	0.012	0.098	<0.01	<0.01
Nitrite	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Organic Carbon	mg/L	0.5	n/v	n/v	n/v	2.43	2.81	1.89	2.63	1.5	2.35	2.39	2.71
Dissolved Metals Analysis by ICP-MS:													
Dissolved Hardness (as $CaCO_3$)	mg/L	0.125	n/v	n/v	n/v	2.87	2.6	0.731	0.887	0.936	0.518	0.574	14
Aluminum Dissolved	mg/L	0.001	n/v	n/v	n/v	0.0289	0.0445	0.0341	0.037	0.0352	0.0364	0.0318	0.28
Antimony Dissolved	mg/L	0.00005	n/v	0.27	n/v	0.000288	0.000126	<0.00005	0.000115	0.000187	0.000092	0.000096	0.000256
Arsenic Dissolved	mg/L	0.00005	0.0125	0.0125	n/v	0.000381	0.000468	0.000414	0.000123	0.00009	0.00012	0.000277	0.000741
Barium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00152	0.0266	0.00132	0.00666	0.00286	0.00084	0.00138	0.0247
Beryllium Dissolved	mg/L	0.00001	n/v	n/v	0.1	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron Dissolved	mg/L	0.002	n/v	n/v	1.2	0.0057	0.0109	0.0095	0.0105	0.0041	0.0049	0.0057	0.0089
Cadmium Dissolved	mg/L	0.000002	0.00012	n/v	n/v	0.0000071	0.000008	0.0000037	0.000002	0.0000033	0.0000037	0.000003	0.0000091
Calcium Dissolved	mg/L	0.05	n/v	n/v	n/v	0.932	0.841	0.217	0.25	0.277	0.105	0.158	5.19
Chromium Dissolved	mg/L	0.0005	n/v	n/v	n/v	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt Dissolved	mg/L	0.000005	n/v	n/v	n/v	0.0000815	0.000118	0.00008	0.0000658	0.0000884	0.0000256	0.0000416	0.0000821
Copper Dissolved	mg/L	0.0001	n/v	0.003	0.002	0.00089	0.00149	0.00084	0.00095	0.00118	0.00054	0.00078	**0.00214**
Iron Dissolved	mg/L	0.002	n/v	n/v	n/v	0.0112	0.0098	0.0078	0.0143	0.0093	0.0091	0.0101	0.0097
Lead Dissolved	mg/L	0.00005	n/v	0.14	0.002	0.00007	0.000093	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000056
Lithium Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00288	0.00856	0.00215	0.00268	0.00218	0.00104	0.000837	0.00241
Magnesium Dissolved	mg/L	0.005	n/v	n/v	n/v	0.131	0.12	0.0457	0.0639	0.0593	0.062	0.0436	0.249
Manganese Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.0165	0.00878	0.0091	0.00679	0.00993	0.0098	0.00943	0.0082
Mercury Dissolved	mg/L	0.00002	0.000016	n/v	n/v	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***
Molybdenum Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.00254	0.00121	0.00133	0.00206	0.00247	0.00128	0.00179	0.00376
Nickel Dissolved	mg/L	0.00004	n/v	n/v	0.0083	0.000168	0.000213	0.000072	0.000127	0.000126	<0.00004	0.000083	0.000152
Phosphorus Dissolved	mg/L	0.01	n/v	n/v	n/v	0.013	0.011	0.013	<0.01	<0.01	<0.01	<0.01	0.033
Potassium Dissolved	mg/L	0.02	n/v	n/v	n/v	1.68	2.75	1.15	1.21	1.19	0.771	1.06	3.53
Selenium Dissolved	mg/L	0.0001	n/v	n/v	0.002	0.00011	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.00012
Silicon Dissolved	mg/L	0.1	n/v	n/v	n/v	0.93	0.93	0.81	1.08	1.08	1.42	1.49	1.2
Silver Dissolved	mg/L	0.00001	0.0075	0.0037	0.0005	0.000043	0.000098	0.000037	0.000025	0.000025	0.000031	0.000044	0.000048
Sodium Dissolved	mg/L	0.02	n/v	n/v	n/v	2.29	4.3	2.89	3.08	2.93	2.82	3.44	5.65
Strontium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.0045	0.00473	0.0011	0.00224	0.00218	0.00094	0.00148	0.0174
Sulphur Dissolved	mg/L	1	n/v	n/v	n/v	<1	<1	<1	<1	<1	<1	<1	1.05
Tellurium Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thallium Dissolved	mg/L	0.000004	n/v	n/v	n/v	0.0000061	0.0000056	0.0000041	0.0000046	<0.000004	<0.000004	<0.000004	0.0000043
Thorium Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.000021	0.000044	0.000019	0.000015	<0.00001	<0.00001	<0.00001	0.000024
Tin Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	0.000103	0.000063	0.000056	<0.00005	<0.00005	0.000083	0.000053
Titanium Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00028	0.00071	0.00052	0.00064	0.00041	0.00091	0.00056	0.00053
Tungsten Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00084	0.00228	0.00283	0.00049	0.00106	0.00028	0.00083	0.00249
Uranium Dissolved	mg/L	0.000001	n/v	n/v	n/v	0.000174	0.00019	0.000226	0.000189	0.000256	0.0000412	0.000115	0.00109
Vanadium Dissolved	mg/L	0.001	0.005	n/v	n/v	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00109
Zinc Dissolved	mg/L	0.001	n/v	0.055	0.01	0.0015	0.0024	0.0016	0.0019	0.0015	0.0011	0.0014	0.0017
Zirconium Dissolved	mg/L	0.00002	n/v	n/v	n/v	<0.00002	<0.00002	<0.00002	0.000037	0.000021	0.000052	0.000028	0.000041

Notes:
EC = Electrical Conductivity
IC = Ion Chromatography
mg/L = Milligrams per Litre
n/v = no value
RDL= reported detection limit
Federal WQG = Federal, Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) Marine Aquatic Life Guideline
BC WQG = British Columbia Marine Aquatic Life Guideline
Values in red font are above the long-term BC WQG
Values shaded in grey are above the short-term BC WQG
Values italicized and underlined are above the Federal WQG

Appendix 3.3-1: Confirmatory Geochemical Results

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

						1200 Area			1100 Area				
					Sample Type	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
					Location	1200D-8	1200D-9	1200D-10	1100-Pre Blast	1100-Post Blast	1100-1	1100-2	1100-3
					Shake Flask Extract ID	24H2961-08	24H2961-09	24H2961-10	24E2908-1	24E2908-2	24H3549-01	24H3549-02	24H3549-03
					Date Received at Lab	2024-08-12	2024-08-12	2024-08-12	2024-05-15	2024-05-15	2024-08-22	2024-08-22	2024-08-22
Parameter	**Unit**	**RDL**	**Federal WQG**	**BCWQG Short Term**	**BCWQG Long Term**								
pH	pH units	0.01	-	-	-	5.91	5.8	5.76	6.84	7.02	6.1	6.3	6.3
EC	µS/cm	1	n/v	n/v	n/v	24.5	19.1	23.2	99.6	77.3	52	45	40
Acidity (to pH 8.3)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	19.4	25.3	18.29	24.29	25.87	17.9	11.8	10.8
Alkalinity (to pH 4.5)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	5.62	5.04	6.42	41.21	29.33	17.4	12.5	11.8
Sulphate	mg/L	1	n/v	n/v	n/v	2.44	2.56	2.21	5.84	5.2	3.9	4.1	4.4
Chloride	mg/L	0.1	n/v	n/v	n/v	2.89	2.05	2.34	1.03	1.54	1.91	3.14	1.76
Fluoride	mg/L	0.1	n/v	n/v	n/v	0.21	0.17	0.22	0.26	0.18	0.16	0.15	0.15
Nitrate	mg/L	0.01	n/v	n/v	n/v	<0.01	0.095	0.015	0.013	<0.01	0.158	0.029	0.035
Nitrite	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	0.015	<0.01	<0.01	<0.01	<0.01
Total Organic Carbon	mg/L	0.5	n/v	n/v	n/v	0.73	1.52	1.5	2.12	9.92	2.21	1.33	2.35
Dissolved Metals Analysis by ICP-MS:													
Dissolved Hardness (as $CaCO_3$)	mg/L	0.125	n/v	n/v	n/v	2.48	1.46	1.95	15.6	32.1	12.20	6.82	4.75
Aluminum Dissolved	mg/L	0.001	n/v	n/v	n/v	0.041	0.0459	0.038	0.49	0.73	0.243	0.215	0.123
Antimony Dissolved	mg/L	0.00005	n/v	0.27	n/v	0.000091	0.000112	0.000095	0.000445	0.000766	0.000228	0.000095	0.00024
Arsenic Dissolved	mg/L	0.00005	0.0125	0.0125	n/v	0.000453	0.000546	0.000267	0.00993	0.00205	0.00104	0.00094	0.00129
Barium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00131	0.00184	0.00096	0.00154	0.00342	0.00237	0.00197	0.00146
Beryllium Dissolved	mg/L	0.00001	n/v	n/v	0.1	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron Dissolved	mg/L	0.002	n/v	n/v	1.2	0.0067	0.0059	0.0052	0.0546	0.0573	0.0088	0.0102	0.0088
Cadmium Dissolved	mg/L	0.000002	0.00012	n/v	n/v	0.0000054	0.0000095	0.0000065	<0.000006	<0.000008	<0.000006	<0.000002	<0.000004
Calcium Dissolved	mg/L	0.05	n/v	n/v	n/v	0.89	0.498	0.611	6.07	12.5	4.54	2.50	1.74
Chromium Dissolved	mg/L	0.0005	n/v	n/v	n/v	<0.0005	<0.0005	<0.0005	0.00053	0.0006	<0.0005	<0.0005	<0.0005
Cobalt Dissolved	mg/L	0.000005	n/v	n/v	n/v	0.000125	0.0000869	0.0000394	0.0000326	0.0000587	0.0000207	0.0000144	0.0000221
Copper Dissolved	mg/L	0.0001	n/v	0.003	0.002	0.00042	0.00182	0.00076	0.00197	***0.00476***	0.00122	0.00049	0.00108
Iron Dissolved	mg/L	0.002	n/v	n/v	n/v	0.005	0.0126	0.0061	0.0113	0.0359	0.0114	0.013	0.0626
Lead Dissolved	mg/L	0.00005	n/v	0.14	0.002	0.000087	0.000151	<0.00005	<0.00005	0.000865	<0.00005	<0.00005	<0.00005
Lithium Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00215	0.00282	0.00101	0.000777	0.000376	0.0033	0.0043	0.0053
Magnesium Dissolved	mg/L	0.005	n/v	n/v	n/v	0.0628	0.053	0.102	0.111	0.247	0.197	0.137	0.096
Manganese Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00761	0.0104	0.0213	0.00134	0.00174	0.00661	0.00576	0.00907
Mercury Dissolved	mg/L	0.00002	0.000016	n/v	n/v	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***
Molybdenum Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.00551	0.00169	0.00255	0.0148	0.00762	0.00795	0.00608	0.00806
Nickel Dissolved	mg/L	0.00004	n/v	n/v	0.0083	<0.00004	0.000164	<0.00004	0.000153	0.000317	0.000103	<0.00004	0.000052
Phosphorus Dissolved	mg/L	0.01	n/v	n/v	n/v	<0.01	0.073	0.01	0.224	0.021	<0.01	0.012	0.018
Potassium Dissolved	mg/L	0.02	n/v	n/v	n/v	2.14	2.17	1.67	1.37	2.09	1.78	2.04	1.16
Selenium Dissolved	mg/L	0.0001	n/v	n/v	0.002	0.00024	<0.0001	<0.0001	0.00036	0.00018	0.00017	0.00022	0.00026
Silicon Dissolved	mg/L	0.1	n/v	n/v	n/v	1.19	0.89	1.12	1.66	1.56	1.25	1.69	1.19
Silver Dissolved	mg/L	0.00001	0.0075	0.0037	0.0005	0.000033	0.000084	0.000013	0.000015	0.000023	<0.00001	0.000091	0.000044
Sodium Dissolved	mg/L	0.02	n/v	n/v	n/v	3.25	2.67	3.85	9.42	7.94	4.83	4.72	4.97
Strontium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00414	0.00272	0.0035	0.018	0.0425	0.017	0.00967	0.00905
Sulphur Dissolved	mg/L	1	n/v	n/v	n/v	<1	<1	<1	3.01	2.17	<1	<1	<1
Tellurium Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thallium Dissolved	mg/L	0.000004	n/v	n/v	n/v	0.0000071	0.0000084	<0.000004	0.0000044	0.0000088	<0.000004	<0.000004	<0.000004
Thorium Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	0.000031	<0.00001	<0.00001	<0.00001	<0.00001	0.000011	<0.00001
Tin Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.000241	<0.00005	<0.00005	<0.00005	<0.00005	0.000143	0.000089	0.000103
Titanium Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00032	0.00067	0.00062	0.00093	0.0011	0.00075	0.00079	0.00096
Tungsten Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00344	0.00136	0.00163	0.00345	0.00116	0.00283	0.00487	0.00319
Uranium Dissolved	mg/L	0.000001	n/v	n/v	n/v	0.000245	0.000127	0.0000514	0.0226	0.00932	0.000949	0.000596	0.000386
Vanadium Dissolved	mg/L	0.001	0.005	n/v	n/v	<0.001	<0.001	<0.001	***0.0398***	***0.00749***	0.00175	0.00114	0.00104
Zinc Dissolved	mg/L	0.001	n/v	0.055	0.01	0.0013	0.0014	<0.001	0.0019	0.0015	<0.001	<0.001	<0.001
Zirconium Dissolved	mg/L	0.00002	n/v	n/v	n/v	<0.00002	0.000479	<0.00002	0.000037	0.000134	0.000021	<0.00002	<0.00002

Notes:
EC = Electrical Conductivity
IC = Ion Chromatography
mg/L = Milligrams per Litre
n/v = no value
RDL= reported detection limit
Federal WQG = Federal, Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) Marine Aquatic Life Guideline
BC WQG = British Columbia Marine Aquatic Life Guideline
Values in red font are above the long-term BC WQG
Values shaded in grey are above the short-term BC WQG
Values italicized and underlined are above the Federal WQG

Appendix 3.3-1: Confirmatory Geochemical Results

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

						1100 Area							4100 Area
					Sample Type	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
					Location	1100-4	1100-5	1100-6	1100-7	1100-8	1100-9	1100-10	4100 Bedrock
					Shake Flask Extract ID	24H3549-04	24H3549-05	24H3549-06	24H3549-07	24H3549-08	24H3549-09	24H3549-10	24C1115-01
					Date Received at Lab	2024-08-22	2024-08-22	2024-08-22	2024-08-22	2024-08-22	2024-08-22	2024-08-22	2024-03-05
Parameter	**Unit**	**RDL**	**Federal WQG**	**BCWQG Short Term**	**BCWQG Long Term**								
pH	pH units	0.01	-	-	-	6.3	6.3	6.5	6.3	6.5	6.6	6.6	6.5
EC	µS/cm	1	n/v	n/v	n/v	60	65	69	60	65	51	60	58.8
Acidity (to pH 8.3)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	21.6	26.8	26.3	21.2	21.5	15.3	22.8	15.82
Alkalinity (to pH 4.5)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	23.6	21.6	26.5	17.4	22.5	16.8	24.4	21.42
Sulphate	mg/L	1	n/v	n/v	n/v	3.2	4.3	4.3	3.7	4.0	3.3	4.2	3.609
Chloride	mg/L	0.1	n/v	n/v	n/v	3.22	1.71	3.89	5.54	3.82	3.40	2.22	1.67
Fluoride	mg/L	0.1	n/v	n/v	n/v	0.16	0.12	0.14	0.12	0.12	0.20	0.17	0.63
Nitrate	mg/L	0.01	n/v	n/v	n/v	0.012	0.035	0.035	0.012	0.015	0.011	0.014	0.238
Nitrite	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.052
Total Organic Carbon	mg/L	0.5	n/v	n/v	n/v	1.16	1.52	1.37	1.08	1.22	1.28	1.13	4.7
Dissolved Metals Analysis by ICP-MS:													
Dissolved Hardness (as $CaCO_3$)	mg/L	0.125	n/v	n/v	n/v	15.60	19.00	15.20	12.30	15.40	5.85	9.33	24
Aluminum Dissolved	mg/L	0.001	n/v	n/v	n/v	0.232	0.307	0.328	0.258	0.291	0.17	0.369	0.113
Antimony Dissolved	mg/L	0.00005	n/v	0.27	n/v	0.000173	0.000307	0.000327	0.000117	0.000132	0.000215	0.000297	0.000495
Arsenic Dissolved	mg/L	0.00005	0.0125	0.0125	n/v	0.00149	0.00494	0.00207	0.00162	0.0016	0.000772	0.00245	0.000494
Barium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.002	0.00232	0.00331	0.00233	0.00261	0.00193	0.00212	0.00439
Beryllium Dissolved	mg/L	0.00001	n/v	n/v	0.1	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron Dissolved	mg/L	0.002	n/v	n/v	1.2	0.0173	0.0283	0.0209	0.015	0.0215	0.0091	0.0246	0.0201
Cadmium Dissolved	mg/L	0.000002	0.00012	n/v	n/v	<0.000006	***<0.000126***	<0.000006	<0.000006	<0.000004	0.0000044	<0.000014	<0.000012
Calcium Dissolved	mg/L	0.05	n/v	n/v	n/v	5.94	7.42	5.84	4.72	6.01	2.17	3.45	9.25
Chromium Dissolved	mg/L	0.0005	n/v	n/v	n/v	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt Dissolved	mg/L	0.000005	n/v	n/v	n/v	0.0000065	0.000016	0.0000174	0.0000115	0.0000102	0.0000108	0.0000118	0.0000345
Copper Dissolved	mg/L	0.0001	n/v	0.003	0.002	0.00019	0.00092	0.00084	0.0005	0.00058	0.00043	0.00064	0.00103
Iron Dissolved	mg/L	0.002	n/v	n/v	n/v	0.0126	0.0089	0.0223	0.0084	0.0046	0.0121	0.0288	0.0108
Lead Dissolved	mg/L	0.00005	n/v	0.14	0.002	<0.00005	**0.00322**	0.000154	0.000074	0.000056	<0.00005	0.000266	0.000199
Lithium Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.0037	0.0024	0.0039	0.0033	0.0036	0.0016	0.0027	0.0011
Magnesium Dissolved	mg/L	0.005	n/v	n/v	n/v	0.186	0.118	0.140	0.118	0.099	0.106	0.171	0.224
Manganese Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00906	0.0083	0.00338	0.005	0.00417	0.0135	0.00898	0.00506
Mercury Dissolved	mg/L	0.00002	0.000016	n/v	n/v	***<0.00002***	***0.000025***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***
Molybdenum Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.00587	0.664	0.00791	0.0123	0.00682	0.00353	0.0187	0.0344
Nickel Dissolved	mg/L	0.00004	n/v	n/v	0.0083	<0.00004	0.00005	0.000055	<0.00004	<0.00004	<0.00004	0.000047	0.000146
Phosphorus Dissolved	mg/L	0.01	n/v	n/v	n/v	0.01	0.026	0.03	0.024	0.021	0.01	0.012	<0.01
Potassium Dissolved	mg/L	0.02	n/v	n/v	n/v	1.77	2.21	2.18	2.19	3.08	2.62	3.29	0.911
Selenium Dissolved	mg/L	0.0001	n/v	n/v	0.002	<0.0001	0.00014	<0.0001	<0.0001	0.00012	<0.0001	<0.0001	<0.0001
Silicon Dissolved	mg/L	0.1	n/v	n/v	n/v	1.61	2.32	2.12	2.29	2.59	0.96	1.98	1.13
Silver Dissolved	mg/L	0.00001	0.0075	0.0037	0.0005	<0.00001	0.000041	0.00001	0.000013	<0.00001	0.00001	0.000017	<0.00001
Sodium Dissolved	mg/L	0.02	n/v	n/v	n/v	3.67	3.88	4.67	5.1	4.56	3.41	5.37	2.72
Strontium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.0127	0.02	0.0175	0.0142	0.0156	0.00659	0.0106	0.033
Sulphur Dissolved	mg/L	1	n/v	n/v	n/v	<1	<1	<1	<1	<1	<1	<1	1.43
Tellurium Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thallium Dissolved	mg/L	0.000004	n/v	n/v	n/v	<0.000004	0.0000044	<0.000004	<0.000004	0.0000063	<0.000004	<0.000004	<0.000004
Thorium Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.00003	<0.00001	0.000036	<0.00001	<0.00001	<0.00001	0.000021	<0.00001
Tin Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00015	<0.00005	0.000059	<0.00005	0.000057	0.000311	<0.00005	<0.00005
Titanium Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00091	0.00073	0.00168	0.00076	0.00043	0.00084	0.00174	0.00052
Tungsten Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00349	0.0124	0.00409	0.00445	0.00425	0.00432	0.00363	0.0006
Uranium Dissolved	mg/L	0.000001	n/v	n/v	n/v	0.000758	0.00296	0.00345	0.00141	0.00106	0.000259	0.000607	0.0167
Vanadium Dissolved	mg/L	0.001	0.005	n/v	n/v	0.0015	0.00235	0.00406	0.00237	0.00272	<0.001	0.00236	0.0016
Zinc Dissolved	mg/L	0.001	n/v	0.055	0.01	<0.001	0.0040	<0.001	<0.001	<0.001	<0.001	<0.001	0.0013
Zirconium Dissolved	mg/L	0.00002	n/v	n/v	n/v	<0.00002	<0.00002	0.000033	<0.00002	<0.00002	<0.00002	<0.00002	0.000041

Notes:
EC = Electrical Conductivity
IC = Ion Chromatography
mg/L = Milligrams per Litre
n/v = no value
RDL= reported detection limit
Federal WQG = Federal, Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) Marine Aquatic Life Guideline
BC WQG = British Columbia Marine Aquatic Life Guideline
Values in red font are above the long-term BC WQG
Values shaded in grey are above the short-term BC WQG
Values italicized and underlined are above the Federal WQG

Appendix 3.3-1: Confirmatory Geochemical Results

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

						FST4 Area							
					Sample Type	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
					Location	FST4-01	FST4-02	FST4-03	FST4-04	FST4-05	FST4-06	FST4-07	FST4-08
					Shake Flask Extract ID	24I2570-01	24I2570-02	24I2570-03	24I2570-04	24I2570-05	24I2570-06	24I2570-07	24I2570-08
					Date Received at Lab	2024-09-13	2024-09-13	2024-09-13	2024-09-13	2024-09-13	2024-09-13	2024-09-13	2024-09-13
Parameter	**Unit**	**RDL**	**Federal WQG**	**BCWQG Short Term**	**BCWQG Long Term**								
pH	pH units	0.01	-	-	-	6.0	6.2	6.3	6.2	6.1	6.1	6.3	6.2
EC	µS/cm	1	n/v	n/v	n/v	33	75	42	31	40	64	42	30
Acidity (to pH 8.3)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	37.5	50.8	33.7	31.2	32.4	44.2	37.5	23.0
Alkalinity (to pH 4.5)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	7.6	21.4	14.5	9.1	12.5	20.1	13.3	10.7
Sulphate	mg/L	1	n/v	n/v	n/v	3.5	3.0	2.8	3.3	3.7	3.5	3.3	3.6
Chloride	mg/L	0.1	n/v	n/v	n/v	5.61	14.60	6.57	6.06	7.39	11.60	6.85	4.06
Fluoride	mg/L	0.1	n/v	n/v	n/v	0.24	0.34	0.30	0.33	0.37	0.43	0.33	0.28
Nitrate	mg/L	0.01	n/v	n/v	n/v	0.268	0.094	<0.01	<0.01	<0.01	<0.01	<0.01	0.031
Nitrite	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Organic Carbon	mg/L	0.5	n/v	n/v	n/v	2.07	1.20	0.81	0.86	1.05	1.73	1.05	10.10
Dissolved Metals Analysis by ICP-MS:													
Dissolved Hardness (as $CaCO_3$)	mg/L	0.125	n/v	n/v	n/v	4.91	9.40	4.50	2.10	2.43	5.42	2.91	3.60
Aluminum Dissolved	mg/L	0.001	n/v	n/v	n/v	0.0424	0.0702	0.0834	0.047	0.0831	0.091	0.0703	0.0445
Antimony Dissolved	mg/L	0.00005	n/v	0.27	n/v	0.000189	0.00015	0.000113	0.000116	0.000112	0.000131	0.000106	0.000144
Arsenic Dissolved	mg/L	0.00005	0.0125	0.0125	n/v	0.000962	0.00277	0.00154	0.00198	0.00257	0.00243	0.00236	0.00119
Barium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00231	0.00265	0.00117	0.00086	0.00157	0.00207	0.00126	0.00152
Beryllium Dissolved	mg/L	0.00001	n/v	n/v	0.1	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron Dissolved	mg/L	0.002	n/v	n/v	1.2	0.0108	0.0201	0.0102	0.0184	0.0212	0.0223	0.0207	0.0139
Cadmium Dissolved	mg/L	0.000002	0.00012	n/v	n/v	0.0000027	<0.000004	<0.000002	<0.000005	<0.000002	<0.000004	<0.000004	0.0000076
Calcium Dissolved	mg/L	0.05	n/v	n/v	n/v	1.77	3.62	1.65	0.74	0.81	2.01	1.01	1.21
Chromium Dissolved	mg/L	0.0005	n/v	n/v	n/v	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt Dissolved	mg/L	0.000005	n/v	n/v	n/v	0.000288	0.000108	0.0000654	0.000244	0.000171	0.000121	0.000116	0.000249
Copper Dissolved	mg/L	0.0001	n/v	0.003	0.002	0.00139	0.00049	0.0003	0.0007	0.0011	0.00196	0.00126	**0.00224**
Iron Dissolved	mg/L	0.002	n/v	n/v	n/v	0.0166	0.007	0.0056	0.0044	0.0065	0.0072	0.0056	0.0154
Lead Dissolved	mg/L	0.00005	n/v	0.14	0.002	0.000146	0.000148	0.000076	<0.00005	0.000093	0.000085	<0.00005	0.000097
Lithium Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.0042	0.0080	0.0050	0.0045	0.0055	0.0085	0.0051	0.0033
Magnesium Dissolved	mg/L	0.005	n/v	n/v	n/v	0.118	0.084	0.092	0.061	0.098	0.096	0.091	0.139
Manganese Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.0125	0.00442	0.00324	0.00651	0.00624	0.00526	0.00537	0.0112
Mercury Dissolved	mg/L	0.00002	0.000016	n/v	n/v	***<0.00002***	***0.000024***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***
Molybdenum Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.00195	0.0049	0.0069	0.00421	0.00342	0.00501	0.00474	0.00281
Nickel Dissolved	mg/L	0.00004	n/v	n/v	0.0083	0.00017	<0.00004	<0.00004	0.000048	<0.00004	0.00013	<0.00004	0.000084
Phosphorus Dissolved	mg/L	0.01	n/v	n/v	n/v	0.013	0.018	0.014	0.015	0.02	0.022	0.017	0.012
Potassium Dissolved	mg/L	0.02	n/v	n/v	n/v	2.84	7.2	4.71	2.52	3.47	5.82	3.68	2.77
Selenium Dissolved	mg/L	0.0001	n/v	n/v	0.002	0.00011	0.00012	0.00012	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Silicon Dissolved	mg/L	0.1	n/v	n/v	n/v	1.25	5.74	2.41	2.2	3.19	5.47	3.54	1.68
Silver Dissolved	mg/L	0.00001	0.0075	0.0037	0.0005	0.00002	0.000024	<0.00001	<0.00001	<0.00001	0.00001	0.000027	<0.00001
Sodium Dissolved	mg/L	0.02	n/v	n/v	n/v	4.23	10.6	5.95	5.48	6.9	10.3	7.03	4.41
Strontium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.0049	0.00824	0.00322	0.00226	0.00275	0.00554	0.00347	0.00412
Sulphur Dissolved	mg/L	1	n/v	n/v	n/v	<1	<1	<1	<1	<1	<1	<1	<1
Tellurium Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thallium Dissolved	mg/L	0.000004	n/v	n/v	n/v	0.0000066	0.0000113	0.0000093	<0.000004	0.0000111	0.000012	0.0000065	0.0000063
Thorium Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.000053	0.000015	0.000011	<0.00001	0.000013	0.000015	0.000015	0.00004
Tin Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	0.000117	0.000062	<0.00005	0.000059	0.000125	0.000125	0.000082
Titanium Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00057	0.00037	0.00048	0.00032	0.00062	0.00062	0.00033	0.00059
Tungsten Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.0134	0.0625	0.0396	0.0222	0.0224	0.0399	0.0243	0.00935
Uranium Dissolved	mg/L	0.000001	n/v	n/v	n/v	0.000764	0.000662	0.000298	0.000214	0.000209	0.000412	0.000335	0.000278
Vanadium Dissolved	mg/L	0.001	0.005	n/v	n/v	<0.001	0.00128	0.0023	<0.001	<0.001	0.0013	<0.001	<0.001
Zinc Dissolved	mg/L	0.001	n/v	0.055	0.01	0.0028	0.0013	<0.001	<0.001	0.0011	0.0032	0.0039	0.0016
Zirconium Dissolved	mg/L	0.00002	n/v	n/v	n/v	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002

Notes:
EC = Electrical Conductivity
IC = Ion Chromatography
mg/L = Milligrams per Litre
n/v = no value
RDL= reported detection limit
Federal WQG = Federal, Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) Marine Aquatic Life Guideline
BC WQG = British Columbia Marine Aquatic Life Guideline
Values in red font are above the long-term BC WQG
Values shaded in grey are above the short-term BC WQG
Values italicized and underlined are above the Federal WQG

Appendix 3.3-1: Confirmatory Geochemical Results

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

						FST4 Area							
					Sample Type	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
					Location	FST4-09	FST4-10	C1.1	C1.2	C1.3	C1.4	C1.5	C1.6
					Shake Flask Extract ID	24I2570-09	24I2570-10	25G0911-01	25G0911-02	25G0911-03	25G0911-04	25G0911-05	25G0911-06
					Date Received at Lab	2024-09-13	2024-09-13	2025-06-30	2025-06-30	2025-06-30	2025-06-30	2025-06-30	2025-06-30
Parameter	**Unit**	**RDL**	**Federal WQG**	**BCWQG Short Term**	**BCWQG Long Term**								
pH	pH units	0.01	-	-	-	6.2	6.1	6.2	6.3	6.4	6.4	6.5	6.4
EC	µS/cm	1	n/v	n/v	n/v	32	39	29	24	33	38	26	21
Acidity (to pH 8.3)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	28.4	31.2	5.3	4.9	5.9	5.6	4.5	5.1
Alkalinity (to pH 4.5)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	10.5	12.6	10.0	9.0	14.7	15.8	11.4	9.8
Sulphate	mg/L	1	n/v	n/v	n/v	2.9	4.9	0.54	<0.01	<0.01	0.83	<0.01	<0.01
Chloride	mg/L	0.1	n/v	n/v	n/v	5.01	3.69	1.53	1.23	1.60	1.44	1.86	1.33
Fluoride	mg/L	0.1	n/v	n/v	n/v	0.36	0.54	<0.1	<0.1	<0.1	<0.1	0.12	<0.1
Nitrate	mg/L	0.01	n/v	n/v	n/v	<0.01	0.037	0.015	0.034	<0.01	<0.01	<0.01	<0.01
Nitrite	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Organic Carbon	mg/L	0.5	n/v	n/v	n/v	2.92	11.40	0.60	0.50	<0.5	<0.5	<0.5	0.76
Dissolved Metals Analysis by ICP-MS:													
Dissolved Hardness (as $CaCO_3$)	mg/L	0.125	n/v	n/v	n/v	1.86	2.89	6.62	5.51	8.62	10.20	4.25	4.44
Aluminum Dissolved	mg/L	0.001	n/v	n/v	n/v	0.0545	0.0692	0.103	0.089	0.158	0.132	0.121	0.0652
Antimony Dissolved	mg/L	0.00005	n/v	0.27	n/v	0.0001	0.000177	<0.00005	<0.00005	0.000055	0.000056	0.000058	0.000059
Arsenic Dissolved	mg/L	0.00005	0.0125	0.0125	n/v	0.00208	0.000658	0.000374	0.000421	0.00119	0.000608	0.000703	0.000512
Barium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00097	0.00171	0.00164	0.00151	0.00203	0.00218	0.00305	0.00134
Beryllium Dissolved	mg/L	0.00001	n/v	n/v	0.1	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron Dissolved	mg/L	0.002	n/v	n/v	1.2	0.0187	0.013	0.0048	0.0051	0.0071	0.0076	0.0072	0.0079
Cadmium Dissolved	mg/L	0.000002	0.00012	n/v	n/v	<0.000004	<0.000004	0.0000026	<0.000002	<0.000006	0.0000048	0.0000032	0.0000042
Calcium Dissolved	mg/L	0.05	n/v	n/v	n/v	0.65	0.82	2.31	1.96	3.27	3.93	1.54	1.66
Chromium Dissolved	mg/L	0.0005	n/v	n/v	n/v	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cobalt Dissolved	mg/L	0.000005	n/v	n/v	n/v	0.00024	0.000271	0.0000253	0.0000133	0.0000078	0.00007	0.0000311	0.0000111
Copper Dissolved	mg/L	0.0001	n/v	0.003	0.002	0.00085	**0.00362**	0.00046	0.00034	0.00017	0.00032	0.00033	0.0002
Iron Dissolved	mg/L	0.002	n/v	n/v	n/v	0.0039	0.0384	0.0046	0.0054	0.0034	0.0072	0.0064	0.0027
Lead Dissolved	mg/L	0.00005	n/v	0.14	0.002	<0.00005	0.000062	<0.00005	<0.00005	0.000071	0.000077	0.000086	<0.00005
Lithium Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.0047	0.0053	0.0017	0.0017	0.0028	0.0027	0.0023	0.0020
Magnesium Dissolved	mg/L	0.005	n/v	n/v	n/v	0.056	0.203	0.209	0.149	0.109	0.106	0.098	0.069
Manganese Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00651	0.0172	0.00278	0.00543	0.00622	0.0085	0.00371	0.0087
Mercury Dissolved	mg/L	0.00002	0.000016	n/v	n/v	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***
Molybdenum Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.00293	0.00641	0.0012	0.000802	0.00479	0.00283	0.00209	0.00193
Nickel Dissolved	mg/L	0.00004	n/v	n/v	0.0083	<0.00004	0.000183	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
Phosphorus Dissolved	mg/L	0.01	n/v	n/v	n/v	0.018	0.026	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium Dissolved	mg/L	0.02	n/v	n/v	n/v	3.13	5.63	1.67	1.44	2.09	2.69	2.02	1.33
Selenium Dissolved	mg/L	0.0001	n/v	n/v	0.002	<0.0001	0.00012	0.00011	<0.0001	<0.0001	0.00013	<0.0001	<0.0001
Silicon Dissolved	mg/L	0.1	n/v	n/v	n/v	2.76	1.53	1.39	1.36	1.85	1.45	1.71	1.38
Silver Dissolved	mg/L	0.00001	0.0075	0.0037	0.0005	<0.00001	0.000022	<0.00001	0.000019	<0.00001	0.00001	0.000015	<0.00001
Sodium Dissolved	mg/L	0.02	n/v	n/v	n/v	5.32	5.23	2.26	1.85	2.44	2.28	2.74	1.96
Strontium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.0021	0.00365	0.00663	0.00626	0.0064	0.00671	0.00446	0.00449
Sulphur Dissolved	mg/L	1	n/v	n/v	n/v	<1	1.1	<1	<1	<1	<1	<1	<1
Tellurium Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thallium Dissolved	mg/L	0.000004	n/v	n/v	n/v	0.000007	0.0000177	0.0000068	0.0000073	0.0000073	0.0000177	0.0000063	0.000008
Thorium Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.000015	0.000049	0.000012	0.00001	0.00002	0.000018	0.000018	<0.00001
Tin Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000117
Titanium Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00033	0.00167	0.00023	0.00036	0.00024	0.00031	0.00054	<0.0002
Tungsten Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.0187	0.00826	0.00097	0.0004	0.00069	0.00119	0.00035	0.00109
Uranium Dissolved	mg/L	0.000001	n/v	n/v	n/v	0.00022	0.000149	0.000295	0.000323	0.000403	0.000309	0.000206	0.000097
Vanadium Dissolved	mg/L	0.001	0.005	n/v	n/v	<0.001	0.00146	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc Dissolved	mg/L	0.001	n/v	0.055	0.01	<0.001	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium Dissolved	mg/L	0.00002	n/v	n/v	n/v	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002

Notes:
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IC = Ion Chromatography
mg/L = Milligrams per Litre
n/v = no value
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Values italicized and underlined are above the Federal WQG

Appendix 3.3-1: Confirmatory Geochemical Results

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

						FST4 Area							
					Sample Type	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
					Location	C1.7	C1.8	C1.9	C1.10	C2.1	C2.2	C2.3	C2.4
					Shake Flask Extract ID	25G0911-07	25G0911-08	25G0911-09	25G0911-10	25G3776-01	25G3776-02	25G3776-03	25G3776-04
					Date Received at Lab	2025-06-30	2025-06-30	2025-06-30	2025-06-30	2025-07-21	2025-07-21	2025-07-21	2025-07-21
Parameter	**Unit**	**RDL**	**Federal WQG**	**BCWQG Short Term**	**BCWQG Long Term**								
pH	pH units	0.01	-	-	-	6.3	6.3	6.5	6.6	6.2	6.4	6.5	6.4
EC	µS/cm	1	n/v	n/v	n/v	16	21	41	34	37	38	39	26
Acidity (to pH 8.3)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	4.0	4.4	9.4	5.6	9.8	8.0	8.3	6.0
Alkalinity (to pH 4.5)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	6.5	8.3	18.8	14.0	10.6	12.5	12.5	8.9
Sulphate	mg/L	1	n/v	n/v	n/v	<0.01	<0.01	1.33	0.85	1.10	<1	1.40	<1
Chloride	mg/L	0.1	n/v	n/v	n/v	1.04	1.45	1.36	1.73	1.73	1.80	1.24	0.85
Fluoride	mg/L	0.1	n/v	n/v	n/v	<0.1	<0.1	<0.1	0.12	0.15	0.17	0.12	0.15
Nitrate	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	0.016	0.020	0.015	<0.01
Nitrite	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Organic Carbon	mg/L	0.5	n/v	n/v	n/v	1.55	1.32	2.10	0.83	2.17	1.45	1.38	1.32
Dissolved Metals Analysis by ICP-MS:													
Dissolved Hardness (as $CaCO_3$)	mg/L	0.125	n/v	n/v	n/v	2.72	3.64	12.90	8.99	7.10	8.00	8.86	5.69
Aluminum Dissolved	mg/L	0.001	n/v	n/v	n/v	0.0664	0.0624	0.153	0.251	0.197	0.261	0.214	0.11
Antimony Dissolved	mg/L	0.00005	n/v	0.27	n/v	0.000054	0.000065	0.000099	0.000452	0.00009	0.000076	0.00008	<0.00005
Arsenic Dissolved	mg/L	0.00005	0.0125	0.0125	n/v	0.000576	0.000472	0.000659	0.000919	0.00228	0.00171	0.00178	0.000806
Barium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00147	0.0047	0.00553	0.00233	0.00378	0.00472	0.00437	0.00261
Beryllium Dissolved	mg/L	0.00001	n/v	n/v	0.1	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron Dissolved	mg/L	0.002	n/v	n/v	1.2	0.0064	0.0063	0.0066	0.0081	0.0076	0.0098	0.006	0.0051
Cadmium Dissolved	mg/L	0.000002	0.00012	n/v	n/v	0.0000053	<0.000008	0.0000115	0.0000034	0.0000051	0.0000046	0.000003	0.000002
Calcium Dissolved	mg/L	0.05	n/v	n/v	n/v	0.96	1.27	4.73	3.42	2.66	3.03	3.34	2.06
Chromium Dissolved	mg/L	0.0005	n/v	n/v	n/v	<0.0005	<0.0005	<0.0005	<0.0005	0.0025	0.0020	0.0022	0.0009
Cobalt Dissolved	mg/L	0.000005	n/v	n/v	n/v	0.000119	0.000077	0.0000767	0.0000211	0.000321	0.0000409	0.0000524	0.0000459
Copper Dissolved	mg/L	0.0001	n/v	0.003	0.002	0.00059	0.00065	**0.00213**	0.00026	0.00111	0.00097	0.00042	0.00033
Iron Dissolved	mg/L	0.002	n/v	n/v	n/v	0.003	0.0053	0.0042	0.0143	0.0077	0.0126	0.0093	0.0049
Lead Dissolved	mg/L	0.00005	n/v	0.14	0.002	<0.00005	0.000051	<0.00005	0.000081	0.000075	0.000072	0.000051	<0.00005
Lithium Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.0004	0.0016	0.0013	0.0030	0.0019	0.0024	0.0021	0.0013
Magnesium Dissolved	mg/L	0.005	n/v	n/v	n/v	0.079	0.112	0.263	0.106	0.108	0.104	0.122	0.128
Manganese Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00674	0.0122	0.00827	0.00436	0.0048	0.00453	0.004	0.00308
Mercury Dissolved	mg/L	0.00002	0.000016	n/v	n/v	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***
Molybdenum Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.000823	0.0081	0.00191	0.00146	0.000754	0.000374	0.000808	0.000937
Nickel Dissolved	mg/L	0.00004	n/v	n/v	0.0083	0.000041	<0.00004	0.000068	<0.00004	0.000249	0.000132	<0.00004	<0.00004
Phosphorus Dissolved	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	0.021	<0.01	0.028	<0.01
Potassium Dissolved	mg/L	0.02	n/v	n/v	n/v	1.06	1.61	2	2.44	1.9	1.98	2.09	1.54
Selenium Dissolved	mg/L	0.0001	n/v	n/v	0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00011	0.00017	<0.0001
Silicon Dissolved	mg/L	0.1	n/v	n/v	n/v	1.03	1.25	1.34	1.9	1.59	1.68	1.41	1.01
Silver Dissolved	mg/L	0.00001	0.0075	0.0037	0.0005	<0.00001	0.000011	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium Dissolved	mg/L	0.02	n/v	n/v	n/v	1.76	2.09	2.41	2.35	2.06	2.19	1.62	1.11
Strontium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00493	0.00516	0.0146	0.00561	0.007	0.00653	0.00861	0.00498
Sulphur Dissolved	mg/L	1	n/v	n/v	n/v	<1	<1	<1	<1	<1	<1	<1	<1
Tellurium Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thallium Dissolved	mg/L	0.000004	n/v	n/v	n/v	0.0000061	0.0000063	0.0000094	0.0000075	0.0000102	0.0000126	0.0000096	0.0000122
Thorium Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	0.000014	0.000011	0.000012	0.000022	0.00001	<0.00001
Tin Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.0002	0.00035	<0.0002	0.00066	<0.0002	0.00035	0.00027	<0.0002
Tungsten Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00225	0.00161	0.00075	0.00195	<0.0002	0.00031	<0.0002	0.00025
Uranium Dissolved	mg/L	0.000001	n/v	n/v	n/v	0.0000618	0.00024	0.00067	0.00195	0.000432	0.000107	0.00029	0.000318
Vanadium Dissolved	mg/L	0.001	0.005	n/v	n/v	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc Dissolved	mg/L	0.001	n/v	0.055	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium Dissolved	mg/L	0.00002	n/v	n/v	n/v	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002

Notes:
EC = Electrical Conductivity
IC = Ion Chromatography
mg/L = Milligrams per Litre
n/v = no value
RDL= reported detection limit
Federal WQG = Federal, Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) Marine Aquatic Life Guideline
BC WQG = British Columbia Marine Aquatic Life Guideline
Values in red font are above the long-term BC WQG
Values shaded in grey are above the short-term BC WQG
Values italicized and underlined are above the Federal WQG

Appendix 3.3-1: Confirmatory Geochemical Results

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

						FST4 Area							
					Sample Type	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock	Bedrock
					Location	C2.5	C2.6	C2.7	C2.8	C2.9	C2.10	C3.1	C3.2
					Shake Flask Extract ID	25G3776-05	25G3776-06	25G3776-07	25G3776-08	25G3776-09	25G3776-10	25G3813-01	25G3813-02
					Date Received at Lab	2025-07-21	2025-07-21	2025-07-21	2025-07-21	2025-07-21	2025-07-21	2025-07-21	2025-07-21
Parameter	**Unit**	**RDL**	**Federal WQG**	**BCWQG Short Term**	**BCWQG Long Term**								
pH	pH units	0.01	-	-	-	6.5	6.3	6.4	6.5	6.6	6.5	5.9	6.2
EC	µS/cm	1	n/v	n/v	n/v	31	26	20	40	40	15	42	22
Acidity (to pH 8.3)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	7.2	4.8	5.5	10.4	9.4	4.6	6.8	4.7
Alkalinity (to pH 4.5)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	11.8	6.2	6.7	15.6	16.6	4.7	2.6	3.7
Sulphate	mg/L	1	n/v	n/v	n/v	<1	2.70	<1	<1	<1	<1	5.57	0.72
Chloride	mg/L	0.1	n/v	n/v	n/v	1.05	0.71	1.02	1.43	1.28	0.97	0.89	1.11
Fluoride	mg/L	0.1	n/v	n/v	n/v	0.17	<0.1	<0.1	0.11	<0.1	0.12	<0.1	0.11
Nitrate	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.011
Nitrite	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Organic Carbon	mg/L	0.5	n/v	n/v	n/v	1.84	1.29	1.30	1.38	1.50	1.55	1.11	1.36
Dissolved Metals Analysis by ICP-MS:													
Dissolved Hardness (as $CaCO_3$)	mg/L	0.125	n/v	n/v	n/v	6.74	3.70	1.84	9.62	10.70	1.90	7.04	2.32
Aluminum Dissolved	mg/L	0.001	n/v	n/v	n/v	0.194	0.0279	0.059	0.271	0.279	0.0565	0.0078	0.0895
Antimony Dissolved	mg/L	0.00005	n/v	0.27	n/v	0.000095	0.000062	0.00006	0.000078	<0.00005	0.000056	<0.00005	0.000072
Arsenic Dissolved	mg/L	0.00005	0.0125	0.0125	n/v	0.00119	0.000223	0.00107	0.00141	0.000857	0.000815	<0.00005	0.000392
Barium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00537	0.0119	0.00108	0.00225	0.00922	0.00808	0.00291	0.00131
Beryllium Dissolved	mg/L	0.00001	n/v	n/v	0.1	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron Dissolved	mg/L	0.002	n/v	n/v	1.2	0.0062	0.004	0.0047	0.0069	0.0035	0.0036	0.0053	0.0071
Cadmium Dissolved	mg/L	0.000002	0.00012	n/v	n/v	0.000004	0.0000205	0.000002	<0.000002	<0.000002	0.000002	0.0000152	0.0000051
Calcium Dissolved	mg/L	0.05	n/v	n/v	n/v	2.59	1.26	0.63	3.66	4.13	0.64	2.46	0.78
Chromium Dissolved	mg/L	0.0005	n/v	n/v	n/v	0.0011	<0.0005	0.0011	0.0015	0.0010	0.0010	<0.0005	<0.0005
Cobalt Dissolved	mg/L	0.000005	n/v	n/v	n/v	0.0000422	0.000565	0.0000258	0.000121	0.0000284	0.0000341	0.00294	0.000213
Copper Dissolved	mg/L	0.0001	n/v	0.003	0.002	0.00107	0.00102	0.00093	0.00076	0.00073	0.00049	0.00035	0.0007
Iron Dissolved	mg/L	0.002	n/v	n/v	n/v	0.0055	0.026	0.003	0.0044	0.0043	0.0051	0.0061	0.0149
Lead Dissolved	mg/L	0.00005	n/v	0.14	0.002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000085
Lithium Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.0019	0.0010	0.0010	0.0018	0.0013	0.0005	0.0012	0.0013
Magnesium Dissolved	mg/L	0.005	n/v	n/v	n/v	0.065	0.131	0.063	0.113	0.100	0.074	0.213	0.092
Manganese Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00579	0.0113	0.00413	0.00287	0.00284	0.00661	0.0216	0.0107
Mercury Dissolved	mg/L	0.00002	0.000016	n/v	n/v	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***
Molybdenum Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.000521	0.00097	0.00089	0.000815	0.00042	0.000211	0.000733	0.00171
Nickel Dissolved	mg/L	0.00004	n/v	n/v	0.0083	0.000087	0.000161	0.000047	0.000068	0.000049	<0.00004	0.000273	0.000049
Phosphorus Dissolved	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	0.017	<0.01	<0.01
Potassium Dissolved	mg/L	0.02	n/v	n/v	n/v	1.87	1.45	1.14	1.98	1.89	0.914	2.15	1.52
Selenium Dissolved	mg/L	0.0001	n/v	n/v	0.002	<0.0001	0.00016	<0.0001	<0.0001	<0.0001	<0.0001	0.00043	<0.0001
Silicon Dissolved	mg/L	0.1	n/v	n/v	n/v	1.18	0.81	1.02	1.57	1.33	0.87	1.09	1.16
Silver Dissolved	mg/L	0.00001	0.0075	0.0037	0.0005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium Dissolved	mg/L	0.02	n/v	n/v	n/v	1.3	2.05	2.05	1.96	1.81	1.12	1.77	1.74
Strontium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.0054	0.00604	0.00182	0.00545	0.00578	0.00465	0.0129	0.00282
Sulphur Dissolved	mg/L	1	n/v	n/v	n/v	<1	1.3	<1	<1	<1	<1	3.8	<1
Tellurium Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thallium Dissolved	mg/L	0.000004	n/v	n/v	n/v	0.0000131	0.0000123	0.0000041	0.0000083	0.0000106	0.0000051	0.0000303	0.0000112
Thorium Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.000011	<0.00001	0.000013	0.000016	0.000021	0.000028	<0.00001	0.000018
Tin Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00027	<0.0002	<0.0002	0.00036	0.00034	0.00037	<0.0002	0.00031
Tungsten Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00023	0.00031	<0.0002	<0.0002	0.00062	<0.0002	<0.0002	<0.0002
Uranium Dissolved	mg/L	0.000001	n/v	n/v	n/v	0.000288	0.0131	0.000109	0.00092	0.001	0.0000833	0.0000987	0.0002
Vanadium Dissolved	mg/L	0.001	0.005	n/v	n/v	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc Dissolved	mg/L	0.001	n/v	0.055	0.01	<0.001	0.0015	<0.001	<0.001	<0.001	<0.001	0.0011	<0.001
Zirconium Dissolved	mg/L	0.00002	n/v	n/v	n/v	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002

Notes:
EC = Electrical Conductivity
IC = Ion Chromatography
mg/L = Milligrams per Litre
n/v = no value
RDL= reported detection limit
Federal WQG = Federal, Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) Marine Aquatic Life Guideline
BC WQG = British Columbia Marine Aquatic Life Guideline
Values in red font are above the long-term BC WQG
Values shaded in grey are above the short-term BC WQG
Values italicized and underlined are above the Federal WQG

Appendix 3.3-1: Confirmatory Geochemical Results

Table 3: Solid Phase Element Analytical Results for Confirmatory Samples

						FST4 Area							
					Sample Type	**Bedrock**	**Bedrock**	**Bedrock**	**Bedrock**	**Bedrock**	**Bedrock**	**Bedrock**	**Bedrock**
					Location	**C3.3**	**C3.4**	**C3.5**	**C3.6**	**C3.7**	**C3.8**	**C3.9**	**C3.10**
					Shake Flask Extract ID	**25G3813-03**	**25G3813-04**	**25G3813-05**	**25G3813-06**	**25G3813-07**	**25G3813-08**	**25G3813-09**	**25G3813-10**
					Date Received at Lab	**2025-07-21**	**2025-07-21**	**2025-07-21**	**2025-07-21**	**2025-07-21**	**2025-07-21**	**2025-07-21**	**2025-07-21**
Parameter	**Unit**	**RDL**	**Federal WQG**	**BCWQG Short Term**	**BCWQG Long Term**								
pH	pH units	0.01	-	-	-	6.3	6.5	6.3	6.4	6.4	6.4	6.4	6.4
EC	µS/cm	1	n/v	n/v	n/v	25	32	23	24	20	18	20	25
Acidity (to pH 8.3)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	6.1	7.5	4.5	5.0	4.3	4.1	4.6	5.6
Alkalinity (to pH 4.5)	mg $CaCO_3$/L	0.5	n/v	n/v	n/v	8.2	13.3	4.9	9.1	7.9	6.9	8.0	8.6
Sulphate	mg/L	1	n/v	n/v	n/v	<0.5	<0.5	1.36	<0.5	<0.5	<0.5	<0.5	<0.5
Chloride	mg/L	0.1	n/v	n/v	n/v	1.32	1.20	0.77	1.17	0.98	0.97	1.22	1.60
Fluoride	mg/L	0.1	n/v	n/v	n/v	0.15	0.14	0.15	0.14	0.14	0.19	<0.1	0.16
Nitrate	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Organic Carbon	mg/L	0.5	n/v	n/v	n/v	1.26	1.48	1.27	1.99	1.82	1.21	1.26	1.19
Dissolved Metals Analysis by ICP-MS:													
Dissolved Hardness (as $CaCO_3$)	mg/L	0.125	n/v	n/v	n/v	4.43	7.39	3.20	4.39	3.11	2.26	2.76	3.74
Aluminum Dissolved	mg/L	0.001	n/v	n/v	n/v	0.104	0.245	0.0436	0.114	0.0736	0.0414	0.0804	0.125
Antimony Dissolved	mg/L	0.00005	n/v	0.27	n/v	0.000095	0.000063	0.00006	0.000073	0.000108	0.000205	0.000473	0.000104
Arsenic Dissolved	mg/L	0.00005	0.0125	0.0125	n/v	0.000928	0.00204	0.00025	0.000967	0.00109	0.000985	0.00285	0.0011
Barium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00107	0.00374	0.00297	0.00331	0.00242	0.00217	0.00376	0.0014
Beryllium Dissolved	mg/L	0.00001	n/v	n/v	0.1	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Bismuth Dissolved	mg/L	0.00001	n/v	n/v	n/v	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Boron Dissolved	mg/L	0.002	n/v	n/v	1.2	0.0057	0.0058	0.0069	0.008	0.0065	0.0069	0.0069	0.0077
Cadmium Dissolved	mg/L	0.000002	0.00012	n/v	n/v	0.000005	<0.000002	<0.000004	0.0000031	0.0000032	0.0000047	0.0000027	0.0000031
Calcium Dissolved	mg/L	0.05	n/v	n/v	n/v	1.58	2.74	1.06	1.63	1.06	0.78	0.96	1.36
Chromium Dissolved	mg/L	0.0005	n/v	n/v	n/v	0.0006	0.0021	<0.0005	<0.0005	0.0014	0.0008	0.0038	0.0005
Cobalt Dissolved	mg/L	0.000005	n/v	n/v	n/v	0.0000979	0.0000536	0.000252	0.000107	0.0000726	0.000318	0.000191	0.0000247
Copper Dissolved	mg/L	0.0001	n/v	0.003	0.002	0.00044	0.00028	0.00038	0.00064	0.00064	0.00059	0.00053	0.00026
Iron Dissolved	mg/L	0.002	n/v	n/v	n/v	0.0078	0.003	0.0099	0.004	0.0033	0.0044	0.0055	0.0027
Lead Dissolved	mg/L	0.00005	n/v	0.14	0.002	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.0013	0.0016	0.0016	0.0018	0.0011	0.0027	0.0011	0.0015
Magnesium Dissolved	mg/L	0.005	n/v	n/v	n/v	0.119	0.131	0.135	0.075	0.111	0.075	0.087	0.082
Manganese Dissolved	mg/L	0.00005	n/v	n/v	n/v	0.00319	0.00268	0.0072	0.00371	0.00414	0.00548	0.00377	0.00322
Mercury Dissolved	mg/L	0.00002	0.000016	n/v	n/v	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***	***<0.00002***
Molybdenum Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.00117	0.00048	0.00437	0.00128	0.0027	0.00052	0.00249	0.0019
Nickel Dissolved	mg/L	0.00004	n/v	n/v	0.0083	0.000064	0.000043	0.000078	<0.00004	0.000048	<0.00004	<0.00004	<0.00004
Phosphorus Dissolved	mg/L	0.01	n/v	n/v	n/v	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01
Potassium Dissolved	mg/L	0.02	n/v	n/v	n/v	1.61	1.87	1.46	1.58	1.33	1.25	1.62	1.72
Selenium Dissolved	mg/L	0.0001	n/v	n/v	0.002	<0.0001	<0.0001	0.00013	<0.0001	<0.0001	0.00012	<0.0001	<0.0001
Silicon Dissolved	mg/L	0.1	n/v	n/v	n/v	1.37	1.75	1.02	1.45	1.29	1.29	1.29	1.48
Silver Dissolved	mg/L	0.00001	0.0075	0.0037	0.0005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium Dissolved	mg/L	0.02	n/v	n/v	n/v	1.64	1.62	1.51	1.54	1.43	1.48	1.69	1.74
Strontium Dissolved	mg/L	0.0001	n/v	n/v	n/v	0.00331	0.00492	0.00464	0.0037	0.00344	0.00264	0.00406	0.00292
Sulphur Dissolved	mg/L	1	n/v	n/v	n/v	<1	<1	1.2	<1	<1	<1	<1	<1
Tellurium Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thallium Dissolved	mg/L	0.000004	n/v	n/v	n/v	0.0000114	0.0000111	0.0000093	0.0000082	0.0000056	0.0000071	0.0000053	0.0000071
Thorium Dissolved	mg/L	0.00001	n/v	n/v	n/v	0.00002	0.000023	<0.00001	0.000024	<0.00001	<0.00001	0.000013	0.000011
Tin Dissolved	mg/L	0.00005	n/v	n/v	n/v	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium Dissolved	mg/L	0.0002	n/v	n/v	n/v	0.00021	0.00025	0.00036	<0.0002	0.00023	<0.0002	0.00028	<0.0002
Tungsten Dissolved	mg/L	0.0002	n/v	n/v	n/v	<0.0002	0.00156	<0.0002	<0.0002	0.00025	<0.0002	<0.0002	0.0002
Uranium Dissolved	mg/L	0.000001	n/v	n/v	n/v	0.000398	0.000333	0.000108	0.000605	0.000467	0.000596	0.000536	0.000629
Vanadium Dissolved	mg/L	0.001	0.005	n/v	n/v	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc Dissolved	mg/L	0.001	n/v	0.055	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zirconium Dissolved	mg/L	0.00002	n/v	n/v	n/v	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002

Notes:
EC = Electrical Conductivity
IC = Ion Chromatography
mg/L = Milligrams per Litre
n/v = no value
RDL= reported detection limit
Federal WQG = Federal, Canadian Council of Ministers of the Environment (CCME) or Environment and Climate Change Canada (ECCC) Marine Aquatic Life Guideline
BC WQG = British Columbia Marine Aquatic Life Guideline
Values in red font are above the long-term BC WQG
Values shaded in grey are above the short-term BC WQG
Values italicized and underlined are above the Federal WQG

Appendix 3.6: Surface Water Quality

3.6-1: Fresh and Estuarine Water Quality Results

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M	5.1						39					11.50	
OUT-01		VA24B1636-006	2024-05-23	Water	M	4.5						25					12.19	
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M	9.1						68					8.98	
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M	4.1												
OUT-01		661-455931031-0	2024-10-28	Water	F							51					11.16	
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M	4.1						19					11.16	
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M	4.4						18					12.07	
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M	23						91					13.04	
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M	3.5						9					12.32	
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M	1.8						19					11.45	
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M													
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M	7						16					11.42	
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M	6.6						44					12.26	
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M	7.2						16	23.00				12.21	
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M	7.7						37					10.80	
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M	10.5						32						
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M	24.6						66					9.10	
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M	5						14					12.00	
OUT-02		VA24B5289-006	2024-06-26	Water	M	31.3						10					11.00	
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M	2.8						17					10.41	
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M	2.5						9.9					11.55	
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M	6.3						10.6					11.32	
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M	2.8						15					11.57	
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M	3.2						19					12.39	
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M	5.2						13					13.16	
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M	1.6						7					12.57	
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M	2.5						12					11.81	
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M													
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M	3.9						9					12.11	
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M	3.2						131					14.33	
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M	2.8						8					11.70	
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M	5.5						16					11.13	
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M	36.5												
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M	19.3												
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	18.3						40					10.52	
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M													
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M	17						36					10.85	
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M	18.2						33					10.93	
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M	16.9						38					12.03	
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M	12						19					13.01	
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	8.7								27.3				
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M													
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M	8.7						16.3					13.42	
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M	8.7						26					11.65	
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M													
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M	8.5						18					11.63	
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M	31.3						45					11.88	
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M	3.2	3.2	<1	<1	<1				14.9				
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M	1.9	1.9	<1	<1	<1				12.3				
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M	2.6	2.6	<1	<1	<1				12.9				
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M	<1	<1	<1	<1	<1				6.7				
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M	<1	<1	<1	<1	<1				6.4				
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M	1	1	<1	<1	<1				20.4				
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M	<1	<1	<1	<1	<1				9.8				
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M	1.8	1.8	<1	<1	<1				5.2				
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M	5.5	5.5	<1	<1	<1				15.2				
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M	3	3	<1	<1	<1				15.8				
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M									25.4			12.79	11.5
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M													11.5
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M								10.16		0.21	101.0	13.02	11.3
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M								7.60	4.6	0.81	102.9	13.30	11.9
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M													11.3

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M									4			12.20	10.1
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M								26.87	19.7	0.97	106.8	11.77	11.3
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M								6.60	4.4	0.00	99.5	12.03	10.3
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M								5.60	3.8	0.00	101.6	12.01	10.5
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M								9.50	7.3	1.12	100.5	10.62	10.4
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M													10.5
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M									6.4	0.33	105.2	11.81	10.3
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M								34.27		0.00	96.1	10.85	11
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M								7.40	4.5	0.17	105.4	13.59	10.6
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M								8.80	5.2	0.45	72.6	13.88	11.6
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M							3.9	6.50		0.30	106.6	14.00	11.3
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M							5.2	8.80		0.00	103.4	13.60	11.5
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M													
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M							5	8.20		0.00	106.8	13.79	11.5
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M							5.7	9.50		0.00	100.8	13.17	9.4
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M							4.3	7.00		0.20	101.7	13.12	10.2
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M							2.8	4.40		0.04	101.5	12.60	10.7
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M							4.4	6.10		0.24	102.7	11.32	9.7
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M							6.6	8.40		0.00	100.7	10.52	10.3
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M							6.8	9.20		0.05	101.2	11.03	10.1
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M							12.3	16.90		0.33	102.5	11.47	9.6
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M							6.6	12.00		0.00	102.8	14.53	8.6
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M							8.8	16.70		0.44	102.1	14.83	9.9
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M										0.20	99.9	13.30	12.5
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M							4.8	9.00		0.95	102.5	14.41	11.3
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M							5.8	10.20		0.36	103.2	14.19	11
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M							5.6	8.90	8.8	0.28	99.6	12.61	
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M							3.3	4.90		0.18	101.7	12.26	9.6
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M							5.7	7.60	146	0.20	99.2	10.75	
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	1.9	1.9	<1.0	<1.0	<1.0	12	6.4	8.40	7	0.10	94.2	10.02	
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	3.9	3.9	<1.0	<1.0	<1.0	11	6.6	8.80	10.6	0.09	99.0	10.72	
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	2.9	2.9	<1.0	<1.0	<1.0	10	7.7	10.30	10.5	0.10	100.5	10.93	
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M	1.6	1.6	<1.0	<1.0	<1.0		6	8.20	7.7	0.45	104.4	11.57	
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	3.6	3.6	<1.0	<1.0	<1.0		5.9	9.70	10.4	0.08	100.9	12.96	
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M	3.1	3.1	<1.0	<1.0	<1.0		6	9.90	11.9	0.81	102.0	13.29	
SW-01		VA24A1299-001	2024-01-23	Water	M	1.5						4.4	7.30		0.23	103.5	13.66	
SW-01		L2754353-1	2024-01-23	Water	M													
SW-01		L2754615-1	2024-02-15	Water	M													
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	2.4						4.7	8.20		0.04	101.9	13.90	
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	2.1					18.2		7.30	7.6	0.00	102.9	13.40	
SW-01		L2755012-1	2024-03-19	Water	M													
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	2					19	9	14.70	7	0.05	100.9	12.96	
SW-01		L2755503-1	2024-04-25	Water	M													
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	2.4						33					14.50	
SW-01		L2755523-1	2024-04-29	Water	M													
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	1.7					16.8	3.3	5.10	8.6	0.02	100.0	12.43	
SW-01		L2755588-1	2024-05-02	Water	M													
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	1.2						30					14.66	
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	1.4						2.8	4.40	6.2	0.00	99.3	12.30	
SW-01		L2755694-1	2024-05-10	Water	M													
SW-01		L2755695-1	2024-05-10	Water	M													
SW-01		L2755788-1	2024-05-15	Water	M													
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M	1.5						3.9						
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	1.2					18.8	2.6	4.00	6.3	0.00	101.5	12.26	
SW-01		L2755820-1	2024-05-16	Water	M													
SW-01		VA24B1628-001	2024-05-22	Water	M	1.9						29						
SW-01		L2755902-1	2024-05-22	Water	M													
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	1.8					17.9	9.1	13.60	6.2	0.10	97.3	11.65	
SW-01		L2755916-1	2024-05-23	Water	M													
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M	1.3						21					15.77	
SW-01		VA24B4655-001	2024-06-20	Water	M	2.4					17	3.9	5.60	7	0.90	94.7	10.90	
SW-01		L2756326-1	2024-06-20	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M	2.3						11					11.72	
SW-01		L2756419-1	2024-06-26	Water	M													
SW-01		VA24B7579-001	2024-07-18	Water	M	2					12.8	5.3	7.00	8.6	0.10	100.9	10.78	
SW-01		L2756717-1	2024-07-18	Water	M													
SW-01		VA24B8974-001	2024-07-31	Water	M	2.4						22					9.50	
SW-01		L2756871-1	2024-07-31	Water	M													
SW-01		VA24C1546-001	2024-08-22	Water	M	2.2						7	9.50	9.2	0.10	101.0	11.09	
SW-01		L2757144-1	2024-08-22	Water	M													
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	1.9						92						
SW-01	SW-01	L2757209-1	2024-08-27	Water	M													
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	2.3						7	9.40	11.4	0.04	102.4	11.11	
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	3.1						8					11.06	
SW-01	SW-01	L2757584-1	2024-09-28	Water	M													
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M	2.7						8					11.10	
SW-01	SW-01	L2757664-2	2024-10-03	Water	M													
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	3						8.9					10.82	
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M													
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	2						310.1					11.87	
SW-01	SW-01	L2757873-1	2024-10-22	Water	M													
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	2.4						5.8	8.80	9.6	0.12	102.9	12.52	
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M	2.4						6.3					11.98	
SW-01	SW-01	L2757942-2	2024-10-26	Water	M													
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	1.9						5.4	8.30	9.3	0.23	103.5	12.61	
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	2.2						5.7	8.70	9.8	0.17	103.2	12.57	
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	1.7						6					12.47	
SW-01	SW-01	L2758119-1	2024-11-12	Water	M													
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	1.3						4	6.20	7.2	0.21	102.5	12.58	
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	2.6						5.4	9.00	9.8	0.00	101.6	13.28	
SW-01	SW-01	L2758350-1	2024-12-06	Water	M													
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M	2.5						8					12.84	
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M							19					13.53	
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	1.9						5	8.00	7.5	0.23	102.0	13.06	
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M													
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	2.5						5.3	9.50	8.8	-0.04	104.3	14.42	
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M													
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M	2.4						5					14.41	
SW-01	SW-01	L2758769-1	2025-01-24	Water	M													
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	2.6						4.3	7.40	9.3	0.38	103.2	13.91	
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M													
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	2.5						5					13.62	
SW-01	SW-01	L2759042-1	2025-02-21	Water	M													
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	2.4						6					13.60	
SW-01	SW-01	L2759255-1	2025-03-19	Water	M													
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	1.3	1.3	<1.0	<1.0	<1.0		3.3	5.60		0.18	102.6	13.37	
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M	3.3						5					12.59	
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M													
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	1.8						4					13.21	
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M													
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	2.3						4					13.68	
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M							4					13.68	
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	1.9						58					11.75	
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M													
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	2						4.6	7.40	6.7	0.01	98.6	12.41	
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	1.8						4					12.97	
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M													
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	<1.0						25.7	41.00	6.4	0.00	100.7	12.73	
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	1.7						4.2	6.50	5.8	0.21	99.4	12.31	
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	1						4.4					13.52	
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	<1.0						4.1	6.10	5.6	0.09	100.9	12.13	
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M	1.6	1.6	<1.0	<1.0	<1.0		8.7	13.40		0.19	101.7	12.44	
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M									22.9			13.00	11.8
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M													12

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M								17.97		0.32	101.2	13.02	11.6
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M								9.50	5.8	0.83	104.0	13.43	12.3
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M								7.80	4.8	1.37	102.2	13.12	11.4
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M									8.1			12.17	9.9
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M								6.57	4.5	1.76	103.7	12.08	11.4
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M								9.70	6.466666667	1.97	101.4	12.20	11.2
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M								7.57	5.1	0.46	101.2	12.04	10.3
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M								260.50	223.7333333	1.44	102.2	9.74	10.3
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M													11
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M									8.1	0.18	106.0	11.98	10.7
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M								11.63		0.25	98.6	11.62	11
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M								14.60	9	0.03	105.4	13.44	10.9
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M								18.70	11	0.43	104.5	13.86	12
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M							6.3	10.70		0.40	107.7	14.30	12.4
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M							10.1	16.10		0.10	103.8	13.70	11
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M													
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M							9.4	15.60		0.30	106.7	13.89	11.9
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M							9.8	16.60		0.30	101.2	13.48	11.1
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M							19.9	29.60		0.30	100.0	11.93	10.2
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M							3.8	5.70		0.14	102.6	12.26	10.4
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M							5.2	7.40		0.14	103.4	11.84	9.6
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M							15.7	19.20		0.10	100.7	10.06	10.1
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M							28.3	36.00		0.22	100.9	10.49	9.8
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M							32.8	44.80		0.17	102.7	11.45	10.3
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M							12.3	21.40		0.16	103.6	14.07	8.3
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M							14.5	26.10		0.93	102.6	14.31	11.8
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M										0.67	100.4	12.86	11.6
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M							12.2	22.10		1.10	102.2	14.05	11.5
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M							13.9	24.20		0.22	103.2	14.00	11.1
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M							7.4	12.20	11.6	0.55	100.3	12.97	
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M							3.9	5.90		0.37	102.5	12.31	9.6
SW-02	SW-02	23F0370-03	2023-06-02	Water	M	1.5	1.5	<1.0	<1.0	<1.0				8.4				
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M							7.8	10.10	10.1	0.87	100.5	10.60	
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M							18.4	22.70	21.4	0.12	94.8	9.52	
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M							30.8	39.10	37.8	0.05	98.8	10.21	
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	1.8	1.8	<1.0	<1.0	<1.0		7.8	10.80	10.5	0.13	106.3	11.85	
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M													
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M													
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M	3.4	3.4	<1.0	<1.0	<1.0		11.5	18.60	17.6	0.20	101.2	12.89	
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M	3.2	3.2	<1.0	<1.0	<1.0		10.6	17.60	18.6	0.97	102.5	13.37	
SW-02		VA24A1299-002	2024-01-23	Water	M	2.2						6.7	11.50		0.51	104.2	13.91	
SW-02		L2754353-2	2024-01-23	Water	M													
SW-02		L2754615-2	2024-02-15	Water	M													
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	3.8						11.1	19.20		0.03	102.4	13.85	
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	2.3							11.30	10.9	0.09	103.6	13.38	
SW-02		L2755012-2	2024-03-19	Water	M													
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	3.4												
SW-02		L2755316-6	2024-04-12	Water	M													
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	2.9						15.7	24.80	12.6	0.01	100.5	12.55	
SW-02		L2755504-1	2024-04-26	Water	M													
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	2.2												
SW-02		L2755521-2	2024-04-28	Water	M													
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	2.8						5.6	8.90	15	0.32	101.5	12.74	
SW-02		L2755598-1	2024-05-03	Water	M													
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	2.5						4.6	7.30	11.7	0.19	102.7	12.75	
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	2.5						14					14.46	
SW-02		L2755677-1	2024-05-09	Water	M													
SW-02		L2755687-1	2024-05-09	Water	M													
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M	2						29					13.74	
SW-02		L2755770-1	2024-05-14	Water	M													
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	2.2						3.4	5.30	8.2	0.00	102.8	12.90	
SW-02		L2755819-1	2024-05-17	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M	2.6						8					15.22	
SW-02		L2755903-1	2024-05-23	Water	M													
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	2.1						12.9	19.50	9.7	0.50	96.9	11.67	
SW-02		L2755933-1	2024-05-24	Water	M													
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M	1.9						42						
SW-02		L2755961-1	2024-05-26	Water	M													
SW-02		VA24B4698-001	2024-06-21	Water	M	2.3						5.7	8.20	8.9	0.10	102.3	11.80	
SW-02		L2756349-1	2024-06-21	Water	M													
SW-02		VA24B5540-001	2024-06-27	Water	M	2.1						1430					6.83	
SW-02		L2756458-1	2024-06-27	Water	M													
SW-02		VA24B7689-001	2024-07-19	Water	M	3.1						10.7	13.00	14.8	0.40	102.5	10.16	
SW-02		L2756726-1	2024-07-19	Water	M													
SW-02		VA24B8974-002	2024-07-31	Water	M	3.8						16					9.65	
SW-02		L2756871-2	2024-07-31	Water	M													
SW-02		VA24C1605-001	2024-08-23	Water	M	4.4						23.2	29.10	26.4	0.30	101.3	10.36	
SW-02		L2757153-1	2024-08-23	Water	M													
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	2.8						59					8.56	
SW-02	SW-02	L2757209-2	2024-08-27	Water	M													
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	5.4						26.4	34.70	32.8	0.29	101.5	10.84	
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	4.2						15					11.34	
SW-02	SW-02	L2757587-1	2024-09-29	Water	M													
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	3.5						14					11.87	
SW-02	SW-02	L2757661-1	2024-10-04	Water	M													
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	5						19.1					10.29	
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M													
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	3						10.8					12.26	
SW-02	SW-02	L2757873-2	2024-10-22	Water	M													
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	3.7						11.3	17.30	20.2	0.26	103.5	12.64	
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M	3.7						73.6					11.81	
SW-02	SW-02	L2757913-1	2024-10-25	Water	M													
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	3.2						10	15.20	16.9	0.46	101.3	12.29	
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	2.8						7.3	11.10	12.4	0.42	103.6	12.54	
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M													
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	2.8						7.6	11.90	13.8	0.24	104.6	13.04	
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	3.6						13					13.05	
SW-02	SW-02	L2758155-3	2024-11-16	Water	M													
SW-02		VA24D1587-001	2024-11-20	Water	M	3.9						11.3	18.50	18.2	0.50	99.9	12.84	
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M													
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	2.6						16					12.97	
SW-02	SW-02	L2758371-1	2024-12-08	Water	M													
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	3.2						8.6	13.90	14.8	0.52	102.8	13.11	
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M													
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	4.3						13.6	24.40	23.9	0.33	104.5	14.55	
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M													
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M	4						25					14.22	
SW-02	SW-02	L2758769-2	2025-01-24	Water	M													
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M	4.4						42.4					14.53	
SW-02	SW-02	L2759009-1	2025-02-19	Water	M													
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	4.3						7.8	13.70	17.2	0.69	103.5	14.10	
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M													
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	3.6						13					13.43	
SW-02	SW-02	L2759254-1	2025-03-18	Water	M													
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M	2.4						4.6	7.60	8.8	0.10	105.1	13.73	
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	3						9					13.40	
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M													
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	1.8						6					13.09	
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M													
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	2.7						7					13.15	
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M							7					13.15	
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M	2.2						7					12.64	
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M													
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	2.7						7.1	11.30	11.4	0.03	99.2	12.40	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	2.1						5					13.01	
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M													
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	1.6						34.9	55.40	9.3	0.35	101.5	12.75	
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	1.9						5.4	8.30	8.3	0.65	100.3	12.33	
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	2.2						6.2					12.33	
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M													
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	1.2						5.6	8.40	8.6	0.37	101.6	12.14	
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	2						13.1	20.40	10.8	0.12	102.2	12.60	
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M	3.5	3.5	<1	<1	<1				25.1				
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M	3.2	3.2	<1	<1	<1				19.2				
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M	4	4	<1	<1	<1				30.4				
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M	<1	<1	<1	<1	<1				7.5				
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M	<1	<1	<1	<1	<1				10.8				
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M	1.5	1.5	<1	<1	<1				20.8				
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M	1.7	1.7	<1	<1	<1				19.8				
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M	3	3	<1	<1	<1				5.9				
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M	5.2	5.2	<1	<1	<1				34.7				
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M	2.2	2.2	<1	<1	<1				9.8				
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M									6.9			12.24	11.6
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M													12.2
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M								1744.13		0.03	104.0	13.04	11.5
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M								483.00	299.3	0.74	104.9	13.34	12
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M								10.10	6.3	1.03	101.0	12.77	11.8
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M									25.43333333			12.14	9.8
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M								113.53	78.83333333	1.44	103.3	11.93	11
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M								10.30	6.9	0.18	102.4	12.24	11.2
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M								12.97	8.7	0.38	103.4	12.29	11
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M								35.67	29.56666667	1.92	105.7	10.41	10.1
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M									8.2	0.06	105.9	11.95	10.8
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M								282.37		0.02	97.9	11.51	11.2
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M								1168.67	725.6666667	0.04	103.4	13.10	11.5
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M								15235.00	9305.666667	0.60	99.4	12.09	12.2
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M													
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M							87.2	145.00		0.20	105.3	13.80	12.4
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M							2828	4694.00		0.00	104.4	13.40	10.9
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M													
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M							214.5	353.60		0.10	107.2	13.89	11
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M							113.1	185.50		0.07	102.3	13.20	11
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M							215.4	349.10		0.60	102.5	13.10	10.2
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M							3.9	5.70		0.03	101.9	12.04	10.6
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M							23.1	32.40		0.05	103.2	11.70	9.8
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M							6204.7	7542.30		0.26	111.4	10.77	9.6
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M							1900.7	2395.70		0.05	100.4	10.41	10.7
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M							17019	22986.30		0.12	104.4	10.54	10.1
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M							4683.7	7894.70		0.00	101.1	13.04	8.6
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M							10416	17467.30		0.40	88.9	11.09	12.6
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M										0.08	99.8	12.95	10.8
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M							4163.3	7313.00		0.80	103.9	13.62	11.8
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M							18784	28991.00		0.60	109.5	11.95	11.3
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M							91.3	148.10	161	0.33	100.6	12.87	
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M							49.7	74.60		0.19	101.5	12.15	7.9
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M							45.5	58.70	57.4	0.27	100.2	10.51	
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M							1117	1339.00	1370	0.00	96.2	9.39	
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M							11296	13751.00	5210	0.00	114.3	10.91	
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M							11833	15321.00	1260	0.25	114.9	11.43	
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M	1.9	1.9	<1.0	<1.0	<1.0		13.6	18.90	15.3	0.50	105.7	11.77	
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	21.2	21.2	<1.0	<1.0	<1.0		4939	7804.00	7860	0.05	99.1	12.06	
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M	11.3	11.3	<1.0	<1.0	<1.0		25573	38212.00	3780	1.28	80.0	8.17	
SW-03		VA24A1299-003	2024-01-23	Water	M	4.2						595.6666667	1004.33		0.21	104.0	13.71	
SW-03		L2754353-3	2024-01-23	Water	M													
SW-03		L2754615-3	2024-02-15	Water	M													
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	17.6						8236	13610.00		0.25	100.5	12.40	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	6.5							5899.00	1870	0.58	106.5	13.24	
SW-03		L2755012-3	2024-03-19	Water	M													
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M	6.4												
SW-03		L2755316-7	2024-04-12	Water	M													
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	3.7						835	1313.00	372	0.04	100.6	12.48	
SW-03		L2755504-2	2024-04-26	Water	M													
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	3.4												
SW-03		L2755521-3	2024-04-28	Water	M													
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	3.5						25	40.00	198	0.07	101.7	12.63	
SW-03		L2755598-2	2024-05-03	Water	M													
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	3.7						378	585.00	507	0.04	102.2	12.56	
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	3.6						17					13.59	
SW-03		L2755677-2	2024-05-09	Water	M													
SW-03		L2755687-2	2024-05-09	Water	M													
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M	3.1						11					15.73	
SW-03		L2755770-2	2024-05-14	Water	M													
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	2.1						14.7	23.20	21.9	0.04	102.6	12.84	
SW-03		L2755819-2	2024-05-17	Water	M													
SW-03		VA24B1636-002	2024-05-23	Water	M	2						12					12.85	
SW-03		L2755903-2	2024-05-23	Water	M													
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	2.6						27.9	41.90	21.1	0.00	96.3	11.56	
SW-03		L2755933-2	2024-05-24	Water	M													
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	3.2						79					12.95	
SW-03		L2755961-2	2024-05-26	Water	M													
SW-03		VA24B4698-002	2024-06-21	Water	M	2.5						25.3	35.90	34.5	0.10	101.9	11.60	
SW-03		L2756349-2	2024-06-21	Water	M													
SW-03		VA24B5540-002	2024-06-27	Water	M	3.3						1430					6.83	
SW-03		L2756458-2	2024-06-27	Water	M													
SW-03		VA24B7689-002	2024-07-19	Water	M	11.3						26.7	32.20	1420	0.30	102.7	10.10	
SW-03		L2756726-2	2024-07-19	Water	M													
SW-03		L2756871-3	2024-07-31	Water	M													
SW-03		VA24B8974-003	2024-07-31	Water	M	3.8						17					10.38	
SW-03		VA24C1605-002	2024-08-23	Water	M	10.7						12308.3	15326.00	2750	0.50	110.1	10.58	
SW-03		L2757153-2	2024-08-23	Water	M													
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	8.2						2649					11.26	
SW-03	SW-03	L2757229-1	2024-08-28	Water	M													
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	12.9						2368.2	3054.70	3270	0.06	107.8	11.18	
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	6.4						1434					11.33	
SW-03	SW-03	L2757587-3	2024-09-29	Water	M													
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	4.3						81					11.56	
SW-03	SW-03	L2757661-3	2024-10-04	Water	M													
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M	4.9						34.8					10.53	
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M													
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	6.2						3423					11.83	
SW-03	SW-03	L2757873-3	2024-10-22	Water	M													
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	4.8						11781.8	16814.70	159	0.69	96.3	10.36	
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	13.6						4086					11.48	
SW-03	SW-03	L2757913-3	2024-10-25	Water	M													
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	5.9						1608.7	2421.10	920	0.24	101.5	12.10	
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	6.7						15308.3	22048.30	2190	0.50	89.6	9.51	
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M													
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	3.3						120.4	188.30	108	0.18	104.7	12.98	
SW-03	SW-03	L2758155-2	2024-11-16	Water	M													
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M	10.2						9545					11.30	
SW-03		VA24D1587-002	2024-11-20	Water	M	11.6						23865.9	34567.10	3170	0.80	82.6	8.34	
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M													
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	3.2						135					13.03	
SW-03	SW-03	L2758371-2	2024-12-08	Water	M													
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	5.8						10667.2	16655.10	1110	0.91	92.8	10.79	
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M													
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	15.2						21724.6	34837.30	5530	0.72	97.6	10.71	
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	46.6						12121					12.60	
SW-03	SW-03	L2758769-3	2025-01-24	Water	M													
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	19.2						4392		7040			13.59	
SW-03	SW-03	L2759009-2	2025-02-19	Water	M													
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	9.7						12358.3	19987.10	3270	0.76	108.5	12.80	
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M													
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	17.8						395					13.32	
SW-03	SW-03	L2759254-2	2025-03-18	Water	M													
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	1.4						6.3	10.50	20	0.70	104.0	13.61	
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M	13.6						1952					13.27	
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M													
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M	2.2						7					13.07	
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M													
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	4.2						131					13.10	
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M							131					13.10	
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	4.8						499					12.60	
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M													
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	2.8						13.9	21.80	23.2	0.48	99.9	12.42	
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	3						173					12.88	
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M													
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	1.3						101.1	159.60	27.4	0.02	101.0	12.65	
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	2.3						7.5	11.50	11.8	0.35	99.7	12.26	
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	2.6						93.8					12.06	
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M													
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	1.6						11	16.40	22.8	0.29	101.4	12.04	
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	2.3						26.2	40.30	17.7	0.30	102.4	12.50	
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M									6.8			13.61	11.6
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M													10.6
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M								36.11		0.15	100.0	11.89	11.2
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M								39.10	26.4	0.83	99.8	11.84	11.5
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M								59.80	42.2	0.92	99.2	11.29	11.5
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M									51.46666667			11.08	11
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M								58.33	45.3	1.16	100.5	10.52	10.9
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M								58.17	43.06666667	0.00	99.9	10.92	10.8
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M								58.17	43.06666667	0.00	99.9	10.92	10.7
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M								118.10	100.8666667	1.05	101.3	9.71	10
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M													10.6
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M									30.8	0.12	102.4	10.93	10.4
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M								7.70		0.05	98.0	11.42	11.1
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M								26.33	17.36666667	0.06	104.5	12.64	11.1
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M								28.80	17.9	0.38	103.7	13.17	12
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M							11.8	19.20		0.00	105.1	13.50	12.1
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M							27.1	43.20		0.00	102.0	12.90	11.2
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M													
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M							23.6	36.60		0.00	104.9	12.91	11
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M							24.5	39.40		0.07	99.4	12.63	11.6
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M							20.8	31.10		0.30	99.5	11.86	9.7
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M							33.5	43.30		0.04	99.6	10.44	10
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M							75.5	93.40		0.03	101.9	10.29	9.2
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M							139.1	167.80		0.00	97.2	9.57	9.4
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M							146.8	181.50		0.02	95.6	9.64	9.5
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M							148.4	193.10		0.00	100.1	10.65	10.1
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M							39.4	63.40		0.00	101.7	12.97	8.4
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M							42.3	72.60		0.33	100.4	13.45	11.8
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M										0.45	99.2	12.62	11.6
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M							27.3	47.40		0.77	100.9	13.45	11.6
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M							35	58.10		0.09	101.9	13.30	11
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M							29.5	42.30	40.4	0.49	98.1	11.31	
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M							39.7	52.60		0.00	98.8	10.61	8.3
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M							115.2	147.90	8.1	0.10	97.5	10.17	
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M							134.8	167.00	165	0.00	89.6	9.06	
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M							149.1	184.30	182	0.00	93.6	9.43	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M							167.4	217.00	222	0.14	97.1	10.22	
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	5.1	5.1	<1.0	<1.0	<1.0		33.2	44.10	42.7	0.07	101.7	10.95	
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M	15.9	15.9	<1.0	<1.0	<1.0		25.9	39.90	42.1	0.30	99.5	12.19	
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	17.8	17.8	<1.0	<1.0	<1.0		28.5	45.30	46	0.79	100.4	12.62	
SW-04		VA24A1299-004	2024-01-23	Water	M	13.1						21	34.53		0.36	101.1	13.09	
SW-04		L2754353-4	2024-01-23	Water	M													
SW-04		L2754615-4	2024-02-15	Water	M													
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	16.7						25.7	42.20		0.33	100.7	13.00	
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	12.7							32.50	32.2	0.05	100.9	12.06	
SW-04		L2755012-4	2024-03-19	Water	M													
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	22.4					13	66.7	97.40	53.6	0.07	100.1	11.71	
SW-04		L2755503-3	2024-04-25	Water	M													
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M	22.8						64					12.70	
SW-04		L2755523-2	2024-04-29	Water	M													
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	26						27.5	37.30	57.9	0.02	99.3	10.88	
SW-04		L2755588-3	2024-05-02	Water	M													
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	26.4						28.5	39.60	61.2	0.00	100.5	11.26	
SW-04		L2755687-4	2024-05-09	Water	M													
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M	27.8						65					12.88	
SW-04		L2755695-2	2024-05-10	Water	M													
SW-04		L2755788-2	2024-05-15	Water	M													
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M	30.7						107					12.94	
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	29.4						5.7	7.50	63.7	0.00	100.7	10.74	
SW-04		L2755820-3	2024-05-16	Water	M													
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	26.3						86	118.70	58.1	0.00	95.6	10.64	
SW-04		VA24B1636-005	2024-05-23	Water	M	26.3						39						
SW-04		L2755903-5	2024-05-23	Water	M													
SW-04		L2755916-3	2024-05-23	Water	M													
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	25.4						33					14.25	
SW-04		L2755961-4	2024-05-26	Water	M													
SW-04		VA24B4655-003	2024-06-20	Water	M	30.3						42.8	53.30	68.7	0.00	95.1	9.60	
SW-04		L2756326-3	2024-06-20	Water	M													
SW-04		VA24B5289-002	2024-06-26	Water	M	36.1						62					9.39	
SW-04		L2756419-2	2024-06-26	Water	M													
SW-04		VA24B7579-003	2024-07-18	Water	M	69.9						115.6	132.20	136	0.20	102.8	9.65	
SW-04		L2756717-3	2024-07-18	Water	M													
SW-04		VA24B8974-004	2024-07-31	Water	M	75.5						144					8.13	
SW-04		L2756871-4	2024-07-31	Water	M													
SW-04		VA24C1546-003	2024-08-22	Water	M	70.1						127.1	152.60	147	0.10	99.1	9.73	
SW-04		L2757144-3	2024-08-22	Water	M													
SW-04	SW-04	L2757209-4	2024-08-27	Water	M													
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	48.3						250						
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	65						175.3	215.90	142	0.02	95.1	9.55	
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	50.8						133					9.09	
SW-04	SW-04	L2757584-2	2024-09-28	Water	M													
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	43.5						190					10.50	
SW-04	SW-04	L2757661-4	2024-10-04	Water	M													
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	73.8						99.6					9.18	
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M													
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	52.8						14.6	20.00		0.10	98.7	10.95	
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M	24.7						39.3					11.51	
SW-04	SW-04	L2757873-4	2024-10-22	Water	M													
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	36.1						46.7	66.40	75.9	0.06	101.2	11.57	
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	29.4						48.1					11.36	
SW-04	SW-04	L2757942-1	2024-10-26	Water	M													
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	39						54.4	77.70	91.7	-0.10	101.9	11.70	
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	37.3						51.6	73.20	80.1	0.00	100.3	11.43	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M													
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	85.1						167.2	236.10	174	0.18	95.2	10.81	
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M	16.9												
SW-04	SW-04	L2758155-4	2024-11-17	Water	M													
SW-04		4-456131118-0	2024-11-17	Water	F							35					11.63	
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	28.6						46.5	71.30	84.4	-0.10	99.7	12.17	
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M	38.2												
SW-04	SW-04	L2758371-3	2024-12-08	Water	M													
SW-04		4-456441522-0	2024-12-18	Water	F							26					12.22	
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	27.3						69.6	106.30	64	0.24	98.0	11.92	
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M													
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	28.5						28.8	47.90	61.4	0.00	102.9	13.44	
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M													
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M	20						59					12.95	
SW-04	SW-04	L2758765-1	2025-01-25	Water	M													
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	33.4						57.7	91.90	74.3	0.18	101.0	12.72	
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M													
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M	29.7						43					12.91	
SW-04	SW-04	L2759042-2	2025-02-21	Water	M													
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	33.3						61					12.15	
SW-04	SW-04	L2759255-2	2025-03-19	Water	M													
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M	13.7	13.7	<1.0	<1.0	<1.0		24.2	36.20		0.20	99.2	11.86	
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	26.9						47					12.04	
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M													
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	23.8						23					11.90	
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M													
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	26.5						39					12.07	
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M							39					12.07	
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	41.6						67					11.14	
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M													
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	57.6						88.6	123.90	131	-0.08	96.5	10.87	
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	44.8						39					11.34	
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M													
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	42.9						446.4	626.00	104	0.00	98.5	11.10	
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	55.6						92.9	126.10	135	0.19	98.4	10.78	
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M	51.8						80.6					12.15	
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	71.5						117.4	157.60	175	0.03	98.6	10.71	
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	42.3	42.3	<1.0	<1.0	<1.0		153.3	212.00		0.00	99.9	11.14	
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M							6.5	10.40			99.5	12.57	11.1
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M							6.5	10.60		0.20	102.5	13.16	9.9
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M							9.9	13.30		0.00	95.7	10.43	10
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M							9.7	15.50		0.00	100.0	12.68	8.6
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M							9.3	16.20		0.36	99.3	13.50	12
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M										0.10	98.3	12.68	11.6
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M							5.5	9.80		0.80	100.7	13.75	11.8
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M							7.1	11.80		0.01	101.4	13.20	11.1
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M							0.5	0.70	10.5	0.14	96.7	11.59	
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	2.6	2.6	<1.0	<1.0	<1.0		10.6	14.20	15.4	0.46	101.4	10.97	
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M													
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M													
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M	2.5	2.5	<1.0	<1.0	<1.0		7.2	11.10	11	0.06	98.6	12.16	
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M	2.2	2.2	<1.0	<1.0	<1.0		7.4	11.90	12	0.73	99.9	12.75	
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M							10.9	16.60			97.7	11.85	11.8
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M							10.7	16.50			97.2	11.61	9.4
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M							17.6	22.50		0.00	97.4	10.13	10
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M							33.7	39.80		0.00	87.5	9.05	9.4
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M							12.6	19.20		0.00	97.3	11.85	8.7

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M							13.4	22.20		0.32	96.4	12.56	11.4
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M										0.05	95.6	12.16	12.1
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M							9.8	16.70		0.79	98.6	12.94	11.6
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M							9.2	14.50		0.00	100.9	12.67	10.6
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M							10.6	15.50	22.1	0.10	96.5	11.30	
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M							23.4	29.50		0.00	98.1	10.06	10.2
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M	3.1	3.1	<1.0	<1.0	<1.0		12.6	16.90	17.6	0.08	99.7	10.84	
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M	3.7	3.7	<1.0	<1.0	<1.0		12.4	18.10	16.9	0.02	94.8	11.12	
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	4.4	4.4	<1.0	<1.0	<1.0		12.6	19.30	17.6	0.71	92.6	11.34	
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	3												
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	3.5												
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M							28.8	37.30	36.4	0.00	96.2	10.11	
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M							15.9	21.80	23.3	0.00	98.3	10.86	
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M	1.8	1.8	<1.0	<1.0	<1.0		6.7	9.40	31.6	0.21	102.5	11.57	
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M	4.5	4.5	<1.0	<1.0	<1.0		10.4	16.90	18.9	0.01	98.1	12.59	
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M	2.9	2.9	<1.0	<1.0	<1.0		9.7	16.30	17.3	0.79	99.3	13.07	
SW-07		VA24A1299-005	2024-01-23	Water	M	2.3						6.3	10.90		0.10	101.1	13.56	
SW-07		L2754353-5	2024-01-23	Water	M													
SW-07		L2754615-5	2024-02-15	Water	M													
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	2.9						10.3	18.00		0.00	99.1	13.50	
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	2.5							10.80	10.5	0.15	100.4	13.30	
SW-07		L2755012-5	2024-03-19	Water	M													
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	2.6						14.6	23.60	12.5	0.19	97.2	12.37	
SW-07		L2755504-3	2024-04-26	Water	M													
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M	1.8												
SW-07		L2755521-1	2024-04-28	Water	M													
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	2.6						5.3	8.50	14.3	0.00	98.5	12.51	
SW-07		L2755598-3	2024-05-03	Water	M													
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	2.2						4.5	7.00	11	0.00	99.3	12.18	
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M	2.1						21					14.35	
SW-07		L2755677-3	2024-05-09	Water	M													
SW-07		L2755687-3	2024-05-09	Water	M													
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	2.1						29					13.74	
SW-07		L2755770-3	2024-05-14	Water	M													
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	2						3.2	5.10	7.3	0.00	99.5	12.69	
SW-07		L2755819-3	2024-05-17	Water	M													
SW-07		VA24B1636-003	2024-05-23	Water	M	2.5						8					14.42	
SW-07		L2755903-3	2024-05-23	Water	M													
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	1.9						12.1	18.60	9.1	0.00	94.1	11.51	
SW-07		L2755933-3	2024-05-24	Water	M													
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M	2.1						76						
SW-07		L2755961-3	2024-05-26	Water	M													
SW-07		VA24B4698-003	2024-06-21	Water	M	2.2						5.7	8.20	8.8	0.10	99.4	11.60	
SW-07		L2756349-3	2024-06-21	Water	M													
SW-07		VA24B5289-003	2024-06-26	Water	M	2.5						140					9.76	
SW-07		L2756419-3	2024-06-26	Water	M													
SW-07		VA24B7689-003	2024-07-19	Water	M	2.8						10.1	12.50	14.4	0.10	99.2	10.00	
SW-07		L2756726-3	2024-07-19	Water	M													
SW-07		L2756871-5	2024-07-31	Water	M													
SW-07		VA24B8974-005	2024-07-31	Water	M	3.3						16					9.52	
SW-07		VA24C1605-003	2024-08-23	Water	M	4.1						22.4	28.80	25.9	0.00	98.4	10.25	
SW-07		L2757153-3	2024-08-23	Water	M													
SW-07	SW-07	L2757209-5	2024-08-27	Water	M													
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	2.8						76					9.91	
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	4.4						24.7	33.10	30.8	0.02	98.4	10.66	
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M	3.3						13					11.09	
SW-07	SW-07	L2757587-4	2024-09-29	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M	3.8						18					11.26	
SW-07	SW-07	L2757664-1	2024-10-03	Water	M													
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	4.1												
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M													
SW-07		492-455781017-0	2024-10-13	Water	F							17					11.55	
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M	1.6						10.7					11.93	
SW-07	SW-07	L2757873-5	2024-10-22	Water	M													
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	2.8	2.8	<1.0	<1.0	<1.0	5	10.3	15.90	18.8	-0.13	99.9	12.29	
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	2.9						12					12.01	
SW-07	SW-07	L2757913-4	2024-10-25	Water	M													
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	2.3						8.7	13.40	15.1	0.00	98.2	12.05	
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	2.5						6.9	10.60	12.3	0.00	99.8	12.25	
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M													
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	1.7						6.7	10.70	11.8	0.33	100.9	12.72	
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	2.5						12					12.77	
SW-07	SW-07	L2758155-1	2024-11-16	Water	M													
SW-07		VA24D1587-003	2024-11-20	Water	M	<2.0	<2.0	<2.0	<2.0	<2.0	13.7	9.3	15.40	11.6	0.10	96.8	12.57	
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M													
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	2.2						9					12.86	
SW-07	SW-07	L2758371-4	2024-12-08	Water	M													
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	1.2					5.4	7.4	12.10	10.9	0.36	99.4	12.85	
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M													
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	3.4						12.7	22.90	21.9	-0.06	101.4	14.16	
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M													
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M	3.3						10					14.23	
SW-07	SW-07	L2758765-2	2025-01-25	Water	M													
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M	3.4						15.5					13.17	
SW-07	SW-07	L2759009-3	2025-02-19	Water	M													
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	2.5	2.5	<1.0	<1.0	<1.0	6.9	7.1	12.60	13.1	0.16	100.1	13.85	
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M													
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	2.7						14					12.85	
SW-07	SW-07	L2759254-3	2025-03-18	Water	M													
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	1.2	1.2	<1.0	<1.0	<1.0	13.1	2.9	5.00	7.4	-0.28	99.8	13.35	
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	2.4						8					13.11	
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M													
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	1.3						9					13.10	
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M													
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M							6					12.79	
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	2.3						6					12.79	
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	2.2						6					12.51	
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M													
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	2.6	2.6	<1.0	<1.0	<1.0	6.6	6.6	10.70	11.4	0.08	96.5	12.43	
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	2						5					12.71	
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M													
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	<1.0	<1.0				7.7	33	53.60	9.2	-0.22	98.5	12.63	
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	1.9	1.9	<1.0	<1.0	<1.0	7.1	5	8.00	7.3	0.14	97.2	12.22	
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	2						6.3					13.09	
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M													
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	1	1	<1.0	<1.0	<1.0	5.3	5.2	8.00	8.6	0.19	98.7	12.11	
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	2.4	2.4	<1.0	<1.0	<1.0	6.5	12.3	19.50	10.7	-0.15	99.1	12.45	
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	1.9					19.4	8.3	14.20	6.5	0.00	96.4	12.82	
SW-08		L2755503-2	2024-04-25	Water	M													
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	1.7						2.9	4.90	7.2	0.00	96.6	12.65	
SW-08		L2755588-2	2024-05-02	Water	M													
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	1.2						2.5	4.20	6	0.00	95.1	12.31	
SW-08		L2755694-2	2024-05-10	Water	M													
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	1.3						2.5	3.90	6.8	0.00	97.3	12.25	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Alkalinity	Alkalinity-Bicarbonate	Alkalinity-Carbonate	Alkalinity-Hydroxide	Alkalinity-Phenolphthalein	Colour	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Depth	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab
						mg/L	mg/L	mg/L	mg/L	mg/L	CU	uS/cm	uS/cm	uS/cm	m	%	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M													
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	1.8						8.4	13.20	5.9	0.00	93.0	11.56	
SW-08		L2755916-2	2024-05-23	Water	M													
SW-08		VA24B4655-002	2024-06-20	Water	M	2.1						4.2	6.30	6.6	0.00	90.9	10.80	
SW-08		L2756326-2	2024-06-20	Water	M													
SW-08		VA24B7579-002	2024-07-18	Water	M	2						4.5	6.40	7.5	0.00	96.7	11.01	
SW-08		L2756717-2	2024-07-18	Water	M													
SW-08		VA24C1546-002	2024-08-22	Water	M	2.3						6.2	8.90	9.3	0.00	97.4	11.20	
SW-08		L2757144-2	2024-08-22	Water	M													
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	1.9						6.4	8.90	9.8	0.29	97.6	10.85	
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	2.2						5.5	8.40	9.1	-0.16	98.5	12.07	
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	1.9						5.1	8.00	9	-0.27	98.3	12.17	
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	2.1						5.3	8.30	9.4	-0.29	100.4	12.39	
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	1						3.8	6.10	6.8	-0.29	97.3	12.24	
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	2.1						5.1	8.60	8.9	-0.20	96.8	12.73	
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	7					11.8	27.1	40.60	20.1	0.00	97.4	11.63	
SW-09		L2755503-4	2024-04-25	Water	M													
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	7.1						8.6	12.80	19.9	0.00	96.7	11.57	
SW-09		L2755588-4	2024-05-02	Water	M													
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	7.1						9.6	13.90	21.7	0.00	97.3	11.29	
SW-09		L2755687-5	2024-05-09	Water	M													
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	7.2						10.8	15.00	22.7	0.00	97.1	10.84	
SW-09		L2755820-4	2024-05-16	Water	M													
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	8						31.4	44.60	22	0.00	93.1	10.63	
SW-09		L2755916-4	2024-05-23	Water	M													
SW-09		VA24B4655-004	2024-06-20	Water	M	8.1						12.7	17.30	22.3	0.00	90.6	10.00	
SW-09		L2756326-4	2024-06-20	Water	M													
SW-09		VA24B7579-004	2024-07-18	Water	M	9.6						20.2	24.40	26.9	0.00	96.0	9.48	
SW-09		L2756717-4	2024-07-18	Water	M													
SW-09		VA24C1546-004	2024-08-22	Water	M	10						26.1	32.40	31.6	0.00	95.2	9.64	
SW-09		L2757144-4	2024-08-22	Water	M													
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	11.1						24.5	31.10	30.2	0.15	98.3	10.15	
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	5.1						58.4	80.70		0.02	100.0	11.14	
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	5.9						12	17.20	18.4	-0.14	99.9	11.47	
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	5.2						11.2	16.00	18	-0.21	100.9	11.59	
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	6.1						12.3	17.60	19.7	0.00	98.6	11.37	
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M													
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	4						9.1	13.10	15.8	-0.16	98.9	11.40	
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	4.2						10.4	15.70	15.4	-0.10	98.6	11.86	
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M													
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	4.3						10.4	15.80	15.9	-0.03	98.4	11.93	
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	5.7						28.9	48.00	17.4	-0.03	102.9	13.44	
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M													
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	4.5						7.8	12.70	16.1	0.09	99.6	12.74	
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M													
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	3.6	3.6	<1.0	<1.0	<1.0		8.3	12.80		-0.12	97.6	11.97	
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	5.7						11.1	16.70	16.8	-0.24	94.1	11.29	
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	6.5						78.6	115.00	18.7	-0.20	96.1	11.25	
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	7.2						13.8	19.60	20.5	-0.08	95.4	10.92	
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	7.5						14.2	19.70	21.4	-0.18	96.6	10.85	
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M	7	7	<1.0	<1.0	<1.0		27.6	39.90		0.00	97.5	11.30	

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M	3.32	3.75		6.60	6.92	0.03		10.20		16	<3.0	6.54	6.31	0	0.22
OUT-01		VA24B1636-006	2024-05-23	Water	M	2.75	2.89		7.00	6.65	0.01		11.70		16	<3.0	5.11	5.27	0.14	0.30
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M	5.75	5.73		5.90	6.98	0.04		12.00		26	<3.0	11.9	11.7	4.94	3.23
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M	6.63	6.72			6.71					27	<3.0	7.41	6.8		4.32
OUT-01		661-455931031-0	2024-10-28	Water	F						0.03		10.10						2.45	
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M	4.8	4.59		7.10	6.63	0.01		9.80		24	<3.0	6.35	6.22	0.64	0.69
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M	3.39	3.29		8.20	6.55	0.01		6.50		18	<3.0	5.69	5.2	1.74	1.06
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M	2.96	3.28		7.10	7.4	0.07		3.90		71	<3.0	29.2	29.2	1.88	1.21
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M	4.02	3.79		6.80	6.7	0.01		4.90		17	<3.0	4.78	4.36	0.15	0.26
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M	4.93	5.82		7.60	6.31	0.01		7.20		18	3.7	3.78	3.41	0.66	0.81
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M															
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M	3.55	3.85		6.60	6.69	0.01		9.10		24	<3.0	7.63	7.83	1.19	0.47
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M	2.53	2.72		6.30	6.46	0.01		10.90		18	<3.0	7.15	7.1	0.31	0.67
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M	3.78	3.98		6.30	7.06	0.01		9.90		21	<3.0	8.91	9	1.34	0.50
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M	6.42	6.3			7.09	0.03		10.40		20	<3.0	9.55	9.34	3.11	0.31
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M	3.05	2.77		7.80	7.27	0.02		13.00		16	<3.0	11.2	11.7	0.82	0.15
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M	2.39	2.65		6.60	7.63	0.04		12.10		41	<3.0	23	23.5	0.71	0.12
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M	4.15	2.98		6.60	6.76	0.01		10.20		22	<3.0	6.01	6.19	0	0.28
OUT-02		VA24B5289-006	2024-06-26	Water	M	2.16	2.04		6.60	7.7	0.01		14.00		49	<3.0	30.6	28.7	0.93	0.13
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M	5.41	5.29		5.60	6.46	0.01		11.80		<10	<3.0	5.03	4.81	1.48	0.35
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M	4.02	3.66		6.35	6.31	0.01		9.60		21	<3.0	4.23	4.2	0.22	0.36
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M	4.13	5.79		5.77	6.96	0.01		10.00		31	4.6	11.6	7.83	0.04	6.06
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M	5.51	5.55		6.60	6.48	0.01		9.60		19	<3.0	5.55	5.27	0.6	0.76
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M	4.55	5.06		7.70	6.58	0.01		7.00		24	<3.0	5.32	5.29	1.51	1.22
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M	3.28	3.57		6.90	6.8	0.01		3.50		23	<3.0	7.21	7.25	1.06	0.88
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M	4.18	4.17		7.50	6.37	0		4.50		12	<3.0	3.74	3.54	1.14	0.31
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M	6.65	7.05		7.60	6.41	0.01		6.90		21	4.3	4.96	4.64	0.91	1.91
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M															
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M	3.85	5.3		7.10	6.59	0.01		7.70		22	<3.0	5.65	5.36	1.28	0.70
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M	3.68	3.8		8.00	6.54	0.09		10.40		14	<3.0	4.6	4.39	1.56	0.43
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M	3.12	2.94		6.60	6.71	0		7.80		16	<3.0	4.1	3.97	0.12	0.10
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M	2.42	2.35		6.90	7.08	0.01		10.60		22	3.3	6.07	6.29	2.39	0.38
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M	3.85	3.74			7.73					54	<3.0	35	34.7		0.90
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M	4.73	4.66			7.62					32	<3.0	20	19.8		1.48
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	7.57	10.4		6.20	7.34	0.02		14.60		47	15.6	25.6	20.2	36.8	12.60
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M															
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M	6	6		6.70	7.29	0.02		10.50		40	<3.0	21.2	20.2	0.56	0.80
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M	5.63	5.75		6.50	7.36	0.02		9.80		25	<3.0	19	19.9	0.4	0.81
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M	4.96	4.98		6.80	7.34	0.03		7.90		43	<3.0	19.3	19.2	0.84	0.58
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M	4.3	4.53		7.70	7.07	0.01		1.90		25	<3.0	15	14.2	2.1	1.98
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	4.21	4.6			7.06		<1.0			52	<3.0	10.6	11		0.76
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M															
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M	4.54	4.46		6.70	7.24	0.01		5.50		42	<3.0	11.4	11.1	1.03	0.62
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M	7.82	7.74		7.20	7.03	0.02		7.60		25	4.1	11.4	10.8	0.47	2.49
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M															
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M	5.08	5.4		7.30	7.2	0.01		8.90		29	<3.0	10.3	9.72	1.75	0.60
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M	3.92	3.95		6.90	7.3	0.03		10.60		51	<3.0	32.6	31.4	0.41	0.37
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M					6.64					<15	<2	4.19	3.68		0.17
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M					6.43					17	<2	2.56	3.33		0.73
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M					6.08					<15	<4	3.99	3.78		<0.1
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M					6.37					<15	<4	2.27	1.84		0.39
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M					5.5					<15	<2	3.51	2.97		0.34
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M					5.92					<15	<2	4.42	3.96		0.19
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M					5.58					<15	<2	3.65	3.4		0.17
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M					6.11					15	<2	2.22	2.33		0.23
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M					6.05					<15	<2	4.66	5.01		
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M					6.4						<2	5.16	5.09		
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M				5.83	6.11		0.02	3.70			<2	3.45			0.80
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M					7.34						9.6	4.57			
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M	2.5		138.55	6.39	5.53			4.60			<2	3.27			0.32
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M	4.12		217.10	5.97	6.81		0	4.50		5	<2.0	3.41			0.17
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M					6.98						<2.0	2.02			

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M	1.08		212.30		6.55			5.90			5.3	2.24			0.21
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M	2.82		141.80	6.51	6.37		0.01	11.00		18	<2.0	2.01			0.35
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M	2.06		140.53	5.63	4.88		0	7.20		4	<2.0	2.43			2.05
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M	2.49		166.17	5.48	6.56		0	8.10		4	<2.0	1.87			2.00
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M	2.26		75.60	7.63	6.92		0	12.83			4	2.27			2.20
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M	1.97				6.75						<2.0	3.46			
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M	4.02				7.08		0	10.20			2.8	3.05			0.62
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M	3.24		163.47	7.19	6.18		0.01	10.00		22	<2.0	2.89			0.29
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M	3.02		135.67	6.88	6.46		0	4.60		5	<2.0	2.71			0.79
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M	2.32		171.13	6.82	7.05		0	3.30		6	<2.0	2.53			1.31
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M	2.64		99.40	6.70	6.82		0	3.90	4		<2.5	2.56		0.37	
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	2.57		199.00	6.52	8.5		0	3.80	6		<2.5	7.59		0.25	
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M															
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M	2.18		145.40	6.60	6.65		0	4.60	5		<2.1	2.34		0.38	
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	2.59		178.20	7.20	6.79			4.10			<2.5	2.54		0.327	
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	3.59		1224.00		6.72			4.60			<3.3	2.1		2.3	
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M	2.22		253.40	5.74	6.42			6.10			<2.5	1.49		0.45	0.45
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	2.15		60.60	6.27	6.51			11.10			<2.6	1.73	1.81	0.47	
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M	2.08		110.00	6.68	6.27			13.30			<2.9	2.4	2.42	0	
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	1.82		127.30	6.53	6.1			11.60			<2.0	2.41	2.48	0	
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	1.82		87.80	7.45	6.5	0.01		10.70			<2.9	4.32	4.32	0	
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M	1.74		80.70	6.33	6.55			1.40			<2.0	3.42	3.49	0.13	
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	1.15		194.40	6.51	6.85	0.01		0.23			<2.0	4.59	4.63	0.14	
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	2.08		166.80	6.36	8.03			3.41			<2.0	3.02	3.03	0.23	
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	2.31		201.40	5.75	6.18			1.00			<4.0	2.81	2.75	0.17	
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M	2.63		196.20	6.06	6.03			2.20			<3.3	3.08	2.96	0	
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	2.63		241.30	5.91	6.14	0.01		5.40			<4.0	2.64	2.7	0.48	0.25
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M	2.71			5.41	6.25	0.01		7.30			<5.0	1.59	1.54	0.43	0.25
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M	1.6		274.40	5.91	7.82			11.80			<2.0	79.4	77.4	0.43	0.54
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	3.34	2.03	202.70	6.51	6.24			12.60		3	<2.0	2.39	2.36	0	0.23
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	1.84	1.99	203.90	6.71	7.63	0		11.80		<15	<5.0	2.55	2.38	0.04	0.22
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	1.62	1.83	110.50	7.31	5.99	0		22.00			<2.0	2.96	2.8	0.1	0.70
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M	3.42		161.40	5.85	5.9	0		10.80			<2.0	2.71	2.59	0.45	0.32
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	2.45		120.30	6.45	6.31	0		4.80			<2.0	2.81	2.75	0.03	0.26
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M	2.64		160.20	6.72	5.68	0		4.20			2	3.36	3.1	0.51	0.31
SW-01		VA24A1299-001	2024-01-23	Water	M	3.48	2.9	207.50	5.53	6.21	0		3.70		13	<3.0	2.22	2.11	0.79666667	0.26
SW-01		L2754353-1	2024-01-23	Water	M															
SW-01		L2754615-1	2024-02-15	Water	M															
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	2.59	2.93	149.30	6.49	6.27	0		2.50		12	<3.0	2.42	2.39	0.46	0.17
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	2.78	2.91	153.50	6.16	6.44		<1.0	4.30		<10	<3.0	2.26	2.25	0.51	0.14
SW-01		L2755012-1	2024-03-19	Water	M															
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	2.9	3.01	187.80	6.24	6.44		<1.0	4.80		10	<3.0	2.34	2.25	2.97	0.30
SW-01		L2755503-1	2024-04-25	Water	M															
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	3.87	3.15		6.10	6.45	0.02		5.10		<10	<3.0	2.21	2.17	0.08	0.15
SW-01		L2755523-1	2024-04-29	Water	M															
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	3.03	2.93	125.60	6.53	6.36	0	<1.0	6.10		12	<3.0	2.46	2.42	4.44	0.22
SW-01		L2755588-1	2024-05-02	Water	M															
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	3.15	3.17		7.30	6.3	0.02		8.00		<10	<3.0	1.97	2.06	0.57	0.14
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	3.29	3.55	171.20	5.88	6.28	0	<1.0	6.20		11	<3.0	2.01	2.04	0	0.16
SW-01		L2755694-1	2024-05-10	Water	M															
SW-01		L2755695-1	2024-05-10	Water	M															
SW-01		L2755788-1	2024-05-15	Water	M															
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M	2.66	2.68		7.20	6.32	0		7.30		<10	<3.0	1.92	1.82	0.17	0.30
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	3.23	2.96	155.50	6.07	6.29	0	<1.0	7.20		<10	<3.0	1.95	1.8	0.17	0.16
SW-01		L2755820-1	2024-05-16	Water	M															
SW-01		VA24B1628-001	2024-05-22	Water	M	3.4	3.13		8.30	6.39	0.02		7.90		12	<3.0	2.13	2.17	0.7	0.16
SW-01		L2755902-1	2024-05-22	Water	M															
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	2.6	2.3	117.90	6.26	6.15	0.01	<1.0	7.60		<10	<3.0	2.14	2.09	0.23	0.18
SW-01		L2755916-1	2024-05-23	Water	M															
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M	3.19	3.36		6.10	6.1	0.01		7.00		19	<3.0	1.89	1.88	0	0.21
SW-01		VA24B4655-001	2024-06-20	Water	M	3.11	2.65	170.80	6.60	6.5	0	<1.0	9.40		<10	3.3	2.13	2.2	4.7	0.20
SW-01		L2756326-1	2024-06-20	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-01		VA24B5289-001	2024-06-26	Water	M	2.48	2.3		6.40	6.48	0.01		10.30		13	<3.0	2.29	2.15	0	0.17
SW-01		L2756419-1	2024-06-26	Water	M															
SW-01		VA24B7579-001	2024-07-18	Water	M	2.98	2.61	171.20	6.46	6.56	0	<1.0	12.40		22	<3.0	2.38	2.49	0	0.27
SW-01		L2756717-1	2024-07-18	Water	M															
SW-01		VA24B8974-001	2024-07-31	Water	M	2.64	2.46		6.50	6.5	0.02		12.20		<10	<3.0	2.29	2.36	0.49	0.28
SW-01		L2756871-1	2024-07-31	Water	M															
SW-01		VA24C1546-001	2024-08-22	Water	M	2.33	2.13	190.20	6.38	6.44	0	<1.0	11.20		12	<3.0	2.46	2.49	0.12	0.15
SW-01		L2757144-1	2024-08-22	Water	M															
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	3.55	3.4		6.80	6.48	0.05		12.10		<10	<3.0	2.88	2.7	0	0.33
SW-01	SW-01	L2757209-1	2024-08-27	Water	M															
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	2.3	2.17	130.50	6.46	6.57	0	<1.0	11.69		15	<3.0	2.67	2.57	1.57	0.17
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	2.76	2.68		5.50	6.63	0		11.70		24	<3.0	3.06	2.72	0	0.25
SW-01	SW-01	L2757584-1	2024-09-28	Water	M															
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M	1.81	1.84		7.60	6.51	0		10.90		16	<3.0	2.86	2.78	1.84	0.29
SW-01	SW-01	L2757664-2	2024-10-03	Water	M															
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	2.83	2.46		6.98	6.63	0		11.50		13	<3.0	2.72	2.94	0.82	0.30
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M															
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	2.96	3.48		9.10	6.4	0.21		10.60		16	<3.0	2.93	2.74	0.21	0.36
SW-01	SW-01	L2757873-1	2024-10-22	Water	M															
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	3.59	3.7	162.50	6.45	6.46	0	<1.0	6.89		17	<3.0	2.72	2.89	0.61	0.47
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M	3.88	4.19		5.42	6.52	0		8.60		16	<3.0	2.94	2.98	0.32	0.34
SW-01	SW-01	L2757942-2	2024-10-26	Water	M															
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	3.93	3.79	150.90	6.48	6.34	0	<1.0	6.84		17	<3.0	2.74	2.67	1.69	0.24
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	3.29	2.79	140.10	6.46	6.51	0	<1.0	6.88		16	<3.0	2.95	2.82	3.7	0.18
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	3.61	3.67		6.40	6.25	0		7.20		14	<3.0	2.51	2.49	0.02	0.23
SW-01	SW-01	L2758119-1	2024-11-12	Water	M															
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	4.22	3.53	169.80	6.11	6.09	0	<1.0	6.55		20	<3.0	2.15	2.22	0.88	0.31
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	2.64	2.31	168.30	6.20	6.66	0	<1.0	4.09		17	<3.0	2.59	2.58	0	0.20
SW-01	SW-01	L2758350-1	2024-12-06	Water	M															
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M	3.1	3.02		7.10	6.46	0.01		5.40		14	<3.0	2.67		1.6	0.21
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M				5.80		0.01		4.40						1.11	
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	2.62	2.75	169.80	6.19	6.47	0	<1.0	4.91		<10	<3.0	2.51	2.36	0.27	0.30
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M															
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	2.58	2.72	107.30		6.44	0	<1.0	1.99		16	<3.0	2.86	2.84	0	0.16
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M															
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M	2.56	2.51		6.60	6.42	0		1.90		25	<3.0	3.56	3.54	0	0.24
SW-01	SW-01	L2758769-1	2025-01-24	Water	M															
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	3.05	3.36	162.00	6.31	6.54	0	<1.0	2.97		28	<3.0	2.95	2.9	0	0.30
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M															
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	3.55	2.97		6.20	6.55	0		2.90		16	<3.0	3.53	2.74	1.84	0.34
SW-01	SW-01	L2759042-1	2025-02-21	Water	M															
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	3.91	4.39		6.60	6.54	0		3.20		10	<3.0	2.85	2.81	0.26	0.16
SW-01	SW-01	L2759255-1	2025-03-19	Water	M															
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	3.76	4.1	224.70	5.98	6.08	0	<1.0	4.20		<10	<3.0	1.92	1.75	0.48	0.83
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M	2.98	3.02		6.40	6.52	0		4.20		14	<3.0	2.55	2.47	0.26	0.35
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M															
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	3.31	3.3		6.90	6.32	0		4.50		<10	<3.0	2.14	2.12	0.48	0.34
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M															
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	2.78	2.72		6.50	6.44	0		3.50		13	<3.0	2.43	2.41	0.49	0.11
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M				6.50		0		3.50						0.49	
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	2.9	2.95		7.20	6.57	0.04		8.50		14	3.3	2.35	2.28	0.8	0.25
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M															
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	2.98	2.97	176.20	6.01	6.37	0	<1.0	5.55		<10	<3.0	2.39	2.31	0	0.13
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	3.51	3.39		6.60	6.18	0		5.50		20	<3.0	2		0.36	0.27
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M															
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	3.03	3.11	188.00	5.84	6.02	0.02	<1.0	5.39		<10	<3.0	2.05	2.02	0	0.15
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	2.87	2.98	218.30	5.84	6.36	0	<1.0	6.20		<10	<3.0	1.94	2.04	0.48	0.16
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	2.62	2.94		7.20	6.03	0		6.20		<10	<3.0	2.06	2.09	0.11	0.15
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	2.87	2.97	220.10	5.76	5.96	0	<1.0	7.40		16	<3.0	2.01	1.97	0	0.14
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M	2.59	3.05	204.00	6.24	6.44	0.01	<1.0	6.70		11	<3.0	2.18	2.05	0	0.19
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M					6.16		0.02	2.40			<4	6.55			1.60
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M					6.85						3	7.25			

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M	2.5		148.67	6.03	6			4.68			<2	5.22			0.24
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M	2.02		221.70	6.09	6.36		0	4.60		6	<2.0	3.88			0.18
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M			276.90		6.65		0	4.80			<2.0	2.29			0.26
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M	1.6		218.07		6.3			6.30			<3.3	2.5			0.17
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M	1.59		194.63	6.37	6.27		0	8.70		4	<2.0	2.22			0.25
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M	1.46		162.67	5.29	6.23		0	7.40		6	<2.0	3.3			1.97
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M	1.76		169.23	5.25	6.32		0	7.80		5	<2.0	2.72			3.36
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M	1.01		207.07		6.67		0.1266667	17.60			<2.0	3.76			0.77
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M	0.77				6.54						<2.0	7.34			
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M	2.74				7.32		0	10.00			7.4	3.71			1.38
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M	1.9		242.10	6.06	6.2		0	8.20		8	<2.0	3.97			-0.08
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M	2.52		46.17	7.54	6.53		0.01	5.10		9	<2.0	5.13			0.87
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M	1.39		145.40	5.17	6.75		0.01	3.60		12	<2.0	5.34			0.10
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M	2.1		51.70	7.40	6.88		0	3.60	7		2.4	3.9		1.54	
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	1.58		182.60	7.20	7.57	0.01	0	3.60	11		<2.5	5.67		0.07	
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M															
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M	1.71		52.30	8.40	6.53	0.01	0	4.20	10		<2.6	4.08		0.22	
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	1.64		276.10	6.10	7.05	0.01		3.40			<3.3	4.38		0.303	
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M	2.3		1224.00		6.66	0.01		7.70			<3.3	3.09		3.2	
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	1.3		158.80	6.17	6.37			7.60			<4.0	1.77		0.53	0.53
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	0.94		66.40	6.45	6.42			9.50			<2.5	2.05	2.17	0	
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M	1.06		120.40	6.98	6.33	0.01		15.40			<2.9	4.65	4.67	0	
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	0.65		105.30	7.37	6.55	0.02		13.70			<2.7	7.64	7.95	0	
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M	1.05		62.60	7.69	6.42	0.02		10.90			<2.9	9.62	9.64	0	
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M	1		70.60	7.04	6.35	0.01		2.90			<2.0	6.03	6.08	0	
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M	0.56		126.60	7.20	6.54	0.01		1.70			<2.0	7	6.97	0.16	
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	1.39		184.70	6.11	7.29			3.91			<2.0	5.41	5.47	0	
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M	1		122.90	7.75	6.18	0.01		1.60			<4.0	6.33	6.35	0.04	
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M	1.62		210.40	5.95	6.08	0.01		2.70			<3.3	6.63	6.57	0	
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M	1.67		201.60	5.53	5.98	0.01		4.50			<4.0	3.55	3.61	0.05	0.24
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M	1.58			5.74	5.51	0.01		7.50			<4.0	1.87	1.67	0.56	0.49
SW-02	SW-02	23F0370-03	2023-06-02	Water	M					5.65							2.46			
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M	1.25		249.60	6.26	6.29			13.00			<2.0	2.78	2.8	0.27	0.30
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M	1.76		190.00	7.00	6.35	0.01		15.20			<2.0	5.34	5.46	0	<0.10
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M	1.72		194.80	7.26	6.35	0.02		13.90			<2.0	8.79	8.82	0.04	<0.10
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	2.17		184.00	6.03	5.84	0		10.60			4	4.23	3.44	1.11	1.27
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M															
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M															
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M	1.37		76.50	7.32	5.91	0.01		5.10			<2.0	5.04	5.49	0	0.14
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M	1.47		179.00	6.40	5.31	0.01		4.20			2.4	5.89	5.25	0.78	0.56
SW-02		VA24A1299-002	2024-01-23	Water	M	2.06	2.16	173.50	6.08	6.45	0		3.30		14	<3.0	3.48	3.36	3.50666667	0.79
SW-02		L2754353-2	2024-01-23	Water	M															
SW-02		L2754615-2	2024-02-15	Water	M															
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	0.97	1.16	176.80	6.63	6.58	0.01		2.80		16	<3.0	5.33	5.32	0.3	<0.10
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	2.02	1.8	149.80	6.39	6.56		<1.0	4.50		<10	<3.0	3.37	3.33	0.46	<0.10
SW-02		L2755012-2	2024-03-19	Water	M															
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	2.13	2			6.71					17	<3.0	4.39	4.08		0.86
SW-02		L2755316-6	2024-04-12	Water	M															
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	2.28	2.09	175.90	6.39	6.67		<1.0	5.90		18	<3.0	3.71	3.64	0.32	0.12
SW-02		L2755504-1	2024-04-26	Water	M															
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	2.98	2.42			6.56					11	<3.0	3.17	3.02		0.28
SW-02		L2755521-2	2024-04-28	Water	M															
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	1.3	1.42	112.90	6.64	6.65	0	<1.0	5.70		14	<3.0	4.02	4.02	0	<0.10
SW-02		L2755598-1	2024-05-03	Water	M															
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	1.98	2.35	117.80	6.70	6.71	0	<1.0	6.10		16	<3.0	3.19	3.05	0.62	0.23
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	1.43	1.73		6.70	6.66	0.01		8.00		14	<3.0	3.25	3.11	0.41	0.12
SW-02		L2755677-1	2024-05-09	Water	M															
SW-02		L2755687-1	2024-05-09	Water	M															
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M	1.33	1.27		6.90	6.52	0.02		8.30		<10	<3.0	2.71	2.52	0.69	0.14
SW-02		L2755770-1	2024-05-14	Water	M															
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	1.5	1.6	143.50	6.32	6.55	0	<1.0	5.70		<10	<3.0	2.43	2.35	0	0.13
SW-02		L2755819-1	2024-05-17	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-02		VA24B1636-001	2024-05-23	Water	M	1.49	1.47		6.30	6.53	0		7.60		<10	<3.0	2.84	2.78	0.8	0.22
SW-02		L2755903-1	2024-05-23	Water	M															
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	1.4	1.38	188.80	6.30	6.58	0.01	<1.0	7.30		16	<3.0	2.79	2.78	0.07	<0.10
SW-02		L2755933-1	2024-05-24	Water	M															
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M	1.24	1.16		7.30	6.45	0.03		7.50		13	<3.0	2.8	2.62	0	0.11
SW-02		L2755961-1	2024-05-26	Water	M															
SW-02		VA24B4698-001	2024-06-21	Water	M	0.94	0.82	178.20	6.50	6.61	0	<1.0	9.40		12	<3.0	2.54	2.44	2.8	<0.10
SW-02		L2756349-1	2024-06-21	Water	M															
SW-02		VA24B5540-001	2024-06-27	Water	M	1.6	1.62		7.40	6.51	0.81		19.30		10	<3.0	2.39	2.12	32.3	0.24
SW-02		L2756458-1	2024-06-27	Water	M															
SW-02		VA24B7689-001	2024-07-19	Water	M	0.84	0.8	172.10	6.85	6.81	0	<1.0	15.80		17	<3.0	3.77	3.56	0	<0.10
SW-02		L2756726-1	2024-07-19	Water	M															
SW-02		VA24B8974-002	2024-07-31	Water	M	0.81	0.93		7.00	6.79	0.01		15.30		<10	<3.0	3.76	4	1.18	0.13
SW-02		L2756871-2	2024-07-31	Water	M															
SW-02		VA24C1605-001	2024-08-23	Water	M	0.89	0.96	193.70	6.70	6.95	0.01	<1.0	14.30		23	<3.0	6.27	6.14	0	<0.10
SW-02		L2757153-1	2024-08-23	Water	M															
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	2.13	2.04		6.60	6.67	0.04		13.60		20	<3.0	4.21	3.98	1.82	0.16
SW-02	SW-02	L2757209-2	2024-08-27	Water	M															
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	0.85	1.34	134.80	7.03	7.05	0	<1.0	12.42		24	<3.0	7.64	7.97	0.11	<0.10
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	1.83	1.72		6.80	6.69	0.01		10.80		29	<3.0	5.55	5.45	0	<0.10
SW-02	SW-02	L2757587-1	2024-09-29	Water	M															
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	3.67	3.6		6.30	6.68	0.01		9.60		16	3.7	6.06	5.74	1.01	0.35
SW-02	SW-02	L2757661-1	2024-10-04	Water	M															
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	0.84	1.17		7.18	6.81	0.01		12.10		24	<3.0	6.71	6.75	0.19	0.10
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M															
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	1.92	1.83		6.70	6.57	0.01		8.50		19	<3.0	4.74	4.43	0.06	0.30
SW-02	SW-02	L2757873-2	2024-10-22	Water	M															
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	1.3	1.21	134.80	6.88	6.6	0.01	<1.0	6.73		16	<3.0	5.36	5.25	1.61	0.15
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M	1.45	1.56		6.42	6.7	0.05		10.70		14	<3.0	5.54	5.59	0.23	0.23
SW-02	SW-02	L2757913-1	2024-10-25	Water	M															
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	1.75	1.84	149.90	6.75	6.62	0.01	<1.0	7.04		19	<3.0	4.72	4.71	1.05	0.21
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	1.47	1.62	140.10	6.98	6.63	0	<1.0	7.10		13	<3.0	3.7	3.46	0.15	0.12
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M															
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	1.62	1.18	186.50	6.18	6.6	0	<1.0	5.96		23	<3.0	4	4.03	1.36	0.30
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	1.61	1.66		7.00	6.68	0.01		5.60		24	<3.0	5.12	4.75	2.11	2.84
SW-02	SW-02	L2758155-3	2024-11-16	Water	M															
SW-02		VA24D1587-001	2024-11-20	Water	M	1.55	1.53	148.10	6.70	6.72	0.01	<1.0	4.77		19	<3.0	5.81	6.99	0.04	2.56
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M															
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	1.72	1.67		6.70	6.61	0.01		6.20		13	<3.0	3.7	3.7	1.89	0.21
SW-02	SW-02	L2758371-1	2024-12-08	Water	M															
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	1.55	2.03	163.50	6.60	6.63	0.01	<1.0	5.10		12	<3.0	4.35	4.04	0	0.20
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M															
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	0.98	1	68.40		6.77	0	<1.0	1.75		26	<3.0	6.47	6.38	0	<0.10
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M															
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M	1	0.89		7.60	6.72	0.02		2.60		16	<3.0	6.63	6.53	0.02	<0.10
SW-02	SW-02	L2758769-2	2025-01-24	Water	M															
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M	1.37	1.66		7.97	6.81	0.03		2.30		28	4.7	8	7.05	6.6	8.00
SW-02	SW-02	L2759009-1	2025-02-19	Water	M															
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	2.07	2.15	138.70	7.01	6.83	0	<1.0	2.55		26	<3.0	5.21	5.17	0	0.47
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M															
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	1.34	1.39		7.05	6.75	0.01		4.80		27	<3.0	5.6	5.52	0.22	<0.10
SW-02	SW-02	L2759254-1	2025-03-18	Water	M															
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M	2.51	2.67	218.50	6.20	6.35	0	<1.0	4.12		13	6.1	2.71	2.43	1.35	2.48
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	1.66	2		7.20	6.61	0.01		4.80		16	<3.0	4.66	4.26	0.45	0.54
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M															
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	2.29	2.56		7.10	6.27	0		5.50		16	<3.0	2.79	2.56	0.96	0.67
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M															
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	1.63	1.5		7.00	6.57	0		5.10		17	<3.0	3.56	3.59	0.48	0.11
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M				7.00		0		5.10						0.48	
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M	1.48	1.48		7.20	6.47	0		7.20		14	<3.0	3.06	2.98	0.12	0.16
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M															
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	1.37	1.41	154.70	6.51	6.61	0	<1.0	5.82		14	<3.0	3.44	3.3	0	<0.10

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	1.53	1.61		6.90	6.42	0		5.70		13	<3.0	2.92	2.48	0.34	<0.10
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M															
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	1.64	1.61	146.60	6.53	6.32	0.03	<1.0	5.64		13	<3.0	2.62	2.65	0	<0.10
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	1.27	1.4	234.00	5.67	6.53	0	<1.0	6.51		<10	<3.0	2.49	2.55	0.31	<0.10
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	1.16	1.08		6.90	6.56	0		8.20		14	<3.0	2.9	2.83	0.54	<0.10
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M															
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	1.42	1.24	208.40	6.49	6.19	0	<1.0	7.63		16	<3.0	2.67	2.54	0	<0.10
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	1.52	1.91	186.10	6.79	6.63	0.01	<1.0	6.40		<10	<3.0	3.05	3	0	<0.10
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M					6.83					18	<2	5.61	5.19		0.21
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M					6.37					21	<2	5.32	5.89		0.56
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M					6.09					18	<4	7.34	7.28		<0.1
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M					6.38					<15	<4	2.32	1.99		0.21
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M					5.8					15	<2	3.88	3.51		0.24
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M					6.12					16	<2	7.66	7.01		0.13
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M					6.07					<15	<2	5.83	6.07		0.12
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M					5.95					<15	<2	2.5	2.71		0.14
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M					7.01					<15	<2	9.25	8.21		
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M					6.33						<2	3.08	3.01		
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M				6.11	6.73		0	7.60			<2	477			1.87
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M					6.78						2.2	658			
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M	1.85		194.71	5.74	6.81			5.50			<2	355			0.29
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M	2.32		218.60	6.59	6.24		0.23	5.10		314	<2.0	17			0.16
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M			235.67		6.47		0	5.40			<2.0	2.33			0.61
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M	1.94		215.50		6.29			6.30			3.7	20.1			0.20
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M	1.37		233.00	6.37	6.39		0.0533333	9.00		74	9	25.2			0.31
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M	1.33		162.80	6.11	6.18		0	7.60		7	4.4	3.43			1.87
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M	1.59		129.73	5.86	6.19		0	7.90		8	<2.0	4.03			3.49
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M	0.72		155.67	5.90	6.56		0.02	16.10			5.2	4.38			0.71
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M	0.68				6.99						<2.0	97.5			
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M	2.73				7.01		0	10.00			7.6	3.53			1.13
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M	1.89		236.73	6.49	6.34		0.1333333	8.30		184	<2.0	25.5			-0.12
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M	2.06		82.03	8.02	6.68		0.58	5.20		760	<2.0	109			0.53
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M	1.38		199.90	7.52	6.85		8.78	4.60		9902	<2.0	349			0.44
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M	2.16		9.70	8.60	6.59	0.7	0.1	4.10	94.3		2.6	10.2		0.77	
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	1.59		244.30	7.20	6.91	2.5	2.5	4.20	3051		<2.5	483		0.17	
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M															
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	1.54		117.40	7.20	6.98	0.14	0.1	4.40	229.7		<2.0	22.9		0.25	
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	1.75		191.30	7.50	6.75	0.06		4.60			<2.5	28.7		0.61	
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M	1.94		1224.00		6.58	0.17		4.90			13.5	37.5		1.2	
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	1.12		273.80	6.34	6.34			8.10			6.6	1.81		0.64	0.64
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	1.13		66.90	6.58	6.44	0.01		9.90			<2.5	3.64	3.67	0.16	
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M	0.55		123.30	7.91	6.53	4.19		15.70			3.1	128	136	3.9	
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M	0.66		140.70	7.50	6.75	1.24		13.50			<3.3	81.2	85.5	1.76	
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M	1		124.90	7.90	6.67	13.9		11.40			<2.9	697	887	2.64	
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	1.03		85.60	7.31	6.5	4.33		3.70			<2.0	820	837	0	
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M	0.87		145.30	7.75	6.97	10.12		3.27			<2.0	380	521	0.27	
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	2.07		143.00	6.90	6.53			4.31			6	474	472	0	
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M	1.36		120.20	7.53	6.48	3.97		2.47			4.8	656	1230	0.06	
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	1.51		224.70	7.68	6.26	17.73		6.60			<3.3	233	287	0	
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	1.7		180.70	6.70	6.14	0.07		4.90			<4.0	15.4	18.5	0	0.23
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M	1.57			6.27	5.9	0.03		7.50			17.6	2.64	1.98	0.65	1.61
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	1.07		220.80	6.71	6.3	0.03		13.20			<2.0	6.57	5.98	0.12	0.52
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	1.83		219.40	7.08	6.54	0.67		16.30			9.6	85.6	82.5	2.82	7.54
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	1.36		231.70	8.05	6.67	6.39		15.60			6	1080	491	1.02	0.64
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M	1.43		209.50	7.93	6.61	8.97		13.10			<2.0	152	143	2	0.51
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M	3.13		188.50	5.83	5.86	0.01		10.50			3	4.2	3.95	1.2	1.09
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	1.29		131.00	7.34	6.35	4.3		5.80			4.4	744	798	0	0.19
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M	1.3		153.20	7.55	6.6	24.05		7.70			4.8	482	360	0.5	0.36
SW-03		VA24A1299-003	2024-01-23	Water	M	2.05	1.99	186.37	6.51	6.75	0.49		3.70		555	<3.0	93.4	96.1	1.31	0.75
SW-03		L2754353-3	2024-01-23	Water	M															
SW-03		L2754615-3	2024-02-15	Water	M															
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	1.09	1.07	195.10	7.71	7.28	7.77		4.30		3800	<3.0	1020	794	1.23	0.95

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	1.82	1.82	159.30	7.99	6.93		1	5.20		1060	<2.0	152	170	0.33	0.18
SW-03		L2755012-3	2024-03-19	Water	M															
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M	2.14	2.04			7.02					24	<3.0	5.63	5.3		0.36
SW-03		L2755316-7	2024-04-12	Water	M															
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	2.08	2.52	205.70	6.76	6.79		<1.0	6.00		210	<3.0	56	104	0.31	0.11
SW-03		L2755504-2	2024-04-26	Water	M															
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	2.51	2.36			6.76					15	<3.0	4.41	4.04		0.39
SW-03		L2755521-3	2024-04-28	Water	M															
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	1.27	1.52	130.50	6.69	6.79	0	<1.0	6.10		106	<3.0	21.4	27.6	0	0.52
SW-03		L2755598-2	2024-05-03	Water	M															
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	1.69	2.1	161.00	6.54	6.83	0.3	<1.0	6.50		274	3.8	63.3	63.8	0.57	0.19
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	1.43	1.64		6.80	6.79	0.01		8.80		18	<3.0	3.93	3.62	0.31	0.12
SW-03		L2755677-2	2024-05-09	Water	M															
SW-03		L2755687-2	2024-05-09	Water	M															
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M	1.22	1.1		6.60	6.75	0.01		8.40		<10	<3.0	3.41	3.34	0.74	0.14
SW-03		L2755770-2	2024-05-14	Water	M															
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	1.52	1.55	123.50	6.44	6.56	0.01	<1.0	5.80		17	<3.0	3.52	3.51	0.22	0.10
SW-03		L2755819-2	2024-05-17	Water	M															
SW-03		VA24B1636-002	2024-05-23	Water	M	1.53	1.43		8.40	6.38	0		9.90		11	<3.0	3.26	3.82	3.09	0.25
SW-03		L2755903-2	2024-05-23	Water	M															
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	1.49	1.35	156.70	6.44	6.62	0.02	<1.0	7.50		18	<3.0	3.58	3.6	0.38	<0.10
SW-03		L2755933-2	2024-05-24	Water	M															
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	1.25	1.24		7.40	6.65	0.05		10.60		16	<3.0	3.45	3.34	0	0.24
SW-03		L2755961-2	2024-05-26	Water	M															
SW-03		VA24B4698-002	2024-06-21	Water	M	1	0.74	152.00	6.70	6.66	0	<1.0	9.50		23	<3.0	5.76	8.34	2.2	<0.10
SW-03		L2756349-2	2024-06-21	Water	M															
SW-03		VA24B5540-002	2024-06-27	Water	M	1.49	1.6		7.40	6.76	0.81		19.30		12	<3.0	3.23	2.83	32.3	1.04
SW-03		L2756458-2	2024-06-27	Water	M															
SW-03		VA24B7689-002	2024-07-19	Water	M	0.87	0.7	163.60	6.84	7.26	0.01	<1.0	16.10		804	3	102	98.3	0	0.85
SW-03		L2756726-2	2024-07-19	Water	M															
SW-03		L2756871-3	2024-07-31	Water	M															
SW-03		VA24B8974-003	2024-07-31	Water	M	0.75	0.84		7.10	6.85	0.01		15.90		12	<3.0	4.22	4.25	1.52	0.17
SW-03		VA24C1605-002	2024-08-23	Water	M	0.98	0.56	217.40	8.02	7.23	8.98	1.5	14.70		1650	2.4	318	296	5.98	1.32
SW-03		L2757153-2	2024-08-23	Water	M															
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	1.53	1.63		7.40	7.37	1.39		12.90		1130	<3.0	197	189	5.78	1.14
SW-03	SW-03	L2757229-1	2024-08-28	Water	M															
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	0.71	0.96	111.40	8.07	7.34	1.6	1.8	13.23		1950	17.8	342	333	15.35	4.81
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	1.53	1.48		6.90	6.89	1		11.20		618	<3.0	110	111	0.68	1.45
SW-03	SW-03	L2757587-3	2024-09-29	Water	M															
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	3.48	3.88		6.20	6.74	0.05		9.50		128	3.7	26.8	11.2	1.39	1.17
SW-03	SW-03	L2757661-3	2024-10-04	Water	M															
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M	1.3	1		5.43	6.9	0.02		15.10		36	<3.0	7.76	7.05	0.68	<0.10
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M															
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	1.86	1.86		7.63	6.88	2.67		8.30		632	<3.0	128	111	4.97	2.33
SW-03	SW-03	L2757873-3	2024-10-22	Water	M															
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	1.22	1.14	148.60	7.48	6.87	9.88	<1.0	9.33		99	4.9	4.24	14.6	5.37	1.19
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	1.14	1.49		6.31	7.2	3.04		10.90		3000	3.8	523	857	0.49	0.92
SW-03	SW-03	L2757913-3	2024-10-25	Water	M															
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	2.03	2.07	156.60	6.88	6.88	1.25	<1.0	7.43		546	<2.0	97.9	89.1	0.69	0.35
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	1.62	1.47	149.40	7.54	7	13.2	1.1	9.00		1190	<2.0	223	215	0.41	0.22
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M															
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	1.64	1.72	167.90	6.73	6.69	0.1	<1.0	6.12		68	<3.0	27.3	26.2	0.55	0.34
SW-03	SW-03	L2758155-2	2024-11-16	Water	M															
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M	1.38	1.56		6.90	7.09	6.41		7.00		1870	<3.0	304	344	1.49	2.27
SW-03		VA24D1587-002	2024-11-20	Water	M	1.64	1.64	133.40	7.60	7.02	21.6	1.6	8.79		1970	<2.0	371	411	0	1.71
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M															
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	1.78	1.69		6.30	6.67	0.1		5.20		97	<3.0	15	17	1.02	0.44
SW-03	SW-03	L2758371-2	2024-12-08	Water	M															
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	1.51	1.7	167.10	7.40	6.9	9.71	<1.0	6.18		614	<2.0	125	149	0.56	0.56
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M															
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	0.98	1.03	126.50		7.31	21.6	3.1	5.29		3390	<2.0	548	473	0	0.11
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	1.11	1.04		7.50	7.7	11.63	11.3	4.70		22600	<3.0	2140	1380	0.38	0.20
SW-03	SW-03	L2758769-3	2025-01-24	Water	M															
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	1.23	1.71		6.65	7.36	4.09	3.8	3.30		4320	13		113	7.88	7.04
SW-03	SW-03	L2759009-2	2025-02-19	Water	M															
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	2.26	2.1	182.70	8.14	7	11.8	1.7	5.02		1570	<2.0	385	271	0	0.51
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M															
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	1.33	1.44		6.70	7.33	0.32		4.50		958	<3.0	153	190	0.27	0.14
SW-03	SW-03	L2759254-2	2025-03-18	Water	M															
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	2.5	2.8	213.60	6.18	6.19	0	<1.0	4.08		13	10.3	3.83	3.24	1.41	2.19
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M	1.4	1.88		7.80	7.28	1.62		5.50		2100	<3.0	387	376	0.69	1.84
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M															
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M	2.31	2.38		6.80	6.44	0		5.30		73	<3.0	10.5	4.14	1.25	0.65
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M															
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	1.79	1.39		6.40	6.72	0.1		5.30		228	<3.0	33.9	31.9	0.39	0.17
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M				6.40		0.1		5.30						0.39	
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	1.52	1.61		6.70	6.78	0.35		9.00		522	<3.0	88.3	80.8	0.23	0.47
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M															
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	1.25	1.45	145.30	6.72	6.62	0	<1.0	6.05		25	<3.0	3.89	3.73	0	<0.10
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	1.63	1.62		6.80	6.56	0.13		5.90		159	<3.0	26	27	0.67	0.15
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M															
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	1.66	1.85	151.80	6.58	6.29	0.08	<1.0	5.80		15	<3.0	4.35	3.71	0	0.10
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	1.33	1.44	205.30	6.28	6.54	0	<1.0	6.48		13	<3.0	2.81	2.78	0.38	0.12
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	1.26	1.4		7.90	6.65	0.06		8.40		54	<3.0	9.86	10.2	0.48	<0.10
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M															
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	1.36	1.09	215.50	6.04	6.34	0	<1.0	7.88		24	<3.0	47	3.77	0	0.11
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	1.19	1.42	189.10	6.60	6.65	0.02	<1.0	6.80		12	<3.0	3.86	3.64	0	<0.10
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M				5.08	6.81		0	1.90			<2	20.6			0.15
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M					7.17						<2	21.7			
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M	2.36		177.37	5.82	6.77			7.90			<2	14.5			0.71
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M	1.93		179.10	6.68	6.9		0.02	7.90		25	2.8	17.1			0.64
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M			183.80	6.79	7.35		0.03	9.60			<2.0	25.7			1.01
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M	1.27		204.87	5.02	7.34			10.53			3.7	33.5			2.61
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M	1.66		175.57	7.38	7.28		0.03	13.30		38	<2.0	27.4			1.42
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M	1.31		112.13	6.54	7.03		0.03	11.40		38	<2.0	28.2			2.73
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M	2.71		112.13	6.54	6.93		0.03	11.40		38	<2.0	15.7			2.73
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M	1.6		113.87	6.88	7.6		0.06	17.40			2	46.2			1.42
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M	1.23				7.86						<2.0	67.7			
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M	3.9				6.71		0.02	12.40			<2.0	16.6			5.79
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M	2.27		185.77	6.30	6.76		0	8.60		5	<2.0	14.7			0.32
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M	2.49		120.73	7.28	7.11		0.01	7.10		17	<2.0	12.7			2.65
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M	2.08		191.83	7.62	7.13		0.01	5.20		19	<2.0	15.1			6.15
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M	2.22		101.50	7.10	7.43	0.01	0	4.90	12.3		<2.0	11.7			
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M	1.66		142.30	7.60	7.33	0.02	0	5.50	28		<2.5	18.5		0.62	
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M															
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M	2.1		101.60	7.40	7.27	0.02	0	6.40	24		<2.0	14.4		0.9	
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M	1.84		291.90	6.90	7.28	0.02		5.20			<3.3	15.2		4.13	
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M	3.23		1224.00		7.13	0.0113		7.70			6.3	11.4		2.8	
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M	1.53		286.40	6.86	7.28	0.02		13.20			<2.7	23.2		0.53	0.53
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M	1.69		40.00	7.92	7.6	0.04		15.00			<3.4	40.8	47.5	0.64	
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M	1.56		151.40	7.60	7.71	0.08		16.00			<2.9	86.9	85.1	0.07	
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M	1.93		166.20	6.93	7.9	0.09		15.00			2	83.8	94	5.02	
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M	1.35		101.30	8.11	7.9	0.09		12.90			<2.9	96.7	98.3	0.42	
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M	2.06		72.10	7.39	7.07	0.03		5.20			<2.0	30	29.7	0.26	
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M	1.52		201.60	7.19	7.36	0.03		3.17			<2.0	33.7	32.6	0.75	
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M	2.24		151.40	6.87	7.22			5.13			2	21.4	21.5	32.45	
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M	1.85		134.50	7.37	6.62	0.02		2.80			<4.0	22.2	22.2	1.41	
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M	2.43		246.10	6.88	6.53	0.03		4.20			<3.3	26.1	26	0	
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M	1.77		191.10	7.48	6.38	0.02		9.10			<4.0	17.9	18.5	0.47	0.65
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M	2.43			7.60	6.39	0.02		12.20			<5.0	24.9	22.5	0.67	0.98
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M	2.36		196.30	7.77	6.29	0.07		13.40			<2.0	2.34	2.29	0.51	0.51
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M	2.19		230.60	7.90	7.94	0.08		14.90			<2.0	85	87.4	1.52	0.41
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M	3.39		230.30	7.59	7.9	0.09		15.00			<5.0	94	96.4	0.11	0.34

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M	2.12		167.10	7.98	7.69	0.1		13.00			3.2	111	110	1.52	2.21
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	3.82		142.50	6.90	6.39	0.02		12.00			9	19.2	18.9	9.18	2.15
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M	2.66		133.50	6.89	6.41	0.02		6.60			<2.0	17	18.3		0.37
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	1.88		117.50	7.44	6.64	0.02		5.60			2	20.8	18.6	1.4	0.20
SW-04		VA24A1299-004	2024-01-23	Water	M	2.51	2.51	139.00	6.92	7.25	0.02		4.50		30	<3.0	13.9	14.1	13.5133333	0.70
SW-04		L2754353-4	2024-01-23	Water	M															
SW-04		L2754615-4	2024-02-15	Water	M															
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	1.67	1.82	169.50	7.26	7.26	0.02		4.60		29	<3.0	17.2	17.3	2.73	0.57
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	1.48	1.79	114.00	7.32	7.33		<1.0	7.60		27	<3.0	13.2	13.2	1.71	0.39
SW-04		L2755012-4	2024-03-19	Water	M															
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	2.64	3.32	187.60	7.47	7.57		<1.0	8.50		42	<3.0	22.7	21.6	7.92	1.32
SW-04		L2755503-3	2024-04-25	Water	M															
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M	2.45	2.58		7.10	7.56	0.04		9.40		28	<3.0	19.7	19.8	1.19	0.39
SW-04		L2755523-2	2024-04-29	Water	M															
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	2.02	2.08	91.50	7.56	7.59	0	<1.0	11.30		37	<3.0	25	24.6	0.5	0.50
SW-04		L2755588-3	2024-05-02	Water	M															
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	2.51	2.06	78.40	7.52	7.64	0	<1.0	10.30		46	<3.0	25.3	24.8	0.56	0.48
SW-04		L2755687-4	2024-05-09	Water	M															
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M	1.61	1.71		7.30	7.7	0.03		10.50		36	<3.0	25.5	26.8	0.47	0.37
SW-04		L2755695-2	2024-05-10	Water	M															
SW-04		L2755788-2	2024-05-15	Water	M															
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M	1.59	2.39		7.50	7.69	0.07		12.20		49	<3.0	27.9	26.7	0.87	1.13
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	2.52	2.05	120.30	7.67	7.6	0	<1.0	12.50		42	<3.0	27.8	26	403.86	0.61
SW-04		L2755820-3	2024-05-16	Water	M															
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	1.59	1.65	131.30	7.55	7.55	0.06	<1.0	10.60		42	3.2	25.7	25.5	0.58	0.48
SW-04		VA24B1636-005	2024-05-23	Water	M	2.08	2.27		7.50	7.53	0.02		10.50		40	<3.0	25	25.2	0.76	0.49
SW-04		L2755903-5	2024-05-23	Water	M															
SW-04		L2755916-3	2024-05-23	Water	M															
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	2.09	2.1		8.30	7.58	0.02		7.00		51	5.2	24.9	25.4	0	2.64
SW-04		L2755961-4	2024-05-26	Water	M															
SW-04		VA24B4655-003	2024-06-20	Water	M	2.33	2.16	154.10	7.80	7.74	0	<1.0	14.70		50	<3.0	27.3	26.4	1.9	0.40
SW-04		L2756326-3	2024-06-20	Water	M															
SW-04		VA24B5289-002	2024-06-26	Water	M	2.04	1.75		7.60	7.79	0.04		13.80		50	<3.0	32.8	30.6	2.25	0.58
SW-04		L2756419-2	2024-06-26	Water	M															
SW-04		VA24B7579-003	2024-07-18	Water	M	1.61	1.74	139.90	8.20	8.11	0.06	<1.0	18.40		84	3.6	63.6	66.2	17.24	0.66
SW-04		L2756717-3	2024-07-18	Water	M															
SW-04		VA24B8974-004	2024-07-31	Water	M	1.59	1.66		8.00	8.1	0.08		18.60		85	<3.0	67.1	73.1	2.01	0.59
SW-04		L2756871-4	2024-07-31	Water	M															
SW-04		VA24C1546-003	2024-08-22	Water	M	1.74	1.68	174.30	8.04	8.02	0.07	<1.0	16.20		90	<3.0	71.2	74.8	1.28	0.80
SW-04		L2757144-3	2024-08-22	Water	M															
SW-04	SW-04	L2757209-4	2024-08-27	Water	M															
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	4	4.04		7.20	7.88	0.15		15.80		137	<3.0	76.7	74.1	3.28	1.10
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	1	1.21	127.40	7.60	8.11	0.1	<1.0	15.16		84	<3.0	60.4	56.5	4.26	1.03
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	2.17	2.37		7.00	7.91	0.08		18.50		106	3	61.5	59	2.93	4.16
SW-04	SW-04	L2757584-2	2024-09-28	Water	M															
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	9.06	10.2		7.00	7.74	0.42		11.80		136	27.5	93.2	94.1	20.8	15.60
SW-04	SW-04	L2757661-4	2024-10-04	Water	M															
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	2.5	1.63		6.95	7.92	0.06		15.70		103	<3.0	65.4	53.4	2.06	2.68
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M															
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M			137.40	6.68	7.89	0.01		10.75		89	62.9	70.1	60.3	3.32	31.00
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M	2.91	3.03		7.20	7.49	0.03		10.08		49	<3.0	25.2	25.6	1.01	1.17
SW-04	SW-04	L2757873-4	2024-10-22	Water	M															
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	2.71	3.82	130.40	7.35	7.53	0.03	<1.0	9.45		60	<3.0	34	35.5	2.33	2.20
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	3.72	3.71		7.02	7.64	0.3		10.00		61	<3.0	31.6	29.1	3.29	1.64
SW-04	SW-04	L2757942-1	2024-10-26	Water	M															
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	3.15	3.21	131.50	7.42	7.69	0.04	<1.0	9.28		65	<3.0	40.7	39.8	2.3	1.90
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	1.73	1.91	107.10	7.57	7.69	0	<1.0	9.60		47	<3.0	41.8	43	5.01	1.67

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M															
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	3.31	4.42	97.70	7.78	8.1	0.1	<1.0	9.72		111	32	84.9	81.9	8.4	5.23
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M	2.83	3			7.41					34	<3.0	16.6	18.6		0.86
SW-04	SW-04	L2758155-4	2024-11-17	Water	M															
SW-04		4-456131118-0	2024-11-17	Water	F				7.20		0.02		8.00						0.06	
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	0.97	2.25	106.10	7.50	7.48	0.03	<1.0	6.80		59	30.5	32.3	33.4	1.65	3.47
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M	1.65	1.97			7.79					56	<3.0	35.8	35.2		0.91
SW-04	SW-04	L2758371-3	2024-12-08	Water	M															
SW-04		4-456441522-0	2024-12-18	Water	F				7.50		0.02		7.40						2.2	
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	2.1	2.4	120.30	7.56	7.64	0.05	<1.0	6.91		36	5.1	25.1	22.8	13.87	6.09
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M															
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	1.44	1.68	126.80		7.58	0	<1.0	4.20		46	3	32.4	28.1	0	2.96
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M															
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M	1	1.25		7.60	7.51	0.04		5.50		32	<3.0	20.2	33.3	1.55	0.99
SW-04	SW-04	L2758765-1	2025-01-25	Water	M															
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	3.14	3.13	180.00	7.65	7.75	0	<1.0	5.52		58	<3.0	31.7	32.3	0	1.09
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M															
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M	4.29	4.86		7.40	7.64	0.03		5.10		61	32.5	34.3	30.2	26.05	24.70
SW-04	SW-04	L2759042-2	2025-02-21	Water	M															
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	1.84	1.89		7.70	7.72	0.04		7.20		59	<3.0	32	33.8	1.29	0.62
SW-04	SW-04	L2759255-2	2025-03-19	Water	M															
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M	3.85	4.05	197.80	7.24	7.29	0	<1.0	7.63		26	<3.0	15.4	14.6	6.04	1.84
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	1.57	1.94		7.50	7.56	0.03		8.20		53	<3.0	30.6	31.4	2.11	0.86
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M															
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	3.22	3.37		7.50	7.51	0.02		7.70		38	<3.0	22	19.6	2.45	1.49
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M															
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	1.29	1.25		7.90	7.56	0.03		7.70		56	<3.0	28.1	26.3	2.38	1.49
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M				7.90		0.03		7.70						2.38	
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	1.21	1.21		7.70	7.93	0.04		10.80		76	3.9	40.2	39.2	1.57	0.70
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M															
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	8.44	8.89	104.70	7.98	7.92	0.1	<1.0	10.07		111	<3.0	63.4	68.5	2.21	0.82
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	1.69	1.98		7.50	7.63	0.02		10.50		83	3.8	43.2		0.78	0.49
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M															
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	1.31	1.29	125.80	7.87	7.88	0.31	<1.0	10.00		57	<3.0	41.9	37.5	3.81	0.39
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	7.68	8.2	229.60	7.45	7.89	0.1	<1.0	11.24		104	<3.0	63	55.8	3.86	0.29
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M	1.71	2.12		7.80	7.82	0.05		10.10		85	<3.0	54.2	51.3	1.84	0.39
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	8.37	9.16	251.90	7.50	7.93	0.1	<1.0	11.64		143	8.3	78.6	78.6	0.1	0.56
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	0.97	1.23	227.70	7.34	7.88	0.1	<1.0	10.50		71	<3.0	43.2	43	2.14	0.42
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	2.66		271.20	6.10	6.52			5.40			<3.3	3.57		0.47	
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M	5.29		1224.00		6.68			4.80			12.5	4.93		1.2	
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M	2.35		238.20	6.29	6.8			11.50			<2.7	4.74		0.23	0.23
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M	2.54		52.90	7.46	6.96	0.01		5.50			<2.0	4.94	4.88	0.14	
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	1.83		208.00	6.18	6.28	0.01		2.65			<2.0	5.23	5.26	0.1	
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M	2.9		168.60	6.26	6.88			4.63			<2.0	3.95	4.07	0	
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M	2.7		214.30	6.51	6.08			2.00			<4.0	3.49	3.5	0.02	
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	2.75		222.90	6.22	6.05			4.30			<3.3	3.16	3.14	0	
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	2.66		216.50	7.28	6.04	0.01		7.50			<4.0	3.23	3.35	29.99	0.30
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	5.92		191.20	6.00	5.99	0.07		11.80			2.8	5.59	5.84	0.41	1.46
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M															
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M															
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M	3.1		140.70	6.12	5.95	0		6.40			<2.0	3.3	3.6	0	0.17
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M	2.69		151.60	6.77	5.66	0		5.00			3.6	3.9	3.47	0.28	0.14
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M	3.7		254.00	6.30	6.53	0.01		7.00			<3.3	5.51		0.587	
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M	5.71		1149.40		6.54	0.01		7.60			4.3	4.47		2.3	
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M	3.21		278.50	6.42	7.01	0.01		13.60			5.1	9.83		0	-0.06
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M	3.64		129.40	7.08	7.39	0.02		15.90			2.8	18.2	19.5	0.33	
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M	3.82		71.00	6.57	6.52	0.01		7.00			<2.0	7.41	7.43	0	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M	2.75		220.10	5.62	6.44	0.01		4.22			3.2	8.92	8.58	0.15	
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M	4.3		151.60	6.49	6.62			5.19			<2.0	6.27	6.3	0	
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M	3.97		223.20	6.59	6.26	0.01		3.40			<4.0	6.93	6.92	0.01	
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M	4.18		211.20	6.31	6.09	0.01		5.70			<3.3	5.15	5.24	0	
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M	3.91		228.30	6.43	6.24	0.01		8.50			<4.0	5.8	5.79	0.11	0.27
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M	3.43			7.26	6.3	0.01		14.30			<5.0	11.4	10.2	4.3	0.54
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M	5.99		170.60	5.98	6.01	0.01		11.60			<2.0	6.44	6.47	1.09	0.34
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M	4.61		111.30	6.56	6.02	0.01		8.40			<2.0	6.62	6.51	0	0.18
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	4.16		145.30	6.83	5.65	0.01		6.60			2	6.75	6.17	0.15	0.16
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	5.14	6.08			6.51					46	<3.0	5.4	5.23		0.31
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	6.36	7.15			6.52					24	3.5	5.84	5.78		1.47
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	0.98		224.50	6.63	6.49	0.02		13.10			<5.0	8.18	8.27	0.06	0.11
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M	1.59		188.80	6.62	5.8	0.01		10.90			<2.0	5.61	5.56		0.30
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M	2.47		206.60	5.25	5.88	0		10.00			2	2.92	2.84	0.65	0.51
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M	1.55		186.60	5.71	6.03	0.01		4.80			<2.5	4.54	4.57	0	0.11
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M	1.42		173.60	6.07	5.77	0.01		3.80			<2.0	4.84	4.34	0.67	<0.10
SW-07		VA24A1299-005	2024-01-23	Water	M	2.01	1.96	200.83	5.72	6.37	0		3.10		16	<3.0	3.13	3.23	1.76	1.14
SW-07		L2754353-5	2024-01-23	Water	M															
SW-07		L2754615-5	2024-02-15	Water	M															
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	0.95	1.24	190.30	6.13	6.5	0.01		2.50		18	<3.0	4.68	4.79	3.38	<0.10
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	1.72	1.8	193.80	5.53	6.57		<1.0	3.50		11	<3.0	3.2	3.12	0.34	<0.10
SW-07		L2755012-5	2024-03-19	Water	M															
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	2.01	2.31	188.00	6.15	6.64		<1.0	5.10		17	<3.0	3.65	3.5	0.44	<0.10
SW-07		L2755504-3	2024-04-26	Water	M															
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M	2.26	2.25			6.49					15	<3.0	2.86	2.81		25.30
SW-07		L2755521-1	2024-04-28	Water	M															
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	1.49	1.81	143.30	6.36	6.66	0	<1.0	5.20		17	<3.0	3.84	3.87	0.06	0.44
SW-07		L2755598-3	2024-05-03	Water	M															
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	1.75	1.97	151.00	6.16	6.66	0	<1.0	6.60		12	<3.0	3.02	2.85	0.25	<0.10
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M	1.53	1.53		6.60	6.56	0.01		8.30		16	<3.0	3.02	2.88	0.76	0.12
SW-07		L2755677-3	2024-05-09	Water	M															
SW-07		L2755687-3	2024-05-09	Water	M															
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	1.44	1.1		6.90	6.52	0.02		8.30		<10	<3.0	2.55	2.45	0.69	0.11
SW-07		L2755770-3	2024-05-14	Water	M															
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	1.86	1.53	158.80	5.96	6.44	0	<1.0	5.00		<10	<3.0	2.28	2.39	0.19	0.18
SW-07		L2755819-3	2024-05-17	Water	M															
SW-07		VA24B1636-003	2024-05-23	Water	M	1.63	1.49		6.10	6.42	0		7.50		<10	<3.0	2.68	2.71	0.91	0.25
SW-07		L2755903-3	2024-05-23	Water	M															
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	1.38	1.33	157.20	6.13	6.51	0.01	<1.0	6.70		<10	<3.0	2.63	2.55	0.07	<0.10
SW-07		L2755933-3	2024-05-24	Water	M															
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M	1.53	1.34		7.20	6.41	0.05		8.10		18	<3.0	2.64	2.54	0	<0.10
SW-07		L2755961-3	2024-05-26	Water	M															
SW-07		VA24B4698-003	2024-06-21	Water	M	0.77	0.82	150.40	6.50	6.6	0	<1.0	8.70		10	<3.0	2.43	2.35	2.4	<0.10
SW-07		L2756349-3	2024-06-21	Water	M															
SW-07		VA24B5289-003	2024-06-26	Water	M	0.85	0.78		6.00	6.55	0.08		14.40		14	<3.0	2.51	2.37	0	<0.10
SW-07		L2756419-3	2024-06-26	Water	M															
SW-07		VA24B7689-003	2024-07-19	Water	M	0.63	0.72	145.50	6.77	6.75	0	<1.0	15.00		18	<3.0	3.66	3.48	0	<0.10
SW-07		L2756726-3	2024-07-19	Water	M															
SW-07		L2756871-5	2024-07-31	Water	M															
SW-07		VA24B8974-005	2024-07-31	Water	M	0.86	1.19		7.00	6.78	0.01		15.00		11	<3.0	3.61	3.77	0.07	<0.10
SW-07		VA24C1605-003	2024-08-23	Water	M	0.95	0.85	212.40	6.23	6.89	0.01	<1.0	13.50		23	<3.0	5.91	5.92	0	<0.10
SW-07		L2757153-3	2024-08-23	Water	M															
SW-07	SW-07	L2757209-5	2024-08-27	Water	M															
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	1.76	1.9		6.40	6.69	0.05		15.00		18	<3.0	3.52	3.44	1.66	<0.10
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	1.31	1.03	133.40	6.78	6.98	0.01	<1.0	11.78		23	<3.0	6.94	7.22	0	<0.10
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M	1.47	1.26		5.90	6.67	0.01		10.50		25	<3.0	4.68	4.51	0	0.33
SW-07	SW-07	L2757587-4	2024-09-29	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M	0.8	0.81		8.40	6.65	0.01		9.20		21	3	5.68	5.44	0.32	<0.10
SW-07	SW-07	L2757664-1	2024-10-03	Water	M															
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	1.09	1.61			6.81					24	<3.0	5.12	5.73		<0.10
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M															
SW-07		492-455781017-0	2024-10-13	Water	F				6.50		0.01		8.80						0.06	
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M	1.88	2.7		6.59	6.19	0.01		8.30		20	<3.0	3.2	3.77	0.08	0.15
SW-07	SW-07	L2757873-5	2024-10-22	Water	M															
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	1.45	1.11	138.70	6.56	6.49	0.01	<1.0	6.44		19	<3.0	4.85	4.75	1.4	<0.10
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	1.45	1.37		6.11	6.56	0.01		7.20		17	<3.0	4.63	5.01	1.95	<0.10
SW-07	SW-07	L2757913-4	2024-10-25	Water	M															
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	1.98	1.82	153.70	6.15	6.48	0.01	<1.0	6.59		12	<3.0	3.92	3.87	0.82	<0.10
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	1.95	2.01	156.70	6.36	6.56	0	<1.0	6.60		14	<3.0	3.52	3.28	0.65	<0.10
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M															
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	1.88	1.92	163.30	6.28	6.36	0	<1.0	5.49		21	<3.0	3.12	3.07	1.41	0.18
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	2.05	1.87		6.90	6.49	0.01		5.20		14	<3.0	3.37	3.09	1.66	0.22
SW-07	SW-07	L2758155-1	2024-11-16	Water	M															
SW-07		VA24D1587-003	2024-11-20	Water	M	2.64	2.66	125.10	6.40	6.2	0.01	<1.0	4.36		21	<3.0	2.86	2.76	0	0.15
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M															
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	1.84	1.73		6.90	6.48	0.01		4.60		14	<3.0	3.36	3.23	1.14	0.22
SW-07	SW-07	L2758371-4	2024-12-08	Water	M															
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	1.92	2.04	184.20	5.93	6.09	0	<1.0	4.53		<10	<3.0	2.5	2.49	0	0.21
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M															
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	1.22	0.98	134.20		6.69	0	<1.0	1.65		20	<3.0	5.74	5.57	0	<0.10
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M															
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M	1.13	1.06		6.80	6.72	0.01		1.40		14	<3.0	6.08	6.08	0.69	0.31
SW-07	SW-07	L2758765-2	2025-01-25	Water	M															
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M	0.87	1.41		6.61	6.71	0.01		3.40		34	<3.0	6.97	7.64	4.47	4.13
SW-07	SW-07	L2759009-3	2025-02-19	Water	M															
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	1.8	1.89	184.60	6.11	6.46	0	<1.0	1.99		24	<3.0	3.28	3.28	0	0.86
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M															
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	1.35	1.42		6.60	6.61	0.01		7.40		30	<3.0	5.42	4.81	0.2	0.15
SW-07	SW-07	L2759254-3	2025-03-18	Water	M															
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	2.51	2.69	218.40	5.85	6.07	0	<1.0	3.25		<10	3.7	2.38	2.07	390.31	1.51
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	1.5	1.51		7.10	6.49	0		4.50		18	<3.0	3.74	3.71	0.16	0.16
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M															
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	2.25	2.29		7.60	6.12	0.01		6.00		15	<3.0	2.47	2.36	0.86	0.42
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M															
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M				6.90		0		4.80						0.4	
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	1.38	1.46		6.90	6.54	0		4.80		17	<3.0	3.79	3.33	0.4	0.13
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	1.58	1.65		6.80	6.49	0		5.50		15	<3.0	2.9	2.85	0.25	0.17
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M															
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	1.47	1.35	190.40	5.68	6.58	0	<1.0	4.67		15	<3.0	3.28	3.22	0	<0.10
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	1.52	1.57		6.90	6.36	0		5.50		19	<3.0	3.42	2.43	0.47	0.28
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M															
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	1.65	1.78	180.60	6.09	5.99	0.02	<1.0	4.83		<10	<3.0	2.46	2.57	0	0.10
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	1.32	1.6	244.60	5.44	6.49	0	<1.0	5.59		11	<3.0	2.4	2.4	0.44	0.10
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	1.51	1.27		6.70	6.52	0		7.50		16	<3.0	2.96	3.66	0.63	0.10
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M															
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	0.98	1.34	259.20	5.50	6.15	0	<1.0	6.58		19	<3.0	2.59	2.43	0	0.18
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	1.24	1.37	242.60	5.54	6.63	0.01	<1.0	5.65		<10	<3.0	3.03	3	0	<0.10
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	3.3	3.62	200.40	6.01	6.41		<1.0	3.40		<10	<3.0	2.29	2.19	0.54	0.14
SW-08		L2755503-2	2024-04-25	Water	M															
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	3.08	3.1	165.00	5.75	6.3	0	<1.0	4.00		12	<3.0	2.39	2.29	0	0.72
SW-08		L2755588-2	2024-05-02	Water	M															
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	3.43	3.58	175.80	5.68	6.24	0	<1.0	4.50		11	<3.0	1.9	2.01	0	0.47
SW-08		L2755694-2	2024-05-10	Water	M															
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	3.46	3.15	157.40	5.63	6.15	0	<1.0	5.60		<10	<3.0	1.82	2.36	0.01	0.13

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	ORP-Field	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature	Total Dissolved Solids (TDS)-Field	Total Dissolved Solids (TDS)-Lab	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness	Turbidity-field	Turbidity-lab
						mg/L	mg/L	mV	s.u.	s.u.	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L	mg/L	NTU	NTU
SW-08		L2755820-2	2024-05-16	Water	M															
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	2.39	2.3	157.00	6.22	6.13	0	<1.0	6.10		<10	<3.0	2.03	2.14	0.04	0.25
SW-08		L2755916-2	2024-05-23	Water	M															
SW-08		VA24B4655-002	2024-06-20	Water	M	2.76	2.88	190.10	5.70	6.44	0	<1.0	7.70		16	<3.0	2.1	2.16	1.8	0.42
SW-08		L2756326-2	2024-06-20	Water	M															
SW-08		VA24B7579-002	2024-07-18	Water	M	2.39	2.64	179.70	6.49	6.49	0	<1.0	9.60		15	4.4	2.21	2.24	0	0.28
SW-08		L2756717-2	2024-07-18	Water	M															
SW-08		VA24C1546-002	2024-08-22	Water	M	2.41	2.28	218.60	5.65	6.35	0	<1.0	9.20		10	<3.0	2.3	2.3	0.43	0.41
SW-08		L2757144-2	2024-08-22	Water	M															
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	2.2	2.2	141.00	5.98	6.52	0	<1.0	10.64		20	<3.0	2.56	2.42	0.11	0.35
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	3.88	4.08	182.50	5.70	6.44	0	<1.0	6.63		19	<3.0	2.65	2.85	0.66	0.84
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	3.87	3.95	163.10	6.14	6.32	0	<1.0	6.21		15	<3.0	2.66	2.66	1.21	0.30
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	3.3	3.04	177.70	6.14	6.48	0	<1.0	6.35		13	<3.0	2.79	2.76	0.2	0.27
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	4.22	3.6	185.20	5.83	6.06	0	<1.0	5.59		18	<3.0	2.09	2.12	1.75	0.25
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	2.65	2.71	183.10	5.80	6.43	0	<1.0	3.88		13	<3.0	2.53	2.61	0	0.28
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	1.91	2.19	200.90	6.93	7.12		<1.0	7.70		20	37.9	6.93	6.62	0.63	4.26
SW-09		L2755503-4	2024-04-25	Water	M															
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	1.29	1.32	85.90	6.95	7.01	0	<1.0	7.60		18	42.5	6.68	6.47	0	5.07
SW-09		L2755588-4	2024-05-02	Water	M															
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	1.49	3.04	143.50	6.94	7.17	0	<1.0	8.80		24	<3.0	6.79	6.78	0	0.16
SW-09		L2755687-5	2024-05-09	Water	M															
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	1.31	1.41	154.90	6.89	7.09	0.01	<1.0	10.50		14	<3.0	7.21	7.13	1.3	0.16
SW-09		L2755820-4	2024-05-16	Water	M															
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	1.13	1.02	155.30	6.94	7.04	0.02	<1.0	9.50		22	<3.0	7.59	7.45	0.09	0.17
SW-09		L2755916-4	2024-05-23	Water	M															
SW-09		VA24B4655-004	2024-06-20	Water	M	1.28	1.23	216.80	7.10	7.22	0	<1.0	11.00		22	<3.0	7.34	7.38	2.4	<0.10
SW-09		L2756326-4	2024-06-20	Water	M															
SW-09		VA24B7579-004	2024-07-18	Water	M	1.04	1.2	160.10	7.13	7.28	0.01	<1.0	16.00		32	<3.0	8.97	9.2	0	<0.10
SW-09		L2756717-4	2024-07-18	Water	M															
SW-09		VA24C1546-004	2024-08-22	Water	M	1.03	1	188.30	6.95	7.14	0.01	<1.0	14.80		28	<3.0	9.98	10	0.62	0.12
SW-09		L2757144-4	2024-08-22	Water	M															
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	0.94	1.45	128.90	7.07	7.34	0.01	<1.0	13.95		29	<3.0	10.7	9.75	0	1.20
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M			118.10	7.38	6.77	0.04		10.56		26	4.1	7.11	6.81	125.31	1.36
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	2.27	2.53	149.60	6.91	6.91	0.01	<1.0	9.29		26	<3.0	5.9	6.27	0.57	0.13
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	2.78	3.15	134.60	6.99	6.88	0.01	<1.0	9.30		23	<3.0	5.48	5.49	0.64	0.13
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	1.51	1.56	157.60	6.77	7	0	<1.0	9.10		17	<3.0	6.71	6.15	0.47	<0.10
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M															
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	3.08	3.21	171.10	6.67	6.72	0	<1.0	9.14		20	<3.0	4.74	4.91	4.29	0.17
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	1.9	2.23	165.00	6.70	6.81	0.01	<1.0	7.36		21	<3.0	4.84	4.69	0	<0.10
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M															
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	2.14	2.26	192.00	6.50	6.89	0.01	<1.0	7.07		12	<3.0	5.17	4.89	0	0.23
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	1.2	1.28	126.80		6.88	0	<1.0	4.15		23	<3.0	5.61	5.35	0	<0.10
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M															
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	2.22	2.28	187.70	6.43	6.94	0	<1.0	4.95		24	<3.0	5.06	5.19	0	<0.10
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M															
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	3.04	3.23	225.10		6.65	0	<1.0	6.58		13	<3.0	4.2	4.09	0.34	0.20
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	1.29	1.24	169.60	6.62	6.96	0	<1.0	7.47		21	<3.0	5.42	5.32	0	0.14
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	1.23	1.4	136.50	7.02	7.02	0.05	<1.0	8.45		15	6.5	5.88	5.58	0	0.53
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	1.22	1.98	240.60	6.26	7.11	0	<1.0	9.40		18	<3.0	6.79	6.74	0.81	<0.10
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	1.41	0.91	278.00	6.33	7.06	0	<1.0	10.21		26	<3.0	6.9	6.96	0	0.38
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M	1.63	1.53	233.30	6.26	7.14	0.02	<1.0	8.90		22	<3.0	7.14	6.63	0	0.14

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M			<0.0050	<0.050	0.89	<0.020	0.0747	<0.0010						2.35	0.104
OUT-01		VA24B1636-006	2024-05-23	Water	M			0.0063	<0.050	<0.50	<0.020	0.0445	<0.0010						1.71	0.101
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M			0.0078	<0.050	0.82	<0.020	0.316	<0.0010						3.05	0.3
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M			<0.0050	<0.050	0.66	<0.020	0.077	<0.0010						1.8	0.551
OUT-01		661-455931031-0	2024-10-28	Water	F															
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M			<0.0050	<0.050	0.62	<0.020	0.0854	<0.0010						1.86	0.223
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M			<0.0050	<0.050	0.55	<0.020	0.119	<0.0010						1.49	0.17
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M			0.0085	0.05	19.6	<0.020	0.421	<0.0010						7.83	0.112
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M			<0.0050	<0.050	<0.50	<0.020	0.186	<0.0010						1.5	0.152
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0468	<0.0010						1.29	0.283
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M															
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0807	<0.0010						1.67	0.143
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0551	<0.0010						1.44	0.164
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M			0.0062	<0.050	<0.50	<0.020	0.104	<0.0010						2.25	0.112
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0806	<0.0010						1.76	0.238
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M			<0.0050	<0.050	0.72	<0.020	0.0643	<0.0010						2.02	0.0954
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M			<0.0050	<0.050	0.96	<0.020	0.121	<0.0010						2.85	0.0841
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0746	<0.0010						1.9	0.108
OUT-02		VA24B5289-006	2024-06-26	Water	M			<0.0050	<0.050	1.5	<0.020	0.219	<0.0010						4.4	0.0727
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M			0.006	<0.050	0.82	<0.020	0.178	<0.0010						1.77	0.191
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M			<0.0050	<0.050	0.66	<0.020	0.0314	<0.0010						1.83	0.144
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M			<0.0050	<0.050	0.93	<0.020	0.166	<0.0010						2.88	0.854
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M			<0.0050	<0.050	0.58	<0.020	0.0575	<0.0010						1.75	0.274
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M			0.007	<0.050	0.75	<0.020	0.0771	<0.0010						1.62	0.302
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M			<0.0050	<0.050	0.96	<0.020	0.188	<0.0010						1.91	0.206
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0844	<0.0010						1.49	0.172
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M			0.0083	<0.050	<0.50	<0.020	0.0381	<0.0010						1.55	0.46
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M															
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0573	<0.0010						1.66	0.498
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0287	<0.0010						1.54	0.228
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0348	<0.0010						1.7	0.108
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0612	<0.0010						2.05	0.159
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M			<0.0050	<0.050	<0.50	<0.020	0.154	<0.0010						3.9	0.19
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M			0.0073	<0.050	<0.50	<0.020	0.133	0.0012						3.07	0.288
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M			<0.0050	<0.050	0.66	<0.020	0.43	<0.0010						2.22	1.3
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M															
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M			0.0096	<0.050	0.65	<0.020	0.244	<0.0010						2.44	0.224
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M			<0.0050	<0.050	0.61	<0.020	0.184	<0.0010						2.54	0.219
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M			<0.0050	<0.050	0.64	<0.020	0.165	<0.0010						2.57	0.184
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M			0.0072	<0.050	0.66	<0.020	0.288	<0.0010						2.14	0.235
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	3		<0.0050	<0.050	0.53	<0.020	0.228	<0.0010		0.089	0.089			1.86	0.174
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M															
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M			0.0052	<0.050	0.51	<0.020	0.236	<0.0010						1.79	0.192
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M			<0.0050	<0.050	<0.50	<0.020	0.103	<0.0010						1.78	0.491
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M															
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M			<0.0050	<0.050	<0.50	<0.020	0.068	<0.0010						1.8	0.203
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0987	<0.0010						3.3	0.138
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M			<0.02				0.029	<0.01	0.0289				0.0129		0.0753
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M			<0.02				0.031	<0.01	0.0313				<0.002		0.139
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M			0.023				0.04	<0.01	0.0397				0.0064		0.112
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M			0.024				<0.01	<0.01	<0.02				0.0025		0.125
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M			0.037				<0.01	<0.01	<0.02				0.0083		0.211
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M			0.047				0.057	<0.005	0.057				0.0025		0.103
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M			<0.02				0.027	<0.01	0.0266				0.0063		0.119
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M			0.078				<0.01	<0.01	<0.02				0.0038		0.14
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M															0.0873
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M															0.0769
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M	<1		<0.05				0.04								0.119
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M	2		<0.05				0.059								0.197
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M	<1		<0.05				0.046								0.13
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M	<1		<0.050				0.025								0.195
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M	2		<0.050				0.021								0.18

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M	1		<0.050				0.021								0.174
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M	<1		<0.050				0.014								0.161
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M	<1		0.112				0.019								0.131
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M	1		<0.050				0.02								0.136
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M	78		<0.050				0.03								0.198
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M	1		<0.050				0.044								0.0868
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M	79		<0.050				0.075								0.215
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M	3		<0.050				0.029								0.154
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M	<1		<0.050				0.027								0.174
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M	1		<0.050				0.031								0.0814
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M	<1.8		<0.050				0.032								0.179
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	<1		<0.050	<0.10	0.56	<0.10	0.035	<0.010						<1.0	0.132
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M															
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M	<1		<0.050	<0.10	0.56	<0.10	0.032	<0.010						<1.0	0.129
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	<1		<0.050	<0.10	0.58	<0.10	0.03	<0.010						<1.0	0.143
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	4		<0.050	<0.10	0.33	<0.10	0.023	<0.010						<1.0	0.294
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M	<1		0.112	<0.10	0.18	<0.10	<0.010	<0.010						<1.0	0.145
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	<1		<0.050	<0.10	0.33	<0.10	0.013	<0.010						<1.0	0.128
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M	10		<0.050	<0.10	0.51	<0.10	0.035	<0.010						<1.0	0.103
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	4		<0.050	<0.10	0.6	<0.10	0.039	<0.010						<1.0	0.0946
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	1		<0.050	<0.10	1.17	<0.10	0.097	<0.010						<1.0	0.0576
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M	3		<0.050	<0.10	0.83	<0.10	0.047	<0.010						1.1	0.0816
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	<1		<0.050	<0.10	1.21	<0.10	0.0828	<0.0050	0.0828					1.2	0.0571
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	3		<0.050	<0.10	0.66	<0.10	0.0755	<0.0050	0.0755					<1.0	0.116
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	<1		<0.050	<0.10	0.63	<0.10	0.036	<0.010						<1.0	0.143
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M	2		<0.050	<0.10	0.68	<0.10	0.033	<0.010						<1.0	0.14
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	<1		<0.050	<0.10	0.45	<0.10	0.042	<0.010						<1.0	0.142
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M	<1		0.054	<0.10	0.24	<0.050	0.0392	<0.0050	0.0392					<1.0	0.166
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M	6		<0.050	<0.10	0.55	<0.050		<0.010						2.6	0.0379
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	1		<0.050	<0.10	0.58	<0.050		<0.0050	<0.0100	0.095				<1.0	0.106
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	6		<0.050	<0.10	0.59	<0.050	0.0265	<0.0050	0.0265	<0.050				<1.0	0.104
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	2		<0.050	<0.10	0.58	<0.10	0.015	<0.010	0.0151	0.066				<1.0	0.0851
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M	5		<0.050	<0.10	0.47	<0.10		<0.010						<1.0	0.209
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	3		<0.050	<0.10	0.62	<0.10	0.036	<0.010						<1.0	0.141
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M	2		<0.050		0.67	<0.050	0.053	<0.010						<1.0	0.15
SW-01		VA24A1299-001	2024-01-23	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.036	<0.0010						0.51	0.193
SW-01		L2754353-1	2024-01-23	Water	M															
SW-01		L2754615-1	2024-02-15	Water	M															
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	1		<0.0050	<0.050	0.62	<0.020	0.0305	<0.0010						0.49	0.146
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	1		<0.0050	<0.050	<0.50	<0.020	0.0278	<0.0010						0.46	0.162
SW-01		L2755012-1	2024-03-19	Water	M															
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	1		<0.0050	<0.050	<0.50	<0.020	0.0201	<0.0010						0.37	0.159
SW-01		L2755503-1	2024-04-25	Water	M															
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0261	<0.0010						0.46	0.148
SW-01		L2755523-1	2024-04-29	Water	M															
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0259	<0.0010						0.44	0.143
SW-01		L2755588-1	2024-05-02	Water	M															
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0135	<0.0010						0.35	0.153
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0127	<0.0010						0.33	0.164
SW-01		L2755694-1	2024-05-10	Water	M															
SW-01		L2755695-1	2024-05-10	Water	M															
SW-01		L2755788-1	2024-05-15	Water	M															
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0131	<0.0010						<0.30	0.18
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0121	<0.0010						0.33	0.15
SW-01		L2755820-1	2024-05-16	Water	M															
SW-01		VA24B1628-001	2024-05-22	Water	M			<0.0050	<0.050	<0.50	<0.020	0.013	<0.0010						0.32	0.154
SW-01		L2755902-1	2024-05-22	Water	M															
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0134	<0.0010						0.33	0.141
SW-01		L2755916-1	2024-05-23	Water	M															
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0166	<0.0010						<0.30	0.188
SW-01		VA24B4655-001	2024-06-20	Water	M	2		<0.0050	<0.050	<0.50	<0.020	0.0243	<0.0010						0.36	0.126
SW-01		L2756326-1	2024-06-20	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M			<0.0050	<0.050	0.5	<0.020	0.0222	<0.0010						0.36	0.126
SW-01		L2756419-1	2024-06-26	Water	M															
SW-01		VA24B7579-001	2024-07-18	Water	M	4		<0.0050	<0.050	0.58	<0.020	0.0336	<0.0010						0.36	0.12
SW-01		L2756717-1	2024-07-18	Water	M															
SW-01		VA24B8974-001	2024-07-31	Water	M			<0.0050	<0.050	0.56	<0.020	0.0276	<0.0010						0.31	0.115
SW-01		L2756871-1	2024-07-31	Water	M															
SW-01		VA24C1546-001	2024-08-22	Water	M	3		<0.0050	<0.050	0.65	<0.020	0.0441	<0.0010						0.43	0.114
SW-01		L2757144-1	2024-08-22	Water	M															
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0552	<0.0010						0.38	0.162
SW-01	SW-01	L2757209-1	2024-08-27	Water	M															
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	<1		<0.0050	<0.050	0.66	<0.020	0.0406	<0.0010						0.36	0.1
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M			<0.0050	<0.050	0.59	<0.020	0.046	<0.0010						0.38	0.126
SW-01	SW-01	L2757584-1	2024-09-28	Water	M															
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M			<0.0050	<0.050	0.7	<0.020	0.0238	<0.0010						0.41	0.0966
SW-01	SW-01	L2757664-2	2024-10-03	Water	M															
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M			<0.0050	<0.050	0.75	<0.020	0.0297	<0.0010						0.4	0.0898
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M															
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M			0.0055	<0.050	0.64	<0.020	0.0545	<0.0010						0.56	0.145
SW-01	SW-01	L2757873-1	2024-10-22	Water	M															
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	5		<0.0050	<0.050	0.66	<0.020	0.0412	<0.0010						0.46	0.123
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M			0.0052	<0.050	0.59	<0.020	0.0365	<0.0010						0.48	0.181
SW-01	SW-01	L2757942-2	2024-10-26	Water	M															
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	5		<0.0050	<0.050	0.63	<0.020	0.039	<0.0010						0.56	0.158
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	<1		<0.0050	<0.050	0.64	<0.020	0.0414	<0.0010						0.5	0.141
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0389	<0.0010						0.55	0.167
SW-01	SW-01	L2758119-1	2024-11-12	Water	M															
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	4		<0.0050	<0.050	<0.50	<0.020	0.0358	<0.0010						0.49	0.192
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	<1		<0.0050	<0.050	0.59	<0.020	0.0372	<0.0010						0.56	0.132
SW-01	SW-01	L2758350-1	2024-12-06	Water	M															
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M			0.0067	<0.050	0.58	<0.020	0.035	<0.0010						0.5	0.15
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M															
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	<1		<0.0050	<0.050	0.95	<0.020	0.0382	<0.0010		0.055	0.055			0.53	0.149
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M															
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	<1		<0.0050	<0.050	0.7	<0.020	0.0353	<0.0010						0.43	0.136
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M															
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M			<0.0050	<0.050	10.4	<0.020	0.038	<0.0010						1.81	0.13
SW-01	SW-01	L2758769-1	2025-01-24	Water	M															
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	<1		<0.0050	<0.050	0.53	<0.020	0.0575	<0.0010		0.069	0.069			0.58	0.167
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M															
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M			<0.0050	<0.050	0.72	<0.020	0.0539	<0.0010						0.65	0.166
SW-01	SW-01	L2759042-1	2025-02-21	Water	M															
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M			0.0053	<0.050	0.7	<0.020	0.036	<0.0010						0.64	0.132
SW-01	SW-01	L2759255-1	2025-03-19	Water	M															
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0262	<0.0010		0.069	0.069			0.46	0.205
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M			<0.0050	<0.050	<0.50	<0.020	0.03	<0.0010						0.51	0.149
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M															
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0239	<0.0010						0.43	0.163
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M															
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M			0.0068	<0.050	<0.50	<0.020	0.0257	<0.0010						0.54	0.149
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M															
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M			<0.0050	<0.050	<0.50	<0.020	0.023	<0.0010						0.41	0.158
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M															
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0185	<0.0010		<0.050	<0.050			0.38	0.15
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0145	<0.0010						0.31	0.154
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M															
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0146	<0.0010		0.064	0.064			<0.30	0.155
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0127	<0.0010		0.06	0.06			0.31	0.157
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0161	<0.0010						0.32	0.136
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	<1		0.0077	<0.050	<0.50	<0.020	0.0123	<0.0010						0.32	0.155
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0213	<0.0010		0.056	0.056			0.38	0.136
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M	<1		<0.05				0.083								0.0565
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M	<1.8		<0.05				0.082								0.0635

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M	1		<0.05				0.071								0.0879
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M	<1		<0.050				0.048								0.127
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M	<1		<0.050				0.029								0.127
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M	12		<0.050				0.03								0.0877
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M	<1		0.063				0.022								0.098
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M	<1		0.069				0.034								0.114
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M	6		<0.050				0.032								0.215
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M	2		<0.050				0.062								0.0291
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M	8		<0.050				0.151								0.0223
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M	79		<0.050				0.082								0.245
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M	2		<0.050				0.043								0.1
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M	<1		<0.050				0.046								0.103
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M	2		<0.050				0.054								0.0179
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M	<1.8		<0.050				0.04								0.211
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	<1		<0.050	<0.10	0.82	<0.10	0.061	<0.010						2.9	0.0705
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M															
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M	<1		<0.050	<0.10	0.6	<0.10	0.055	<0.010						2.4	0.0998
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	<1		<0.050	<0.10	0.87	<0.10	0.058	<0.010						2.5	0.124
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M	4		<0.050	<0.10	0.55	<0.10	0.049	<0.010						1.5	0.145
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	1		0.108	<0.10	0.18	<0.10	0.012	<0.010						<1.0	0.12
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	<1		<0.050	<0.10	0.27	<0.10	0.013	<0.010						<1.0	0.0556
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M	14		<0.050	<0.10	1.21	<0.10	0.083	<0.010						2.4	0.0266
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	1		<0.050	<0.10	3.17	<0.10	0.155	<0.010						4.7	0.0196
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M	2		<0.050	<0.10	4.22	<0.10	0.201	<0.010						5.8	0.019
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M	1		<0.050	<0.10	1.22	<0.10	0.108	<0.010						3	0.0427
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M	1		0.051	<0.10	1.77	<0.10	0.131	<0.0050	0.131					3.8	0.0366
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	<1		<0.050	<0.10	0.95	<0.10	0.106	<0.0050	0.106					3.5	0.0497
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M	<1		<0.050	<0.10	1.27	<0.10	0.078	<0.010						3.5	0.0505
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M	3		<0.050	<0.10	1.34	<0.10	0.076	<0.010						3.3	0.0585
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M	<1		<0.050	<0.10	0.44	<0.10	0.072	<0.010						1.6	0.0898
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M	<1		<0.050	<0.10	0.9	<0.050	0.0286	0.0067	0.0353					<1.0	0.114
SW-02	SW-02	23F0370-03	2023-06-02	Water	M		<0.00400		<0.10	0.38	<0.10	0.019	<0.010					<0.0050	1.1	0.0584
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M	8		<0.050	<0.10	0.45	<0.050		<0.010						1.1	0.04
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M	<1		<0.050	<0.10	1.67	<0.050		0.0101						2.9	0.0246
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M	2		<0.050	<0.10	3.59	<0.050	0.15	<0.0050	0.15					5.4	0.0191
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	8		<0.050	<0.10	0.43	<0.10		<0.010						1.3	0.277
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M															
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M															
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M	<1		<0.050	<0.10	0.74	<0.10	0.082	<0.010						2.8	0.0598
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M	2		<0.050		0.83	<0.050	0.079	<0.010						2.4	0.104
SW-02		VA24A1299-002	2024-01-23	Water	M	1		0.0063	<0.050	<0.50	<0.020	0.0506	<0.0010						1.72	0.197
SW-02		L2754353-2	2024-01-23	Water	M															
SW-02		L2754615-2	2024-02-15	Water	M															
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	<1		<0.0050	<0.050	1.05	<0.020	0.0654	<0.0010						3.4	0.0577
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	1		<0.0050	<0.050	<0.50	<0.020	0.0512	<0.0010						1.79	0.108
SW-02		L2755012-2	2024-03-19	Water	M															
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M			<0.0050	<0.050	0.58	<0.020	0.0419	<0.0010						2.26	0.142
SW-02		L2755316-6	2024-04-12	Water	M															
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	1		0.007	<0.050	<0.50	<0.020	0.0339	<0.0010						1.6	0.0911
SW-02		L2755504-1	2024-04-26	Water	M															
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M			<0.0050	<0.050	<0.50	<0.020	0.037	<0.0010						1.35	0.133
SW-02		L2755521-2	2024-04-28	Water	M															
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	<1		<0.0050	<0.050	0.56	<0.020	0.0405	<0.0010						2	0.0746
SW-02		L2755598-1	2024-05-03	Water	M															
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	1		<0.0050	<0.050	<0.50	<0.020	0.0319	<0.0010						1.3	0.098
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0292	<0.0010						1.38	0.0901
SW-02		L2755677-1	2024-05-09	Water	M															
SW-02		L2755687-1	2024-05-09	Water	M															
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0229	<0.0010						1.03	0.0851
SW-02		L2755770-1	2024-05-14	Water	M															
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	1		<0.0050	<0.050	<0.50	<0.020	0.0174	<0.0010						0.81	0.0891
SW-02		L2755819-1	2024-05-17	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0205	<0.0010						1.23	0.0896
SW-02		L2755903-1	2024-05-23	Water	M															
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.023	<0.0010						1.21	0.0715
SW-02		L2755933-1	2024-05-24	Water	M															
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0222	<0.0010						1.15	0.077
SW-02		L2755961-1	2024-05-26	Water	M															
SW-02		VA24B4698-001	2024-06-21	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0182	<0.0010						1.02	0.0523
SW-02		L2756349-1	2024-06-21	Water	M															
SW-02		VA24B5540-001	2024-06-27	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0181	<0.0010						0.72	0.0902
SW-02		L2756458-1	2024-06-27	Water	M															
SW-02		VA24B7689-001	2024-07-19	Water	M	6		<0.0050	<0.050	0.85	<0.020	0.0505	<0.0010						1.61	0.0301
SW-02		L2756726-1	2024-07-19	Water	M															
SW-02		VA24B8974-002	2024-07-31	Water	M			<0.0050	<0.050	0.93	<0.020	0.0434	<0.0010						1.79	0.0372
SW-02		L2756871-2	2024-07-31	Water	M															
SW-02		VA24C1605-001	2024-08-23	Water	M	2		<0.0050	<0.050	2.03	<0.020	0.133	<0.0010						3.3	0.0252
SW-02		L2757153-1	2024-08-23	Water	M															
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M			<0.0050	<0.050	0.56	<0.020	0.135	<0.0010						1.67	0.0771
SW-02	SW-02	L2757209-2	2024-08-27	Water	M															
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	5		<0.0050	<0.050	2.94	<0.020	0.156	<0.0010						4.4	0.0233
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M			<0.0050	<0.050	1.12	<0.020	0.119	<0.0010						2.48	0.0501
SW-02	SW-02	L2757587-1	2024-09-29	Water	M															
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M			<0.0050	<0.050	0.79	<0.020	0.108	<0.0010						2.84	0.136
SW-02	SW-02	L2757661-1	2024-10-04	Water	M															
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M			<0.0050	<0.050	1.75	<0.020	0.106	<0.0010						3.19	0.0344
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M															
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M			<0.0050	<0.050	0.66	<0.020	0.12	<0.0010						2.33	0.0852
SW-02	SW-02	L2757873-2	2024-10-22	Water	M															
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	1		<0.0050	<0.050	1	<0.020	0.105	<0.0010		0.086	0.086			3.16	0.0556
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M			<0.0050	<0.050	1.03	<0.020	0.104	<0.0010						3.57	0.0533
SW-02	SW-02	L2757913-1	2024-10-25	Water	M															
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	<1		<0.0050	<0.050	1.03	<0.020	0.079	<0.0010		<0.050	<0.050			2.69	0.0876
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	5		0.0052	<0.050	0.5	<0.020	0.0499	<0.0010		<0.050	<0.050			1.56	0.0957
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M															
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	2		<0.0050	<0.050	<0.50	<0.020	0.0761	<0.0010		<0.050	<0.050			2.2	0.102
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M			<0.0050	<0.050	0.57	<0.020	0.0775	<0.0010						2.63	0.207
SW-02	SW-02	L2758155-3	2024-11-16	Water	M															
SW-02		VA24D1587-001	2024-11-20	Water	M	2		<0.0050	<0.050	0.72	<0.020	0.0718	<0.0010				0.103		3.01	0.185
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M															
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M			0.0051	<0.050	0.57	<0.020	0.0624	<0.0010						1.9	0.115
SW-02	SW-02	L2758371-1	2024-12-08	Water	M															
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0716	<0.0010		<0.050	<0.050			2.09	0.101
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M															
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	<1		<0.0050	<0.050	1.6	<0.020	0.0792	<0.0010						3.86	0.0425
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M															
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M			<0.0050	<0.050	1.66	<0.020	0.0807	<0.0010						3.97	0.0389
SW-02	SW-02	L2758769-2	2025-01-24	Water	M															
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M			<0.0050	<0.050	1.45	<0.020	0.107	<0.0010						3.66	0.668
SW-02	SW-02	L2759009-1	2025-02-19	Water	M															
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	<1		<0.0050	<0.050	0.74	<0.020	0.108	<0.0010		0.05	0.05			2.28	0.126
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M															
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M			<0.0050	<0.050	1.02	<0.020	0.0645	<0.0010						3.38	0.0618
SW-02	SW-02	L2759254-1	2025-03-18	Water	M															
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0425	<0.0010		0.065	0.065			1.17	0.277
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M			<0.0050	<0.050	0.58	<0.020	0.0527	<0.0010						2.3	0.148
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M															
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0381	<0.0010						1.18	0.166
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M															
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M			<0.0050	<0.050	<0.50	<0.020	0.043	<0.0010						1.98	0.0864
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M															
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0336	<0.0010						1.45	0.0782
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M															
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	<1		<0.0050	<0.050	0.52	<0.020	0.0296	<0.0010		<0.050	<0.050			1.56	0.0726

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0262	<0.0010						1.08	0.078
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M															
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.022	<0.0010		<0.050	<0.050			1.01	0.0872
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0192	<0.0010		<0.050	<0.050			1.02	0.0747
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0212	<0.0010						1.23	0.0709
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M															
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	1		<0.0050	<0.050	<0.50	<0.020	0.0185	<0.0010						1.11	0.0743
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0294	<0.0010		<0.050	<0.050			1.43	0.0733
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M			0.022				0.048	<0.01	0.0476				0.0064		0.0311
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M			0.032				0.047	<0.01	0.0466				<0.002		0.0631
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M			0.031				0.068	<0.01	0.0683				0.0028		0.0364
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M			0.026				<0.01	<0.01	<0.02				0.0024		0.0677
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M							0.029	<0.01	0.0287				0.0052		0.135
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M			0.039				0.103	<0.005	0.103				0.003		0.0567
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M			0.052				0.047	<0.01	0.0466				0.008		0.0522
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M			0.104				<0.01	<0.01	<0.02				0.0021		0.0727
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M															0.0341
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M															0.14
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M	5		<0.05				<1								0.0504
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M	<1.8		<0.05				<1								0.0598
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M	<1		<0.05				0.127								0.0822
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M	<1		<0.050				0.049								0.124
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M	<1		<0.050				0.032								0.129
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M	<1		<0.050				0.027								0.0959
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M	<1		0.072				0.024								0.207
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M	<1		0.051				0.029								0.122
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M	52		0.074				0.034								0.243
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M	5		<0.050				0.066								0.0843
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M	5		<0.050				0.108								0.0586
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M	49		<0.050				0.081								0.224
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M	2		<0.050				0.045								0.103
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M	1		<0.050				0.053								0.0971
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M	3		<0.050				0.06								0.0113
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M	<1.8		<0.050				0.041								0.205
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	<1		<0.050	4.85	1480	<0.10	0.024	<0.010						222	0.0676
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M															
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	<1		0.05	0.26	66.9	<0.10	0.058	<0.010						12.4	0.0831
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	<1		<0.050	0.23	63.4	<0.10	0.046	<0.010						10.7	0.132
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M	4		<0.050	0.39	97.5	<0.10	0.044	<0.010						15.2	0.17
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	1		0.095	<0.10	0.19	<0.10	0.012	<0.010						<1.0	0.163
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	1		<0.050	<0.10	4.54	<0.10	0.016	<0.010						1.5	0.0754
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M	11		<0.050	2.71	704	<0.10	0.05	<0.010						115	0.0566
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M	2		<0.050	0.81	237	<0.10	0.121	<0.010						39.5	0.0594
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M	3		<0.050	4.15	2490	<0.10	<0.010	<0.010						324	0.0375
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	3		<0.050	<0.10	1980	<0.10	<0.010	<0.010						283	0.0562
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M	1		<0.050	1.41	1130	<0.10	0.138	<0.0050	0.138					164	0.0387
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	2		<0.050	3.79	1320	<0.10	0.116	<0.0050	0.116					195	0.0486
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M	<1		<0.050	7.89	2350	<0.10	0.17	<0.010						327	0.0443
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	4		<0.050	1.9	605	<0.10	0.067	<0.010						<100	0.0511
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	<1		<0.050	0.12	38.5	<0.10	0.104	<0.010						6.9	0.0881
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M	<1		<0.050	<0.10	1.27	<0.050	0.0337	<0.0050	0.0337					<1.0	0.323
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	10		<0.050	<0.10	12.8	<0.050		<0.010						2.9	0.0449
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	14		<0.050	0.5	386	<0.050		<0.010						54.3	0.0951
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	2		<0.050	<2.50	1530	0.12	0.0874	<0.0050	0.0874					228	0.0794
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M	1730		0.088	2.84	390	<0.10	0.082	<0.010						52.1	0.0373
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M	22		<0.050	<0.10	1.54	<0.10		<0.010						1.5	0.259
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	10		<0.050	4.8	2430	<0.10	0.228	<0.010						380	0.0686
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M	<1.8		<0.050		1130	0.089	0.483	<0.100						165	0.105
SW-03		VA24A1299-003	2024-01-23	Water	M	3		<0.0050	0.94	293	<0.100	0.0633	<0.0050						42.9	0.19
SW-03		L2754353-3	2024-01-23	Water	M															
SW-03		L2754615-3	2024-02-15	Water	M															
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	<1		<0.0050	6.91	2110	<1.00	<0.250	<0.0500						291	0.128

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	<10		<0.0050	<5.0	536	<1.0	<0.50	<0.10						57	0.101
SW-03		L2755012-3	2024-03-19	Water	M															
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M			<0.0050	<0.050	1.71	<0.020	0.0521	<0.0010						2.98	0.101
SW-03		L2755316-7	2024-04-12	Water	M															
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	1		<0.0050	0.324	99.6	<0.020	0.0326	<0.0010						15.3	0.0876
SW-03		L2755504-2	2024-04-26	Water	M															
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0405	<0.0010						1.58	0.201
SW-03		L2755521-3	2024-04-28	Water	M															
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	<1		<0.0050	0.16	49.9	<0.020	0.039	<0.0010						9.16	0.0955
SW-03		L2755598-2	2024-05-03	Water	M															
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	<1		<0.0050	0.432	129	<0.020	0.0439	<0.0010						19.3	0.105
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0321	<0.0010						1.47	0.0839
SW-03		L2755677-2	2024-05-09	Water	M															
SW-03		L2755687-2	2024-05-09	Water	M															
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0261	<0.0010						1.21	0.0786
SW-03		L2755770-2	2024-05-14	Water	M															
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	<1		<0.0050	<0.050	3.53	<0.020	0.0176	<0.0010						1.3	0.0814
SW-03		L2755819-2	2024-05-17	Water	M															
SW-03		VA24B1636-002	2024-05-23	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0213	<0.0010						1.22	0.0865
SW-03		L2755903-2	2024-05-23	Water	M															
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	<1		<0.0050	<0.050	3.18	<0.020	0.0216	<0.0010						1.62	0.0732
SW-03		L2755933-2	2024-05-24	Water	M															
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0239	<0.0010						1.3	0.0866
SW-03		L2755961-2	2024-05-26	Water	M															
SW-03		VA24B4698-002	2024-06-21	Water	M	<1		<0.0050	<0.050	6.82	<0.020	0.0191	<0.0010						1.93	0.0536
SW-03		L2756349-2	2024-06-21	Water	M															
SW-03		VA24B5540-002	2024-06-27	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0189	<0.0010						0.84	0.153
SW-03		L2756458-2	2024-06-27	Water	M															
SW-03		VA24B7689-002	2024-07-19	Water	M	2		<0.0050	1.2	386	<0.100	0.0373	<0.0050						53.5	0.0828
SW-03		L2756726-2	2024-07-19	Water	M															
SW-03		L2756871-3	2024-07-31	Water	M															
SW-03		VA24B8974-003	2024-07-31	Water	M			<0.0050	<0.050	2.15	<0.020	0.0448	<0.0010						1.99	0.0432
SW-03		VA24C1605-002	2024-08-23	Water	M	20		<0.0050	<5.0	815	<1.0	<0.50	<0.10						83	0.091
SW-03		L2757153-2	2024-08-23	Water	M															
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M			<0.0050	1.53	475	<0.200	0.0913	<0.0100						64.9	0.135
SW-03	SW-03	L2757229-1	2024-08-28	Water	M															
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	10		<0.0050	<5.0	973	<1.0	<0.50	<0.10						114	0.354
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M			<0.0050	0.954	311	<0.100	0.106	<0.0050						44.8	0.134
SW-03	SW-03	L2757587-3	2024-09-29	Water	M															
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M			<0.0050	0.148	47.4	<0.020	0.102	<0.0010						9.83	0.403
SW-03	SW-03	L2757661-3	2024-10-04	Water	M															
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M			<0.0050	<0.050	7.75	<0.020	0.101	<0.0010						4.11	0.0409
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M															
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M			<0.0050	1.04	310	<0.100	0.11	<0.0050						42.8	0.198
SW-03	SW-03	L2757873-3	2024-10-22	Water	M															
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	<10		<0.0050	<5.0	<50	<1.0	<0.50	<0.10		<0.050	<0.050			<30	0.14
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M			0.0055	4.88	1480	<0.400	0.108	<0.0200						215	0.0671
SW-03	SW-03	L2757913-3	2024-10-25	Water	M															
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	<10		<0.0050	<5.0	255	<1.0	<0.50	<0.10		<0.050	<0.050			<30	0.0911
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	<10		<0.0050	<5.0	627	<1.0	<0.50	0.14		<0.050	<0.050			51	0.081
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M															
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	1		<0.0050	0.076	24.7	<0.020	0.0852	<0.0010		<0.050	<0.050			5.57	0.108
SW-03	SW-03	L2758155-2	2024-11-16	Water	M															
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M			<0.0050	3.3	968	<0.400	0.119	<0.0200						122	0.178
SW-03		VA24D1587-002	2024-11-20	Water	M	<10		<0.0050	<5.0	944	<1.0	<0.50	<0.10				0.167		128	0.165
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M															
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M			0.0053	0.129	46.9	<0.020	0.058	<0.0010						8.57	0.108
SW-03	SW-03	L2758371-2	2024-12-08	Water	M															
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	<10		<0.0050	<5.0	300	<1.0	<0.50	<0.10		<0.050	<0.050			44	0.082
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M															
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	<10		<0.0050	5.4	1710	<1.0	<0.50	<0.10						224	0.0337
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M			<0.0050	20.4	6270	<1.0	<0.50	<0.10						879	0.0248
SW-03	SW-03	L2758769-3	2025-01-24	Water	M															
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M			<0.0050	6.3	2140	<1.00	0.276	<0.0500						280	0.399
SW-03	SW-03	L2759009-2	2025-02-19	Water	M															
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	<10		<0.0050	<5.0	915	<1.0	<0.50	<0.10		0.059	0.059			102	0.128
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M															
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M			0.00651	1.77	528	<0.200	0.0892	<0.0100						71.6	0.0646
SW-03	SW-03	L2759254-2	2025-03-18	Water	M															
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M			<0.0050	<0.050	3.43	<0.020	0.0395	<0.0010		0.075	0.075			1.6	0.491
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M			<0.0050	3.7	1080	<0.400	0.115	<0.0200						146	0.162
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M															
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M			<0.0050	0.094	29.7	<0.020	0.0358	<0.0010						5.43	0.169
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M															
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M			<0.0050	0.341	99.1	<0.020	0.0454	<0.0010						16.4	0.0922
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M															
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M			<0.0050	0.908	259	<0.100	0.0381	<0.0050						35.6	0.0908
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M															
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	<1		<0.0050	<0.050	3.57	<0.020	0.0291	<0.0010		<0.050	<0.050			1.98	0.0739
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M			<0.0050	0.28	71.5	<0.020	0.0232	<0.0010						11.3	0.0759
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M															
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	<1		<0.0050	<0.050	4.99	<0.020	0.0208	<0.0010		<0.050	<0.050			1.74	0.083
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	<1		<0.0050	<0.050	1.27	<0.020	0.0267	<0.0010		0.054	0.054			1.16	0.0778
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M			<0.0050	0.083	25	<0.020	0.0199	<0.0010						4.84	0.0701
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M															
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	1		<0.0050	<0.050	4.24	<0.020	0.0199	<0.0010						1.63	0.0851
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	<1		<0.0050	<0.050	2.31	<0.020	0.0294	<0.0010		<0.050	<0.050			1.7	0.0761
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M	<1		<0.05				0.019								0.0719
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M	<1.8		<0.05				0.031								0.0956
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M	<1		0.078				0.021								0.0928
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M	9		<0.050				0.013								0.0885
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M	2		<0.050				0.018								0.0643
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M	3		<0.050				0.022								0.0545
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M	7		0.05				0.022								0.0613
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M	4		0.061				0.026								0.0583
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M	8		0.063				0.026								0.11
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M	<1		<0.050				0.034								0.0297
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M	14		<0.050				<0.010								0.0158
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M	23		<0.050				0.04								0.123
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M	<1		<0.050				<0.010								0.0878
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M	2		<0.050				0.012								0.119
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M	3		<0.050				0.016								0.0429
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M	<1.8		<0.050				0.022								0.118
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M	1		<0.050	<0.10	0.78	<0.10	0.019	<0.010						2.5	0.0562
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M															
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M	<1		<0.050	<0.10	0.47	<0.10	0.018	<0.010						2.1	0.096
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M	<1		<0.050	<0.10	0.5	<0.10	0.015	<0.010						2.2	0.0768
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M	6		<0.050	<0.10	0.5	<0.10	0.017	<0.010						1.7	0.264
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M	<1		0.051	<0.10	0.45	<0.10	0.011	<0.010						2	0.0593
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M	<1		<0.050	<0.10	0.47	<0.10	0.019	<0.010						2.2	0.046
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M	<1		<0.050	<0.10	0.57	<0.10	0.015	<0.010						2.1	0.044
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M	<1		<0.050	<0.10	0.71	<0.10	0.012	<0.010						2	0.0876
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M	<1		<0.050	<0.10	0.7	<0.10	0.016	<0.010						2	0.0373
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M	5		<0.050	<0.10	1.47	<0.10	0.021	<0.010						<1.0	0.0526
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M	3		<0.050	<0.10	1.09	<0.10	0.0563	<0.0050	0.0563					3	0.0398
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M	<1		<0.050	<0.10	0.67	<0.10	0.0592	<0.0050	0.0592					2.9	0.0626
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M	<1		<0.050	<0.10	0.93	<0.10	0.022	<0.010						3	0.0573
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M	<1		<0.050	<0.10	0.6	<0.10	0.021	<0.010						2.6	0.0585
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M	<1		0.079	<0.10	0.57	<0.10	0.014	<0.010						2.2	0.0695
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M	14		<0.050	<0.10	0.52	<0.050	0.0237	<0.0050	0.0237					2.1	0.0568
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M	1		<0.050	<0.10	0.5	<0.050		<0.010						<1.0	0.11
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M	3		0.053	<0.10	0.65	<0.050		<0.010						2.2	0.0355
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M	20		<0.050	<0.10	0.77	<0.050	<0.0100	<0.0050	<0.0050					2.1	0.0363

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M	120		<0.050	<0.10	0.97	<0.10	<0.010	<0.010						3.3	0.158
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	82		<0.050	<0.10	1.03	<0.10		<0.010						3.6	0.366
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M	19		<0.050	<0.10	0.77	<0.10	0.036	<0.010						2.7	0.0789
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	<1.8		<0.050		0.8	<0.050	0.06	<0.010						2.6	0.0862
SW-04		VA24A1299-004	2024-01-23	Water	M	18		0.0063	<0.050	0.73	<0.020	0.147	<0.0010						2.54	0.158
SW-04		L2754353-4	2024-01-23	Water	M															
SW-04		L2754615-4	2024-02-15	Water	M															
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	1		<0.0050	<0.050	0.61	0.022	0.0621	<0.0010						2.85	0.101
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	2		<0.0050	<0.050	0.58	0.021	0.0861	<0.0010						2.03	0.109
SW-04		L2755012-4	2024-03-19	Water	M															
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	21		<0.0050	<0.050	0.79	<0.020	0.0706	<0.0010						3.55	0.127
SW-04		L2755503-3	2024-04-25	Water	M															
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M			<0.0050	<0.050	0.55	<0.020	0.116	<0.0010						2.91	0.0805
SW-04		L2755523-2	2024-04-29	Water	M															
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	<1		<0.0050	<0.050	0.56	<0.020	0.105	<0.0010						2.84	0.0747
SW-04		L2755588-3	2024-05-02	Water	M															
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	1		<0.0050	<0.050	0.54	0.026	0.083	<0.0010						2.38	0.0614
SW-04		L2755687-4	2024-05-09	Water	M															
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M			<0.0050	<0.050	0.56	0.022	0.0784	<0.0010						2.77	0.0572
SW-04		L2755695-2	2024-05-10	Water	M															
SW-04		L2755788-2	2024-05-15	Water	M															
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M			<0.0050	<0.050	0.56	0.024	0.048	<0.0010						2.7	0.0796
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	>2420		0.0074	<0.050	0.62	0.031	0.0599	<0.0010						3.04	0.0688
SW-04		L2755820-3	2024-05-16	Water	M															
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	517		<0.0050	<0.050	0.59	0.023	0.0824	<0.0010						2.82	0.0658
SW-04		VA24B1636-005	2024-05-23	Water	M			<0.0050	<0.050	0.58	<0.020	0.0806	<0.0010						2.84	0.0722
SW-04		L2755903-5	2024-05-23	Water	M															
SW-04		L2755916-3	2024-05-23	Water	M															
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M			<0.0050	<0.050	0.79	0.023	0.0616	<0.0010						4.75	0.138
SW-04		L2755961-4	2024-05-26	Water	M															
SW-04		VA24B4655-003	2024-06-20	Water	M	10		<0.0050	<0.050	1.3	0.038	0.0386	<0.0010						2.81	0.0535
SW-04		L2756326-3	2024-06-20	Water	M															
SW-04		VA24B5289-002	2024-06-26	Water	M			<0.0050	<0.050	1.03	0.039	0.039	<0.0010						2.87	0.0517
SW-04		L2756419-2	2024-06-26	Water	M															
SW-04		VA24B7579-003	2024-07-18	Water	M	6		<0.0050	<0.050	0.8	0.037	0.0382	<0.0010						2.96	0.0353
SW-04		L2756717-3	2024-07-18	Water	M															
SW-04		VA24B8974-004	2024-07-31	Water	M			<0.0050	<0.050	1.18	0.04	0.0779	<0.0010						3.06	0.0326
SW-04		L2756871-4	2024-07-31	Water	M															
SW-04		VA24C1546-003	2024-08-22	Water	M	86		<0.0050	<0.050	1.32	0.05	0.0845	<0.0010						3.47	0.0428
SW-04		L2757144-3	2024-08-22	Water	M															
SW-04	SW-04	L2757209-4	2024-08-27	Water	M															
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M			<0.0050	<0.050	4.78	0.033	1.95	0.0084						28.4	0.0509
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	2		<0.0050	<0.050	1.88	0.102	0.201	0.002						6.05	0.0308
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M			0.007	<0.050	3.93	0.087	0.385	0.0016						17.8	0.163
SW-04	SW-04	L2757584-2	2024-09-28	Water	M															
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M			0.0115	<0.050	6.51	0.052	1.28	0.0028						57.5	0.591
SW-04	SW-04	L2757661-4	2024-10-04	Water	M															
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M			<0.0050	<0.050	1.44	0.091	0.0741	<0.0010						7.66	0.0504
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M															
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	387		0.0051	<0.050	1.59	0.026	0.247	<0.0010						8.9	1.62
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M			<0.0050	<0.050	1.02	0.02	0.0416	<0.0010						3.55	0.108
SW-04	SW-04	L2757873-4	2024-10-22	Water	M															
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	9		<0.0050	<0.050	0.97	0.025	0.0204	<0.0010						3.75	0.114
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M			<0.0050	<0.050	1.41	0.041	0.062	<0.0010						5.9	0.149
SW-04	SW-04	L2757942-1	2024-10-26	Water	M															
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	12		0.0064	<0.050	1.16	0.028	0.0455	<0.0010						6.12	0.141
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	1		0.0062	<0.050	0.9	0.057	0.0284	0.0013		0.065	0.059			3.66	0.0961

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M															
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	4		<0.0050	<0.050	1.03	0.028	0.0864	<0.0010						5.78	0.516
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M			<0.0050	<0.050	0.77	0.022	0.0339	<0.0010						2.91	0.125
SW-04	SW-04	L2758155-4	2024-11-17	Water	M															
SW-04		4-456131118-0	2024-11-17	Water	F															
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	1		0.0058	<0.050	6.47	0.024	0.0638	<0.0010						4.59	8.59
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M			0.0061	<0.050	0.9	0.066	0.0434	<0.0010						4.24	0.0983
SW-04	SW-04	L2758371-3	2024-12-08	Water	M															
SW-04		4-456441522-0	2024-12-18	Water	F															
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	<1		<0.0050	<0.050	0.88	0.032	0.0592	<0.0010		0.087	0.087			3.6	0.389
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M															
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	<1		<0.0050	<0.050	1.12	0.044	0.0315	<0.0010						2.98	0.102
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M															
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M			<0.0050	<0.050	1.02	0.045	0.0343	<0.0010						2.9	0.0702
SW-04	SW-04	L2758765-1	2025-01-25	Water	M															
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	3		<0.0050	<0.050	1.53	0.028	<0.0050	<0.0010		0.08	0.08			3.82	0.213
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M															
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M			<0.0050	<0.050	2.56	0.04	0.0886	0.0019						4.67	1.68
SW-04	SW-04	L2759042-2	2025-02-21	Water	M															
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M			0.0135	<0.050	5.73	0.092	0.0181	0.0013						4.78	0.0808
SW-04	SW-04	L2759255-2	2025-03-19	Water	M															
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M			<0.0050	<0.050	1.61	0.028	0.019	<0.0010		0.201	0.201			2.44	0.268
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M			<0.0050	<0.050	3.53	0.07	0.0128	0.0042						4.15	0.12
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M															
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M			<0.0050	<0.050	2.32	0.042	0.0203	<0.0010						2.89	0.191
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M															
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M			<0.0050	<0.050	4.24	0.068	0.0088	<0.0010						3.7	0.2
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M															
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M			0.0073	<0.050	4.35	0.117	0.0085	<0.0010						5.28	0.162
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M															
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	1		<0.0050	<0.050	4.27	0.165	<0.0050	<0.0010		0.207	0.207			6.68	0.418
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M			0.0062	<0.050	4.47	0.11	<0.0050	<0.0010						4.68	0.191
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M															
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	<1		<0.0050	<0.050	4.24	0.111	0.0058	<0.0010		0.151	0.151			4.42	0.152
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	9		<0.0050	<0.050	5.47	0.155	<0.0050	<0.0010		0.217	0.217			7.32	0.474
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M			<0.0050	<0.050	5.72	0.133	<0.0050	<0.0010						6.55	0.264
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	1		<0.0050	<0.050	10.1	0.149	<0.0050	<0.0010						8.52	0.866
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M			0.0062	<0.050	6.3	0.127	0.01	<0.0010		0.126	0.12			6.15	0.12
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	<1		<0.050	<0.10	0.89	<0.10	0.056	<0.010						2.5	0.253
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M	5		<0.050	<0.10	0.44	<0.10	0.036	<0.010						1.2	0.361
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M	<1		0.054	<0.10	0.25	<0.10	0.047	<0.010						1.3	0.116
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M	5		<0.050	<0.10	0.98	<0.10	0.036	<0.010						1.6	0.113
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	4		<0.050	<0.10	1.15	<0.10	0.0871	<0.0050	0.0871					1.7	0.0833
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M	<1		<0.050	<0.10	0.47	<0.10	0.05	<0.0050	0.05					1.6	0.127
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M	<1		0.079	<0.10	0.56	<0.10	0.052	<0.010						1.1	0.113
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	1		<0.050	<0.10	0.57	<0.10	0.044	<0.010						1.2	0.12
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	<1		<0.050	<0.10	0.45	<0.10	0.014	<0.010						1.1	0.127
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	114		<0.050	<0.10	0.85	<0.10		<0.010						1.5	0.281
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M															
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M															
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M	1		<0.050	<0.10	0.6	<0.10	0.018	<0.010						1.1	0.127
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M	<1.8		<0.050		0.65	<0.050	0.05	<0.010						1.1	0.139
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M	<1		<0.050	<0.10	0.31	<0.10	0.116	<0.010						1.7	0.175
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M	15		<0.050	<0.10	0.35	<0.10	0.065	<0.010						1.9	0.433
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M	6		0.091	<0.10	0.16	<0.10	0.092	<0.010						1.8	0.13
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M	1		<0.050	<0.10	0.27	<0.10	0.176	<0.010						2	0.118
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M	30		<0.050	<0.10	1.09	<0.10	0.094	<0.010						1.9	0.147

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M	14		<0.050	<0.10	1.2	<0.10	0.175	<0.0050	0.175					2	0.118
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M	<1		<0.050	<0.10	0.42	<0.10	0.0682	<0.0050	0.0682					1.7	0.186
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M	<1		0.054	<0.10	0.48	<0.10	0.07	<0.010						1.6	0.167
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M			<0.050	<0.10	0.41	<0.10	0.052	<0.010						1.7	0.161
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M	<1		<0.050	<0.10	0.38	<0.10	0.038	<0.010						1.6	0.17
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M	7		<0.050	<0.10	0.35	<0.050	0.0899	<0.0050	0.0899					1.8	0.125
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M	14		<0.050	<0.10	0.87	<0.10		<0.010						1.6	0.248
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M	8		<0.050	<0.10	0.68	<0.10	0.028	<0.010						1.8	0.174
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	<1.8		<0.050		0.6	<0.050	0.049	<0.010						1.5	0.33
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0634	<0.0010						1.53	0.238
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0514	<0.0010						1.46	0.329
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	2		<0.050	<0.10	3.56	<0.050	0.155	<0.0050	0.155					5	0.021
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M	2		<0.050	<0.10	1.52	<0.10	0.162	<0.010						2.9	0.0362
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M	3		<0.050	<0.10	0.38	<0.10		<0.010						1.2	0.211
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M	<1		<0.050	<0.10	0.69	<0.10	0.074	<0.010						2.8	0.0679
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M	<1.8		<0.050		0.82	<0.050	0.077	<0.010						2.4	0.0735
SW-07		VA24A1299-005	2024-01-23	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0509	<0.0010						1.76	0.194
SW-07		L2754353-5	2024-01-23	Water	M															
SW-07		L2754615-5	2024-02-15	Water	M															
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	<1		<0.0050	<0.050	1.08	<0.020	0.0656	<0.0010						3.58	0.057
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	1		<0.0050	<0.050	<0.50	<0.020	0.0533	<0.0010						1.75	0.105
SW-07		L2755012-5	2024-03-19	Water	M															
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.035	<0.0010						1.72	0.09
SW-07		L2755504-3	2024-04-26	Water	M															
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0354	<0.0010						1.32	0.135
SW-07		L2755521-1	2024-04-28	Water	M															
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	1		<0.0050	<0.050	0.55	<0.020	0.0398	<0.0010						2	0.0814
SW-07		L2755598-3	2024-05-03	Water	M															
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0302	<0.0010						1.32	0.0846
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0302	<0.0010						1.4	0.0863
SW-07		L2755677-3	2024-05-09	Water	M															
SW-07		L2755687-3	2024-05-09	Water	M															
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0423	<0.0010						1.07	0.0749
SW-07		L2755770-3	2024-05-14	Water	M															
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0168	<0.0010						0.8	0.0825
SW-07		L2755819-3	2024-05-17	Water	M															
SW-07		VA24B1636-003	2024-05-23	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0219	<0.0010						1.28	0.0896
SW-07		L2755903-3	2024-05-23	Water	M															
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0216	<0.0010						1.19	0.0713
SW-07		L2755933-3	2024-05-24	Water	M															
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M			<0.0050	<0.050	<0.50	<0.020	0.019	<0.0010						1.17	0.0794
SW-07		L2755961-3	2024-05-26	Water	M															
SW-07		VA24B4698-003	2024-06-21	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0177	<0.0010						1.04	0.0521
SW-07		L2756349-3	2024-06-21	Water	M															
SW-07		VA24B5289-003	2024-06-26	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0159	<0.0010						1.12	0.0446
SW-07		L2756419-3	2024-06-26	Water	M															
SW-07		VA24B7689-003	2024-07-19	Water	M	1		<0.0050	<0.050	0.87	<0.020	0.0506	<0.0010						1.65	0.0311
SW-07		L2756726-3	2024-07-19	Water	M															
SW-07		L2756871-5	2024-07-31	Water	M															
SW-07		VA24B8974-005	2024-07-31	Water	M			<0.0050	<0.050	0.91	<0.020	0.0457	<0.0010						1.79	0.0344
SW-07		VA24C1605-003	2024-08-23	Water	M	<1		<0.0050	<0.050	2.12	<0.020	0.135	<0.0010						3.4	0.0255
SW-07		L2757153-3	2024-08-23	Water	M															
SW-07	SW-07	L2757209-5	2024-08-27	Water	M															
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M			<0.0050	<0.050	0.55	<0.020	0.104	<0.0010						1.39	0.0711
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	1		<0.0050	<0.050	2.92	<0.020	0.159	<0.0010						4.44	0.0255
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M			0.0093	<0.050	1.03	<0.020	0.105	<0.0010						2.14	0.0506
SW-07	SW-07	L2757587-4	2024-09-29	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M			0.0187	<0.050	1.62	<0.020	0.109	<0.0010						3.04	0.0349
SW-07	SW-07	L2757664-1	2024-10-03	Water	M															
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M			<0.0050	<0.050	1.7	<0.020	0.102	<0.0010						3.02	0.0354
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M															
SW-07		492-455781017-0	2024-10-13	Water	F															
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M			0.0106	<0.050	0.68	0.023	0.0548	<0.0010						2.27	0.119
SW-07	SW-07	L2757873-5	2024-10-22	Water	M															
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	1		<0.0050	<0.050	0.98	<0.020	0.102	<0.0010		<0.050	<0.050			3.13	0.0528
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M			<0.0050	<0.050	1.01	<0.020	0.0997	<0.0010						4.17	0.0541
SW-07	SW-07	L2757913-4	2024-10-25	Water	M															
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	10		<0.0050	<0.050	0.7	<0.020	0.073	<0.0010		<0.050	<0.050			2.53	0.113
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	5		<0.0050	<0.050	0.51	<0.020	0.0462	<0.0010		<0.050	<0.050			1.76	0.0844
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M															
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	1		<0.0050	<0.050	<0.50	<0.020	0.0566	<0.0010		<0.050	<0.050			2.15	0.115
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M			<0.0050	<0.050	0.55	<0.020	0.0716	<0.0010						2.5	0.0942
SW-07	SW-07	L2758155-1	2024-11-16	Water	M															
SW-07		VA24D1587-003	2024-11-20	Water	M	1		<0.0050	<0.050	0.57	<0.020	0.031	<0.0010		0.07	0.07	0.093		2.19	0.132
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M															
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0598	<0.0010						1.7	0.17
SW-07	SW-07	L2758371-4	2024-12-08	Water	M															
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	<1		<0.0050	<0.050	0.58	<0.020	0.0302	<0.0010		<0.050	<0.050			2.07	0.128
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M															
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	<1		<0.0050	<0.050	1.52	<0.020	0.0774	<0.0010						3.86	0.0467
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M															
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M			<0.0050	<0.050	1.69	<0.020	0.0857	<0.0010						4.02	0.0383
SW-07	SW-07	L2758765-2	2025-01-25	Water	M															
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M			<0.0050	<0.050	6.68	<0.020	0.0849	<0.0010						4.45	0.337
SW-07	SW-07	L2759009-3	2025-02-19	Water	M															
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	12		<0.0050	<0.050	0.56	0.021	0.12	<0.0010		0.059	0.059			2.23	0.121
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M															
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M			<0.0050	<0.050	1.57	<0.020	0.0658	<0.0010						3.6	0.0848
SW-07	SW-07	L2759254-3	2025-03-18	Water	M															
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	1		<0.0050	<0.050	<0.50	<0.020	0.0414	<0.0010		0.064	0.064			1.1	0.237
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M			<0.0050	<0.050	0.55	<0.020	0.048	<0.0010						2.22	0.0874
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M															
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M			0.0103	<0.050	<0.50	<0.020	0.0369	<0.0010						1.13	0.147
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M															
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M															
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M			<0.0050	<0.050	1.84	<0.020	0.0423	<0.0010						2.23	0.0847
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0318	<0.0010						1.58	0.0752
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M															
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	<1		<0.0050	<0.050	0.5	<0.020	0.0314	<0.0010		<0.050	<0.050			1.64	0.0771
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M			<0.0050	<0.050	3.08	<0.020	0.0242	<0.0010						1.47	0.0764
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M															
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0254	<0.0010		0.06	0.06			1.05	0.0882
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0193	<0.0010		<0.050	<0.050			1	0.0738
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M			<0.0050	<0.050	0.78	<0.020	0.0195	<0.0010						1.22	0.0875
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M															
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0222	<0.0010						1.08	0.0843
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0305	<0.0010		<0.050	<0.050			1.5	0.0785
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0196	<0.0010						0.32	0.161
SW-08		L2755503-2	2024-04-25	Water	M															
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0226	<0.0010						0.39	0.198
SW-08		L2755588-2	2024-05-02	Water	M															
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0133	<0.0010						0.32	0.161
SW-08		L2755694-2	2024-05-10	Water	M															
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.012	<0.0010						0.31	0.155

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	E.coli	Chlorophyll A	Total Ammonia as N (N-NH3)	Bromide (Br)	Chloride (Cl)	Fluoride (F)	Nitrate as N (N-NO3)	Nitrite as N (N-NO3)	Nitrate + Nitrite (NO3+NO2)	Total Kjeldahl Nitrogen (TKN)	Total Nitrogen (T-N)	Dissolved Nitrogen (D-N)	Total Phosporous (P)	Sulphate (SO4)	T-Al
						MPN/100 mL	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M															
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	2		<0.0050	<0.050	<0.50	<0.020	0.0134	<0.0010						0.3	0.143
SW-08		L2755916-2	2024-05-23	Water	M															
SW-08		VA24B4655-002	2024-06-20	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.0207	<0.0010						0.33	0.161
SW-08		L2756326-2	2024-06-20	Water	M															
SW-08		VA24B7579-002	2024-07-18	Water	M	2		<0.0050	<0.050	0.54	<0.020	0.032	<0.0010						0.32	0.123
SW-08		L2756717-2	2024-07-18	Water	M															
SW-08		VA24C1546-002	2024-08-22	Water	M	2		<0.0050	<0.050	0.62	<0.020	0.0409	<0.0010						0.41	0.122
SW-08		L2757144-2	2024-08-22	Water	M															
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	2		<0.0050	<0.050	0.6	<0.020	0.0308	<0.0010						0.33	0.111
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	4		<0.0050	<0.050	0.64	<0.020	0.0384	<0.0010						0.44	0.132
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	9		<0.0050	<0.050	0.6	<0.020	0.036	<0.0010						0.48	0.164
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	1		<0.0050	<0.050	0.61	<0.020	0.0377	<0.0010						0.46	0.154
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	4		<0.0050	<0.050	<0.50	<0.020	0.0317	<0.0010						0.46	0.186
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	1		<0.0050	<0.050	0.57	<0.020	0.0339	<0.0010						0.53	0.133
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	1		<0.0050	<0.050	0.51	<0.020	<0.0050	<0.0010						1.52	0.068
SW-09		L2755503-4	2024-04-25	Water	M															
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	<0.0050	<0.0010						1.71	0.062
SW-09		L2755588-4	2024-05-02	Water	M															
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	1		<0.0050	<0.050	<0.50	0.022	<0.0050	<0.0010						1.5	0.0786
SW-09		L2755687-5	2024-05-09	Water	M															
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	<1		<0.0050	<0.050	0.55	<0.020	0.0057	<0.0010						1.8	0.039
SW-09		L2755820-4	2024-05-16	Water	M															
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	<0.0050	<0.0010						1.75	0.0606
SW-09		L2755916-4	2024-05-23	Water	M															
SW-09		VA24B4655-004	2024-06-20	Water	M	2		<0.0050	<0.050	0.5	0.021	0.0077	<0.0010						1.72	0.0516
SW-09		L2756326-4	2024-06-20	Water	M															
SW-09		VA24B7579-004	2024-07-18	Water	M	5		<0.0050	<0.050	0.57	0.025	0.0111	<0.0010						2.18	0.0358
SW-09		L2756717-4	2024-07-18	Water	M															
SW-09		VA24C1546-004	2024-08-22	Water	M	2		<0.0050	<0.050	0.67	0.028	0.0095	<0.0010						2.56	0.0299
SW-09		L2757144-4	2024-08-22	Water	M															
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	2		<0.0050	<0.050	0.65	0.024	0.014	<0.0010						2.51	0.0637
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	162		<0.0050	<0.050	0.92	0.02	0.0579	<0.0010						1.54	0.235
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	1		<0.0050	<0.050	0.68	<0.020	<0.0050	<0.0010						1.55	0.0555
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	<1		<0.0050	<0.050	0.7	<0.020	<0.0050	<0.0010						1.65	0.0709
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	1		<0.0050	<0.050	0.64	<0.020	<0.0050	<0.0010		<0.050	<0.050			1.57	0.0569
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M															
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	<1		<0.0050	<0.050	0.64	<0.020	<0.0050	<0.0010						1.61	0.119
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	<1		<0.0050	<0.050	0.62	<0.020	<0.0050	<0.0010						1.57	0.07
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M															
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	<1		<0.0050	<0.050	0.66	<0.020	<0.0050	<0.0010		<0.050	<0.050			1.58	0.0884
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	<1		<0.0050	<0.050	0.6	<0.020	0.0128	<0.0010						1.74	0.0443
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M															
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	<1		0.005	<0.050	0.56	<0.020	0.0361	<0.0010		0.05	<0.050			1.64	0.086
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M															
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M			<0.0050	<0.050	<0.50	<0.020	0.0056	<0.0010		0.056	0.056			1.59	0.109
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	<1		<0.0050	<0.050	<0.50	<0.020	0.008	<0.0010		<0.050	<0.050			1.59	0.0416
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	<1		<0.0050	<0.050	0.52	<0.020	0.0078	<0.0010		0.063	0.063			1.6	0.0478
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	2		<0.0050	<0.050	0.51	<0.020	0.0071	<0.0010		0.094	0.094			1.79	0.0385
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	1		<0.0050	<0.050	0.57	0.021	0.0078	<0.0010						1.92	0.0388
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M			<0.0050	<0.050	0.51	0.022	0.0096	<0.0010		<0.050	<0.050			1.86	0.0472

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M	<0.00010	0.00011	0.00361	<0.000100	<0.000050	<0.010	<0.0000050	2.37	<0.000010	<0.00050	<0.00050		<0.00010	0.00073		0.039	<0.000050	<0.0010
OUT-01		VA24B1636-006	2024-05-23	Water	M	<0.00010	0.00013	0.00339	<0.000100	<0.000050	<0.010	<0.0000050	1.81	<0.000010	<0.00050			<0.00010	0.00067		0.036	0.000057	<0.0010
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M	0.00012	0.00025	0.00777	<0.000100	<0.000050	<0.010	0.000011	4.33	0.00002	<0.00050	<0.00050		0.00014	0.0015		0.142	0.000446	<0.0010
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M	<0.00010	0.00024	0.00576	<0.000100	<0.000050	<0.010	0.0000173	2.59	0.000026	<0.00050	<0.00050		0.00014	0.00189		0.224	0.000524	<0.0010
OUT-01		661-455931031-0	2024-10-28	Water	F																		
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M	<0.00010	0.00024	0.00389	<0.000020	<0.000050	<0.010	0.0000056	2.26	<0.000010	<0.00050			<0.00010	0.00113		0.052	0.000141	<0.0010
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M	<0.00010	0.00014	0.00317	<0.000020	<0.000050	<0.010	0.000005	2.03	<0.000010	<0.00050			<0.00010	0.00097		0.04	0.000123	<0.0010
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M	0.00021	0.0002	0.00813	<0.000020	<0.000050	0.015	0.0000092	9.3	0.000012	<0.00050			0.00012	0.00093		0.288	0.000109	<0.0010
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M	<0.00010	0.00012	0.00311	<0.000020	<0.000050	<0.010	0.0000058	1.66	<0.000010	<0.00050	<0.00050		<0.00010	0.00078		0.026	0.000078	<0.0010
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M	<0.00010	<0.00010	0.00295	<0.000020	<0.000050	<0.010	<0.0000050	1.31	0.000012	<0.00050			<0.00010	0.00068		0.065	0.000099	<0.0010
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M																		
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M	<0.00010	0.00015	0.00446	<0.000020	<0.000050	<0.010	<0.0000050	2.78	0.00001	<0.00050	<0.00050		<0.00010	0.00085		0.036	0.000102	<0.0010
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M	<0.00010	0.00018	0.00463	<0.000020	<0.000050	<0.010	0.0000055	2.58	0.000014	<0.00050	<0.00050		0.00016	0.0007		0.084	0.000158	<0.0010
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M	<0.00010	0.00012	0.00445	<0.000020	<0.000050	<0.010	<0.0000050	3.27	<0.000010	<0.00050			<0.00010	0.00082		0.025	0.000059	<0.0010
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M	<0.00010	0.00012	0.00387	<0.000100	<0.000050	<0.010	0.0000115	3.45	<0.000010	<0.00050	<0.00050		<0.00010	0.00171		0.028	0.000144	<0.0010
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M	<0.00010	0.00011	0.00422	<0.000100	<0.000050	<0.010	<0.0000050	4.01	<0.000010	<0.00050	<0.00050		<0.00010	0.00071		0.016	0.00006	<0.0010
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M	<0.00010	0.00012	0.00753	<0.000100	<0.000050	<0.010	0.0000107	8.41	<0.000010	<0.00050	<0.00050		<0.00010	0.00112		0.013	0.000087	<0.0010
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M	<0.00010	0.00011	0.00385	<0.000100	<0.000050	<0.010	0.0000056	2.15	<0.000010	<0.00050			<0.00010	0.0007		0.042	0.00007	<0.0010
OUT-02		VA24B5289-006	2024-06-26	Water	M	<0.00010	0.00014	0.00983	<0.000100	<0.000050	0.013	0.0000152	11.2	<0.000010	<0.00050			<0.00010	0.00099		0.023	0.000123	<0.0010
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M	<0.00010	0.00011	0.00392	<0.000100	<0.000050	<0.010	0.0000069	1.74	0.000012	<0.00050	<0.00050		<0.00010	0.00069		0.041	0.000084	<0.0010
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M	<0.00010	<0.00010	0.00304	<0.000100	<0.000050	<0.010	<0.0000050	1.47	<0.000010	<0.00050	<0.00050		<0.00010	0.00058		0.027	<0.000060	<0.0010
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M	0.00012	0.0003	0.0091	<0.000100	<0.000050	<0.010	0.000021	4.04	0.00004	<0.00050	<0.00050		0.00021	0.00411		0.399	0.00108	<0.0010
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M	<0.00010	0.00015	0.00321	<0.000020	<0.000050	<0.010	0.0000141	1.95	0.00001	<0.00050			<0.00010	0.00124		0.055	0.00018	<0.0010
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M	<0.00010	0.00011	0.00363	<0.000020	<0.000050	<0.010	0.0000067	1.84	0.000013	<0.00050	<0.00050		<0.00010	0.00112		0.079	0.000262	<0.0010
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M	<0.00010	0.0001	0.00388	<0.000020	<0.000050	<0.010	<0.0000050	2.48	0.000011	<0.00050			<0.00010	0.00066		0.073	0.000172	<0.0010
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M	<0.00010	<0.00010	0.00298	<0.000020	<0.000050	<0.010	<0.0000050	1.3	<0.000010	<0.00050	<0.00050		<0.00010	0.00069		0.026	<0.000050	<0.0010
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M	<0.00010	0.00016	0.0031	<0.000020	<0.000050	<0.010	<0.0000050	1.71	0.000013	<0.00050			0.00016	0.00115		0.138	0.000431	<0.0010
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M																		
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M	<0.00010	0.00014	0.00557	<0.000020	<0.000050	<0.010	0.0000104	1.94	0.000024	<0.00050	<0.00050		0.00012	0.00104		0.182	0.000437	<0.0010
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M	<0.00010	<0.00010	0.00331	<0.000020	<0.000050	<0.010	<0.0000050	1.58	0.000012	<0.00050	<0.00050		<0.00010	0.00073		0.082	0.000116	<0.0010
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M	<0.00010	<0.00010	0.0029	<0.000020	<0.000050	<0.010	<0.0000050	1.4	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.016	<0.000050	<0.0010
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M	<0.00010	0.00014	0.00358	<0.000020	<0.000050	<0.010	0.0000053	2.1	<0.000010	0.00056			<0.00010	0.00056		0.102	0.000141	<0.0010
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M	0.00031	0.00038	0.0084	<0.000100	<0.000050	0.012	0.000008	13.1	<0.000010	<0.00050			<0.00010	0.00103		0.049	0.000258	<0.0010
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M	0.00054	0.00068	0.00355	<0.000100	<0.000050	<0.010	0.0000081	7.62	<0.000010	0.0007	0.00075		<0.00010	0.00125		0.069	0.000358	<0.0010
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	0.00023	0.0007	0.0155	<0.000100	<0.000050	0.012	0.000028	9.27	0.000077	0.00094	<0.00050		0.00042	0.00338		0.856	0.00293	<0.0010
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M																		
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M	0.00016	0.0003	0.00707	<0.000100	<0.000050	0.011	0.0000066	7.87	<0.000010	<0.00050	<0.00050		<0.00010	0.00113		0.048	0.000188	<0.0010
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M	0.00014	0.00024	0.00686	<0.000020	<0.000050	<0.010	0.0000068	7.04	<0.000010	<0.00050			<0.00010	0.00104		0.052	0.000214	<0.0010
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M	0.00014	0.0002	0.00633	<0.000020	<0.000050	<0.010	<0.0000050	7.13	<0.000010	<0.00050	<0.00050		<0.00010	0.00094		0.03	0.000136	<0.0010
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M	0.0002	0.00034	0.00379	<0.000020	<0.000050	<0.010	<0.0000050	5.6	0.000011	<0.00050			<0.00010	0.00104		0.099	0.000322	<0.0010
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	<0.00010	0.00018	0.00373	<0.000100	<0.000050	<0.010	0.000007	3.89	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00081		0.038	0.00013	<0.0010
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M																		
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M	<0.00010	0.00017	0.00342	<0.000020	<0.000050	<0.010	<0.0000050	4.22	<0.000010	<0.00050			<0.00010	0.00087		0.041	0.000157	<0.0010
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M	0.00012	0.00022	0.00489	<0.000020	<0.000050	<0.010	0.000008	4.14	0.000014	<0.00050			0.00013	0.00118		0.139	0.000403	<0.0010
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M																		
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M	<0.00010	0.00022	0.00343	<0.000020	<0.000050	<0.010	<0.0000050	3.82	<0.000010	<0.00050	<0.00050		<0.00010	0.00084		0.034	0.000133	<0.0010
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M	0.0002	0.00017	0.00889	<0.000020	<0.000050	0.011	0.0000053	12.2	<0.000010	<0.00050	<0.00050		<0.00010	0.00075		0.019	0.000093	<0.0010
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M	0.0003	<0.0005	<0.005	<0.0001	<0.0001	0.028	<0.00001	1.37		0.00057			<0.0001	0.00058		0.019	<0.0002	0.00071
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0083	0.000011	0.8		<0.0005			<0.0001	<0.0004		0.043	<0.0002	0.00069
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M	<0.0002	0.00101	<0.005	<0.0001	<0.0001	0.0177	<0.00001	1.3		<0.0005			<0.0001	0.00067		0.023	<0.0002	0.00079
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0078	<0.00001	0.69		<0.0005			<0.0001	0.00064		0.029	<0.0002	0.0004
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0104	<0.00001	1.2		<0.0005			<0.0001	0.00052		0.049	<0.0002	0.00052
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.039	<0.00001	1.52		<0.0005			<0.0001	0.00047		0.036	<0.0002	0.00068
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0597	<0.00001	1.2		<0.0005			<0.0001	0.00059		0.024	<0.0002	0.00066
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0202	<0.00001	0.74		<0.0005			<0.0001	<0.0004		0.027	<0.0002	0.00044
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	<0.05	0.000047	1.54		<0.0005			<0.0001	0.00079		0.021	<0.0002	0.00083
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	<0.05	0.000013	1.8		<0.0005			<0.0001	0.00056		0.011	<0.0002	0.00035
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M	<0.000050	0.000094	0.00211	<0.000010	<0.000010	0.0107	0.0000039	0.99		0.00014			0.000018	0.00041		0.0359	0.000076	0.000565
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M	0.000458	0.000107	0.00256	<0.000010	<0.000010	0.0071	0.0000055	1.03		0.0002			0.0000727	0.00053		0.0984	0.000153	0.000557
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M	<0.000050	0.0001	0.0023	<0.000010	<0.000010	0.0115	0.0000051	1.07		0.00013			0.0000235	0.00026		0.0304	0.000064	0.000567
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M	<0.000050	0.000098	0.00171	<0.000010	<0.000010	0.0366	0.000003	1.06		0.00034			0.0000287	0.00065		0.0476	0.00017	0.000569
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.67		<0.00050			<0.00010	<0.00040		0.041	<0.00020	0.00038

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M	0.000117	0.000081	0.00164	<0.000010	<0.000010	0.0038	0.0000022	0.743		0.00026			0.0000284	0.00029		0.0529	0.000132	0.000394
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M	<0.000050	0.00009	0.00143	<0.000010	<0.000010	0.0058	<0.0000020	0.669		0.00023			0.0000193	<0.00020		0.0296	<0.000050	0.000376
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M	<0.000050	0.000085	0.00147	<0.000010	<0.000010	0.0167	0.0000022	0.83		0.00017			0.0000158	0.00026		0.0257	0.000067	0.000372
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M	<0.000050	0.000089	0.00163	<0.000010	<0.000010	0.0052	0.0000045	0.605		0.00017			0.0000331	0.00098		0.0416	0.000102	0.000262
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M	<0.000050	0.000128	0.00212	<0.000010	<0.000010	0.007	0.000002	0.719		0.00021			0.000044	0.00119		0.101	0.000521	0.000499
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M	<0.000050	0.000081	0.0019	<0.000010	<0.000010	0.0121	0.0000031	1.13		0.00014			0.0000115	0.00024		0.0155	0.000056	0.000621
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M	0.000052	0.000116	0.00396	<0.000010	<0.000010	0.0128	0.0000057	1.02		0.0002			0.000069	0.00037		0.0693	0.000139	0.000327
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.98		<0.00050			<0.00010	0.00041		0.051	<0.00020	0.00046
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.89		<0.00050			<0.00010	0.00042		0.057	<0.00020	0.00037
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.79		<0.00050			<0.00010	<0.00040		0.031	<0.00020	0.00039
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.87		<0.00050			<0.00010	<0.00040		0.041	<0.00020	0.00036
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	0.00024	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.97		<0.00050			<0.00010	<0.00040		0.033	<0.00020	0.00047
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M																		
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.78		<0.00050			<0.00010	<0.00040		0.027	<0.00020	0.00043
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.95		<0.00050			<0.00010	<0.00040		0.03	<0.00020	0.0004
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.73		<0.00050			<0.00010	0.0008		0.126	<0.00020	0.00039
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M	<0.000050	0.000066	0.00116	<0.000010	<0.000010	0.0022	0.0000021	0.487		0.0002			0.0000248	<0.00020		0.0339	0.000063	0.000213
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	<0.000050	0.000071	0.00134	<0.000010	<0.000010	0.0038	0.0000024	0.569		<0.00010			0.0000197	<0.00020		0.0272	0.000061	0.000305
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M	<0.000050	0.000074	0.00156	<0.000010	<0.000010	0.0083	0.0000033	0.795		0.00022			0.0000146	0.00022		0.0215	0.000084	0.000539
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	<0.000050	0.000073	0.00159	<0.000010	<0.000010	0.0089	0.0000021	0.787		0.00019			0.0000153	<0.00020		0.021	<0.000050	0.000535
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	<0.000050	0.000084	0.00268	<0.000010	<0.000010	0.0175	0.0000023	1.4		0.00022			0.0000122	0.00025		0.01	<0.000050	0.000624
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M	<0.000050	0.000069	0.00246	<0.000010	<0.000010	0.0091	0.000004	1.11		0.0002			0.0000162	0.00024		0.0245	<0.000050	0.000503
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	<0.000050	0.000065	0.00281	<0.000010	<0.000010	0.0128	0.0000031	1.47		0.00013			0.000014	0.00021		0.0121	<0.000050	0.000633
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	<0.000050	0.000079	0.00199	<0.000010	<0.000010	0.0085	0.0000045	0.995		0.00019			0.0000222	0.00026		0.0344	0.000061	0.000536
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.92		<0.00050			<0.00010	<0.00040		0.043	<0.00020	0.00044
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.02		0.00107			<0.00010	<0.00040		0.04	<0.00020	0.00067
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	<0.000050	0.00008	0.00164	<0.000010	<0.000010	0.0049	0.000002	0.891		0.00048			0.0000232	0.00031		0.0306	0.000058	0.000325
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M	<0.000050	0.00006	0.00117	<0.000010	<0.000010	<0.0020	<0.0000020	0.532		<0.00050			0.0000199	0.00027		0.0307	0.000069	0.000303
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M	0.000108	0.000094	0.0136	<0.000010	<0.000010	0.0148	0.0000099	30		<0.00050			0.0000286	0.00082		0.0762	0.000069	0.000279
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	<0.000050	0.000083	0.00151	<0.000010	<0.000010	0.0083	<0.0000020	0.795		<0.00050			0.0000202	0.00035		0.0328	0.000077	0.000534
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	<0.000050	0.000081	0.00169	<0.000010	<0.000010	0.0096	0.0000034	0.862		<0.00010			0.0000165	0.00031		0.0261	0.000082	0.000509
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	<0.000050	0.000127	0.00183	<0.000010	<0.000010	0.0115	<0.0000020	0.989		0.00024			0.0000227	0.00034		0.0344	0.000085	0.00052
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M	<0.000050	0.000091	0.00239	<0.000010	<0.000010	0.0036	0.000006	0.91		0.00022			0.0000449	0.0003		0.0431	0.000082	0.000378
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	<0.000050	0.000093	0.00206	<0.000010	<0.000010	0.0069	0.0000031	0.926		0.00015			0.0000219	0.00027		0.0319	0.000063	0.000463
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M	<0.000050	0.000081	0.00178	<0.000010	<0.000010	0.0082	0.0000036	1.13		0.00015			0.0000235	0.00026		0.0446	0.000067	0.000539
SW-01		VA24A1299-001	2024-01-23	Water	M	<0.00010	<0.00010	0.00174	<0.000100	<0.000050	<0.010	<0.0000050	0.734	0.000011	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.046	0.00006	<0.0010
SW-01		L2754353-1	2024-01-23	Water	M																		
SW-01		L2754615-1	2024-02-15	Water	M																		
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	<0.00010	<0.00010	0.00173	<0.000100	<0.000050	<0.010	<0.0000050	0.802	0.000012	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.033	0.000066	<0.0010
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	<0.00010	0.00011	0.00156	<0.000100	<0.000050	<0.010	<0.0000050	0.754	0.000012	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.03	0.000054	<0.0010
SW-01		L2755012-1	2024-03-19	Water	M																		
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	<0.00010	0.00011	0.00148	<0.000100	<0.000050	<0.010	<0.0000050	0.791	0.00001	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.034	0.000061	<0.0010
SW-01		L2755503-1	2024-04-25	Water	M																		
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	<0.00010	<0.00010	0.0016	<0.000100	<0.000050	<0.010	<0.0000050	0.74	0.00001	<0.00050	<0.00050		<0.00010	<0.00050		0.028	0.000053	<0.0010
SW-01		L2755523-1	2024-04-29	Water	M																		
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	<0.00010	<0.00010	0.00162	<0.000100	<0.000050	<0.010	<0.0000050	0.819	0.000011	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.025	<0.000050	<0.0010
SW-01		L2755588-1	2024-05-02	Water	M																		
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	<0.00010	<0.00010	0.00133	<0.000100	<0.000050	<0.010	<0.0000050	0.66	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.028	0.000058	<0.0010
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	<0.00010	0.00012	0.00144	<0.000100	<0.000050	<0.010	<0.0000050	0.682	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.03	0.000059	<0.0010
SW-01		L2755694-1	2024-05-10	Water	M																		
SW-01		L2755695-1	2024-05-10	Water	M																		
SW-01		L2755788-1	2024-05-15	Water	M																		
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M	<0.00010	<0.00010	0.00132	<0.000100	<0.000050	<0.010	<0.0000050	0.647	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.029	0.000056	<0.0010
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	<0.00010	0.0001	0.00136	<0.000100	<0.000050	<0.010	<0.0000050	0.66	0.000012	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.031	0.000058	<0.0010
SW-01		L2755820-1	2024-05-16	Water	M																		
SW-01		VA24B1628-001	2024-05-22	Water	M	<0.00010	<0.00010	0.0014	<0.000100	<0.000050	<0.010	<0.0000050	0.731	0.00001	<0.00050	<0.00050		<0.00010	<0.00050		0.028	0.000058	<0.0010
SW-01		L2755902-1	2024-05-22	Water	M																		
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	<0.00010	<0.00010	0.00142	<0.000100	<0.000050	<0.010	<0.0000050	0.728	0.00001	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.027	0.000052	<0.0010
SW-01		L2755916-1	2024-05-23	Water	M																		
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M	<0.00010	<0.00010	0.00149	<0.000100	<0.000050	<0.010	<0.0000050	0.636	0.00001	<0.00050	<0.00050		<0.00010	<0.00050		0.043	0.000076	<0.0010
SW-01		VA24B4655-001	2024-06-20	Water	M	<0.00010	<0.00010	0.00155	<0.000100	<0.000050	<0.010	<0.0000050	0.713	0.000011	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.036	0.000056	<0.0010
SW-01		L2756326-1	2024-06-20	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M	<0.00010	0.00013	0.0019	<0.000100	<0.000050	<0.010	<0.0000050	0.764	0.000011	<0.00050	<0.00050		<0.00010	<0.00050		0.041	0.000069	<0.0010
SW-01		L2756419-1	2024-06-26	Water	M																		
SW-01		VA24B7579-001	2024-07-18	Water	M	<0.00010	0.0001	0.00166	<0.000100	<0.000050	<0.010	<0.0000050	0.793	0.000014	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.039	0.000066	<0.0010
SW-01		L2756717-1	2024-07-18	Water	M																		
SW-01		VA24B8974-001	2024-07-31	Water	M	<0.00010	0.0001	0.00171	<0.000100	<0.000050	<0.010	<0.0000050	0.762	0.000012	<0.00050	<0.00050		<0.00010	<0.00050		0.033	0.000051	<0.0010
SW-01		L2756871-1	2024-07-31	Water	M																		
SW-01		VA24C1546-001	2024-08-22	Water	M	<0.00010	<0.00010	0.00166	<0.000100	<0.000050	<0.010	<0.0000050	0.816	0.000013	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.032	0.000062	<0.0010
SW-01		L2757144-1	2024-08-22	Water	M																		
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	<0.00010	0.00013	0.00207	<0.000100	<0.000050	<0.010	<0.0000050	0.972	0.000013	<0.00050	<0.00050		<0.00010	<0.00050		0.037	0.000074	<0.0010
SW-01	SW-01	L2757209-1	2024-08-27	Water	M																		
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	<0.00010	<0.00010	0.00173	<0.000100	<0.000050	<0.010	<0.0000050	0.902	0.000013	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.033	0.000058	<0.0010
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	<0.00010	0.00014	0.00201	<0.000100	<0.000050	<0.010	<0.0000050	1.05	0.000017	<0.00050	<0.00050		<0.00010	0.00062		0.038	0.00007	<0.0010
SW-01	SW-01	L2757584-1	2024-09-28	Water	M																		
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M	<0.00010	0.00013	0.00213	<0.000100	<0.000050	0.01	<0.0000050	0.969	0.000016	<0.00050	<0.00050		<0.00010	<0.00050		0.047	0.000068	<0.0010
SW-01	SW-01	L2757664-2	2024-10-03	Water	M																		
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	<0.00010	0.00012	0.00195	<0.000100	<0.000050	<0.010	<0.0000050	0.895	0.000016	<0.00050	<0.00050		<0.00010	<0.00050		0.038	0.000056	<0.0010
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M																		
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	<0.00010	0.00015	0.00201	<0.000100	<0.000050	<0.010	<0.0000050	0.99	0.000015	<0.00050	<0.00050		<0.00010	<0.00050		0.035	0.000061	<0.0010
SW-01	SW-01	L2757873-1	2024-10-22	Water	M																		
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	<0.00010	0.0001	0.00198	<0.000100	<0.000050	<0.010	<0.0000050	0.906	0.000013	<0.00050	<0.00050	<0.00050	<0.00010	0.00184		0.039	0.00011	<0.0010
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M	<0.00010	0.00012	0.00214	<0.000100	<0.000050	<0.010	<0.0000050	0.989	0.000013	<0.00050	<0.00050		<0.00010	<0.00050		0.044	0.000074	<0.0010
SW-01	SW-01	L2757942-2	2024-10-26	Water	M																		
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	<0.00010	0.00016	0.00205	<0.000100	<0.000050	<0.010	<0.0000050	0.918	0.000013	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.042	0.000061	<0.0010
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	<0.00010	0.00011	0.00209	<0.000100	<0.000050	<0.010	<0.0000050	0.997	0.000014	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.036	0.00006	<0.0010
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	<0.00010	0.00014	0.00207	<0.000020	<0.000050	<0.010	<0.0000050	0.84	0.000014	<0.00050	<0.00050		<0.00010	0.00097		0.04	0.000065	<0.0010
SW-01	SW-01	L2758119-1	2024-11-12	Water	M																		
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	<0.00010	<0.00010	0.00187	<0.000100	<0.000050	<0.010	<0.0000050	0.719	0.000015	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.043	0.000058	<0.0010
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	<0.00010	<0.00010	0.0018	<0.000100	<0.000050	<0.010	<0.0000050	0.87	0.000012	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.037	0.000052	<0.0010
SW-01	SW-01	L2758350-1	2024-12-06	Water	M																		
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M	<0.00010	0.00011	0.00163	<0.000020	<0.000050	<0.010	<0.0000050	0.907	0.000012	<0.00050	<0.00050		<0.00010	<0.00050		0.042	0.000058	0.001
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M																		
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	<0.00010	<0.00010	0.00186	<0.000100	<0.000050	<0.010	<0.0000050	0.836	0.000012	<0.00050			<0.00010	<0.00050		0.038	0.000055	<0.0010
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M																		
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	<0.00010	0.00011	0.00181	<0.000100	<0.000050	<0.010	0.000005	0.953	0.000012	<0.00050			<0.00010	<0.00050		0.039	0.000057	<0.0010
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M																		
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M	<0.00010	<0.00010	0.0018	<0.000020	<0.000050	<0.010	<0.0000050	1.01	0.00001	<0.00050	<0.00050		<0.00010	<0.00050		0.04	<0.000050	<0.0010
SW-01	SW-01	L2758769-1	2025-01-24	Water	M																		
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	<0.00010	<0.00010	0.00206	<0.000100	<0.000050	<0.010	<0.0000050	0.986	0.000012	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.039	0.000065	<0.0010
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M																		
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	<0.00010	0.0001	0.00257	<0.000020	<0.000050	<0.010	<0.0000050	1.2	0.000011	<0.00050	<0.00050		<0.00010	<0.00050		0.05	0.000079	<0.0010
SW-01	SW-01	L2759042-1	2025-02-21	Water	M																		
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	<0.00010	<0.00010	0.0018	<0.000020	<0.000050	<0.010	<0.0000050	0.944	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.0316	<0.000050	<0.0010
SW-01	SW-01	L2759255-1	2025-03-19	Water	M																		
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	<0.00010	<0.00010	0.00154	<0.000100	<0.000050	<0.010	<0.0000050	0.639	0.000016	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.052	0.000076	<0.0010
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M	<0.00010	<0.00010	0.00165	<0.000020	<0.000050	<0.010	<0.0000050	0.864	0.00001	<0.00050	<0.00050		<0.00010	<0.00050		0.033	0.000057	<0.0010
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M																		
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	<0.00010	<0.00010	0.00168	<0.000020	<0.000050	<0.010	<0.0000050	0.72	0.000012	<0.00050	<0.00050		<0.00010	<0.00050		0.033	0.00005	<0.0010
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M																		
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	<0.00010	<0.00010	0.00165	<0.000020	<0.000050	<0.010	<0.0000050	0.809	0.00001	<0.00050	<0.00050		<0.00010	<0.00050		0.03	<0.000050	<0.0010
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M																		
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	<0.00010	0.00011	0.00162	<0.000020	<0.000050	<0.010	<0.0000050	0.786	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.03	0.000058	<0.0010
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M																		
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	<0.00010	<0.00010	0.00152	<0.000100	<0.000050	<0.010	<0.0000050	0.811	0.000011	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.03	0.000054	<0.0010
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	<0.00010	0.0001	0.00139	<0.000020	<0.000050	<0.010	<0.0000050	0.674	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.029	0.000063	<0.0010
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M																		
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	<0.00010	<0.00010	0.00134	<0.000100	<0.000050	<0.010	<0.0000050	0.692	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.03	0.000057	<0.0010
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	<0.00010	<0.00010	0.00124	<0.000100	<0.000050	<0.010	<0.0000050	0.65	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.026	<0.000050	<0.0010
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	<0.00010	0.00011	0.00138	<0.000020	<0.000050	<0.010	<0.0000050	0.688	<0.000010	<0.00050	<0.00050		<0.00010	0.0007		0.027	0.000051	<0.0010
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	<0.00010	<0.00010	0.00132	<0.000100	<0.000050	<0.010	<0.0000050	0.678	0.00001	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.026	0.000052	<0.0010
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M	<0.00010	<0.00010	0.00137	<0.000100	<0.000050	<0.010	<0.0000050	0.746	0.000012	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.028	0.000053	<0.0010
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M	0.000274	0.000053	0.00351	<0.000010	<0.000010	0.0165	0.0000069	1.81		0.00012			0.0000445	0.00052		0.0168	<0.000050	0.000915
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M	0.00023	<0.000050	0.00338	<0.000010	<0.000010	0.0118	0.0000081	1.73		0.00011			0.0000508	0.00052		0.017	0.000063	0.000816

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M	0.000136	<0.000050	0.00321	<0.000010	<0.000010	0.0136	0.0000091	1.76		0.00014			0.0000549	0.00038		0.013	<0.000050	0.000866
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M	0.000056	0.000051	0.00196	<0.000010	<0.000010	0.0214	0.0000057	1.3		0.00015			0.0000458	0.00056		0.0241	<0.000050	0.000585
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.77		<0.00050			<0.00010	<0.00040		0.019	<0.00020	0.00031
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M	<0.000050	<0.000050	0.00152	<0.000010	<0.000010	0.0031	0.0000023	0.86		0.00016			0.000025	<0.00020		0.0162	<0.000050	0.000313
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M	<0.000050	<0.000050	0.00191	<0.000010	<0.000010	0.0038	0.0000025	0.763		0.00017			0.0000274	0.00021		0.0183	<0.000050	0.000303
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M	<0.000050	0.000075	0.00248	<0.000010	<0.000010	0.0096	0.0000104	1.12		0.00022			0.000055	0.00044		0.0423	0.000063	0.000437
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M	<0.000050	0.000209	0.00234	<0.000010	<0.000010	0.0046	0.0000068	0.916		0.00023			0.0000675	0.00062		0.106	0.000115	0.000267
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M	<0.000050	<0.000050	0.00298	<0.000010	<0.000010	0.0156	0.000006	1.24		0.00012			0.0000168	<0.00020		0.0064	<0.000050	0.000894
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M	<0.000050	0.000066	0.00533	0.000011	<0.000010	0.0392	0.0000073	2.4		0.00014			0.0000135	0.00023		0.0053	0.000065	0.00157
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M	<0.000050	0.000109	0.0169	<0.000010	<0.000010	0.0103	0.0000113	1.24		0.00092			0.000188	0.00058		0.429	0.000794	0.000302
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.38		<0.00050			<0.00010	<0.00040		0.021	<0.00020	0.00034
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.74		<0.00050			<0.00010	0.00078		0.019	<0.00020	0.00052
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.82		<0.00050			<0.00010	0.00045		0.011	<0.00020	0.00066
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.34		<0.00050			<0.00010	0.00056		0.072	<0.00020	0.0004
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.83		<0.00050			<0.00010	<0.00040		0.011	<0.00020	0.00074
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M																		
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.44		<0.00050			<0.00010	<0.00040		0.015	<0.00020	0.00054
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.63		<0.00050			<0.00010	<0.00040		0.037	<0.00020	0.00069
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.1		<0.00050			<0.00010	0.00046		0.056	<0.00020	0.00035
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	<0.000050	0.000052	0.00146	<0.000010	<0.000010	0.002	0.0000036	0.558		0.00015			0.0000362	<0.00020		0.0318	<0.000050	0.000223
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	<0.000050	<0.000050	0.0013	<0.000010	<0.000010	0.0034	0.0000037	0.7		<0.00010			0.0000241	<0.00020		0.0102	<0.000050	0.000299
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M	<0.000050	<0.000050	0.00321	<0.000010	<0.000010	0.0207	0.0000073	1.58		0.00019			0.0000145	<0.00020		0.0046	<0.000050	0.00112
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	<0.000050	0.00006	0.00577	<0.000010	<0.000010	0.0443	0.0000068	2.54		0.00019			0.0000126	<0.00020		0.0035	<0.000050	0.00168
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M	<0.000050	0.000055	0.00706	<0.000010	<0.000010	0.0604	0.0000089	3.16		0.00018			0.0000135	0.00021		0.0034	<0.000050	0.00208
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M	<0.000050	<0.000050	0.00347	<0.000010	<0.000010	0.0147	0.000009	2.05		0.00016			0.0000317	0.00028		0.0062	<0.000050	0.000946
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M	<0.000050	0.000051	0.004	<0.000010	<0.000010	0.021	0.0000075	2.36		0.00013			0.0000249	0.00024		0.0084	<0.000050	0.0013
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	<0.000050	<0.000050	0.00288	<0.000010	<0.000010	0.0127	0.0000077	1.84		0.00019			0.0000428	0.00024		0.008	<0.000050	0.00088
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	2.13		<0.00050			<0.00010	<0.00040		0.013	<0.00020	0.00113
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	2.25		<0.00050			<0.00010	<0.00040		0.012	<0.00020	0.00137
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M	<0.000050	0.000053	0.00199	<0.000010	<0.000010	0.0042	0.0000074	1.23		0.00014			0.0000495	0.00025		0.0131	<0.000050	0.000383
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M	<0.000050	<0.000050	0.00138	<0.000010	<0.000010	<0.0020	0.000004	0.636		<0.00050			0.0000332	<0.00020		0.0255	<0.000050	0.000252
SW-02	SW-02	23F0370-03	2023-06-02	Water	M	<0.000050	<0.000050	0.00148	<0.000010	<0.000010	0.0035	0.0000047	0.846		<0.00050			0.0000224	<0.00020		0.0067	<0.000050	0.000421
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M	<0.000050	<0.000050	0.00188	<0.000010	<0.000010	0.0084	0.000003	0.961		<0.00050			0.0000209	0.00028		0.0053	<0.000050	0.000587
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M	<0.000050	0.000065	0.00375	<0.000010	<0.000010	0.0248	0.0000056	1.8		<0.00050			0.0000141	<0.00020		0.004	<0.000050	0.00128
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M	<0.000050	<0.000050	0.00629	<0.000010	<0.000010	0.0549	0.000007	2.92		0.00015			0.0000105	0.00028		0.0029	<0.000050	0.00194
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	<0.000050	0.0001	0.0041	0.000013	<0.000010	0.0035	0.0000091	1.39		0.00018			0.000134	0.00047		0.12	0.00008	0.000463
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M																		
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M																		
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M	<0.000050	<0.000050	0.00314	<0.000010	<0.000010	0.0071	0.0000103	1.72		<0.00010			0.0000509	0.00028		0.009	<0.000050	0.00059
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M	<0.000050	<0.000050	0.00307	<0.000010	<0.000010	0.0102	0.0000109	2		0.00012			0.0000562	0.00035		0.0305	0.000232	0.0008
SW-02		VA24A1299-002	2024-01-23	Water	M	<0.00010	<0.00010	0.00317	<0.000100	<0.000050	<0.010	0.0000082	1.17	0.000013	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.065	<0.000050	<0.0010
SW-02		L2754353-2	2024-01-23	Water	M																		
SW-02		L2754615-2	2024-02-15	Water	M																		
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	<0.00010	<0.00010	0.00303	<0.000100	<0.000050	0.012	0.0000089	1.81	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	<0.00010	<0.00010	0.00206	<0.000100	<0.000050	<0.010	0.0000057	1.15	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.015	<0.000050	<0.0010
SW-02		L2755012-2	2024-03-19	Water	M																		
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	<0.00010	<0.00010	0.00296	<0.000100	<0.000050	<0.010	0.0000072	1.49	0.000011	<0.00050	<0.00050		<0.00010	0.00071		0.058	0.000176	<0.0010
SW-02		L2755316-6	2024-04-12	Water	M																		
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	<0.00010	<0.00010	0.00195	<0.000100	<0.000050	<0.010	0.0000073	1.28	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.013	<0.000050	<0.0010
SW-02		L2755504-1	2024-04-26	Water	M																		
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	<0.00010	<0.00010	0.00194	<0.000100	<0.000050	<0.010	0.000005	1.09	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.024	<0.000050	<0.0010
SW-02		L2755521-2	2024-04-28	Water	M																		
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	<0.00010	<0.00010	0.00214	<0.000100	<0.000050	<0.010	<0.0000050	1.38	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-02		L2755598-1	2024-05-03	Water	M																		
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	<0.00010	<0.00010	0.00194	<0.000100	<0.000050	<0.010	<0.0000050	1.1	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.025	<0.000050	<0.0010
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	<0.00010	<0.00010	0.0019	<0.000100	<0.000050	<0.010	<0.0000050	1.12	<0.000010	<0.00050	<0.00050		<0.00010	0.00055		0.016	<0.000050	<0.0010
SW-02		L2755677-1	2024-05-09	Water	M																		
SW-02		L2755687-1	2024-05-09	Water	M																		
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M	<0.00010	<0.00010	0.00157	<0.000100	<0.000050	<0.010	0.0000051	0.914	<0.000010	<0.00050	<0.00050		<0.00010	0.0006		0.016	<0.000050	<0.0010
SW-02		L2755770-1	2024-05-14	Water	M																		
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	<0.00010	<0.00010	0.00144	<0.000100	<0.000050	<0.010	<0.0000050	0.839	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.02	<0.000050	<0.0010
SW-02		L2755819-1	2024-05-17	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M	<0.00010	<0.00010	0.00166	<0.000100	<0.000050	<0.010	<0.0000050	0.98	0.00001	<0.00050	<0.00050		<0.00010	<0.00050		0.018	<0.000050	<0.0010
SW-02		L2755903-1	2024-05-23	Water	M																		
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	<0.00010	<0.00010	0.00158	<0.000100	<0.000050	<0.010	0.0000056	0.959	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-02		L2755933-1	2024-05-24	Water	M																		
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M	<0.00010	<0.00010	0.00158	<0.000100	<0.000050	<0.010	0.0000051	0.958	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.011	<0.000050	<0.0010
SW-02		L2755961-1	2024-05-26	Water	M																		
SW-02		VA24B4698-001	2024-06-21	Water	M	<0.00010	<0.00010	0.00146	<0.000100	<0.000050	<0.010	0.0000067	0.88	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-02		L2756349-1	2024-06-21	Water	M																		
SW-02		VA24B5540-001	2024-06-27	Water	M	<0.00010	<0.00010	0.00136	<0.000100	<0.000050	<0.010	<0.0000050	0.815	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.015	<0.000050	<0.0010
SW-02		L2756458-1	2024-06-27	Water	M																		
SW-02		VA24B7689-001	2024-07-19	Water	M	<0.00010	<0.00010	0.00242	<0.000100	<0.000050	0.013	<0.0000050	1.29	0.000016	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-02		L2756726-1	2024-07-19	Water	M																		
SW-02		VA24B8974-002	2024-07-31	Water	M	<0.00010	<0.00010	0.00268	<0.000100	<0.000050	0.013	<0.0000050	1.27	0.000013	<0.00050	<0.00050		<0.00010	0.00052		<0.010	<0.000050	<0.0010
SW-02		L2756871-2	2024-07-31	Water	M																		
SW-02		VA24C1605-001	2024-08-23	Water	M	<0.00010	<0.00010	0.0042	<0.000100	<0.000050	0.031	0.0000077	2.11	0.00002	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	0.0015
SW-02		L2757153-1	2024-08-23	Water	M																		
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	<0.00010	<0.00010	0.00264	<0.000100	<0.000050	<0.010	0.0000059	1.42	0.000012	<0.00050	<0.00050		<0.00010	<0.00050		0.012	<0.000050	<0.0010
SW-02	SW-02	L2757209-2	2024-08-27	Water	M																		
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	<0.00010	<0.00010	0.00499	<0.000100	<0.000050	0.037	0.000006	2.56	0.000023	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	0.0017
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	<0.00010	<0.00010	0.00313	<0.000100	<0.000050	0.014	0.0000055	1.87	0.000014	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-02	SW-02	L2757587-1	2024-09-29	Water	M																		
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	<0.00010	0.00012	0.0032	<0.000100	<0.000050	<0.010	0.0000083	1.95	0.000011	<0.00050	<0.00050		<0.00010	0.00064		0.031	0.000052	<0.0010
SW-02	SW-02	L2757661-1	2024-10-04	Water	M																		
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	<0.00010	<0.00010	0.00363	<0.000100	<0.000050	0.02	0.000007	2.02	0.000016	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	0.0012
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M																		
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	<0.00010	<0.00010	0.00286	<0.000100	<0.000050	<0.010	0.0000075	1.63	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.016	0.000052	<0.0010
SW-02	SW-02	L2757873-2	2024-10-22	Water	M																		
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	<0.00010	<0.00010	0.00336	<0.000100	<0.000050	0.011	0.0000058	1.82	0.00001	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.011	<0.000050	<0.0010
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M	<0.00010	<0.00010	0.00328	<0.000100	<0.000050	0.011	0.0000064	1.88	0.000011	<0.00050	<0.00050		<0.00010	<0.00050		0.01	<0.000050	<0.0010
SW-02	SW-02	L2757913-1	2024-10-25	Water	M																		
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	<0.00010	<0.00010	0.00293	<0.000100	<0.000050	<0.010	0.0000076	1.59	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.017	<0.000050	<0.0010
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	<0.00010	<0.00010	0.00224	<0.000100	<0.000050	<0.010	0.0000074	1.27	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.016	<0.000050	<0.0010
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M																		
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	<0.00010	<0.00010	0.00264	<0.000100	<0.000050	<0.010	0.0000078	1.37	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.024	<0.000050	<0.0010
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	<0.00010	0.0001	0.00412	<0.000020	<0.000050	<0.010	0.0000088	1.72	0.00002	0.00065	<0.00050		0.00011	0.00098		0.124	0.000156	<0.0010
SW-02	SW-02	L2758155-3	2024-11-16	Water	M																		
SW-02		VA24D1587-001	2024-11-20	Water	M	<0.00010	<0.00010	0.00443	<0.000100	<0.000050	<0.010	0.000009	1.92	0.000018	<0.00050	<0.00050	<0.00050	0.0001	0.00053		0.094	0.000116	<0.0010
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M																		
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	<0.00010	<0.00010	0.00241	<0.000020	<0.000050	<0.010	0.0000056	1.27	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.026	<0.000050	<0.0010
SW-02	SW-02	L2758371-1	2024-12-08	Water	M																		
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	<0.00010	<0.00010	0.00267	<0.000100	<0.000050	<0.010	0.0000079	1.5	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.019	<0.000050	<0.0010
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M																		
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	<0.00010	<0.00010	0.00375	<0.000100	<0.000050	0.019	0.000008	2.16	0.000011	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	0.0011
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M																		
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M	<0.00010	<0.00010	0.00379	<0.000020	<0.000050	0.021	<0.0000050	2.25	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	0.0012
SW-02	SW-02	L2758769-2	2025-01-24	Water	M																		
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M	<0.00010	0.00014	0.0098	<0.000020	<0.000050	0.018	0.0000101	2.5	0.000054	<0.00050	<0.00050		0.00023	0.00151		0.523	0.000215	0.0014
SW-02	SW-02	L2759009-1	2025-02-19	Water	M																		
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	<0.00010	<0.00010	0.00323	<0.000100	<0.000050	<0.010	0.0000068	1.76	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.034	<0.000050	<0.0010
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M																		
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	<0.00010	<0.00010	0.00307	<0.000020	<0.000050	0.0111	0.00000864	1.91	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-02	SW-02	L2759254-1	2025-03-18	Water	M																		
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M	<0.00010	<0.00010	0.00279	<0.000100	<0.000050	<0.010	<0.0000050	0.899	0.000016	<0.00050	<0.00050	<0.00050	0.00011	<0.00050		0.105	0.000073	<0.0010
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	<0.00010	<0.00010	0.00288	<0.000020	<0.000050	<0.010	0.0000085	1.59	0.000014	<0.00050	<0.00050		<0.00010	0.00052		0.062	0.000083	<0.0010
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M																		
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	<0.00010	<0.00010	0.00207	<0.000020	<0.000050	<0.010	<0.0000050	0.949	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.047	<0.000050	<0.0010
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M																		
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	<0.00010	<0.00010	0.00211	<0.000020	<0.000050	<0.010	0.0000071	1.22	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.012	<0.000050	<0.0010
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M																		
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M	<0.00010	<0.00010	0.00177	<0.000020	<0.000050	<0.010	0.0000062	1.05	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.012	<0.000050	<0.0010
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M																		
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	<0.00010	<0.00010	0.00178	<0.000100	<0.000050	<0.010	<0.0000050	1.19	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	<0.00010	<0.00010	0.00154	<0.000020	<0.000050	<0.010	0.0000056	0.94	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.011	<0.000050	<0.0010
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M																		
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	<0.00010	<0.00010	0.00142	<0.000100	<0.000050	<0.010	<0.0000050	0.896	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00052		0.012	<0.000050	<0.0010
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	<0.00010	<0.00010	0.00131	<0.000100	<0.000050	<0.010	<0.0000050	0.864	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	<0.00010	<0.00010	0.00163	<0.000020	<0.000050	<0.010	<0.0000050	1	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.012	<0.000050	<0.0010
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M																		
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	<0.00010	<0.00010	0.00152	<0.000100	<0.000050	<0.010	<0.0000050	0.912	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00053		<0.010	<0.000050	<0.0010
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	<0.00010	<0.00010	0.0017	<0.000100	<0.000050	<0.010	<0.0000050	1.05	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0385	0.000016	1.87		<0.0005			<0.0001	0.00057		0.015	<0.0002	0.00125
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0118	<0.00001	1.81		<0.0005			<0.0001	0.0015		0.02	<0.0002	0.00091
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M	<0.0002	0.00061	<0.005	<0.0001	<0.0001	0.0351	0.000014	2.42		<0.0005			<0.0001	0.00058		0.013	<0.0002	0.00185
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0057	0.000011	0.8		<0.0005			<0.0001	<0.0004		<0.01	<0.0002	0.00033
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.008	0.000051	1.35		<0.0005			<0.0001	0.00079		0.028	<0.0002	0.00044
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0396	0.000017	2.72		<0.0005			<0.0001	0.00052		<0.01	<0.0002	0.00097
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.052	<0.00001	1.99		<0.0005			<0.0001	0.00049		<0.01	<0.0002	0.00105
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0155	<0.00001	0.87		<0.0005			<0.0001	<0.0004		0.011	<0.0002	0.00041
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M	<0.0002	<0.0005	0.0066	<0.0001	<0.0001	<0.05	0.000021	3.14		<0.0005			<0.0001	<0.0004		0.013	<0.0002	0.00184
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	<0.05	<0.00001	1.05		<0.0005			<0.0001	<0.0004		0.036	<0.0002	0.00023
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M	0.000108	0.000177	0.00929	<0.000010	<0.000010	0.333	0.000013	30.8		0.0002			0.0000521	0.00039		0.0144	<0.000050	0.0127
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M	<0.000250	0.000275	0.00437	<0.000050	<0.000050	0.412	0.0000161	36.9		<0.00050			0.0000527	<0.00050		0.0186	<0.000250	0.0168
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M	<0.000500	<0.000500	0.00411	<0.000100	<0.000100	0.252	<0.0000200	22.6		<0.00100			0.0000818	<0.00100		0.038	<0.000500	0.011
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M	0.000051	0.000066	0.00223	<0.000010	<0.000010	0.0305	0.0000054	2.02		0.00015			0.0000506	0.00048		0.0261	<0.000050	0.00102
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.77		<0.00050			<0.00010	<0.00040		0.027	<0.00020	0.00031
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M	<0.000050	0.000052	0.00171	<0.000010	<0.000010	0.0169	0.0000034	1.76		0.00019			0.0000308	0.00027		0.0258	<0.000050	0.001
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M	<0.000050	0.00013	0.00225	<0.000010	<0.000010	0.0272	0.0000073	2.22		0.00027			0.000104	0.00042		0.0956	0.000213	0.00199
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M	<0.000050	0.000088	0.00217	<0.000010	<0.000010	0.0085	0.0000101	1.09		0.0002			0.0000567	0.00031		0.058	0.000094	0.000498
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M	<0.000050	0.000222	0.00223	<0.000010	<0.000010	0.0064	0.0000072	0.967		0.00026			0.0000863	0.00077		0.133	0.000126	0.000395
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M	<0.000050	0.000065	0.00229	<0.000010	<0.000010	0.0176	0.0000043	1.13		0.00013			0.0000421	0.00026		0.0525	0.00007	0.00102
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M	<0.000050	0.000098	0.00619	<0.000010	<0.000010	0.0948	0.0000086	8.96		0.00012			0.0000326	0.00031		0.0371	<0.000050	0.00385
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M	<0.000050	0.000093	0.00359	<0.000010	<0.000010	0.009	0.0000117	1.17		0.0002			0.000128	0.00051		0.0923	0.00011	0.000304
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	3.06		<0.00050			<0.00010	<0.00040		0.025	<0.00020	0.00093
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M	<0.00020	<0.00050	0.0054	<0.00010	<0.00010	0.0745	0.000012	8.2		0.00281			<0.00010	0.00056		0.028	<0.00020	0.00324
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	0.277	<0.000010	24.1		<0.00050			<0.00010	<0.00040		0.028	<0.00020	0.0111
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	0.000011	1.88		<0.00050			<0.00010	0.00083		0.195	<0.00020	0.00059
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	0.336	0.000027	32		<0.00050			<0.00010	0.00065		0.018	<0.00020	0.0149
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M																		
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	0.000011	2.57		<0.00050			<0.00010	<0.00040		0.017	<0.00020	0.00112
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	2.83		<0.00050			<0.00010	<0.00040		0.052	<0.00020	0.00119
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	3.6		<0.00050			<0.00010	0.0005		0.09	<0.00020	0.00156
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	<0.000050	0.000063	0.00187	<0.000010	<0.000010	0.0023	0.0000047	0.645		0.00029			0.0000521	0.0002		0.0622	0.000065	0.00027
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	<0.000050	<0.000050	0.00136	<0.000010	<0.000010	0.0059	0.0000044	0.784		<0.00010			0.0000355	<0.00020		0.0402	<0.000050	0.000426
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M	<0.000050	0.000101	0.00531	<0.000010	<0.000010	0.114	0.0000079	10.5		0.00017			0.0000287	0.00024		0.0324	<0.000050	0.00465
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M	<0.000050	0.000092	0.00677	<0.000010	<0.000010	0.0986	0.000008	7.24		0.00019			0.0000336	0.00033		0.0379	<0.000050	0.00355
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M	<0.000250	0.00029	0.0098	<0.000050	<0.000050	0.555	0.0000162	51.5		<0.00050			0.000038	<0.00100		0.0299	<0.000250	0.0203
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	<0.000250	0.000311	0.00595	<0.000050	<0.000050	0.581	0.00003	53.6		0.00062			0.0000494	<0.00100		0.0129	<0.000250	0.0227
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M	<0.000100	0.000151	0.00558	<0.000020	<0.000020	0.27	0.0000126	26.8		<0.00020			0.0000313	<0.00040		0.0132	<0.000100	0.0104
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	<0.000050	0.000177	0.00587	<0.000010	<0.000010	0.355	0.0000179	32.5		0.00019			0.000058	0.00032		0.0331	<0.000050	0.0134
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M	<0.00020	<0.00050	0.0054	<0.00010	<0.00010	0.478	0.000018	49.2		<0.00050			<0.00010	<0.00040		0.026	<0.00020	0.0189
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	0.178	<0.000010	16.7		<0.00050			<0.00010	<0.00040		0.017	<0.00020	0.00725
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	<0.000050	0.000056	0.00212	<0.000010	<0.000010	0.0131	0.0000065	2		0.00023			0.0000449	0.00026		0.0131	<0.000050	0.000732
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M	<0.000050	0.000071	0.00307	<0.000010	<0.000010	0.0021	0.0000057	0.745		<0.00050			0.000107	0.00044		0.208	0.000102	0.000447
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	<0.000050	0.000059	0.00198	<0.000010	<0.000010	0.0136	0.0000035	1.23		<0.00050			0.000024	0.00022		0.0097	<0.000050	0.000811
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	<0.000050	0.000102	0.0063	<0.000010	<0.000010	0.0823	0.0000087	7.4		<0.00050			0.0000504	0.00033		0.0659	<0.000050	0.00395
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	<0.000250	0.000343	0.0122	<0.000050	<0.000050	0.772	0.0000119	73.9		<0.00050			0.0000556	<0.00100		0.0604	<0.000250	0.0301
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M	<0.000050	0.000134	0.00427	<0.000010	<0.000010	0.125	0.0000096	10.9		0.0001			0.0000206	0.00036		0.0094	<0.000050	0.00499
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M	<0.000050	0.00009	0.00367	<0.000010	<0.000010	0.0032	0.000008	1.28		0.00066			0.000124	0.00049		0.0937	0.000066	0.000338
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	<0.000250	<0.000250	0.00599	<0.000050	<0.000050	0.486	0.0000343	48.5		<0.00050			0.0000504	<0.00100		0.0246	<0.000250	0.0185
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M	<0.000050	0.000175	0.00689	<0.000010	<0.000010	0.324	0.0000141	29.8		0.00015			0.0000633	0.00032		0.0376	<0.000050	0.0138
SW-03		VA24A1299-003	2024-01-23	Water	M	<0.00010	0.00012	0.0031	<0.000100	<0.000050	0.063	0.0000091	6.75	0.000015	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.065	0.000063	0.0028
SW-03		L2754353-3	2024-01-23	Water	M																		
SW-03		L2754615-3	2024-02-15	Water	M																		
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	<0.00050	<0.00050	0.0103	<0.000100	<0.000250	0.692	0.000028	63.5	0.000065	<0.00250	<0.00250	<0.00061	<0.00050	<0.00250		0.096	0.000639	0.0273

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	<0.0010	<0.00040	0.0022	<0.00050	<0.00050	<0.30	<0.000020	11.3	<0.00050	<0.00050	<0.00150	<0.00050	0.000053	<0.00050	<0.00050	0.016	<0.00010	<0.020
SW-03		L2755012-3	2024-03-19	Water	M																		
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M	<0.00010	0.00011	0.0026	<0.000100	<0.000050	<0.010	0.000007	1.85	<0.000010	<0.00050	<0.00050		<0.00010	0.00077		0.023	0.000085	<0.0010
SW-03		L2755316-7	2024-04-12	Water	M																		
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	<0.00010	<0.00010	0.00215	<0.000100	<0.000050	0.041	0.0000061	4.62	0.000011	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.017	<0.000050	0.0018
SW-03		L2755504-2	2024-04-26	Water	M																		
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	<0.00010	0.00013	0.00242	<0.000100	<0.000050	<0.010	0.0000066	1.48	0.000011	<0.00050	<0.00050		<0.00010	<0.00050		0.068	0.000142	<0.0010
SW-03		L2755521-3	2024-04-28	Water	M																		
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	<0.00010	<0.00010	0.00204	<0.000100	<0.000050	0.023	<0.0000050	2.4	0.000011	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.028	<0.000050	0.0012
SW-03		L2755598-2	2024-05-03	Water	M																		
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	<0.00010	0.00011	0.0021	<0.000100	<0.000050	0.056	0.0000052	5.22	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.038	0.000057	0.0025
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	<0.00010	<0.00010	0.00184	<0.000100	<0.000050	<0.010	0.0000054	1.34	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.012	<0.000050	<0.0010
SW-03		L2755677-2	2024-05-09	Water	M																		
SW-03		L2755687-2	2024-05-09	Water	M																		
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M	<0.00010	<0.00010	0.00158	<0.000100	<0.000050	<0.010	<0.0000050	1.14	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.013	<0.000050	<0.0010
SW-03		L2755770-2	2024-05-14	Water	M																		
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	<0.00010	<0.00010	0.00132	<0.000100	<0.000050	<0.010	<0.0000050	0.871	<0.000010	0.00163	<0.00050	0.00163	<0.00010	<0.00050		0.019	<0.000050	<0.0010
SW-03		L2755819-2	2024-05-17	Water	M																		
SW-03		VA24B1636-002	2024-05-23	Water	M	<0.00010	0.0001	0.00176	<0.000100	<0.000050	<0.010	<0.0000050	1.11	0.00001	<0.00050	<0.00050		<0.00010	<0.00050		0.02	0.000058	<0.0010
SW-03		L2755903-2	2024-05-23	Water	M																		
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	<0.00010	<0.00010	0.00155	<0.000100	<0.000050	<0.010	0.0000056	0.998	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.01	<0.000050	<0.0010
SW-03		L2755933-2	2024-05-24	Water	M																		
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	<0.00010	<0.00010	0.00172	<0.000100	<0.000050	<0.010	0.0000051	1.17	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.02	0.000066	<0.0010
SW-03		L2755961-2	2024-05-26	Water	M																		
SW-03		VA24B4698-002	2024-06-21	Water	M	<0.00010	<0.00010	0.0015	<0.000100	<0.000050	<0.010	<0.0000050	1.11	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-03		L2756349-2	2024-06-21	Water	M																		
SW-03		VA24B5540-002	2024-06-27	Water	M	<0.00010	0.0001	0.00191	<0.000100	<0.000050	<0.010	<0.0000050	1.08	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.067	0.000139	<0.0010
SW-03		L2756458-2	2024-06-27	Water	M																		
SW-03		VA24B7689-002	2024-07-19	Water	M	0.00011	0.00015	0.00297	<0.000100	<0.000050	0.121	0.0000055	6.96	0.000023	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.043	0.000054	0.0058
SW-03		L2756726-2	2024-07-19	Water	M																		
SW-03		L2756871-3	2024-07-31	Water	M																		
SW-03		VA24B8974-003	2024-07-31	Water	M	<0.00010	<0.00010	0.00257	<0.000100	<0.000050	0.013	<0.0000050	1.37	0.000013	<0.00050	<0.00050		<0.00010	<0.00050		0.011	<0.000050	<0.0010
SW-03		VA24C1605-002	2024-08-23	Water	M	<0.0010	<0.00040	0.0081	<0.00050	<0.00050	<0.30	<0.000020	21.3	<0.00050	<0.00050	<0.00150	<0.00050	<0.000050	0.00066	<0.00050	0.053	<0.00010	<0.020
SW-03		L2757153-2	2024-08-23	Water	M																		
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	0.00011	0.00018	0.00717	<0.000100	<0.000050	0.136	0.0000084	14	0.000026	<0.00050	<0.00050		<0.00010	0.0008		0.083	0.000196	0.0052
SW-03	SW-03	L2757229-1	2024-08-28	Water	M																		
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	<0.0010	0.00044	0.0097	<0.00050	<0.00050	0.37	<0.000020	25.7	<0.00050	<0.00050	<0.00150	<0.00050	0.000176	0.00243	<0.00050	0.425	0.00197	<0.020
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	<0.00010	0.00013	0.00477	<0.000100	<0.000050	0.089	0.0000088	8.74	0.000024	<0.00050	<0.00050		<0.00010	0.00067		0.073	0.000242	0.0037
SW-03	SW-03	L2757587-3	2024-09-29	Water	M																		
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	<0.00010	0.00025	0.00544	<0.000100	<0.000050	0.022	0.0000099	3.14	0.00003	<0.00050	<0.00050		0.00018	0.00163		0.303	0.000856	0.0017
SW-03	SW-03	L2757661-3	2024-10-04	Water	M																		
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M	<0.00010	<0.00010	0.00354	<0.000100	<0.000050	0.021	<0.0000050	2.08	0.000015	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	0.0012
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M																		
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	<0.00010	0.00012	0.00647	<0.000100	<0.000050	0.099	0.0000111	10.5	0.000022	<0.00050	<0.00050		0.00012	0.00064		0.098	0.000063	0.0039
SW-03	SW-03	L2757873-3	2024-10-22	Water	M																		
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	<0.0010	<0.00040	0.0034	<0.00050	<0.00050	<0.30	<0.000020	1.7	<0.00050	<0.00050	<0.00150	<0.00050	0.000063	<0.00050	<0.00050	0.076	<0.00010	<0.020
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	<0.0010	<0.00040	0.0074	<0.00050	<0.00050	0.32	<0.000020	32.1	<0.00050	<0.00050	<0.00050		0.000062	0.00056	<0.00050	0.038	<0.00010	<0.020
SW-03	SW-03	L2757913-3	2024-10-25	Water	M																		
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	<0.0010	<0.00040	0.0042	<0.00050	<0.00050	<0.30	<0.000020	8.2	<0.00050	<0.00050	<0.00150	<0.00050	0.000065	0.00062	<0.00050	0.027	<0.00010	<0.020
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	<0.0010	<0.00040	0.0029	<0.00050	<0.00050	<0.30	<0.000020	15	<0.00050	<0.00050	<0.00150	<0.00050	<0.000050	<0.00050	<0.00050	0.012	<0.00010	<0.020
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M																		
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	<0.00010	<0.00010	0.00302	<0.000100	<0.000050	0.019	0.0000065	3.03	0.00001	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.025	<0.000050	0.0011
SW-03	SW-03	L2758155-2	2024-11-16	Water	M																		
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M	<0.00020	0.0002	0.0053	<0.000040	<0.000100	0.225	0.0000114	22.2	0.000034	<0.00100	<0.00050		<0.00020	<0.00100		0.107	0.000135	0.0089
SW-03		VA24D1587-002	2024-11-20	Water	M	<0.0010	<0.00040	0.0078	<0.00050	<0.00050	<0.30	0.000027	25.4	<0.00050	<0.00050	<0.00150	<0.00050	0.000114	0.00059	<0.00050	0.093	0.00013	<0.020
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M																		
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	<0.00010	<0.00010	0.00263	<0.000020	<0.000050	0.014	0.0000058	2.1	0.000011	<0.00050	<0.00050		<0.00010	<0.00050		0.022	<0.000050	<0.0010
SW-03	SW-03	L2758371-2	2024-12-08	Water	M																		
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	<0.0010	<0.00040	0.0032	<0.00050	<0.00050	<0.30	<0.000020	10.6	<0.00050	<0.00050	<0.00050	<0.00050	0.000095	<0.00050	<0.00050	0.041	<0.00010	<0.020
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M																		
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	<0.0010	<0.00040	0.005	<0.00050	<0.00050	0.5	<0.000020	39.8	<0.00050	<0.00050	<0.00150	<0.00050	<0.000050	<0.00050	<0.00050	0.016	<0.00010	<0.020
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	<0.0010	0.00058	0.0087	<0.00050	<0.00050	1.53	0.000035	136	<0.00050	<0.00050	<0.00150		0.000054	0.00069	<0.00050	0.022	<0.00010	0.058
SW-03	SW-03	L2758769-3	2025-01-24	Water	M																		
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	<0.00010	0.00018	0.00822	<0.000020	<0.000050	0.091	0.0000133	9.72	0.000039	<0.00050	<0.00150		0.00015	0.00097		0.313	0.000276	0.0034
SW-03	SW-03	L2759009-2	2025-02-19	Water	M																		
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	<0.0010	<0.00040	0.0039	<0.00050	<0.00050	0.3	<0.000020	25.1	<0.00050	<0.00050	<0.00050	<0.00050	0.000083	<0.00050	<0.00050	0.042	<0.00010	<0.020
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M																		
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	<0.00010	0.000124	0.00434	<0.000020	<0.000050	0.125	0.0000172	12.5	0.0000132	<0.00050	<0.00050		<0.00010	0.000548		0.0172	<0.000050	0.00499
SW-03	SW-03	L2759254-2	2025-03-18	Water	M																		
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	<0.00010	0.00015	0.00446	<0.000100	<0.000050	<0.010	0.0000055	1	0.000047	<0.00050	<0.00050	<0.00050	0.00022	0.00058		0.356	0.000149	<0.0010
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M	<0.00020	0.00022	0.00474	<0.000040	<0.000100	0.301	0.0000125	27.6	0.000031	<0.00100	<0.00050		<0.00020	0.00116		0.115	0.000159	0.0122
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M																		
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M	<0.00010	<0.00010	0.00204	<0.000020	<0.000050	0.013	0.0000051	1.41	0.00001	<0.00050	<0.00050		<0.00010	0.00056		0.05	<0.000050	<0.0010
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M																		
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	<0.00010	<0.00010	0.00234	<0.000020	<0.000050	0.03	0.0000066	3.17	<0.000010	<0.00050	<0.00050		<0.00010	0.00055		0.021	<0.000050	0.0015
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M																		
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	<0.00010	0.00016	0.00222	<0.000020	<0.000050	0.063	<0.0000050	7	0.000012	<0.00050	<0.00050		<0.00010	<0.00050		0.03	<0.000050	0.0031
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M																		
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	<0.00010	<0.00010	0.00199	<0.000100	<0.000050	<0.010	0.0000075	1.22	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00054		<0.010	<0.000050	<0.0010
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	<0.00010	<0.00010	0.0012	<0.000020	<0.000050	0.024	<0.0000050	2.36	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.011	<0.000050	0.0011
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M																		
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	<0.00010	<0.00010	0.00148	<0.000100	<0.000050	<0.010	0.0000057	1.02	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.012	<0.000050	<0.0010
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	<0.00010	<0.00010	0.00127	<0.000100	<0.000050	<0.010	<0.0000050	0.908	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.013	<0.000050	<0.0010
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	<0.00010	<0.00010	0.0016	<0.000020	<0.000050	0.013	<0.0000050	1.51	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.016	<0.000050	<0.0010
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M																		
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	<0.00010	<0.00010	0.00165	<0.000100	<0.000050	0.047	<0.0000050	3.54	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.021	<0.000050	0.0023
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	<0.00010	<0.00010	0.00172	<0.000100	<0.000050	<0.010	0.0000062	1.12	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.012	<0.000050	<0.0010
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M	0.000233	0.00009	0.00438	<0.000010	<0.000010	0.0057	0.0000106	5.84		0.00019			0.0000286	0.00078		0.1	0.000074	0.000163
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M	0.000059	0.000098	0.00422	<0.000010	<0.000010	0.0054	0.0000105	5.93		0.00014			0.0000329	0.00065		0.1	0.000099	0.000163
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M	0.000088	0.000078	0.00472	<0.000010	<0.000010	0.0073	0.0000094	5.11		0.00011	0.00073		0.0000287	0.00063		0.0665	0.00008	0.000175
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M	0.000178	0.0001	0.00471	<0.000010	<0.000010	0.0218	0.0000113	6.34		0.00017			0.0000352	0.00092		0.108	0.000146	0.000255
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M	<0.00020	<0.00050	0.0064	<0.00010	<0.00010	<0.0500	0.000014	9.47		<0.00050			<0.00010	0.00048		0.173	<0.00020	0.00024
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M	0.000065	0.000081	0.00707	<0.000010	<0.000010	0.0064	0.0000165	11.1		0.00021			0.000032	0.00094		0.176	0.000172	0.000211
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M	0.00006	0.000089	0.00702	<0.000010	<0.000010	0.0073	0.0000134	10.1		0.00018			0.0000281	0.00096		0.128	0.000124	0.000235
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M	0.000066	0.000091	0.00683	<0.000010	<0.000010	0.0074	0.0000206	10.4		0.0002			0.0000297	0.00091		0.129	0.000131	0.00018
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M	0.000072	0.00013	0.00626	<0.000010	<0.000010	0.0069	0.00001	5.58		0.0002			0.0000425	0.00089		0.11	0.000121	0.000212
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M	0.00013	0.000091	0.0115	<0.000010	<0.000010	0.0096	0.0000184	17.2		0.00021			0.0000217	0.00115		0.117	0.000469	0.000257
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M	0.00006	0.000088	0.0135	<0.000010	<0.000010	0.0125	0.0000077	25.4		0.00013			0.0000099	0.00053		0.0372	0.000105	0.000292
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M	0.000075	0.000121	0.00578	<0.000010	<0.000010	0.0103	0.0000131	6.02		0.00018			0.0000507	0.00097		0.139	0.000139	0.000213
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	5.28		<0.00050			<0.00010	0.00068		0.052	<0.00020	0.00017
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	4.48		<0.00050			<0.00010	0.0008		0.039	<0.00020	0.00015
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	5.38		<0.00050			<0.00010	0.00063		0.04	<0.00020	0.00012
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	4.24		<0.00050			<0.00010	0.00056		0.034	<0.00020	0.00015
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M	0.0002	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	6.98		<0.00050			<0.00010	0.00081		0.05	<0.00020	0.00017
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M																		
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	5.61		<0.00050			<0.00010	<0.00040		0.046	<0.00020	0.00019
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	5.71		<0.00050			<0.00010	0.00048		0.045	<0.00020	0.00012
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	0.000015	4.55		<0.00050			<0.00010	0.00102		0.273	0.00032	0.00024
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M	<0.000050	0.000085	0.00534	<0.000010	<0.000010	0.005	0.0000102	7.68		0.0002			0.0000296	0.00066		0.131	0.000108	0.000156
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M	0.000068	0.000082	0.00873	<0.000010	<0.000010	0.0075	0.0000098	15.2		0.00022			0.0000258	0.00085		0.139	0.000118	0.000153
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M	<0.000050	0.000083	0.0143	<0.000010	<0.000010	0.0154	0.0000099	33		0.0002			0.0000167	0.00054		0.0705	0.000177	0.000304
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M	0.000053	0.000103	0.0151	<0.000010	<0.000010	0.015	0.0000141	31.6		0.00023			0.0000482	0.00069		0.262	0.000236	0.00027
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M	0.000056	0.000115	0.0153	<0.000010	<0.000010	0.0176	0.0000061	36.6		0.00021			0.000016	0.00044		0.0465	0.000095	0.000347
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M	<0.000050	0.000088	0.00634	<0.000010	<0.000010	0.0056	0.0000108	11		0.00018			0.0000299	0.00063		0.123	0.000085	0.000214
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M	<0.000050	0.000065	0.00619	<0.000010	<0.000010	0.006	0.0000085	12.5		0.00015			0.000023	0.00053		0.0945	0.000063	0.000169
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M	<0.000050	0.000054	0.0045	<0.000010	<0.000010	0.0061	0.0000078	7.79		0.0002			0.0000246	0.00059		0.0902	0.000058	0.000181
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	8.05		<0.00050			<0.00010	0.00056		0.066	<0.00020	0.00016
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M	<0.00020	<0.00050	0.0053	<0.00010	<0.00010	<0.0500	<0.000010	9.57		<0.00050			<0.00010	0.00063		0.106	<0.00020	0.00017
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M	<0.000050	0.000066	0.00428	<0.000010	<0.000010	0.0049	0.0000066	6.53		0.00027			0.0000295	0.00064		0.0897	0.00008	0.00016
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M	<0.000050	0.000066	0.00518	<0.000010	<0.000010	0.0042	0.0000092	9.24		<0.00050			0.0000273	0.00077		0.142	0.000112	0.000179
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M	<0.000050	0.000089	0.00156	<0.000010	<0.000010	0.0081	0.000003	0.789		<0.00050			0.0000208	0.00033		0.0331	0.000078	0.000449
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M	0.000067	0.000102	0.015	<0.000010	<0.000010	0.0145	0.0000059	32.2		<0.00050			0.000016	0.00051		0.0315	0.000053	0.000301
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M	0.000077	0.000106	0.0171	<0.000010	<0.000010	0.0164	0.000005	35.7		0.00018			0.0000137	0.00051		0.0256	<0.000050	0.00032

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M	0.000098	0.00016	0.0191	<0.000010	<0.000010	0.0203	0.0000164	41.8		0.00031			0.0000744	0.00093		0.26	0.000537	0.000441
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	0.000069	0.00019	0.00626	<0.000010	<0.000010	0.0063	0.0000154	6.86		0.00034			0.000117	0.00146		0.287	0.000224	0.000308
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M	<0.000050	0.000092	0.00415	<0.000010	<0.000010	0.0038	0.0000062	6.12		0.00014			0.0000305	0.0007		0.0698	0.000054	0.00015
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	<0.000050	0.000082	0.00424	<0.000010	<0.000010	0.0042	0.000004	7.41		0.00011			0.0000245	0.00062		0.0653	0.000055	0.000203
SW-04		VA24A1299-004	2024-01-23	Water	M	<0.00010	0.00012	0.00417	<0.000100	<0.000050	<0.010	0.0000066	4.94	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00072		0.092	0.00008	<0.0010
SW-04		L2754353-4	2024-01-23	Water	M																		
SW-04		L2754615-4	2024-02-15	Water	M																		
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	<0.00010	0.0001	0.00423	<0.000100	<0.000050	<0.010	0.0000073	6.15	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00058		0.056	0.000084	<0.0010
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	<0.00010	0.00014	0.0038	<0.000100	<0.000050	<0.010	0.0000095	4.7	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00064		0.084	0.000085	<0.0010
SW-04		L2755012-4	2024-03-19	Water	M																		
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	<0.00010	0.00018	0.0061	<0.000100	<0.000050	<0.010	0.0000124	8.2	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00114		0.231	0.000171	<0.0010
SW-04		L2755503-3	2024-04-25	Water	M																		
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M	<0.00010	0.00011	0.00514	<0.000100	<0.000050	<0.010	0.0000078	7.1	<0.000010	<0.00050	<0.00050		<0.00010	0.00075		0.078	0.000068	<0.0010
SW-04		L2755523-2	2024-04-29	Water	M																		
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	<0.00010	0.00011	0.00566	<0.000100	<0.000050	<0.010	0.000007	9.12	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00072		0.094	0.000086	<0.0010
SW-04		L2755588-3	2024-05-02	Water	M																		
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	<0.00010	<0.00010	0.00602	<0.000100	<0.000050	<0.010	0.0000074	9.27	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00073		0.146	0.000092	<0.0010
SW-04		L2755687-4	2024-05-09	Water	M																		
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M	<0.00010	0.0001	0.00555	<0.000100	<0.000050	<0.010	0.0000095	9.33	<0.000010	<0.00050	<0.00050		<0.00010	0.00101		0.111	0.000091	<0.0010
SW-04		L2755695-2	2024-05-10	Water	M																		
SW-04		L2755788-2	2024-05-15	Water	M																		
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M	<0.00010	0.00011	0.00664	<0.000100	<0.000050	<0.010	0.0000116	10.2	<0.000010	<0.00050	<0.00050		<0.00010	0.00104		0.253	0.000182	<0.0010
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	0.0001	0.00011	0.00641	<0.000100	<0.000050	<0.010	0.0000068	10.2	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00088		0.122	0.000122	<0.0010
SW-04		L2755820-3	2024-05-16	Water	M																		
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	<0.00010	0.00011	0.00606	<0.000100	<0.000050	<0.010	0.000008	9.47	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00073		0.077	0.000068	<0.0010
SW-04		VA24B1636-005	2024-05-23	Water	M	<0.00010	0.00014	0.00583	<0.000100	<0.000050	<0.010	0.0000097	9.16	<0.000010	<0.00050	<0.00050		<0.00010	0.00074		0.084	0.000103	<0.0010
SW-04		L2755903-5	2024-05-23	Water	M																		
SW-04		L2755916-3	2024-05-23	Water	M																		
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	<0.00010	0.00014	0.00692	<0.000100	<0.000050	<0.010	0.0000132	8.96	<0.000010	<0.00050	<0.00050		<0.00010	0.00111		0.261	0.000209	<0.0010
SW-04		L2755961-4	2024-05-26	Water	M																		
SW-04		VA24B4655-003	2024-06-20	Water	M	0.00011	0.00016	0.0072	<0.000100	<0.000050	<0.010	0.0000076	9.96	0.00001	<0.00050	<0.00050	<0.00050	<0.00010	0.00067		0.074	0.000058	<0.0010
SW-04		L2756326-3	2024-06-20	Water	M																		
SW-04		VA24B5289-002	2024-06-26	Water	M	0.00012	0.00014	0.0079	<0.000100	<0.000050	0.01	0.0000135	12	<0.000010	<0.00050	<0.00050		<0.00010	0.00089		0.094	0.000073	<0.0010
SW-04		L2756419-2	2024-06-26	Water	M																		
SW-04		VA24B7579-003	2024-07-18	Water	M	0.00014	0.00012	0.0118	<0.000100	<0.000050	0.015	0.0000076	23.8	0.000014	<0.00050	<0.00050	<0.00050	<0.00010	0.00076		0.076	0.000051	<0.0010
SW-04		L2756717-3	2024-07-18	Water	M																		
SW-04		VA24B8974-004	2024-07-31	Water	M	0.00011	<0.00010	0.013	<0.000100	<0.000050	0.016	0.0000066	25.1	0.000014	<0.00050	<0.00050		<0.00010	0.00081		0.109	0.000051	<0.0010
SW-04		L2756871-4	2024-07-31	Water	M																		
SW-04		VA24C1546-003	2024-08-22	Water	M	0.00013	0.00011	0.0135	<0.000100	<0.000050	0.016	0.0000074	26.7	0.000018	<0.00050	<0.00050	<0.00050	<0.00010	0.00063		0.188	0.000099	<0.0010
SW-04		L2757144-3	2024-08-22	Water	M																		
SW-04	SW-04	L2757209-4	2024-08-27	Water	M																		
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	0.00012	0.00018	0.017	<0.000100	<0.000050	0.015	0.0000152	26.2	0.000017	<0.00050	<0.00050		<0.00010	0.00158		0.122	0.00008	<0.0010
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	0.0004	0.00029	0.014	<0.000100	<0.000050	0.018	0.0000123	22.3	0.000022	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.126	0.000051	0.0031
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	0.00024	0.00055	0.0146	<0.000100	<0.000050	0.014	0.0000179	21.6	0.000034	<0.00050	<0.00050		0.0001	0.00135		0.345	0.000212	0.0022
SW-04	SW-04	L2757584-2	2024-09-28	Water	M																		
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	0.00025	0.00094	0.0213	<0.000100	<0.000050	0.021	0.0000422	26.8	0.000067	<0.00050	<0.00050		0.00042	0.00497		1.14	0.000836	0.002
SW-04	SW-04	L2757661-4	2024-10-04	Water	M																		
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	0.00012	0.00064	0.0128	<0.000100	<0.000050	0.014	0.0000155	23.8	0.00002	<0.00050	<0.00050		<0.00010	0.00073		0.472	0.000151	0.0014
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M																		
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	0.00023	0.00094	0.0302	<0.000100	<0.000050	0.016	0.0000839	25.1	0.000084	0.00143	<0.00050	0.00143	0.0009	0.00623		5.9	0.00342	<0.0010
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M	<0.00010	0.00015	0.00806	<0.000100	<0.000050	<0.010	0.0000085	9.13	<0.000010	<0.00050	<0.00050		<0.00010	0.00097		0.171	0.000169	<0.0010
SW-04	SW-04	L2757873-4	2024-10-22	Water	M																		
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	<0.00010	0.00018	0.00715	<0.000100	<0.000050	<0.010	0.0000126	12.4	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.0011		0.345	0.000182	<0.0010
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	<0.00010	0.00032	0.00723	<0.000100	<0.000050	<0.010	0.0000186	10.9	<0.000010	<0.00050	<0.00050		0.0001	0.00157		0.496	0.000221	<0.0010
SW-04	SW-04	L2757942-1	2024-10-26	Water	M																		
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	<0.00010	0.00031	0.00788	<0.000100	<0.000050	<0.010	0.0000114	14.5	<0.000010	<0.00050	<0.00050	<0.00050	0.0001	0.00148		0.417	0.000174	<0.0010
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	<0.00010	0.00045	0.00724	<0.000100	<0.000050	<0.010	0.0000099	15.3	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00085		0.377	0.000181	<0.0010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M																		
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	0.00012	0.0003	0.0182	<0.000100	<0.000050	0.018	0.000034	31.2	0.000032	<0.00050	<0.00050	<0.00050	0.00026	0.0028		1.58	0.000812	<0.0010
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M	<0.00010	0.00021	0.00433	<0.000020	<0.000050	<0.010	0.000005	5.87	<0.000010	<0.00050	<0.00050		<0.00010	0.00118		0.109	0.000073	<0.0010
SW-04	SW-04	L2758155-4	2024-11-17	Water	M																		
SW-04		4-456131118-0	2024-11-17	Water	F																		
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	<0.00010	0.00068	0.00612	<0.000100	<0.000050	<0.010	0.0000124	11.5	0.000012	<0.00050	<0.00050	<0.00050	<0.00010	0.001		0.195	0.000109	<0.0010
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M	<0.00010	0.00052	0.00624	<0.000020	<0.000050	<0.010	0.000009	13.1	<0.000010	<0.00050	<0.00050		<0.00010	0.00091		0.164	0.000095	<0.0010
SW-04	SW-04	L2758371-3	2024-12-08	Water	M																		
SW-04		4-456441522-0	2024-12-18	Water	F																		
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	<0.00010	0.00032	0.00838	<0.000100	<0.000050	<0.010	0.0000143	8.89	0.000022	<0.00050	<0.00050	<0.00050	0.00013	0.00146		0.464	0.000321	<0.0010
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M																		
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	0.00024	0.0002	0.00502	<0.000100	<0.000050	<0.010	0.0000155	11.9	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00093		0.315	0.000204	0.0011
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M																		
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M	0.00015	0.00019	0.00344	<0.000020	<0.000050	<0.010	<0.0000100	7.38	<0.000010	<0.00050	<0.00050		<0.00010	0.00061		0.156	0.000076	<0.0010
SW-04	SW-04	L2758765-1	2025-01-25	Water	M																		
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	0.00011	0.00019	0.0116	<0.000100	<0.000050	<0.010	0.0000115	11.6	0.000021	<0.00050	<0.00050	<0.00050	<0.00010	0.00129		0.205	0.000137	<0.0010
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M																		
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M	0.00017	0.0007	0.019	0.000026	<0.000050	<0.010	0.0000278	11.8	0.000123	0.0014	0.00067		0.00052	0.00437		1.54	0.00104	0.0013
SW-04	SW-04	L2759042-2	2025-02-21	Water	M																		
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	0.000287	0.00027	0.00623	<0.000020	<0.000050	<0.010	<0.0000050	11.7	0.0000166	<0.00050	<0.00050		<0.00010	0.000677		0.0567	<0.000050	0.00203
SW-04	SW-04	L2759255-2	2025-03-19	Water	M																		
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M	0.00016	0.00033	0.00494	<0.000100	<0.000050	<0.010	0.0000106	5.48	0.00002	<0.00050	<0.00050	<0.00050	<0.00010	0.00141		0.177	0.000173	<0.0010
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	0.0001	0.00057	0.0055	<0.000020	<0.000050	<0.010	0.0000123	11.2	0.000015	0.0005	<0.00050		<0.00010	0.00103		0.074	0.000062	0.001
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M																		
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	0.00016	0.00052	0.00569	<0.000020	<0.000050	<0.010	0.000006	7.8	0.000012	<0.00050	<0.00050		<0.00010	0.00172		0.142	0.000102	<0.0010
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M																		
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	<0.00010	0.00034	0.00478	<0.000020	<0.000050	<0.010	0.0000133	10.4	0.000014	<0.00050	<0.00050		<0.00010	0.00071		0.087	0.000051	<0.0010
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M																		
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	<0.00010	0.00112	0.00748	<0.000020	<0.000050	<0.010	<0.0000100	14.7	0.000022	0.00099	0.00082		<0.00010	0.00061		0.052	<0.000050	0.0011
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M																		
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	0.00023	0.00227	0.00812	<0.000100	<0.000050	0.011	0.0000182	23.9	0.000035	0.00234	0.00188	<0.00057	<0.00010	0.00122		0.113	0.000071	0.0015
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	0.00013	0.00078	0.00579	<0.000020	<0.000050	<0.010	0.0000218	16	0.000015	<0.00050	<0.00050		<0.00010	<0.00050		0.069	0.00007	0.0014
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M																		
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	0.00011	0.00078	0.00558	<0.000100	<0.000050	<0.010	0.00002	15.5	0.000012	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.04	<0.000050	0.0014
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	0.00025	0.00174	0.00873	<0.000100	<0.000050	0.012	0.0000169	23.8	0.000035	0.00236	0.00162	0.00074	<0.00010	0.00064		0.057	<0.000050	0.0016
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M	0.00013	0.00293	0.00712	<0.000020	<0.000050	0.012	<0.0000150	20.2	0.000027	0.00228	0.00212		<0.00010	0.00053		0.043	<0.000050	0.0018
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	0.0004	0.00347	0.0115	<0.000100	<0.000050	0.012	0.000026	29.5	0.000044	0.00363	0.0017	0.00193	<0.00010	0.00206		0.115	0.000066	0.0017
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	0.00022	0.00076	0.00784	<0.000100	<0.000050	0.011	0.0000184	15.9	0.000013	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.05	<0.000050	0.0017
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.76		<0.00050			<0.00010	0.00073		0.078	<0.00020	0.00022
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.33		<0.00050			0.00026	0.00069		0.156	<0.00020	0.00024
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M	<0.000050	0.000059	0.00279	<0.000010	<0.000010	0.0039	0.0000076	1.53		0.00023			0.0000562	0.00045		0.0266	0.000102	0.00032
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M	<0.000050	0.000076	0.00297	<0.000010	<0.000010	0.0032	0.0000051	1.7		0.00027			0.0000334	0.00046		0.0192	0.000064	0.00037
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	<0.000050	0.00008	0.00274	<0.000010	<0.000010	0.0038	0.0000055	1.8		0.00017			0.0000212	0.00038		0.0095	<0.000050	0.000377
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M	<0.000050	0.000053	0.00271	0.000011	<0.000010	0.004	0.0000037	1.36		0.00022			0.00003	0.00041		0.0219	<0.000050	0.000274
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.18		<0.00050			<0.00010	<0.00040		0.015	<0.00020	0.00022
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.08		0.00075			<0.00010	<0.00040		0.018	<0.00020	0.00016
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	<0.000050	0.000057	0.00234	<0.000010	<0.000010	0.0047	0.0000038	1.11		0.00028			0.0000302	0.00044		0.018	<0.000050	0.000184
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	<0.000050	0.000106	0.00362	<0.000010	<0.000010	0.0048	0.0000081	1.97		0.00023			0.0000647	0.00138		0.0433	0.000131	0.000288
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M																		
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M																		
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M	<0.000050	0.000063	0.00261	<0.000010	<0.000010	0.0028	0.0000026	1.13		0.00016			0.0000364	0.0004		0.0187	<0.000050	0.000167
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M	<0.000050	0.000052	0.00254	<0.000010	<0.000010	0.003	0.0000022	1.33		0.00019			0.0000365	0.00038		0.0224	<0.000050	0.00021
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	2.2		<0.00050			<0.00010	0.00051		0.018	<0.00020	<0.00010
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	2.98		<0.00050			0.0002	0.00142		0.159	0.00052	0.00017
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M	<0.000050	0.00006	0.00241	<0.000010	<0.000010	0.0043	0.0000034	3.33		0.00025			0.0000485	0.00056		0.0196	0.000063	0.000079
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M	<0.000050	0.000095	0.00333	<0.000010	<0.000010	0.004	0.0000042	6.91		0.00026			0.0000805	0.00063		0.0287	0.000084	<0.000050
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M	<0.000050	0.000059	0.00227	<0.000010	<0.000010	0.0037	0.0000039	2.67		0.00024			0.000047	0.00064		0.018	0.00006	0.000089

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M	<0.000050	0.000061	0.00228	<0.000010	<0.000010	0.0037	0.0000045	3.25		0.00019			0.0000395	0.00053		0.0171	<0.000050	0.000071
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M	<0.000050	0.000053	0.00179	<0.000010	<0.000010	0.004	0.0000024	2.26		0.00018			0.0000539	0.00062		0.0265	0.000065	0.000071
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	2.51		<0.00050			<0.00010	0.00061		0.02	<0.00020	<0.00010
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.83		<0.00050			<0.00010	0.00056		0.014	<0.00020	<0.00010
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M	<0.000050	0.000062	0.00183	<0.000010	<0.000010	0.0038	<0.0000020	2.08		0.00036			0.0000382	0.00064		0.0209	0.0001	0.000064
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M	<0.000050	<0.000050	0.00261	<0.000010	<0.000010	0.0035	0.0000029	4.24		<0.00050			0.0000465	0.00059		0.0199	0.000056	0.00009
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M	<0.000050	0.000088	0.00243	<0.000010	<0.000010	0.0052	0.000004	2.3		0.00025			0.0000556	0.00093		0.0249	0.000078	0.000057
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M	<0.000050	0.000067	0.002	<0.000010	<0.000010	0.0044	<0.0000030	2.38		0.00018			0.0000402	0.0007		0.0147	0.000057	0.00009
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	<0.000050	0.000094	0.00217	<0.000010	<0.000010	0.0033	<0.0000020	2.38		0.0002			0.000144	0.00089		0.0752	0.000295	0.000095
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	<0.00010	0.00012	0.00183	<0.000020	<0.000050	<0.010	<0.0000050	1.92	<0.000010	<0.00050	<0.00050		<0.00010	0.00097		0.038	0.000085	<0.0010
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	<0.00010	<0.00010	0.00213	<0.000020	<0.000050	<0.010	<0.0000050	2.1	<0.000010	<0.00050	<0.00050	<0.00050	0.0001	0.00086		0.069	0.000144	<0.0010
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	<0.000050	<0.000050	0.00559	<0.000010	<0.000010	0.0521	0.0000113	2.69		<0.00010			0.0000154	0.0002		<0.0020	<0.000050	0.00272
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M	<0.000050	0.000086	0.00348	<0.000010	<0.000010	0.0242	0.0000062	1.88		0.0001			0.000022	0.00031		0.0052	<0.000050	0.0014
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M	<0.000050	0.000082	0.00298	<0.000010	<0.000010	0.0025	0.0000063	0.981		0.00019			0.000132	0.00041		0.0625	<0.000050	0.000289
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M	<0.000050	<0.000050	0.00295	<0.000010	<0.000010	0.0079	0.0000093	1.54		0.00013			0.0000673	0.00027		0.013	<0.000050	0.000688
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M	<0.000050	0.000051	0.0025	<0.000010	<0.000010	0.0072	0.0000105	1.63		0.0001			0.0000524	0.00024		0.0088	<0.000050	0.000762
SW-07		VA24A1299-005	2024-01-23	Water	M	<0.00010	<0.00010	0.00296	<0.000100	<0.000050	<0.010	0.0000085	1.04	0.000012	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.068	<0.000050	<0.0010
SW-07		L2754353-5	2024-01-23	Water	M																		
SW-07		L2754615-5	2024-02-15	Water	M																		
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	<0.00010	<0.00010	0.00271	<0.000100	<0.000050	0.012	0.0000114	1.57	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	<0.00010	<0.00010	0.00192	<0.000100	<0.000050	<0.010	<0.0000050	1.09	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.014	<0.000050	<0.0010
SW-07		L2755012-5	2024-03-19	Water	M																		
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	<0.00010	<0.00010	0.0021	<0.000100	<0.000050	<0.010	0.0000061	1.25	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.012	<0.000050	<0.0010
SW-07		L2755504-3	2024-04-26	Water	M																		
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M	<0.00010	<0.00010	0.00174	<0.000100	<0.000050	<0.010	<0.0000050	0.981	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.023	<0.000050	<0.0010
SW-07		L2755521-1	2024-04-28	Water	M																		
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	<0.00010	<0.00010	0.00214	<0.000100	<0.000050	<0.010	0.0000065	1.32	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.014	<0.000050	<0.0010
SW-07		L2755598-3	2024-05-03	Water	M																		
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	<0.00010	<0.00010	0.00173	<0.000100	<0.000050	<0.010	<0.0000050	1.04	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.013	<0.000050	<0.0010
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M	<0.00010	<0.00010	0.00173	<0.000100	<0.000050	<0.010	0.0000061	1.04	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.011	<0.000050	<0.0010
SW-07		L2755677-3	2024-05-09	Water	M																		
SW-07		L2755687-3	2024-05-09	Water	M																		
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	<0.00010	<0.00010	0.00144	<0.000100	<0.000050	<0.010	<0.0000050	0.878	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07		L2755770-3	2024-05-14	Water	M																		
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	<0.00010	<0.00010	0.00132	<0.000100	<0.000050	<0.010	<0.0000050	0.784	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.013	<0.000050	<0.0010
SW-07		L2755819-3	2024-05-17	Water	M																		
SW-07		VA24B1636-003	2024-05-23	Water	M	<0.00010	<0.00010	0.0016	<0.000100	<0.000050	<0.010	<0.0000050	0.919	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.024	0.000051	<0.0010
SW-07		L2755903-3	2024-05-23	Water	M																		
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	<0.00010	<0.00010	0.00146	<0.000100	<0.000050	<0.010	0.0000052	0.901	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07		L2755933-3	2024-05-24	Water	M																		
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M	<0.00010	<0.00010	0.00153	<0.000100	<0.000050	<0.010	<0.0000050	0.908	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07		L2755961-3	2024-05-26	Water	M																		
SW-07		VA24B4698-003	2024-06-21	Water	M	<0.00010	<0.00010	0.00139	<0.000100	<0.000050	<0.010	<0.0000050	0.837	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07		L2756349-3	2024-06-21	Water	M																		
SW-07		VA24B5289-003	2024-06-26	Water	M	<0.00010	<0.00010	0.00143	<0.000100	<0.000050	<0.010	<0.0000050	0.861	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07		L2756419-3	2024-06-26	Water	M																		
SW-07		VA24B7689-003	2024-07-19	Water	M	<0.00010	<0.00010	0.00227	<0.000100	<0.000050	0.014	0.0000061	1.25	0.000015	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07		L2756726-3	2024-07-19	Water	M																		
SW-07		L2756871-5	2024-07-31	Water	M																		
SW-07		VA24B8974-005	2024-07-31	Water	M	<0.00010	<0.00010	0.00235	<0.000100	<0.000050	0.013	0.0000059	1.23	0.000011	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07		VA24C1605-003	2024-08-23	Water	M	<0.00010	<0.00010	0.00373	<0.000100	<0.000050	0.033	0.000008	1.97	0.00002	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	0.0018
SW-07		L2757153-3	2024-08-23	Water	M																		
SW-07	SW-07	L2757209-5	2024-08-27	Water	M																		
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	<0.00010	<0.00010	0.00227	<0.000100	<0.000050	<0.010	0.0000072	1.2	<0.000010	<0.00050	<0.00050		<0.00010	0.0006		<0.010	<0.000050	<0.0010
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	<0.00010	<0.00010	0.00434	<0.000100	<0.000050	0.037	0.000007	2.3	0.000022	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	0.0021
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M	<0.00010	<0.00010	0.00284	<0.000100	<0.000050	0.014	0.0000089	1.6	0.000013	<0.00050	<0.00050		<0.00010	0.00054		<0.010	<0.000050	<0.0010
SW-07	SW-07	L2757587-4	2024-09-29	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M	<0.00010	<0.00010	0.00332	<0.000100	<0.000050	0.022	0.0000082	1.93	0.000014	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	0.0013
SW-07	SW-07	L2757664-1	2024-10-03	Water	M																		
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	<0.00010	<0.00010	0.00321	<0.000100	<0.000050	0.019	0.0000067	1.69	0.000013	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	0.0013
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M																		
SW-07		492-455781017-0	2024-10-13	Water	F																		
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M	<0.00010	<0.00010	0.00493	<0.000100	<0.000050	<0.010	<0.0000050	1.01	<0.000010	<0.00050	<0.00050		<0.00010	0.00055		0.02	<0.000050	<0.0010
SW-07	SW-07	L2757873-5	2024-10-22	Water	M																		
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	<0.00010	<0.00010	0.00299	<0.000100	<0.000050	0.011	0.0000078	1.64	0.00001	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	<0.00010	<0.00010	0.00297	<0.000100	<0.000050	0.011	0.0000072	1.55	0.00001	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07	SW-07	L2757913-4	2024-10-25	Water	M																		
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	<0.00010	<0.00010	0.00333	<0.000100	<0.000050	<0.010	0.0000076	1.3	0.00001	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.034	<0.000050	<0.0010
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	<0.00010	<0.00010	0.00277	<0.000100	<0.000050	<0.010	0.0000054	1.2	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.013	<0.000050	<0.0010
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M																		
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	<0.00010	<0.00010	0.00323	<0.000100	<0.000050	<0.010	0.0000071	1.03	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.02	<0.000050	<0.0010
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	<0.00010	<0.00010	0.00346	<0.000020	<0.000050	<0.010	0.0000058	1.12	<0.000010	<0.00050	<0.00050		<0.00010	0.00051		0.021	<0.000050	<0.0010
SW-07	SW-07	L2758155-1	2024-11-16	Water	M																		
SW-07		VA24D1587-003	2024-11-20	Water	M	<0.00010	<0.00010	0.00562	<0.000100	<0.000050	<0.010	<0.0000050	0.869	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.026	<0.000050	<0.0010
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M																		
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	<0.00010	<0.00010	0.00318	<0.000020	<0.000050	<0.010	0.0000051	1.13	0.000015	<0.00050	<0.00050		0.00016	0.00062		0.112	<0.000050	<0.0010
SW-07	SW-07	L2758371-4	2024-12-08	Water	M																		
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	<0.00010	<0.00010	0.00476	<0.000100	<0.000050	<0.010	<0.0000050	0.779	<0.000010	<0.00050	<0.00150	<0.00050	<0.00010	<0.00050		0.028	<0.000050	<0.0010
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M																		
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	<0.00010	<0.00010	0.0035	<0.000100	<0.000050	0.018	0.0000077	1.88	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	0.0011
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M																		
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M	<0.00010	<0.00010	0.00343	<0.000020	<0.000050	0.02	0.0000078	2.03	0.00001	<0.00050	<0.00050		<0.00010	<0.00050		<0.010	<0.000050	0.0016
SW-07	SW-07	L2758765-2	2025-01-25	Water	M																		
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M	<0.00010	<0.00010	0.00618	<0.000020	<0.000050	0.018	0.0000098	2.02	0.00003	<0.00050	<0.00050		0.00014	0.0007		0.246	0.0001	0.0012
SW-07	SW-07	L2759009-3	2025-02-19	Water	M																		
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	<0.00010	<0.00010	0.00513	<0.000100	<0.000050	<0.010	<0.0000050	1	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.029	<0.000050	<0.0010
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M																		
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	<0.00010	<0.00010	0.00271	<0.000020	<0.000050	0.012	0.0000116	1.73	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.0229	<0.000050	<0.0010
SW-07	SW-07	L2759254-3	2025-03-18	Water	M																		
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	<0.00010	<0.00010	0.00234	<0.000100	<0.000050	<0.010	<0.0000050	0.785	0.00002	<0.00050	<0.00050	<0.00050	0.00011	0.0005		0.098	0.000066	<0.0010
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	<0.00010	<0.00010	0.00208	<0.000020	<0.000050	<0.010	0.0000057	1.28	<0.000010	<0.00050	<0.00050		<0.00010	0.00061		0.012	<0.000050	<0.0010
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M																		
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	<0.00010	0.0001	0.00166	<0.000020	<0.000050	<0.010	<0.0000050	0.832	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.03	<0.000050	<0.0010
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M																		
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M																		
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	<0.00010	<0.00010	0.00187	<0.000020	<0.000050	<0.010	0.0000057	1.18	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.01	<0.000050	<0.0010
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	<0.00010	<0.00010	0.00198	<0.000020	<0.000050	<0.010	<0.0000050	0.979	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.014	<0.000050	<0.0010
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M																		
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	<0.00010	<0.00010	0.00194	<0.000100	<0.000050	<0.010	<0.0000050	1.12	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.011	<0.000050	<0.0010
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	<0.00010	<0.00010	0.00143	<0.000020	<0.000050	<0.010	<0.0000050	0.917	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.03	<0.000050	<0.0010
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M																		
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	<0.00010	<0.00010	0.00143	<0.000100	<0.000050	<0.010	<0.0000050	0.837	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	<0.00010	<0.00010	0.00121	<0.000100	<0.000050	<0.010	<0.0000050	0.83	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		<0.010	<0.000050	<0.0010
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	<0.00010	<0.00010	0.00167	<0.000020	<0.000050	<0.010	<0.0000050	0.963	<0.000010	<0.00050	<0.00050		<0.00010	<0.00050		0.021	<0.000050	<0.0010
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M																		
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	<0.00010	<0.00010	0.00156	<0.000100	<0.000050	<0.010	<0.0000050	0.877	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.015	<0.000050	<0.0010
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	<0.00010	<0.00010	0.00186	<0.000100	<0.000050	<0.010	<0.0000050	1.03	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.012	<0.000050	<0.0010
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	<0.00010	0.00011	0.00143	<0.000100	<0.000050	<0.010	<0.0000050	0.776	0.000011	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.038	0.000052	<0.0010
SW-08		L2755503-2	2024-04-25	Water	M																		
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	<0.00010	0.0001	0.00182	<0.000100	<0.000050	<0.010	<0.0000050	0.788	0.000016	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.07	0.000075	<0.0010
SW-08		L2755588-2	2024-05-02	Water	M																		
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	<0.00010	0.00011	0.00138	<0.000100	<0.000050	<0.010	<0.0000050	0.647	0.000012	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.03	<0.000050	<0.0010
SW-08		L2755694-2	2024-05-10	Water	M																		
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	<0.00010	<0.00010	0.00127	<0.000100	<0.000050	<0.010	<0.0000050	0.613	0.00001	<0.00050			<0.00010	<0.00050		0.032	<0.000050	<0.0010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cs	T-Cr	Total Hexavalent Chromium	Total Trivalent Chromium	T-Co	T-Cu	T-Ga	T-Fe	T-Pb	T-Li
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M																		
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	<0.00010	<0.00010	0.00133	<0.000100	<0.000050	<0.010	0.000005	0.692	0.00001	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.028	<0.000050	<0.0010
SW-08		L2755916-2	2024-05-23	Water	M																		
SW-08		VA24B4655-002	2024-06-20	Water	M	<0.00010	0.00012	0.00159	<0.000100	<0.000050	<0.010	<0.0000050	0.699	0.000015	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.065	0.000068	<0.0010
SW-08		L2756326-2	2024-06-20	Water	M																		
SW-08		VA24B7579-002	2024-07-18	Water	M	<0.00010	0.00011	0.0016	<0.000100	<0.000050	<0.010	<0.0000050	0.741	0.000012	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.05	0.000053	<0.0010
SW-08		L2756717-2	2024-07-18	Water	M																		
SW-08		VA24C1546-002	2024-08-22	Water	M	<0.00010	<0.00010	0.00162	<0.000100	<0.000050	<0.010	<0.0000050	0.774	0.000013	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.044	0.000054	<0.0010
SW-08		L2757144-2	2024-08-22	Water	M																		
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	<0.00010	0.00012	0.00167	<0.000100	<0.000050	<0.010	<0.0000050	0.872	0.000011	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.039	<0.000050	<0.0010
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	<0.00010	<0.00010	0.0019	<0.000100	<0.000050	<0.010	<0.0000050	0.89	0.000014	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.045	<0.000050	<0.0010
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	<0.00010	0.00016	0.00205	<0.000100	<0.000050	<0.010	<0.0000050	0.895	0.000015	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.051	0.000061	<0.0010
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	<0.00010	0.00011	0.00198	<0.000100	<0.000050	<0.010	<0.0000050	0.938	0.000016	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.043	0.000051	<0.0010
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	<0.00010	<0.00010	0.00177	<0.000100	<0.000050	<0.010	<0.0000050	0.697	0.000016	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.043	0.00005	<0.0010
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	<0.00010	<0.00010	0.00175	<0.000100	<0.000050	<0.010	<0.0000050	0.846	0.000013	<0.00050	<0.00050	<0.00050	<0.00010	<0.00050		0.044	<0.000050	<0.0010
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	<0.00010	0.00012	0.00256	<0.000100	<0.000050	<0.010	0.0000168	2.4	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00072		0.026	<0.000050	<0.0010
SW-09		L2755503-4	2024-04-25	Water	M																		
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	<0.00010	0.00011	0.00258	<0.000100	<0.000050	<0.010	0.0000066	2.3	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00065		0.02	<0.000050	<0.0010
SW-09		L2755588-4	2024-05-02	Water	M																		
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	<0.00010	0.00014	0.0028	<0.000100	<0.000050	<0.010	0.0000096	2.34	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00072		0.03	0.000051	<0.0010
SW-09		L2755687-5	2024-05-09	Water	M																		
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	<0.00010	0.00012	0.0027	<0.000100	<0.000050	<0.010	0.0000058	2.49	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00054		0.012	<0.000050	<0.0010
SW-09		L2755820-4	2024-05-16	Water	M																		
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	<0.00010	0.00014	0.0028	<0.000100	<0.000050	<0.010	0.0000084	2.65	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00068		0.019	<0.000050	<0.0010
SW-09		L2755916-4	2024-05-23	Water	M																		
SW-09		VA24B4655-004	2024-06-20	Water	M	<0.00010	0.00014	0.00272	<0.000100	<0.000050	<0.010	0.0000108	2.54	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.0006		0.019	<0.000050	<0.0010
SW-09		L2756326-4	2024-06-20	Water	M																		
SW-09		VA24B7579-004	2024-07-18	Water	M	<0.00010	0.00018	0.00329	<0.000100	<0.000050	<0.010	0.0000121	3.1	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00061		<0.010	<0.000050	<0.0010
SW-09		L2756717-4	2024-07-18	Water	M																		
SW-09		VA24C1546-004	2024-08-22	Water	M	<0.00010	0.00016	0.00337	<0.000100	<0.000050	<0.010	0.0000112	3.46	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00055		<0.010	<0.000050	<0.0010
SW-09		L2757144-4	2024-08-22	Water	M																		
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	<0.00010	0.00018	0.00396	<0.000100	<0.000050	<0.010	0.0000108	3.69	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00074		0.032	<0.000050	<0.0010
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	<0.00010	0.00015	0.0041	<0.000100	<0.000050	<0.010	0.0000189	2.42	<0.000010	<0.00050	<0.00050	<0.00050	0.00013	0.00205		0.088	0.00013	<0.0010
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	<0.00010	0.0001	0.00274	<0.000100	<0.000050	<0.010	0.0000096	2.02	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00085		<0.010	<0.000050	<0.0010
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	<0.00010	0.00017	0.00267	<0.000100	<0.000050	<0.010	0.000006	1.88	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00092		0.011	<0.000050	<0.0010
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	<0.00010	<0.00010	0.00279	<0.000100	<0.000050	<0.010	0.0000095	2.32	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00074		0.011	<0.000050	<0.0010
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M																		
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	<0.00010	<0.00010	0.00254	<0.000100	<0.000050	<0.010	0.0000071	1.62	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00127		0.021	<0.000050	<0.0010
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	<0.00010	<0.00010	0.00229	<0.000100	<0.000050	<0.010	0.000005	1.67	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00088		0.013	<0.000050	<0.0010
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M																		
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	<0.00010	<0.00010	0.00312	<0.000100	<0.000050	<0.010	0.0000077	1.78	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00101		0.014	<0.000050	<0.0010
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	<0.00010	<0.00010	0.00208	<0.000100	<0.000050	<0.010	0.0000073	1.91	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.0006		<0.010	<0.000050	<0.0010
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M																		
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	<0.00010	<0.00010	0.00248	<0.000100	<0.000050	<0.010	0.0000071	1.72	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00091		0.014	<0.000050	<0.0010
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M																		
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	<0.00010	0.0001	0.00219	<0.000100	<0.000050	<0.010	0.0000057	1.44	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00117		0.017	<0.000050	<0.0010
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	<0.00010	<0.00010	0.00221	<0.000100	<0.000050	<0.010	0.0000064	1.88	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00052		<0.010	<0.000050	<0.0010
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	<0.00010	0.0001	0.00248	<0.000100	<0.000050	<0.010	0.000007	2.03	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.0006		0.012	<0.000050	<0.0010
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	<0.00010	0.00011	0.00245	<0.000100	<0.000050	<0.010	0.0000089	2.37	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00059		<0.010	<0.000050	<0.0010
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	<0.00010	0.00012	0.00278	<0.000100	<0.000050	<0.010	0.0000073	2.37	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.00054		0.01	<0.000050	<0.0010
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M	<0.00010	0.00012	0.0026	<0.000100	<0.000050	<0.010	0.0000068	2.47	<0.000010	<0.00050	<0.00050	<0.00050	<0.00010	0.0007		0.014	<0.000050	<0.0010

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M	0.15	0.00154	<0.0000050	0.000323	<0.00050	<0.050	0.244		0.00058	<0.000050	1.79	<0.000010	1.22	0.00979	0.58	<0.00020	<0.000010	<0.00010	<0.00010
OUT-01		VA24B1636-006	2024-05-23	Water	M	0.143	0.00179	<0.0000050	0.000272	<0.00050	<0.050	0.17		0.00045	<0.000050	2	<0.000010	0.973	0.00863	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M	0.266	0.00588	<0.0000050	0.000567	<0.00050	<0.050	0.4		0.00112	<0.000050	2.98	<0.000010	1.55	0.018	0.98	<0.00020	<0.000010	<0.00010	<0.00010
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M	0.23	0.00728	<0.0000050	0.000734	<0.00050	<0.050	0.284		0.00089	<0.000050	2.66	<0.000010	0.877	0.0098	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-01		661-455931031-0	2024-10-28	Water	F																			
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M	0.172	0.00224	0.00000299	0.000579	<0.00050	<0.050	0.2		0.0006	<0.000050	2.3	<0.000010	0.778	0.00908	0.68	<0.00020	<0.000010	<0.00010	<0.00010
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M	0.151	0.0016	0.00000284	0.000288	<0.00050	<0.050	0.183		0.00055	<0.000050	2.04	<0.000010	0.699	0.0089	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M	1.45	0.0112	0.0000014	0.00103	<0.00050	<0.050	1.06		0.00141	<0.000050	2.57	<0.000010	12.4	0.0421	2.53	<0.00020	<0.000010	<0.00010	<0.00010
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M	0.153	0.00136	0.00000248	0.000269	<0.00050	<0.050	0.189		0.00058	<0.000050	1.88	<0.000010	0.702	0.00722	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M	0.124	0.00436		0.000258	<0.00050	<0.050	0.214		0.00059	<0.000050	1.55	<0.000010	0.521	0.00553	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M			0.00000138																
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M	0.167	0.00207	0.00000263	0.000395	<0.00050	<0.050	0.262		0.00082	<0.000050	1.89	<0.000010	0.725	0.0114	0.55	<0.00020	<0.000010	<0.00010	<0.00010
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M	0.173	0.00585	0.00000143	0.000482	<0.00050	<0.050	0.223		0.00076	<0.000050	2.21	<0.000010	0.818	0.012	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M	0.182	0.00247	0.00000204	0.000337	<0.00050	<0.050	0.184		0.0006	<0.000050	2.24	<0.000010	0.834	0.0131	0.56	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M	0.228	0.00185	<0.0000050	0.00136	<0.00050	<0.050	0.249		0.00057	0.000052	2.13	<0.000010	0.834	0.0119	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M	0.279	0.001	<0.0000050	0.00136	<0.00050	<0.050	0.24		0.00054	<0.000050	2.46	<0.000010	1.1	0.0153	0.65	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M	0.498	0.00118	<0.0000050	0.00197	<0.00050	<0.050	0.373		0.00082	<0.000050	2.92	<0.000010	1.71	0.0296	1.06	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M	0.156	0.00178	<0.0000050	0.000265	<0.00050	<0.050	0.205		0.00055	<0.000050	2.06	<0.000010	1.04	0.01	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02		VA24B5289-006	2024-06-26	Water	M	0.631	0.00373	<0.0000050	0.00273	<0.00050	<0.050	0.547		0.00122	<0.000050	3.82	<0.000010	2.28	0.0387	1.6	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M	0.167	0.00251	<0.0000050	0.000436	<0.00050	<0.050	0.148		0.00054	<0.000050	2.52	<0.000010	0.972	0.00757	0.6	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M	0.137	0.00131	<0.0000050	0.000413	<0.00050	<0.050	0.116		0.00037	<0.000050	2.33	<0.000010	0.762	0.00642	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M	0.364	0.0161	<0.0000050	0.00236	0.00052	<0.050	0.372		0.00112	<0.000050	3.36	<0.000010	1.2	0.0137	1.01	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M	0.166	0.00237	0.00000396	0.000837	<0.00050	<0.050	0.186		0.00045	<0.000050	2.28	<0.000010	0.744	0.00814	0.53	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M	0.177	0.0036	0.00000333	0.000679	0.00052	<0.050	0.18		0.00047	0.000052	2.15	<0.000010	0.749	0.00735	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M	0.248	0.00424	0.00000286	0.00135	<0.00050	<0.050	0.206		0.00049	0.000053	2.15	<0.000010	1.18	0.00972	0.53	<0.00020	<0.000010	<0.00020	<0.00010
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M	0.12	0.0017	0.00000282	0.000269	<0.00050	<0.050	0.166		0.00042	<0.000050	1.7	<0.000010	0.57	0.00541	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M	0.167	0.00803		0.000747	<0.00050	<0.050	0.22		0.00059	0.000077	1.83	<0.000010	0.577	0.00704	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M			0.00000354																
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M	0.196	0.0082	0.00000378	0.000839	<0.00050	<0.050	0.224		0.00064	<0.000050	1.97	<0.000010	0.759	0.00807	<0.50	<0.00020	<0.000010	<0.00040	<0.00010
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M	0.159	0.00289	0.00000298	0.00073	<0.00050	<0.050	0.171		0.00048	<0.000050	1.91	<0.000010	0.675	0.00682	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M	0.146	0.00087	0.00000153	0.000566	<0.00050	<0.050	0.155		0.00047	<0.000050	1.92	<0.000010	0.727	0.00625	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M	0.2	0.00356	0.00000167	0.00126	<0.00050	<0.050	0.16		0.00049	<0.000050	2.15	<0.000010	0.997	0.00804	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M	0.554	0.00214	<0.0000050	0.00129	<0.00050	<0.050	0.512		0.001	<0.000050	2.6	<0.000010	1.21	0.0505	1.08	<0.00020	<0.000010	<0.00010	<0.00010
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M	0.231	0.00308	0.0000051	0.000931	<0.00050	<0.050	0.565		0.00084	<0.000050	2.56	<0.000010	1.56	0.0272	0.76	<0.00020	<0.000010	<0.00010	<0.00010
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	0.584	0.0247	0.0000172	0.000953	0.00089	0.053	0.568		0.00156	<0.000050	3.6	0.000014	1.02	0.0459	0.89	<0.00020	0.000011	<0.00010	<0.00010
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M																			
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M	0.371	0.00178	0.000006	0.000675	<0.00050	<0.050	0.402		0.0009	0.00006	2.48	<0.000010	0.994	0.0354	0.78	<0.00020	<0.000010	<0.00010	<0.00010
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M	0.342	0.00197	0.00000503	0.000694	<0.00050	<0.050	0.345		0.00082	0.000068	2.52	<0.000010	0.83	0.035	0.85	<0.00020	<0.000010	<0.00010	<0.00010
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M	0.355	0.00115	0.00000365	0.000761	<0.00050	<0.050	0.332		0.00072	<0.000050	2.42	<0.000010	0.836	0.0302	0.86	<0.00020	<0.000010	<0.00010	<0.00010
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M	0.24	0.00309	0.00000546	0.000647	<0.00050	<0.050	0.35		0.00067	<0.000050	2.28	<0.000010	0.928	0.0212	0.8	<0.00020	<0.000010	<0.00010	<0.00010
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	0.219	0.00147	<0.0000050	0.000602	<0.00050	<0.050	0.262		0.00061	0.000052	2.17	<0.000010	0.924	0.0165	0.5	<0.00020	<0.000010	<0.00010	<0.00010
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M																			
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M	0.206	0.00148	0.00000447	0.000543	<0.00050	<0.050	0.239		0.0005	0.00006	1.93	<0.000010	0.765	0.0192	0.52	<0.00020	<0.000010	<0.00010	<0.00010
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M	0.249	0.00578		0.000491	<0.00050	<0.050	0.291		0.0007	<0.000050	2.01	<0.000010	0.669	0.0204	0.54	<0.00020	<0.000010	<0.00010	<0.00010
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M			0.00000307																
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M	0.192	0.00126	0.00000474	0.000586	<0.00050	<0.050	0.248		0.00051	<0.000050	1.93	<0.000010	0.691	0.0175	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M	0.528	0.00088	0.00000285	0.00111	<0.00050	<0.050	0.381		0.00093	<0.000050	2.3	<0.000010	1.06	0.0432	0.86	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M	0.183	0.00115	<0.00001	0.00063	<0.0004	<0.05	0.23			<0.0005	1.6	<0.00005	1.25	0.006	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M	0.133	0.00165	<0.00001	0.00029	<0.0004	<0.05	0.18			<0.0005	1.5	<0.00005	0.84	0.0045	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M	0.182	0.00054	<0.00001	0.00043	<0.0004	<0.05	0.17			<0.0005	1.7	<0.00005	1.1	0.0052	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M	0.131	0.00094	<0.00001	0.00017	<0.0004	<0.05	<0.1			<0.0005	<1	<0.00005	0.73	0.003	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M	0.123	0.00165	<0.00001	0.00039	<0.0004	<0.05	0.18			<0.0005	1.9	<0.00005	0.69	0.0047	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M	0.151	0.00051	<0.00001	0.00041	0.00082	<0.05	0.17			<0.0005	2.1	<0.00005	0.91	0.006	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M	0.155	0.00071	<0.00001	0.0012	<0.0004	<0.05	0.17			<0.0005	1.9	<0.00005	0.93	0.0054	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M	0.087	0.00088	<0.00001	0.00022	<0.0004	<0.05	<0.1			<0.0005	<1	<0.00005	1.54	0.0041	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M	0.195	0.00045	<0.00001	0.00057	<0.0004	<0.05	0.24			<0.0005	1.6	<0.00005	1.36	0.0067	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M	0.159	0.00043	<0.00001	0.00039	<0.0004	<0.05	0.28			<0.0005	1.5	<0.00005	1.01	0.0076	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M	0.141	0.000709	<0.00001	0.000323	0.000144	<0.01	0.136			<0.00010	1.79	<0.000010	0.825	0.00459	<1	<0.000050	<0.0000040	0.000019	<0.000050
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M	0.173	0.00334	<0.00001	0.000297	0.000232	<0.01	0.162			<0.00010	1.79	<0.000010	0.858	0.00427	<1	<0.000050	<0.0000040	0.000027	0.000089
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M	0.144	0.000693	<0.00001	0.000297	<0.00300	<0.01	0.11			<0.00010	2.22	<0.000010	0.827	0.00472	<1	<0.000050	<0.0000040	0.000014	<0.000050
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M	0.183	0.00105	<0.000010	0.000399	0.000139	<0.01	0.235			0.00054	1.59	<0.000010	1.22	0.00467	<1	0.000069	<0.0000040	0.000019	0.000055
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M	0.085	0.00109	<0.000010	0.00046	<0.00040	<0.050	<0.10			<0.00050	<1.0	<0.000050	0.66	0.0027	<3.0	<0.00050	<0.000020	<0.00010	<0.00020

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M	0.0922	0.00128	<0.000010	0.000263	0.000126	<0.01	0.082			<0.00010	1.07	<0.000010	0.486	0.003	<1	0.000105	<0.0000040	0.000015	0.000078
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M	0.0824	0.000968	<0.000010	0.000196	0.000079	<0.01	0.071			<0.00010	1.02	<0.000010	0.504	0.00258	<1	<0.000050	<0.0000040	0.000016	<0.000050
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M	0.0861	0.000873	<0.0000050	0.000243	0.000103	<0.01	0.095			<0.00010	1.17	<0.000010	0.534	0.00269	<1	0.000062	<0.0000040	0.000017	<0.000050
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M	0.0877	0.00177	<0.000010	0.000206	0.000286	<0.01	0.119			0.00021	0.89	<0.000010	0.84	0.00255	<1	<0.000050	<0.0000040	0.000011	<0.000050
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M	0.114	0.0025	<0.000010	0.000269	0.00012	<0.01	0.114			<0.00010	0.93	<0.000010	0.616	0.00301	<1	<0.000050	<0.0000040	0.000017	<0.000050
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M	0.155	0.000527	<0.000010	0.000369	0.000084	<0.01	0.153			<0.00010	1.33	<0.000010	1.06	0.00431	<1	<0.000050	<0.0000040	0.000011	<0.000050
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M	0.121	0.00373	<0.000010	0.000147	0.00016	<0.01	0.135			<0.00010	1.58	<0.000010	0.53	0.00391	<1	<0.000050	<0.0000040	0.000022	0.000078
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M	0.105	0.00127	<0.000040	0.00026	0.00082	<0.050	0.12			<0.00050	1.4	<0.000050	0.7	0.0078	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M	0.12	0.00112	<0.000010	0.00024	<0.00040	<0.050	0.11			<0.00050	1.6	<0.000050	0.66	0.0033	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M	0.133	0.00061	<0.000010	0.00025	<0.00040	<0.050	0.14			<0.00050	1.7	<0.000050	1.02	0.0037	<3.0	<0.00050	<0.000020	<0.00010	0.00061
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M	0.094	0.00149	<0.000010	0.00016	<0.00040	<0.050	<0.10			<0.00050	1.3	<0.000050	0.39	0.0033	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	0.116	0.00058	<0.000010	0.00024	<0.00040	<0.050	0.11			<0.00050	1.4	<0.000050	0.63	0.0038	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M																			
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M	0.118	0.00072	<0.000010	0.00027	<0.00040	<0.050	<0.10			<0.00050	1.4	<0.000050	0.56	0.0036	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	0.125	0.00061	<0.000010	0.00032	<0.00040	<0.050	0.15			<0.00050	1.3	<0.000050	0.7	0.0042	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	0.112	0.00303	<0.000010	0.00016	<0.00040	<0.050	0.13			<0.00050	1.2	<0.000050	0.45	0.0032	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M	0.0546	0.00116	<0.000010	0.0001	0.000071	<0.01	0.057			<0.00010	0.61	<0.000010	0.29	0.00237	<1	<0.000050	<0.0000040	0.000013	<0.000050
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	0.0756	0.000985	<0.000010	0.000178	0.000049	<0.010	0.087			<0.00010	0.86	<0.000010	0.468	0.00258	<1.0	<0.000050	<0.0000040	0.000012	<0.000050
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M	0.0993	0.000807	<0.000010	0.000228	0.000056	<0.01	0.112			<0.00010	0.89	<0.000010	0.631	0.00316	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	0.109	0.000926	<0.000010	0.000267	0.000081	<0.010	0.121			<0.00010	0.85	<0.000010	0.706	0.00338	<1.0	<0.000050	<0.0000040	<0.000010	<0.000050
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	0.198	0.00039	<0.000010	0.000565	0.000078	<0.01	0.228			<0.00010	1.61	<0.000010	1.4	0.00566	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M	0.158	0.000644	<0.000010	0.000359	0.000146	<0.02	0.169			<0.00010	1.7	<0.000010	0.858	0.00492	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	0.222	0.000339	<0.000010	0.000538	0.000101	<0.02	0.207			<0.00010	2.17	<0.000010	1.39	0.00633	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	0.129	0.000567	<0.000010	0.000283	0.000104	<0.01	0.162			<0.00010	1.56	<0.000010	0.818	0.00423	<1	<0.000050	<0.0000040	0.000012	<0.000050
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	0.125	0.00075	<0.000010	0.00028	<0.00040	<0.050	0.15			<0.00050	1.4	<0.000050	0.78	0.0038	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M	0.128	0.00062	<0.000010	0.00055	<0.00040	<0.050	0.14			<0.00050	1.5	<0.000050	0.78	0.0039	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	0.101	0.000695	<0.000010	0.00027	0.000272	<0.01	0.146			<0.00010	1.43	<0.000010	0.608	0.00346	<1	<0.000050	<0.0000040	0.000019	<0.000050
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M	0.0637	0.000858	<0.000010	0.000138	0.000085	<0.01	0.086			<0.00010	0.76	<0.000010	0.394	0.00214	<1	<0.000050	<0.0000040	0.000021	<0.000050
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M	1.05	0.00705	<0.000010	0.000781	0.00033	0.013	0.447			<0.00010	5.24	<0.000010	2.18	0.0752	<1	<0.000050	<0.0000040	<0.000010	0.000053
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	0.0968	0.000972	<0.000010	0.000289	0.00007	<0.01	0.111			<0.00010	0.97	<0.000010	0.634	0.00335	<1	<0.000050	<0.0000040	0.000014	<0.000050
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	0.0963	0.000937	<0.000010	0.000293	0.000059	<0.01	0.099			<0.00010	0.95	<0.000010	0.72	0.00332	<1	<0.000050	0.0000052	0.000018	<0.000050
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	0.118	0.00123	<0.000010	0.000471	0.000137	0.016	0.153			<0.00010	1.28	<0.000010	0.827	0.00344	<1	<0.000050	<0.0000040	0.00001	<0.000050
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M	0.106	0.00236	<0.000010	0.000162	0.000146	<0.01	0.145			<0.00010	1.72	<0.000010	0.562	0.00396	<1	<0.000050	<0.0000040	0.000019	<0.000050
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	0.12	0.00102	<0.000010	0.00026	0.000179	<0.01	0.134			<0.00010	1.56	<0.000010	0.713	0.00416	<1	<0.000050	<0.0000040	0.000016	<0.000050
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M	0.13	0.000931	0.000012	0.000273	0.000128	<0.01	0.059			<0.00010	1.69	<0.000010	0.874	0.00404	<1	<0.000050	<0.0000040	0.000013	<0.000050
SW-01		VA24A1299-001	2024-01-23	Water	M	0.094	0.00149	<0.0000050	0.000189	<0.00050	<0.050	0.105		0.00032	<0.000050	1.47	<0.000010	0.513	0.00312	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2754353-1	2024-01-23	Water	M																			
SW-01		L2754615-1	2024-02-15	Water	M																			
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	0.101	0.00082	<0.0000050	0.000227	<0.00050	<0.050	0.094		0.00025	<0.000050	1.35	<0.000010	0.617	0.0036	<0.50	<0.00020	<0.000010	<0.00020	<0.00010
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	0.0928	0.00094	<0.0000050	0.000184	<0.00050	<0.050	0.096		0.00029	0.00005	1.4	<0.000010	0.52	0.00319	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2755012-1	2024-03-19	Water	M																			
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	0.0881	0.00089	<0.0000050	0.000215	<0.00050	<0.050	0.106		0.00026	<0.000050	1.18	<0.000010	0.536	0.00306	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2755503-1	2024-04-25	Water	M																			
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	0.089	0.00088	<0.0000050	0.000182	<0.00050	<0.050	0.088		0.00028	<0.000050	1.28	<0.000010	0.489	0.00299	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2755523-1	2024-04-29	Water	M																			
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	0.101	0.0008	<0.0000050	0.000235	<0.00050	<0.050	0.113		0.00028	<0.000050	1.3	<0.000010	0.6	0.00324	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2755588-1	2024-05-02	Water	M																			
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	0.0775	0.00096	<0.0000050	0.000192	<0.00050	<0.050	0.094		0.00024	<0.000050	1.2	<0.000010	0.47	0.00274	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	0.0748	0.0009	<0.0000050	0.000183	<0.00050	<0.050	0.069		0.00021	<0.000050	1.09	<0.000010	0.444	0.00257	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2755694-1	2024-05-10	Water	M																			
SW-01		L2755695-1	2024-05-10	Water	M																			
SW-01		L2755788-1	2024-05-15	Water	M																			
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M	0.0737	0.00093	<0.0000050	0.000177	<0.00050	<0.050	0.076		0.00024	<0.000050	0.94	<0.000010	0.445	0.00257	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	0.074	0.00091	<0.0000050	0.000195	<0.00050	<0.050	0.077		0.00023	<0.000050	1.05	<0.000010	0.455	0.0026	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2755820-1	2024-05-16	Water	M																			
SW-01		VA24B1628-001	2024-05-22	Water	M	0.0751	0.00099	<0.0000050	0.00019	<0.00050	<0.050	0.068		0.00021	<0.000050	1.08	<0.000010	0.467	0.00267	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2755902-1	2024-05-22	Water	M																			
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	0.0774	0.0009	<0.0000050	0.000213	<0.00050	<0.050	0.068		0.00021	<0.000050	1.08	<0.000010	0.497	0.00273	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2755916-1	2024-05-23	Water	M																			
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M	0.073	0.00118	<0.0000050	0.000166	<0.00050	<0.050	0.085		0.00024	<0.000050	1	<0.000010	0.425	0.00253	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		VA24B4655-001	2024-06-20	Water	M	0.0861	0.00103	<0.0000050	0.000195	<0.00050	<0.050	0.094		0.00029	<0.000050	1.1	<0.000010	0.576	0.00291	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2756326-1	2024-06-20	Water	M																			

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M	0.0923	0.001	<0.0000050	0.000242	<0.00050	<0.050	0.101		0.00026	<0.000050	1.14	<0.000010	0.826	0.00306	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2756419-1	2024-06-26	Water	M																			
SW-01		VA24B7579-001	2024-07-18	Water	M	0.0978	0.001	<0.0000050	0.000247	<0.00050	<0.050	0.096		0.00023	<0.000050	1.1	<0.000010	0.607	0.00334	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2756717-1	2024-07-18	Water	M																			
SW-01		VA24B8974-001	2024-07-31	Water	M	0.0948	0.0009	<0.0000050	0.000261	<0.00050	<0.050	0.101		0.00029	<0.000050	1.17	<0.000010	0.657	0.00319	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2756871-1	2024-07-31	Water	M																			
SW-01		VA24C1546-001	2024-08-22	Water	M	0.103	0.00102	<0.0000050	0.000259	<0.00050	<0.050	0.118		0.00027	<0.000050	1.1	<0.000010	0.671	0.00334	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01		L2757144-1	2024-08-22	Water	M																			
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	0.109	0.00138	<0.0000050	0.000309	<0.00050	<0.050	0.122		0.00028	<0.000050	1.51	<0.000010	0.694	0.00354	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	L2757209-1	2024-08-27	Water	M																			
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	0.102	0.00101	<0.0000050	0.000287	<0.00050	<0.050	0.113		0.00026	<0.000050	1.17	<0.000010	0.702	0.00326	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	0.106	0.00122	<0.0000050	0.000372	<0.00050	<0.050	0.127		0.0003	<0.000050	1.61	<0.000010	0.762	0.00362	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	L2757584-1	2024-09-28	Water	M																			
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M	0.108	0.0012	<0.0000050	0.000396	<0.00050	<0.050	0.133		0.00032	<0.000050	1.36	<0.000010	0.763	0.00369	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	L2757664-2	2024-10-03	Water	M																			
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	0.118	0.00095	<0.0000050	0.000394	<0.00050	<0.050	0.143		0.00036	<0.000050	1.52	<0.000010	0.841	0.00368	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M																			
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	0.112	0.00119	<0.0000050	0.000254	<0.00050	<0.050	0.133		0.00038	<0.000050	1.83	<0.000010	0.691	0.00381	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	L2757873-1	2024-10-22	Water	M																			
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	0.112	0.00092	<0.0000050	0.000294	<0.00050	<0.050	0.129		0.00037	<0.000050	1.56	<0.000010	0.663	0.00399	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M	0.114	0.0013	<0.0000050	0.000272	<0.00050	<0.050	0.129		0.00037	<0.000050	1.66	<0.000010	0.662	0.00381	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	L2757942-2	2024-10-26	Water	M																			
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	0.108	0.00102	<0.0000050	0.000244	<0.00050	<0.050	0.123		0.00032	<0.000050	1.7	<0.000010	0.634	0.00386	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	0.111	0.00093	<0.0000050	0.000282	<0.00050	<0.050	0.132		0.00033	<0.000050	1.74	<0.000010	0.703	0.00424	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	0.101	0.00144	0.00000184	0.000171	<0.00050	<0.050	0.11		0.00031	<0.000050	1.64	<0.000010	0.575	0.0037	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	L2758119-1	2024-11-12	Water	M																			
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	0.0865	0.0018	<0.0000050	0.000152	<0.00050	<0.050	0.106		0.00035	<0.000050	1.45	<0.000010	0.441	0.0035	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	0.102	0.00096	<0.0000050	0.000228	<0.00050	<0.050	0.111		0.0003	<0.000050	1.56	<0.000010	0.638	0.00389	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	L2758350-1	2024-12-06	Water	M																			
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M	0.0995	0.00093	0.00000168	0.000252	<0.00050	<0.050	0.105		0.00032	<0.000050	1.51	<0.000010	0.618	0.00348	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M																			
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	0.102	0.00104	<0.0000050	0.000212	<0.00050	<0.050	0.118		0.00035	<0.000050	1.51	<0.000010	0.598	0.00367	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M																			
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	0.116	0.00092	<0.0000050	0.000306	<0.00050	<0.050	0.105		0.00032	<0.000050	1.5	<0.000010	0.706	0.00418	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M																			
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M	0.253	0.00081	0.00000189	0.000276	<0.00050	<0.050	0.153		0.00028	<0.000050	1.46	<0.000010	2.03	0.0045	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	L2758769-1	2025-01-24	Water	M																			
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	0.119	0.0015	<0.0000050	0.000283	<0.00050	<0.050	0.125		0.0003	<0.000050	1.69	<0.000010	0.839	0.0039	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M																			
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	0.13	0.00202	0.0000019	0.000258	<0.00050	<0.050	0.125		0.00029	<0.000050	1.6	<0.000010	0.794	0.0056	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	L2759042-1	2025-02-21	Water	M																			
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	0.12	0.000758	0.00000133	0.000279	<0.00050	<0.050	0.109		0.000292	<0.000050	1.58	<0.000010	0.763	0.0039	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	L2759255-1	2025-03-19	Water	M																			
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	0.0796	0.00217	<0.0000050	0.000138	<0.00050	<0.050	0.083		0.00032	<0.000050	1.11	<0.000010	0.433	0.00289	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M	0.0965	0.00099	0.00000127	0.000236	<0.00050	<0.050	0.107		0.00028	<0.000050	1.4	<0.000010	0.645	0.00341	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M																			
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	0.0826	0.00104	0.0000019	0.000159	<0.00050	<0.050	0.083		0.00028	<0.000050	1.21	<0.000010	0.491	0.0031	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M																			
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	0.0991	0.00066	0.00000144	0.000222	<0.00050	<0.050	0.096		0.00025	<0.000050	1.44	<0.000010	0.665	0.00349	<0.50	<0.00020	<0.000010	<0.00010	0.00015
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M																			
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	0.0952	0.00091	0.00000166	0.000196	<0.00050	<0.050	0.083		0.00025	<0.000050	1.24	<0.000010	0.57	0.00305	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M																			
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	0.0885	0.00073	<0.0000050	0.000239	<0.00050	<0.050	0.088		0.00022	<0.000050	1.24	<0.000010	0.59	0.00298	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	0.0774	0.00094	0.0000018	0.000186	<0.00050	<0.050	0.086		0.00021	<0.000050	1.06	<0.000010	0.556	0.00265	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M																			
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	0.0775	0.00075	<0.0000050	0.000204	0.0022	<0.050	0.075		<0.00020	<0.000050	1.08	<0.000010	0.546	0.00264	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	0.0766	0.00076	<0.0000050	0.000189	<0.00050	<0.050	0.066		<0.00020	<0.000050	1.06	<0.000010	0.473	0.00239	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	0.0829	0.00086	0.00000182	0.000204	<0.00050	<0.050	0.073		0.00022	<0.000050	1.07	<0.000010	0.531	0.00267	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	0.0767	0.00091	<0.0000050	0.000183	<0.00050	<0.050	0.055		<0.00020	<0.000050	1.02	<0.000010	0.476	0.0026	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M	0.0768	0.00084	<0.0000050	0.000214	<0.00050	<0.050	0.074		0.00025	<0.000050	1.15	<0.000010	0.519	0.0029	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M	0.215	0.000504	<0.00001	0.000597	0.000201	<0.01	0.24			<0.00010	2.98	<0.000010	1.39	0.00956	1.2	<0.000050	<0.0000040	0.000012	<0.000050
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M	0.226	0.000765	<0.00001	0.00061	0.000248	<0.01	0.253			<0.00010	2.52	<0.000010	1.38	0.0085	<1	0.000097	<0.0000040	0.00001	0.00009

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M	0.2	0.000586	<0.00001	0.000463	<0.00300	0.012	0.199			<0.00010	3.26	<0.000010	1.2	0.00893	1.4	<0.000050	<0.0000040	0.000012	<0.000050
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M	0.153	0.000805	<0.000010	0.000388	0.00017	<0.01	0.245			0.00027	1.69	<0.000010	0.911	0.00504	<1	<0.000050	<0.0000040	0.000011	0.000062
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M	0.088	0.00073	<0.000010	0.00035	<0.00040	<0.050	<0.10			<0.00050	<1.0	<0.000050	0.66	0.0035	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M	0.0847	0.000483	<0.000010	0.000281	0.000085	<0.01	0.103			<0.00010	1.27	<0.000010	0.504	0.00366	<1	<0.000050	<0.0000040	<0.000010	0.000055
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M	0.0762	0.000621	<0.000010	0.000281	0.000081	<0.01	0.1			<0.00010	1.19	<0.000010	0.473	0.00346	<1	<0.000050	<0.0000040	0.000011	<0.000050
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M	0.119	0.00155	<0.0000050	0.000718	0.000246	<0.01	0.163			<0.00010	1.72	<0.000010	0.755	0.00453	<1	0.000059	0.0000044	0.000016	<0.000050
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M	0.103	0.00173	<0.000010	0.000291	0.000298	<0.01	0.139			<0.00010	1.39	0.000013	0.551	0.00356	<1	<0.000050	<0.0000040	0.00001	0.000055
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M	0.162	0.000349	<0.000010	0.00067	0.000124	<0.01	0.26			<0.00010	1.8	<0.000010	1.3	0.00658	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M	0.329	0.000297	<0.000010	0.000935	0.000135	<0.01	0.469			<0.00010	2.89	<0.000010	3.16	0.0129	1.1	<0.000050	0.0000128	0.000011	<0.000050
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M	0.149	0.00578	<0.000010	0.000244	0.000603	<0.01	0.207			<0.00010	1.82	<0.000010	0.677	0.00575	<1	<0.000050	0.0000049	0.000017	<0.000050
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M	0.126	0.00109	<0.000010	0.00029	<0.00040	<0.050	0.17			<0.00050	2	<0.000050	0.71	0.0053	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M	0.189	0.00111	<0.000010	0.00041	<0.00040	<0.050	0.24			<0.00050	2.5	<0.000050	1.12	0.0068	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M	0.191	0.00088	<0.000010	0.00039	<0.00040	<0.050	0.24			<0.00050	2.6	<0.000050	1.41	0.0079	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M	0.135	0.00276	<0.000010	0.00028	<0.00040	<0.050	0.14			<0.00050	1.9	<0.000050	0.57	0.0056	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	0.178	0.00042	<0.000010	0.0005	<0.00040	<0.050	0.22			<0.00050	2.5	<0.000050	1.09	0.0077	8.9	<0.00050	<0.000020	<0.00010	<0.00020
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M																			
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M	0.166	0.00091	<0.000010	0.00043	<0.00040	<0.050	0.11			<0.00050	2.2	<0.000050	0.9	0.0074	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	0.185	0.00137	<0.000010	0.00052	<0.00040	<0.050	0.25			<0.00050	2	<0.000050	1.1	0.0086	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M	0.115	0.00226	<0.000010	0.00026	<0.00040	<0.050	0.15			<0.00050	1.6	<0.000050	0.59	0.0047	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	0.0624	0.00108	<0.000010	0.000181	0.000084	<0.01	0.093			<0.00010	0.8	<0.000010	0.35	0.00277	<1	<0.000050	<0.0000040	0.00001	<0.000050
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	0.0737	0.000497	<0.000010	0.000284	0.000076	<0.010	0.118			<0.00010	1.05	<0.000010	0.513	0.00336	<1.0	<0.000050	<0.0000040	<0.000010	<0.000050
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M	0.167	<0.000350	<0.000010	0.000682	0.000096	<0.01	0.299			<0.00010	1.84	<0.000010	1.53	0.00786	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	0.315	0.000228	<0.000010	0.000824	0.000138	<0.010	0.472			<0.00010	2.8	<0.000010	2.87	0.0139	1.6	<0.000050	0.0000043	<0.000010	<0.000050
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M	0.415	0.000194	<0.000010	0.00101	0.000129	<0.01	0.543			<0.00010	3.15	<0.000010	3.85	0.0177	1.9	<0.000050	0.000005	<0.000010	<0.000050
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M	0.221	0.000542	<0.000010	0.000605	0.000211	<0.025	0.269			<0.00010	2.54	<0.000010	1.38	0.00938	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M	0.264	0.000397	<0.000010	0.000746	0.000194	<0.02	0.288			<0.00010	2.73	<0.000010	1.89	0.0114	1.2	<0.000050	<0.0000040	<0.000010	<0.000050
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	0.195	0.000445	<0.000010	0.000486	0.000134	<0.01	0.265			<0.00010	2.61	<0.000010	1.34	0.00868	1.1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M	0.243	0.00056	<0.000010	0.00061	<0.00040	<0.050	0.29			<0.00050	2.7	<0.000050	1.66	0.0102	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M	0.242	0.00055	<0.000010	0.00077	<0.00040	<0.050	0.29			<0.00050	2.8	<0.000050	1.68	0.0107	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M	0.119	0.000516	<0.000010	0.000361	0.000158	<0.01	0.177			<0.00010	1.67	<0.000010	0.701	0.00517	<1	<0.000050	<0.0000040	0.00001	<0.000050
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M	0.0683	0.000888	<0.000010	0.000176	0.000069	<0.01	0.117			<0.00010	0.95	<0.000010	0.43	0.00277	<1	<0.000050	<0.0000040	0.000012	<0.000050
SW-02	SW-02	23F0370-03	2023-06-02	Water	M	0.0838	0.000311		0.000361	0.000087	<0.01	0.124			<0.00010	1.2	<0.000010	0.589	0.0037	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M	0.0921	0.000258	<0.000010	0.000473	0.000075	<0.01	0.173			<0.00010	1.15	<0.000010	0.722	0.00449	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M	0.206	0.00024	<0.000010	0.000733	0.000101	0.01	0.345			<0.00010	2.23	<0.000010	1.81	0.00949	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M	0.363	0.000189	<0.000010	0.000957	0.0001	0.011	0.516			<0.00010	3.09	<0.000010	3.33	0.0154	2.2	<0.000050	0.0000064	0.00001	<0.000050
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	0.183	0.00461	<0.000010	0.000242	0.000198	<0.01	0.233			<0.00010	2.01	<0.000010	0.779	0.00685	<1	<0.000050	0.0000045	0.00002	<0.000050
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M																			
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M																			
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M	0.18	0.000513	<0.000010	0.000442	0.000193	<0.01	0.241			<0.00010	2.68	<0.000010	1.13	0.00859	1.2	<0.000050	<0.0000040	<0.000010	<0.000050
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M	0.215	0.00109	<0.000010	0.000461	0.000217	0.011	0.168			<0.00010	2.76	<0.000010	1.34	0.00805	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-02		VA24A1299-002	2024-01-23	Water	M	0.137	0.00255	<0.0000050	0.00032	<0.00050	<0.050	0.167		0.00047	<0.000050	2.04	<0.000010	0.698	0.00534	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2754353-2	2024-01-23	Water	M																			
SW-02		L2754615-2	2024-02-15	Water	M																			
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	0.197	0.00048	<0.0000050	0.000506	<0.00050	<0.050	0.232		0.00056	<0.000050	2.73	<0.000010	1.3	0.00926	0.97	<0.00020	<0.000010	<0.00020	<0.00010
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	0.121	0.00066	<0.0000050	0.000329	<0.00050	<0.050	0.163		0.00042	<0.000050	1.96	<0.000010	0.732	0.00533	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2755012-2	2024-03-19	Water	M																			
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	0.162	0.00206	<0.0000050	0.000502	<0.00050	<0.050	0.209		0.00055	<0.000050	2.28	<0.000010	1.1	0.00704	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2755316-6	2024-04-12	Water	M																			
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	0.125	0.00038	<0.0000050	0.000419	<0.00050	<0.050	0.178		0.00042	<0.000050	1.77	<0.000010	0.802	0.00564	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2755504-1	2024-04-26	Water	M																			
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	0.11	0.00086	<0.0000050	0.000301	<0.00050	<0.050	0.145		0.00036	<0.000050	1.59	<0.000010	0.61	0.00448	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2755521-2	2024-04-28	Water	M																			
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	0.139	0.00031	<0.0000050	0.000463	<0.00050	<0.050	0.184		0.00045	<0.000050	1.99	<0.000010	0.849	0.00576	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2755598-1	2024-05-03	Water	M																			
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	0.108	0.00066	<0.0000050	0.000378	<0.00050	<0.050	0.15		0.00036	<0.000050	1.6	<0.000010	0.68	0.00469	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	0.111	0.0006	<0.0000050	0.000358	<0.00050	<0.050	0.16		0.00043	<0.000050	1.61	<0.000010	0.872	0.00472	<0.50	<0.00020	<0.000010	<0.00010	0.00011
SW-02		L2755677-1	2024-05-09	Water	M																			
SW-02		L2755687-1	2024-05-09	Water	M																			
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M	0.103	0.00059	<0.0000050	0.000304	<0.00050	<0.050	0.132		0.0003	<0.000050	1.27	<0.000010	0.596	0.00372	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2755770-1	2024-05-14	Water	M																			
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	0.0822	0.00062	<0.0000050	0.000309	<0.00050	<0.050	0.117		0.00034	<0.000050	1.29	<0.000010	0.712	0.00358	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2755819-1	2024-05-17	Water	M																			

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M	0.0964	0.00064	<0.0000050	0.000317	<0.00050	<0.050	0.146		0.00032	<0.000050	1.46	<0.000010	0.641	0.00435	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2755903-1	2024-05-23	Water	M																			
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	0.0957	0.00035	<0.0000050	0.000341	<0.00050	<0.050	0.138		0.00037	<0.000050	1.43	<0.000010	0.647	0.00428	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2755933-1	2024-05-24	Water	M																			
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M	0.0979	0.00047	<0.0000050	0.000318	<0.00050	<0.050	0.133		0.0003	<0.000050	1.36	<0.000010	0.622	0.00413	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2755961-1	2024-05-26	Water	M																			
SW-02		VA24B4698-001	2024-06-21	Water	M	0.0845	0.00032	<0.0000050	0.000327	<0.00050	<0.050	0.125		0.00034	<0.000050	1.27	<0.000010	0.561	0.00374	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2756349-1	2024-06-21	Water	M																			
SW-02		VA24B5540-001	2024-06-27	Water	M	0.0857	0.00053	<0.0000050	0.000267	<0.00050	<0.050	0.109		0.00031	<0.000050	1.08	<0.000010	0.54	0.00322	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2756458-1	2024-06-27	Water	M																			
SW-02		VA24B7689-001	2024-07-19	Water	M	0.134	0.00032	<0.0000050	0.000575	<0.00050	<0.050	0.23		0.00072	<0.000050	1.63	<0.000010	1.09	0.00605	0.63	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2756726-1	2024-07-19	Water	M																			
SW-02		VA24B8974-002	2024-07-31	Water	M	0.144	0.00043	<0.0000050	0.000595	<0.00050	<0.050	0.247		0.00066	<0.000050	1.84	<0.000010	1.51	0.00653	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2756871-2	2024-07-31	Water	M																			
SW-02		VA24C1605-001	2024-08-23	Water	M	0.243	0.00023	<0.0000050	0.000819	<0.00050	<0.050	0.399		0.00098	<0.000050	2.61	<0.000010	2.23	0.011	0.98	<0.00020	<0.000010	<0.00010	<0.00010
SW-02		L2757153-1	2024-08-23	Water	M																			
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	0.162	0.0006	<0.0000050	0.000479	<0.00050	<0.050	0.208		0.0006	<0.000050	1.92	<0.000010	0.986	0.00613	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	L2757209-2	2024-08-27	Water	M																			
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	0.303	0.00019	<0.0000050	0.00096	<0.00050	<0.050	0.426		0.00121	<0.000050	2.9	<0.000010	2.82	0.0147	1.22	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	0.215	0.00027	<0.0000050	0.000689	<0.00050	<0.050	0.258		0.00065	<0.000050	2.46	<0.000010	1.37	0.00822	0.62	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	L2757587-1	2024-09-29	Water	M																			
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	0.289	0.00146	<0.0000050	0.000568	<0.00050	<0.050	0.269		0.00058	<0.000050	2.16	<0.000010	1.31	0.00746	0.93	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	L2757661-1	2024-10-04	Water	M																			
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	0.405	0.00029	<0.0000050	0.000783	<0.00050	<0.050	0.373		0.00077	<0.000050	2.64	<0.000010	3.3	0.0108	0.81	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M																			
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	0.163	0.00129	<0.0000050	0.000358	<0.00050	<0.050	0.227		0.00058	<0.000050	2.48	<0.000010	0.895	0.00653	0.7	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	L2757873-2	2024-10-22	Water	M																			
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	0.197	0.00056	<0.0000050	0.0005	<0.00050	<0.050	0.265		0.0007	<0.000050	2.84	<0.000010	1.14	0.00968	0.96	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M	0.205	0.00057	<0.0000050	0.000512	<0.00050	<0.050	0.272		0.00075	<0.000050	2.82	<0.000010	1.17	0.00928	0.98	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	L2757913-1	2024-10-25	Water	M																			
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	0.182	0.00081	<0.0000050	0.000435	<0.00050	<0.050	0.225		0.00059	<0.000050	2.72	<0.000010	1.02	0.00814	0.74	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	0.129	0.00066	<0.0000050	0.000432	<0.00050	<0.050	0.188		0.00047	<0.000050	2.04	<0.000010	0.84	0.0055	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M																			
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	0.142	0.00123	<0.0000050	0.000305	<0.00050	<0.050	0.177		0.00046	<0.000050	2.21	<0.000010	0.755	0.00671	0.5	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	0.2	0.00363	0.00000095	0.000381	<0.00050	<0.050	0.256		0.00064	<0.000050	2.59	<0.000010	1.02	0.00837	0.81	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	L2758155-3	2024-11-16	Water	M																			
SW-02		VA24D1587-001	2024-11-20	Water	M	0.246	0.00285	<0.0000050	0.000429	<0.00050	<0.050	0.276		0.00071	<0.000050	2.92	<0.000010	1.08	0.0087	0.88	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M																			
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	0.128	0.00129	0.00000129	0.000337	<0.00050	<0.050	0.178		0.0004	<0.000050	1.88	<0.000010	0.776	0.00598	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	L2758371-1	2024-12-08	Water	M																			
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	0.148	0.00109	<0.0000050	0.000354	<0.00050	<0.050	0.196		0.00047	<0.000050	2.12	<0.000010	0.844	0.00702	0.55	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M																			
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	0.261	0.00042	<0.0000050	0.000722	<0.00050	<0.050	0.276		0.00068	<0.000050	3.18	<0.000010	1.84	0.0124	1.2	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M																			
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M	0.245	0.00029	0.00000055	0.000622	<0.00050	<0.050	0.248		0.00058	<0.000050	3.02	<0.000010	1.92	0.0109	1.13	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	L2758769-2	2025-01-24	Water	M																			
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M	0.428	0.0116	0.00000126	0.000841	<0.00050	<0.050	0.414		0.00114	<0.000050	3.68	<0.000010	1.9	0.0128	1.14	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	L2759009-1	2025-02-19	Water	M																			
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	0.198	0.00148	<0.0000050	0.00058	<0.00050	<0.050	0.218		0.00045	<0.000050	2.46	<0.000010	1.18	0.00845	0.53	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M																			
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	0.202	0.000697	0.00000067	0.000533	<0.00050	<0.050	0.207		0.000468	<0.000050	2.6	<0.000010	1.32	0.00934	0.766	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	L2759254-1	2025-03-18	Water	M																			
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M	0.113	0.00388	<0.0000050	0.0002	<0.00050	<0.050	0.129		0.00038	<0.000050	1.5	<0.000010	0.52	0.00446	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	0.167	0.00236	0.00000102	0.000388	<0.00050	<0.050	0.199		0.00048	<0.000050	2.29	<0.000010	1.15	0.00729	0.59	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M																			
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	0.102	0.00187	0.0000013	0.000229	<0.00050	<0.050	0.14		0.00033	<0.000050	1.35	<0.000010	0.586	0.004	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M																			
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	0.125	0.00066	0.000001	0.000318	<0.00050	<0.050	0.148		0.00037	<0.000050	1.92	<0.000010	0.795	0.00594	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M																			
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M	0.106	0.00047	0.0000006	0.000352	<0.00050	<0.050	0.135		0.00033	<0.000050	1.65	<0.000010	0.742	0.00487	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M																			
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	0.114	0.00035	<0.0000050	0.000396	<0.00050	<0.050	0.153		0.00035	<0.000050	1.64	<0.000010	0.792	0.00502	<0.50	<0.00020	<0.000010	<0.00010	<0.00010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	0.138	0.00039	0.00000082	0.000316	<0.00050	<0.050	0.132		0.00033	<0.000050	1.39	<0.000010	0.972	0.00427	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M																			
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	0.0927	0.00047	<0.0000050	0.000328	<0.00050	<0.050	0.116		0.00029	<0.000050	1.32	<0.000010	0.637	0.00386	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	0.0816	0.00037	<0.0000050	0.000315	<0.00050	<0.050	0.102		0.00028	<0.000050	1.25	<0.000010	0.54	0.00369	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	0.098	0.00047	0.00000068	0.000369	<0.00050	<0.050	0.127		0.00032	<0.000050	1.4	<0.000010	0.681	0.0042	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M																			
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	0.0946	0.00041	<0.0000050	0.000347	<0.00050	<0.050	0.11		0.00028	<0.000050	1.34	<0.000010	0.659	0.0041	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	0.104	0.0004	<0.0000050	0.000376	<0.00050	<0.050	0.133		0.00036	<0.000050	1.6	<0.000010	0.721	0.00493	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M	0.227	0.00047	<0.00001	0.00078	<0.0004	<0.05	0.42			<0.0005	2.6	<0.00005	2.02	0.0107	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M	0.191	<0.0002	<0.00001	0.0006	<0.0004	<0.05	0.31			<0.0005	2.5	<0.00005	1.33	0.0088	3.1	<0.0005	<0.00002	<0.0001	<0.0002
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M	0.313	0.00055	<0.00001	0.00082	<0.0004	<0.05	0.33			<0.0005	3.1	<0.00005	2.38	0.0126	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M	0.076	0.00046	<0.00001	0.00021	<0.0004	<0.05	0.11			<0.0005	1	<0.00005	0.51	0.0031	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M	0.123	0.00131	<0.00001	0.00036	<0.0004	<0.05	0.28			<0.0005	2.1	<0.00005	0.8	0.0059	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M	0.21	0.00029	<0.00001	0.00061	<0.0004	<0.05	0.28			<0.0005	2.9	<0.00005	1.38	0.0106	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M	0.206	0.00049	<0.00001	0.00054	<0.0004	<0.05	0.25			<0.0005	2.9	<0.00005	1.38	0.0097	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M	0.08	0.00047	<0.00001	0.00028	<0.0004	<0.05	0.11			<0.0005	1.2	<0.00005	0.67	0.0038	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M	0.338	<0.0002	<0.00001	0.00088	<0.0004	<0.05	0.48			<0.0005	3.5	<0.00005	2.93	0.0149	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M	0.113	0.00067	<0.00001	0.00026	<0.0004	<0.05	0.18			<0.0005	<1	<0.00005	0.66	0.0042	<3	<0.0005	<0.00002	<0.0001	<0.0002
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M	87.2	0.00105	<0.00001	0.00142	0.000231	<0.01	26.4			<0.00010	3.41	<0.000010	700	0.576	68.1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M	108	0.00158	<0.00001	0.0016	0.000211	<0.05	38			<0.00050	2.78	<0.000050	908	0.675	81.3	<0.000250	<0.0000200	<0.000050	<0.000250
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M	72.5	0.00279	<0.00001	0.00101	<0.00300	<0.1	22.4			<0.00100	3.86	<0.000100	510	0.425	50.7	<0.000500	<0.0000400	<0.000100	<0.000500
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M	2.67	0.000946	<0.000010	0.000586	0.000159	<0.01	1.11			0.0003	1.85	<0.000010	21	0.0203	2.6	<0.000050	0.0000054	0.000014	<0.000050
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M	0.101	0.00089	<0.000010	0.00027	<0.00040	<0.050	<0.10			<0.00050	<1.0	<0.000050	0.82	0.0032	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M	3.34	0.000755	<0.000010	0.000445	0.000085	<0.01	1.26			<0.00010	1.37	<0.000010	26.4	0.0218	2.7	<0.000050	<0.0000040	0.00001	0.000064
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M	4.76	0.00355	<0.000010	0.000493	0.000112	<0.01	1.93			<0.00010	1.42	<0.000010	40.7	0.0299	4.2	<0.000050	<0.0000040	0.000014	<0.000050
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M	0.171	0.00195	<0.0000050	0.000466	0.000156	<0.01	0.193			<0.00010	1.73	<0.000010	1.53	0.00463	<1	<0.000050	0.0000046	0.000015	<0.000050
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M	0.392	0.0023	<0.000010	0.000292	0.000249	0.013	0.277			<0.00010	1.42	<0.000010	3.86	0.00478	<1	<0.000050	<0.0000040	0.000011	<0.000050
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M	0.381	0.00205	<0.000010	0.000621	0.000132	<0.01	0.38			<0.00010	2.01	<0.000010	2.73	0.00662	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M	18.2	0.00158	<0.000010	0.00122	0.000135	<0.01	6.51			<0.00010	3.27	<0.000010	156	0.125	14.2	<0.000050	<0.0000040	<0.000010	<0.000050
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M	0.148	0.0042	<0.000010	0.00046	0.000302	<0.01	0.196			<0.00010	1.79	<0.000010	0.706	0.00523	<1	<0.000050	0.0000047	0.000015	<0.000050
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M	4.34	0.00125	<0.000010	0.00037	<0.00040	<0.050	1.39			<0.00050	1.9	<0.000050	36	0.0276	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M	21.4	0.00175	<0.000010	0.00055	<0.00040	<0.050	6.36			<0.00050	2.5	<0.000050	158	0.113	15.7	<0.00050	<0.000020	<0.00010	<0.00020
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M	70.2	0.00263	<0.000010	0.00099	<0.00040	<0.050	21.8			<0.00050	2.8	<0.000050	583	0.425	52.3	<0.00050	<0.000020	<0.00010	<0.00020
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M	1.33	0.0027	<0.000010	0.00037	<0.00040	<0.050	0.55			<0.00050	1.9	<0.000050	11.1	0.0129	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	93.8	0.00097	<0.000010	0.00141	<0.00040	<0.050	29			<0.00050	2.5	<0.000050	787	0.595	74.4	<0.00050	<0.000020	<0.00010	<0.00020
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M																			
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	3.79	0.00077	<0.000010	0.00047	<0.00040	<0.050	1.29			<0.00050	2	<0.000050	33.5	0.0268	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	4.57	0.00176	<0.000010	0.0006	<0.00040	<0.050	1.57			<0.00050	1.9	<0.000050	37.8	0.034	4.4	<0.00050	<0.000020	<0.00010	<0.00020
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M	7.63	0.00283	<0.000010	0.00036	<0.00040	<0.050	2.38			<0.00050	1.6	<0.000050	60.3	0.0473	5.7	<0.00050	<0.000020	<0.00010	<0.00020
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	0.0842	0.00189	<0.000010	0.000212	0.000097	<0.01	0.118			<0.00010	0.91	<0.000010	0.404	0.00318	<1	<0.000050	<0.0000040	0.000012	<0.000050
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	0.408	0.00132	<0.000010	0.000324	0.00006	<0.010	0.3			<0.00010	1.07	<0.000010	4.54	0.00509	<1.0	<0.000050	<0.0000040	<0.000010	<0.000050
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M	24.8	0.00189	<0.000010	0.000865	0.000106	0.016	8.66			<0.00010	1.89	<0.000010	210	0.158	20.2	<0.000050	<0.0000040	<0.000010	<0.000050
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M	15.3	0.00232	<0.000010	0.001	0.000159	<0.010	5.16			<0.00010	2.85	<0.000010	134	0.104	12.9	<0.000050	0.0000054	<0.000010	<0.000050
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M	138	0.00292	<0.000010	0.00221	<0.000200	<0.05	43.8			<0.00050	3.24	<0.000050	1210	0.856	107	<0.000250	<0.0000200	<0.000050	<0.000250
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	167	0.00192	<0.000010	0.00195	0.000301	<0.05	49.4			<0.00050	2.49	<0.000050	1330	0.943	122	<0.000250	<0.0000200	<0.000050	<0.000250
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M	76.1	0.00669	<0.000010	0.00145	0.000201	<0.02	23			<0.00020	2.96	<0.000020	619	0.447	57.8	<0.000100	<0.0000080	<0.000020	<0.000100
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	95.3	0.00322	<0.000010	0.00128	0.000173	<0.02	29.1			<0.00010	3.06	<0.000010	809	0.543	74	<0.000050	<0.0000040	<0.000010	<0.000050
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M	129	0.00261	<0.000010	0.00182	<0.00040	<0.050	41.8			<0.00050	2.5	<0.000050	1070	0.816	107	<0.00050	<0.000020	<0.00010	<0.00020
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	46.4	0.00134	<0.000010	0.00124	<0.00040	<0.050	14.8			<0.00050	2.9	<0.000050	376	0.265	35.7	<0.00050	<0.000020	<0.00010	<0.00020
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	2.52	0.000576	<0.000010	0.000378	0.00021	<0.01	0.93			<0.00010	1.65	<0.000010	21.1	0.0191	2.5	<0.000050	<0.0000040	0.000011	<0.000050
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M	0.189	0.00584	<0.000010	0.000201	0.000143	0.017	0.197			<0.00010	1.24	<0.000010	1.3	0.00367	<1	<0.000050	<0.0000040	0.00007	<0.000050
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	0.845	0.000409	<0.000010	0.000576	0.000156	0.018	0.527			<0.00010	1.2	<0.000010	8.67	0.00865	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	16.3	0.0029	<0.000010	0.000925	0.00012	0.011	5.58			<0.00010	2.38	<0.000010	131	0.111	13.2	<0.000050	<0.0000040	0.000014	<0.000050
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	218	0.00605	<0.000010	0.00328	0.000212	<0.05	69.6			<0.00050	2.71	<0.000050	1820	1.3	163	<0.000250	<0.0000200	<0.000050	<0.000250
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M	30.2	0.00101	<0.000010	0.00119	0.000158	0.025	9.07			<0.00010	2.45	<0.000010	239	0.175	23.4	<0.000050	<0.0000040	<0.000010	<0.000050
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M	0.241	0.00404	<0.000010	0.000231	0.000519	0.011	0.246			<0.00010	1.91	<0.000010	1.55	0.00649	<1	<0.000050	<0.0000040	0.000018	<0.000050
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	151	0.00242	<0.000010	0.00174	0.000369	<0.05	47.1			<0.00050	2.71	<0.000050	1220	0.893	113	<0.000250	<0.0000200	<0.000050	<0.000250
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M	99	0.00213	<0.000010	0.00125	0.000226	0.015	24.5			<0.00010	2.71	<0.000010	787	0.483	61.5	<0.000050	<0.0000040	0.000011	<0.000050
SW-03		VA24A1299-003	2024-01-23	Water	M	18.6	0.00266	<0.0000050	0.000483	<0.00050	<0.050	5.56		0.00199	<0.000050	2.13	<0.000010	152	0.108	13.7	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2754353-3	2024-01-23	Water	M																			
SW-03		L2754615-3	2024-02-15	Water	M																			
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	208	0.00498	<0.0000050	0.0022	<0.00250	<0.250	62.8		0.0175	<0.000250	3.02	<0.000050	1710	1.24	164	<0.00100	<0.000050	<0.00050	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	30.1	0.00089	<0.0000050	0.00059	<0.00050	<0.050	9.5	<0.00050	<0.0050	<0.00050	1.9	<0.00010	254	0.189	22.8	<0.00050	<0.000050	<0.00050	<0.0010
SW-03		L2755012-3	2024-03-19	Water	M																			
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M	0.246	0.00095	<0.0000050	0.000606	<0.00050	<0.050	0.266		0.00053	<0.000050	2.21	<0.000010	2.25	0.00846	0.59	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2755316-7	2024-04-12	Water	M																			
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	10.8	0.00049	<0.0000050	0.000575	<0.00050	<0.050	3.41		0.00132	<0.000050	1.86	<0.000010	87.4	0.0687	8.06	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2755504-2	2024-04-26	Water	M																			
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	0.174	0.00193	<0.0000050	0.000385	<0.00050	<0.050	0.198		0.00049	<0.000050	1.66	<0.000010	0.983	0.00599	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2755521-3	2024-04-28	Water	M																			
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	3.73	0.00108	<0.0000050	0.000538	<0.00050	<0.050	1.39		0.00075	<0.000050	2.07	<0.000010	30.7	0.0252	3.1	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2755598-2	2024-05-03	Water	M																			
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	12.2	0.00101	<0.0000050	0.000566	<0.00050	<0.050	4.5		0.00157	<0.000050	1.66	<0.000010	106	0.0761	9.9	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	0.141	0.00043	<0.0000050	0.000431	<0.00050	<0.050	0.167		0.00038	<0.000050	1.57	<0.000010	0.892	0.00537	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2755677-2	2024-05-09	Water	M																			
SW-03		L2755687-2	2024-05-09	Water	M																			
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M	0.137	0.00047	<0.0000050	0.000378	<0.00050	<0.050	0.156		0.00035	<0.000050	1.26	<0.000010	0.824	0.00465	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2755770-2	2024-05-14	Water	M																			
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	0.328	0.00058	<0.0000050	0.000304	0.00076	<0.050	0.251		0.00033	<0.000050	1.28	<0.000010	3.83	0.00478	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2755819-2	2024-05-17	Water	M																			
SW-03		VA24B1636-002	2024-05-23	Water	M	0.118	0.00078	<0.0000050	0.000389	<0.00050	<0.050	0.164		0.00036	<0.000050	1.48	<0.000010	0.775	0.00495	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2755903-2	2024-05-23	Water	M																			
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	0.265	0.00043	<0.0000050	0.000356	<0.00050	<0.050	0.218		0.00032	<0.000050	1.44	<0.000010	2.59	0.00506	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2755933-2	2024-05-24	Water	M																			
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	0.128	0.00074	<0.0000050	0.000399	<0.00050	<0.050	0.166		0.00038	<0.000050	1.48	<0.000010	0.82	0.00512	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2755961-2	2024-05-26	Water	M																			
SW-03		VA24B4698-002	2024-06-21	Water	M	0.725	0.00036	<0.0000050	0.000356	<0.00050	<0.050	0.36		0.00038	<0.000050	1.18	<0.000010	6.45	0.00746	0.72	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2756349-2	2024-06-21	Water	M																			
SW-03		VA24B5540-002	2024-06-27	Water	M	0.13	0.00172	<0.0000050	0.000338	<0.00050	<0.050	0.153		0.00038	<0.000050	1.16	<0.000010	0.973	0.00441	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2756458-2	2024-06-27	Water	M																			
SW-03		VA24B7689-002	2024-07-19	Water	M	20.6	0.00146	<0.0000050	0.00123	<0.00050	<0.050	8.3		0.003	<0.000050	1.84	<0.000010	186	0.108	17	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		L2756726-2	2024-07-19	Water	M																			
SW-03		L2756871-3	2024-07-31	Water	M																			
SW-03		VA24B8974-003	2024-07-31	Water	M	0.194	0.00046	<0.0000050	0.000623	<0.00050	<0.050	0.284		0.00073	<0.000050	1.82	<0.000010	2.07	0.00703	0.61	<0.00020	<0.000010	<0.00010	<0.00010
SW-03		VA24C1605-002	2024-08-23	Water	M	64.4	0.00314	<0.0000050	0.00125	<0.00050	<0.050	18.3	<0.00050	0.006	<0.00050	2.4	<0.00010	495	0.352	46.8	<0.00050	<0.000050	<0.00050	<0.0010
SW-03		L2757153-2	2024-08-23	Water	M																			
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	39.4	0.00406	<0.0000050	0.000966	<0.00050	<0.050	12.8		0.00421	<0.000050	2.43	<0.000010	324	0.221	29.8	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	L2757229-1	2024-08-28	Water	M																			
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	67.5	0.0153	0.0000054	0.00137	<0.00050	<0.050	20.8	<0.00050	0.0065	<0.00050	3.2	<0.00010	542	0.359	49.1	<0.00050	<0.000050	<0.00050	<0.0010
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	21.4	0.00316	<0.0000050	0.000918	<0.00050	<0.050	6.15		0.00237	<0.000050	2.62	<0.000010	164	0.13	16.1	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	L2757587-3	2024-09-29	Water	M																			
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	4.61	0.0141	<0.0000050	0.00067	<0.00050	<0.050	1.53		0.00112	<0.000050	2.63	<0.000010	33.2	0.0331	3.82	<0.00020	<0.000010	<0.00010	0.0001
SW-03	SW-03	L2757661-3	2024-10-04	Water	M																			
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M	0.622	0.00028	<0.0000050	0.000871	<0.00050	<0.050	0.463		0.00086	<0.000050	2.64	<0.000010	5.94	0.0122	1.28	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M																			
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	24.6	0.0049	<0.0000050	0.000688	<0.00050	<0.050	8.3		0.00273	<0.000050	2.78	<0.000010	202	0.143	20.4	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	L2757873-3	2024-10-22	Water	M																			
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	<1.0	0.00236	<0.0000050	0.00059	<0.00050	<0.050	<1.0	<0.00050	<0.0050	<0.00050	2.8	<0.00010	9.1	0.012	<5.0	<0.00050	<0.000050	<0.00050	<0.0010
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	91.7	0.00357	<0.0000050	0.00134	<0.00050	<0.050	27.5	<0.00050	0.009	<0.00050	2.6	<0.00010	765	0.574	66.4	<0.00050	<0.000050	<0.00050	<0.0010
SW-03	SW-03	L2757913-3	2024-10-25	Water	M																			
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	18.8	0.00118	<0.0000050	0.00071	<0.00050	<0.050	5.8	<0.00050	<0.0050	<0.00050	2.7	<0.00010	155	0.116	14.8	<0.00050	<0.000050	<0.00050	<0.0010
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	45.1	0.00096	<0.0000050	0.0007	<0.00050	<0.050	12.6	<0.00050	<0.0050	<0.00050	1.9	<0.00010	310	0.254	30.5	<0.00050	<0.000050	<0.00050	<0.0010
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M																			
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	4.79	0.00141	<0.0000050	0.000434	<0.00050	<0.050	1.62		0.00087	<0.000050	2.31	<0.000010	36.2	0.0327	3.83	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	L2758155-2	2024-11-16	Water	M																			
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M	60.3	0.00381	0.000001	0.000958	<0.00100	<0.100	20.5		0.00639	<0.000100	2.76	<0.000020	548	0.41	47.1	<0.00040	<0.000020	<0.00020	<0.00020
SW-03		VA24D1587-002	2024-11-20	Water	M	74.7	0.00334	<0.0000050	0.00112	<0.00050	<0.050	20.7	<0.00050	0.0068	<0.00050	2.7	<0.00010	555	0.443	57	<0.00050	<0.000050	<0.00050	<0.0010
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M																			
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	2.37	0.00103	0.00000098	0.000398	<0.00050	<0.050	0.936		0.00065	<0.000050	1.83	<0.000010	19.2	0.0209	2.3	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	L2758371-2	2024-12-08	Water	M																			
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	23.9	0.00185	<0.0000050	0.00064	<0.00050	<0.050	8.8	<0.00050	<0.0050	<0.00050	2	<0.00010	274	0.196	23	<0.00050	<0.000050	<0.00050	<0.0010
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M																			
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	109	0.0014	<0.0000050	0.00133	<0.00050	<0.050	36.1	<0.00050	0.009	<0.00050	2.8	<0.00010	735	0.61	74	<0.00050	<0.000050	<0.00050	<0.0010
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M																			

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	436	0.00325	<0.00000050	0.00342	<0.00050	<0.050	123	<0.00050	0.0303	<0.00050	2.6	<0.00010	3090	2.1	274	<0.00050	<0.000050	<0.00050	<0.0010
SW-03	SW-03	L2758769-3	2025-01-24	Water	M																			
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	23.2	0.00832	0.00000132	0.000982	<0.00050	<0.050	6.97		0.00272	<0.000050	3.58	0.000019	180	0.146	17.9	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	L2759009-2	2025-02-19	Water	M																			
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	78.3	0.00285	<0.0000050	0.00107	<0.00050	<0.050	21	<0.00050	0.0061	<0.00050	2.7	<0.00010	648	0.383	52.2	<0.00050	<0.000050	<0.00050	<0.0010
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M																			
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	29.5	0.0713	0.00000067	0.00112	<0.00050	<0.050	9.04		0.00306	<0.000050	2.73	<0.000010	236	0.203	23.4	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	L2759254-2	2025-03-18	Water	M																			
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	0.324	0.0092	<0.0000050	0.000214	<0.00050	<0.050	0.252		0.00079	<0.000050	1.78	<0.000010	2.22	0.00548	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M	77.3	0.00366	0.00000093	0.00139	<0.00100	<0.100	24.3		0.0071	<0.000100	2.23	<0.000020	653	0.474	60.7	<0.00040	<0.000020	<0.00020	<0.00020
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M																			
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M	1.69	0.00186	0.00000138	0.000282	<0.00050	<0.050	0.736		0.00047	<0.000050	1.4	<0.000010	16.7	0.0133	1.5	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M																			
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	6.32	0.00101	0.00000085	0.000464	<0.00050	<0.050	2		0.00096	<0.000050	1.9	<0.000010	53.1	0.0396	4.63	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M																			
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	17.2	0.00122	0.00000073	0.000568	<0.00050	<0.050	5.44		0.0018	<0.000050	1.78	<0.000010	140	0.11	13.5	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M																			
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	0.206	0.00033	<0.0000050	0.000419	<0.00050	<0.050	0.198		0.00039	<0.000050	1.68	<0.000010	1.66	0.0056	0.52	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	4.89	0.00054	0.00000092	0.000424	<0.00050	<0.050	1.63		0.00078	<0.000050	1.38	<0.000010	43.9	0.0329	3.93	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M																			
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	0.438	0.00059	<0.0000050	0.000325	<0.00050	<0.050	0.241		0.00032	<0.000050	1.34	<0.000010	4.17	0.00581	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	0.131	0.00082	<0.0000050	0.000306	<0.00050	<0.050	0.123		0.00026	<0.000050	1.27	<0.000010	1.29	0.00387	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	1.48	0.001	0.00000087	0.000398	<0.00050	<0.050	0.612		0.00046	<0.000050	1.36	<0.000010	12.8	0.0125	1.1	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M																			
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	9.28	0.00096	<0.0000050	0.000474	<0.00050	<0.050	3.17		0.00116	<0.000050	1.33	<0.000010	77.4	0.054	6.93	<0.00020	<0.000010	<0.00010	<0.00010
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	0.258	0.00038	<0.0000050	0.000369	<0.00050	<0.050	0.229		0.00041	<0.000050	1.59	<0.000010	2.21	0.00586	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M	0.433	0.00449	<0.00001	0.000437	0.000303	<0.01	0.165			<0.00010	3.87	<0.000010	1.37	0.0215	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M	0.47	0.00491	<0.00001	0.00046	0.000318	<0.01	0.201			<0.00010	3.2	<0.000010	1.17	0.0201	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M	0.408	0.00322	<0.00001	0.000511	<0.00300	<0.01	0.136			<0.00010	4.16	<0.000010	1.24	0.0203	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M	0.39	0.00489	<0.000010	0.0155	0.000288	<0.01	0.358			0.00016	4.96	<0.000010	1.47	0.0225	<1	<0.000050	<0.0000040	<0.000010	0.000064
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M	0.488	0.0067	<0.000010	0.00053	0.00049	<0.050	0.12			<0.00050	4.2	<0.000050	1.65	0.0267	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M	0.574	0.00706	<0.000010	0.000601	0.000367	<0.01	0.206			<0.00010	5.15	<0.000010	1.59	0.0345	<1	<0.000050	<0.0000040	<0.000010	0.000055
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M	0.538	0.00534	<0.000010	0.0015	0.000385	<0.01	0.202			<0.00010	5.58	<0.000010	1.62	0.0321	1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M	0.529	0.00567	<0.0000050	0.000927	0.000399	<0.01	0.205			<0.00010	5.07	<0.000010	1.59	0.0285	<1	<0.000050	<0.0000040	<0.000010	0.000052
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M	0.418	0.00495	<0.000010	0.000701	0.000428	<0.01	0.158			<0.00010	4.52	<0.000010	1.41	0.0212	<1	<0.000050	<0.0000040	<0.000010	0.000051
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M	0.77	0.00754	<0.000010	0.000641	0.000444	<0.01	0.382			<0.00010	5.11	<0.000010	1.93	0.0489	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M	1.01	0.00151	<0.000010	0.00046	0.000326	<0.01	0.43			<0.00010	5.52	<0.000010	2.43	0.0641	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M	0.383	0.00804	<0.000010	0.00058	0.000604	<0.01	0.188			<0.00010	3.81	<0.000010	1.35	0.02	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M	0.356	0.0041	<0.000010	0.00043	<0.00040	<0.050	0.14			<0.00050	3.6	<0.000050	1.16	0.017	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M	0.356	0.00225	<0.000010	0.00039	<0.00040	<0.050	0.17			<0.00050	3.5	<0.000050	1.26	0.0142	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M	0.393	0.00303	<0.000010	0.00034	<0.00040	<0.050	0.18			<0.00050	3.6	<0.000050	1.39	0.0182	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M	0.28	0.00182	<0.000010	0.00035	<0.00040	<0.050	0.13			<0.00050	2.6	<0.000050	0.79	0.0139	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M	0.435	0.00286	<0.000010	0.0005	<0.00040	<0.050	0.2			<0.00050	3.5	<0.000050	1.19	0.0216	5.1	<0.00050	<0.000020	<0.00010	<0.00020
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M																			
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M	0.388	0.00241	<0.000010	0.00041	<0.00040	<0.050	0.11			<0.00050	3.2	<0.000050	1.06	0.0184	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M	0.42	0.00229	<0.000010	0.00051	<0.00040	<0.050	0.2			<0.00050	3	<0.000050	1.16	0.0212	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M	0.31	0.0133	<0.000010	0.00038	<0.00040	<0.050	0.2			<0.00050	3.2	<0.000050	0.99	0.0155	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M	0.416	0.00748	<0.000010	0.000501	0.000275	<0.01	0.191			<0.00010	3.73	<0.000010	1.21	0.026	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M	0.693	0.00776	<0.000010	0.000671	0.000365	<0.010	0.298			<0.00010	4.6	<0.000010	1.69	0.047	<1.0	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M	1.05	0.00529	<0.000010	0.00073	0.000283	<0.01	0.482			<0.00010	4.95	<0.000010	2.05	0.0787	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M	1.15	0.0158	<0.000010	0.000546	0.000365	<0.010	0.524			<0.00010	5.37	<0.000010	2.15	0.0829	<1.0	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M	1.29	0.00404	<0.000010	0.000431	0.000277	<0.01	0.556			<0.00010	5.85	<0.000010	2.49	0.0894	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M	0.597	0.0104	<0.000010	0.00056	0.000413	<0.02	0.285			<0.00010	4.43	<0.000010	1.55	0.032	1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M	0.609	0.00776	<0.000010	0.000603	0.000311	<0.02	0.254			<0.00010	3.93	<0.000010	1.68	0.0342	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M	0.472	0.00468	<0.000010	0.000495	0.000229	<0.01	0.234			<0.00010	3.69	<0.000010	1.39	0.0234	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M	0.502	0.00355	<0.000010	0.00056	<0.00040	<0.050	0.25			<0.00050	3.4	<0.000050	1.55	0.0244	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M	0.516	0.00472	<0.000010	0.00062	<0.00040	<0.050	0.22			<0.00050	3.5	<0.000050	1.34	0.0271	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M	0.379	0.00459	<0.000010	0.000505	0.000322	<0.01	0.216			<0.00010	3.43	<0.000010	1.23	0.0206	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M	0.447	0.00627	<0.000010	0.000579	0.000266	0.012	0.23			<0.00010	4.41	<0.000010	1.46	0.0268	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M	0.0893	0.000763	<0.000010	0.000271	0.000062	<0.01	0.118			<0.00010	0.95	<0.000010	0.584	0.00308	<1	<0.000050	<0.0000040	0.000015	<0.000050
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M	1.09	0.00454	<0.000010	0.000533	0.000319	<0.01	0.489			<0.00010	5.43	<0.000010	2.3	0.0827	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M	1.19	0.00162	<0.000010	0.00057	0.000287	<0.01	0.581			<0.00010	5.8	<0.000010	2.8	0.0899	1	<0.000050	0.0000059	<0.000010	<0.000050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M	1.69	0.0236	<0.000010	0.000431	0.000498	0.025	0.867			<0.00010	6.43	<0.000010	2.83	0.104	1.3	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	0.512	0.0162	<0.000010	0.000604	0.000778	0.038	0.302			<0.00010	3.89	<0.000010	1.62	0.0234	1.2	<0.000050	<0.0000040	0.000015	<0.000050
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M	0.407	0.00475	<0.000010	0.00048	0.000285	<0.02	0.213			<0.00010	3.73	<0.000010	1.42	0.0209	1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	0.545	0.00409	<0.000010	0.000513	0.000256	<0.01	0.199			<0.00010	3.96	<0.000010	1.74	0.0219	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-04		VA24A1299-004	2024-01-23	Water	M	0.392	0.00427	<0.0000050	0.000548	<0.00050	<0.050	0.223		0.00032	<0.000050	3.23	<0.000010	1.22	0.0166	0.67	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2754353-4	2024-01-23	Water	M																			
SW-04		L2754615-4	2024-02-15	Water	M																			
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	0.446	0.00344	<0.0000050	0.000551	<0.00050	<0.050	0.205		0.00032	<0.000050	3.59	<0.000010	1.27	0.0218	0.75	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	0.35	0.00407	<0.0000050	0.00049	<0.00050	<0.050	0.213		0.00033	<0.000050	4	<0.000010	1.34	0.0174	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2755012-4	2024-03-19	Water	M																			
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	0.55	0.0104	<0.0000050	0.00177	0.0005	<0.050	0.422		0.00064	<0.000050	3.84	<0.000010	1.66	0.0277	1.02	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2755503-3	2024-04-25	Water	M																			
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M	0.478	0.00418	<0.0000050	0.000691	<0.00050	<0.050	0.246		0.00034	<0.000050	3.61	<0.000010	1.42	0.0234	0.78	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2755523-2	2024-04-29	Water	M																			
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	0.55	0.00494	<0.0000050	0.000668	<0.00050	<0.050	0.304		0.00055	<0.000050	4.12	<0.000010	1.55	0.0281	0.62	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2755588-3	2024-05-02	Water	M																			
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	0.52	0.00646	<0.0000050	0.000676	<0.00050	<0.050	0.288		0.00054	<0.000050	4.08	<0.000010	1.56	0.0278	0.86	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2755687-4	2024-05-09	Water	M																			
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M	0.53	0.0058	<0.0000050	0.000701	<0.00050	<0.050	0.296		0.00046	<0.000050	4.17	<0.000010	1.5	0.0309	0.92	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2755695-2	2024-05-10	Water	M																			
SW-04		L2755788-2	2024-05-15	Water	M																			
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M	0.594	0.0108	<0.0000050	0.000827	<0.00050	<0.050	0.335		0.00057	<0.000050	4.17	<0.000010	1.77	0.0333	0.97	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	0.577	0.00552	<0.0000050	0.000889	<0.00050	<0.050	0.33		0.00056	<0.000050	4.4	<0.000010	1.68	0.0323	0.7	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2755820-3	2024-05-16	Water	M																			
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	0.499	0.00444	<0.0000050	0.000793	<0.00050	<0.050	0.272		0.00046	<0.000050	4.11	<0.000010	1.77	0.03	0.6	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		VA24B1636-005	2024-05-23	Water	M	0.522	0.00477	<0.0000050	0.000784	<0.00050	<0.050	0.288		0.00047	<0.000050	4.18	<0.000010	1.63	0.0305	0.81	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2755903-5	2024-05-23	Water	M																			
SW-04		L2755916-3	2024-05-23	Water	M																			
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	0.62	0.0116	<0.0000050	0.00115	0.0005	<0.050	0.365		0.00067	<0.000050	4.34	<0.000010	1.95	0.0317	1.23	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2755961-4	2024-05-26	Water	M																			
SW-04		VA24B4655-003	2024-06-20	Water	M	0.598	0.0045	<0.0000050	0.0012	<0.00050	<0.050	0.704		0.0012	<0.000050	4.56	<0.000010	3.31	0.0341	1.15	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2756326-3	2024-06-20	Water	M																			
SW-04		VA24B5289-002	2024-06-26	Water	M	0.677	0.00492	<0.0000050	0.000967	<0.00050	<0.050	0.629		0.0011	<0.000050	4.7	<0.000010	2.48	0.0381	0.9	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2756419-2	2024-06-26	Water	M																			
SW-04		VA24B7579-003	2024-07-18	Water	M	1.02	0.0052	<0.0000050	0.0013	<0.00050	<0.050	0.638		0.00128	<0.000050	5.16	<0.000010	2.38	0.0712	1.02	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2756717-3	2024-07-18	Water	M																			
SW-04		VA24B8974-004	2024-07-31	Water	M	1.08	0.00675	<0.0000050	0.00127	<0.00050	<0.050	0.731		0.00126	<0.000050	5.48	<0.000010	2.74	0.0736	1.21	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2756871-4	2024-07-31	Water	M																			
SW-04		VA24C1546-003	2024-08-22	Water	M	1.11	0.0115	<0.0000050	0.00192	<0.00050	<0.050	0.939		0.00167	<0.000050	5.27	<0.000010	2.78	0.0775	0.89	<0.00020	<0.000010	<0.00010	<0.00010
SW-04		L2757144-3	2024-08-22	Water	M																			
SW-04	SW-04	L2757209-4	2024-08-27	Water	M																			
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	2.74	0.014	<0.0000050	0.00137	0.00105	<0.050	1.17		0.00165	<0.000050	5.2	<0.000010	5.32	0.0778	9.9	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	1.15	0.0122	<0.0000050	0.00932	<0.00050	<0.050	1.82		0.00351	<0.000050	5.85	<0.000010	4.27	0.0576	2.01	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	1.83	0.0336	<0.0000050	0.00658	0.00079	<0.050	1.35		0.0025	<0.000050	5.7	<0.000010	4.58	0.0597	5.69	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	L2757584-2	2024-09-28	Water	M																			
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	6.38	0.0764	0.0000072	0.00355	0.00297	0.165	2.92		0.00278	0.000108	5.99	<0.000010	7.76	0.0783	19.2	<0.00020	0.000014	<0.00010	<0.00010
SW-04	SW-04	L2757661-4	2024-10-04	Water	M																			
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	1.45	0.0394	<0.0000050	0.00739	<0.00050	<0.050	0.972		0.00183	<0.000050	5.74	<0.000010	4.16	0.0657	2.62	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M																			
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	1.81	0.458	0.000016	0.00117	0.00273	0.225	1.27		0.0023	0.000085	6.05	0.000012	2.85	0.0766	3.56	<0.00020	0.000013	<0.00010	<0.00010
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M	0.586	0.0173	<0.0000050	0.000643	<0.00050	<0.050	0.333		0.00054	<0.000050	4.18	<0.000010	1.71	0.0277	1.39	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	L2757873-4	2024-10-22	Water	M																			
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	0.739	0.0321	<0.0000050	0.000894	<0.00050	<0.050	0.406		0.00068	<0.000050	4	<0.000010	1.89	0.0395	1.14	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	1.07	0.0385	<0.0000050	0.00124	0.00077	0.064	1.03		0.0014	<0.000050	4.47	<0.000010	2.94	0.0336	2.07	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	L2757942-1	2024-10-26	Water	M																			
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	1.1	0.0342	<0.0000050	0.000851	0.00074	0.052	0.654		0.00074	<0.000050	4.38	<0.000010	2.3	0.0424	1.96	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	0.882	0.0287	<0.0000050	0.00365	<0.00050	<0.050	0.558		0.00093	<0.000050	4.83	<0.000010	2.21	0.0405	1.24	<0.00020	<0.000010	<0.00010	<0.00010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M																			
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	1.71	0.146	<0.0000050	0.00109	0.00116	0.051	0.878		0.00155	<0.000050	5.09	<0.000010	2.43	0.102	2.27	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M	0.46	0.00736	0.00000222	0.000618	<0.00050	<0.050	0.303		0.00036	<0.000050	3.5	<0.000010	1.44	0.0215	0.91	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	L2758155-4	2024-11-17	Water	M																			
SW-04		4-456131118-0	2024-11-17	Water	F																			
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	0.861	0.0121	<0.0000050	0.00355	0.00058	0.07	0.605		0.00081	<0.000050	4.26	<0.000010	2.1	0.0347	1.6	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M	0.744	0.0126	0.00000159	0.00517	<0.00050	<0.050	0.492		0.00071	<0.000050	4.28	<0.000010	1.98	0.0358	1.32	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	L2758371-3	2024-12-08	Water	M																			
SW-04		4-456441522-0	2024-12-18	Water	F																			
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	0.698	0.0232	<0.0000050	0.00143	0.00052	0.079	0.502		0.00072	<0.000050	4.02	<0.000010	1.63	0.029	1.14	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M																			
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	0.644	0.0202	<0.0000050	0.00251	<0.00050	<0.050	0.534		0.00095	<0.000050	4.24	<0.000010	2.01	0.0337	0.96	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M																			
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M	0.429	0.01	0.0000013	0.00227	<0.00050	<0.050	0.449		0.00071	<0.000050	4.25	<0.000010	1.67	0.0219	0.95	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	L2758765-1	2025-01-25	Water	M																			
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	0.663	0.0127	<0.0000050	0.00113	<0.00050	<0.050	0.426		0.00077	<0.000050	4	<0.000010	1.73	0.0319	1.23	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M																			
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M	1.18	0.05	0.00000508	0.00298	0.001	0.167	0.946		0.00244	<0.000050	5.51	<0.000010	2.48	0.0339	1.34	<0.00020	0.000015	<0.00010	<0.00010
SW-04	SW-04	L2759042-2	2025-02-21	Water	M																			
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	0.672	0.00695	0.00000082	0.00906	<0.00050	<0.050	0.904		0.00176	0.0000574	4.16	<0.000010	3.43	0.0296	1.48	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	L2759255-2	2025-03-19	Water	M																			
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M	0.409	0.00755	<0.0000050	0.00219	<0.00050	0.112	0.419		0.00069	<0.000050	3.15	<0.000010	1.55	0.0166	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	0.649	0.00554	0.00000112	0.00714	<0.00050	0.058	0.644		0.00112	0.000059	4.18	<0.000010	2.82	0.0274	1.22	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M																			
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	0.62	0.00776	0.00000266	0.00337	0.00053	0.16	0.573		0.00068	<0.000050	3.31	<0.000010	2.12	0.0219	0.58	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M																			
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	0.525	0.00603	0.00000137	0.00572	<0.00050	<0.050	0.435		0.0007	<0.000050	4.36	<0.000010	2.72	0.0249	0.89	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M																			
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	0.863	0.00973	0.00000067	0.00941	<0.00050	<0.050	0.71		0.00114	<0.000050	5.71	<0.000010	3.61	0.0376	1.4	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M																			
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	0.904	0.00529	<0.0000050	0.0122	<0.00050	<0.050	1		0.00164	0.000089	6.35	<0.000010	3.42	0.0447	2.22	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	0.786	0.0055	0.00000099	0.01	<0.00050	<0.050	0.708		0.00095	<0.000050	5.42	<0.000010	3.42	0.0388	1.38	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M																			
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	0.767	0.00436	<0.0000050	0.0106	<0.00050	<0.050	0.668		0.00102	<0.000050	5.86	<0.000010	3.52	0.0367	1.39	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	0.877	0.012	<0.0000050	0.0143	<0.00050	<0.050	0.974		0.00164	0.000068	7.49	<0.000010	3.58	0.0426	2.33	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M	0.91	0.00932	0.0000009	0.0156	<0.00050	<0.050	0.952		0.00165	0.00006	6.32	<0.000010	4.39	0.0443	1.86	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	1.2	0.0147	<0.0000050	0.0172	<0.00050	<0.050	1.24		0.0023	0.000069	8.9	<0.000010	5.11	0.0537	2.86	<0.00020	<0.000010	<0.00010	<0.00010
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	0.846	0.012	<0.0000050	0.0125	<0.00050	<0.050	1.09		0.00184	0.000066	5.85	<0.000010	4.17	0.0403	1.77	<0.00020	<0.000010	<0.00010	<0.00010
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	0.17	0.00305	<0.000010	0.0009	<0.00040	<0.050	0.18			<0.00050	1.6	<0.000050	0.71	0.0074	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M	0.128	0.0144		0.00036	<0.00040	<0.050	0.14			<0.00050	1.5	<0.000050	0.55	0.0058	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M	0.141	0.00256	<0.000010	0.000609	0.000237	<0.01	0.089			<0.00010	1.88	<0.000010	0.674	0.00639	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M	0.168	0.00117	<0.000010	0.000625	0.000347	<0.02	0.158			<0.00010	2.1	<0.000010	0.81	0.00707	<1	<0.000050	<0.0000040	0.00001	<0.000050
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	0.176	0.000511	<0.000010	0.000862	0.0002	<0.01	0.137			<0.00010	2.02	<0.000010	0.919	0.00717	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M	0.131	0.000797	<0.000010	0.000496	0.000185	<0.01	0.177			<0.00010	1.79	<0.000010	0.742	0.00546	<1	<0.000050	<0.0000040	0.000012	<0.000050
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M	0.129	0.00064	<0.000010	0.0004	<0.00040	<0.050	0.19			<0.00050	1.5	<0.000050	0.82	0.0052	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	0.11	0.00079	<0.000010	0.0003	<0.00040	<0.050	0.16			<0.00050	1.6	<0.000050	0.67	0.0047	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	0.108	0.00101	<0.000010	0.000298	0.000257	<0.01	0.186			<0.00010	1.55	<0.000010	0.66	0.00473	<1	<0.000050	<0.0000040	0.00001	<0.000050
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	0.161	0.00226	<0.000010	0.000791	0.00047	<0.01	0.184			<0.00010	2.22	<0.000010	0.83	0.00801	<1	<0.000050	<0.0000040	0.000016	<0.000050
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M																			
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M																			
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M	0.112	0.00108	<0.000010	0.000225	0.000209	<0.01	0.139			<0.00010	1.86	<0.000010	0.672	0.00554	<1	<0.000050	<0.0000040	0.000012	<0.000050
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M	0.139	0.0011	0.000012	0.00029	0.000195	<0.01	0.104			<0.00010	1.84	<0.000010	0.812	0.00537	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M	0.161	0.0011	<0.000010	0.00056	<0.00040	<0.050	0.21			<0.00050	1.5	<0.000050	0.56	0.0099	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M	0.174	0.0109	<0.000010	0.00048	<0.00040	<0.050	0.23			<0.00050	1.7	<0.000050	0.58	0.0106	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M	0.18	0.00148	<0.000010	0.000644	0.000205	<0.01	0.169			<0.00010	1.89	<0.000010	0.651	0.0131	<1	<0.000050	<0.0000040	0.000011	<0.000050
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M	0.217	0.00493	<0.000010	0.000894	0.000269	<0.010	0.178			<0.00010	2.11	<0.000010	0.784	0.0202	<1.0	<0.000050	<0.0000040	<0.000010	<0.000050
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M	0.179	0.00104	<0.000010	0.000536	0.000222	<0.02	0.208			<0.00010	1.98	<0.000010	0.682	0.0105	<1	<0.000050	<0.0000040	0.000015	<0.000050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M	0.191	0.00126	<0.000010	0.000516	0.000172	<0.01	0.187			<0.00010	1.86	<0.000010	0.745	0.0122	<1	<0.000050	<0.0000040	0.00001	<0.000050
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M	0.152	0.00159	<0.000010	0.000511	0.000161	<0.01	0.21			<0.00010	1.72	<0.000010	0.622	0.00828	<1	<0.000050	<0.0000040	0.000012	<0.000050
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M	0.162	0.001	<0.000010	0.00051	<0.00040	<0.050	0.22			<0.00050	1.7	<0.000050	0.75	0.009	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M	0.14	0.00071	<0.000010	0.00052	<0.00040	<0.050	0.18			<0.00050	1.6	<0.000050	0.61	0.0076	<3.0	<0.00050	<0.000020	<0.00010	<0.00020
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M	0.148	0.000838	<0.000010	0.000585	0.000331	<0.01	0.207			<0.00010	1.68	<0.000010	0.634	0.00867	<1	<0.000050	<0.0000040	0.000046	<0.000050
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M	0.189	0.00119	<0.000010	0.000675	0.000168	<0.01	0.192			<0.00010	1.99	<0.000010	0.77	0.0136	<1	<0.000050	<0.0000040	0.000012	<0.000050
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M	0.166	0.00133	<0.000010	0.00051	0.000218	<0.01	0.249			<0.00010	2.09	<0.000010	0.746	0.01	<1	<0.000050	<0.0000040	0.000021	<0.000050
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M	0.163	0.000643	<0.000010	0.00067	0.000232	<0.01	0.195			<0.00010	1.9	<0.000010	0.711	0.00974	<1	<0.000050	<0.0000040	0.000017	<0.000050
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	0.194	0.00545	0.000014	0.000579	0.000212	<0.01	0.146			<0.00010	2.03	<0.000010	0.836	0.00892	<1	<0.000050	<0.0000040	0.000014	<0.000050
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	0.146	0.00137	0.00000464	0.000508	<0.00050	<0.050	0.19		0.00039	<0.000050	1.68	<0.000010	0.686	0.00796	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	0.144	0.00387	0.00000606	0.000492	<0.00050	<0.050	0.198		0.0004	<0.000050	1.58	<0.000010	0.61	0.00835	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	0.352	0.000254	<0.000010	0.000659	0.000125	<0.01	0.499			<0.00010	3	<0.000010	3.35	0.0163	1.6	<0.000050	<0.0000040	<0.000010	<0.000050
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M	0.222	0.000342	<0.000010	0.000857	0.000192	0.018	0.351			<0.00010	2.56	<0.000010	1.92	0.00961	1.2	<0.000050	<0.0000040	<0.000010	<0.000050
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M	0.113	0.00307	<0.000010	0.000172	0.000198	<0.01	0.177			<0.00010	1.8	<0.000010	0.682	0.00482	<1	<0.000050	<0.0000040	0.000017	<0.000050
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M	0.17	0.000732	<0.000010	0.000365	0.000331	<0.01	0.221			<0.00010	2.62	<0.000010	1.08	0.00762	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M	0.185	0.000529	<0.000010	0.000362	0.000192	<0.01	0.155			<0.00010	2.62	<0.000010	1.24	0.00726	<1	<0.000050	<0.0000040	<0.000010	<0.000050
SW-07		VA24A1299-005	2024-01-23	Water	M	0.129	0.00237	<0.0000050	0.000295	<0.00050	<0.050	0.162		0.0004	<0.000050	2.05	<0.000010	0.69	0.0049	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2754353-5	2024-01-23	Water	M																			
SW-07		L2754615-5	2024-02-15	Water	M																			
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	0.185	0.00052	<0.0000050	0.000378	<0.00050	<0.050	0.22		0.00052	<0.000050	2.74	<0.000010	1.28	0.00853	1.02	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	0.116	0.00063	<0.0000050	0.000308	<0.00050	<0.050	0.148		0.00035	<0.000050	1.87	<0.000010	0.692	0.00499	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2755012-5	2024-03-19	Water	M																			
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	0.129	0.00038	<0.0000050	0.000491	<0.00050	<0.050	0.183		0.00039	<0.000050	1.88	<0.000010	0.834	0.00523	0.51	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2755504-3	2024-04-26	Water	M																			
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M	0.101	0.00082	<0.0000050	0.000268	<0.00050	<0.050	0.14		0.00037	<0.000050	1.6	<0.000010	0.592	0.00407	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2755521-1	2024-04-28	Water	M																			
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	0.131	0.00053	<0.0000050	0.000466	<0.00050	<0.050	0.179		0.00043	<0.000050	1.94	<0.000010	0.835	0.00559	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2755598-3	2024-05-03	Water	M																			
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	0.102	0.00048	<0.0000050	0.00035	<0.00050	<0.050	0.144		0.00034	<0.000050	1.61	<0.000010	0.681	0.0042	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M	0.102	0.00042	<0.0000050	0.000337	<0.00050	<0.050	0.142		0.0003	<0.000050	1.56	<0.000010	0.687	0.00428	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2755677-3	2024-05-09	Water	M																			
SW-07		L2755687-3	2024-05-09	Water	M																			
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	0.0862	0.00042	<0.0000050	0.000311	<0.00050	<0.050	0.128		0.0003	<0.000050	1.31	<0.000010	0.639	0.00356	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2755770-3	2024-05-14	Water	M																			
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	0.0771	0.00049	<0.0000050	0.00025	<0.00050	<0.050	0.114		0.0003	<0.000050	1.24	<0.000010	0.524	0.00338	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2755819-3	2024-05-17	Water	M																			
SW-07		VA24B1636-003	2024-05-23	Water	M	0.094	0.00075	<0.0000050	0.00031	<0.00050	<0.050	0.136		0.00032	<0.000050	1.4	<0.000010	0.612	0.0042	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2755903-3	2024-05-23	Water	M																			
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	0.0921	0.0004	<0.0000050	0.000296	<0.00050	<0.050	0.143		0.00031	<0.000050	1.45	<0.000010	0.626	0.00413	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2755933-3	2024-05-24	Water	M																			
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M	0.0895	0.00039	<0.0000050	0.000305	<0.00050	<0.050	0.136		0.00031	<0.000050	1.42	<0.000010	0.608	0.00403	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2755961-3	2024-05-26	Water	M																			
SW-07		VA24B4698-003	2024-06-21	Water	M	0.0829	0.00031	<0.0000050	0.000342	<0.00050	<0.050	0.13		0.00036	<0.000050	1.21	<0.000010	0.614	0.0037	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2756349-3	2024-06-21	Water	M																			
SW-07		VA24B5289-003	2024-06-26	Water	M	0.0875	0.00029	<0.0000050	0.00034	<0.00050	<0.050	0.141		0.00037	<0.000050	1.27	<0.000010	0.636	0.00389	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2756419-3	2024-06-26	Water	M																			
SW-07		VA24B7689-003	2024-07-19	Water	M	0.13	0.00032	<0.0000050	0.000471	<0.00050	<0.050	0.226		0.00056	<0.000050	1.67	<0.000010	1.07	0.00588	0.62	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2756726-3	2024-07-19	Water	M																			
SW-07		L2756871-5	2024-07-31	Water	M																			
SW-07		VA24B8974-005	2024-07-31	Water	M	0.132	0.00026	<0.0000050	0.000548	<0.00050	<0.050	0.224		0.00056	<0.000050	1.8	<0.000010	1.29	0.00616	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		VA24C1605-003	2024-08-23	Water	M	0.24	0.00027	<0.0000050	0.000672	<0.00050	<0.050	0.375		0.00083	<0.000050	2.55	<0.000010	2.19	0.0115	1.1	<0.00020	<0.000010	<0.00010	<0.00010
SW-07		L2757153-3	2024-08-23	Water	M																			
SW-07	SW-07	L2757209-5	2024-08-27	Water	M																			
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	0.127	0.00051	<0.0000050	0.000447	<0.00050	<0.050	0.206		0.00056	<0.000050	1.78	<0.000010	1	0.00544	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	0.291	0.00024	<0.0000050	0.00068	<0.00050	<0.050	0.394		0.00099	<0.000050	2.85	<0.000010	2.74	0.0136	1.3	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M	0.166	0.00038	<0.0000050	0.000589	<0.00050	<0.050	0.242		0.00057	<0.000050	2.52	<0.000010	1.32	0.00755	0.56	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	L2757587-4	2024-09-29	Water	M																			

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M	0.209	0.00025	<0.0000050	0.000647	<0.00050	<0.050	0.294		0.00072	<0.000050	2.56	<0.000010	1.67	0.00943	1	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	L2757664-1	2024-10-03	Water	M																			
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	0.218	0.00023	<0.0000050	0.000629	<0.00050	<0.050	0.289		0.0007	<0.000050	2.57	<0.000010	2.08	0.00924	0.78	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M																			
SW-07		492-455781017-0	2024-10-13	Water	F																			
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M	0.164	0.0026	<0.0000050	0.000609	<0.00050	<0.050	0.12		0.00028	<0.000050	3.16	<0.000010	0.962	0.00503	0.7	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	L2757873-5	2024-10-22	Water	M																			
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	0.183	0.00058	<0.0000050	0.000442	<0.00050	<0.050	0.254		0.00068	<0.000050	2.81	<0.000010	1.13	0.00847	0.87	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	0.185	0.00055	<0.0000050	0.000413	<0.00050	<0.050	0.253		0.00061	<0.000050	2.75	<0.000010	1.21	0.00799	0.82	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	L2757913-4	2024-10-25	Water	M																			
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	0.164	0.00135	<0.0000050	0.000456	<0.00050	<0.050	0.206		0.00052	<0.000050	2.83	<0.000010	0.994	0.00685	0.67	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	0.127	0.00063	<0.0000050	0.000527	<0.00050	<0.050	0.159		0.00037	<0.000050	2.26	<0.000010	0.807	0.00518	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M																			
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	0.133	0.00161	<0.0000050	0.000279	<0.00050	<0.050	0.147		0.00041	<0.000050	2.51	<0.000010	0.768	0.00561	0.78	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	0.139	0.00154	0.00000086	0.000392	<0.00050	<0.050	0.163		0.00034	<0.000050	2.6	<0.000010	0.9	0.00606	0.51	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	L2758155-1	2024-11-16	Water	M																			
SW-07		VA24D1587-003	2024-11-20	Water	M	0.169	0.00224	<0.0000050	0.000566	<0.00050	<0.050	0.12		0.0002	<0.000050	2.89	<0.000010	0.916	0.00506	0.68	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M																			
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	0.132	0.00236	0.00000123	0.000302	<0.00050	<0.050	0.185		0.00039	<0.000050	1.88	<0.000010	0.992	0.00532	0.5	<0.00020	<0.000010	<0.00010	0.00011
SW-07	SW-07	L2758371-4	2024-12-08	Water	M																			
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	0.135	0.00281	<0.0000050	0.000358	<0.00050	<0.050	0.107		0.00026	<0.000050	2.34	<0.000010	0.833	0.00452	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M																			
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	0.254	0.00052	<0.0000050	0.000698	<0.00050	<0.050	0.259		0.00061	<0.000050	3.19	<0.000010	1.8	0.011	1.1	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M																			
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M	0.246	0.00038	0.00000055	0.000516	<0.00050	<0.050	0.248		0.00055	<0.000050	3.06	<0.000010	1.83	0.011	1.14	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	L2758765-2	2025-01-25	Water	M																			
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M	0.467	0.00575	0.00000075	0.000635	<0.00050	<0.050	0.347		0.00074	<0.000050	3.2	<0.000010	3.25	0.0114	1.17	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	L2759009-3	2025-02-19	Water	M																			
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	0.191	0.00321	<0.0000050	0.000688	<0.00050	<0.050	0.125		0.00024	<0.000050	2.8	<0.000010	1.06	0.00509	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M																			
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	0.266	0.00123	0.00000073	0.000412	<0.00050	<0.050	0.226		0.000526	<0.000050	2.64	<0.000010	1.9	0.00905	0.893	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	L2759254-3	2025-03-18	Water	M																			
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	0.101	0.00339	<0.0000050	0.000174	<0.00050	<0.050	0.116		0.00037	<0.000050	1.35	<0.000010	0.51	0.00376	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	0.131	0.0006	0.00000067	0.000331	<0.00050	<0.050	0.174		0.00039	<0.000050	2.14	<0.000010	0.938	0.00607	0.52	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M																			
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	0.0951	0.0012	0.00000125	0.000182	<0.00050	<0.050	0.127		0.00026	<0.000050	1.29	<0.000010	0.543	0.00363	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M																			
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M																			
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	0.205	0.00072	0.00000089	0.000301	<0.00050	<0.050	0.171		0.00035	<0.000050	1.9	<0.000010	1.54	0.00606	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	0.112	0.00044	0.00000076	0.000464	<0.00050	<0.050	0.132		0.0003	<0.000050	1.79	<0.000010	0.787	0.00466	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M																			
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	0.118	0.0004	<0.0000050	0.000487	<0.00050	<0.050	0.153		0.00034	<0.000050	1.74	<0.000010	0.784	0.00487	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	0.275	0.00078	0.00000072	0.000306	<0.00050	<0.050	0.177		0.00031	<0.000050	1.37	<0.000010	2.14	0.00505	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M																			
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	0.09	0.0004	<0.0000050	0.000306	<0.00050	<0.050	0.113		0.00027	<0.000050	1.29	<0.000010	0.56	0.00379	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	0.0801	0.00039	<0.0000050	0.000266	<0.00050	<0.050	0.099		0.00025	<0.000050	1.22	<0.000010	0.522	0.00336	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	0.136	0.00096	0.00000097	0.000337	<0.00050	<0.050	0.134		0.00032	<0.000050	1.38	<0.000010	0.9	0.00439	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M																			
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	0.0964	0.0007	<0.0000050	0.00032	<0.00050	<0.050	0.11		0.00033	<0.000050	1.25	<0.000010	0.633	0.00386	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	0.111	0.00053	<0.0000050	0.000481	<0.00050	<0.050	0.137		0.00037	<0.000050	1.76	<0.000010	0.787	0.00493	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	0.0846	0.00118	<0.0000050	0.000245	<0.00050	<0.050	0.095		0.00023	<0.000050	1.16	<0.000010	0.509	0.00283	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08		L2755503-2	2024-04-25	Water	M																			
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	0.103	0.00318	<0.0000050	0.00021	<0.00050	<0.050	0.112		0.00029	<0.000050	1.29	<0.000010	0.568	0.00315	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08		L2755588-2	2024-05-02	Water	M																			
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	0.0691	0.00108	<0.0000050	0.000178	<0.00050	<0.050	0.07		0.00028	<0.000050	1.02	<0.000010	0.444	0.0024	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08		L2755694-2	2024-05-10	Water	M																			
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	0.0698	0.00118	<0.0000050	0.000374	<0.00050	<0.050	0.079		<0.00020	<0.000050	1.01	<0.000010	0.434	0.00242	<0.50	<0.00020	<0.000010	<0.00010	<0.00010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Re	T-Rb	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Te	T-Tl	T-Th	T-Sn
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M																			
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	0.0735	0.00114	<0.0000050	0.000197	<0.00050	<0.050	0.061		0.00022	<0.000050	1.06	<0.000010	0.467	0.00255	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08		L2755916-2	2024-05-23	Water	M																			
SW-08		VA24B4655-002	2024-06-20	Water	M	0.0849	0.00274	<0.0000050	0.000207	<0.00050	<0.050	0.095		0.00025	<0.000050	1.06	<0.000010	0.541	0.00286	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08		L2756326-2	2024-06-20	Water	M																			
SW-08		VA24B7579-002	2024-07-18	Water	M	0.0878	0.00222	<0.0000050	0.000232	<0.00050	<0.050	0.091		0.00026	<0.000050	1.12	<0.000010	0.56	0.00312	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08		L2756717-2	2024-07-18	Water	M																			
SW-08		VA24C1546-002	2024-08-22	Water	M	0.0894	0.0021	<0.0000050	0.000251	<0.00050	<0.050	0.103		0.00026	<0.000050	1.06	<0.000010	0.615	0.00312	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08		L2757144-2	2024-08-22	Water	M																			
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	0.0942	0.00189	<0.0000050	0.000274	<0.00050	<0.050	0.104		0.00028	<0.000050	1.12	<0.000010	0.648	0.00299	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	0.105	0.00134	<0.0000050	0.000257	<0.00050	<0.050	0.126		0.00037	<0.000050	1.45	<0.000010	0.645	0.00373	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	0.104	0.00131	<0.0000050	0.000268	<0.00050	<0.050	0.123		0.00033	<0.000050	1.64	<0.000010	0.609	0.00365	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	0.108	0.0015	<0.0000050	0.000277	<0.00050	<0.050	0.137		0.0003	<0.000050	1.66	<0.000010	0.683	0.00399	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	0.0846	0.00168	<0.0000050	0.00015	<0.00050	<0.050	0.103		0.00039	<0.000050	1.42	<0.000010	0.425	0.00343	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	0.101	0.00108	<0.0000050	0.000212	<0.00050	<0.050	0.107		0.00033	<0.000050	1.53	<0.000010	0.628	0.00385	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	0.228	0.00208	<0.0000050	0.000487	<0.00050	<0.050	0.17		0.00022	<0.000050	3.81	<0.000010	1.29	0.0125	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09		L2755503-4	2024-04-25	Water	M																			
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	0.228	0.00145	<0.0000050	0.000488	<0.00050	<0.050	0.149		<0.00020	<0.000050	4.1	<0.000010	1.37	0.0122	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09		L2755588-4	2024-05-02	Water	M																			
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	0.231	0.00229	<0.0000050	0.000493	<0.00050	<0.050	0.149		0.00021	<0.000050	4.01	<0.000010	1.38	0.0121	<0.50	<0.00020	<0.000010	<0.00020	<0.00010
SW-09		L2755687-5	2024-05-09	Water	M																			
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	0.242	0.00074	<0.0000050	0.000545	<0.00050	<0.050	0.163		0.00022	<0.000050	4.39	<0.000010	1.43	0.0139	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09		L2755820-4	2024-05-16	Water	M																			
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	0.237	0.00144	<0.0000050	0.000527	<0.00050	<0.050	0.13		0.0002	<0.000050	4.02	<0.000010	1.52	0.0138	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09		L2755916-4	2024-05-23	Water	M																			
SW-09		VA24B4655-004	2024-06-20	Water	M	0.243	0.00159	<0.0000050	0.00055	<0.00050	<0.050	0.147		<0.00020	<0.000050	4.3	<0.000010	1.53	0.0138	0.57	<0.00020	<0.000010	<0.00010	<0.00010
SW-09		L2756326-4	2024-06-20	Water	M																			
SW-09		VA24B7579-004	2024-07-18	Water	M	0.298	0.00072	<0.0000050	0.000696	<0.00050	<0.050	0.171		0.00025	<0.000050	5.2	<0.000010	1.7	0.0179	0.63	<0.00020	<0.000010	<0.00010	<0.00010
SW-09		L2756717-4	2024-07-18	Water	M																			
SW-09		VA24C1546-004	2024-08-22	Water	M	0.326	0.00082	<0.0000050	0.000756	<0.00050	<0.050	0.224		0.00026	<0.000050	4.9	<0.000010	1.86	0.0201	0.72	<0.00020	<0.000010	<0.00010	<0.00010
SW-09		L2757144-4	2024-08-22	Water	M																			
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	0.355	0.00318	<0.0000050	0.000823	<0.00050	<0.050	0.226		0.00028	<0.000050	5.03	<0.000010	1.96	0.0188	0.89	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	0.259	0.00751	<0.0000050	0.000305	<0.00050	<0.050	0.155		0.00029	<0.000050	3.47	<0.000010	1.28	0.0127	0.54	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	0.208	0.00066	<0.0000050	0.000407	<0.00050	<0.050	0.14		<0.00020	<0.000050	3.49	<0.000010	1.16	0.0112	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	0.19	0.00058	<0.0000050	0.000386	<0.00050	<0.050	0.125		0.00021	<0.000050	3.54	<0.000010	1.13	0.0101	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	0.223	0.00083	<0.0000050	0.00046	<0.00050	<0.050	0.142		0.00021	<0.000050	3.85	<0.000010	1.27	0.0116	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M																			
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	0.17	0.00115	<0.0000050	0.000308	<0.00050	<0.050	0.1		0.00023	<0.000050	3.12	<0.000010	0.966	0.00887	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	0.162	0.00096	<0.0000050	0.000371	<0.00050	<0.050	0.118		<0.00020	<0.000050	3.44	<0.000010	1.09	0.00907	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M																			
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	0.177	0.00085	<0.0000050	0.00037	<0.00050	<0.050	0.124		<0.00020	<0.000050	3.07	<0.000010	1.09	0.00944	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	0.205	0.00038	<0.0000050	0.000526	<0.00050	<0.050	0.136		<0.00020	<0.000050	3.92	<0.000010	1.32	0.0112	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M																			
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	0.185	0.00084	<0.0000050	0.000364	<0.00050	<0.050	0.114		<0.00020	<0.000050	3.29	<0.000010	1.21	0.00886	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M																			
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	0.148	0.00095	<0.0000050	0.000304	<0.00050	<0.050	0.104		0.00021	<0.000050	2.84	<0.000010	0.971	0.00799	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	0.176	0.0005	<0.0000050	0.000454	<0.00050	<0.050	0.142		<0.00020	<0.000050	3.58	<0.000010	1.15	0.00961	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	0.198	0.00093	<0.0000050	0.000486	<0.00050	<0.050	0.16		0.00022	<0.000050	4.03	<0.000010	1.36	0.0111	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	0.212	0.00063	<0.0000050	0.000544	<0.00050	<0.050	0.156		0.00025	<0.000050	4.17	<0.000010	1.45	0.0124	0.55	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	0.238	0.0008	<0.0000050	0.00053	<0.00050	<0.050	0.172		0.00027	<0.000050	4.48	<0.000010	1.51	0.0132	<0.50	<0.00020	<0.000010	<0.00010	<0.00010
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M	0.237	0.00101	<0.0000050	0.000516	<0.00050	<0.050	0.172		0.00025	<0.000050	4.35	<0.000010	1.55	0.0138	<0.50	<0.00020	<0.000010	<0.00010	<0.00010

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M	0.00069	<0.00010	0.000075	<0.00050		0.0134	<0.00020	0.0903	<0.00010	0.0001	0.00356	<0.000100	<0.000050	<0.010	<0.0000050	2.28	<0.000010	<0.00050
OUT-01		VA24B1636-006	2024-05-23	Water	M	0.0007	<0.00010	0.000056	<0.00050		0.011	<0.00020	0.091	<0.00010	<0.00010	0.00336	<0.000100	<0.000050	<0.010	<0.0000050	1.88	<0.000010	<0.00050
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M	0.00622	<0.00010	0.000159	0.00081		0.0116	<0.00020	0.148	0.0001	0.00016	0.0059	<0.000100	<0.000050	<0.010	0.0000064	4.31	<0.000010	<0.00050
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M	0.0109	<0.00010	0.000281	0.00075		0.0044	<0.00020	0.257	<0.00010	0.00018	0.00348	<0.000100	<0.000050	<0.010	<0.0000050	2.43	<0.000010	<0.00050
OUT-01		661-455931031-0	2024-10-28	Water	F																		
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M	0.00203	<0.00010	0.000173	<0.00050		<0.0030	<0.00020	0.17	<0.00010	0.00017	0.00354	<0.000020	<0.000050	<0.010	<0.0000050	2.22	<0.000010	<0.00050
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M	0.00128	<0.00010	0.000102	<0.00050		<0.0030	<0.00020	0.139	<0.00010	0.00011	0.00267	<0.000020	<0.000050	<0.010	<0.0000050	1.86	<0.000010	<0.00050
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M	0.00206	<0.00010	0.000378	<0.00050		0.046	<0.00020	0.0625	0.0002	0.00019	0.0081	<0.000020	<0.000050	0.015	0.0000124	9.28	0.000012	<0.00050
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M	0.00101	<0.00010	0.000081	<0.00050		<0.0030	<0.00020	0.14	<0.00010	0.0001	0.00262	<0.000020	<0.000050	<0.010	<0.0000050	1.53	<0.000010	<0.00050
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M	0.00277	<0.00010	0.00004	<0.00050		0.0052	<0.00020	0.199	<0.00010	<0.00010	0.00244	<0.000020	<0.000050	<0.010	<0.0000050	1.18	<0.000010	<0.00050
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M																		
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M	0.00146	<0.00010	0.000127	<0.00050		<0.0030	<0.00020	0.113	<0.00010	0.00014	0.00439	<0.000020	<0.000050	<0.010	0.0000052	2.86	<0.000010	<0.00050
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M	0.00333	<0.00010	0.000236	<0.00050		<0.0030	<0.00020	0.069	<0.00010	0.00015	0.00397	<0.000020	<0.000050	<0.010	<0.0000050	2.58	<0.000010	<0.00050
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M	0.00039	<0.00010	0.000084	<0.00050		<0.0030	<0.00020	0.141	<0.00010	0.00012	0.00514	<0.000020	<0.000050	<0.010	<0.0000050	3.29	0.00001	<0.00050
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M	0.0013	<0.00010	0.000376	<0.00050		<0.0030	<0.00020	0.214	<0.00010	<0.00010	0.00393	<0.000100	<0.000050	<0.010	0.0000085	3.38	<0.000010	<0.00050
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M	0.00056	<0.00010	0.000274	<0.00050		<0.0030	<0.00020	0.0925	<0.00010	0.0001	0.00424	<0.000100	<0.000050	<0.010	<0.0000050	4.2	<0.000010	<0.00050
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M	0.00056	<0.00010	0.000312	<0.00050		<0.0030	<0.00020	0.0657	<0.00010	<0.00010	0.00755	<0.000100	<0.000050	<0.010	0.0000101	8.64	<0.000010	<0.00050
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M	0.00085	<0.00010	0.000069	<0.00050		0.0098	<0.00020	0.095	<0.00010	<0.00010	0.00382	<0.000100	<0.000050	<0.010	<0.0000050	2.21	<0.000010	<0.00050
OUT-02		VA24B5289-006	2024-06-26	Water	M	0.0009	<0.00010	0.000281	<0.00050		<0.0030	<0.00020	0.0484	<0.00010	0.0001	0.00972	<0.000100	<0.000050	0.012	0.0000143	10.5	<0.000010	<0.00050
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M	0.00115	<0.00010	0.000091	<0.00050		<0.0030	<0.00020	0.169	<0.00010	<0.00010	0.00385	<0.000100	<0.000050	<0.010	<0.0000050	1.67	0.000011	<0.00050
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M	0.00099	<0.00010	0.000088	<0.00050		<0.0030	<0.00020	0.121	<0.00010	<0.00010	0.00311	<0.000100	<0.000050	<0.010	<0.0000050	1.45	<0.000010	<0.00050
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M	0.0225	<0.00010	0.000701	0.00115		0.0036	0.00027	0.206	<0.00010	0.00012	0.0041	<0.000100	<0.000050	<0.010	0.0000079	2.78	<0.000010	<0.00050
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M	0.00251	<0.00010	0.000236	<0.00050		<0.0030	<0.00020	0.214	<0.00010	<0.00010	0.00286	<0.000020	<0.000050	<0.010	<0.0000050	1.86	<0.000010	<0.00050
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M	0.00384	<0.00010	0.000181	<0.00050		<0.0030	<0.00020	0.185	<0.00010	<0.00010	0.00279	<0.000020	<0.000050	<0.010	<0.0000050	1.86	<0.000010	<0.00050
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M	0.00318	<0.00010	0.00018	<0.00050		<0.0030	<0.00020	0.118	<0.00010	<0.00010	0.0031	<0.000020	<0.000050	<0.010	<0.0000050	2.48	<0.000010	<0.00050
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M	0.00079	<0.00010	0.000048	<0.00050		<0.0030	<0.00020	0.156	<0.00010	<0.00010	0.00272	<0.000020	<0.000050	<0.010	<0.0000050	1.22	<0.000010	<0.00050
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M	0.00714	<0.00010	0.000216	0.00061		<0.0030	<0.00020	0.263	<0.00010	<0.00010	0.00217	<0.000020	<0.000050	<0.010	<0.0000050	1.64	<0.000010	<0.00050
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M																		
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M	0.00974	<0.00010	0.000323	0.00059		<0.0030	0.00093	0.122	<0.00010	<0.00010	0.00309	<0.000020	<0.000050	<0.010	0.000006	1.88	<0.000010	<0.00050
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M	0.00446	<0.00010	0.000173	<0.00050		<0.0030	<0.00020	0.15	<0.00010	<0.00010	0.00272	<0.000020	<0.000050	<0.010	<0.0000050	1.53	<0.000010	<0.00050
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M	0.00048	<0.00010	0.000096	<0.00050		<0.0030	<0.00020	0.0959	<0.00010	<0.00010	0.00278	<0.000020	<0.000050	<0.010	<0.0000050	1.37	<0.000010	<0.00050
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M	0.00198	<0.00010	0.000214	<0.00050		0.0108	<0.00020	0.085	<0.00010	<0.00010	0.00325	<0.000020	<0.000050	<0.010	<0.0000050	2.2	<0.000010	<0.00050
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M	0.00286	<0.00010	0.000208	0.00093		<0.0030	<0.00020	0.128	0.00031	0.00031	0.00779	<0.000100	<0.000050	0.012	0.0000053	13	<0.000010	<0.00050
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M	0.00409	<0.00010	0.000187	0.00128		<0.0030	<0.00020	0.202	0.00052	0.00071	0.00273	<0.000100	<0.000050	<0.010	<0.0000050	7.58	<0.000010	0.0006
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	0.0416	<0.00010	0.000283	0.00264		0.0081	0.00026	0.222	0.00014	0.00032	0.00647	<0.000100	<0.000050	0.011	<0.0000050	7.49	<0.000010	<0.00050
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M																		
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M	0.00282	<0.00010	0.000102	0.0007		<0.0030	<0.00020	0.182	0.00015	0.00026	0.00675	<0.000100	<0.000050	0.01	0.0000092	7.5	<0.000010	<0.00050
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M	0.00306	<0.00010	0.00009	0.00063		<0.0030	<0.00020	0.168	0.00013	0.00016	0.00665	<0.000020	<0.000050	<0.010	0.000005	7.41	<0.000010	<0.00050
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M	0.00186	<0.00010	0.000077	0.00056		<0.0030	<0.00020	0.149	0.00013	0.00018	0.00601	<0.000020	<0.000050	<0.010	<0.0000050	7.14	<0.000010	<0.00050
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M	0.00529	<0.00010	0.000103	0.00076		<0.0030	<0.00020	0.149	0.00019	0.00032	0.0027	<0.000020	<0.000050	<0.010	<0.0000050	5.32	<0.000010	<0.00050
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	0.00199	<0.00010	0.000098	<0.00050		<0.0030	<0.00020	0.142	<0.00010	0.00018	0.00311	<0.000100	<0.000050	<0.010	<0.0000050	4.08	<0.000010	<0.00050
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M																		
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M	0.00225	<0.00010	0.000051	<0.00050		<0.0030	<0.00020	0.163	<0.00010	0.00017	0.00315	<0.000020	<0.000050	<0.010	<0.0000050	4.11	<0.000010	<0.00050
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M	0.00769	<0.00010	0.000063	0.0008		<0.0030	<0.00020	0.232	<0.00010	0.00016	0.00376	<0.000020	<0.000050	<0.010	<0.0000050	3.99	<0.000010	<0.00050
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M																		
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M	0.00227	<0.00010	0.000045	0.0006		<0.0030	<0.00020	0.16	<0.00010	0.00018	0.00324	<0.000020	<0.000050	<0.010	<0.0000050	3.59	<0.000010	<0.00050
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M	0.00113	<0.00010	0.000191	<0.00050		<0.0030	<0.00020	0.119	0.0002	0.00015	0.0084	<0.000020	<0.000050	0.01	0.0000061	11.7	<0.000010	<0.00050
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M	<0.005	<0.001	0.000377	<0.001		<0.004	<0.0001	0.0639	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0232	<0.00001	1.2		<0.0005
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M	<0.005	<0.001	0.000435	<0.001		<0.004	<0.0001	0.108	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0073	0.000158	1.11		0.00051
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M	<0.005	<0.001	0.000449	0.0015		<0.004	<0.0001	0.1	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.017	0.000016	1.21		<0.0005
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M	<0.005	<0.001	0.00055	<0.001		<0.004	<0.0001	0.119	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	<0.005	<0.00001	0.62		<0.0005
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M	<0.005	<0.001	0.000778	0.0011		<0.004	<0.0001	0.193	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.025	<0.00001	1.01		<0.0005
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M	<0.005	<0.001	0.000457	<0.001		<0.004	<0.0001	0.0973	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0209	0.000011	1.36		<0.0005
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M	<0.005	<0.001	0.000522	<0.001		<0.004	<0.0001	0.115	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0161	<0.00001	1.14		<0.0005
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M	<0.005	<0.001	0.000536	<0.001		<0.004	<0.0001	0.128	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	<0.005	<0.00001	0.8		<0.0005
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M	<0.005	<0.001	0.000395	<0.001		<0.004	<0.0001	0.0813	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	<0.05	<0.00001	1.69		<0.0005
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M	<0.005	<0.001	0.000176	<0.001		0.0042	<0.0001	0.0763	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	<0.05	<0.00001	1.75		<0.0005
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M	0.00071	<0.00020	0.000495	0.00041		0.0012	0.000027											
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M	0.00513	<0.00020	0.000436	0.00097		0.0025	0.000036											
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M	0.00141	<0.00020	0.000466	<0.00020		0.0043	0.000027											
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M	0.0019	<0.00020	0.000629	<0.00020		0.002	0.000036											
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M	<0.0050	<0.0010	0.000499	0.0015		0.0058	<0.00010											

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M	0.00209	<0.00020	0.000515	0.00035		0.0019	0.000027											
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M	0.00163	<0.00020	0.000466	<0.00020		0.0012	0.000022											
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M	0.00081	<0.00020	0.000531	<0.00020		<0.0010	0.000027											
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M	0.00209	<0.00020	0.000474	<0.00020		0.0026	0.000027											
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M	0.00403	<0.00020	0.000486	0.00039		<0.0010	0.000028											
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M	0.00073	<0.00020	0.000367	0.00033		<0.0010	<0.000020											
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M	0.00369	<0.00020	0.000471	0.00057		0.0011	0.000041											
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M	<0.0050	<0.0010	0.00051	<0.0010		<0.0040	<0.00010											
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M	<0.0050	<0.0010	0.000502	<0.0010		<0.0040	<0.00010											
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M	<0.0050	<0.0010	0.00032	<0.0010		<0.0040	<0.00010											
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M	<0.0050	<0.0010	0.000432	<0.0010		<0.0040	<0.00010											
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	<0.0050	<0.0010	0.000464	<0.0010		<0.0040	<0.00010	0.113	<0.00020	0.00054	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	2.52		<0.00050
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M																		
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M	<0.0050	<0.0010	0.000381	0.0014		<0.0040	<0.00010	0.123	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.76		<0.00050
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	<0.0050	<0.0010	0.00053	<0.0050		<0.0040	<0.00010	0.116	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.83		<0.00050
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	0.0084	<0.0002	0.000475	<0.0050		<0.0040	<0.00010	0.156	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.7		<0.00050
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M	0.00118	<0.00020	0.000416	<0.00100		<0.0010	0.000027	0.137	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.51		<0.00050
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	0.00101	<0.00020	0.000423	<0.00100		<0.0010	<0.000020	0.112	<0.000050	0.000058	0.00121	<0.000010	<0.000010	0.0051	<0.0000020	0.606		0.00018
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M	0.00066	<0.00020	0.000357	<0.00100		<0.0010	<0.000020	0.093	<0.000050	0.000058	0.00159	<0.000010	<0.000010	0.0092	<0.0000020	0.794		0.00016
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	0.00071	<0.00020	0.000368	<0.00100		<0.0010	<0.000020	0.0889	<0.000050	0.000075	0.00174	<0.000010	<0.000010	0.0086	0.0000031	0.806		0.00017
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	0.00025	<0.00020	0.000274	<0.00100		<0.0010	<0.000020	0.0555	<0.000050	0.000083	0.00278	<0.000010	<0.000010	0.017	0.0000023	1.39		0.00013
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M	0.0005	<0.00020	0.000313	<0.00100		<0.0010	0.000026	0.0733	<0.000050	0.000052	0.0021	<0.000010	<0.000010	0.0094	0.0000042	1.14		0.00015
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	<0.00020	<0.00020	0.00021	<0.00100		<0.0010	<0.000020	0.0567	<0.000050	<0.000050	0.00271	<0.000010	<0.000010	0.0141	0.0000037	1.46		0.00016
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	0.00088	<0.00020	0.000473	<0.00100		<0.0010	0.00003	0.112	<0.000050	<0.000050	0.00205	<0.000010	<0.000010	0.008	0.0000033	0.992		0.0002
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	<0.0050	<0.0010	0.000598	<0.0050		<0.0040	<0.00010	0.122	<0.000050	0.000065	0.00163	<0.000010	<0.000010	0.0077	0.0000027	0.901		0.0002
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M	<0.0050	<0.0010	0.000574	<0.0050		<0.0040	<0.00010	0.122	<0.000050	0.00006	0.00182	<0.000010	<0.000010	0.0082	0.0000031	0.973		0.00014
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	0.00077	<0.00020	0.000621	<0.00100		0.001	0.000027	0.133	<0.000050	0.000074	0.00152	<0.000010	<0.000010	0.0047	0.0000028	0.919		<0.00050
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M	0.00101	<0.00020	0.000505	<0.00100		0.0013	0.000032	0.162	<0.000050	0.000074	0.00109	<0.000010	<0.000010	<0.0020	0.0000025	0.511		<0.00050
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M	0.00052	<0.00020	0.000107	<0.00100		0.0024	0.000023	0.019	0.000101	<0.000050	0.0131	<0.000010	<0.000010	0.011	0.0000084	29.2		<0.00050
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	0.00075	<0.00020	0.000439	<0.00100		<0.0010	0.000028	0.0918	<0.000050	0.000068	0.00158	<0.000010	<0.000010	0.0077	<0.0000020	0.791		<0.00050
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	0.00073	<0.00020	0.000458	<0.00100		<0.0010	0.000021	0.0821	<0.000050	0.000077	0.00157	<0.000010	<0.000010	0.0088	<0.0000020	0.787		<0.00050
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	0.00162	<0.00020	0.000422	<0.00100		<0.0010	<0.000020	0.0629	<0.000050	0.000104	0.00176	<0.000010	<0.000010	0.0104	0.0000041	0.936		<0.00050
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M	0.00167	<0.00020	0.000542	<0.00100		0.0022	0.000046	0.185	<0.000050	0.000073	0.0021	<0.000010	<0.000010	0.0027	0.0000036	0.872		<0.00050
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	0.00271	<0.00020	0.000562	<0.00100		0.0011	0.000038	0.124	<0.000050	0.000091	0.00186	<0.000010	<0.000010	0.0051	0.0000026	0.92		<0.00050
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M	0.0011	0.00002	0.000597	<0.00040		<0.0010	0.000042	0.124	<0.000050	0.000094	0.00192	<0.000010	<0.000010	0.0075	<0.0000020	1.04		<0.00050
SW-01		VA24A1299-001	2024-01-23	Water	M	0.00223	<0.00010	0.00047	<0.00050		<0.0030	<0.00020	0.147	<0.00010	<0.00010	0.0015	<0.000100	<0.000050	<0.010	<0.0000050	0.703	<0.000010	<0.00050
SW-01		L2754353-1	2024-01-23	Water	M																		
SW-01		L2754615-1	2024-02-15	Water	M																		
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	0.00106	<0.00010	0.00063	<0.00050		<0.0030	<0.00020	0.13	<0.00010	<0.00010	0.00158	<0.000100	<0.000050	<0.010	<0.0000050	0.794	<0.000010	<0.00050
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	0.00105	<0.00010	0.000566	<0.00050		<0.0030	<0.00020	0.153	<0.00010	<0.00010	0.00157	<0.000100	<0.000050	<0.010	<0.0000050	0.752	0.00001	<0.00050
SW-01		L2755012-1	2024-03-19	Water	M																		
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	0.00108	<0.00010	0.000617	<0.00050		<0.0030	<0.00020	0.141	<0.00010	<0.00010	0.0014	<0.000100	<0.000050	<0.010	<0.0000050	0.765	0.000011	<0.00050
SW-01		L2755503-1	2024-04-25	Water	M																		
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	0.00101	<0.00010	0.000532	<0.00050		<0.0030	<0.00020	0.137	<0.00010	<0.00010	0.00156	<0.000100	<0.000050	<0.010	<0.0000050	0.731	<0.000010	<0.00050
SW-01		L2755523-1	2024-04-29	Water	M																		
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	0.00078	<0.00010	0.000609	<0.00050		<0.0030	<0.00020	0.133	<0.00010	<0.00010	0.00153	<0.000100	<0.000050	<0.010	<0.0000050	0.803	0.00001	<0.00050
SW-01		L2755588-1	2024-05-02	Water	M																		
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	0.00123	<0.00010	0.000593	<0.00050		<0.0030	<0.00020	0.148	<0.00010	<0.00010	0.00132	<0.000100	<0.000050	<0.010	<0.0000050	0.702	0.00001	<0.00050
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	0.00109	<0.00010	0.000566	<0.00050		<0.0030	<0.00020	0.151	<0.00010	<0.00010	0.00127	<0.000100	<0.000050	<0.010	<0.0000050	0.671	<0.000010	<0.00050
SW-01		L2755694-1	2024-05-10	Water	M																		
SW-01		L2755695-1	2024-05-10	Water	M																		
SW-01		L2755788-1	2024-05-15	Water	M																		
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M	0.00106	<0.00010	0.000587	<0.00050		<0.0030	<0.00020	0.136	<0.00010	<0.00010	0.00124	<0.000100	<0.000050	<0.010	<0.0000050	0.617	<0.000010	<0.00050
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	0.00094	<0.00010	0.0006	<0.00050		<0.0030	<0.00020	0.136	<0.00010	<0.00010	0.00124	<0.000100	<0.000050	<0.010	<0.0000050	0.601	<0.000010	<0.00050
SW-01		L2755820-1	2024-05-16	Water	M																		
SW-01		VA24B1628-001	2024-05-22	Water	M	0.001	<0.00010	0.000557	<0.00050		<0.0030	<0.00020	0.15	<0.00010	<0.00010	0.00134	<0.000100	<0.000050	<0.010	<0.0000050	0.745	<0.000010	<0.00050
SW-01		L2755902-1	2024-05-22	Water	M																		
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	0.00089	<0.00010	0.00057	<0.00050		<0.0030	<0.00020	0.134	<0.00010	<0.00010	0.00135	<0.000100	<0.000050	<0.010	<0.0000050	0.716	<0.000010	<0.00050
SW-01		L2755916-1	2024-05-23	Water	M																		
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M	0.00134	<0.00010	0.000566	<0.00050		<0.0030	<0.00020	0.17	<0.00010	<0.00010	0.00144	<0.000100	<0.000050	<0.010	<0.0000050	0.636	<0.000010	<0.00050
SW-01		VA24B4655-001	2024-06-20	Water	M	0.00086	<0.00010	0.000609	<0.00050		<0.0030	<0.00020	0.113	<0.00010	<0.00010	0.0015	<0.000100	<0.000050	<0.010	<0.0000050	0.746	0.000011	<0.00050
SW-01		L2756326-1	2024-06-20	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M	0.00084	<0.00010	0.000586	<0.00050		<0.0030	<0.00020	0.114	<0.00010	<0.00010	0.00151	<0.000100	<0.000050	<0.010	<0.0000050	0.724	0.000011	<0.00050
SW-01		L2756419-1	2024-06-26	Water	M																		
SW-01		VA24B7579-001	2024-07-18	Water	M	0.00076	<0.00010	0.000526	<0.00050		<0.0030	<0.00020	0.111	<0.00010	<0.00010	0.00159	<0.000100	<0.000050	<0.010	<0.0000050	0.835	0.000012	<0.00050
SW-01		L2756717-1	2024-07-18	Water	M																		
SW-01		VA24B8974-001	2024-07-31	Water	M	0.00074	<0.00010	0.000535	<0.00050		<0.0030	<0.00020	0.102	<0.00010	<0.00010	0.00165	<0.000100	<0.000050	<0.010	<0.0000050	0.792	0.00001	<0.00050
SW-01		L2756871-1	2024-07-31	Water	M																		
SW-01		VA24C1546-001	2024-08-22	Water	M	0.00078	<0.00010	0.000485	<0.00050		<0.0030	<0.00020	0.0971	<0.00010	<0.00010	0.00162	<0.000100	<0.000050	0.02	<0.0000050	0.839	0.000012	<0.00050
SW-01		L2757144-1	2024-08-22	Water	M																		
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	0.00111	<0.00010	0.000686	<0.00050		<0.0030	<0.00020	0.143	<0.00010	<0.00010	0.00176	<0.000100	<0.000050	<0.010	<0.0000050	0.912	0.000011	<0.00050
SW-01	SW-01	L2757209-1	2024-08-27	Water	M																		
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	0.00068	<0.00010	0.000515	<0.00050		<0.0030	<0.00020	0.1	<0.00010	0.0001	0.00186	<0.000100	<0.000050	<0.010	<0.0000050	0.854	0.000014	<0.00050
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	0.00092	<0.00010	0.000648	<0.00050		<0.0030	<0.00020	0.113	<0.00010	0.00011	0.00182	<0.000100	<0.000050	<0.010	<0.0000050	0.916	0.000014	<0.00050
SW-01	SW-01	L2757584-1	2024-09-28	Water	M																		
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M	0.00118	<0.00010	0.000462	<0.00050		<0.0030	<0.00020	0.0745	<0.00010	<0.00010	0.00183	<0.000100	<0.000050	<0.010	<0.0000050	0.932	0.000013	<0.00050
SW-01	SW-01	L2757664-2	2024-10-03	Water	M																		
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	0.00073	<0.00010	0.000486	<0.00050		<0.0030	<0.00020	0.0753	<0.00010	<0.00010	0.00184	<0.000100	<0.000050	<0.010	<0.0000050	0.988	0.000013	<0.00050
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M																		
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	0.00124	<0.00010	0.000596	<0.00050		<0.0030	<0.00020	0.125	<0.00010	<0.00010	0.00197	<0.000100	<0.000050	<0.010	<0.0000050	0.913	0.000013	<0.00050
SW-01	SW-01	L2757873-1	2024-10-22	Water	M																		
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	0.00092	<0.00010	0.000584	<0.00050		<0.0030	<0.00020	0.12	<0.00010	<0.00010	0.00198	<0.000100	<0.000050	<0.010	<0.0000050	0.966	0.000013	<0.00050
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M	0.00143	<0.00010	0.000719	<0.00050		<0.0030	<0.00020	0.172	<0.00010	0.0001	0.00206	<0.000100	<0.000050	<0.010	<0.0000050	1.01	0.000013	<0.00050
SW-01	SW-01	L2757942-2	2024-10-26	Water	M																		
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	0.00111	<0.00010	0.000591	<0.00050		<0.0030	<0.00020	0.143	<0.00010	<0.00010	0.00189	<0.000100	<0.000050	<0.010	<0.0000050	0.897	0.000013	<0.00050
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	0.00096	<0.00010	0.000565	<0.00050		<0.0030	<0.00020	0.131	<0.00010	<0.00010	0.00197	<0.000100	<0.000050	<0.010	<0.0000050	0.941	0.000013	<0.00050
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	0.00116	<0.00010	0.000572	<0.00050		<0.0030	<0.00020	0.151	<0.00010	<0.00010	0.00186	<0.000020	<0.000050	<0.010	<0.0000050	0.84	0.000012	<0.00050
SW-01	SW-01	L2758119-1	2024-11-12	Water	M																		
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	0.00178	<0.00010	0.000438	<0.00050		<0.0030	<0.00020	0.171	<0.00010	<0.00010	0.00177	<0.000100	<0.000050	<0.010	<0.0000050	0.747	0.000013	<0.00050
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	0.00096	<0.00010	0.00054	<0.00050		<0.0030	<0.00020	0.124	<0.00010	<0.00010	0.00185	<0.000100	<0.000050	<0.010	<0.0000050	0.861	0.000012	<0.00050
SW-01	SW-01	L2758350-1	2024-12-06	Water	M																		
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M	0.00093	<0.00010	0.000692	<0.00050		<0.0030	<0.00020	0.144	<0.00010	<0.00010	0.00168	<0.000020	<0.000050	<0.010	<0.0000050	0.848	0.00001	<0.00050
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M																		
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	0.00095	<0.00010	0.000521	<0.00050		<0.0030	<0.00020	0.132	<0.00010	<0.00010	0.00173	<0.000100	<0.000050	<0.010	<0.0000050	0.787	0.00001	<0.00050
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M																		
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	0.00075	<0.00010	0.000637	<0.00050		<0.0030	<0.00020	0.121	<0.00010	<0.00010	0.00167	<0.000100	<0.000050	<0.010	<0.0000050	0.96	0.00001	<0.00050
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M																		
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M	0.00087	<0.00010	0.000576	<0.00050		<0.0030	<0.00020	0.123	<0.00010	<0.00010	0.00181	<0.000020	<0.000050	<0.010	<0.0000050	1.01	0.00001	<0.00050
SW-01	SW-01	L2758769-1	2025-01-24	Water	M																		
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	0.00108	<0.00010	0.000591	<0.00050		<0.0030	<0.00020	0.138	<0.00010	<0.00010	0.00189	<0.000100	<0.000050	<0.010	<0.0000050	0.974	<0.000010	<0.00050
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M																		
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	0.00166	<0.00010	0.000546	<0.00050		<0.0030	<0.00020	0.15	<0.00010	0.0001	0.00194	<0.000020	<0.000050	<0.010	<0.0000050	0.9	<0.000010	<0.00050
SW-01	SW-01	L2759042-1	2025-02-21	Water	M																		
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	0.000925	<0.00010	0.000623	<0.00050		0.00333	<0.00020	0.12	<0.00010	<0.00010	0.0018	<0.000020	<0.000050	<0.010	<0.0000050	0.936	<0.000010	<0.00050
SW-01	SW-01	L2759255-1	2025-03-19	Water	M																		
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	0.00239	<0.00010	0.000422	<0.00050		<0.0030	<0.00020	0.177	<0.00010	<0.00010	0.00144	<0.000100	<0.000050	<0.010	<0.0000050	0.578	<0.000010	<0.00050
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M	0.00083	<0.00010	0.000651	<0.00050		<0.0030	<0.00020	0.126	<0.00010	<0.00010	0.00151	<0.000020	<0.000050	<0.010	<0.0000050	0.835	<0.000010	<0.00050
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M																		
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	0.00123	<0.00010	0.000533	<0.00050		<0.0030	<0.00020	0.151	<0.00010	<0.00010	0.00143	<0.000020	<0.000050	<0.010	<0.0000050	0.718	0.00001	<0.00050
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M																		
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	0.00092	<0.00010	0.000662	<0.00050		<0.0030	<0.00020	0.135	<0.00010	<0.00010	0.00158	<0.000020	<0.000050	<0.010	<0.0000050	0.8	0.00001	<0.00050
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M																		
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	0.00106	<0.00010	0.000647	<0.00050		<0.0030	<0.00020	0.137	<0.00010	<0.00010	0.00144	<0.000020	<0.000050	<0.010	<0.0000050	0.763	<0.000010	<0.00050
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M																		
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	0.00099	<0.00010	0.000692	<0.00050		<0.0030	<0.00020	0.148	<0.00010	<0.00010	0.00136	<0.000100	<0.000050	<0.010	<0.0000050	0.782	<0.000010	<0.00050
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	0.0012	<0.00010	0.000624	<0.00050		<0.0030	<0.00020	0.153	<0.00010	<0.00010	0.00138	<0.000020	<0.000050	<0.010	<0.0000050	0.723	<0.000010	<0.00050
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M																		
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	0.00102	<0.00010	0.000591	<0.00050		<0.0030	<0.00020	0.149	<0.00010	<0.00010	0.00137	<0.000100	<0.000050	<0.010	<0.0000050	0.687	<0.000010	<0.00050
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	0.00095	<0.00010	0.000575	<0.00050		<0.0030	<0.00020	0.142	<0.00010	<0.00010	0.00129	<0.000100	<0.000050	<0.010	<0.0000050	0.696	<0.000010	<0.00050
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	0.00095	<0.00010	0.000579	<0.00050		<0.0030	<0.00020	0.131	<0.00010	<0.00010	0.00128	<0.000020	<0.000050	<0.010	<0.0000050	0.704	<0.000010	<0.00050
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	0.00098	<0.00010	0.000599	<0.00050		<0.0030	<0.00020	0.143	<0.00010	<0.00010	0.00132	<0.000100	<0.000050	<0.010	<0.0000050	0.646	<0.000010	<0.00050
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M	0.00095	<0.00010	0.000576	<0.00050		0.0032	<0.00020	0.131	<0.00010	<0.00010	0.00135	<0.000100	<0.000050	<0.010	<0.0000050	0.69	<0.000010	<0.00050
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M	0.00041	<0.00020	0.000147	0.00049		0.0019	<0.000020											
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M	0.00057	<0.00020	0.000139	0.00044		0.0027	<0.000020											

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M	0.00061	<0.00020	0.000163	0.00036		0.002	<0.000020											
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M	0.00098	<0.00020	0.000185	<0.00020		0.0023	0.000034											
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M	<0.0050	<0.0010	0.000167	0.0012		<0.0040	<0.00010											
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M	0.00087	<0.00020	0.000152	0.00034		0.001	<0.000020											
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M	0.00078	<0.00020	0.000142	<0.00020		0.0017	<0.000020											
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M	0.00199	<0.00020	0.000182	<0.00020		0.0037	0.000021											
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M	0.00311	<0.00020	0.000159	0.00044		0.0035	<0.000020											
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M	0.00024	<0.00020	0.000104	0.00021		<0.0010	<0.000020											
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M	0.00045	<0.00020	0.000116	0.00049		0.0021	<0.000020											
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M	0.00507	<0.00020	0.000175	0.00047		0.0036	0.000029											
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M	<0.0050	<0.0010	0.000171	<0.0010		<0.0040	<0.00010											
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M	<0.0050	<0.0010	0.000182	<0.0010		<0.0040	<0.00010											
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M	<0.0050	<0.0010	0.000104	<0.0010		<0.0040	<0.00010											
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M	<0.0050	<0.0010	0.00026	<0.0010		<0.0040	<0.00010											
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	<0.0050	<0.0010	0.000165	<0.0010		<0.0040	<0.00010	0.0628	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.94		<0.00050
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M																		
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M	<0.0050	<0.0010	0.000141	0.0015		0.0047	<0.00010	0.0862	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	0.000014	1.38		<0.00050
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	<0.0050	<0.0010	0.00019	<0.0050		<0.0040	<0.00010	0.0787	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.47		<0.00050
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M	<0.0050	<0.0002	0.000178	<0.0050		<0.0040	<0.00010	0.0935	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.07		<0.00050
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	0.00185	<0.00020	0.000127	<0.00100		<0.0010	<0.000020	0.0777	<0.00020	<0.00050	<0.0050	<0.00010	<0.00050	<0.0500	<0.000010	0.61		<0.00050
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	0.00044	<0.00020	0.000119	<0.00100		<0.0010	<0.000020	0.0467	<0.000050	<0.000050	0.00129	<0.000010	<0.000010	0.0042	0.0000037	0.747		0.00016
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M	<0.00020	<0.00020	0.0000975	<0.00100		<0.0010	<0.000020	0.0246	<0.000050	<0.000050	0.00337	<0.000010	<0.000010	0.0219	0.0000061	1.58		0.0002
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	<0.00020	<0.00020	0.000102	<0.00100		<0.0010	<0.000020	0.0201	<0.000050	0.000052	0.00592	<0.000010	<0.000010	0.0449	0.0000068	2.63		0.00015
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M	<0.00020	<0.00020	0.000109	<0.00100		<0.0010	<0.000020	0.0169	<0.000050	0.000056	0.00669	<0.000010	<0.000010	0.0592	0.0000078	3.17		0.0001
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M	<0.00020	<0.00020	0.000122	<0.00100		0.0011	<0.000020	0.0425	<0.000050	<0.000050	0.00346	<0.000010	<0.000010	0.0146	0.0000079	2.06		0.00011
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M	0.00032	<0.00020	0.000116	<0.00100		0.001	<0.000020	0.0363	<0.000050	<0.000050	0.00405	<0.000010	<0.000010	0.0222	0.0000085	2.32		0.00016
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	0.00028	<0.00020	0.00013	<0.00100		0.0028	<0.000020	0.0499	<0.000050	<0.000050	0.00315	<0.000010	<0.000010	0.0121	0.0000097	1.86		0.00013
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M	<0.0050	<0.0010	0.000123	<0.0050		<0.0040	<0.00010	0.0389	<0.000050	<0.000050	0.00337	<0.000010	<0.000010	0.0157	0.0000076	2.16		0.00016
SW-02	SW21-2	23C3502-02	2023-03-16	Water	M	<0.0050	<0.0010	0.000121	<0.0050		<0.0040	<0.00010	0.0479	<0.000050	<0.000050	0.00358	<0.000010	<0.000010	0.0168	0.0000082	2.22		<0.00010
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M	0.00054	<0.00020	0.00017	<0.00100		0.0013	<0.000020	0.0838	<0.000050	<0.000050	0.00203	<0.000010	<0.000010	0.004	0.0000077	1.24		<0.00050
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M	0.00118	<0.00020	0.00015	<0.00100		0.0012	<0.000020	0.0874	<0.000050	<0.000050	0.00111	<0.000010	<0.000010	<0.0020	0.0000037	0.566		<0.00050
SW-02	SW-02	23F0370-03	2023-06-02	Water	M	0.00029	<0.00040	0.000125	<0.00100		<0.0010	<0.000020											
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M	<0.00020	<0.00020	0.000104	<0.00100		<0.0010	<0.000020	0.0329	<0.000050	<0.000050	0.00181	<0.000010	<0.000010	0.0063	0.0000045	0.952		<0.00050
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M	<0.00020	<0.00020	0.000105	<0.00100		<0.0010	<0.000020	0.0242	<0.000050	0.000055	0.00422	<0.000010	<0.000010	0.0245	0.0000062	1.85		<0.00050
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M	<0.00020	<0.00020	0.000104	<0.00100		<0.0010	<0.000020	0.0293	<0.000050	0.000071	0.00661	<0.000010	<0.000010	0.053	0.0000064	2.92		<0.00050
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	0.00548	<0.00020	0.000199	<0.00100		0.0018	0.000038	0.133	<0.000050	0.000066	0.00261	<0.000010	<0.000010	0.0024	0.000007	1.19		<0.00050
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M																		
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M																		
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M	0.0005	<0.00020	0.000135	<0.00100		<0.0010	<0.000020	0.0623	<0.000050	<0.000050	0.00333	<0.000010	<0.000010	0.0062	0.0000076	1.88		<0.00050
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M	0.00143	0.00001	0.000157	<0.00040		0.0013	0.000021	0.0649	<0.000050	<0.000050	0.00305	<0.000010	<0.000010	0.0087	0.0000064	1.79		<0.00050
SW-02		VA24A1299-002	2024-01-23	Water	M	0.00337	<0.00010	0.000209	<0.00050		<0.0030	<0.00020	0.108	<0.00010	<0.00010	0.00192	<0.000100	<0.000050	<0.010	0.0000051	1.15	<0.000010	<0.00050
SW-02		L2754353-2	2024-01-23	Water	M																		
SW-02		L2754615-2	2024-02-15	Water	M																		
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	0.00042	<0.00010	0.000151	<0.00050		0.0039	<0.00020	0.0492	<0.00010	<0.00010	0.0029	<0.000100	<0.000050	0.011	0.0000063	1.82	<0.000010	<0.00050
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	<0.00090	<0.00010	0.000197	<0.00050		<0.0030	<0.00020	0.087	<0.00010	<0.00010	0.00189	<0.000100	<0.000050	<0.010	0.0000066	1.14	<0.000010	<0.00050
SW-02		L2755012-2	2024-03-19	Water	M																		
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	0.00226	<0.00010	0.000186	<0.00050		<0.0030	<0.00020	0.0852	<0.00010	<0.00010	0.0024	<0.000100	<0.000050	<0.010	0.00001	1.4	<0.000010	<0.00050
SW-02		L2755316-6	2024-04-12	Water	M																		
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	<0.00090	<0.00010	0.000207	<0.00050		<0.0030	<0.00020	0.0867	<0.00010	<0.00010	0.0018	<0.000100	<0.000050	<0.010	0.0000062	1.26	<0.000010	<0.00050
SW-02		L2755504-1	2024-04-26	Water	M																		
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	0.00119	<0.00010	0.000208	<0.00050		<0.0030	<0.00020	0.105	<0.00010	<0.00010	0.0018	<0.000100	<0.000050	<0.010	<0.0000050	1.04	<0.000010	<0.00050
SW-02		L2755521-2	2024-04-28	Water	M																		
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	0.00033	<0.00010	0.000179	<0.00050		<0.0030	<0.00020	0.0683	<0.00010	<0.00010	0.00219	<0.000100	<0.000050	<0.010	0.0000064	1.38	<0.000010	<0.00050
SW-02		L2755598-1	2024-05-03	Water	M																		
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	0.00139	<0.00010	0.000199	<0.00050		<0.0030	<0.00020	0.0676	<0.00010	<0.00010	0.00175	<0.000100	<0.000050	<0.010	<0.0000050	1.05	<0.000010	<0.00050
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	0.00101	<0.00010	0.000181	<0.00050		<0.0030	<0.00020	0.07	<0.00010	<0.00010	0.00163	<0.000100	<0.000050	<0.010	<0.0000050	1.08	<0.000010	<0.00050
SW-02		L2755677-1	2024-05-09	Water	M																		
SW-02		L2755687-1	2024-05-09	Water	M																		
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M	0.00081	<0.00010	0.000158	<0.00050		<0.0030	<0.00020	0.0685	<0.00010	<0.00010	0.00139	<0.000100	<0.000050	<0.010	<0.0000050	0.875	<0.000010	<0.00050
SW-02		L2755770-1	2024-05-14	Water	M																		
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	0.00119	<0.00010	0.000171	<0.00050		<0.0030	<0.00020	0.0685	<0.00010	<0.00010	0.00132	<0.000100	<0.000050	<0.010	<0.0000050	0.807	<0.000010	<0.00050
SW-02		L2755819-1	2024-05-17	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M	0.00103	<0.00010	0.00017	<0.00050		<0.0030	<0.00020	0.0661	<0.00010	<0.00010	0.00152	<0.000100	<0.000050	<0.010	0.0000054	0.967	<0.000010	<0.00050
SW-02		L2755903-1	2024-05-23	Water	M																		
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	0.00036	<0.00010	0.00017	<0.00050		<0.0030	<0.00020	0.0607	<0.00010	<0.00010	0.0016	<0.000100	<0.000050	<0.010	<0.0000050	0.969	<0.000010	<0.00050
SW-02		L2755933-1	2024-05-24	Water	M																		
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M	0.00054	<0.00010	0.000174	<0.00050		<0.0030	<0.00020	0.0665	<0.00010	<0.00010	0.00154	<0.000100	<0.000050	<0.010	<0.0000050	0.895	<0.000010	<0.00050
SW-02		L2755961-1	2024-05-26	Water	M																		
SW-02		VA24B4698-001	2024-06-21	Water	M	<0.00030	<0.00010	0.000141	<0.00050		<0.0030	<0.00020	0.0978	<0.00010	<0.00010	0.00146	<0.000100	<0.000050	<0.010	<0.0000050	0.833	<0.000010	<0.00050
SW-02		L2756349-1	2024-06-21	Water	M																		
SW-02		VA24B5540-001	2024-06-27	Water	M	0.00066	<0.00010	0.000182	<0.00050		<0.0030	<0.00020	0.077	<0.00010	<0.00010	0.00136	<0.000100	<0.000050	<0.010	0.0000079	0.733	<0.000010	<0.00050
SW-02		L2756458-1	2024-06-27	Water	M																		
SW-02		VA24B7689-001	2024-07-19	Water	M	<0.00030	<0.00010	0.00011	<0.00050		<0.0030	<0.00020	0.0263	<0.00010	<0.00010	0.00246	<0.000100	<0.000050	0.012	<0.0000050	1.21	0.000014	<0.00050
SW-02		L2756726-1	2024-07-19	Water	M																		
SW-02		VA24B8974-002	2024-07-31	Water	M	<0.00030	<0.00010	0.000126	<0.00050		<0.0030	<0.00020	0.0277	<0.00010	<0.00010	0.00259	<0.000100	<0.000050	0.013	<0.0000050	1.38	0.000016	<0.00050
SW-02		L2756871-2	2024-07-31	Water	M																		
SW-02		VA24C1605-001	2024-08-23	Water	M	<0.00030	<0.00010	0.000113	<0.00050		<0.0030	<0.00020	0.0236	<0.00010	<0.00010	0.004	<0.000100	<0.000050	0.031	0.0000051	2.06	0.000021	<0.00050
SW-02		L2757153-1	2024-08-23	Water	M																		
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	0.00046	<0.00010	0.000196	<0.00050		<0.0030	<0.00020	0.0694	<0.00010	<0.00010	0.00238	<0.000100	<0.000050	<0.010	0.0000095	1.34	0.00001	<0.00050
SW-02	SW-02	L2757209-2	2024-08-27	Water	M																		
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	<0.00030	<0.00010	0.000114	<0.00050		<0.0030	<0.00020	0.0218	<0.00010	<0.00010	0.00506	<0.000100	<0.000050	0.039	<0.0000050	2.57	0.000021	<0.00050
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	<0.00030	<0.00010	0.000154	<0.00050		<0.0030	<0.00020	0.0448	<0.00010	<0.00010	0.00317	<0.000100	<0.000050	0.013	0.0000072	1.82	0.000013	<0.00050
SW-02	SW-02	L2757587-1	2024-09-29	Water	M																		
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	0.00119	<0.00010	0.000264	<0.00050		<0.0030	<0.00020	0.115	<0.00010	<0.00010	0.00281	<0.000100	<0.000050	<0.010	<0.0000050	1.86	<0.000010	<0.00050
SW-02	SW-02	L2757661-1	2024-10-04	Water	M																		
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	<0.00030	<0.00010	0.000134	<0.00050		<0.0030	<0.00020	0.0334	<0.00010	<0.00010	0.00384	<0.000100	<0.000050	0.021	0.0000081	2.27	0.000015	<0.00050
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M																		
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	0.00076	<0.00010	0.000156	<0.00050		<0.0030	<0.00020	0.0668	<0.00010	<0.00010	0.00281	<0.000100	<0.000050	<0.010	0.0000062	1.52	<0.000010	<0.00050
SW-02	SW-02	L2757873-2	2024-10-22	Water	M																		
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	0.00037	<0.00010	0.000147	<0.00050		<0.0030	<0.00020	0.053	<0.00010	<0.00010	0.00328	<0.000100	<0.000050	<0.010	0.0000064	1.79	<0.000010	<0.00050
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M	0.00043	<0.00010	0.000146	<0.00050		<0.0030	<0.00020	0.049	<0.00010	<0.00010	0.00311	<0.000100	<0.000050	0.011	<0.0000050	1.91	<0.000010	<0.00050
SW-02	SW-02	L2757913-1	2024-10-25	Water	M																		
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	0.00076	<0.00010	0.000183	<0.00050		<0.0030	<0.00020	0.0773	<0.00010	<0.00010	0.0028	<0.000100	<0.000050	<0.010	0.0000058	1.59	<0.000010	<0.00050
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	0.00083	<0.00010	0.000202	<0.00050		<0.0030	<0.00020	0.08	<0.00010	<0.00010	0.0021	<0.000100	<0.000050	<0.010	0.0000076	1.19	<0.000010	<0.00050
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M																		
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	0.00082	<0.00010	0.000167	<0.00050		<0.0030	<0.00020	0.0849	<0.00010	<0.00010	0.00268	<0.000100	<0.000050	<0.010	0.0000087	1.38	<0.000010	<0.00050
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	0.00703	<0.00010	0.000155	<0.00050		<0.0030	<0.00020	0.0762	<0.00010	<0.00010	0.00283	<0.000020	<0.000050	<0.010	0.0000065	1.61	<0.000010	<0.00050
SW-02	SW-02	L2758155-3	2024-11-16	Water	M																		
SW-02		VA24D1587-001	2024-11-20	Water	M	0.0057	<0.00010	0.000158	<0.00050		<0.0030	<0.00020	0.0918	<0.00010	<0.00010	0.00385	<0.000100	<0.000050	<0.010	0.0000102	2.08	0.00001	<0.00050
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M																		
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	0.00117	<0.00010	0.000174	<0.00050		<0.0030	<0.00020	0.0932	<0.00010	<0.00010	0.00223	<0.000020	<0.000050	<0.010	0.0000095	1.27	<0.000010	<0.00050
SW-02	SW-02	L2758371-1	2024-12-08	Water	M																		
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	0.00062	<0.00010	0.000165	<0.00050		<0.0030	<0.00020	0.0841	<0.00010	<0.00010	0.00252	<0.000100	<0.000050	<0.010	0.0000088	1.38	<0.000010	<0.00050
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M																		
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	<0.00030	<0.00010	0.000137	<0.00050		<0.0030	<0.00020	0.0376	<0.00010	<0.00010	0.00342	<0.000100	<0.000050	0.019	<0.0000050	2.18	<0.000010	<0.00050
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M																		
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M	<0.00030	<0.00010	0.000126	<0.00050		<0.0030	<0.00020	0.0358	<0.00010	<0.00010	0.00402	<0.000020	<0.000050	0.019	0.000011	2.19	0.00001	<0.00050
SW-02	SW-02	L2758769-2	2025-01-24	Water	M																		
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M	0.0225	<0.00010	0.000191	0.00116		<0.0030	<0.00020	0.0492	<0.00010	<0.00010	0.003	<0.000020	<0.000050	0.017	0.0000089	2.38	<0.000010	<0.00050
SW-02	SW-02	L2759009-1	2025-02-19	Water	M																		
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	0.00144	<0.00010	0.000194	<0.00050		<0.0030	<0.00020	0.0954	<0.00010	<0.00010	0.00289	<0.000100	<0.000050	<0.010	0.0000055	1.76	<0.000010	<0.00050
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M																		
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	0.000432	<0.00010	0.000132	<0.00050		<0.0030	<0.00020	0.0531	<0.00010	<0.00010	0.00304	<0.000020	<0.000050	0.0106	0.00000601	1.89	<0.000010	<0.00050
SW-02	SW-02	L2759254-1	2025-03-18	Water	M																		
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M	0.00477	<0.00010	0.000204	<0.00050		<0.0030	<0.00020	0.132	<0.00010	<0.00010	0.0017	<0.000100	<0.000050	<0.010	<0.0000050	0.828	<0.000010	<0.00050
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	0.0027	<0.00010	0.000204	<0.00050		<0.0030	<0.00020	0.08	<0.00010	<0.00010	0.00225	<0.000020	<0.000050	<0.010	0.0000095	1.46	<0.000010	<0.00050
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M																		
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	0.00259	<0.00010	0.000177	<0.00050		<0.0030	<0.00020	0.105	<0.00010	<0.00010	0.00167	<0.000020	<0.000050	<0.010	0.0000063	0.882	<0.000010	<0.00050
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M																		
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	0.00047	<0.00010	0.000172	<0.00050		<0.0030	<0.00020	0.0793	<0.00010	<0.00010	0.00199	<0.000020	<0.000050	<0.010	<0.0000050	1.23	<0.000010	<0.00050
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M																		
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M	0.00055	<0.00010	0.000172	0.00055		<0.0030	<0.00020	0.0739	<0.00010	<0.00010	0.00167	<0.000020	<0.000050	<0.010	<0.0000050	1.01	<0.000010	<0.00050
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M																		
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	0.00044	<0.00010	0.000179	<0.00050		<0.0030	<0.00020	0.0709	<0.00010	<0.00010	0.00178	<0.000100	<0.000050	<0.010	<0.0000050	1.13	<0.000010	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	0.0004	<0.00010	0.000165	<0.00050		<0.0030	<0.00020	0.0744	<0.00010	<0.00010	0.00155	<0.000020	<0.000050	<0.010	<0.0000050	0.852	<0.000010	<0.00050
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M																		
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	0.00062	<0.00010	0.000174	<0.00050		<0.0030	<0.00020	0.0828	<0.00010	<0.00010	0.00148	<0.000100	<0.000050	<0.010	<0.0000050	0.92	<0.000010	<0.00050
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	0.0005	<0.00010	0.000158	<0.00050		<0.0030	<0.00020	0.0651	<0.00010	<0.00010	0.00135	<0.000100	<0.000050	<0.010	<0.0000050	0.889	<0.000010	<0.00050
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	0.00062	<0.00010	0.000161	<0.00050		<0.0030	<0.00020	0.0646	<0.00010	<0.00010	0.00157	<0.000020	<0.000050	<0.010	<0.0000050	0.975	<0.000010	<0.00050
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M																		
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	0.00042	<0.00010	0.000166	<0.00050		<0.0030	<0.00020	0.063	<0.00010	<0.00010	0.00146	<0.000100	<0.000050	<0.010	<0.0000050	0.859	<0.000010	<0.00050
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	0.00033	<0.00010	0.000183	<0.00050		<0.0030	<0.00020	0.0697	<0.00010	<0.00010	0.00168	<0.000100	<0.000050	<0.010	<0.0000050	1.03	<0.000010	<0.00050
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M	<0.005	<0.001	0.00013	<0.001		0.0049	<0.0001	0.0248	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0333	<0.00001	1.74		<0.0005
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M	<0.005	<0.001	0.000129	<0.001		<0.004	<0.0001	0.0507	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0107	0.000024	2.02		<0.0005
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M	<0.005	<0.001	0.000141	<0.001		0.0098	<0.0001	0.0384	<0.0002	<0.0005	0.0051	<0.0001	<0.0001	0.0362	0.000022	2.39		<0.0005
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M	<0.005	<0.001	0.000149	<0.001		<0.004	<0.0001	0.0602	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	<0.005	0.000014	0.69		<0.0005
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M	<0.005	<0.001	0.000213	0.0011		0.0048	<0.0001	0.115	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0162	0.000013	1.22		<0.0005
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M	<0.005	<0.001	0.00015	0.001		<0.004	<0.0001	0.0531	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0219	0.000012	2.48		<0.0005
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M	<0.005	<0.001	0.000148	<0.001		<0.004	<0.0001	0.0556	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	0.0193	0.000011	2.09		<0.0005
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M	<0.005	<0.001	0.000139	0.0017		<0.004	<0.0001	0.0642	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	<0.005	<0.00001	0.95		<0.0005
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M	<0.005	<0.001	0.000123	<0.001		<0.004	<0.0001	0.0257	<0.0002	<0.0005	0.0062	<0.0001	<0.0001	<0.05	0.000015	2.76		<0.0005
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M	<0.005	<0.001	0.000537	<0.001		<0.004	<0.0001	0.13	<0.0002	<0.0005	<0.005	<0.0001	<0.0001	<0.05	<0.00001	0.99		<0.0005
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M	0.00035	<0.00020	0.000388	<0.00020		0.0014	<0.000020											
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M	<0.00100	<0.00025	0.000427	<0.00100		<0.0050	<0.000100											
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M	<0.00200	<0.00050	0.000353	<0.00200		<0.0100	<0.000200											
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M	0.00132	<0.00020	0.0002	<0.00020		0.001	<0.000020											
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M	<0.0050	<0.0010	0.000179	0.0013		<0.0040	<0.00010											
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M	0.0014	<0.00020	0.000156	<0.00020		0.0015	<0.000020											
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M	0.006	<0.00020	0.000174	0.00026		0.0016	<0.000020											
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M	0.00259	<0.00020	0.000175	<0.00020		0.002	<0.000020											
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M	0.00433	<0.00020	0.000161	0.00059		0.0023	<0.000020											
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M	0.00322	<0.00020	0.000112	0.00034		0.001	0.000048											
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M	0.00239	<0.00020	0.000159	0.00038		<0.0010	<0.000020											
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M	0.00419	<0.00020	0.000167	0.00034		0.0012	0.000029											
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M	<0.0050	<0.0010	0.000188	<0.0010		<0.0040	<0.00010											
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M	<0.0050	<0.0010	0.000221	<0.0010		<0.0040	<0.00010											
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M	<0.0050	<0.0010	0.000276	<0.0010		<0.0040	<0.00010											
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M	<0.0050	<0.0010	0.000249	<0.0010		<0.0040	<0.00010											
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	<0.0050	<0.0010	0.000378	<0.0010		<0.0040	<0.00010	0.0594	<0.00020	0.0005	<0.0050	<0.00010	<0.00010	0.342	0.000016	32.9		<0.00050
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M																		
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	<0.0050	<0.0010	0.000172	0.0015		0.0044	<0.00010	0.111	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	2.59		<0.00050
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	<0.0050	<0.0010	0.000218	<0.0050		<0.0040	<0.00010	0.0839	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	2.96		<0.00050
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M	<0.0050	<0.0002	0.000183	<0.0050		<0.0040	<0.00010	0.0792	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	3.24		<0.00050
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	0.00327	<0.00020	0.000147	<0.00100		0.0012	<0.000020	0.0796	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	0.63		<0.00050
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	0.00194	<0.00020	0.000122	<0.00100		<0.0010	<0.000020	0.0445	<0.000050	<0.000050	0.00128	<0.000010	<0.000010	0.0075	0.0000042	0.824		0.00016
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M	0.00228	<0.00020	0.000151	<0.00100		0.0012	<0.000020	0.0243	<0.000050	0.00008	0.00486	<0.000010	<0.000010	0.118	0.0000076	10.3		0.00014
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M	0.00228	<0.00020	0.000143	<0.00100		<0.0010	<0.000020	0.0194	<0.000050	0.000084	0.00704	<0.000010	<0.000010	0.101	0.0000094	7.85		0.00017
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M	0.00211	<0.00100	0.00043	<0.00500		<0.0050	<0.000100	0.0142	<0.000250	0.000304	0.00949	<0.000050	<0.000050	0.698	0.0000182	63.6		<0.00050
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	<0.00100	<0.00100	0.000569	<0.00500		<0.0050	<0.000100	0.0525	<0.000250	0.000301	0.00586	<0.000050	<0.000050	0.568	0.000016	54.3		<0.00050
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M	<0.00040	<0.00040	0.000329	<0.00200		<0.0020	<0.000040	0.0327	<0.000100	0.000179	0.00574	<0.000020	<0.000020	0.38	0.0000123	32.6		<0.00020
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	0.0004	<0.00020	0.000339	<0.00100		0.0012	0.00002	0.0456	<0.000050	0.000148	0.00585	<0.000010	<0.000010	0.335	0.0000169	32.8		0.00021
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M	<0.0050	<0.0010	0.000509	<0.0050		<0.0040	<0.00010	0.0373	<0.000250	0.000459	0.00636	<0.000050	<0.000050	0.82	0.0000362	79.8		<0.00050
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	<0.0050	<0.0010	0.00023	<0.0050		<0.0040	<0.00010	0.0461	<0.000050	0.000105	0.00471	<0.000010	<0.000010	0.196	0.00001	20.9		0.00036
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	0.00035	<0.00020	0.000179	<0.00100		0.0011	<0.000020	0.0806	<0.000050	<0.000050	0.00202	<0.000010	<0.000010	0.014	0.0000055	2.25		<0.00050
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M	0.00987	<0.00020	0.000173	<0.00100		0.0019	<0.000020	0.0886	<0.000050	0.000052	0.00118	<0.000010	<0.000010	0.0021	0.000003	0.591		<0.00050
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	0.00036	<0.00020	0.000119	<0.00100		0.0013	<0.000020	0.0323	<0.000050	<0.000050	0.0017	<0.000010	<0.000010	0.0102	0.0000037	1.14		<0.00050
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	0.00469	<0.00020	0.000133	<0.00100		0.001	0.000026	0.0225	<0.000050	0.000083	0.00559	<0.000010	<0.000010	0.078	0.0000093	7.28		<0.00050
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	0.00416	<0.00100	0.000607	<0.00500		<0.0050	<0.000100	0.0201	<0.000100	0.000224	0.00889	<0.000020	<0.000020	0.408	0.0000112	35.4		<0.00100
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M	0.0004	<0.00020	0.000206	<0.00100		<0.0010	<0.000020	0.0296	<0.000050	0.000101	0.00463	<0.000010	<0.000010	0.115	0.0000112	10.2		<0.00050
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M	0.00482	<0.00020	0.000187	<0.00100		0.0062	0.000033	0.137	<0.000050	0.000068	0.0026	<0.000010	<0.000010	0.0028	0.0000062	1.3		<0.00050
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	<0.00100	<0.00100	0.000503	<0.00500		<0.0050	<0.000100	0.071	<0.000250	<0.000250	0.00644	<0.000050	<0.000050	0.574	0.000026	55.1		<0.00250
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M	0.00147	0.00002	0.000385	<0.00040		0.0015	<0.000020	0.0568	<0.000050	0.000136	0.00701	<0.000010	<0.000010	0.255	0.0000146	24.2		<0.00050
SW-03		VA24A1299-003	2024-01-23	Water	M	0.0039	<0.00010	0.000252	<0.00050		<0.0030	<0.00020	0.1	<0.00010	<0.00010	0.00247	<0.000100	<0.000050	0.068	0.0000088	7	0.000011	<0.00050
SW-03		L2754353-3	2024-01-23	Water	M																		
SW-03		L2754615-3	2024-02-15	Water	M																		
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	0.00492	<0.00050	0.000755	<0.00250		<0.0150	<0.00100	0.045	<0.00050	<0.00050	0.0084	<0.000100	<0.000250	0.562	<0.0000250	54.2	0.000065	<0.00250

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	<0.0050	<0.0010	0.000289	<0.00050	<0.00050	<0.0030	<0.00050	0.0819	<0.0010	<0.00040	0.0022	<0.00050	<0.00050	<0.30	<0.000020	12.4	<0.00050	<0.00050
SW-03		L2755012-3	2024-03-19	Water	M																		
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M	0.00092	<0.00010	0.000201	<0.00050		<0.0030	<0.00020	0.0817	<0.00010	<0.00010	0.00246	<0.000100	<0.000050	<0.010	0.0000073	1.76	<0.000010	<0.00050
SW-03		L2755316-7	2024-04-12	Water	M																		
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	<0.00060	<0.00010	0.00026	<0.00050		<0.0030	<0.00020	0.0785	<0.00010	<0.00010	0.00232	<0.000100	<0.000050	0.075	0.0000069	7.87	0.000014	<0.00050
SW-03		L2755504-2	2024-04-26	Water	M																		
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	0.00351	<0.00010	0.000234	<0.00050		<0.0030	<0.00020	0.107	<0.00010	<0.00010	0.00194	<0.000100	<0.000050	<0.010	0.0000056	1.37	<0.000010	<0.00050
SW-03		L2755521-3	2024-04-28	Water	M																		
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	0.00136	<0.00010	0.000192	<0.00050		<0.0030	<0.00020	0.0665	<0.00010	<0.00010	0.00185	<0.000100	<0.000050	0.028	<0.0000050	2.73	<0.000010	<0.00050
SW-03		L2755598-2	2024-05-03	Water	M																		
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	0.00186	<0.00010	0.000227	<0.00050		<0.0030	<0.00020	0.0682	<0.00010	<0.00010	0.00191	<0.000100	<0.000050	0.054	0.0000057	5.12	<0.000010	<0.00050
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	0.00054	<0.00010	0.000187	<0.00050		<0.0030	<0.00020	0.0635	<0.00010	<0.00010	0.0017	<0.000100	<0.000050	<0.010	<0.0000050	1.25	<0.000010	<0.00050
SW-03		L2755677-2	2024-05-09	Water	M																		
SW-03		L2755687-2	2024-05-09	Water	M																		
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M	0.00058	<0.00010	0.000163	<0.00050		<0.0030	<0.00020	0.0633	<0.00010	<0.00010	0.00154	<0.000100	<0.000050	<0.010	<0.0000050	1.13	<0.000010	<0.00050
SW-03		L2755770-2	2024-05-14	Water	M																		
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	0.00052	<0.00010	0.00017	<0.00050		<0.0030	<0.00020	0.0676	<0.00010	<0.00010	0.00127	<0.000100	<0.000050	<0.010	<0.0000050	0.866	<0.000010	<0.00050
SW-03		L2755819-2	2024-05-17	Water	M																		
SW-03		VA24B1636-002	2024-05-23	Water	M	0.0011	<0.00010	0.000182	<0.00050		<0.0030	<0.00020	0.0644	<0.00010	<0.00010	0.0013	<0.000100	<0.000050	<0.010	<0.0000050	1.32	<0.000010	<0.00050
SW-03		L2755903-2	2024-05-23	Water	M																		
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	0.00045	<0.00010	0.000171	<0.00050		<0.0030	<0.00020	0.06	<0.00010	<0.00010	0.00154	<0.000100	<0.000050	<0.010	0.0000069	1.02	<0.000010	<0.00050
SW-03		L2755933-2	2024-05-24	Water	M																		
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	0.00094	<0.00010	0.000174	<0.00050		<0.0030	<0.00020	0.0634	<0.00010	<0.00010	0.0016	<0.000100	<0.000050	<0.010	<0.0000050	1.13	<0.000010	<0.00050
SW-03		L2755961-2	2024-05-26	Water	M																		
SW-03		VA24B4698-002	2024-06-21	Water	M	0.00042	<0.00010	0.000149	<0.00050		<0.0030	<0.00020	0.0395	<0.00010	<0.00010	0.00138	<0.000100	<0.000050	<0.010	<0.0000050	1.18	<0.000010	<0.00050
SW-03		L2756349-2	2024-06-21	Water	M																		
SW-03		VA24B5540-002	2024-06-27	Water	M	0.00364	<0.00010	0.000189	<0.00050		<0.0030	<0.00020	0.0744	<0.00010	<0.00010	0.00128	<0.000100	<0.000050	<0.010	<0.0000050	0.969	<0.000010	<0.00050
SW-03		L2756458-2	2024-06-27	Water	M																		
SW-03		VA24B7689-002	2024-07-19	Water	M	0.00319	<0.00010	0.000112	<0.00050		<0.0030	<0.00020	0.0235	0.0001	0.00013	0.00234	<0.000100	<0.000050	0.132	<0.0000050	7.53	0.00002	<0.00050
SW-03		L2756726-2	2024-07-19	Water	M																		
SW-03		L2756871-3	2024-07-31	Water	M																		
SW-03		VA24B8974-003	2024-07-31	Water	M	0.00058	<0.00010	0.000129	<0.00050		<0.0030	<0.00020	0.0303	<0.00010	<0.00010	0.00248	<0.000100	<0.000050	0.013	<0.0000050	1.43	0.000012	<0.00050
SW-03		VA24C1605-002	2024-08-23	Water	M	<0.0050	<0.0010	0.000246	<0.00050	<0.00050	<0.0030	<0.00050	0.0239	<0.0010	<0.00040	0.007	<0.00050	<0.00050	<0.30	<0.000020	21.6	<0.00050	<0.00050
SW-03		L2757153-2	2024-08-23	Water	M																		
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	0.00504	<0.00010	0.000241	0.0006		<0.0030	<0.00020	0.0389	<0.00010	0.00012	0.00622	<0.000100	<0.000050	0.136	0.0000076	13.6	0.000023	<0.00050
SW-03	SW-03	L2757229-1	2024-08-28	Water	M																		
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	0.0205	<0.0010	0.000256	0.00121	<0.00050	<0.0030	<0.00050	0.0222	<0.0010	<0.00040	0.0069	<0.00050	<0.00050	<0.30	<0.000020	24.2	<0.00050	<0.00050
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	0.00372	<0.00010	0.00022	<0.00050		<0.0030	<0.00020	0.0437	<0.00010	<0.00010	0.00394	<0.000100	<0.000050	0.089	0.0000065	8.7	0.000019	<0.00050
SW-03	SW-03	L2757587-3	2024-09-29	Water	M																		
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	0.0137	<0.00010	0.000296	0.00112		<0.0030	<0.00020	0.111	<0.00010	<0.00010	0.00294	<0.000100	<0.000050	0.011	0.0000057	2.3	<0.000010	<0.00050
SW-03	SW-03	L2757661-3	2024-10-04	Water	M																		
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M	<0.00030	<0.00010	0.000145	<0.00050		<0.0030	<0.00020	0.0327	<0.00010	<0.00010	0.00369	<0.000100	<0.000050	0.021	0.0000085	2.22	0.000014	<0.00050
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M																		
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	0.00643	<0.00010	0.000222	<0.00050		<0.0030	<0.00020	0.0661	<0.00010	<0.00010	0.00506	<0.000100	<0.000050	0.083	0.0000086	8.71	0.000016	<0.00050
SW-03	SW-03	L2757873-3	2024-10-22	Water	M																		
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	<0.0050	<0.0010	0.000158	<0.00050	<0.00050	<0.0030	<0.00050	0.0514	<0.0010	<0.00040	0.0026	<0.00050	<0.00050	<0.30	<0.000020	2.2	<0.00050	<0.00050
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	<0.0050	<0.0010	0.000383	<0.00050	<0.00050	<0.0030	<0.00050	0.0342	<0.0010	<0.00040	0.0082	<0.00050	<0.00050	0.57	0.000023	54.1	<0.00050	<0.00050
SW-03	SW-03	L2757913-3	2024-10-25	Water	M																		
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	<0.0050	<0.0010	0.000243	<0.00050	<0.00050	<0.0030	<0.00050	0.0677	<0.0010	<0.00040	0.004	<0.00050	<0.00050	<0.30	<0.000020	7.5	<0.00050	<0.00050
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	<0.0050	<0.0010	0.000272	<0.00050	<0.00050	<0.0030	<0.00050	0.0684	<0.0010	<0.00040	0.0028	<0.00050	<0.00050	<0.30	<0.000020	14	<0.00050	<0.00050
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M																		
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	0.0011	<0.00010	0.000169	<0.00050		<0.0030	<0.00020	0.085	<0.00010	<0.00010	0.00299	<0.000100	<0.000050	0.016	0.0000076	2.76	0.000011	<0.00050
SW-03	SW-03	L2758155-2	2024-11-16	Water	M																		
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M	0.00625	<0.00020	0.000304	<0.00100		<0.0060	<0.00040	0.0619	<0.00020	<0.00020	0.00444	<0.000040	<0.000100	0.216	0.0000149	20.7	0.000031	<0.00100
SW-03		VA24D1587-002	2024-11-20	Water	M	0.0051	<0.0010	0.000328	<0.00050	<0.00050	<0.0030	<0.00050	0.064	<0.0010	<0.00040	0.0075	<0.00050	<0.00050	<0.30	<0.000020	28.2	<0.00050	<0.00050
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M																		
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	0.00105	<0.00010	0.000192	<0.00050		<0.0030	<0.00020	0.0845	<0.00010	<0.00010	0.00227	<0.000020	<0.000050	0.016	0.0000062	2.28	<0.000010	<0.00050
SW-03	SW-03	L2758371-2	2024-12-08	Water	M																		
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	<0.0050	<0.0010	0.000212	<0.00050	<0.00050	<0.0030	<0.00050	0.0768	<0.0010	<0.00040	0.0029	<0.00050	<0.00050	<0.30	<0.000020	10.3	<0.00050	<0.00050
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M																		
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	<0.0050	<0.0010	0.00042	<0.00050	<0.00050	<0.0030	<0.00050	0.0296	<0.0010	<0.00040	0.0045	<0.00050	<0.00050	0.49	<0.000020	36	<0.00050	<0.00050
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	<0.0050	<0.0010	0.00113	0.0006	<0.00050	<0.0030	<0.00050	0.0211	<0.0010	0.00046	0.0064	<0.00050	<0.00050	1.26	0.000025	106	<0.00050	<0.00050
SW-03	SW-03	L2758769-3	2025-01-24	Water	M																		
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	0.0147	<0.00010	0.000328	0.00074		0.0072	<0.00020	0.0555	<0.00010	0.00014	0.00514	<0.000020	<0.000050	0.08	0.0000103	9.32	0.000011	<0.00050
SW-03	SW-03	L2759009-2	2025-02-19	Water	M																		
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	<0.0050	<0.0010	0.000355	<0.00050	<0.00050	<0.0030	<0.00050	0.0864	<0.0010	<0.00040	0.0034	<0.00050	<0.00050	<0.30	<0.000020	18.1	<0.00050	<0.00050
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M																		
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	0.000736	<0.00010	0.000392	<0.00050		<0.0030	<0.00020	0.0536	<0.00010	0.000115	0.00416	<0.000020	<0.000050	0.145	0.000014	15	0.0000151	<0.00050
SW-03	SW-03	L2759254-2	2025-03-18	Water	M																		
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	0.0174	<0.00010	0.000244	0.00095		<0.0030	<0.00020	0.136	<0.00010	<0.00010	0.00168	<0.000100	<0.000050	<0.010	<0.0000050	0.899	<0.000010	<0.00050
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M	0.00454	<0.00020	0.000393	<0.00100		<0.0060	<0.00040	0.0648	<0.00050	<0.00050	0.00315	<0.000100	<0.000250	0.283	<0.0000250	26.8	<0.000050	<0.00250
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M																		
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M	0.00232	<0.00010	0.000173	<0.00050		<0.0030	<0.00020	0.0998	<0.00010	<0.00010	0.0016	<0.000020	<0.000050	<0.010	<0.0000050	0.964	<0.000010	<0.00050
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M																		
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	0.00089	<0.00010	0.000193	<0.00050		<0.0030	<0.00020	0.0691	<0.00010	<0.00010	0.00214	<0.000020	<0.000050	0.026	<0.0000050	2.86	<0.000010	<0.00050
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M																		
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	0.0015	<0.00010	0.00021	0.0008		<0.0030	<0.00020	0.0644	<0.00010	<0.00010	0.00183	<0.000020	<0.000050	0.06	<0.0000050	6.15	0.00001	<0.00050
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M																		
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	0.00032	<0.00010	0.000186	<0.00050		<0.0030	<0.00020	0.0673	<0.00010	<0.00010	0.00168	<0.000100	<0.000050	<0.010	<0.0000050	1.17	<0.000010	<0.00050
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	0.00054	<0.00010	0.000176	<0.00050		<0.0030	<0.00020	0.0686	<0.00010	<0.00010	0.00121	<0.000020	<0.000050	0.023	<0.0000050	2.4	<0.000010	<0.00050
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M																		
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	0.0007	<0.00010	0.000172	<0.00050		<0.0030	<0.00020	0.0807	<0.00010	<0.00010	0.00145	<0.000100	<0.000050	<0.010	<0.0000050	0.959	<0.000010	<0.00050
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	0.0006	<0.00010	0.000153	<0.00050		<0.0030	<0.00020	0.0676	<0.00010	<0.00010	0.00135	<0.000100	<0.000050	<0.010	<0.0000050	0.898	<0.000010	<0.00050
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	0.00084	<0.00010	0.000161	<0.00050		<0.0030	<0.00020	0.0622	<0.00010	<0.00010	0.00151	<0.000020	<0.000050	0.013	<0.0000050	1.4	<0.000010	<0.00050
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M																		
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	0.00089	<0.00010	0.000165	<0.00050		<0.0030	<0.00020	0.065	<0.00010	<0.00010	0.0014	<0.000100	<0.000050	<0.010	<0.0000050	0.939	<0.000010	<0.00050
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	0.00062	<0.00010	0.000182	<0.00050		<0.0030	<0.00020	0.0676	<0.00010	<0.00010	0.00165	<0.000100	<0.000050	<0.010	<0.0000050	1.08	<0.000010	<0.00050
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M	0.00055	<0.00020	0.000111	0.00035		0.0034	0.000042											
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M	0.00073	<0.00020	0.000124	0.00042		0.003	0.000046											
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M	0.00119	<0.00020	0.00012	<0.00020		0.0031	0.000055											
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M	0.00145	<0.00020	0.0000945	<0.00020		0.0042	0.000041											
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M	<0.0050	<0.0010	0.000079	0.0018		0.007	<0.00010											
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M	0.00082	<0.00020	0.0000686	<0.00020		0.0075	0.000034											
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M	0.0009	<0.00020	0.0000672	<0.00020		0.0062	0.000032											
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M	0.00071	<0.00020	0.0000767	<0.00020		0.0071	0.00004											
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M	0.0019	<0.00020	0.00013	0.0007		0.0054	0.000055											
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M	0.00079	<0.00020	0.0000659	<0.00020		0.0095	0.000041											
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M	<0.00020	<0.00020	0.0000826	0.0003		0.0037	<0.000020											
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M	0.00145	<0.00020	0.000144	0.00027		0.0045	0.000079											
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M	<0.0050	<0.0010	0.000133	<0.0010		<0.0040	<0.00010											
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M	<0.0050	<0.0010	0.000137	<0.0010		0.0049	<0.00010											
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M	<0.0050	<0.0010	0.000118	<0.0010		<0.0040	<0.00010											
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M	<0.0050	<0.0010	0.000157	<0.0010		<0.0040	<0.00010											
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M	<0.0050	<0.0010	0.000097	0.0011		<0.0040	<0.00010	0.0438	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	6.66		<0.00050
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M																		
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M	<0.0050	<0.0010	0.000108	0.0018		0.0092	<0.00010	0.071	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	5.17		<0.00050
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M	<0.0050	<0.0010	0.000107	<0.0050		0.0104	<0.00010	0.0549	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	5.45		<0.00050
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M	0.0062	<0.0002	0.000174	<0.0050		<0.0040	<0.00010	0.0923	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	4.08		<0.00050
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M	0.00078	<0.00020	0.0000808	<0.00100		0.0029	0.000034	0.0408	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	8.55		<0.00050
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M	0.00053	<0.00020	0.0000898	<0.00100		0.0032	0.000039	0.0287	0.000054	0.000054	0.00861	<0.000010	<0.000010	0.0096	0.0000085	17.9		0.00019
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M	0.00039	<0.00020	0.000187	<0.00100		0.0017	<0.000020	0.033	0.000066	0.000059	0.0147	<0.000010	<0.000010	0.0172	0.0000055	32.2		0.00019
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M	0.00221	<0.00020	0.0002	<0.00100		0.0027	0.000032	0.0298	<0.000050	0.000083	0.0159	<0.000010	<0.000010	0.0163	0.0000042	35.6		0.0002
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M	0.0009	<0.00020	0.000178	<0.00100		0.0011	<0.000020	0.0205	0.000057	0.000072	0.0151	<0.000010	<0.000010	0.0187	0.0000046	37.1		0.00016
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M	0.00049	<0.00020	0.0000889	<0.00100		0.0031	0.000043	0.0463	0.000051	0.000053	0.00613	<0.000010	<0.000010	0.0053	0.0000058	10.9		0.00015
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M	0.00039	<0.00020	0.0000655	<0.00100		0.003	0.000038	0.032	<0.000050	<0.000050	0.00632	<0.000010	<0.000010	0.0064	0.0000057	11.9		0.00016
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M	0.00059	<0.00020	0.0000983	<0.00100		0.0025	0.000049	0.0527	<0.000050	<0.000050	0.00458	<0.000010	<0.000010	0.0067	0.0000065	7.83		0.00013
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M	<0.0050	<0.0010	0.000085	<0.0050		<0.0040	<0.00010	0.0489	<0.000050	0.000054	0.00453	<0.000010	<0.000010	0.0043	0.0000068	8.02		0.00021
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M	<0.0050	<0.0010	0.000086	<0.0050		<0.0040	<0.00010	0.0489	<0.000050	<0.000050	0.00504	<0.000010	<0.000010	0.005	0.0000071	9.55		0.00021
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M	0.00067	<0.00020	0.0000906	<0.00100		0.0027	0.000036	0.0488	<0.000050	0.000075	0.00418	<0.000010	<0.000010	0.0039	0.0000105	6.74		<0.00050
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M	0.00081	<0.00020	0.00008	<0.00100		0.0032	0.000034	0.0385	<0.000050	0.000086	0.00541	<0.000010	<0.000010	0.0044	0.0000059	8.24		<0.00050
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M	0.00085	<0.00020	0.000465	<0.00100		<0.0010	0.000025	0.1	<0.000050	0.000073	0.00148	<0.000010	<0.000010	0.0056	0.0000024	0.761		<0.00050
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M	0.00082	<0.00020	0.000139	<0.00100		0.0014	0.00003	0.019	0.000077	0.00008	0.0154	<0.000010	<0.000010	0.014	0.0000049	33.2		<0.00050
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M	0.00062	<0.00020	0.000168	<0.00100		<0.0010	0.000025	0.0373	0.000065	0.000103	0.0169	<0.000010	<0.000010	0.0197	0.0000046	36.6		<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M	0.00456	<0.00020	0.000181	<0.00100		0.0036	0.000038	0.0147	0.00008	0.000086	0.0185	<0.000010	<0.000010	0.0192	0.0000035	41.3		<0.00050
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	0.0076	<0.00020	0.000203	<0.00100		0.0041	0.000133	0.126	0.000062	0.000155	0.0056	<0.000010	<0.000010	0.006	0.0000115	6.78		<0.00050
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M	0.00081	<0.00020	0.000119	<0.00100		0.0022	0.000062	0.0649	<0.000050	0.000067	0.00428	<0.000010	<0.000010	0.0029	0.000007	6.59		<0.00050
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	0.00054	0.000009	0.000109	<0.00040		0.0022	0.000051	0.0603	<0.000050	0.000092	0.00433	<0.000010	<0.000010	0.0051	0.0000059	6.68		<0.00050
SW-04		VA24A1299-004	2024-01-23	Water	M	0.0031	<0.00010	0.000162	<0.00050		<0.0030	<0.00020	0.0898	<0.00010	<0.00010	0.00378	<0.000100	<0.000050	<0.010	0.0000075	5.02	<0.000010	<0.00050
SW-04		L2754353-4	2024-01-23	Water	M																		
SW-04		L2754615-4	2024-02-15	Water	M																		
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	0.00139	<0.00010	0.000124	<0.00050		<0.0030	<0.00020	0.0581	<0.00010	<0.00010	0.00387	<0.000100	<0.000050	<0.010	0.0000054	6.2	<0.000010	<0.00050
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	0.00196	<0.00010	0.000124	<0.00050		<0.0030	<0.00020	0.0512	<0.00010	<0.00010	0.00364	<0.000100	<0.000050	<0.010	0.0000054	4.74	<0.000010	<0.00050
SW-04		L2755012-4	2024-03-19	Water	M																		
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	0.00291	<0.00010	0.000112	<0.00050		0.003	<0.00020	0.0494	<0.00010	0.00014	0.00513	<0.000100	<0.000050	<0.010	0.0000064	7.8	<0.000010	<0.00050
SW-04		L2755503-3	2024-04-25	Water	M																		
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M	0.00113	<0.00010	0.000106	<0.00050		<0.0030	<0.00020	0.0632	<0.00010	<0.00010	0.00514	<0.000100	<0.000050	<0.010	0.0000069	7.16	<0.000010	<0.00050
SW-04		L2755523-2	2024-04-29	Water	M																		
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	0.0013	<0.00010	0.00009	<0.00050		<0.0030	<0.00020	0.0446	<0.00010	<0.00010	0.00545	<0.000100	<0.000050	<0.010	0.0000067	8.95	<0.000010	<0.00050
SW-04		L2755588-3	2024-05-02	Water	M																		
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	0.00088	<0.00010	0.000081	<0.00050		<0.0030	<0.00020	0.0384	<0.00010	<0.00010	0.00528	<0.000100	<0.000050	<0.010	0.0000073	9.08	<0.000010	<0.00050
SW-04		L2755687-4	2024-05-09	Water	M																		
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M	0.00071	<0.00010	0.000085	<0.00050		<0.0030	<0.00020	0.0401	<0.00010	<0.00010	0.00571	<0.000100	<0.000050	<0.010	0.0000077	9.84	<0.000010	<0.00050
SW-04		L2755695-2	2024-05-10	Water	M																		
SW-04		L2755788-2	2024-05-15	Water	M																		
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M	0.00164	<0.00010	0.000092	<0.00050		<0.0030	<0.00020	0.0308	<0.00010	0.0001	0.00583	<0.000100	<0.000050	<0.010	<0.0000050	9.78	<0.000010	<0.00050
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	0.00128	<0.00010	0.00008	<0.00050		<0.0030	<0.00020	0.036	<0.00010	<0.00010	0.00604	<0.000100	<0.000050	<0.010	0.0000069	9.47	<0.000010	<0.00050
SW-04		L2755820-3	2024-05-16	Water	M																		
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	0.00076	<0.00010	0.000086	<0.00050		<0.0030	<0.00020	0.0467	<0.00010	<0.00010	0.00588	<0.000100	<0.000050	<0.010	0.0000062	9.38	<0.000010	<0.00050
SW-04		VA24B1636-005	2024-05-23	Water	M	0.00118	<0.00010	0.000093	<0.00050		<0.0030	<0.00020	0.0438	<0.00010	<0.00010	0.00556	<0.000100	<0.000050	<0.010	0.0000076	9.25	<0.000010	<0.00050
SW-04		L2755903-5	2024-05-23	Water	M																		
SW-04		L2755916-3	2024-05-23	Water	M																		
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	0.0032	<0.00010	0.000105	<0.00050		0.0031	<0.00020	0.0446	<0.00010	<0.00010	0.00656	<0.000100	<0.000050	<0.010	0.0000084	9.15	<0.000010	<0.00050
SW-04		L2755961-4	2024-05-26	Water	M																		
SW-04		VA24B4655-003	2024-06-20	Water	M	0.00076	<0.00010	0.000087	<0.00050		<0.0030	<0.00020	0.0367	0.00011	0.00016	0.00676	<0.000100	<0.000050	<0.010	0.000008	9.58	<0.000010	<0.00050
SW-04		L2756326-3	2024-06-20	Water	M																		
SW-04		VA24B5289-002	2024-06-26	Water	M	0.00078	<0.00010	0.000077	<0.00050		<0.0030	<0.00020	0.032	0.00011	0.0001	0.00777	<0.000100	<0.000050	<0.010	0.0000068	11.2	<0.000010	<0.00050
SW-04		L2756419-2	2024-06-26	Water	M																		
SW-04		VA24B7579-003	2024-07-18	Water	M	0.00057	<0.00010	0.000114	<0.00050		<0.0030	<0.00020	0.0255	0.00013	<0.00010	0.012	<0.000100	<0.000050	0.017	0.0000057	24.8	0.000013	<0.00050
SW-04		L2756717-3	2024-07-18	Water	M																		
SW-04		VA24B8974-004	2024-07-31	Water	M	0.00052	<0.00010	0.000096	<0.00050		<0.0030	<0.00020	0.0174	0.00011	<0.00010	0.0128	<0.000100	<0.000050	0.016	0.0000074	27.5	0.000014	<0.00050
SW-04		L2756871-4	2024-07-31	Water	M																		
SW-04		VA24C1546-003	2024-08-22	Water	M	0.00106	<0.00010	0.000096	<0.00050		<0.0030	<0.00020	0.014	0.00012	0.0001	0.0134	<0.000100	<0.000050	0.018	<0.0000050	28.1	0.000016	<0.00050
SW-04		L2757144-3	2024-08-22	Water	M																		
SW-04	SW-04	L2757209-4	2024-08-27	Water	M																		
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	0.00095	<0.00010	0.000124	<0.00050		<0.0030	<0.00020	0.0307	0.00011	0.00012	0.0162	<0.000100	<0.000050	0.014	0.0000118	25.3	0.000014	<0.00050
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	<0.00030	0.00019	0.001	<0.00050		<0.0030	<0.00020	0.0206	0.00039	0.00029	0.0149	<0.000100	<0.000050	0.016	0.0000095	20.7	0.000022	<0.00050
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	0.00526	0.00013	0.00134	<0.00050		0.0045	<0.00020	0.0318	0.00022	0.00046	0.0121	<0.000100	<0.000050	0.015	0.00001	20.8	0.000022	<0.00050
SW-04	SW-04	L2757584-2	2024-09-28	Water	M																		
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	0.0188	0.00012	0.000639	0.00133		0.0085	<0.00020	0.075	0.00018	0.00071	0.0143	<0.000100	<0.000050	0.02	0.0000171	27.9	0.000019	<0.00050
SW-04	SW-04	L2757661-4	2024-10-04	Water	M																		
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	0.00137	0.00016	0.00218	<0.00050		0.0048	<0.00020	0.0142	0.00011	0.00052	0.00981	<0.000100	<0.000050	0.013	0.0000086	19.4	0.000017	<0.00050
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M																		
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	0.0573	0.00011	0.000832	0.00333		0.021	0.00023	0.123	0.00011	0.00036	0.0106	<0.000100	<0.000050	0.014	0.000013	21.9	0.00001	<0.00050
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M	0.00304	<0.00010	0.000216	<0.00050		<0.0030	<0.00020	0.0684	<0.00010	0.00014	0.00515	<0.000100	<0.000050	<0.010	0.0000066	9.28	<0.000010	<0.00050
SW-04	SW-04	L2757873-4	2024-10-22	Water	M																		
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	0.00254	<0.00010	0.000202	<0.00050		<0.0030	<0.00020	0.0562	<0.00010	0.00013	0.00641	<0.000100	<0.000050	<0.010	0.0000125	12.9	<0.000010	<0.00050
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	0.0029	<0.00010	0.000192	<0.00050		0.0036	<0.00020	0.0898	<0.00010	0.00031	0.00599	<0.000100	<0.000050	<0.010	<0.0000050	9.91	<0.000010	<0.00050
SW-04	SW-04	L2757942-1	2024-10-26	Water	M																		
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	<0.00255	<0.00010	0.000184	<0.00050		0.0034	<0.00020	0.0665	<0.00010	0.00021	0.00653	<0.000100	<0.000050	<0.010	0.0000088	14.3	<0.000010	<0.00050
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	0.00202	<0.00010	0.000622	<0.00050		<0.0030	<0.00020	0.0381	<0.00010	0.00035	0.00643	<0.000100	<0.000050	<0.010	0.0000091	15.8	<0.000010	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M																		
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	0.0162	<0.00010	0.000312	0.001		0.0072	<0.00020	0.0644	0.0001	0.00015	0.0116	<0.000100	<0.000050	0.017	0.0000071	30.2	<0.000010	<0.00050
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M	0.00162	<0.00010	0.000197	<0.00050		<0.0030	<0.00020	0.086	<0.00010	0.00015	0.00424	<0.000020	<0.000050	<0.010	0.0000075	6.64	<0.000010	<0.00050
SW-04	SW-04	L2758155-4	2024-11-17	Water	M																		
SW-04		4-456131118-0	2024-11-17	Water	F																		
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	<0.00270	<0.00010	0.00182	0.00129		0.0101	<0.00020	0.0161	<0.00010	<0.00010	0.00539	<0.000100	<0.000050	<0.010	0.0000065	11.4	<0.000010	<0.00050
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M	0.00158	<0.00010	0.00171	<0.00050		0.0033	<0.00020	0.05	<0.00010	0.00052	0.00551	<0.000020	<0.000050	<0.010	<0.0000100	12.9	<0.000010	<0.00050
SW-04	SW-04	L2758371-3	2024-12-08	Water	M																		
SW-04		4-456441522-0	2024-12-18	Water	F																		
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	0.0121	<0.00010	0.000543	0.00066		0.005	<0.00020	0.0883	<0.00010	0.00024	0.00506	<0.000100	<0.000050	<0.010	0.0000073	8.1	<0.000010	<0.00050
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M																		
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	0.00231	0.00012	0.000301	<0.00050		0.0032	<0.00020	0.0452	0.0003	0.00014	0.0039	<0.000100	<0.000050	<0.010	0.0000082	10.4	<0.000010	<0.00050
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M																		
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M	0.00098	<0.00010	0.000307	<0.00050		<0.0030	<0.00020	0.0445	0.00054	0.0005	0.00517	<0.000020	<0.000050	<0.010	0.0000085	12.2	<0.000010	<0.00050
SW-04	SW-04	L2758765-1	2025-01-25	Water	M																		
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	0.00874	<0.00010	0.000322	0.00052		0.0033	<0.00020	0.113	<0.00010	0.00015	0.00516	<0.000100	<0.000050	<0.010	0.0000074	11.9	0.000013	<0.00050
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M																		
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M	0.058	0.00013	0.000793	0.00323		0.0087	<0.00020	0.178	0.00011	0.00043	0.00492	<0.000020	<0.000050	<0.010	0.0000108	10.8	0.000015	0.00062
SW-04	SW-04	L2759042-2	2025-02-21	Water	M																		
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	0.000776	0.000164	0.000321	<0.00050		<0.0030	<0.00020	0.0496	0.000271	0.000241	0.00629	<0.000020	<0.000050	<0.010	0.00000866	12.4	0.0000155	<0.00050
SW-04	SW-04	L2759255-2	2025-03-19	Water	M																		
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M	0.00585	<0.00010	0.000248	<0.00050		<0.0030	<0.00020	0.124	0.00012	0.00028	0.00382	<0.000100	<0.000050	<0.010	0.0000071	5.15	<0.000010	<0.00050
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	0.00168	0.00023	0.00043	<0.00050		<0.0030	<0.00020	0.0656	<0.00010	0.00048	0.00442	<0.000020	<0.000050	<0.010	0.0000097	11.6	0.000012	<0.00050
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M																		
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	0.00343	0.00011	0.000445	<0.00050		<0.0030	<0.00020	0.0959	0.00012	0.00044	0.00422	<0.000020	<0.000050	<0.010	0.0000063	6.99	<0.000010	<0.00050
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M																		
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	0.00236	<0.00010	0.000566	<0.00050		<0.0030	<0.00020	0.0491	<0.00010	0.00023	0.00423	<0.000020	<0.000050	<0.010	0.0000079	9.64	<0.000010	<0.00050
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M																		
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	0.00128	0.00023	0.00192	0.0008		<0.0030	<0.00020	0.106	<0.00010	0.00112	0.00644	<0.000020	<0.000050	<0.010	0.0000113	14.4	0.000018	0.00093
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M																		
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	0.00279	0.00077	0.00511	0.00205		<0.0030	<0.00020	0.295	0.00024	0.00217	0.00664	<0.000100	<0.000050	0.01	0.0000161	26	0.000032	0.00224
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	0.00117	0.00023	0.00147	<0.00050		<0.0030	<0.00020	0.0949	0.00012	0.00068	0.00571	<0.000020	<0.000050	<0.010	0.0000175	16.9	0.000011	<0.00050
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M																		
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	0.0006	0.00021	0.000907	<0.00050		<0.0030	<0.00020	0.0791	0.0001	0.0007	0.00534	<0.000100	<0.000050	<0.010	0.00002	13.9	0.00001	<0.00050
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	0.00096	0.00085	0.00322	0.00201		<0.0030	<0.00020	0.402	0.00022	0.00153	0.00871	<0.000100	<0.000050	0.01	0.0000205	21	0.000028	0.00215
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M	0.00088	0.00093	0.00202	0.00129		<0.0030	<0.00020	0.211	0.00011	0.00274	0.00641	<0.000020	<0.000050	0.011	0.0000123	19.1	0.000028	0.00212
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	0.00191	0.00076	0.00436	0.00254		<0.0030	<0.00020	0.731	0.00038	0.00326	0.0109	<0.000100	<0.000050	0.012	0.0000223	29.6	0.000043	0.00332
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	0.00086	0.00066	0.000592	<0.00050		<0.0030	<0.00020	0.0538	0.00021	0.00061	0.00736	<0.000100	<0.000050	0.011	0.0000143	15.8	<0.000010	<0.00050
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	<0.0050	<0.0010	0.000216	<0.0050		<0.0040	0.00012	0.129	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.2		<0.00050
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M	<0.0050	<0.0002	0.000088	<0.0050		<0.0040	<0.00010	0.178	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.74		<0.00050
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M	0.00065	<0.00020	0.000133	<0.00100		0.0014	0.000059	0.0956	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.65		<0.00050
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M	0.00055	<0.00020	0.000143	<0.00100		0.0023	0.000066	0.107	<0.000050	0.00007	0.00319	<0.000010	<0.000010	0.003	0.0000052	1.67		0.00015
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	0.00028	<0.00020	0.000172	<0.00100		0.0015	0.000051	0.0841	<0.000050	0.000072	0.0027	<0.000010	<0.000010	0.0038	0.0000045	1.8		0.00012
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M	0.00071	<0.00020	0.000115	<0.00100		0.0013	0.000089	0.116	<0.000050	<0.000050	0.0026	<0.000010	<0.000010	0.0031	0.0000061	1.41		0.00017
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M	<0.0050	<0.0010	0.000111	<0.0050		<0.0040	<0.00010	0.11	<0.000050	<0.000050	0.00229	<0.000010	<0.000010	0.0032	0.0000027	1.18		0.00023
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	<0.0050	<0.0010	0.000067	<0.0050		<0.0040	<0.00010	0.116	<0.000050	<0.000050	0.00231	<0.000010	<0.000010	0.0032	0.0000031	1.07		0.00012
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	0.0002	<0.00020	0.0000788	<0.00100		0.0037	0.000057	0.122	<0.000050	<0.000050	0.00257	<0.000010	<0.000010	0.004	0.0000027	1.16		<0.00050
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	0.00158	<0.00020	0.000243	<0.00100		0.0016	0.00013	0.264	<0.000050	0.000081	0.00367	<0.000010	<0.000010	0.0048	0.0000096	2.07		<0.00050
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M																		
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M																		
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M	0.00048	<0.00020	0.0000654	<0.00100		0.0013	0.000086	0.147	<0.000050	<0.000050	0.00265	<0.000010	<0.000010	<0.0020	0.0000026	1.24		<0.00050
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M	0.00042	<0.000006	0.0000678	<0.00040		0.0011	0.00008	0.122	<0.000050	<0.000050	0.00257	<0.000010	<0.000010	0.004	0.0000022	1.19		<0.00050
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M	<0.0050	<0.0010	0.000028	<0.0050		<0.0040	0.00022	0.143	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	0.000012	1.96		<0.00050
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M	0.0073	<0.0002	0.000051	<0.0050		<0.0040	0.00014	0.184	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	1.56		<0.00050
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M	0.00077	<0.00020	0.0000263	<0.00100		<0.0010	0.000125	0.116	<0.00020	<0.00050	<0.0050	<0.00010	<0.00010	<0.0500	<0.000010	3.63		<0.00050
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M	0.00089	<0.00020	0.0000301	<0.00100		0.0015	0.000103	0.09	<0.000050	<0.000050	0.00336	<0.000010	<0.000010	0.0051	<0.0000020	7.43		0.00018
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M	0.00079	<0.00020	0.0000278	<0.00100		0.0011	0.00014	0.139	<0.000050	<0.000050	0.00211	<0.000010	<0.000010	0.0034	0.0000041	2.68		0.00021

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M	0.00065	<0.00020	0.0000228	<0.00100		<0.0010	0.000125	0.113	<0.000050	<0.000050	0.00216	<0.000010	<0.000010	0.004	0.0000033	3.1		0.0002
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M	0.00104	<0.00020	0.0000311	<0.00100		<0.0010	0.000168	0.157	<0.000050	<0.000050	0.00184	<0.000010	<0.000010	0.0038	<0.0000020	2.27		0.00024
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M	<0.0050	<0.0010	0.000032	<0.0050		<0.0040	0.00015	0.148	<0.000050	<0.000050	0.00188	<0.000010	<0.000010	0.0031	0.0000028	2.5		0.00025
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M	<0.0050	<0.0010	0.000024	<0.0050		<0.0040	0.0002	0.155	<0.000050	<0.000050	0.00159	<0.000010	<0.000010	0.0028	0.0000033	1.87		0.00036
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M	0.00077	<0.00020	0.000027	<0.00100		0.0011	0.000149	0.156	<0.000050	0.000054	0.00183	<0.000010	<0.000010	0.0035	0.0000032	2.07		<0.00050
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M	0.00071	<0.00020	0.0000279	<0.00100		0.0017	0.000126	0.113	<0.000050	0.000062	0.0027	<0.000010	<0.000010	0.0032	<0.0000020	3.78		<0.00050
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M	0.00154	<0.00020	0.0000312	<0.00100		0.001	0.000175	0.227	<0.000050	0.000068	0.00208	<0.000010	<0.000010	0.0055	0.000002	2.32		<0.00050
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M	0.00075	<0.00020	0.0000283	<0.00100		0.0011	0.000173	0.16	<0.000050	0.000066	0.00199	<0.000010	<0.000010	0.0028	0.0000026	2.35		<0.00050
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	0.00344	<0.000006	0.000042	0.00045		0.0013	0.00015	0.163	<0.000050	0.000063	0.00186	<0.000010	<0.000010	0.0042	<0.0000020	2.2		<0.00050
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	0.00187	<0.00010	0.000026	0.0005		<0.0030	<0.00020	0.207	<0.00010	<0.00010	0.00159	<0.000020	<0.000050	<0.010	<0.0000050	1.86	<0.000010	<0.00050
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	0.00368	<0.00010	0.000038	<0.00050		<0.0030	<0.00020	0.23	<0.00010	<0.00010	0.00186	<0.000020	<0.000050	<0.010	<0.0000050	2.08	<0.000010	<0.00050
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	<0.00020	<0.00020	0.0000653	<0.00100		<0.0010	<0.000020	0.0206	<0.000050	0.000053	0.00575	<0.000010	<0.000010	0.0556	0.0000094	2.73		<0.00050
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M	0.00025	<0.00020	0.000116	<0.00100		<0.0010	<0.000020	0.0326	<0.000050	0.000059	0.00345	<0.000010	<0.000010	0.0233	0.0000078	1.86		<0.00050
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M	0.00318	<0.00020	0.000189	<0.00100		0.0015	0.000028	0.136	<0.000050	0.000053	0.00242	<0.000010	<0.000010	0.0022	0.0000059	0.974		<0.00050
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M	0.0003	<0.00020	0.000135	<0.00100		0.0013	<0.000020	0.0596	<0.000050	<0.000050	0.00291	<0.000010	<0.000010	0.0062	0.00001	1.56		<0.00050
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M	0.00032	0.00002	0.000146	<0.00040		0.0017	<0.000020	0.0637	<0.000050	<0.000050	0.00258	<0.000010	<0.000010	0.0084	0.0000066	1.47		<0.00050
SW-07		VA24A1299-005	2024-01-23	Water	M	0.00358	<0.00010	0.000212	<0.00050		<0.0030	<0.00020	0.109	<0.00010	<0.00010	0.00179	<0.000100	<0.000050	<0.010	0.000006	1.1	<0.000010	<0.00050
SW-07		L2754353-5	2024-01-23	Water	M																		
SW-07		L2754615-5	2024-02-15	Water	M																		
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	0.00034	<0.00010	0.000133	<0.00050		<0.0030	<0.00020	0.0552	<0.00010	<0.00010	0.00257	<0.000100	<0.000050	0.011	0.0000073	1.62	<0.000010	<0.00050
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	0.00057	<0.00010	0.000201	<0.00050		<0.0030	<0.00020	0.0921	<0.00010	<0.00010	0.00185	<0.000100	<0.000050	<0.010	0.0000078	1.06	<0.000010	<0.00050
SW-07		L2755012-5	2024-03-19	Water	M																		
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	0.00044	<0.00010	0.000186	<0.00050		<0.0030	<0.00020	0.0892	<0.00010	<0.00010	0.00216	<0.000100	<0.000050	<0.010	<0.0000050	1.19	0.00001	<0.00050
SW-07		L2755504-3	2024-04-26	Water	M																		
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M	0.0012	<0.00010	0.000211	<0.00050		<0.0030	<0.00020	0.108	<0.00010	<0.00010	0.00163	<0.000100	<0.000050	<0.010	<0.0000050	0.967	<0.000010	<0.00050
SW-07		L2755521-1	2024-04-28	Water	M																		
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	0.00091	<0.00010	0.000178	<0.00050		<0.0030	<0.00020	0.0696	<0.00010	<0.00010	0.00198	<0.000100	<0.000050	<0.010	0.0000064	1.31	<0.000010	<0.00050
SW-07		L2755598-3	2024-05-03	Water	M																		
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	0.00082	<0.00010	0.000178	<0.00050		<0.0030	<0.00020	0.0697	<0.00010	<0.00010	0.00163	<0.000100	<0.000050	<0.010	<0.0000050	0.976	<0.000010	<0.00050
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M	0.00062	<0.00010	0.00018	<0.00050		<0.0030	<0.00020	0.0664	<0.00010	<0.00010	0.00152	<0.000100	<0.000050	<0.010	0.0000063	0.998	<0.000010	<0.00050
SW-07		L2755677-3	2024-05-09	Water	M																		
SW-07		L2755687-3	2024-05-09	Water	M																		
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	0.00041	<0.00010	0.000154	<0.00050		0.0031	<0.00020	0.0649	<0.00010	<0.00010	0.00135	<0.000100	<0.000050	<0.010	0.0000053	0.846	<0.000010	<0.00050
SW-07		L2755770-3	2024-05-14	Water	M																		
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	0.00063	<0.00010	0.000173	<0.00050		<0.0030	<0.00020	0.0797	0.00013	<0.00010	0.0014	<0.000100	<0.000050	<0.010	<0.0000050	0.813	<0.000010	<0.00050
SW-07		L2755819-3	2024-05-17	Water	M																		
SW-07		VA24B1636-003	2024-05-23	Water	M	0.00125	<0.00010	0.000161	<0.00050		<0.0030	<0.00020	0.0668	<0.00010	<0.00010	0.00142	<0.000100	<0.000050	<0.010	<0.0000050	0.945	<0.000010	<0.00050
SW-07		L2755903-3	2024-05-23	Water	M																		
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	0.00035	<0.00010	0.000171	<0.00050		<0.0030	<0.00020	0.0626	<0.00010	<0.00010	0.00143	<0.000100	<0.000050	<0.010	<0.0000050	0.884	<0.000010	<0.00050
SW-07		L2755933-3	2024-05-24	Water	M																		
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M	0.00043	<0.00010	0.000171	<0.00050		<0.0030	<0.00020	0.0739	<0.00010	<0.00010	0.00167	<0.000100	<0.000050	<0.010	<0.0000050	0.871	<0.000010	<0.00050
SW-07		L2755961-3	2024-05-26	Water	M																		
SW-07		VA24B4698-003	2024-06-21	Water	M	<0.00030	<0.00010	0.00014	<0.00050		<0.0030	<0.00020	0.0431	<0.00010	<0.00010	0.00133	<0.000100	<0.000050	<0.010	<0.0000050	0.808	<0.000010	<0.00050
SW-07		L2756349-3	2024-06-21	Water	M																		
SW-07		VA24B5289-003	2024-06-26	Water	M	<0.00030	<0.00010	0.000129	<0.00050		<0.0030	<0.00020	0.0423	<0.00010	<0.00010	0.0015	<0.000100	<0.000050	<0.010	<0.0000050	0.817	<0.000010	<0.00050
SW-07		L2756419-3	2024-06-26	Water	M																		
SW-07		VA24B7689-003	2024-07-19	Water	M	<0.00030	<0.00010	0.000093	<0.00050		<0.0030	<0.00020	0.0263	<0.00010	<0.00010	0.00234	<0.000100	<0.000050	0.013	<0.0000050	1.18	0.000014	<0.00050
SW-07		L2756726-3	2024-07-19	Water	M																		
SW-07		L2756871-5	2024-07-31	Water	M																		
SW-07		VA24B8974-005	2024-07-31	Water	M	<0.00030	<0.00010	0.00011	<0.00050		<0.0030	<0.00020	0.0325	<0.00010	<0.00010	0.00237	<0.000100	<0.000050	0.013	<0.0000050	1.29	0.000011	<0.00050
SW-07		VA24C1605-003	2024-08-23	Water	M	<0.00030	<0.00010	0.000091	<0.00050		<0.0030	<0.00020	0.027	<0.00010	<0.00010	0.00376	<0.000100	<0.000050	0.03	0.0000081	1.97	0.00002	<0.00050
SW-07		L2757153-3	2024-08-23	Water	M																		
SW-07	SW-07	L2757209-5	2024-08-27	Water	M																		
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	0.00038	<0.00010	0.000177	<0.00050		<0.0030	<0.00020	0.0652	<0.00010	<0.00010	0.00213	<0.000100	<0.000050	<0.010	0.0000074	1.18	<0.000010	<0.00050
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	<0.00030	<0.00010	0.000081	<0.00050		<0.0030	<0.00020	0.022	<0.00010	<0.00010	0.00444	<0.000100	<0.000050	0.04	0.0000082	2.4	0.00002	<0.00050
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M	<0.00030	<0.00010	0.000136	<0.00050		<0.0030	<0.00020	0.0438	<0.00010	<0.00010	0.00266	<0.000100	<0.000050	0.013	0.0000059	1.54	0.000013	<0.00050
SW-07	SW-07	L2757587-4	2024-09-29	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M	<0.00030	<0.00010	0.00011	<0.00050		<0.0030	<0.00020	0.0342	<0.00010	<0.00010	0.00328	<0.000100	<0.000050	0.02	0.0000059	1.83	0.000012	<0.00050
SW-07	SW-07	L2757664-1	2024-10-03	Water	M																		
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	<0.00030	<0.00010	0.000108	<0.00050		<0.0030	<0.00020	0.0337	<0.00010	<0.00010	0.00339	<0.000100	<0.000050	0.021	0.0000064	1.93	0.000013	<0.00050
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M																		
SW-07		492-455781017-0	2024-10-13	Water	F																		
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M	0.00042	<0.00010	0.00004	<0.00050		<0.0030	<0.00020	0.0734	<0.00010	<0.00010	0.0027	<0.000100	<0.000050	<0.010	0.0000083	1.28	<0.000010	<0.00050
SW-07	SW-07	L2757873-5	2024-10-22	Water	M																		
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	<0.00030	<0.00010	0.000132	<0.00050		<0.0030	<0.00020	0.0539	<0.00010	<0.00010	0.00289	<0.000100	<0.000050	0.01	0.0000062	1.62	0.00001	<0.00050
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	<0.00030	<0.00010	0.000116	<0.00050		<0.0030	<0.00020	0.0493	<0.00010	<0.00010	0.00285	<0.000100	<0.000050	0.012	0.0000075	1.7	<0.000010	<0.00050
SW-07	SW-07	L2757913-4	2024-10-25	Water	M																		
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	0.00166	<0.00010	0.000149	<0.00050		<0.0030	<0.00020	0.0784	<0.00010	<0.00010	0.00278	<0.000100	<0.000050	<0.010	0.0000069	1.3	<0.000010	<0.00050
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	0.00039	<0.00010	0.000159	<0.00050		<0.0030	<0.00020	0.0796	<0.00010	<0.00010	0.00337	<0.000100	<0.000050	<0.010	0.0000054	1.09	<0.000010	<0.00050
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M																		
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	0.0007	<0.00010	0.000124	<0.00050		<0.0030	<0.00020	0.0922	<0.00010	<0.00010	0.00311	<0.000100	<0.000050	<0.010	0.0000078	1.02	<0.000010	<0.00050
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	0.0007	<0.00010	0.0001	<0.00050		<0.0030	<0.00020	0.0886	<0.00010	<0.00010	0.00396	<0.000020	<0.000050	<0.010	0.000006	1	<0.000010	<0.00050
SW-07	SW-07	L2758155-1	2024-11-16	Water	M																		
SW-07		VA24D1587-003	2024-11-20	Water	M	0.00054	<0.00010	0.000025	<0.00050		<0.0030	<0.00020	0.124	<0.00010	<0.00010	0.00539	<0.000100	<0.000050	<0.010	<0.0000050	0.841	<0.000010	<0.00050
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M																		
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	0.00375	<0.00010	0.000183	<0.00050		<0.0030	<0.00020	0.0932	<0.00010	<0.00010	0.00197	<0.000020	<0.000050	<0.010	0.0000071	1.11	<0.000010	<0.00050
SW-07	SW-07	L2758371-4	2024-12-08	Water	M																		
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	0.00083	<0.00010	0.000042	<0.00050		<0.0030	<0.00020	0.107	<0.00010	<0.00010	0.00463	<0.000100	<0.000050	<0.010	<0.0000050	0.755	<0.000010	<0.00050
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M																		
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	<0.00030	<0.00010	0.000105	<0.00050		<0.0030	<0.00020	0.038	<0.00010	<0.00010	0.00325	<0.000100	<0.000050	0.018	0.0000084	1.88	<0.000010	<0.00050
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M																		
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M	<0.00030	<0.00010	0.000102	<0.00050		<0.0030	<0.00020	0.0367	<0.00010	<0.00010	0.00336	<0.000020	<0.000050	0.02	0.000011	2.03	0.00001	<0.00050
SW-07	SW-07	L2758765-2	2025-01-25	Water	M																		
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M	0.0115	<0.00010	0.000149	0.00057		<0.0030	<0.00020	0.0425	<0.00010	<0.00010	0.0029	<0.000020	<0.000050	0.018	0.0000087	2.07	<0.000010	<0.00050
SW-07	SW-07	L2759009-3	2025-02-19	Water	M																		
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	0.00092	<0.00010	0.000022	<0.00050		<0.0030	<0.00020	0.092	<0.00010	<0.00010	0.00469	<0.000100	<0.000050	<0.010	<0.0000050	1.01	<0.000010	<0.00050
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M																		
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	0.00101	<0.00010	0.000127	<0.00050		0.00348	<0.00020	0.0559	<0.00010	<0.00010	0.00257	<0.000020	<0.000050	0.0112	0.00000608	1.62	<0.000010	<0.00050
SW-07	SW-07	L2759254-3	2025-03-18	Water	M																		
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	0.00448	<0.00010	0.000203	<0.00050		<0.0030	<0.00020	0.128	<0.00010	<0.00010	0.00153	<0.000100	<0.000050	<0.010	<0.0000050	0.698	<0.000010	<0.00050
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	0.00036	<0.00010	0.000176	<0.00050		<0.0030	<0.00020	0.0751	<0.00010	<0.00010	0.00206	<0.000020	<0.000050	<0.010	0.0000051	1.27	<0.000010	<0.00050
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M																		
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	0.00127	<0.00010	0.000166	<0.00050		<0.0030	<0.00020	0.109	<0.00010	<0.00010	0.00145	<0.000020	<0.000050	<0.010	<0.0000050	0.788	<0.000010	<0.00050
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M																		
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M																		
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	0.00041	<0.00010	0.000156	<0.00050		<0.0030	<0.00020	0.0748	<0.00010	<0.00010	0.00192	<0.000020	<0.000050	<0.010	<0.0000050	1.12	<0.000010	<0.00050
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	0.00035	<0.00010	0.000146	<0.00050		<0.0030	<0.00020	0.0706	<0.00010	<0.00010	0.00158	<0.000020	<0.000050	<0.010	0.0000058	0.975	<0.000010	<0.00050
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M																		
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	0.00045	<0.00010	0.000168	<0.00050		<0.0030	<0.00020	0.0694	<0.00010	<0.00010	0.00192	<0.000100	<0.000050	<0.010	<0.0000050	1.09	<0.000010	<0.00050
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	0.00054	<0.00010	0.000157	<0.00050		<0.0030	<0.00020	0.0752	<0.00010	<0.00010	0.00145	<0.000020	<0.000050	<0.010	<0.0000050	0.83	<0.000010	<0.00050
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M																		
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	0.00043	<0.00010	0.000176	<0.00050		<0.0030	<0.00020	0.0836	<0.00010	<0.00010	0.00141	<0.000100	<0.000050	<0.010	<0.0000050	0.881	<0.000010	<0.00050
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	0.00038	<0.00010	0.000154	<0.00050		<0.0030	<0.00020	0.0694	<0.00010	<0.00010	0.00128	<0.000100	<0.000050	<0.010	<0.0000050	0.836	<0.000010	<0.00050
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	0.0026	<0.00010	0.000152	<0.00050		<0.0030	<0.00020	0.0647	<0.00010	<0.00010	0.0015	<0.000020	<0.000050	<0.010	<0.0000050	0.98	<0.000010	<0.00050
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M																		
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	0.00079	<0.00010	0.000162	<0.00050		<0.0030	<0.00020	0.0701	<0.00010	<0.00010	0.0014	<0.000100	<0.000050	<0.010	<0.0000050	0.832	<0.000010	<0.00050
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	0.00054	<0.00010	0.000167	<0.00050		<0.0030	<0.00020	0.0705	<0.00010	<0.00010	0.00185	<0.000100	<0.000050	<0.010	0.0000052	1.02	<0.000010	<0.00050
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	0.001	<0.00010	0.000636	<0.00050		<0.0030	<0.00020	0.15	<0.00010	<0.00010	0.00139	<0.000100	<0.000050	<0.010	<0.0000050	0.746	<0.000010	<0.00050
SW-08		L2755503-2	2024-04-25	Water	M																		
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	0.00343	<0.00010	0.000698	<0.00050		<0.0030	<0.00020	0.14	<0.00010	<0.00010	0.00145	<0.000100	<0.000050	<0.010	<0.0000050	0.769	<0.000010	<0.00050
SW-08		L2755588-2	2024-05-02	Water	M																		
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	0.00098	<0.00010	0.00057	<0.00050		<0.0030	<0.00020	0.153	<0.00010	<0.00010	0.00127	<0.000100	<0.000050	<0.010	<0.0000050	0.664	0.000011	<0.00050
SW-08		L2755694-2	2024-05-10	Water	M																		
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	0.00109	<0.00010	0.000603	<0.00050		<0.0030	<0.00020	0.141	<0.00010	<0.00010	0.00124	<0.000100	<0.000050	<0.010	<0.0000050	0.654	0.00001	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	T-Ti	T-W	T-U	T-V	T-Y	T-Zn	T-Zr	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cs	D-Cr
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M																		
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	0.00089	<0.00010	0.000581	<0.00050		<0.0030	<0.00020	0.142	<0.00010	<0.00010	0.0014	<0.000100	<0.000050	<0.010	<0.0000050	0.707	0.00001	<0.00050
SW-08		L2755916-2	2024-05-23	Water	M																		
SW-08		VA24B4655-002	2024-06-20	Water	M	0.00187	<0.00010	0.000661	<0.00050		<0.0030	<0.00020	0.121	<0.00010	<0.00010	0.00142	<0.000100	<0.000050	<0.010	<0.0000050	0.731	<0.000010	<0.00050
SW-08		L2756326-2	2024-06-20	Water	M																		
SW-08		VA24B7579-002	2024-07-18	Water	M	0.0009	<0.00010	0.000554	<0.00050		<0.0030	<0.00020	0.115	<0.00010	<0.00010	0.00148	<0.000100	<0.000050	<0.010	<0.0000050	0.746	0.000012	<0.00050
SW-08		L2756717-2	2024-07-18	Water	M																		
SW-08		VA24C1546-002	2024-08-22	Water	M	0.00106	<0.00010	0.000521	<0.00050		<0.0030	<0.00020	0.102	<0.00010	<0.00010	0.00154	<0.000100	<0.000050	0.013	<0.0000050	0.776	0.000012	<0.00050
SW-08		L2757144-2	2024-08-22	Water	M																		
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	0.00078	<0.00010	0.000541	<0.00050		<0.0030	<0.00020	0.105	<0.00010	<0.00010	0.00169	<0.000100	<0.000050	<0.010	<0.0000050	0.814	0.000014	<0.00050
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	0.00112	<0.00010	0.000655	<0.00050		<0.0030	<0.00020	0.125	<0.00010	<0.00010	0.00181	<0.000100	<0.000050	<0.010	<0.0000050	0.963	0.000012	<0.00050
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	0.00143	<0.00010	0.000659	<0.00050		<0.0030	<0.00020	0.149	<0.00010	<0.00010	0.00182	<0.000100	<0.000050	<0.010	<0.0000050	0.896	0.000014	<0.00050
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	0.00133	<0.00010	0.000624	<0.00050		<0.0030	<0.00020	0.138	<0.00010	<0.00010	0.00184	<0.000100	<0.000050	<0.010	<0.0000050	0.919	0.000014	<0.00050
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	0.00159	<0.00010	0.000485	<0.00050		<0.0030	<0.00020	0.172	<0.00010	<0.00010	0.00157	<0.000100	<0.000050	<0.010	<0.0000050	0.705	0.000014	<0.00050
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	0.00108	<0.00010	0.000589	<0.00050		<0.0030	<0.00020	0.123	<0.00010	<0.00010	0.00176	<0.000100	<0.000050	<0.010	<0.0000050	0.827	0.000011	<0.00050
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	0.00101	<0.00010	0.000128	<0.00050		<0.0030	<0.00020	0.0406	<0.00010	<0.00010	0.00239	<0.000100	<0.000050	<0.010	0.0000071	2.29	<0.000010	<0.00050
SW-09		L2755503-4	2024-04-25	Water	M																		
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	0.00078	<0.00010	0.000126	<0.00050		<0.0030	<0.00020	0.0344	<0.00010	<0.00010	0.00244	<0.000100	<0.000050	<0.010	0.000006	2.22	<0.000010	<0.00050
SW-09		L2755588-4	2024-05-02	Water	M																		
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	0.0012	<0.00010	0.000128	<0.00050		<0.0030	<0.00020	0.0743	<0.00010	0.00011	0.00269	<0.000100	<0.000050	<0.010	0.0000098	2.34	<0.000010	<0.00050
SW-09		L2755687-5	2024-05-09	Water	M																		
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	0.00052	<0.00010	0.000098	<0.00050		<0.0030	<0.00020	0.0259	<0.00010	<0.00010	0.0026	<0.000100	<0.000050	<0.010	0.0000051	2.44	<0.000010	<0.00050
SW-09		L2755820-4	2024-05-16	Water	M																		
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	0.00089	<0.00010	0.000115	<0.00050		<0.0030	<0.00020	0.0342	<0.00010	<0.00010	0.00261	<0.000100	<0.000050	<0.010	0.0000102	2.59	<0.000010	<0.00050
SW-09		L2755916-4	2024-05-23	Water	M																		
SW-09		VA24B4655-004	2024-06-20	Water	M	0.00073	<0.00010	0.000128	<0.00050		<0.0030	<0.00020	0.0281	<0.00010	0.00011	0.00261	<0.000100	<0.000050	<0.010	0.000006	2.56	<0.000010	<0.00050
SW-09		L2756326-4	2024-06-20	Water	M																		
SW-09		VA24B7579-004	2024-07-18	Water	M	0.00037	<0.00010	0.000099	<0.00050		<0.0030	<0.00020	0.026	<0.00010	0.00016	0.00314	<0.000100	<0.000050	<0.010	0.0000087	3.21	<0.000010	<0.00050
SW-09		L2756717-4	2024-07-18	Water	M																		
SW-09		VA24C1546-004	2024-08-22	Water	M	<0.00030	<0.00010	0.000091	<0.00050		<0.0030	<0.00020	0.0227	<0.00010	0.00014	0.00332	<0.000100	<0.000050	<0.010	0.0000065	3.47	<0.000010	<0.00050
SW-09		L2757144-4	2024-08-22	Water	M																		
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	0.00116	<0.00010	0.000124	<0.00050		<0.0030	<0.00020	0.0222	<0.00010	0.00016	0.00361	<0.000100	<0.000050	<0.010	0.0000092	3.37	<0.000010	<0.00050
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	0.00388	<0.00010	0.000247	<0.00050		<0.0030	<0.00020	0.124	<0.00010	<0.00010	0.00357	<0.000100	<0.000050	<0.010	0.0000092	2.34	<0.000010	<0.00050
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	0.00038	<0.00010	0.000153	<0.00050		<0.0030	<0.00020	0.0512	<0.00010	<0.00010	0.00266	<0.000100	<0.000050	<0.010	0.0000085	2.14	<0.000010	<0.00050
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	0.0003	<0.00010	0.000167	<0.00050		<0.0030	<0.00020	0.0643	<0.00010	<0.00010	0.00253	<0.000100	<0.000050	<0.010	0.0000058	1.88	<0.000010	<0.00050
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	0.00033	<0.00010	0.000144	<0.00050		<0.0030	<0.00020	0.0466	<0.00010	<0.00010	0.00266	<0.000100	<0.000050	<0.010	0.0000085	2.11	<0.000010	<0.00050
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M																		
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	0.00081	<0.00010	0.000225	<0.00050		<0.0030	<0.00020	0.102	<0.00010	<0.00010	0.00246	<0.000100	<0.000050	<0.010	0.0000056	1.69	<0.000010	<0.00050
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	0.00047	<0.00010	0.000178	<0.00050		<0.0030	<0.00020	0.0646	<0.00010	<0.00010	0.00219	<0.000100	<0.000050	<0.010	0.0000071	1.6	<0.000010	<0.00050
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M																		
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	0.00043	<0.00010	0.000182	<0.00050		<0.0030	<0.00020	0.0711	<0.00010	<0.00010	0.00243	<0.000100	<0.000050	<0.010	<0.0000050	1.66	<0.000010	<0.00050
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	<0.00030	<0.00010	0.000112	<0.00050		<0.0030	<0.00020	0.0373	<0.00010	<0.00010	0.00205	<0.000100	<0.000050	<0.010	<0.0000050	1.84	<0.000010	<0.00050
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M																		
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	0.00044	<0.00010	0.00014	<0.00050		<0.0030	<0.00020	0.0742	<0.00010	<0.00010	0.0024	<0.000100	<0.000050	<0.010	0.0000088	1.77	<0.000010	<0.00050
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M																		
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	0.00068	<0.00010	0.000199	<0.00050		<0.0030	<0.00020	0.103	<0.00010	<0.00010	0.00227	<0.000100	<0.000050	<0.010	<0.0000050	1.38	<0.000010	<0.00050
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	0.0003	<0.00010	0.000108	<0.00050		<0.0030	<0.00020	0.0372	<0.00010	<0.00010	0.00223	<0.000100	<0.000050	<0.010	0.000006	1.84	<0.000010	<0.00050
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	0.00045	<0.00010	0.000112	<0.00050		<0.0030	<0.00020	0.0334	<0.00010	<0.00010	0.00242	<0.000100	<0.000050	<0.010	<0.0000050	1.93	<0.000010	<0.00050
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	<0.00030	<0.00010	0.000107	<0.00050		<0.0030	<0.00020	0.0302	<0.00010	0.00011	0.00255	<0.000100	<0.000050	<0.010	0.0000088	2.34	<0.000010	<0.00050
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	0.00036	<0.00010	0.000105	<0.00050		<0.0030	<0.00020	0.0242	<0.00010	0.0001	0.00257	<0.000100	<0.000050	<0.010	0.0000082	2.36	<0.000010	<0.00050
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M	0.00048	<0.00010	0.00012	<0.00050		<0.0030	<0.00020	0.0336	<0.00010	<0.00010	0.00262	<0.000100	<0.000050	<0.010	0.0000096	2.28	<0.000010	<0.00050

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M	<0.00050		<0.00010	0.00071		0.031	<0.000050	<0.0010	0.149	0.0014	<0.0000050	0.00032	<0.00050	<0.050	0.234		0.00053	<0.000050
OUT-01		VA24B1636-006	2024-05-23	Water	M			<0.00010	0.00065		0.028	<0.000050	<0.0010	0.14	0.0014	<0.0000050	0.000273	<0.00050	<0.050	0.148		0.00044	<0.000050
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M	<0.00050		<0.00010	0.00118		0.041	0.000093	<0.0010	0.225	0.00287	<0.0000050	0.000505	<0.00050	<0.050	0.365		0.00095	<0.000050
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M	<0.00050		<0.00010	0.00111		0.04	0.000135	<0.0010	0.178	0.00202	<0.0000050	0.000623	<0.00050	<0.050	0.25		0.00062	<0.000050
OUT-01		661-455931031-0	2024-10-28	Water	F																		
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M			<0.00010	0.00091		0.022	0.000076	<0.0010	0.165	0.0015	0.00000273	0.000518	<0.00050	<0.050	0.202		0.00054	<0.000050
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M			<0.00010	0.00068		0.02	<0.000050	<0.0010	0.135	0.00077	0.00000245	0.00024	<0.00050	<0.050	0.175		0.0005	<0.000050
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M			0.00012	0.00083		0.24	0.000054	<0.0010	1.46	0.0102	0.000001	0.000982	<0.00050	<0.050	1.1		0.00136	<0.000050
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M	<0.00050		<0.00010	0.00062		0.014	<0.000050	<0.0010	0.131	0.00077	0.00000222	0.000226	<0.00050	<0.050	0.184		0.00042	<0.000050
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M			0.0001	0.00052		0.021	<0.000050	<0.0010	0.113	0.00095		0.000214	<0.00050	<0.050	0.202		0.00056	<0.000050
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M											0.00000066							
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M	<0.00050		<0.00010	0.0008		0.017	0.000051	<0.0010	0.168	0.00122	0.00000252	0.00037	<0.00050	<0.050	0.249		0.00072	<0.000050
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M	<0.00050		<0.00010	0.00056		0.015	<0.000050	<0.0010	0.159	0.00146	0.00000098	0.000429	<0.00050	<0.050	0.229		0.00072	<0.000050
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M			<0.00010	0.00084		0.04	0.000104	<0.0010	0.19	0.00263	0.00000175	0.00035	<0.00050	<0.050	0.209		0.0007	<0.000050
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M	<0.00050		<0.00010	0.0016		0.016	0.000111	<0.0010	0.22	0.00137	0.0000059	0.00125	<0.00050	<0.050	0.241		0.00055	<0.000050
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M	<0.00050		<0.00010	0.00076		0.011	<0.000050	<0.0010	0.288	0.00059	<0.0000050	0.00138	<0.00050	<0.050	0.244		0.00054	<0.000050
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M	<0.00050		<0.00010	0.00099		<0.010	<0.000050	<0.0010	0.469	0.00058	<0.0000050	0.00203	<0.00050	<0.050	0.369		0.0008	<0.000050
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M			<0.00010	0.00067		0.03	<0.000050	<0.0010	0.164	0.00175	<0.0000050	0.000245	<0.00050	<0.050	0.209		0.00051	<0.000050
OUT-02		VA24B5289-006	2024-06-26	Water	M			<0.00010	0.00086		<0.010	0.00005	<0.0010	0.603	0.00111	<0.0000050	0.00267	<0.00050	<0.050	0.518		0.00113	<0.000050
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M	<0.00050		0.00011	0.00064		0.029	<0.000050	<0.0010	0.156	0.0014	<0.0000050	0.000372	<0.00050	<0.050	0.142		0.00046	<0.000050
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M	<0.00050		<0.00010	0.00053		0.014	<0.000050	<0.0010	0.14	0.00096	<0.0000050	0.000407	<0.00050	<0.050	0.117		0.00038	<0.000050
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M	<0.00050		<0.00010	0.00129		0.042	0.000165	<0.0010	0.216	0.0018	<0.0000050	0.00131	<0.00050	<0.050	0.228		0.0006	<0.000050
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M			<0.00010	0.00092		0.022	0.000091	<0.0010	0.153	0.00082	0.0000038	0.000684	<0.00050	<0.050	0.169		0.00047	<0.000050
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M	<0.00050		<0.00010	0.00085		0.02	0.000074	<0.0010	0.157	0.00082	0.00000313	0.000618	<0.00050	<0.050	0.168		0.00044	<0.000050
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M			<0.00010	0.00048		0.023	<0.000050	<0.0010	0.256	0.00087	0.00000227	0.00127	<0.00050	<0.050	0.212		0.00046	<0.000050
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M	<0.00050		<0.00010	0.00045		0.016	<0.000050	<0.0010	0.12	0.00075	0.00000255	0.000262	<0.00050	<0.050	0.171		0.00045	<0.000050
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M			<0.00010	0.00078		0.024	0.000125	<0.0010	0.133	0.00138		0.000639	<0.00050	<0.050	0.208		0.00049	<0.000050
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M											0.0000033							
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M	<0.00050		<0.00010	0.00062		0.026	0.000053	<0.0010	0.162	0.00191	0.00000254	0.000863	<0.00050	<0.050	0.191		0.00048	<0.000050
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M	<0.00050		<0.00010	0.00062		0.015	<0.000050	<0.0010	0.138	0.00048	0.00000253	0.000654	<0.00050	<0.050	0.173		0.00047	<0.000050
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M	<0.00050		<0.00010	0.00041		0.01	<0.000050	<0.0010	0.133	0.00047	0.00000166	0.000504	<0.00050	<0.050	0.164		0.00045	<0.000050
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M			<0.00010	0.00044		<0.010	<0.000050	<0.0010	0.194	0.00155	0.00000152	0.00134	<0.00050	<0.050	0.17		0.00041	<0.000050
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M			<0.00010	0.0009		0.01	0.00006	<0.0010	0.543	0.00111	<0.0000050	0.00119	<0.00050	<0.050	0.523		0.00102	<0.000050
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M			<0.00010	0.00106		0.017	0.000098	<0.0010	0.21	0.00145	<0.0000050	0.000879	<0.00050	<0.050	0.555		0.00085	<0.000050
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	<0.00050		<0.00010	0.00117		0.023	0.000116	<0.0010	0.359	0.0014	0.0000066	0.000493	<0.00050	<0.050	0.464		0.0009	0.000058
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M																		
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M	<0.00050		<0.00010	0.00104		0.017	0.00008	<0.0010	0.351	0.00237	<0.0000050	0.000636	<0.00050	<0.050	0.396		0.00076	<0.000050
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M			<0.00010	0.00087		0.014	0.000074	<0.0010	0.34	0.00083	0.00000421	0.000582	<0.00050	<0.050	0.335		0.00076	0.00007
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M	<0.00050		<0.00010	0.00083		0.014	0.00006	<0.0010	0.338	0.00172	0.00000334	0.000735	<0.00050	<0.050	0.314		0.00075	<0.000050
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M			<0.00010	0.00084		0.02	0.000098	<0.0010	0.219	0.00107	0.00000415	0.000617	<0.00050	<0.050	0.359		0.0007	<0.000050
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	<0.00050	<0.00050	<0.00010	0.00073		0.013	0.000059	<0.0010	0.204	0.0007	<0.0000050	0.000562	<0.00050	<0.050	0.256		0.00056	0.000054
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M																		
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M			0.00042	0.0008		0.015	0.000067	<0.0010	0.201	0.00115	0.00000399	0.000559	<0.00050	<0.050	0.253		0.0005	0.000074
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M			<0.00010	0.00083		0.02	0.000075	<0.0010	0.211	0.00084		0.00042	<0.00050	<0.050	0.271		0.00067	<0.000050
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M											0.00000246							
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M	<0.00050		<0.00010	0.00074		0.014	0.000052	<0.0010	0.184	0.00107	0.00000494	0.000545	<0.00050	<0.050	0.222		0.0005	0.000054
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M	<0.00050		<0.00010	0.00076		0.01	<0.000050	<0.0010	0.525	0.0006	0.00000321	0.00114	<0.00050	<0.050	0.389		0.00088	<0.000050
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M			<0.0001	<0.0004		<0.01	<0.0002	0.0007	0.166	0.00039	<0.00001	0.00061	<0.0004	<0.05	0.22			<0.0005
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M			<0.0001	0.00228		0.031	0.00035	0.00079	0.137	0.00098	<0.00001	0.00033	0.00045	<0.05	0.2			<0.0005
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M			<0.0001	0.00141		0.017	<0.0002	0.00078	0.181	0.00049	<0.00001	0.0004	<0.0004	<0.05	0.2			<0.0005
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M			<0.0001	<0.0004		0.021	<0.0002	0.00033	0.069	0.00079	<0.00001	0.00019	<0.0004	<0.05	<0.1			<0.0005
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M			<0.0001	0.00044		0.032	<0.0002	0.00038	0.11	0.00073	0.00002	0.00043	<0.0004	<0.05	0.12			<0.0005
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M			<0.0001	<0.0004		0.024	<0.0002	0.00056	0.138	<0.0002	<0.00001	0.00042	<0.0004	<0.05	0.14			<0.0005
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M			<0.0001	<0.0004		0.018	<0.0002	0.00058	0.135	0.00037	<0.00001	0.00031	<0.0004	<0.05	0.15			<0.0005
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M			<0.0001	<0.0004		0.018	<0.0002	0.0004	0.083	0.00033	<0.00001	0.00025	<0.0004	<0.05	<0.1			<0.0005
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M			<0.0001	0.00074		0.029	<0.0002	0.00071	0.189	0.00042	<0.00001	0.0006	<0.0004	<0.05	0.32			<0.0005
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M			<0.0001	<0.0004		<0.01	<0.0002	<0.0001	0.176	<0.0002	<0.00001	0.00042	0.00043	<0.05	0.23			<0.0005
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M																		
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M																		
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M																		
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M																		
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M																		
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M																		
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M																		
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M																		
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M																		
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M																		
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M																		
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M																		
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M																		
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M																		
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M																		
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M			<0.00010	<0.00040		0.028	<0.00020	0.00295	0.31	0.00051	<0.000010	0.00023	<0.00040	<0.050	0.24			<0.00050
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M																		
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M			<0.00010	<0.00040		0.02	<0.00020	0.00045	0.11	0.0004	<0.000010	0.00022	<0.00040	<0.050	<0.10			<0.00050
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M			<0.00010	<0.00040		0.02	<0.00020	0.00032	0.111	0.00036	<0.000010	0.00027	<0.00040	<0.050	0.13			<0.00050
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M			<0.00010	<0.00040		0.028	<0.00020	0.00024	0.083	0.00068	<0.000010	0.00015	<0.00040	<0.050	0.11			<0.00050
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M			<0.00010	<0.00040		0.018	<0.00020	0.0002	0.055	0.00056	<0.000010	<0.00010	<0.00040	<0.050	<0.10			<0.00050
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M			0.0000111	0.00017		0.013	0.000056	0.000417	0.0718	0.000337	<0.000010	0.000155	<0.000070	<0.010	0.077			<0.00010
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M			0.0000095	0.00021		0.015	<0.000050	0.000604	0.106	0.000265	<0.000010	0.000214	0.000041	<0.01	0.109			<0.00010
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M			0.0000097	0.00022		0.0127	<0.000050	0.000544	0.113	0.000364	<0.000010	0.00025	0.000078	<0.010	0.135			<0.00010
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M			0.0000089	0.00023		0.0075	<0.000050	0.000618	0.204	0.000233	<0.000010	0.000503	0.000088	<0.01	0.232			<0.00010
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M			0.0000136	0.00023		0.0169	<0.000050	0.000535	0.158	0.000409	<0.000010	0.000335	0.000129	<0.01	0.175			<0.00010
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M			0.0000134	0.00022		0.0095	<0.000050	0.000711	0.237	0.000216	<0.000010	0.000519	0.000095	<0.01	0.215			<0.00010
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M			0.000017	0.00025		0.0234	0.000051	0.000484	0.134	0.000288	<0.000010	0.000278	0.000082	<0.01	0.155			<0.00010
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M			0.000014	0.00031		0.0268	0.000073	0.000466	0.12	0.000351	<0.000010	0.000252	0.000065	<0.01	0.14			<0.00010
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M			0.0000158	0.00029		0.023	0.000068	0.000492	0.128	0.000305	<0.000010	0.000305	0.000098	<0.01	0.143			<0.00010
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M			0.0000163	0.00022		0.0191	0.000064	0.000332	0.0989	0.00034	<0.000010	0.000235	0.000064	<0.01	0.129			<0.00010
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M			0.0000147	0.00027		0.0209	0.000072	0.000274	0.0644	0.000508	<0.000010	0.00013	0.000059	<0.01	0.095			<0.00010
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M			0.000013	0.00062		0.0129	<0.000050	0.000261	1.06	0.00525	<0.000010	0.000579	0.000304	<0.01	0.436			<0.00010
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M			0.0000103	0.00029		0.0157	0.000055	0.000519	0.0941	0.000325	<0.000010	0.000197	<0.000040	<0.01	0.114			<0.00010
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M			0.0000069	0.00025		0.0135	<0.000050	0.000499	0.1	0.000259	<0.000010	0.000244	<0.000040	<0.01	0.114			<0.00010
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M			0.0000089	0.00026		0.0158	0.000053	0.000544	0.112	0.000346	<0.000010	0.000416	0.000063	<0.01	0.137			<0.00010
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M			0.0000338	0.00024		0.0243	0.000055	0.000312	0.0985	0.00133	<0.000010	0.000145	0.000076	<0.01	0.143			<0.00010
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M			0.0000169	0.00026		0.0193	<0.000050	0.000395	0.109	0.000445	<0.000010	0.000224	0.000113	<0.01	0.127			<0.00010
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M			0.000019	0.00024		0.0288	0.000064	0.000488	0.124	0.000505	<0.000010	0.00025	0.000131	<0.01	0.117			<0.00010
SW-01		VA24A1299-001	2024-01-23	Water	M			<0.00010	0.0002		0.019	<0.000050	<0.0010	0.0873	0.00081	<0.0000050	0.000173	<0.00050	<0.050	0.101		0.00024	<0.000050
SW-01		L2754353-1	2024-01-23	Water	M																		
SW-01		L2754615-1	2024-02-15	Water	M																		
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	<0.00050	<0.00050	<0.00010	0.00023		0.022	0.000051	<0.0010	0.0992	0.00041	<0.0000050	0.000207	<0.00050	<0.050	0.1		0.00023	<0.000050
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.02	<0.000050	<0.0010	0.0902	0.00044	<0.0000050	0.000191	<0.00050	<0.050	0.109		0.00029	<0.000050
SW-01		L2755012-1	2024-03-19	Water	M																		
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.023	<0.000050	<0.0010	0.0826	0.0004	<0.0000050	0.000212	<0.00050	<0.050	0.102		0.00025	<0.000050
SW-01		L2755503-1	2024-04-25	Water	M																		
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	<0.00050		<0.00010	0.00023		0.018	<0.000050	<0.0010	0.0849	0.00044	<0.0000050	0.000174	<0.00050	<0.050	0.088		<0.00020	<0.000050
SW-01		L2755523-1	2024-04-29	Water	M																		
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.017	<0.000050	<0.0010	0.1	0.00035	<0.0000050	0.000235	<0.00050	<0.050	0.109		0.00025	<0.000050
SW-01		L2755588-1	2024-05-02	Water	M																		
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	<0.00050		<0.00010	0.00021		0.02	<0.000050	<0.0010	0.0752	0.00039	<0.0000050	0.000194	<0.00050	<0.050	0.095		0.00023	<0.000050
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.021	<0.000050	<0.0010	0.0874	0.00036	<0.0000050	0.000191	<0.00050	<0.050	0.084		0.00022	<0.000050
SW-01		L2755694-1	2024-05-10	Water	M																		
SW-01		L2755695-1	2024-05-10	Water	M																		
SW-01		L2755788-1	2024-05-15	Water	M																		
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M	<0.00050		<0.00010	<0.00020		0.02	<0.000050	<0.0010	0.0678	0.00037	<0.0000050	0.00018	<0.00050	<0.050	0.077		<0.00020	<0.000050
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.02	<0.000050	<0.0010	0.0729	0.0004	<0.0000050	0.000177	<0.00050	<0.050	0.074		0.00021	<0.000050
SW-01		L2755820-1	2024-05-16	Water	M																		
SW-01		VA24B1628-001	2024-05-22	Water	M	<0.00050		<0.00010	<0.00020		0.018	<0.000050	<0.0010	0.0744	0.00051	<0.0000050	0.000186	<0.00050	<0.050	0.07		0.00024	<0.000050
SW-01		L2755902-1	2024-05-22	Water	M																		
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	<0.00050	<0.00050	<0.00010	0.0002		0.016	<0.000050	<0.0010	0.0744	0.00038	<0.0000050	0.000195	<0.00050	<0.050	0.068		0.00026	<0.000050
SW-01		L2755916-1	2024-05-23	Water	M																		
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M	<0.00050		<0.00010	0.00021		0.029	0.000059	<0.0010	0.0703	0.00055	<0.0000050	0.000133	<0.00050	<0.050	0.074		0.00022	<0.000050
SW-01		VA24B4655-001	2024-06-20	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.021	<0.000050	<0.0010	0.0833	0.00037	<0.0000050	0.000238	<0.00050	<0.050	0.092		0.00025	<0.000050
SW-01		L2756326-1	2024-06-20	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M	<0.00050		<0.00010	0.0003		0.023	<0.000050	<0.0010	0.0838	0.00037	<0.0000050	0.000218	<0.00050	<0.050	0.108		0.00029	<0.000050
SW-01		L2756419-1	2024-06-26	Water	M																		
SW-01		VA24B7579-001	2024-07-18	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.024	<0.000050	<0.0010	0.0979	0.00035	<0.0000050	0.000215	<0.00050	<0.050	0.12		0.00024	<0.000050
SW-01		L2756717-1	2024-07-18	Water	M																		
SW-01		VA24B8974-001	2024-07-31	Water	M	<0.00050		<0.00010	0.00023		0.21	<0.000050	<0.0010	0.0942	0.00108	<0.0000050	0.00026	<0.00050	<0.050	0.074		0.00028	<0.000050
SW-01		L2756871-1	2024-07-31	Water	M																		
SW-01		VA24C1546-001	2024-08-22	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.019	<0.000050	<0.0010	0.0958	0.00037	<0.0000050	0.00025	<0.00050	<0.050	0.11		0.00025	<0.000050
SW-01		L2757144-1	2024-08-22	Water	M																		
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	<0.00050		<0.00010	0.00032		0.022	<0.000050	<0.0010	0.103	0.00072	<0.0000050	0.000296	<0.00050	<0.050	0.13		0.00029	<0.000050
SW-01	SW-01	L2757209-1	2024-08-27	Water	M																		
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	<0.00050	<0.00050	<0.00010	0.00024		0.022	<0.000050	<0.0010	0.106	0.00033	<0.0000050	0.000305	<0.00050	<0.050	0.14		0.00032	<0.000050
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	<0.00050		<0.00010	0.0003		0.024	<0.000050	<0.0010	0.104	0.00053	<0.0000050	0.000346	<0.00050	<0.050	0.128		0.00031	<0.000050
SW-01	SW-01	L2757584-1	2024-09-28	Water	M																		
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M	<0.00050		<0.00010	0.00024		0.025	<0.000050	<0.0010	0.109	0.00044	<0.0000050	0.0004	<0.00050	<0.050	0.143		0.00034	<0.000050
SW-01	SW-01	L2757664-2	2024-10-03	Water	M																		
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	<0.00050		<0.00010	0.00023		0.024	<0.000050	<0.0010	0.116	0.00047	<0.0000050	0.000386	<0.00050	<0.050	0.14		0.00031	<0.000050
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M																		
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	<0.00050		<0.00010	0.00024		0.02	<0.000050	<0.0010	0.113	0.00068	<0.0000050	0.00025	<0.00050	<0.050	0.135		0.00036	<0.000050
SW-01	SW-01	L2757873-1	2024-10-22	Water	M																		
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	<0.00050	<0.00050	<0.00010	0.00022		0.029	<0.000050	<0.0010	0.117	0.00039	<0.0000050	0.000269	<0.00050	<0.050	0.139		0.00035	<0.000050
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M	<0.00050		<0.00010	0.00028		0.03	0.000056	<0.0010	0.111	0.00101	<0.0000050	0.000269	<0.00050	<0.050	0.137		0.0004	<0.000050
SW-01	SW-01	L2757942-2	2024-10-26	Water	M																		
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	<0.00050	<0.00050	<0.00010	0.00024		0.028	<0.000050	<0.0010	0.105	0.00045	<0.0000050	0.000248	<0.00050	<0.050	0.112		0.00032	<0.000050
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	<0.00050	<0.00050	<0.00010	0.00025		0.025	<0.000050	<0.0010	0.115	0.00037	<0.0000050	0.000263	<0.00050	<0.050	0.133		0.00033	<0.000050
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	<0.00050		<0.00010	0.00022		0.022	<0.000050	<0.0010	0.0961	0.00078	0.00000158	0.000169	<0.00050	<0.050	0.11		0.00034	<0.000050
SW-01	SW-01	L2758119-1	2024-11-12	Water	M																		
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	<0.00050	<0.00050	<0.00010	0.00021		0.023	<0.000050	<0.0010	0.0869	0.00098	<0.0000050	0.000133	<0.00050	<0.050	0.109		0.00032	<0.000050
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	<0.00050	<0.00050	<0.00010	0.0002		0.026	<0.000050	<0.0010	0.104	0.00045	<0.0000050	0.000232	<0.00050	<0.050	0.114		0.0003	<0.000050
SW-01	SW-01	L2758350-1	2024-12-06	Water	M																		
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M	<0.00050		<0.00010	0.00024		0.03	<0.000050	<0.0010	0.103	0.00053	0.00000155	0.000249	<0.00050	<0.050	0.117		0.00025	<0.000050
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M																		
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.023	<0.000050	<0.0010	0.0958	0.00055	<0.0000050	0.0002	<0.00050	<0.050	0.109		0.00028	<0.000050
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M																		
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M			<0.00010	0.00022		0.028	<0.000050	<0.0010	0.108	0.00032	<0.0000050	0.000282	<0.00050	<0.050	0.105		0.00027	<0.000050
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M																		
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M	<0.00050		<0.00010	0.00023		0.031	<0.000050	<0.0010	0.248	0.00048	0.00000146	0.000252	<0.00050	<0.050	0.164		0.00027	<0.000050
SW-01	SW-01	L2758769-1	2025-01-24	Water	M																		
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	<0.00050	<0.00050	<0.00010	0.00024		0.025	<0.000050	<0.0010	0.113	0.00069	<0.0000050	0.000271	<0.00050	<0.050	0.116		0.00025	<0.000050
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M																		
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	<0.00050		<0.00010	0.00034		0.026	<0.000050	<0.0010	0.121	0.00088	0.00000184	0.000265	<0.00050	<0.050	0.119		0.00032	<0.000050
SW-01	SW-01	L2759042-1	2025-02-21	Water	M																		
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	<0.00050		<0.00010	0.000274		0.0247	<0.000050	<0.0010	0.115	0.000703	0.00000125	0.000268	<0.00050	<0.050	0.116		0.000306	<0.000050
SW-01	SW-01	L2759255-1	2025-03-19	Water	M																		
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	<0.00050	<0.00050	<0.00010	0.00022		0.022	<0.000050	<0.0010	0.075	0.00073	<0.0000050	0.000122	<0.00050	<0.050	0.089		0.00029	<0.000050
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M	<0.00050		<0.00010	<0.00020		0.025	<0.000050	<0.0010	0.0944	0.00043	0.00000102	0.000244	<0.00050	<0.050	0.079		0.00024	<0.000050
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M																		
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	<0.00050		<0.00010	0.00027		0.021	<0.000050	<0.0010	0.0797	0.0007	0.00000159	0.000174	<0.00050	<0.050	0.103		0.00026	<0.000050
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M																		
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	<0.00050		<0.00010	<0.00020		0.025	<0.000050	<0.0010	0.0996	0.00065	0.00000163	0.000236	<0.00050	<0.050	0.091		0.00023	<0.000050
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M																		
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	<0.00050		<0.00010	<0.00020		0.021	<0.000050	<0.0010	0.0899	0.00121	0.00000164	0.000186	<0.00050	<0.050	0.081		0.00021	<0.000050
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M																		
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.019	<0.000050	<0.0010	0.0877	0.00029	<0.0000050	0.00023	<0.00050	<0.050	0.097		0.00021	<0.000050
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	<0.00050		0.00011	<0.00020		0.023	<0.000050	<0.0010	0.0738	0.00078	0.00000138	0.000188	<0.00050	<0.050	0.071		<0.00020	<0.000050
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M																		
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	<0.00050	<0.00050	<0.00010	0.00025		0.02	<0.000050	<0.0010	0.0754	0.00033	<0.0000050	0.000168	<0.00050	<0.050	0.095		<0.00020	<0.000050
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.018	<0.000050	<0.0010	0.0747	0.00036	<0.0000050	0.000174	<0.00050	<0.050	0.081		0.00024	<0.000050
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	<0.00050		<0.00010	<0.00020		0.019	<0.000050	<0.0010	0.0803	0.00048	0.00000129	0.000209	<0.00050	<0.050	0.084		<0.00020	<0.000050
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.017	<0.000050	<0.0010	0.0859	0.00034	<0.0000050	0.000195	<0.00050	<0.050	0.066		<0.00020	<0.000050
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.017	<0.000050	<0.0010	0.079	0.00034	<0.0000050	0.000174	<0.00050	<0.050	0.085		<0.00020	<0.000050
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M																		
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M																		
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M																		
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M																		
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M																		
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M																		
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M																		
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M																		
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M																		
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M																		
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M																		
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M																		
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M																		
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M																		
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M																		
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M			<0.00010	<0.00040		<0.010	<0.00020	0.00104	0.199	0.00039	<0.000010	0.00053	<0.00040	<0.050	0.23			<0.00050
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M																		
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M			<0.00010	<0.00040		<0.010	<0.00020	0.00053	0.153	0.00067	<0.000010	0.00041	0.00064	<0.050	0.1			<0.00050
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M			<0.00010	<0.00040		<0.010	<0.00020	0.00063	0.175	0.00037	<0.000010	0.00046	<0.00040	<0.050	0.23			<0.00050
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M			<0.00010	<0.00040		0.012	<0.00020	0.00032	0.101	0.00078	<0.000010	0.00027	<0.00040	<0.050	0.15			<0.00050
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M			<0.00010	<0.00040		<0.010	<0.00020	0.00019	0.058	0.00035	<0.000010	0.00011	<0.00040	<0.050	<0.10			<0.00050
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M			0.0000169	0.00012		0.0033	<0.000050	0.000412	0.073	0.000207	<0.000010	0.000243	<0.000160	<0.010	0.111			<0.00010
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M			0.0000119	0.00017		0.0033	<0.000050	0.00126	0.177	0.000166	<0.000010	0.000653	0.000114	<0.01	0.309			<0.00010
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M			0.0000109	0.00019		0.0024	<0.000050	0.00182	0.333	0.000157	<0.000010	0.000855	0.000137	<0.010	0.517			<0.00010
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M			0.000011	0.00019		0.0022	<0.000050	0.00211	0.415	0.000116	<0.000010	0.000894	0.000116	<0.01	0.56			<0.00010
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M			0.0000311	0.00024		0.0045	<0.000050	0.000991	0.226	0.000413	<0.000010	0.000589	0.000178	<0.01	0.27			<0.00010
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M			0.0000231	0.00024		0.0039	<0.000050	0.00156	0.282	0.000268	<0.000010	0.000782	0.000182	<0.01	0.305			<0.00010
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M			0.0000445	0.00026		0.0054	<0.000050	0.000835	0.197	0.000362	<0.000010	0.000459	0.000187	<0.01	0.263			<0.00010
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M			0.0000373	0.00028		0.0038	<0.000050	0.00106	0.23	0.00036	<0.000010	0.000549	0.000183	<0.01	0.272			<0.00010
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M			0.000033	0.00031		0.0049	<0.000050	0.00128	0.247	0.000385	<0.000010	0.000634	0.000211	<0.01	0.291			<0.00031
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M			0.0000438	0.00023		0.0066	<0.000050	0.000396	0.122	0.000352	<0.000010	0.000307	0.000116	<0.01	0.181			<0.00010
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M			0.0000226	0.00017		0.007	<0.000050	0.000213	0.063	0.000384	<0.000010	0.000169	0.000072	<0.01	0.109			<0.00010
SW-02	SW-02	23F0370-03	2023-06-02	Water	M																		
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M			0.000014	0.00012		0.0022	<0.000050	0.000671	0.102	0.000157	<0.000010	0.000403	0.000096	<0.01	0.191			<0.00010
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M			0.0000109	0.00018		0.0023	<0.000050	0.0014	0.205	0.000158	<0.000010	0.000602	0.000075	<0.01	0.365			<0.00010
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M			0.0000105	0.00024		<0.0020	<0.000050	0.00198	0.37	0.000151	<0.000010	0.000933	0.000101	<0.01	0.535			<0.00010
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M			0.0000793	0.00035		0.0135	<0.000050	0.000284	0.115	0.00177	<0.000010	0.000199	0.000174	<0.01	0.194			<0.00010
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M				0.00038														
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M				0.00038														
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M			0.0000492	0.00037		0.0049	0.000051	0.000622	0.188	0.000441	<0.000010	0.000314	0.00021	<0.01	0.239			<0.00010
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M			0.000049	0.00028		0.0067	<0.000050	0.000728	0.185	0.000473	<0.000010	0.000426	0.000167	<0.01	0.212			<0.00010
SW-02		VA24A1299-002	2024-01-23	Water	M			<0.00010	0.0003		0.01	<0.000050	<0.0010	0.12	0.00099	<0.0000050	0.000302	<0.00050	<0.050	0.154		0.00035	<0.000050
SW-02		L2754353-2	2024-01-23	Water	M																		
SW-02		L2754615-2	2024-02-15	Water	M																		
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	<0.00050	<0.00050	<0.00010	0.00025		<0.010	<0.000050	<0.0010	0.188	0.00035	<0.0000050	0.000451	<0.00050	<0.050	0.232		0.00045	<0.000050
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	<0.00050	<0.00050	<0.00010	0.00021		<0.010	<0.000050	<0.0010	0.117	0.00041	<0.0000050	0.000313	<0.00050	<0.050	0.17		0.00039	<0.000050
SW-02		L2755012-2	2024-03-19	Water	M																		
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	<0.00050		<0.00010	0.00107		0.012	<0.000050	<0.0010	0.142	0.00051	<0.0000050	0.000383	<0.00050	<0.050	0.19		0.00046	<0.000050
SW-02		L2755316-6	2024-04-12	Water	M																		
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	<0.00050	<0.00050	<0.00010	0.00021		<0.010	<0.000050	<0.0010	0.119	0.00022	<0.0000050	0.000416	<0.00050	<0.050	0.157		0.00037	<0.000050
SW-02		L2755504-1	2024-04-26	Water	M																		
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	<0.00050		<0.00010	0.00024		0.011	<0.000050	<0.0010	0.104	0.00046	<0.0000050	0.000292	<0.00050	<0.050	0.143		0.00037	<0.000050
SW-02		L2755521-2	2024-04-28	Water	M																		
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	<0.00050	<0.00050	<0.00010	0.00021		<0.010	<0.000050	<0.0010	0.139	0.00023	<0.0000050	0.00044	<0.00050	<0.050	0.189		0.00045	<0.000050
SW-02		L2755598-1	2024-05-03	Water	M																		
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.104	0.00026	<0.0000050	0.000372	<0.00050	<0.050	0.163		0.00034	<0.000050
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	<0.00050		<0.00010	0.00022		<0.010	<0.000050	<0.0010	0.101	0.00034	<0.0000050	0.000358	<0.00050	<0.050	0.15		0.00037	<0.000050
SW-02		L2755677-1	2024-05-09	Water	M																		
SW-02		L2755687-1	2024-05-09	Water	M																		
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0822	0.00025	<0.0000050	0.000294	<0.00050	<0.050	0.127		0.00027	<0.000050
SW-02		L2755770-1	2024-05-14	Water	M																		
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0806	0.00025	<0.0000050	0.000277	<0.00050	<0.050	0.124		0.00031	<0.000050
SW-02		L2755819-1	2024-05-17	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M	<0.00050		<0.00010	0.00035		0.011	<0.000050	<0.0010	0.0885	0.00031	<0.0000050	0.000335	<0.00050	<0.050	0.126		0.00033	<0.000050
SW-02		L2755903-1	2024-05-23	Water	M																		
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	0.00062	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0871	0.00021	<0.0000050	0.000324	<0.00050	<0.050	0.108		0.00033	<0.000050
SW-02		L2755933-1	2024-05-24	Water	M																		
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M	<0.00050		<0.00010	0.00022		<0.010	<0.000050	<0.0010	0.0938	0.00024	<0.0000050	0.000302	<0.00050	<0.050	0.141		0.00034	<0.000050
SW-02		L2755961-1	2024-05-26	Water	M																		
SW-02		VA24B4698-001	2024-06-21	Water	M	<0.00050	<0.00050	<0.00010	0.00027		<0.010	<0.000050	<0.0010	0.088	0.00026	<0.0000050	0.000344	<0.00050	<0.050	0.126		0.00032	<0.000050
SW-02		L2756349-1	2024-06-21	Water	M																		
SW-02		VA24B5540-001	2024-06-27	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0694	0.00021	<0.0000050	0.000292	<0.00050	<0.050	0.123		0.00033	<0.000050
SW-02		L2756458-1	2024-06-27	Water	M																		
SW-02		VA24B7689-001	2024-07-19	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.131	0.00013	<0.0000050	0.000549	<0.00050	<0.050	0.237		0.00064	<0.000050
SW-02		L2756726-1	2024-07-19	Water	M																		
SW-02		VA24B8974-002	2024-07-31	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.136	0.00025	<0.0000050	0.000587	<0.00050	<0.050	0.214		0.0007	<0.000050
SW-02		L2756871-2	2024-07-31	Water	M																		
SW-02		VA24C1605-001	2024-08-23	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	0.0014	0.242	0.00016	<0.0000050	0.000854	<0.00050	<0.050	0.372		0.00101	<0.000050
SW-02		L2757153-1	2024-08-23	Water	M																		
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	<0.00050		<0.00010	0.00032		<0.010	<0.000050	<0.0010	0.154	0.00048	<0.0000050	0.000436	<0.00050	<0.050	0.227		0.00052	<0.000050
SW-02	SW-02	L2757209-2	2024-08-27	Water	M																		
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	0.0018	0.378	0.00012	<0.0000050	0.000893	<0.00050	<0.050	0.482		0.00115	<0.000050
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	<0.00050		<0.00010	0.00024		<0.010	<0.000050	<0.0010	0.219	0.00016	<0.0000050	0.000692	<0.00050	<0.050	0.268		0.0007	<0.000050
SW-02	SW-02	L2757587-1	2024-09-29	Water	M																		
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	<0.00050		<0.00010	0.00036		0.018	<0.000050	<0.0010	0.267	0.00088	<0.0000050	0.000495	<0.00050	<0.050	0.248		0.0005	<0.000050
SW-02	SW-02	L2757661-1	2024-10-04	Water	M																		
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	<0.00050		<0.00010	0.00021		<0.010	<0.000050	0.0013	0.263	0.0002	<0.0000050	0.000773	<0.00050	<0.050	0.311		0.00081	<0.000050
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M																		
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	<0.00050		<0.00010	0.00035		<0.010	<0.000050	<0.0010	0.154	0.00092	<0.0000050	0.000343	<0.00050	<0.050	0.228		0.00057	<0.000050
SW-02	SW-02	L2757873-2	2024-10-22	Water	M																		
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	<0.00050	<0.00050	<0.00010	0.00027		<0.010	<0.000050	<0.0010	0.189	0.00036	<0.0000050	0.000501	<0.00050	<0.050	0.276		0.00068	<0.000050
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M	<0.00050		<0.00010	0.00044		<0.010	<0.000050	<0.0010	0.2	0.0005	<0.0000050	0.0005	<0.00050	<0.050	0.282		0.00065	<0.000050
SW-02	SW-02	L2757913-1	2024-10-25	Water	M																		
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	<0.00050	<0.00050	<0.00010	0.00036		<0.010	<0.000050	<0.0010	0.179	0.00053	<0.0000050	0.000422	<0.00050	<0.050	0.233		0.0006	<0.000050
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	<0.00050	<0.00050	<0.00010	0.0002		<0.010	<0.000050	<0.0010	0.119	0.00029	<0.0000050	0.000402	<0.00050	<0.050	0.181		0.00052	0.000056
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M																		
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	<0.00050	<0.00050	<0.00010	0.00031		<0.010	<0.000050	<0.0010	0.141	0.00095	<0.0000050	0.000285	<0.00050	<0.050	0.194		0.00042	<0.000050
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	<0.00050		<0.00010	0.00034		0.016	<0.000050	<0.0010	0.178	0.0011	0.00000076	0.000365	<0.00050	<0.050	0.225		0.00053	<0.000050
SW-02	SW-02	L2758155-3	2024-11-16	Water	M																		
SW-02		VA24D1587-001	2024-11-20	Water	M	<0.00050	<0.00050	<0.00010	0.00076		0.028	0.000079	<0.0010	0.437	0.00123	<0.0000050	0.000417	<0.00050	<0.050	0.345		0.00052	<0.000050
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M																		
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	<0.00050		<0.00010	0.00035		0.011	<0.000050	<0.0010	0.128	0.00279	0.00000101	0.000343	<0.00050	<0.050	0.166		0.00033	<0.000050
SW-02	SW-02	L2758371-1	2024-12-08	Water	M																		
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	<0.00050	<0.00050	<0.00010	0.00025		<0.010	<0.000050	<0.0010	0.145	0.00075	<0.0000050	0.000334	<0.00050	<0.050	0.184		0.0004	<0.000050
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M																		
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	0.0011	0.227	0.00022	<0.0000050	0.000619	<0.00050	<0.050	0.247		0.00057	<0.000050
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M																		
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M	<0.00050		<0.00010	0.00021		<0.010	<0.000050	0.0011	0.257	0.00035	<0.00000050	0.00062	<0.00050	<0.050	0.283		0.00074	<0.000050
SW-02	SW-02	L2758769-2	2025-01-24	Water	M																		
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M	<0.00050		<0.00010	0.00041		0.011	<0.000050	0.0012	0.27	0.00114	0.00000097	0.000755	<0.00050	<0.050	0.275		0.00054	<0.000050
SW-02	SW-02	L2759009-1	2025-02-19	Water	M																		
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	<0.00050	<0.00050	<0.00010	0.00038		0.013	<0.000050	<0.0010	0.189	0.00091	<0.0000050	0.000523	<0.00050	<0.050	0.225		0.00049	<0.000050
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M																		
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	<0.00050		0.000174	0.000287		<0.010	<0.000050	<0.0010	0.195	0.000521	0.000000564	0.000509	<0.00050	<0.050	0.213		0.000529	<0.000050
SW-02	SW-02	L2759254-1	2025-03-18	Water	M																		
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M	<0.00050	<0.00050	<0.00010	0.00029		0.013	<0.000050	<0.0010	0.0891	0.00093	<0.0000050	0.000181	<0.00050	<0.050	0.121		0.00026	<0.000050
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	<0.00050		<0.00010	0.00024		<0.010	<0.000050	<0.0010	0.15	0.00051	0.00000055	0.00034	<0.00050	<0.050	0.164		0.00047	<0.000050
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M																		
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	<0.00050		<0.00010	0.00024		0.012	<0.000050	<0.0010	0.0859	0.00082	0.00000099	0.000218	<0.00050	<0.050	0.102		0.00025	<0.000050
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M																		
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	<0.00050		<0.00010	0.00023		<0.010	<0.000050	<0.0010	0.127	0.00054	0.00000112	0.000325	<0.00050	<0.050	0.148		0.00035	<0.000050
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M																		
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.111	0.0003	0.00000085	0.000324	<0.00050	<0.050	0.145		0.00032	<0.000050
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M																		
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	<0.00050	<0.00050	<0.00010	0.00027		<0.010	<0.000050	<0.0010	0.115	0.00033	<0.0000050	0.000379	<0.00050	<0.050	0.145		0.00031	<0.000050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.085	0.00042	0.00000075	0.000283	<0.00050	<0.050	0.114		0.00026	<0.000050
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M																		
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	<0.00050	<0.00050	<0.00010	0.00028		<0.010	<0.000050	<0.0010	0.0858	0.00028	<0.0000050	0.000294	<0.00050	<0.050	0.124		0.00029	<0.000050
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0796	0.00024	<0.0000050	0.000301	<0.00050	<0.050	0.113		0.00027	<0.000050
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0965	0.00059	0.00000075	0.000341	<0.00050	<0.050	0.128		0.00036	<0.000050
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M																		
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0967	0.00025	<0.0000050	0.000333	<0.00050	<0.050	0.112		0.00032	<0.000050
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.105	0.00022	<0.0000050	0.000343	<0.00050	<0.050	0.138		0.00035	<0.000050
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M			<0.0001	0.00081		<0.01	<0.0002	0.00121	0.205	<0.0002	<0.00001	0.00082	<0.0004	<0.05	0.38			<0.0005
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M			<0.0001	0.00083		<0.01	<0.0002	0.00085	0.201	0.0006	<0.00001	0.00057	<0.0004	<0.05	0.29			<0.0005
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M			<0.0001	0.00138		<0.01	<0.0002	0.00195	0.318	0.00063	<0.00001	0.00078	<0.0004	<0.05	0.36			<0.0005
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M			<0.0001	0.00045		<0.01	<0.0002	0.00028	0.066	0.00046	<0.00001	0.00028	<0.0004	<0.05	0.1			<0.0005
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M			<0.0001	0.00046		0.012	<0.0002	0.00037	0.112	0.00076	0.000015	0.00034	<0.0004	<0.05	0.17			<0.0005
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M			<0.0001	<0.0004		<0.01	<0.0002	0.0009	0.198	0.00021	<0.00001	0.0006	<0.0004	<0.05	0.23			<0.0005
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M			<0.0001	<0.0004		<0.01	<0.0002	0.001	0.202	0.00041	<0.00001	0.00056	<0.0004	<0.05	0.26			<0.0005
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M			<0.0001	<0.0004		<0.01	<0.0002	0.00033	0.081	0.00023	<0.00001	0.00029	<0.0004	<0.05	0.13			<0.0005
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M			<0.0001	<0.0004		<0.01	<0.0002	0.00166	0.321	<0.0002	<0.00001	0.00088	<0.0004	<0.05	0.57			<0.0005
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M			<0.0001	<0.0004		0.031	<0.0002	<0.0001	0.129	<0.0002	<0.00001	0.00022	<0.0004	<0.05	0.13			<0.0005
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M																		
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M																		
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M																		
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M																		
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M																		
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M																		
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M																		
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M																		
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M																		
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M																		
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M																		
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M																		
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M																		
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M																		
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M																		
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M																		
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M			<0.00010	0.00077		<0.010	<0.00020	0.0156	97.4	0.00076	<0.000010	0.00149	<0.00040	<0.050	29.7			<0.00050
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M																		
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M			<0.00010	0.0006		0.014	<0.00020	0.00115	3.99	0.00102	<0.000010	0.00048	0.0029	<0.050	1.32			<0.00050
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M			<0.00010	<0.00040		<0.010	<0.00020	0.0012	5.17	0.00046	<0.000010	0.00053	<0.00040	<0.050	1.73			<0.00050
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M			<0.00010	<0.00040		<0.010	<0.00020	0.00126	7.15	0.00067	<0.000010	0.00034	<0.00040	<0.050	2.37			<0.00050
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M			<0.00010	<0.00040		<0.010	<0.00020	0.00021	0.061	0.00038	<0.000010	0.00012	<0.00040	<0.050	<0.10			<0.00050
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M			0.0000175	0.00015		0.0034	<0.000050	0.00057	0.392	0.000254	<0.000010	0.000283	<0.000100	<0.010	0.276			<0.00010
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M			0.0000142	0.00018		0.0035	<0.000050	0.00522	26.9	0.000891	<0.000010	0.000866	0.000099	<0.01	8.46			<0.00010
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M			0.0000147	0.00027		0.0025	<0.000050	0.00402	16	0.00118	<0.000010	0.00104	0.00012	<0.010	5.82			<0.00010
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M			<0.0000250	<0.00050		<0.0100	<0.000250	0.0262	177	0.00302	<0.000010	0.00235	<0.000200	<0.05	57.4			<0.00050
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M			0.0000377	<0.00050		<0.0100	<0.000250	0.0224	170	0.00164	<0.000010	0.00199	0.000241	<0.05	50.3			<0.00050
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M			0.0000287	0.00032		0.005	<0.000100	0.0146	107	0.00406	<0.000010	0.00168	0.000221	<0.02	31			<0.00020
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M			0.0000579	0.00029		0.0065	<0.000050	0.0139	94.7	0.00325	<0.000010	0.00121	0.000204	<0.01	29.3			<0.00010
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M			0.0000728	<0.00050		0.0383	<0.000250	0.0309	250	0.00425	<0.000010	0.00264	0.000313	<0.05	73.7			<0.00050
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M			0.000038	0.00032		0.0059	<0.000050	0.00872	57	0.00133	<0.000010	0.00125	0.000221	<0.01	18.1			<0.00010
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M			0.0000415	0.00023		0.0059	<0.000050	0.000868	3.12	0.000394	<0.000010	0.00032	0.000115	<0.01	1.13			<0.00010
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M			0.0000225	0.00022		0.0075	<0.000050	0.000251	0.122	0.000441	<0.000010	0.000199	0.00007	<0.01	0.155			<0.00010
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M			0.0000137	0.00016		0.0021	<0.000050	0.00085	0.763	0.000186	<0.000010	0.00048	0.000065	<0.01	0.494			<0.00010
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M			0.0000182	0.00021		<0.0020	<0.000050	0.00392	15.6	0.00116	<0.000010	0.000744	0.0001	<0.01	5.54			<0.00010
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M			0.0000182	0.00026		<0.0040	<0.000100	0.0143	97.8	0.00225	<0.000010	0.00186	0.000098	<0.02	30.8			<0.00020
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M			0.0000137	0.00026		0.0037	<0.000050	0.00518	28.5	0.000891	<0.000010	0.00112	0.000139	0.017	8.47			<0.00010
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M			0.0000769	0.00034		0.0151	<0.000050	0.000288	0.171	0.00183	<0.000010	0.000198	0.00017	<0.01	0.223			<0.00010
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M			0.0000497	<0.00050		<0.0100	<0.000250	0.0232	160	0.00206	<0.000010	0.00196	<0.000200	<0.05	50.1			<0.00050
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M			0.0000513	0.00027		0.0067	<0.000050	0.0107	72.7	0.00135	<0.000010	0.00106	0.00023	<0.01	22.1			<0.00010
SW-03		VA24A1299-003	2024-01-23	Water	M			<0.00010	0.0003		<0.010	<0.000050	0.0026	19.1	0.00097	<0.0000050	0.000493	<0.00050	<0.050	6.13		0.00193	<0.000050
SW-03		L2754353-3	2024-01-23	Water	M																		
SW-03		L2754615-3	2024-02-15	Water	M																		
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	<0.00250	<0.00250	<0.00050	<0.00100		<0.050	<0.000250	0.0213	160	0.00205	<0.0000050	0.0018	<0.00250	<0.250	50.7		0.014	<0.000250

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	<0.00150	<0.00150	<0.000050	<0.00050	<0.00050	<0.010	<0.00010	<0.020	33.7	0.00062	<0.0000050	0.00057	<0.00050	<0.050	10.3	<0.00050	<0.0050	<0.00050
SW-03		L2755012-3	2024-03-19	Water	M																		
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M	<0.00050		<0.00010	0.00085		0.01	<0.000050	<0.0010	0.221	0.00045	<0.0000050	0.000621	<0.00050	<0.050	0.249		0.00048	<0.000050
SW-03		L2755316-7	2024-04-12	Water	M																		
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	<0.00050	<0.00050	<0.00010	0.00024		0.011	<0.000050	0.0031	20.6	0.00035	<0.0000050	0.000664	<0.00050	<0.050	6.74		0.0021	<0.000050
SW-03		L2755504-2	2024-04-26	Water	M																		
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	<0.00050		<0.00010	0.00028		0.011	<0.000050	<0.0010	0.15	0.0005	<0.0000050	0.000383	<0.00050	<0.050	0.18		0.00036	<0.000050
SW-03		L2755521-3	2024-04-28	Water	M																		
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	<0.00050	<0.00050	<0.00010	0.00022		<0.010	<0.000050	0.0015	5.04	0.00031	<0.0000050	0.000533	<0.00050	<0.050	1.89		0.00095	<0.000050
SW-03		L2755598-2	2024-05-03	Water	M																		
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	0.0025	12.4	0.00029	<0.0000050	0.000531	<0.00050	<0.050	4.37		0.00153	<0.000050
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	<0.00050		<0.00010	0.00024		<0.010	<0.000050	<0.0010	0.121	0.00025	<0.0000050	0.000415	<0.00050	<0.050	0.166		0.00037	<0.000050
SW-03		L2755677-2	2024-05-09	Water	M																		
SW-03		L2755687-2	2024-05-09	Water	M																		
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M	<0.00050		<0.00010	0.00021		<0.010	<0.000050	<0.0010	0.126	0.00026	<0.0000050	0.000392	<0.00050	<0.050	0.16		0.00033	<0.000050
SW-03		L2755770-2	2024-05-14	Water	M																		
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.327	0.00027	<0.0000050	0.000461	<0.00050	<0.050	0.253		0.00034	<0.000050
SW-03		L2755819-2	2024-05-17	Water	M																		
SW-03		VA24B1636-002	2024-05-23	Water	M	<0.00050		<0.00010	0.00023		<0.010	<0.000050	<0.0010	0.128	0.00055	<0.0000050	0.000398	<0.00050	<0.050	0.156		0.00031	<0.000050
SW-03		L2755903-2	2024-05-23	Water	M																		
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.255	0.00026	<0.0000050	0.000341	<0.00050	<0.050	0.182		0.00028	<0.000050
SW-03		L2755933-2	2024-05-24	Water	M																		
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.126	0.00031	<0.0000050	0.000348	<0.00050	<0.050	0.162		0.00036	<0.000050
SW-03		L2755961-2	2024-05-26	Water	M																		
SW-03		VA24B4698-002	2024-06-21	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	1.31	0.00018	<0.0000050	0.000375	<0.00050	<0.050	0.54		0.00047	<0.000050
SW-03		L2756349-2	2024-06-21	Water	M																		
SW-03		VA24B5540-002	2024-06-27	Water	M	<0.00050		<0.00010	0.00021		<0.010	<0.000050	<0.0010	0.0994	0.00031	<0.0000050	0.000323	<0.00050	<0.050	0.146		0.00037	<0.000050
SW-03		L2756458-2	2024-06-27	Water	M																		
SW-03		VA24B7689-002	2024-07-19	Water	M	<0.00050	<0.00050	<0.00010	0.00029		<0.010	<0.000050	0.0066	19.3	0.00033	<0.0000050	0.00129	<0.00050	<0.050	8.44		0.0029	<0.000050
SW-03		L2756726-2	2024-07-19	Water	M																		
SW-03		L2756871-3	2024-07-31	Water	M																		
SW-03		VA24B8974-003	2024-07-31	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.166	0.00065	0.0000056	0.000607	<0.00050	<0.050	0.232		0.00067	<0.000050
SW-03		VA24C1605-002	2024-08-23	Water	M	<0.00150	<0.00150	<0.000050	<0.00050	<0.00050	<0.010	<0.00010	<0.020	58.9	0.00181	<0.0000050	0.00115	<0.00050	<0.050	18.5	<0.00050	0.0055	<0.00050
SW-03		L2757153-2	2024-08-23	Water	M																		
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	<0.00050		<0.00010	0.00048		<0.010	<0.000050	0.0054	37.7	0.00182	<0.0000050	0.000985	<0.00050	<0.050	11.5		0.00406	<0.000050
SW-03	SW-03	L2757229-1	2024-08-28	Water	M																		
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	<0.00150	<0.00150	<0.000050	<0.00050	<0.00050	<0.010	<0.00010	<0.020	66.1	0.0018	<0.0000050	0.00131	<0.00050	<0.050	19.2	<0.00050	0.0062	<0.00050
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	<0.00050		<0.00010	0.00032		<0.010	<0.000050	0.0037	21.7	0.00164	<0.0000050	0.000878	<0.00050	<0.050	6.52		0.00244	<0.000050
SW-03	SW-03	L2757587-3	2024-09-29	Water	M																		
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	<0.00050		<0.00010	0.00038		0.018	<0.000050	<0.0010	1.32	0.00143	<0.0000050	0.000588	<0.00050	<0.050	0.58		0.00061	<0.000050
SW-03	SW-03	L2757661-3	2024-10-04	Water	M																		
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M	<0.00050		<0.00010	0.00024		<0.010	<0.000050	0.0013	0.366	0.00077	<0.0000050	0.000804	<0.00050	<0.050	0.356		0.00082	<0.000050
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M																		
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	<0.00050		<0.00010	0.00032		<0.010	<0.000050	0.0035	21.6	0.00224	<0.0000050	0.00062	<0.00050	<0.050	6.71		0.00222	<0.000050
SW-03	SW-03	L2757873-3	2024-10-22	Water	M																		
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	<0.00150	<0.00150	<0.000050	<0.00050	<0.00050	<0.010	<0.00010	<0.020	2.2	0.0005	<0.0000050	0.0005	<0.00050	<0.050	<1.0	<0.00050	<0.0050	<0.00050
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	<0.00050		0.000057	<0.00050	<0.00050	<0.010	<0.00010	0.022	170	0.00361	<0.0000050	0.00177	<0.00050	<0.050	47.2	<0.00050	0.0136	<0.00050
SW-03	SW-03	L2757913-3	2024-10-25	Water	M																		
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	<0.00150	<0.00150	<0.000050	<0.00050	<0.00050	<0.010	<0.00010	<0.020	17.1	0.00068	<0.0000050	0.00071	<0.00050	<0.050	5.4	<0.00050	<0.0050	<0.00050
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	<0.00150	<0.00150	<0.000050	<0.00050	<0.00050	<0.010	<0.00010	<0.020	43.8	0.0007	<0.0000050	0.00074	<0.00050	<0.050	12.2	<0.00050	<0.0050	<0.00050
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M																		
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	<0.00050	<0.00050	<0.00010	0.00034		<0.010	<0.000050	<0.0010	4.7	0.00087	<0.0000050	0.00041	<0.00050	<0.050	1.53		0.00088	<0.000050
SW-03	SW-03	L2758155-2	2024-11-16	Water	M																		
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M	<0.00050		<0.00020	<0.00040		<0.020	<0.000100	0.0091	71.1	0.00215	0.00000057	0.000958	<0.00100	<0.100	21.9		0.0063	<0.000100
SW-03		VA24D1587-002	2024-11-20	Water	M	<0.00150	<0.00150	0.000069	<0.00050	<0.00050	0.01	<0.00010	<0.020	82.8	0.00128	<0.0000050	0.00108	<0.00050	<0.050	23.2	<0.00050	0.0068	<0.00050
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M																		
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	<0.00050		<0.00010	0.00031		<0.010	<0.000050	<0.0010	2.75	0.00113	0.00000081	0.000414	<0.00050	<0.050	1.01		0.0006	<0.000050
SW-03	SW-03	L2758371-2	2024-12-08	Water	M																		
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	<0.00150	<0.00150	0.00007	<0.00050	<0.00050	<0.010	<0.00010	<0.020	30	0.00091	<0.0000050	0.00054	<0.00050	<0.050	8.2	<0.00050	<0.0050	<0.00050
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M																		
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	<0.00150	<0.00150	<0.000050	<0.00050	<0.00050	<0.010	<0.00010	<0.020	93.1	0.00137	<0.0000050	0.00126	<0.00050	<0.050	31.5	<0.00050	0.0085	<0.00050
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	<0.00150		<0.000050	<0.00050	<0.00050	<0.010	<0.00010	0.044	272	0.00239	<0.00000050	0.00257	<0.00050	<0.050	87.8	<0.00050	0.0233	<0.00050
SW-03	SW-03	L2758769-3	2025-01-24	Water	M																		
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	<0.00150		<0.00010	0.00036		0.013	<0.000050	0.0031	21.7	0.00131	0.00000074	0.000932	<0.00050	<0.050	6.77		0.00219	<0.000050
SW-03	SW-03	L2759009-2	2025-02-19	Water	M																		
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	<0.00050	<0.00050	0.000062	<0.00050	<0.00050	0.011	<0.00010	<0.020	54.9	0.0019	<0.0000050	0.00093	<0.00050	<0.050	15.1	<0.00050	<0.0050	<0.00050
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M																		
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	<0.00050		<0.00010	0.000271		<0.010	<0.000050	0.00574	37.1	0.109	0.000000642	0.00117	<0.00050	<0.050	11.1		0.00335	<0.000050
SW-03	SW-03	L2759254-2	2025-03-18	Water	M																		
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	<0.00050	<0.00050	<0.00010	0.00027		0.015	<0.000050	<0.0010	0.243	0.00096	<0.0000050	0.000193	<0.00050	<0.050	0.192		0.0003	<0.000050
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M	<0.00050		<0.00050	<0.00100		<0.050	<0.000250	0.0111	75.1	0.00092	0.00000063	0.0011	<0.00250	<0.250	24.8		0.00702	<0.000250
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M																		
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M	<0.00050		<0.00010	0.00024		0.011	<0.000050	<0.0010	0.42	0.00061	0.00000138	0.000232	<0.00050	<0.050	0.23		0.00031	<0.000050
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M																		
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	<0.00050		<0.00010	0.00026		<0.010	<0.000050	0.0013	6.01	0.00059	0.00000126	0.000453	<0.00050	<0.050	1.9		0.00083	<0.000050
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M																		
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	<0.00050		<0.00010	0.00021		<0.010	<0.000050	0.0027	15.9	0.00092	0.00000099	0.000514	<0.00050	<0.050	5.24		0.00171	<0.000050
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M																		
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.196	0.00019	<0.0000050	0.000397	<0.00050	<0.050	0.181		0.00033	<0.000050
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	0.0011	5.11	0.00038	0.00000085	0.000429	<0.00050	<0.050	1.71		0.00076	<0.000050
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M																		
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	<0.00050	<0.00050	<0.00010	0.00042		<0.010	<0.000050	<0.0010	0.32	0.00024	<0.0000050	0.000291	<0.00050	<0.050	0.214		0.00033	<0.000050
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.13	0.00032	<0.0000050	0.000298	<0.00050	<0.050	0.142		0.00025	<0.000050
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	1.64	0.00053	0.00000055	0.000405	<0.00050	<0.050	0.661		0.00047	<0.000050
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M																		
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	<0.00050	<0.00050	<0.00010	0.00031		<0.010	<0.000050	<0.0010	0.347	0.00024	<0.0000050	0.00033	<0.00050	<0.050	0.2		0.00036	<0.000050
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.229	0.00029	<0.0000050	0.000337	<0.00050	<0.050	0.193		0.00036	<0.000050
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M																		
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M																		
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M																		
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M																		
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M																		
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M																		
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M																		
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M																		
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M																		
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M																		
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M																		
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M																		
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M																		
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M																		
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M																		
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M																		
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M			<0.00010	0.00045		0.016	<0.00020	0.00024	0.445	0.0018	<0.000010	0.00051	<0.00040	<0.050	0.2			<0.00050
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M																		
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M			<0.00010	<0.00040		0.013	<0.00020	0.0002	0.353	0.00099	<0.000010	0.00046	<0.00040	<0.050	<0.10			<0.00050
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M			<0.00010	0.00105		0.014	<0.00020	<0.00010	0.387	0.00214	<0.000010	0.00047	<0.00040	<0.050	0.19			<0.00050
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M			<0.00010	0.0006		0.023	<0.00020	0.00011	0.297	0.00143	<0.000010	0.00035	<0.00040	<0.050	0.2			<0.00050
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M			<0.00010	0.00056		0.016	<0.00020	0.00014	0.44	0.00206	<0.000010	0.00034	<0.00040	<0.050	0.19			<0.00050
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M			0.0000156	0.00069		0.0205	<0.000050	0.000235	0.695	0.00357	<0.0000010	0.000598	0.000229	<0.010	0.281			<0.00010
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M			0.0000108	0.00052		0.0108	<0.000050	0.000354	1.14	0.00234	<0.0000010	0.000695	0.000262	<0.01	0.489			<0.00010
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M			0.0000081	0.00044		0.0033	<0.000050	0.000265	1.2	0.00025	<0.0000010	0.00053	0.00027	<0.010	0.57			<0.00010
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M			0.0000104	0.00035		0.0074	<0.000050	0.000319	1.32	0.00247	<0.0000010	0.000389	0.000261	<0.01	0.581			<0.00010
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M			0.0000245	0.00078		0.0237	<0.000050	0.000201	0.614	0.00656	<0.0000010	0.000534	0.000346	<0.01	0.276			<0.00010
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M			0.0000168	0.0005		0.0215	<0.000050	0.000174	0.675	0.00598	<0.0000010	0.000596	0.000296	<0.01	0.274			<0.00010
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M			0.0000137	0.00054		0.0162	<0.000050	0.000137	0.467	0.0024	<0.0000010	0.000442	0.000185	<0.01	0.22			<0.00010
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M			0.0000146	0.00057		0.0126	<0.000050	0.000173	0.517	0.00215	<0.0000010	0.000516	0.000237	<0.01	0.238			<0.00010
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M			0.000016	0.00059		0.0144	<0.000050	0.000138	0.51	0.0019	<0.0000010	0.000575	0.000236	<0.01	0.237			<0.00010
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M			0.0000146	0.00054		0.0105	<0.000050	0.000108	0.389	0.00109	<0.0000010	0.000425	0.0002	<0.01	0.209			<0.00010
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M			0.0000128	0.00068		0.0168	<0.000050	0.000158	0.455	0.00175	<0.0000010	0.000563	0.00029	<0.01	0.236			<0.00010
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M			0.00001	0.00027		0.0199	0.000061	0.00048	0.0954	0.000377	<0.0000010	0.000214	0.00006	<0.01	0.125			<0.00010
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M			0.0000093	0.00044		0.0067	<0.000050	0.000311	1.08	0.00361	<0.0000010	0.000465	0.000283	<0.01	0.519			<0.00010
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M			0.0000063	0.00048		0.004	<0.000050	0.000313	1.21	0.000678	<0.0000010	0.00141	0.000214	<0.01	0.604			<0.00010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M			0.0000122	0.0004		0.0129	<0.000050	0.000378	1.64	0.00536	<0.000010	0.000424	0.000341	<0.01	0.851			<0.00010
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M			0.0000417	0.00091		0.0301	<0.000050	0.000244	0.473	0.0055	<0.000010	0.000523	0.000433	0.015	0.306			<0.00010
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M			0.0000212	0.00068		0.0178	<0.000050	0.000111	0.434	0.00334	<0.000010	0.00035	0.000232	<0.01	0.212			<0.00010
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M			0.0000181	0.00058		0.0161	<0.000050	0.000171	0.466	0.0025	<0.000010	0.000474	0.000248	<0.01	0.211			<0.00010
SW-04		VA24A1299-004	2024-01-23	Water	M			<0.00010	0.00063		0.016	<0.000050	<0.0010	0.377	0.00196	<0.0000050	0.000506	<0.00050	<0.050	0.22		0.00033	<0.000050
SW-04		L2754353-4	2024-01-23	Water	M																		
SW-04		L2754615-4	2024-02-15	Water	M																		
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	<0.00050	<0.00050	<0.00010	0.00046		0.014	<0.000050	<0.0010	0.442	0.00196	<0.0000050	0.000505	<0.00050	<0.050	0.211		0.0003	<0.000050
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	<0.00050	<0.00050	<0.00010	0.00047		0.011	<0.000050	<0.0010	0.345	0.00144	<0.0000050	0.000454	<0.00050	<0.050	0.228		0.00034	<0.000050
SW-04		L2755012-4	2024-03-19	Water	M																		
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	<0.00050	<0.00050	<0.00010	0.00091		0.021	<0.000050	<0.0010	0.527	0.00259	<0.0000050	0.00166	<0.00050	<0.050	0.395		0.0006	<0.000050
SW-04		L2755503-3	2024-04-25	Water	M																		
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M	<0.00050		<0.00010	0.00065		0.032	<0.000050	<0.0010	0.466	0.00244	<0.0000050	0.000614	<0.00050	<0.050	0.242		0.00039	<0.000050
SW-04		L2755523-2	2024-04-29	Water	M																		
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	<0.00050	<0.00050	<0.00010	0.00061		0.017	<0.000050	<0.0010	0.535	0.00234	<0.0000050	0.000678	<0.00050	<0.050	0.308		0.00047	<0.000050
SW-04		L2755588-3	2024-05-02	Water	M																		
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	<0.00050	<0.00050	<0.00010	0.0006		0.02	<0.000050	<0.0010	0.509	0.00245	<0.0000050	0.000675	<0.00050	<0.050	0.276		0.00044	<0.000050
SW-04		L2755687-4	2024-05-09	Water	M																		
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M	<0.00050		<0.00010	0.00071		0.036	<0.000050	<0.0010	0.554	0.00304	<0.0000050	0.000747	<0.00050	<0.050	0.303		0.00049	<0.000050
SW-04		L2755695-2	2024-05-10	Water	M																		
SW-04		L2755788-2	2024-05-15	Water	M																		
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M	<0.00050		<0.00010	0.00068		0.019	<0.000050	<0.0010	0.544	0.00274	<0.0000050	0.000787	<0.00050	<0.050	0.328		0.00053	<0.000050
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	<0.00050	<0.00050	<0.00010	0.0007		0.023	<0.000050	<0.0010	0.578	0.00258	<0.0000050	0.00097	<0.00050	<0.050	0.336		0.00054	<0.000050
SW-04		L2755820-3	2024-05-16	Water	M																		
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	<0.00050	<0.00050	<0.00010	0.00078		0.02	<0.000050	<0.0010	0.501	0.00267	<0.0000050	0.000783	<0.00050	<0.050	0.28		0.0005	<0.000050
SW-04		VA24B1636-005	2024-05-23	Water	M	<0.00050		<0.00010	0.00061		0.018	<0.000050	<0.0010	0.502	0.00275	<0.0000050	0.00078	<0.00050	<0.050	0.275		0.00047	<0.000050
SW-04		L2755903-5	2024-05-23	Water	M																		
SW-04		L2755916-3	2024-05-23	Water	M																		
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	<0.00050		<0.00010	0.00077		0.025	<0.000050	<0.0010	0.63	0.00304	<0.0000050	0.0011	<0.00050	<0.050	0.364		0.00055	<0.000050
SW-04		L2755961-4	2024-05-26	Water	M																		
SW-04		VA24B4655-003	2024-06-20	Water	M	<0.00050	<0.00050	<0.00010	0.00065		0.023	<0.000050	<0.0010	0.596	0.00315	<0.0000050	0.00112	<0.00050	<0.050	0.747		0.00123	<0.000050
SW-04		L2756326-3	2024-06-20	Water	M																		
SW-04		VA24B5289-002	2024-06-26	Water	M	<0.00050		<0.00010	0.0007		0.018	<0.000050	<0.0010	0.639	0.0023	<0.0000050	0.000951	<0.00050	<0.050	0.645		0.0011	<0.000050
SW-04		L2756419-2	2024-06-26	Water	M																		
SW-04		VA24B7579-003	2024-07-18	Water	M	<0.00050	<0.00050	<0.00010	0.00069		0.02	<0.000050	<0.0010	1.03	0.00359	<0.0000050	0.00127	<0.00050	<0.050	0.74		0.00118	<0.000050
SW-04		L2756717-3	2024-07-18	Water	M																		
SW-04		VA24B8974-004	2024-07-31	Water	M	<0.00050		<0.00010	0.00058		0.017	<0.000050	<0.0010	1.07	0.00396	<0.0000050	0.00115	<0.00050	<0.050	0.698		0.00142	<0.000050
SW-04		L2756871-4	2024-07-31	Water	M																		
SW-04		VA24C1546-003	2024-08-22	Water	M	<0.00050	<0.00050	<0.00010	0.00054		0.02	<0.000050	<0.0010	1.12	0.00231	<0.0000050	0.00177	<0.00050	<0.050	0.901		0.00174	<0.000050
SW-04		L2757144-3	2024-08-22	Water	M																		
SW-04	SW-04	L2757209-4	2024-08-27	Water	M																		
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	<0.00050		<0.00010	0.00122		0.032	<0.000050	<0.0010	2.65	0.00945	<0.0000050	0.00127	0.00093	<0.050	1.19		0.00167	<0.000050
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	<0.00050	<0.00050	<0.00010	0.00043		0.012	<0.000050	0.0029	1.16	0.00974	<0.0000050	0.00957	<0.00050	<0.050	1.88		0.00336	<0.000050
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	<0.00050		<0.00010	0.00071		0.02	<0.000050	0.0021	1.71	0.0179	<0.0000050	0.00686	0.00065	<0.050	1.31		0.00252	<0.000050
SW-04	SW-04	L2757584-2	2024-09-28	Water	M																		
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	<0.00050		0.00024	0.00322		0.059	<0.000050	0.0014	5.94	0.016	<0.0000050	0.00314	0.00251	0.114	2.78		0.00218	0.000097
SW-04	SW-04	L2757661-4	2024-10-04	Water	M																		
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	<0.00050		<0.00010	0.00043		0.016	<0.000050	0.0014	1.21	0.0146	<0.0000050	0.0069	<0.00050	<0.050	0.866		0.00164	<0.000050
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M																		
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	<0.00050	<0.00050	<0.00010	0.00172		0.05	0.000058	<0.0010	1.37	0.0309	<0.0000050	0.000768	0.0008	0.105	1.1		0.0014	<0.000050
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M	<0.00050		<0.00010	0.00076		0.024	<0.000050	<0.0010	0.604	0.0113	<0.0000050	0.000578	<0.00050	<0.050	0.347		0.00052	<0.000050
SW-04	SW-04	L2757873-4	2024-10-22	Water	M																		
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	<0.00050	<0.00050	<0.00010	0.00074		0.036	<0.000050	<0.0010	0.791	0.0187	<0.0000050	0.000823	<0.00050	<0.050	0.432		0.00066	<0.000050
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	<0.00050		<0.00010	0.00106		0.028	<0.000050	<0.0010	1.05	0.0111	<0.0000050	0.00124	0.00063	0.054	1.11		0.00137	<0.000050
SW-04	SW-04	L2757942-1	2024-10-26	Water	M																		
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	<0.00050	<0.00050	<0.00010	0.00108		0.037	<0.000050	<0.0010	0.995	0.0144	<0.0000050	0.000878	0.00071	<0.050	0.537		0.00073	<0.000050
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	<0.00050	<0.00050	<0.00010	0.00064		0.034	<0.000050	<0.0010	0.86	0.0129	<0.0000050	0.0027	<0.00050	<0.050	0.559		0.00101	<0.000050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M																		
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	<0.00050	<0.00050	<0.00010	0.00104		0.045	<0.000050	<0.0010	1.57	0.0208	<0.0000050	0.000984	<0.00050	<0.050	0.828		0.00121	<0.000050
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M	<0.00050		<0.00010	0.00085		0.03	<0.000050	<0.0010	0.499	0.00536	0.00000194	0.000565	<0.00050	<0.050	0.301		0.00043	<0.000050
SW-04	SW-04	L2758155-4	2024-11-17	Water	M																		
SW-04		4-456131118-0	2024-11-17	Water	F																		
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	<0.00050	<0.00050	<0.00010	0.00023		0.013	<0.000050	<0.0010	1.2	0.00586	<0.0000050	0.00216	<0.00050	<0.050	0.726		0.00071	<0.000050
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M	<0.00050		<0.00010	0.00068		0.023	<0.000050	<0.0010	0.727	0.00542	0.00000112	0.0051	<0.00050	<0.050	0.47		0.00071	<0.000050
SW-04	SW-04	L2758371-3	2024-12-08	Water	M																		
SW-04		4-456441522-0	2024-12-18	Water	F																		
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	<0.00050	<0.00050	<0.00010	0.00079		0.031	<0.000050	<0.0010	0.634	0.00316	<0.0000050	0.00136	<0.00050	<0.050	0.431		0.00054	<0.000050
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M																		
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	<0.00050	<0.00050	<0.00010	0.00058		0.023	<0.000050	0.001	0.527	0.00532	<0.0000050	0.00198	<0.00050	<0.050	0.457		0.00073	<0.000050
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M																		
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M	<0.00050		<0.00010	0.00034		0.016	<0.000050	0.0025	0.68	0.00579	0.00000082	0.00818	<0.00050	<0.050	1.18		0.00178	<0.000050
SW-04	SW-04	L2758765-1	2025-01-25	Water	M																		
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	0.00071	<0.00050	<0.00010	0.00101		0.02	<0.000050	<0.0010	0.631	0.00256	<0.0000050	0.00109	<0.00050	<0.050	0.4		0.00074	<0.000050
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M																		
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M	<0.00050		<0.00010	0.00162		0.027	<0.000050	<0.0010	0.798	0.00335	0.00000271	0.00274	0.0005	0.096	0.724		0.00131	<0.000050
SW-04	SW-04	L2759042-2	2025-02-21	Water	M																		
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	<0.00050		<0.00010	0.000424		0.0114	0.0000538	0.00208	0.686	0.00542	0.00000066	0.00886	<0.00050	<0.050	0.951		0.00188	<0.000050
SW-04	SW-04	L2759255-2	2025-03-19	Water	M																		
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M	<0.00050	<0.00050	<0.00010	0.00111		0.024	<0.000050	<0.0010	0.433	0.00197	<0.0000050	0.00206	<0.00050	0.101	0.45		0.0006	<0.000050
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	<0.00050		<0.00010	0.00062		0.014	<0.000050	<0.0010	0.603	0.00334	0.00000102	0.00673	<0.00050	<0.050	0.609		0.00085	<0.000050
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M																		
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	<0.00050		<0.00010	0.00139		0.022	<0.000050	<0.0010	0.532	0.00269	0.00000216	0.00206	0.00052	0.156	0.482		0.00058	<0.000050
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M																		
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	<0.00050		<0.00010	0.00062		0.011	<0.000050	<0.0010	0.538	0.00279	0.00000097	0.00599	<0.00050	<0.050	0.441		0.0007	<0.000050
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M																		
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	0.00095		<0.00010	0.00035		<0.010	<0.000050	0.0012	0.799	0.0068	0.00000052	0.00987	<0.00050	<0.050	0.704		0.00105	<0.000050
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M																		
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	0.00124	0.001	<0.00010	0.00073		0.023	<0.000050	0.0013	0.861	0.00311	<0.0000050	0.0121	<0.00050	<0.050	0.91		0.00156	<0.000050
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	<0.00050		<0.00010	0.00035		0.012	<0.000050	0.0015	0.738	0.00348	0.00000064	0.00986	<0.00050	<0.050	0.672		0.00093	<0.000050
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M																		
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	<0.00050	<0.00050	<0.00010	0.00046		<0.010	<0.000050	0.0013	0.672	0.00355	<0.0000050	0.00892	<0.00050	<0.050	0.634		0.00086	<0.000050
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	0.00169	<0.00053	<0.00010	0.0006		0.034	<0.000050	0.0014	0.809	0.0106	<0.0000050	0.0123	<0.00050	<0.050	0.986		0.0017	<0.000050
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M	0.00224		<0.00010	0.00033		0.011	<0.000050	0.0014	0.868	0.00728	0.00000052	0.0155	<0.00050	<0.050	1.05		0.00174	<0.000050
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	0.00094	0.00238	<0.00010	0.00143		0.058	<0.000050	0.0019	1.15	0.0123	<0.0000050	0.0168	<0.00050	<0.050	1.21		0.00216	0.000062
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	<0.00050	<0.00050	<0.00010	0.00022		<0.010	<0.000050	0.0016	0.85	0.0104	<0.0000050	0.012	<0.00050	<0.050	1.1		0.0017	<0.000050
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M			<0.00010	<0.00040		0.023	<0.00020	0.00014	0.135	0.00063	<0.000010	0.00045	<0.00040	<0.050	0.17			<0.00050
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M			<0.00010	0.00076		0.026	<0.00020	0.0002	0.138	0.00108	<0.000010	0.00048	<0.00040	<0.050	0.15			<0.00050
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M			<0.00010	0.00042		0.013	<0.00020	0.00031	0.146	0.00058	<0.000010	0.00041	<0.00040	<0.050	<0.10			<0.00050
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M			0.0000241	0.00044		0.0126	<0.000050	0.00037	0.169	0.000726	<0.000010	0.000574	0.000217	<0.01	0.161			<0.00010
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M			0.000019	0.00037		0.0079	<0.000050	0.000409	0.186	0.000416	<0.000010	0.000826	0.00018	<0.01	0.146			<0.00010
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M			0.0000241	0.00048		0.0125	<0.000050	0.000244	0.131	0.000366	<0.000010	0.000484	0.000155	<0.01	0.17			<0.00010
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M			0.0000178	0.00038		0.0105	<0.000050	0.000251	0.133	0.000326	<0.000010	0.000433	0.000172	<0.01	0.19			<0.00010
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M			0.0000198	0.00031		0.011	<0.000050	0.00014	0.111	0.000328	<0.000010	0.00027	0.000183	<0.01	0.171			<0.00010
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M			0.0000184	0.00039		0.0114	<0.000050	0.00016	0.11	0.000398	<0.000010	0.000283	0.000165	<0.01	0.18			<0.00010
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M			0.0000381	0.00136		0.0254	0.000114	0.00029	0.162	0.00109	<0.000010	0.000765	0.000334	<0.01	0.193			<0.00010
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M				0.00145														
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M				0.00144														
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M			0.0000261	0.00046		0.0132	<0.000050	0.000151	0.119	0.000547	<0.000010	0.000183	0.000195	<0.01	0.14			<0.00010
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M			0.0000223	0.00036		0.0136	<0.000050	0.000184	0.12	0.000549	<0.000010	0.000242	0.000203	<0.01	0.117			<0.00010
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M			<0.00010	0.00095		<0.010	<0.00020	<0.00010	0.147	0.00045	<0.000010	0.00049	<0.00040	<0.050	0.18			<0.00050
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M			<0.00010	0.00054		0.015	<0.00020	<0.00010	0.139	0.00081	<0.000010	0.00051	<0.00040	<0.050	0.2			<0.00050
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M			<0.00010	0.00054		0.011	<0.00020	<0.00010	0.183	0.00105	<0.000010	0.00054	<0.00040	<0.050	0.16			<0.00050
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M			0.0000578	0.00054		0.0149	<0.000050	0.00006	0.221	0.00328	<0.000010	0.000744	<0.000200	<0.010	0.166			<0.00010
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M			0.0000419	0.0006		0.0121	0.000053	0.000077	0.18	0.00066	<0.000010	0.000484	0.000205	<0.01	0.211			<0.00010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M			0.0000392	0.00052		0.0122	<0.000050	0.000058	0.202	0.00105	<0.000010	0.000483	0.000147	<0.01	0.201			<0.00010
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M			0.0000334	0.0006		0.011	<0.000050	<0.000050	0.153	0.000408	<0.000010	0.000463	0.00015	<0.01	0.209			<0.00010
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M			0.0000252	0.00059		0.0107	<0.000050	0.00008	0.165	0.000436	<0.000010	0.000497	0.000189	<0.01	0.211			<0.00010
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M			0.000026	0.00057		0.0095	<0.000050	<0.000050	0.14	0.000364	<0.000010	0.000489	0.000193	<0.01	0.193			<0.00010
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M			0.0000306	0.0006		0.0101	0.000052	<0.000050	0.148	0.000508	<0.000010	0.000496	0.000171	<0.01	0.197			<0.00010
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M			0.0000346	0.00057		0.0115	<0.000050	0.000062	0.195	0.000605	<0.000010	0.000638	0.00014	<0.01	0.185			<0.00010
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M			0.0000311	0.00083		0.0127	0.000069	<0.000050	0.161	0.000789	<0.000010	0.000457	0.000167	<0.01	0.239			<0.00010
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M			0.0000317	0.00064		0.0104	0.000061	<0.000050	0.152	0.00048	<0.000010	0.000519	0.00029	<0.01	0.191			<0.00010
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M			0.0000305	0.0008		0.0097	0.000066	0.000052	0.161	0.000605	<0.000010	0.000506	0.000219	<0.01	0.18			<0.00010
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	<0.00050		<0.00010	0.00072		0.012	<0.000050	<0.0010	0.143	0.00057	0.00000427	0.00044	<0.00050	<0.050	0.195		0.00037	<0.000050
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	<0.00050	<0.00050	<0.00010	0.00063		0.016	0.000055	<0.0010	0.142	0.00055	0.00000468	0.000417	<0.00050	<0.050	0.194		0.00044	<0.000050
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M			0.0000145	0.00016		<0.0020	<0.000050	0.00278	0.349	0.00021	<0.000010	0.000645	0.000094	<0.01	0.479			<0.00010
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M			0.0000172	0.00023		0.0032	<0.000050	0.00149	0.22	0.000249	<0.000010	0.000801	0.000101	<0.01	0.353			<0.00010
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M			0.000087	0.00029		0.0142	<0.000050	0.000255	0.0972	0.0017	<0.000010	0.000146	0.00011	<0.01	0.177			<0.00010
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M			0.000061	0.00027		0.0057	<0.000050	0.000627	0.161	0.00059	<0.000010	0.00034	0.000184	<0.01	0.215			<0.00010
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M			0.0000542	0.00026		0.0064	<0.000050	0.000673	0.163	0.000507	<0.000010	0.000365	0.00024	<0.01	0.206			<0.00010
SW-07		VA24A1299-005	2024-01-23	Water	M			<0.00010	0.00027		0.01	<0.000050	<0.0010	0.117	0.00094	<0.0000050	0.000269	<0.00050	<0.050	0.162		0.00034	<0.000050
SW-07		L2754353-5	2024-01-23	Water	M																		
SW-07		L2754615-5	2024-02-15	Water	M																		
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	<0.00050	<0.00050	<0.00010	0.00046		<0.010	0.000172	<0.0010	0.182	0.00052	<0.0000050	0.000339	<0.00050	<0.050	0.236		0.0005	<0.000050
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.114	0.00045	<0.0000050	0.000284	<0.00050	<0.050	0.167		0.00032	<0.000050
SW-07		L2755012-5	2024-03-19	Water	M																		
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	<0.00050	<0.00050	<0.00010	0.0002		<0.010	<0.000050	<0.0010	0.128	0.00025	<0.0000050	0.000545	<0.00050	<0.050	0.153		0.00037	<0.000050
SW-07		L2755504-3	2024-04-26	Water	M																		
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M	<0.00050		<0.00010	0.00022		0.011	<0.000050	<0.0010	0.0966	0.00049	<0.0000050	0.000239	<0.00050	<0.050	0.138		0.00034	<0.000050
SW-07		L2755521-1	2024-04-28	Water	M																		
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	<0.00050	<0.00050	<0.00010	0.00021		<0.010	<0.000050	<0.0010	0.145	0.00028	<0.0000050	0.000411	<0.00050	<0.050	0.193		0.0004	<0.000050
SW-07		L2755598-3	2024-05-03	Water	M																		
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.101	0.00028	<0.0000050	0.000348	<0.00050	<0.050	0.146		0.00033	<0.000050
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0952	0.00026	<0.0000050	0.000337	<0.00050	<0.050	0.142		0.00033	<0.000050
SW-07		L2755677-3	2024-05-09	Water	M																		
SW-07		L2755687-3	2024-05-09	Water	M																		
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0811	0.00028	<0.0000050	0.00029	<0.00050	<0.050	0.132		0.0003	<0.000050
SW-07		L2755770-3	2024-05-14	Water	M																		
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.014	<0.000050	<0.0010	0.0878	0.00049	<0.0000050	0.000257	<0.00050	<0.050	0.126		0.00027	<0.000050
SW-07		L2755819-3	2024-05-17	Water	M																		
SW-07		VA24B1636-003	2024-05-23	Water	M	<0.00050		<0.00010	0.00021		<0.010	<0.000050	<0.0010	0.0857	0.00028	<0.0000050	0.000299	<0.00050	<0.050	0.124		0.00029	<0.000050
SW-07		L2755903-3	2024-05-23	Water	M																		
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0828	0.00026	<0.0000050	0.000302	<0.00050	<0.050	0.098		0.0003	<0.000050
SW-07		L2755933-3	2024-05-24	Water	M																		
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M	<0.00050		<0.00010	0.0002		<0.010	<0.000050	<0.0010	0.0897	0.0003	<0.0000050	0.000289	<0.00050	<0.050	0.134		0.00027	<0.000050
SW-07		L2755961-3	2024-05-26	Water	M																		
SW-07		VA24B4698-003	2024-06-21	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.08	0.00017	<0.0000050	0.000325	<0.00050	<0.050	0.121		0.00029	<0.000050
SW-07		L2756349-3	2024-06-21	Water	M																		
SW-07		VA24B5289-003	2024-06-26	Water	M	<0.00050		<0.00010	0.00022		<0.010	<0.000050	<0.0010	0.0809	0.00026	<0.0000050	0.000341	<0.00050	<0.050	0.144		0.00032	<0.000050
SW-07		L2756419-3	2024-06-26	Water	M																		
SW-07		VA24B7689-003	2024-07-19	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.129	0.00019	<0.0000050	0.000511	<0.00050	<0.050	0.22		0.00068	<0.000050
SW-07		L2756726-3	2024-07-19	Water	M																		
SW-07		L2756871-5	2024-07-31	Water	M																		
SW-07		VA24B8974-005	2024-07-31	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.134	0.00031	<0.0000050	0.000504	<0.00050	<0.050	0.214		0.0006	<0.000050
SW-07		VA24C1605-003	2024-08-23	Water	M	<0.00050	<0.00050	<0.00010	0.00021		<0.010	<0.000050	0.0017	0.242	0.00025	<0.0000050	0.000662	<0.00050	<0.050	0.356		0.00095	<0.000050
SW-07		L2757153-3	2024-08-23	Water	M																		
SW-07	SW-07	L2757209-5	2024-08-27	Water	M																		
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	<0.00050		<0.00010	0.00054		<0.010	<0.000050	<0.0010	0.121	0.00048	<0.0000050	0.000413	<0.00050	<0.050	0.23		0.0005	<0.000050
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	0.0023	0.298	0.00016	<0.0000050	0.000655	<0.00050	<0.050	0.416		0.00099	<0.000050
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M	<0.00050		<0.00010	0.00029		<0.010	<0.000050	<0.0010	0.161	0.00036	<0.0000050	0.000557	<0.00050	<0.050	0.234		0.00063	<0.000050
SW-07	SW-07	L2757587-4	2024-09-29	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M	<0.00050		<0.00010	0.00021		<0.010	<0.000050	0.0014	0.211	0.0003	<0.0000050	0.000624	<0.00050	<0.050	0.299		0.00074	<0.000050
SW-07	SW-07	L2757664-1	2024-10-03	Water	M																		
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	0.0014	0.222	0.00024	<0.0000050	0.000627	<0.00050	<0.050	0.289		0.00074	<0.000050
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M																		
SW-07		492-455781017-0	2024-10-13	Water	F																		
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M	<0.00050		<0.00010	0.00041		0.01	<0.000050	<0.0010	0.14	0.00156	<0.0000050	0.000319	<0.00050	<0.050	0.23		0.00051	<0.000050
SW-07	SW-07	L2757873-5	2024-10-22	Water	M																		
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	<0.00050	<0.00050	<0.00010	0.00021		<0.010	<0.000050	<0.0010	0.172	0.00044	<0.0000050	0.000439	<0.00050	<0.050	0.258		0.00062	<0.000050
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	<0.00050		<0.00010	0.00025		<0.010	<0.000050	<0.0010	0.186	0.00054	<0.0000050	0.000446	<0.00050	<0.050	0.273		0.00068	<0.000050
SW-07	SW-07	L2757913-4	2024-10-25	Water	M																		
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	<0.00050	<0.00050	<0.00010	0.00028		<0.010	<0.000050	<0.0010	0.152	0.00064	<0.0000050	0.00042	<0.00050	<0.050	0.207		0.00054	<0.000050
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	<0.00050	<0.00050	<0.00010	0.00023		0.01	<0.000050	<0.0010	0.136	0.00051	<0.0000050	0.000593	<0.00050	<0.050	0.149		0.00034	<0.000050
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M																		
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	<0.00050	<0.00050	<0.00010	0.00027		0.01	<0.000050	<0.0010	0.127	0.00128	<0.0000050	0.000254	<0.00050	<0.050	0.159		0.00036	<0.000050
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	<0.00050		<0.00010	0.00037		0.012	<0.000050	<0.0010	0.144	0.00149	0.00000088	0.000412	<0.00050	<0.050	0.149		0.00029	<0.000050
SW-07	SW-07	L2758155-1	2024-11-16	Water	M																		
SW-07		VA24D1587-003	2024-11-20	Water	M	<0.00050	<0.00050	<0.00010	0.00026		0.022	<0.000050	<0.0010	0.161	0.00169	<0.0000050	0.000532	<0.00050	<0.050	0.118		0.0002	<0.000050
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M																		
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	<0.00050		<0.00010	0.0005		<0.010	<0.000050	<0.0010	0.111	0.00098	0.00000095	0.000286	<0.00050	<0.050	0.161		0.00034	<0.000050
SW-07	SW-07	L2758371-4	2024-12-08	Water	M																		
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.148	0.00186	<0.0000050	0.000365	<0.00050	<0.050	0.108		0.00028	<0.000050
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M																		
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	0.0012	0.213	0.00035	<0.0000050	0.000594	<0.00050	<0.050	0.232		0.00053	<0.000050
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M																		
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	0.0013	0.245	0.00042	<0.00000050	0.000538	<0.00050	<0.050	0.273		0.00065	<0.000050
SW-07	SW-07	L2758765-2	2025-01-25	Water	M																		
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M	<0.00050		0.00021	0.00032		<0.010	<0.000050	0.0011	0.601	0.00086	0.00000063	0.00063	<0.00050	<0.050	0.353		0.00051	<0.000050
SW-07	SW-07	L2759009-3	2025-02-19	Water	M																		
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	<0.00050	<0.00050	<0.00010	0.00023		0.011	<0.000050	<0.0010	0.183	0.00186	<0.0000050	0.000645	<0.00050	<0.050	0.124		<0.00020	<0.000050
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M																		
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	<0.00050		<0.00010	0.000261		<0.010	<0.000050	<0.0010	0.185	0.00069	0.000000563	0.000371	<0.00050	<0.050	0.201		0.000492	<0.000050
SW-07	SW-07	L2759254-3	2025-03-18	Water	M																		
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	<0.00050	<0.00050	<0.00010	0.00023		0.015	<0.000050	<0.0010	0.0796	0.00081	<0.0000050	0.000162	<0.00050	<0.050	0.122		0.00024	<0.000050
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	<0.00050		<0.00010	0.0002		<0.010	<0.000050	<0.0010	0.13	0.00051	0.00000068	0.00032	<0.00050	<0.050	0.152		0.00042	<0.000050
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M																		
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	<0.00050		<0.00010	0.00023		0.012	<0.000050	<0.0010	0.0957	0.00084	0.00000117	0.000189	<0.00050	<0.050	0.097		0.00029	<0.000050
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M																		
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M																		
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	<0.00050		<0.00010	0.00023		<0.010	<0.000050	<0.0010	0.13	0.00058	0.00000084	0.000278	<0.00050	<0.050	0.15		0.00034	<0.000050
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.102	0.00057	0.00000072	0.000319	<0.00050	<0.050	0.136		0.00027	<0.000050
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M																		
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.12	0.00024	<0.0000050	0.000502	<0.00050	<0.050	0.153		0.00032	<0.000050
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0875	0.00047	0.00000076	0.00028	<0.00050	<0.050	0.125		0.0003	<0.000050
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M																		
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.089	0.00032	<0.0000050	0.000291	<0.00050	<0.050	0.128		0.00028	<0.000050
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0762	0.00026	<0.0000050	0.000274	<0.00050	<0.050	0.106		0.00028	<0.000050
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	<0.00050		<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.296	0.00038	0.00000054	0.000348	<0.00050	<0.050	0.175		0.0003	<0.000050
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M																		
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.0856	0.00026	<0.0000050	0.000293	<0.00050	<0.050	0.115		0.00032	<0.000050
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		<0.010	<0.000050	<0.0010	0.11	0.00029	<0.0000050	0.0005	<0.00050	<0.050	0.141		0.0003	<0.000050
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.026	<0.000050	<0.0010	0.0805	0.0005	<0.0000050	0.000202	<0.00050	<0.050	0.097		0.00022	<0.000050
SW-08		L2755503-2	2024-04-25	Water	M																		
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.021	<0.000050	<0.0010	0.0905	0.00067	<0.0000050	0.000198	<0.00050	<0.050	0.102		0.00024	<0.000050
SW-08		L2755588-2	2024-05-02	Water	M																		
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.022	<0.000050	<0.0010	0.0863	0.0005	<0.0000050	0.000162	<0.00050	<0.050	0.087		0.00025	<0.000050
SW-08		L2755694-2	2024-05-10	Water	M																		
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M			<0.00010	<0.00020		0.021	<0.000050	<0.0010	0.176	0.00056	<0.0000050	0.000193	<0.00050	<0.050	0.112		0.0002	<0.000050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Ga	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Re	D-Rb	D-Se
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M																		
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.017	<0.000050	<0.0010	0.091	0.00053	<0.0000050	0.000189	<0.00050	<0.050	0.074		0.00024	<0.000050
SW-08		L2755916-2	2024-05-23	Water	M																		
SW-08		VA24B4655-002	2024-06-20	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.022	<0.000050	<0.0010	0.0802	0.00072	<0.0000050	0.000202	<0.00050	<0.050	0.093		<0.00020	<0.000050
SW-08		L2756326-2	2024-06-20	Water	M																		
SW-08		VA24B7579-002	2024-07-18	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.027	<0.000050	<0.0010	0.0926	0.0007	<0.0000050	0.000209	<0.00050	<0.050	0.1		0.00026	<0.000050
SW-08		L2756717-2	2024-07-18	Water	M																		
SW-08		VA24C1546-002	2024-08-22	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.021	<0.000050	<0.0010	0.0881	0.00089	<0.0000050	0.000254	<0.00050	<0.050	0.101		0.00023	<0.000050
SW-08		L2757144-2	2024-08-22	Water	M																		
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.024	<0.000050	<0.0010	0.0948	0.00104	<0.0000050	0.000285	<0.00050	<0.050	0.119		0.00027	<0.000050
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.032	<0.000050	<0.0010	0.108	0.00066	<0.0000050	0.000273	<0.00050	<0.050	0.134		0.00034	<0.000050
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	<0.00050	<0.00050	<0.00010	0.00051		0.031	0.000056	<0.0010	0.103	0.00058	<0.0000050	0.000241	<0.00050	<0.050	0.118		0.00035	<0.000050
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.026	<0.000050	<0.0010	0.113	0.00055	<0.0000050	0.000255	<0.00050	<0.050	0.135		0.00036	<0.000050
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.025	<0.000050	<0.0010	0.0863	0.00094	<0.0000050	0.000141	<0.00050	<0.050	0.105		0.00037	<0.000050
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	<0.00050	<0.00050	<0.00010	<0.00020		0.028	<0.000050	<0.0010	0.132	0.00048	<0.0000050	0.00022	<0.00050	<0.050	0.122		0.00032	<0.000050
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	<0.00050	<0.00050	<0.00010	0.00064		<0.010	<0.000050	<0.0010	0.22	0.00035	<0.0000050	0.000477	<0.00050	<0.050	0.166		0.00022	<0.000050
SW-09		L2755503-4	2024-04-25	Water	M																		
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	<0.00050	<0.00050	<0.00010	0.00051		<0.010	<0.000050	<0.0010	0.225	<0.00010	<0.0000050	0.000484	<0.00050	<0.050	0.155		<0.00020	<0.000050
SW-09		L2755588-4	2024-05-02	Water	M																		
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	<0.00050	<0.00050	<0.00010	0.0007		0.03	0.000075	<0.0010	0.227	0.00255	<0.0000050	0.000501	<0.00050	<0.050	0.153		<0.00020	<0.000050
SW-09		L2755687-5	2024-05-09	Water	M																		
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	<0.00050	<0.00050	<0.00010	0.00045		<0.010	<0.000050	<0.0010	0.251	0.00015	<0.0000050	0.000575	<0.00050	<0.050	0.164		0.0002	<0.000050
SW-09		L2755820-4	2024-05-16	Water	M																		
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	<0.00050	<0.00050	<0.00010	0.00055		<0.010	<0.000050	<0.0010	0.238	0.00013	<0.0000050	0.000528	<0.00050	<0.050	0.133		0.00022	<0.000050
SW-09		L2755916-4	2024-05-23	Water	M																		
SW-09		VA24B4655-004	2024-06-20	Water	M	<0.00050	<0.00050	<0.00010	0.00047		<0.010	<0.000050	<0.0010	0.24	0.00012	<0.0000050	0.000527	<0.00050	<0.050	0.147		0.0002	<0.000050
SW-09		L2756326-4	2024-06-20	Water	M																		
SW-09		VA24B7579-004	2024-07-18	Water	M	<0.00050	<0.00050	<0.00010	0.00051		<0.010	<0.000050	<0.0010	0.288	0.00017	<0.0000050	0.00071	<0.00050	<0.050	0.201		0.00025	<0.000050
SW-09		L2756717-4	2024-07-18	Water	M																		
SW-09		VA24C1546-004	2024-08-22	Water	M	<0.00050	<0.00050	<0.00010	0.00052		<0.010	<0.000050	<0.0010	0.326	0.00023	<0.0000050	0.000733	<0.00050	<0.050	0.207		0.00028	<0.000050
SW-09		L2757144-4	2024-08-22	Water	M																		
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	<0.00050	<0.00050	<0.00010	0.00049		<0.010	<0.000050	<0.0010	0.324	0.00016	<0.0000050	0.000829	<0.00050	<0.050	0.232		0.00033	<0.000050
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	<0.00050	<0.00050	<0.00010	0.00137		0.014	<0.000050	<0.0010	0.236	0.00085	0.000005	0.000282	<0.00050	<0.050	0.145		0.00024	<0.000050
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	<0.00050	<0.00050	<0.00010	0.00086		<0.010	<0.000050	<0.0010	0.224	0.00017	<0.0000050	0.000397	<0.00050	<0.050	0.152		0.00021	<0.000050
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	<0.00050	<0.00050	<0.00010	0.00091		<0.010	<0.000050	<0.0010	0.194	0.00019	<0.0000050	0.000404	<0.00050	<0.050	0.119		<0.00020	<0.000050
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	<0.00050	<0.00050	<0.00010	0.00067		<0.010	<0.000050	<0.0010	0.214	0.00017	<0.0000050	0.000415	<0.00050	<0.050	0.151		0.00022	<0.000050
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M																		
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	<0.00050	<0.00050	<0.00010	0.00117		<0.010	<0.000050	<0.0010	0.168	0.00029	<0.0000050	0.000321	<0.00050	<0.050	0.113		<0.00020	<0.000050
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	<0.00050	<0.00050	<0.00010	0.00079		<0.010	<0.000050	<0.0010	0.169	0.00015	<0.0000050	0.000351	<0.00050	<0.050	0.122		<0.00020	<0.000050
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M																		
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	<0.00050	<0.00050	<0.00010	0.00089		<0.010	<0.000050	<0.0010	0.18	0.00018	<0.0000050	0.000337	<0.00050	<0.050	0.122		0.00021	<0.000050
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	<0.00050	<0.00050	<0.00010	0.0005		<0.010	<0.000050	<0.0010	0.183	<0.00010	<0.0000050	0.000459	<0.00050	<0.050	0.129		<0.00020	<0.000050
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M																		
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	<0.00050	<0.00050	<0.00010	0.00087		<0.010	<0.000050	<0.0010	0.188	0.00017	<0.0000050	0.000364	<0.00050	<0.050	0.121		0.0002	<0.000050
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M																		
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	<0.00050	<0.00050	<0.00010	0.00108		<0.010	<0.000050	<0.0010	0.156	0.00023	<0.0000050	0.000293	<0.00050	<0.050	0.123		0.00022	<0.000050
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	<0.00050	<0.00050	<0.00010	0.0005		<0.010	<0.000050	<0.0010	0.177	0.00019	<0.0000050	0.000442	<0.00050	<0.050	0.138		<0.00020	<0.000050
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	<0.00050	<0.00050	<0.00010	0.0005		<0.010	<0.000050	<0.0010	0.185	0.00019	<0.0000050	0.000432	<0.00050	<0.050	0.161		0.0002	<0.000050
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	<0.00050	<0.00050	<0.00010	0.0005		<0.010	<0.000050	<0.0010	0.217	0.00016	<0.0000050	0.000504	<0.00050	<0.050	0.181		0.00023	<0.000050
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	<0.00050	<0.00050	<0.00010	0.00047		<0.010	<0.000050	<0.0010	0.26	0.00014	<0.0000050	0.000524	<0.00050	<0.050	0.184		<0.00020	<0.000050
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M	<0.00050	<0.00050	<0.00010	0.00063		<0.010	<0.000050	<0.0010	0.227	0.00015	<0.0000050	0.000477	<0.00050	<0.050	0.181		0.00025	<0.000050

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M	1.73	<0.000010	1.25	0.00964	0.53	<0.00020	<0.000010	<0.00010	<0.00010	0.00031	<0.00010	0.000069	<0.00050		0.013	<0.00020	<0.000000020	0.000000022
OUT-01		VA24B1636-006	2024-05-23	Water	M	1.81	<0.000010	0.874	0.00783	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000046	<0.00050		0.0105	<0.00020	0.000000021	<0.000000040
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M	2.68	<0.000010	1.43	0.0165	0.91	<0.00020	<0.000010	<0.00010	<0.00010	0.00063	<0.00010	0.000134	<0.00050		0.0102	<0.00020	0.000000031	0.000000032
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M	2.2	<0.000010	0.841	0.00893	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.0014	<0.00010	0.000171	<0.00050		0.0027	<0.00020	0.000000028	0.000000028
OUT-01		661-455931031-0	2024-10-28	Water	F																		
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M	2.18	<0.000010	0.79	0.00827	0.53	<0.00020	<0.000010	<0.00010	<0.00010	0.0007	<0.00010	0.000136	<0.00050		0.0028	<0.00030	0.000000029	0.000000026
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M	1.84	<0.000010	0.652	0.0078	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00049	<0.00010	0.000072	<0.00050		<0.0010	<0.00030	0.000000037	0.000000074
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M	2.44	<0.000010	12.6	0.0419	2.23	<0.00020	<0.000010	<0.00010	<0.00010	0.00054	<0.00010	0.000343	<0.00050		0.0459	<0.00030	0.000000034	0.000000037
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M	1.61	<0.000010	0.601	0.00635	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00039	<0.00010	0.000048	<0.00050		<0.0010	<0.00030	0.000000141	0.000000024
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M	1.44	<0.000010	0.496	0.00514	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00065	0.00022	0.000029	<0.00050		<0.0010	<0.00030	0.000000031	0.000000027
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M																		
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M	1.93	<0.000010	0.699	0.012	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00045	<0.00010	0.000126	<0.00050		0.001	<0.00030	0.00000003	0.00000002
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M	1.98	<0.000010	0.818	0.0117	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000201	<0.00050		<0.0010	<0.00030	0.000000041	0.000000033
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M	2.36	<0.000010	0.838	0.0132	0.55	<0.00020	<0.000010	<0.00010	<0.00010	0.0013	<0.00010	0.0001	<0.00050		0.001	<0.00030	0.000000042	0.000000044
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M	2.07	<0.000010	0.851	0.0114	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.0007	<0.00010	0.000348	<0.00050		0.0011	<0.00020	<0.000000020	0.000000025
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M	2.31	<0.000010	1.21	0.0152	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000266	<0.00050		0.0026	<0.00020	0.000000068	<0.000000020
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M	2.98	<0.000010	1.72	0.0288	0.93	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000276	<0.00050		<0.0010	<0.00020	0.000000022	0.000000033
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M	1.94	<0.000010	1.07	0.00973	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00042	<0.00010	0.000064	<0.00050		0.0092	<0.00020	0.000000025	0.000000047
OUT-02		VA24B5289-006	2024-06-26	Water	M	3.7	<0.000010	2.36	0.0378	1.28	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000267	<0.00050		0.0011	<0.00020	0.000000048	0.00000007
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M	2.44	<0.000010	1.01	0.00723	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00062	<0.00010	0.000068	<0.00050		0.0016	<0.00020	0.000000027	0.000000031
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M	2.21	<0.000010	0.776	0.00654	0.6	<0.00020	<0.000010	<0.00010	<0.00010	0.00031	<0.00010	0.000071	<0.00050		0.001	<0.00020	<0.000000020	<0.000000080
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M	2.5	<0.000010	0.994	0.0099	0.74	<0.00020	<0.000010	<0.00010	<0.00010	0.00193	<0.00010	0.00025	<0.00050		<0.0010	<0.00020	0.000000022	0.000000038
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M	2.17	<0.000010	0.73	0.00701	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.0008	<0.00010	0.000165	<0.00050		<0.0010	<0.00030	0.000000023	0.000000031
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M	1.93	<0.000010	0.744	0.00714	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.0006	<0.00010	0.000146	<0.00050		0.0015	<0.00030	0.000000027	0.00000003
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M	1.98	<0.000010	1.42	0.0096	<0.50	<0.00020	<0.000010	<0.00020	<0.00010	0.0005	<0.00010	0.000129	<0.00050		0.0018	<0.00030	0.000000037	0.000000045
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M	1.57	<0.000010	0.586	0.00546	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00036	<0.00010	0.000038	<0.00050		<0.0010	<0.00030	0.000000059	<0.000000020
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M	1.55	<0.000010	0.542	0.00657	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00103	0.00011	0.000148	<0.00050		0.0017	<0.00030	0.000000041	0.000000035
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M																		
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M	1.67	<0.000010	0.708	0.00793	<0.50	<0.00020	<0.000010	<0.00010	0.00013	0.00061	<0.00010	0.000123	<0.00050		0.0013	<0.00030	0.000000042	0.000000043
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M	1.77	<0.000010	0.671	0.0067	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00043	<0.00010	0.000139	<0.00050		0.0011	<0.00030	0.000000032	0.000000023
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M	1.91	<0.000010	0.693	0.00606	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000088	<0.00050		<0.0010	<0.00030	0.000000021	<0.000000020
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M	2.02	<0.000010	1.02	0.00832	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000215	<0.00050		0.0042	<0.00030	<0.000000020	<0.000000020
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M	2.42	<0.000010	1.21	0.049	1.09	<0.00020	<0.000010	<0.00010	<0.00010	0.00061	<0.00010	0.000203	0.00069		<0.0010	<0.00020	0.000000031	0.000000058
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M	2.46	<0.000010	1.48	0.0257	0.73	<0.00020	<0.000010	<0.00010	<0.00010	0.00111	<0.00010	0.000173	0.00109		<0.0010	<0.00020	0.00000003	0.000000042
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	2.21	<0.000010	0.948	0.038	0.88	<0.00020	<0.000010	<0.00010	<0.00010	0.00133	<0.00010	0.000096	0.00067		0.0012	<0.00020	0.000000115	<0.000000160
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M																		
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M	2.49	<0.000010	0.965	0.0341	0.73	<0.00020	<0.000010	<0.00010	<0.00010	0.00086	<0.00010	0.000088	0.00065		0.0011	<0.00020	0.000000025	0.000000046
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M	2.27	<0.000010	0.849	0.0308	0.68	<0.00020	<0.000010	<0.00010	<0.00010	0.00081	<0.00010	0.000076	<0.00050		<0.0010	<0.00030	0.00000003	0.000000032
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M	2.2	<0.000010	0.828	0.0298	0.64	<0.00020	<0.000010	<0.00010	<0.00010	0.00074	<0.00010	0.000072	<0.00050		<0.0010	<0.00030	0.000000022	0.000000076
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M	2	<0.000010	0.927	0.0209	0.56	<0.00020	<0.000010	<0.00010	<0.00010	0.00134	<0.00010	0.000092	0.00056		<0.0010	<0.00030	0.000000055	0.000000042
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	2.03	<0.000010	0.84	0.0175	0.53	<0.00020	<0.000010	<0.00010	<0.00010	0.00073	<0.00010	0.000066	<0.00050		0.0013	<0.00020	0.000000136	
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M																		
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M	1.77	<0.000010	0.769	0.019	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00093	0.00029	0.000045	<0.00050		0.0012	<0.00030	0.000000225	0.000000034
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M	1.77	<0.000010	0.622	0.0197	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.001	<0.00010	0.000042	<0.00050		0.0014	<0.00030	0.00000005	0.000000028
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M																		
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M	1.84	<0.000010	0.631	0.019	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00087	<0.00010	0.000037	<0.00050		0.0011	<0.00030	0.000000038	0.000000042
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M	2.28	<0.000010	1.07	0.0442	1.04	<0.00020	<0.000010	<0.00010	<0.00010	0.00055	<0.00010	0.000189	<0.00050		<0.0010	<0.00030	0.000000023	0.000000027
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M	1.5	<0.00005	1.33	0.0057	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000318	<0.001		<0.004	<0.0001		
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M	1.5	<0.00005	0.79	0.0045	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000445	<0.001		0.0112	<0.0001		
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M	1.5	<0.00005	1.21	0.0051	3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.0004	<0.001		0.0046	<0.0001		
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M	<1	<0.00005	0.4	0.0026	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000535	<0.001		<0.004	<0.0001		
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M	1.9	<0.00005	0.34	0.0045	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.00073	<0.001		<0.004	<0.0001		
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M	2.1	<0.00005	0.87	0.006	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000442	<0.001		<0.004	<0.0001		
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M	1.8	<0.00005	0.8	0.0051	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000448	<0.001		<0.004	<0.0001		
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M	1.1	<0.00005	0.47	0.0031	<3	<0.0005	<0.00002	0.00031	<0.0002	<0.005	<0.001	0.000539	<0.001		<0.004	<0.0001		
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M	1.6	<0.00005	1.33	0.0065	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000409	<0.001		<0.004	<0.0001		
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M	2.6	<0.00005	1.15	0.0078	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000176	<0.001		0.018	<0.0001		
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M																		
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M																		
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M																	<0.000000050	
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M																		
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M																	<0.000000024	
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M																	<0.000000024	
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M																	<0.000000023	
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M																	<0.000000023	
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M																	<0.000000025	
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M																	<0.000000050	
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M																	0.000000025	
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M																		
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M																	0.000000025	
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M																	0.00000003	
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M																	<0.000000024	
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	1.3	<0.000050	4.34	0.0629	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000422	<0.0010		<0.0040	<0.00010		
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M																	<0.000000023	
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M	1.4	<0.000050	0.54	0.003	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000381	<0.0010		<0.0040	<0.00010	<0.000000023	
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	1.2	<0.000050	0.65	0.0039	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000481	<0.0050		<0.0040	<0.00010	<0.000000050	
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	1	<0.000050	0.48	0.0029	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000413	<0.0050		<0.0040	<0.00010	<0.000000024	
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M	<1.0	<0.000050	0.32	0.0019	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000401	<0.0050		<0.0040	<0.00010	0.000000086	
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	0.8	<0.000010	0.427	0.00242	<1.00	<0.000050	<0.0000040	<0.000010	<0.000050	0.00051	<0.00020	0.000516	<0.00100		<0.0010	<0.000020	0.000000347	
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M	0.94	<0.000010	0.657	0.00327	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.0004	<0.00020	0.000379	<0.00100		<0.0010	<0.000020	0.000000445	
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	0.95	<0.000010	0.742	0.00368	<1.00	<0.000050	<0.0000040	<0.000010	<0.000050	0.00038	<0.00020	0.000384	<0.00100		<0.0010	<0.000020	0.000000508	
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	1.62	<0.000010	1.44	0.00569	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00021	<0.00020	0.000257	<0.00100		<0.0010	<0.000020	<0.000000050	
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M	1.74	<0.000010	0.906	0.00463	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00033	<0.00020	0.000303	<0.00100		<0.0010	0.000024	0.000000057	
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	2.15	<0.000010	1.48	0.00658	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000227	<0.00100		<0.0010	<0.000020	<0.000000023	
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	1.55	<0.000010	0.796	0.00456	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00047	<0.00020	0.000442	<0.00100		<0.0010	0.000033	<0.000000060	
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	1.28	<0.000010	0.749	0.00374	<1	<0.000050	<0.0000040	0.000012	<0.000050	0.00068	<0.00020	0.000555	<0.00100		<0.0010	0.000032	<0.000000050	
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M	1.4	<0.000010	0.785	0.00404	<1	<0.000050	<0.0000040	0.000011	<0.000050	0.00054	<0.00020	0.000531	<0.00100		<0.0010	0.000033	<0.000000050	
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	1.4	<0.000010	0.597	0.0035	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00043	<0.00020	0.000576	<0.00100		<0.0010	0.00003	<0.000000050	
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M	0.75	<0.000010	0.393	0.00222	<1	<0.000050	<0.0000040	0.00002	<0.000050	0.00066	<0.00020	0.000483	<0.00100		0.0019	0.000035	0.00000007	
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M	5.2	<0.000010	2.33	0.0718	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.0001	<0.00100		0.0022	0.000024	0.000000089	
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	0.96	<0.000010	0.622	0.00328	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00035	<0.00020	0.00033	<0.00100		<0.0010	0.000026	0.000000109	
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	0.91	<0.000010	0.69	0.00315	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00026	<0.00020	0.000418	<0.00100		<0.0010	<0.000020	0.000000078	
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	1.24	<0.000010	0.804	0.00361	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00031	<0.00020	0.000403	<0.00100		<0.0010	<0.000020	<0.000000050	
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M	1.56	<0.000010	0.575	0.00398	<1	<0.000050	<0.0000040	0.00002	<0.000050	0.00078	<0.00020	0.000511	<0.00100		<0.0010	0.000051	0.000000043	
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	1.57	<0.000010	0.648	0.00408	<1	<0.000050	<0.0000040	0.000015	<0.000050	0.00053	<0.00020	0.000522	<0.00100		<0.0010	0.00004	0.000000069	
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M	1.63	<0.000010	0.746	0.00394	<1	<0.000050	<0.0000040	0.000015	<0.000050	0.00057	0.00001	0.000549	<0.00040		0.0025	0.000036	<0.000000050	
SW-01		VA24A1299-001	2024-01-23	Water	M	1.38	<0.000010	0.505	0.00308	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00068	<0.00010	0.000484	<0.00050		<0.0010	<0.00020	0.000000043	
SW-01		L2754353-1	2024-01-23	Water	M																		
SW-01		L2754615-1	2024-02-15	Water	M																		
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	1.22	<0.000010	0.598	0.00323	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00059	<0.00010	0.000538	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	1.38	<0.000010	0.535	0.00325	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00075	<0.00010	0.000544	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01		L2755012-1	2024-03-19	Water	M																		
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	1.14	<0.000010	0.548	0.00299	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.0006	<0.00010	0.000638	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01		L2755503-1	2024-04-25	Water	M																		
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	1.18	<0.000010	0.497	0.00287	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00067	<0.00010	0.000489	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-01		L2755523-1	2024-04-29	Water	M																		
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	1.27	<0.000010	0.611	0.00326	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00052	<0.00010	0.000562	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01		L2755588-1	2024-05-02	Water	M																		
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	1.09	<0.000010	0.493	0.00274	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00061	<0.00010	0.000578	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	1.08	<0.000010	0.467	0.0027	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00069	<0.00010	0.000587	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01		L2755694-1	2024-05-10	Water	M																		
SW-01		L2755695-1	2024-05-10	Water	M																		
SW-01		L2755788-1	2024-05-15	Water	M																		
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M	0.917	<0.000010	0.442	0.00241	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00061	<0.00010	0.00052	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	0.903	<0.000010	0.481	0.00242	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00074	<0.00010	0.000507	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01		L2755820-1	2024-05-16	Water	M																		
SW-01		VA24B1628-001	2024-05-22	Water	M	1.02	<0.000010	0.467	0.00268	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00067	<0.00010	0.000524	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-01		L2755902-1	2024-05-22	Water	M																		
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	1.07	<0.000010	0.482	0.00265	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00066	<0.00010	0.00054	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01		L2755916-1	2024-05-23	Water	M																		
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M	0.922	<0.000010	0.406	0.00244	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00084	<0.00010	0.000535	<0.00050		<0.0010	<0.00020	<0.000000020	0.00000003
SW-01		VA24B4655-001	2024-06-20	Water	M	1.03	<0.000010	0.554	0.00288	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00056	<0.00010	0.000542	<0.00050		<0.0010	<0.00020	<0.000000030	
SW-01		L2756326-1	2024-06-20	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M	1.05	<0.000010	0.56	0.00306	<0.50	<0.00020	<0.000010	<0.00010	0.00011	0.00047	<0.00010	0.00056	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000180
SW-01		L2756419-1	2024-06-26	Water	M																		
SW-01		VA24B7579-001	2024-07-18	Water	M	1.05	<0.000010	0.658	0.00332	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00063	<0.00010	0.000504	<0.00050		<0.0010	<0.00020	0.000000022	
SW-01		L2756717-1	2024-07-18	Water	M																		
SW-01		VA24B8974-001	2024-07-31	Water	M	1.13	<0.000010	0.623	0.00313	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00038	<0.00010	0.000492	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000032
SW-01		L2756871-1	2024-07-31	Water	M																		
SW-01		VA24C1546-001	2024-08-22	Water	M	1.1	<0.000010	0.659	0.00311	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00041	<0.00010	0.000464	<0.00050		<0.0010	<0.00020	0.000000028	
SW-01		L2757144-1	2024-08-22	Water	M																		
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	1.44	<0.000010	0.686	0.00342	<0.50	<0.00020	<0.000010	<0.00010	0.00014	0.00068	<0.00010	0.000645	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000026
SW-01	SW-01	L2757209-1	2024-08-27	Water	M																		
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	1.14	<0.000010	0.748	0.0037	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00043	<0.00010	0.000464	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	1.55	<0.000010	0.696	0.00357	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00043	<0.00010	0.000584	<0.00050		<0.0010	<0.00020	0.000000023	0.000000039
SW-01	SW-01	L2757584-1	2024-09-28	Water	M																		
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M	1.33	<0.000010	0.768	0.00369	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00036	<0.00010	0.000437	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000034
SW-01	SW-01	L2757664-2	2024-10-03	Water	M																		
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	1.4	<0.000010	0.82	0.00379	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00036	<0.00010	0.000473	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000025
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M																		
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	1.77	<0.000010	0.641	0.00384	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00057	<0.00010	0.000519	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000021
SW-01	SW-01	L2757873-1	2024-10-22	Water	M																		
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	1.59	<0.000010	0.75	0.00402	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00062	<0.00010	0.000614	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M	1.6	<0.000010	0.628	0.00374	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00088	<0.00010	0.000712	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-01	SW-01	L2757942-2	2024-10-26	Water	M																		
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	1.62	<0.000010	0.647	0.00409	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00074	<0.00010	0.000604	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	1.72	<0.000010	0.693	0.00414	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00061	<0.00010	0.000576	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	1.61	<0.000010	0.512	0.00335	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00063	<0.00010	0.000475	<0.00050		<0.0010	<0.00030	<0.000000020	0.000000037
SW-01	SW-01	L2758119-1	2024-11-12	Water	M																		
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	1.32	<0.000010	0.483	0.00344	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00074	<0.00010	0.000401	<0.00050		<0.0010	<0.00020	0.000000071	
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	1.48	<0.000010	0.63	0.00385	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00057	<0.00010	0.000505	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01	SW-01	L2758350-1	2024-12-06	Water	M																		
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M	1.52	<0.000010	0.634	0.00351	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00078	<0.00010	0.000658	<0.00050		<0.0010	<0.00030		<0.000000020
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M																	<0.000000020	0.000000052
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	1.48	<0.000010	0.559	0.00343	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00052	<0.00010	0.000486	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M																		
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	1.36	<0.000010	0.66	0.00377	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00058	<0.00010	0.000604	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M																		
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M	1.29	<0.000010	1.83	0.00458	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.0005	0.00011	0.00055	<0.00050		<0.0010	<0.00030	0.000000023	0.000000025
SW-01	SW-01	L2758769-1	2025-01-24	Water	M																		
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	1.54	<0.000010	0.732	0.00386	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00058	<0.00010	0.000548	<0.00050		0.001	<0.00020	<0.000000020	
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M																		
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	1.54	<0.000010	0.734	0.0039	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00066	<0.00010	0.000528	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-01	SW-01	L2759042-1	2025-02-21	Water	M																		
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	1.5	<0.000010	0.737	0.00387	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.000618	<0.00010	0.000575	<0.00050		<0.0010	<0.00030	<0.000000020	0.000000024
SW-01	SW-01	L2759255-1	2025-03-19	Water	M																		
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	1.08	<0.000010	0.47	0.00277	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00083	<0.00010	0.000391	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M	1.28	<0.000010	0.558	0.00349	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00053	<0.00010	0.000625	<0.00050		<0.0010	<0.00030	<0.000000020	0.00000002
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M																		
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	1.19	<0.000010	0.486	0.0029	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00072	<0.00010	0.000473	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M																		
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	1.31	<0.000010	0.588	0.00334	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00058	<0.00010	0.00061	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M																		
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	1.14	<0.000010	0.546	0.00298	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00064	<0.00010	0.000614	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M																		
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	1.26	<0.000010	0.53	0.00299	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00065	<0.00010	0.000664	<0.00050		<0.0010	<0.00020	<0.000000080	
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	1.02	<0.000010	0.5	0.0027	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00074	0.00012	0.000592	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M																		
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	0.996	<0.000010	0.52	0.00257	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00066	<0.00010	0.000598	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	0.988	<0.000010	0.492	0.00255	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00066	<0.00010	0.000584	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	1.01	<0.000010	0.519	0.00265	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00059	<0.00010	0.000568	<0.00050		<0.0010	<0.00030	0.000000051	<0.000000020
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	0.959	<0.000010	0.558	0.00266	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00062	<0.00010	0.000565	<0.00050		<0.0010	<0.00020	<0.000000080	
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M	1.14	<0.000010	0.522	0.00273	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00046	<0.00010	0.000541	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M																		
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M																	<0.000000050	
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M																		
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M																		
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M																	<0.000000024	
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M																	<0.000000024	
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M																	<0.000000023	
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M																	<0.000000023	
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M																	<0.000000025	
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M																	<0.000000050	
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M																	0.000000032	
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M																		
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M																	<0.000000023	
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M																	<0.000000023	
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M																	<0.000000024	
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	2.4	<0.000050	1.63	0.0157	11.5	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000159	<0.0010		<0.0040	<0.00010		
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M																	<0.000000023	
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M	2.1	<0.000050	0.84	0.0074	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.00014	<0.0010		<0.0040	<0.00010	<0.000000023	
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	2	<0.000050	1.03	0.0078	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000162	<0.0050		0.0048	<0.00010	<0.000000050	
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M	1.4	<0.000050	0.59	0.0048	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000162	<0.0050		<0.0040	<0.00010	<0.000000024	
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	<1.0	<0.000050	0.37	0.0026	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000126	<0.0050		<0.0040	<0.00010	0.000000125	
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	1	<0.000010	0.472	0.00317	<1.00	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000144	<0.00100		0.0011	<0.000020	0.000000143	
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M	1.98	<0.000010	1.59	0.00781	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000109	<0.00100		<0.0010	<0.000020	0.000000321	
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	3	<0.000010	3.08	0.0152	1.44	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000105	<0.00100		<0.0010	<0.000020	0.000000499	
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M	3.24	<0.000010	3.88	0.0174	1.8	<0.000050	0.0000048	<0.000010	<0.000050	<0.00020	<0.00020	0.000104	<0.00100		<0.0010	<0.000020	<0.000000050	
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M	2.56	<0.000010	1.42	0.00951	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000123	<0.00100		<0.0010	<0.000020	<0.000000050	
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M	2.73	<0.000010	2.11	0.0116	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000126	<0.00100		<0.0010	<0.000020	<0.000000023	
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	2.64	<0.000010	1.3	0.00925	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000127	<0.00100		<0.0010	<0.000020	<0.000000060	
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M	2.62	<0.000010	1.6	0.0104	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.0000962	<0.00100		0.0017	<0.000020	<0.000000050	
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M	2.75	<0.000010	1.76	0.011	1.06	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000105	<0.00100		0.0011	<0.000020	<0.000000050	
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M	1.66	<0.000010	0.719	0.00526	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00029	<0.00020	0.000151	<0.00100		<0.0010	0.000021	0.00000008	
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M	0.92	<0.000010	0.406	0.00292	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00034	<0.00020	0.000143	<0.00100		0.0013	<0.000020	0.000000056	
SW-02	SW-02	23F0370-03	2023-06-02	Water	M																		
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M	1.13	<0.000010	0.792	0.00442	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000107	<0.00100		0.0016	<0.000020	<0.000000050	
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M	2.26	<0.000010	1.8	0.00966	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.0000797	<0.00100		0.001	<0.000020	0.000000066	
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M	3.01	<0.000010	3.56	0.0154	1.53	<0.000050	0.000005	<0.000010	<0.000050	<0.00020	<0.00020	0.000104	<0.00100		<0.0010	<0.000020	<0.000000050	
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	1.69	<0.000010	0.65	0.00527	<1	<0.000050	<0.0000040	0.000014	<0.000050	0.0006	<0.00020	0.000172	<0.00100		0.0017	0.000028	0.000000059	
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M																		
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M																		
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M	2.76	<0.000010	1.23	0.00894	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000109	<0.00100		0.0013	<0.000020	0.000000111	
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M	2.63	<0.000010	1.13	0.00834	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00026	0.00002	0.000151	<0.00040		0.0012	<0.000020	<0.000000050	
SW-02		VA24A1299-002	2024-01-23	Water	M	1.75	<0.000010	0.693	0.00526	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00037	<0.00010	0.00019	<0.00050		0.001	<0.00020	<0.000000020	
SW-02		L2754353-2	2024-01-23	Water	M																		
SW-02		L2754615-2	2024-02-15	Water	M																		
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	2.56	<0.000010	1.25	0.00846	0.79	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000136	<0.00050		<0.0010	<0.00020	0.000000024	
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	1.86	<0.000010	0.704	0.00531	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00031	<0.00010	0.000179	<0.00050		<0.0010	<0.00020	0.000000045	
SW-02		L2755012-2	2024-03-19	Water	M																		
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	2.11	<0.000010	0.906	0.00634	<0.50	<0.00020	<0.000010	<0.00010	0.00014	0.00032	<0.00010	0.000168	<0.00050		0.0021	<0.00020		
SW-02		L2755316-6	2024-04-12	Water	M																		
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	1.86	<0.000010	0.765	0.00528	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000203	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02		L2755504-1	2024-04-26	Water	M																		
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	1.5	<0.000010	0.581	0.0042	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00046	<0.00010	0.000187	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-02		L2755521-2	2024-04-28	Water	M																		
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	1.98	<0.000010	0.93	0.00631	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000199	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02		L2755598-1	2024-05-03	Water	M																		
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	1.6	<0.000010	0.705	0.00462	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000179	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	1.5	<0.000010	0.655	0.00428	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00046	<0.00010	0.000152	<0.00050		<0.0010	<0.00020		
SW-02		L2755677-1	2024-05-09	Water	M																		
SW-02		L2755687-1	2024-05-09	Water	M																		
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M	1.19	<0.000010	0.537	0.00368	<0.50	<0.00020	<0.000010	<0.00010	0.00018	<0.00030	<0.00010	0.000149	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000022
SW-02		L2755770-1	2024-05-14	Water	M																		
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	1.16	<0.000010	0.557	0.00353	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00031	<0.00010	0.000165	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02		L2755819-1	2024-05-17	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M	1.34	<0.000010	0.561	0.00393	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000144	<0.00050		0.0031	<0.00020	<0.000000020	<0.000000020
SW-02		L2755903-1	2024-05-23	Water	M																		
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	1.31	<0.000010	0.581	0.004	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000155	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02		L2755933-1	2024-05-24	Water	M																		
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M	1.31	<0.000010	0.604	0.00409	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000162	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-02		L2755961-1	2024-05-26	Water	M																		
SW-02		VA24B4698-001	2024-06-21	Water	M	1.18	<0.000010	0.566	0.00384	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00014	0.000132	<0.00050		<0.0010	<0.00020	0.000000021	
SW-02		L2756349-1	2024-06-21	Water	M																		
SW-02		VA24B5540-001	2024-06-27	Water	M	1.04	<0.000010	0.465	0.00313	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000165	<0.00050		<0.0010	<0.00020	<0.000000050	0.000000039
SW-02		L2756458-1	2024-06-27	Water	M																		
SW-02		VA24B7689-001	2024-07-19	Water	M	1.59	<0.000010	1.05	0.00608	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00011	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02		L2756726-1	2024-07-19	Water	M																		
SW-02		VA24B8974-002	2024-07-31	Water	M	1.83	<0.000010	1.2	0.00641	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000107	<0.00050		<0.0010	<0.00020	0.000000022	<0.000000020
SW-02		L2756871-2	2024-07-31	Water	M																		
SW-02		VA24C1605-001	2024-08-23	Water	M	2.6	<0.000010	2.26	0.0108	0.88	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00011	<0.00050		<0.0010	<0.00020	0.000000027	
SW-02		L2757153-1	2024-08-23	Water	M																		
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	1.86	<0.000010	0.994	0.00577	0.6	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000188	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000021
SW-02	SW-02	L2757209-2	2024-08-27	Water	M																		
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	3.04	<0.000010	3.37	0.0138	1.24	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000109	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	2.27	<0.000010	1.39	0.00811	0.58	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000145	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-02	SW-02	L2757587-1	2024-09-29	Water	M																		
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	2.04	<0.000010	1.05	0.00692	0.91	<0.00020	<0.000010	<0.00010	<0.00010	0.00044	<0.00010	0.000254	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000026
SW-02	SW-02	L2757661-1	2024-10-04	Water	M																		
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	2.51	<0.000010	1.81	0.0104	0.69	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000136	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M																		
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	2.27	<0.000010	0.863	0.00678	0.72	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000138	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-02	SW-02	L2757873-2	2024-10-22	Water	M																		
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	2.75	<0.000010	1.2	0.00791	0.89	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00013	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M	2.64	<0.000010	1.2	0.0081	0.82	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000141	<0.00050		0.0011	<0.00020	<0.000000020	<0.000000020
SW-02	SW-02	L2757913-1	2024-10-25	Water	M																		
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	2.55	<0.000010	1.02	0.00795	0.75	<0.00020	<0.000010	<0.00010	<0.00010	0.00033	<0.00010	0.000191	<0.00050		0.0011	<0.00020	<0.000000020	
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	1.87	<0.000010	0.806	0.00543	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00032	<0.00010	0.000182	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M																		
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	2.18	<0.000010	0.778	0.00703	0.6	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000162	<0.00050		0.0011	<0.00020	<0.000000020	
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	2.56	<0.000010	0.895	0.00776	0.94	<0.00020	<0.000010	<0.00010	<0.00010	0.00064	<0.00010	0.000151	<0.00050		<0.0010	<0.00030	<0.000000020	0.000000029
SW-02	SW-02	L2758155-3	2024-11-16	Water	M																		
SW-02		VA24D1587-001	2024-11-20	Water	M	2.47	<0.000010	3.14	0.0104	0.86	<0.00020	<0.000010	<0.00010	<0.00010	0.00136	<0.00010	0.000142	<0.00050		0.0084	<0.00020	<0.000000080	
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M																		
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	1.95	<0.000010	0.72	0.00574	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00034	<0.00010	0.000177	<0.00050		0.001	<0.00030	<0.000000020	<0.000000020
SW-02	SW-02	L2758371-1	2024-12-08	Water	M																		
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	2.13	<0.000010	0.786	0.00649	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000154	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M																		
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	2.88	<0.000010	1.58	0.0102	1.13	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000124	<0.00050		<0.0010	<0.00020	0.000000029	
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M																		
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M	2.93	<0.000010	1.72	0.011	1.28	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000124	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-02	SW-02	L2758769-2	2025-01-24	Water	M																		
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M	2.84	<0.000010	1.7	0.0108	1.09	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000114	<0.00050		0.001	<0.00030	<0.000000020	0.000000036
SW-02	SW-02	L2759009-1	2025-02-19	Water	M																		
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	2.3	<0.000010	1.22	0.00798	0.7	<0.00020	<0.000010	<0.00010	<0.00010	0.00037	<0.00010	0.000181	<0.00050		0.0015	<0.00020	<0.000000020	
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M																		
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	2.54	<0.000010	1.32	0.00905	0.718	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000128	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-02	SW-02	L2759254-1	2025-03-18	Water	M																		
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M	1.19	<0.000010	0.496	0.00406	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00052	<0.00010	0.000165	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	1.94	<0.000010	0.849	0.00648	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000179	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M																		
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	1.24	<0.000010	0.485	0.00402	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00037	<0.00010	0.000149	<0.00050		0.001	<0.00030	<0.000000020	<0.000000020
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M																		
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	1.79	<0.000010	0.744	0.00566	0.56	<0.00020	<0.000010	<0.00010	<0.00010	0.0003	<0.00010	0.000158	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M																		
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M	1.63	<0.000010	0.734	0.00452	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000157	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M																		
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	1.66	<0.000010	0.795	0.00516	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000178	<0.00050		<0.0010	<0.00020	<0.000000020	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	1.25	<0.000010	0.589	0.00378	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000158	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M																		
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	1.23	<0.000010	0.625	0.0039	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00035	<0.00010	0.000178	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	1.17	<0.000010	0.555	0.00369	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000148	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	1.37	<0.000010	0.679	0.00422	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00015	<0.00050		0.0011	<0.00030	<0.000000020	<0.000000020
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M																		
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	1.2	<0.000010	0.67	0.00398	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00016	<0.00050		<0.0010	<0.00020	0.000000051	
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	1.52	<0.000010	0.719	0.00457	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000166	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M	2.4	<0.00005	2.03	0.0104	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000105	<0.001		<0.004	<0.0001		
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M	2.4	<0.00005	1.23	0.0086	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000132	<0.001		0.0065	<0.0001		
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M	3	<0.00005	2.5	0.0126	3.6	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000129	<0.001		0.0078	<0.0001		
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M	<1	<0.00005	0.48	0.003	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000139	<0.001		<0.004	<0.0001		
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M	2.1	<0.00005	0.43	0.0059	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.00021	<0.001		<0.004	<0.0001		
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M	3	<0.00005	1.33	0.011	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.00014	<0.001		<0.004	<0.0001		
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M	2.8	<0.00005	1.36	0.0101	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000147	<0.001		<0.004	<0.0001		
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M	1.4	<0.00005	0.5	0.004	<3	<0.0005	<0.00002	0.00022	<0.0002	<0.005	<0.001	0.000155	<0.001		<0.004	<0.0001		
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M	3	<0.00005	3.16	0.0158	3.2	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000128	<0.001		<0.004	<0.0001		
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M	1.7	<0.00005	0.78	0.0042	<3	<0.0005	<0.00002	<0.0001	<0.0002	<0.005	<0.001	0.000548	<0.001		<0.004	<0.0001		
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M																		
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M																		
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M																	<0.000000050	
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M																		
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M																		
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M																	<0.000000024	
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M																	<0.000000024	
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M																	<0.000000023	
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M																	<0.000000023	
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M																	<0.000000025	
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M																	<0.000000050	
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M																	0.00000003	
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M																		
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M																	<0.000000023	
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M																	<0.000000023	
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M																	<0.000000024	
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	2.5	<0.000050	806	0.636	75.7	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000393	<0.0010		<0.0040	<0.00010		
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M																	<0.000000023	
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	2	<0.000050	35.3	0.028	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000161	<0.0010		<0.0040	<0.00010	<0.000000023	
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	1.7	<0.000050	42.9	0.0372	4.3	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000188	<0.0050		<0.0040	<0.00010	<0.000000050	
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M	1.5	<0.000050	59.6	0.0451	5.5	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000144	<0.0050		<0.0040	<0.00010	<0.000000024	
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	<1.0	<0.000050	0.39	0.0027	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000121	<0.0050		<0.0040	<0.00010	<0.000000050	
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	1.01	<0.000010	4.35	0.00474	<1.00	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000145	<0.00100		0.0031	<0.000020	0.000000019	
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M	1.97	<0.000010	214	0.169	20.5	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000161	<0.00100		0.001	<0.000020	0.000000294	
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M	2.95	<0.000010	134	0.111	12.9	<0.000050	0.0000047	<0.000010	<0.000050	<0.00020	<0.00020	0.00015	<0.00100		<0.0010	<0.000020	0.000000327	
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M	2.69	<0.000050	1490	1.12	145	<0.000250	<0.0000200	<0.000050	<0.000250	<0.00100	<0.00100	0.000522	<0.00500		<0.0050	<0.000100	<0.000000050	
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	2.42	<0.000050	1350	0.961	123	<0.000250	<0.0000200	<0.000050	<0.000250	<0.00100	<0.00100	0.000578	<0.00500		<0.0050	<0.000100	<0.000000050	
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M	2.77	<0.000020	851	0.622	74.5	<0.000100	<0.0000080	<0.000020	<0.000100	<0.00040	<0.00040	0.000422	<0.00200		<0.0020	<0.000040	<0.000000023	
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	3.05	<0.000010	773	0.592	72.9	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000321	<0.00100		<0.0010	<0.000020	<0.000000060	
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M	2.64	<0.000050	1970	1.46	177	<0.000250	<0.0000200	<0.000050	<0.000250	<0.00100	<0.00100	0.000757	<0.00500		0.0055	<0.000100	<0.000000050	
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	2.84	<0.000010	462	0.341	42.2	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000247	<0.00100		<0.0010	<0.000020	<0.000000050	
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	1.69	<0.000010	25.8	0.0233	2.16	<0.000050	<0.0000040	<0.000010	<0.000050	0.00023	<0.00020	0.000153	<0.00100		<0.0010	<0.000020	0.000000097	
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M	0.93	<0.000010	1.39	0.00322	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00028	<0.00020	0.000148	<0.00100		0.001	<0.000020	0.000000072	
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	1.12	<0.000010	7.89	0.0077	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000109	<0.00100		0.0014	<0.000020	<0.000000050	
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	2.28	<0.000010	128	0.107	12.9	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.0000959	<0.00100		0.0015	<0.000020	0.000000062	
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	2.91	<0.000020	783	0.579	73.8	<0.000100	<0.0000080	<0.000020	<0.000100	<0.00040	<0.00040	0.000344	<0.00200		<0.0020	<0.000040	0.000000068	
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M	2.4	<0.000010	223	0.169	20.6	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000194	<0.00100		0.0014	<0.000020	0.000000067	
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M	1.67	<0.000010	1.19	0.00607	<1	<0.000050	<0.0000040	0.000015	<0.000050	0.00056	<0.00020	0.000179	<0.00100		0.0016	0.000031	0.000000066	
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	2.76	<0.000050	1340	0.967	125	<0.000250	<0.0000200	<0.000050	<0.000250	<0.00100	<0.00100	0.000472	<0.00500		<0.0050	<0.000100	0.000000106	
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M	2.69	<0.000010	600	0.416	52	<0.000050	0.0000045	<0.000010	<0.000050	<0.00020	0.00002	0.000329	<0.00040		0.0014	<0.000020	<0.000000050	
SW-03		VA24A1299-003	2024-01-23	Water	M	1.8	<0.000010	150	0.116	13.3	<0.00020	<0.000010	<0.00010	<0.00010	0.00036	<0.00010	0.000236	<0.00050		0.001	<0.00020	<0.000000020	
SW-03		L2754353-3	2024-01-23	Water	M																		
SW-03		L2754615-3	2024-02-15	Water	M																		
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	2.67	<0.000050	1340	0.935	125	<0.00100	<0.000050	<0.00050	<0.00050	<0.00150	<0.00050	0.000538	<0.00250		<0.0050	<0.00100	0.00000002	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	1.8	<0.00010	279	0.206	25	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.000239	<0.00050	<0.00050	<0.0010	<0.00050	<0.000000020	
SW-03		L2755012-3	2024-03-19	Water	M																		
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M	2.09	<0.000010	1.77	0.00784	0.69	<0.00020	<0.000010	<0.00010	0.00016	<0.00030	<0.00010	0.000192	<0.00050		0.0016	<0.00020		
SW-03		L2755316-7	2024-04-12	Water	M																		
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	1.83	<0.000010	170	0.127	15.9	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000273	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-03		L2755504-2	2024-04-26	Water	M																		
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	1.59	<0.000010	0.889	0.00543	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00049	<0.00010	0.000204	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-03		L2755521-3	2024-04-28	Water	M																		
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	1.97	<0.000010	44	0.033	3.82	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00021	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-03		L2755598-2	2024-05-03	Water	M																		
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	1.65	<0.000010	110	0.0736	10.1	<0.00020	<0.000010	<0.00010	<0.00010	0.00038	<0.00010	0.000194	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	1.46	<0.000010	0.797	0.00503	<0.50	<0.00020	<0.000010	<0.00010	0.00036	<0.00030	<0.00010	0.000158	<0.00050		<0.0010	<0.00020		
SW-03		L2755677-2	2024-05-09	Water	M																		
SW-03		L2755687-2	2024-05-09	Water	M																		
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M	1.25	<0.000010	0.789	0.00474	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000151	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-03		L2755770-2	2024-05-14	Water	M																		
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	1.16	<0.000010	3.82	0.00475	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000165	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-03		L2755819-2	2024-05-17	Water	M																		
SW-03		VA24B1636-002	2024-05-23	Water	M	1.42	<0.000010	0.878	0.00511	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000222	<0.00050		0.001	<0.00020	<0.000000020	<0.000000040
SW-03		L2755903-2	2024-05-23	Water	M																		
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	1.3	<0.000010	2.56	0.00484	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000151	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-03		L2755933-2	2024-05-24	Water	M																		
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	1.32	<0.000010	0.795	0.00495	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000163	<0.00050		0.0017	<0.00020	0.000000022	0.000000024
SW-03		L2755961-2	2024-05-26	Water	M																		
SW-03		VA24B4698-002	2024-06-21	Water	M	1.16	<0.000010	10.5	0.0106	0.91	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000128	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-03		L2756349-2	2024-06-21	Water	M																		
SW-03		VA24B5540-002	2024-06-27	Water	M	1.07	<0.000010	0.621	0.00403	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00034	<0.00010	0.000173	<0.00050		<0.0010	<0.00020	<0.000000050	0.000000039
SW-03		L2756458-2	2024-06-27	Water	M																		
SW-03		VA24B7689-002	2024-07-19	Water	M	1.75	<0.000010	193	0.121	18.1	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000104	<0.00050		<0.0010	<0.00020	0.000000033	
SW-03		L2756726-2	2024-07-19	Water	M																		
SW-03		L2756871-3	2024-07-31	Water	M																		
SW-03		VA24B8974-003	2024-07-31	Water	M	1.78	<0.000010	1.54	0.00681	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000122	<0.00050		<0.0010	<0.00020	0.000000026	<0.000000020
SW-03		VA24C1605-002	2024-08-23	Water	M	2.5	<0.00010	484	0.323	45.1	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.000232	<0.00050	<0.00050	<0.0010	<0.00050	<0.000000020	
SW-03		L2757153-2	2024-08-23	Water	M																		
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	2.07	<0.000010	319	0.215	27.2	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000225	<0.00050		0.0014	<0.00020	0.00000003	0.000000039
SW-03	SW-03	L2757229-1	2024-08-28	Water	M																		
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	2.7	<0.00010	515	0.378	46.9	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.000214	<0.00050	<0.00050	<0.0010	<0.00050	<0.000000020	
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	2.39	<0.000010	166	0.131	15.8	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000198	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000023
SW-03	SW-03	L2757587-3	2024-09-29	Water	M																		
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	2.05	<0.000010	9.41	0.0129	1.64	<0.00020	<0.000010	<0.00010	<0.00010	0.00045	<0.00010	0.000265	<0.00050		<0.0010	<0.00020	0.000000027	0.000000021
SW-03	SW-03	L2757661-3	2024-10-04	Water	M																		
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M	2.51	<0.000010	2.95	0.0105	0.77	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000142	<0.00050		<0.0010	<0.00020	<0.000000080	<0.000000020
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M																		
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	2.4	<0.000010	171	0.124	17.7	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000193	<0.00050		<0.0010	<0.00020	<0.000000080	<0.000000020
SW-03	SW-03	L2757873-3	2024-10-22	Water	M																		
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	2.6	<0.00010	19.1	0.018	<5.0	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.000159	<0.00050	<0.00050	<0.0010	<0.00050	<0.000000020	
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	2.4	<0.00010	1300	0.932	123	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.000467	<0.00050	<0.00050	<0.0010	<0.00050	<0.000000020	<0.000000020
SW-03	SW-03	L2757913-3	2024-10-25	Water	M																		
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	2.6	<0.00010	141	0.099	13.6	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.000216	<0.00050	<0.00050	<0.0010	<0.00050	<0.000000020	
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	1.9	<0.00010	301	0.248	31.6	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.000247	<0.00050	<0.00050	<0.0010	<0.00050	<0.000000020	
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M																		
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	2.18	<0.000010	35.2	0.0329	3.57	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00017	<0.00050		0.0011	<0.00020	<0.000000020	
SW-03	SW-03	L2758155-2	2024-11-16	Water	M																		
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M	2.46	<0.000020	545	0.423	53.2	<0.00040	<0.000020	<0.00020	<0.00020	<0.00060	<0.00020	0.000305	<0.00100		<0.0020	<0.00040	<0.000000020	0.000000029
SW-03		VA24D1587-002	2024-11-20	Water	M	2.4	<0.00010	575	0.45	56	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.000317	<0.00050	<0.00050	<0.0020	<0.00050	<0.000000020	
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M																		
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	1.94	<0.000010	22.1	0.0225	2.39	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000182	<0.00050		0.0012	<0.00030	<0.000000020	<0.000000020
SW-03	SW-03	L2758371-2	2024-12-08	Water	M																		
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	2	<0.00010	235	0.167	20.3	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.00016	<0.00050	<0.00050	0.0011	<0.00050	<0.000000020	
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M																		
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	2.5	<0.00010	653	0.577	70.9	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.00036	<0.00050	<0.00050	0.0012	<0.00050	<0.000000020	
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	2.5	<0.00010	2150	1.6	204	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.00089	<0.00050	<0.00050	<0.0010	<0.00050	<0.000000020	<0.000000020
SW-03	SW-03	L2758769-3	2025-01-24	Water	M																		
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	2.71	<0.000010	168	0.138	15.6	<0.00020	<0.000010	<0.00010	<0.00010	0.00038	<0.00010	0.000275	<0.00050		0.0026	<0.00030	0.000000029	<0.000000020
SW-03	SW-03	L2759009-2	2025-02-19	Water	M																		
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	2.6	<0.00010	412	0.279	39.5	<0.00050	<0.000050	<0.00050	<0.0010	<0.0050	<0.0010	0.000288	<0.00050	<0.00050	<0.0010	<0.00050	<0.000000020	
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M																		
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	2.76	<0.000010	296	0.245	26.6	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000426	<0.00050		0.00124	<0.00030	<0.000000020	<0.000000020
SW-03	SW-03	L2759254-2	2025-03-18	Water	M																		
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	1.24	<0.000010	2.39	0.00495	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00059	<0.00010	0.000178	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M	1.96	<0.000050	644	0.472	57.1	<0.00100	<0.000050	<0.00050	<0.00050	<0.00150	<0.00050	0.000362	<0.00250		<0.0050	<0.00100	<0.000000020	<0.000000020
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M																		
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M	1.29	<0.000010	3.67	0.00594	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00039	<0.00010	0.000159	<0.00050		<0.0010	<0.00030	<0.000000020	0.00000002
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M																		
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	1.91	<0.000010	47.6	0.0368	4.52	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00016	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M																		
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	1.64	<0.000010	133	0.106	12	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.0002	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M																		
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	1.72	<0.000010	1.47	0.00553	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00018	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	1.26	<0.000010	43.1	0.0342	3.49	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000174	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M																		
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	1.25	<0.000010	3.14	0.00521	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00032	<0.00010	0.000177	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	1.13	<0.000010	1.26	0.00381	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000151	<0.00050		0.0012	<0.00020	<0.000000020	
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	1.37	<0.000010	14.4	0.0127	1.35	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000152	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M																		
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	1.22	<0.000010	2.95	0.00529	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000156	<0.00050		<0.0010	<0.00020	<0.000000160	
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	1.53	<0.000010	2.06	0.0052	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000171	<0.00050		0.0012	<0.00020		
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M																		
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M																		
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M																	<0.000000050	
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M																		
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M																		
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M																	<0.000000024	
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M																	0.000000026	
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M																	<0.000000023	
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M																	<0.000000023	
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M																	0.000000031	
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M																	<0.000000050	
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M																	0.000000052	
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M																		
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M																	<0.000000023	
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M																	0.000000026	
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M																	<0.000000024	
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M	3.8	<0.000050	1.38	0.0229	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.00009	<0.0010		<0.0040	<0.00010		
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M																	<0.000000023	
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M	3	<0.000050	0.98	0.0173	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000105	<0.0010		<0.0040	0.0005	0.000000064	
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M	2.8	<0.000050	1.11	0.0199	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000091	<0.0050		0.0045	<0.00010	<0.000000050	
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M	2.9	<0.000050	1.04	0.0158	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.0001	<0.0050		<0.0040	<0.00010	0.000000037	
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M	3.9	<0.000050	1.37	0.0267	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.00008	<0.0050		<0.0040	<0.00010	<0.000000050	
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M	4.61	<0.000010	1.55	0.0448	<1.00	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000105	<0.00100		0.0024	0.00002	0.000000015	
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M	5.38	<0.000010	2.12	0.0821	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000205	<0.00100		0.001	0.000083	0.000000304	
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M	5.61	<0.000010	2.3	0.0885	<1.00	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000204	<0.00100		<0.0010	0.000025	0.000000404	
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M	6.08	<0.000010	2.6	0.0888	<1	<0.000050	<0.0000040	<0.000010	0.000055	<0.00020	<0.00020	0.000174	<0.00100		<0.0010	0.000021	<0.000000050	
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M	4.5	<0.000010	1.66	0.0307	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000084	<0.00100		0.0027	0.000055	<0.000000050	
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M	4.13	<0.000010	1.82	0.0352	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.0000702	<0.00100		0.003	0.000037	<0.000000023	
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M	3.51	<0.000010	1.32	0.0247	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.0000954	<0.00100		0.003	0.000051	<0.000000060	
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M	3.66	<0.000010	1.51	0.024	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000074	<0.00100		0.0023	0.000043	0.000000056	
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M	3.49	<0.000010	1.33	0.028	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.0000822	<0.00100		0.0027	0.000051	<0.000000050	
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M	3.44	<0.000010	1.29	0.0208	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.0000796	<0.00100		0.0019	0.000034	0.000000173	
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M	4.42	<0.000010	1.5	0.0278	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.0000742	<0.00100		0.0038	0.00003	<0.000000050	
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M	0.9	<0.000010	0.634	0.00298	<1	<0.000050	<0.0000040	0.000011	<0.000050	0.0004	<0.00020	0.000443	<0.00100		0.0021	0.000025	0.00000006	
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M	5.62	<0.000010	2.28	0.0836	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000108	<0.00100		<0.0010	<0.000020	<0.000000050	
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M	5.84	<0.000010	2.64	0.0864	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000164	<0.00100		0.0022	<0.000020	0.000000062	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M	6.26	<0.000010	2.8	0.105	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000168	<0.00100		<0.0010	0.000026	<0.000000050	
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	3.64	<0.000010	1.65	0.0228	1.29	<0.000050	<0.0000040	0.000011	<0.000050	0.00048	<0.00020	0.000157	<0.00100		0.0033	0.000091	0.00000008	
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M	3.98	<0.000010	1.55	0.0221	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.0002	<0.00020	0.0000859	<0.00100		0.0019	0.000055	0.000000135	
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	3.76	<0.000010	1.45	0.0224	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	0.000006	0.0000992	<0.00040		0.0022	0.000046	<0.000000050	
SW-04		VA24A1299-004	2024-01-23	Water	M	2.92	<0.000010	1.19	0.0172	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.0003	<0.00010	0.00013	<0.00050		0.0023	<0.00020	<0.000000020	
SW-04		L2754353-4	2024-01-23	Water	M																		
SW-04		L2754615-4	2024-02-15	Water	M																		
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	3.49	<0.000010	1.26	0.0206	0.69	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000103	<0.00050		0.0017	<0.00020	<0.000000020	
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	3.71	<0.000010	1.33	0.0179	0.65	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000101	<0.00050		0.0013	<0.00020	<0.000000020	
SW-04		L2755012-4	2024-03-19	Water	M																		
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	3.76	<0.000010	1.65	0.0264	0.91	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000099	<0.00050		0.0017	<0.00020	<0.000000020	
SW-04		L2755503-3	2024-04-25	Water	M																		
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M	3.59	<0.000010	1.4	0.022	0.6	<0.00020	<0.000010	<0.00010	<0.00010	0.00032	<0.00010	0.000098	<0.00050		0.0018	<0.00020	<0.000000020	0.00000002
SW-04		L2755523-2	2024-04-29	Water	M																		
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	4.01	<0.000010	1.52	0.0277	0.8	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000085	<0.00050		0.0014	<0.00020	<0.000000020	
SW-04		L2755588-3	2024-05-02	Water	M																		
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	4.02	<0.000010	1.57	0.0281	0.78	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000072	<0.00050		0.0017	<0.00020	0.000000021	
SW-04		L2755687-4	2024-05-09	Water	M																		
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M	4.14	<0.000010	1.57	0.031	<0.50	<0.00020	<0.000010	<0.00010	0.00012	<0.00030	<0.00010	0.000078	<0.00050		0.0021	<0.00020	0.000000022	<0.000000020
SW-04		L2755695-2	2024-05-10	Water	M																		
SW-04		L2755788-2	2024-05-15	Water	M																		
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M	4.08	<0.000010	1.58	0.0321	0.8	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00007	<0.00050		0.0017	<0.00020	0.000000022	<0.000000020
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	4.13	<0.000010	1.96	0.0312	0.88	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000069	<0.00050		0.0018	<0.00020	<0.000000020	
SW-04		L2755820-3	2024-05-16	Water	M																		
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	4.04	<0.000010	1.86	0.0289	0.66	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000085	<0.00050		0.0018	<0.00120	0.000000021	
SW-04		VA24B1636-005	2024-05-23	Water	M	3.97	<0.000010	1.54	0.0294	0.7	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000091	<0.00050		0.0016	<0.00020	<0.000000020	<0.000000060
SW-04		L2755903-5	2024-05-23	Water	M																		
SW-04		L2755916-3	2024-05-23	Water	M																		
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	4.05	<0.000010	2.06	0.0317	1.16	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000093	<0.00050		0.0017	<0.00020	0.000000068	0.000000042
SW-04		L2755961-4	2024-05-26	Water	M																		
SW-04		VA24B4655-003	2024-06-20	Water	M	4.17	<0.000010	3.02	0.0318	0.73	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000081	<0.00050		0.0012	<0.00020	<0.000000030	
SW-04		L2756326-3	2024-06-20	Water	M																		
SW-04		VA24B5289-002	2024-06-26	Water	M	4.31	<0.000010	2.39	0.0373	0.7	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000075	<0.00050		0.0014	<0.00020	<0.000000050	0.000000553
SW-04		L2756419-2	2024-06-26	Water	M																		
SW-04		VA24B7579-003	2024-07-18	Water	M	4.96	<0.000010	2.44	0.0679	1.04	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00011	<0.00050		0.0012	<0.00020	0.000000045	
SW-04		L2756717-3	2024-07-18	Water	M																		
SW-04		VA24B8974-004	2024-07-31	Water	M	5.19	<0.000010	2.51	0.0729	0.76	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000091	<0.00050		<0.0010	<0.00020	0.000000063	0.00000004
SW-04		L2756871-4	2024-07-31	Water	M																		
SW-04		VA24C1546-003	2024-08-22	Water	M	5.42	<0.000010	2.86	0.0711	0.83	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000092	<0.00050		<0.0010	<0.00020	0.000000053	
SW-04		L2757144-3	2024-08-22	Water	M																		
SW-04	SW-04	L2757209-4	2024-08-27	Water	M																		
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	5.16	<0.000010	5.21	0.0774	9.3	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00012	<0.00050		0.0023	<0.00020	0.000000046	0.000000041
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	5.88	<0.000010	4.23	0.067	1.92	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00017	0.000864	<0.00050		0.0016	<0.00020	0.000000031	
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	5.37	<0.000010	4.11	0.059	5.74	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00012	0.00135	<0.00050		0.0028	<0.00020	0.000000038	0.000000048
SW-04	SW-04	L2757584-2	2024-09-28	Water	M																		
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	5.2	<0.000010	7.48	0.0693	18.6	<0.00020	<0.000010	<0.00010	<0.00010	0.00076	<0.00010	0.000403	0.00054		0.004	<0.00020	0.000000117	0.000000041
SW-04	SW-04	L2757661-4	2024-10-04	Water	M																		
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	5.21	<0.000010	3.23	0.0528	2.08	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00013	0.00134	<0.00050		0.0042	<0.00020	0.000000034	0.000000041
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M																		
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	3.77	<0.000010	2.56	0.0668	3.17	<0.00020	<0.000010	<0.00010	<0.00010	0.00084	<0.00010	0.00024	<0.00050		0.0031	<0.00020		
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M	3.99	<0.000010	1.68	0.0271	1.28	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000186	<0.00050		0.0018	<0.00020	0.000000025	0.000000025
SW-04	SW-04	L2757873-4	2024-10-22	Water	M																		
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	4.16	<0.000010	2.06	0.0391	1.3	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000178	<0.00050		0.0025	<0.00020	0.000000031	
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	4.28	<0.000010	2.85	0.0322	1.7	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000164	<0.00050		0.002	<0.00020	<0.000000080	0.000000027
SW-04	SW-04	L2757942-1	2024-10-26	Water	M																		
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	4.13	<0.000010	2.27	0.0434	2.09	<0.00020	<0.000010	<0.00010	<0.00010	0.00033	<0.00010	0.000177	<0.00050		0.002	<0.00020	0.000000033	
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	4.48	<0.000010	2.2	0.043	1.18	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000466	<0.00050		0.0014	<0.00020	0.000000035	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M																		
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	4.1	<0.000010	2.58	0.096	2.09	<0.00020	<0.000010	<0.00010	<0.00010	0.00038	<0.00010	0.000237	<0.00050		0.0017	<0.00020	0.000000062	
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M	3.41	<0.000010	1.33	0.023	0.93	<0.00020	<0.000010	<0.00010	<0.00010	0.00031	<0.00010	0.00018	<0.00050		0.0019	<0.00030	<0.000000020	0.00000002
SW-04	SW-04	L2758155-4	2024-11-17	Water	M																		
SW-04		4-456131118-0	2024-11-17	Water	F																		
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	3.67	<0.000010	4.63	0.034	1.53	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	<0.000010	<0.00050		<0.0010	<0.00020	<0.000000080	
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M	4.42	<0.000010	1.98	0.0342	1.12	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00164	<0.00050		0.0036	<0.00030	0.000000021	0.000000024
SW-04	SW-04	L2758371-3	2024-12-08	Water	M																		
SW-04		4-456441522-0	2024-12-18	Water	F																		
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	3.65	<0.000010	1.65	0.0276	1.02	<0.00020	<0.000010	<0.00010	<0.00010	0.00119	<0.00010	0.000454	<0.00050		0.0026	<0.00020	0.000000033	
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M																		
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	3.91	<0.000010	1.76	0.0254	1.04	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000238	<0.00050		0.0025	<0.00020	0.000000024	
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M																		
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M	4.45	<0.000010	3.15	0.0321	1.21	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00031	0.0017	<0.00050		0.0026	<0.00030	0.000000021	<0.000000020
SW-04	SW-04	L2758765-1	2025-01-25	Water	M																		
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	3.68	<0.000010	1.67	0.0307	1.1	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000296	<0.00050		0.0024	<0.00020	0.000000041	
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M																		
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M	3.63	<0.000010	2.24	0.0301	1.42	<0.00020	<0.000010	<0.00010	<0.00010	0.0006	<0.00010	0.000636	0.00082		0.0029	<0.00030	0.000000068	0.000000025
SW-04	SW-04	L2759042-2	2025-02-21	Water	M																		
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	4.17	<0.000010	3.5	0.03	1.44	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.000171	0.000293	<0.00050		0.00218	<0.00030	<0.000000020	<0.000000080
SW-04	SW-04	L2759255-2	2025-03-19	Water	M																		
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M	2.94	<0.000010	1.63	0.0161	0.62	<0.00020	<0.000010	<0.00010	<0.00010	0.00059	<0.00010	0.00017	<0.00050		0.0025	<0.00020	0.000000035	
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	3.73	<0.000010	2.38	0.0276	1.05	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00022	0.000388	<0.00050		0.0013	<0.00030	<0.000000020	<0.000000020
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M																		
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	3.38	<0.000010	1.74	0.0185	0.61	<0.00020	<0.000010	<0.00010	<0.00010	0.00047	<0.00010	0.000204	<0.00050		0.0024	<0.00030	0.00000003	0.000000028
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M																		
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	4.12	<0.000010	2.69	0.0244	0.9	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000403	<0.00050		0.0014	<0.00030	<0.000000020	0.000000022
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M																		
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	5.59	<0.000010	3.48	0.0374	1.43	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00026	0.00204	0.00075		0.0012	<0.00030	<0.000000020	0.000000031
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M																		
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	6.57	<0.000010	3.59	0.0476	1.78	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00069	0.00485	0.0019		<0.0010	<0.00020	<0.000000080	
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	5.3	<0.000010	3.51	0.0368	1.12	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00027	0.00132	<0.00050		0.0012	<0.00030	<0.000000020	<0.000000020
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M																		
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	5.14	<0.000010	3.24	0.0342	1.2	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00018	0.000804	<0.00050		0.0018	<0.00020	<0.000000020	
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	7.02	<0.000010	3.43	0.0407	2.14	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00071	0.00286	0.00177		0.0014	<0.00020	0.000000029	
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M	5.86	<0.000010	4.05	0.0446	2.09	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00097	0.00203	0.00104		0.001	<0.00030	<0.000000100	<0.000000020
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	8.63	<0.000010	4.88	0.0536	2.73	<0.00020	<0.000010	<0.00010	<0.00010	0.00052	0.00071	0.0041	0.00243		0.0018	<0.00020	<0.000000080	
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	5.7	<0.000010	4.06	0.0388	1.79	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00064	0.000494	<0.00050		0.0015	<0.00020	0.000000021	
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	1.3	<0.000050	0.6	0.0059	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000095	<0.0050		<0.0040	<0.00010	<0.000000050	
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M	1.6	<0.000050	0.61	0.0069	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000143	<0.0050		<0.0040	0.00011	0.000000069	
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M	1.9	<0.000050	0.73	0.007	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000109	<0.0050		<0.0040	<0.00010	0.000000408	
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M	2.15	<0.000010	0.862	0.00675	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00024	<0.00020	0.000136	<0.00100		0.0013	0.000079	0.00000014	
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	1.97	<0.000010	1.03	0.00723	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000178	<0.00100		0.0036	0.000045	<0.000000023	
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M	1.72	<0.000010	0.717	0.00591	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00027	<0.00020	0.000109	<0.00100		0.0012	0.000068	<0.000000060	
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M	1.49	<0.000010	0.796	0.00502	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00023	<0.00020	0.000085	<0.00100		0.0017	0.000076	<0.000000050	
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	1.53	<0.000010	0.666	0.00485	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00026	<0.00020	0.0000678	<0.00100		<0.0010	0.000076	<0.000000050	
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	1.56	<0.000010	0.696	0.00513	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00027	<0.00020	0.0000739	<0.00100		<0.0010	0.000069	0.000000156	
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	2.15	<0.000010	0.878	0.0083	<1	<0.000050	0.0000042	0.00002	<0.000050	0.0008	<0.00020	0.00025	<0.00100		0.0015	0.000151	0.000000168	
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M																		
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M																		
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M	1.86	<0.000010	0.713	0.00572	<1	<0.000050	<0.0000040	<0.000010	<0.000050	0.00023	<0.00020	0.000047	<0.00100		<0.0010	0.000085	0.000000073	
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M	1.78	<0.000010	0.694	0.00557	<1	<0.000050	<0.0000040	0.000014	<0.000050	0.00023	<0.000006	0.0000656	<0.00040		0.0012	0.000079	<0.000000050	
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M	1.4	<0.000050	0.52	0.0087	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000021	<0.0050		<0.0040	0.00017	<0.000000050	
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M	1.6	<0.000050	0.58	0.0073	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.000033	<0.0050		<0.0040	0.00017	0.000000056	
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M	1.9	<0.000050	0.68	0.0125	<3.0	<0.00050	<0.000020	<0.00010	<0.00020	<0.0050	<0.0010	0.00003	<0.0050		<0.0040	0.00015	0.00000009	
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M	2.06	<0.000010	0.736	0.0194	<1.00	<0.000050	<0.0000040	<0.000010	<0.000050	0.00031	<0.00020	0.0000329	<0.00100		<0.0010	0.000078	0.000000191	
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M	1.99	<0.000010	0.735	0.0104	<1	<0.000050	<0.0000040	0.000015	<0.000050	0.00055	<0.00020	0.0000256	<0.00100		<0.0010	0.000162	<0.000000050	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M	1.81	<0.000010	0.849	0.0118	<1	<0.000050	<0.0000040	0.000011	<0.000050	0.00042	<0.00020	0.000024	<0.00100		<0.0010	0.000124	<0.000000023	
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M	1.67	<0.000010	0.614	0.00903	<1	<0.000050	<0.0000040	0.000013	<0.000050	0.0005	<0.00020	0.0000259	<0.00100		<0.0010	0.000186	<0.000000060	
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M	1.61	<0.000010	0.716	0.00897	<1	<0.000050	<0.0000040	0.000016	<0.000050	0.00038	<0.00020	0.000025	<0.00100		0.0012	0.000173	<0.000000050	
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M	1.62	<0.000010	0.599	0.00787	<1	<0.000050	<0.0000040	0.000016	<0.000050	0.00054	<0.00020	0.0000236	<0.00100		<0.0010	0.000167	<0.000000050	
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M	1.64	<0.000010	0.648	0.00844	<1	<0.000050	<0.0000040	0.000011	<0.000050	0.00049	<0.00020	0.0000239	<0.00100		<0.0010	0.000168	<0.000000050	
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M	2.01	<0.000010	0.776	0.0144	<1	<0.000050	<0.0000040	0.000012	<0.000050	0.00034	<0.00020	0.0000289	<0.00100		<0.0010	0.000113	0.000000073	
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M	1.93	<0.000010	0.749	0.0102	<1	<0.000050	0.0000044	0.000022	<0.000050	0.00087	<0.00020	0.0000275	<0.00100		<0.0010	0.000184	0.000000052	
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M	1.94	<0.000010	0.675	0.00973	<1	<0.000050	<0.0000040	0.000017	<0.000050	0.00042	<0.00020	0.000028	<0.00100		<0.0010	0.000214	0.000000077	
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	1.89	<0.000010	0.735	0.00918	<1	<0.000050	<0.0000040	0.000016	<0.000050	0.00062	<0.000006	0.0000288	<0.00040		0.0013	0.000184	<0.000000050	
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	1.68	<0.000010	0.62	0.00773	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.0008	<0.00010	0.000023	<0.00050		<0.0010	<0.00030	0.000000032	0.000000032
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	1.57	<0.000010	0.572	0.00825	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00095	<0.00010	0.000026	<0.00050		<0.0010	<0.00030		
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	3.08	<0.000010	3.4	0.0154	1.56	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.0000638	<0.00100		<0.0010	<0.000020	<0.000000050	
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M	2.52	<0.000010	1.89	0.00955	<1	<0.000050	0.0000042	<0.000010	<0.000050	<0.00020	<0.00020	0.000111	<0.00100		<0.0010	<0.000020	<0.000000050	
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M	1.65	<0.000010	0.601	0.00471	<1	<0.000050	<0.0000040	0.000011	<0.000050	0.00051	<0.00020	0.000169	<0.00100		0.0013	0.000029	0.000000149	
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M	2.65	<0.000010	1.03	0.00769	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	<0.00020	0.000119	<0.00100		<0.0010	<0.000020	0.000000074	
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M	2.5	<0.000010	1.07	0.00728	<1	<0.000050	<0.0000040	<0.000010	<0.000050	<0.00020	0.00001	0.000137	<0.00040		0.0012	<0.000020	<0.000000050	
SW-07		VA24A1299-005	2024-01-23	Water	M	1.8	<0.000010	0.702	0.00483	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00044	<0.00010	0.000193	<0.00050		0.0015	<0.00020	<0.000000020	
SW-07		L2754353-5	2024-01-23	Water	M																		
SW-07		L2754615-5	2024-02-15	Water	M																		
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	2.56	<0.000010	1.26	0.00765	1.17	<0.00020	<0.000010	<0.00010	<0.00010	<0.00060	<0.00010	0.000119	<0.00050		0.012	<0.00020	<0.000000020	
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	1.82	<0.000010	0.691	0.00498	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000181	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07		L2755012-5	2024-03-19	Water	M																		
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	1.98	<0.000010	0.812	0.0051	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000188	<0.00050		0.0039	<0.00020	<0.000000020	
SW-07		L2755504-3	2024-04-26	Water	M																		
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M	1.52	<0.000010	0.577	0.00386	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00048	<0.00010	0.000191	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-07		L2755521-1	2024-04-28	Water	M																		
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	1.92	<0.000010	1.06	0.00602	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000186	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07		L2755598-3	2024-05-03	Water	M																		
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	1.55	<0.000010	0.682	0.0042	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00016	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M	1.45	<0.000010	0.638	0.00401	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00015	<0.00050		<0.0010	<0.00020		
SW-07		L2755677-3	2024-05-09	Water	M																		
SW-07		L2755687-3	2024-05-09	Water	M																		
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	1.26	<0.000010	0.525	0.00359	<0.50	<0.00020	<0.000010	<0.00010	0.00018	<0.00030	<0.00010	0.000138	<0.00050		<0.0010	<0.00020	<0.000000020	0.00000002
SW-07		L2755770-3	2024-05-14	Water	M																		
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	1.16	<0.000010	0.586	0.00344	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00071	<0.00010	0.000163	<0.00050		0.0013	<0.00020	<0.000000020	
SW-07		L2755819-3	2024-05-17	Water	M																		
SW-07		VA24B1636-003	2024-05-23	Water	M	1.31	<0.000010	0.537	0.00393	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000151	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000040
SW-07		L2755903-3	2024-05-23	Water	M																		
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	1.28	<0.000010	0.573	0.00382	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000145	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07		L2755933-3	2024-05-24	Water	M																		
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M	1.39	<0.000010	0.604	0.00389	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000164	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000022
SW-07		L2755961-3	2024-05-26	Water	M																		
SW-07		VA24B4698-003	2024-06-21	Water	M	1.21	<0.000010	0.577	0.00362	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00012	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07		L2756349-3	2024-06-21	Water	M																		
SW-07		VA24B5289-003	2024-06-26	Water	M	1.22	<0.000010	0.606	0.00385	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000126	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000036
SW-07		L2756419-3	2024-06-26	Water	M																		
SW-07		VA24B7689-003	2024-07-19	Water	M	1.59	<0.000010	1.04	0.00621	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000098	<0.00050		<0.0010	<0.00020	0.000000025	
SW-07		L2756726-3	2024-07-19	Water	M																		
SW-07		L2756871-5	2024-07-31	Water	M																		
SW-07		VA24B8974-005	2024-07-31	Water	M	1.79	<0.000010	1.15	0.00616	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000102	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-07		VA24C1605-003	2024-08-23	Water	M	2.7	<0.000010	2.23	0.0109	0.96	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000086	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07		L2757153-3	2024-08-23	Water	M																		
SW-07	SW-07	L2757209-5	2024-08-27	Water	M																		
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	1.76	<0.000010	0.987	0.00512	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000174	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	3.07	<0.000010	2.71	0.0134	1.34	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000077	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M	2.28	<0.000010	1.24	0.00715	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000127	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-07	SW-07	L2757587-4	2024-09-29	Water	M																		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M	2.56	<0.000010	1.68	0.00959	0.82	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00011	<0.00050		<0.0010	<0.00020	<0.000000020	0.000000026
SW-07	SW-07	L2757664-1	2024-10-03	Water	M																		
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	2.51	<0.000010	1.72	0.00957	0.8	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000111	<0.00050		<0.0010	<0.00020	<0.000000020	<0.000000020
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M																		
SW-07		492-455781017-0	2024-10-13	Water	F																		
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M	2.37	<0.000010	0.843	0.00582	0.69	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00014	<0.00050		0.0017	<0.00020	<0.000000020	<0.000000080
SW-07	SW-07	L2757873-5	2024-10-22	Water	M																		
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	2.78	<0.000010	1.16	0.00687	0.99	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000116	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	2.68	<0.000010	1.22	0.00757	0.75	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000122	<0.00050		<0.0010	<0.00020	<0.000000080	<0.000000020
SW-07	SW-07	L2757913-4	2024-10-25	Water	M																		
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	2.63	<0.000010	0.982	0.00686	0.59	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000163	<0.00050		0.0013	<0.00020	<0.000000020	
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	2.36	<0.000010	0.894	0.00506	0.56	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000122	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M																		
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	2.29	<0.000010	0.773	0.00554	0.68	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000117	<0.00050		0.001	<0.00020	<0.000000020	
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	2.53	<0.000010	0.886	0.00549	0.61	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000071	<0.00050		0.0012	<0.00030	<0.000000020	<0.000000020
SW-07	SW-07	L2758155-1	2024-11-16	Water	M																		
SW-07		VA24D1587-003	2024-11-20	Water	M	2.66	<0.000010	0.944	0.00512	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00034	<0.00010	0.000021	<0.00050		0.0013	<0.00020	0.000000025	
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M																		
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	1.91	<0.000010	0.727	0.00498	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00039	<0.00010	0.00017	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-07	SW-07	L2758371-4	2024-12-08	Water	M																		
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	2.44	<0.000010	0.869	0.0043	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000027	<0.00050		0.0017	<0.00020	<0.000000020	
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M																		
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	2.98	<0.000010	1.55	0.00931	1.19	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000103	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M																		
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M	2.83	<0.000010	1.72	0.0105	1.48	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000092	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-07	SW-07	L2758765-2	2025-01-25	Water	M																		
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M	2.78	<0.000010	4.77	0.0117	1.29	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	0.00017	0.000104	<0.00050		0.0013	<0.00030	<0.000000020	0.000000025
SW-07	SW-07	L2759009-3	2025-02-19	Water	M																		
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	2.74	<0.000010	1.07	0.00498	0.57	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000017	<0.00050		0.0017	<0.00020	<0.000000020	
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M																		
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	2.51	<0.000010	1.37	0.00828	0.793	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000121	<0.00050		0.00119	<0.00030	<0.000000020	<0.000000020
SW-07	SW-07	L2759254-3	2025-03-18	Water	M																		
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	1.16	<0.000010	0.513	0.00331	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00052	<0.00010	0.000152	<0.00050		0.001	<0.00020	<0.000000020	
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	1.98	<0.000010	0.835	0.00584	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00016	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M																		
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	1.21	<0.000010	0.558	0.00375	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00043	<0.00010	0.000151	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M																		
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M																		
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	1.82	<0.000010	0.823	0.00538	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000144	<0.00050		0.0012	<0.00030	<0.000000020	0.000000032
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	1.63	<0.000010	0.694	0.0044	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000145	<0.00050		<0.0010	<0.00030	<0.000000020	<0.000000020
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M																		
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	1.79	<0.000010	0.778	0.00509	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000157	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	1.32	<0.000010	0.595	0.0037	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000151	<0.00050		<0.0010	<0.00030	0.000000026	<0.000000020
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M																		
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	1.25	<0.000010	0.626	0.00378	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00033	<0.00010	0.000174	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	1.12	<0.000010	0.523	0.00347	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000149	<0.00050		<0.0010	<0.00020		
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	1.41	<0.000010	2.41	0.00531	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000152	<0.00050		0.001	<0.00030	<0.000000020	<0.000000020
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M																		
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	1.17	<0.000010	0.58	0.00372	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000156	<0.00050		<0.0010	<0.00020	<0.000000080	
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	1.63	<0.000010	0.765	0.00453	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000156	<0.00050		<0.0010	<0.00020	<0.000000080	
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	1.13	<0.000010	0.538	0.00282	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00062	<0.00010	0.00066	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-08		L2755503-2	2024-04-25	Water	M																		
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	1.21	<0.000010	0.563	0.00297	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00061	<0.00010	0.000608	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-08		L2755588-2	2024-05-02	Water	M																		
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	1.04	<0.000010	0.49	0.00261	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00069	<0.00010	0.000604	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-08		L2755694-2	2024-05-10	Water	M																		
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	0.88	<0.000010	1.37	0.0029	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00069	<0.00010	0.000551	<0.00050		0.0012	<0.00020	<0.000000020	

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Te	D-Tl	D-Th	D-Sn	D-Ti	D-W	D-U	D-V	D-Y	D-Zn	D-Zr	Total Methylmercury (T-MeHg)	Dissolved Methylmercury (D-MeHg)
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M																		
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	1	<0.000010	0.63	0.00257	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00063	<0.00010	0.000555	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-08		L2755916-2	2024-05-23	Water	M																		
SW-08		VA24B4655-002	2024-06-20	Water	M	0.977	<0.000010	0.53	0.00275	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00046	<0.00010	0.000556	<0.00050		<0.0010	<0.00020	<0.000000030	
SW-08		L2756326-2	2024-06-20	Water	M																		
SW-08		VA24B7579-002	2024-07-18	Water	M	1.03	<0.000010	0.633	0.00299	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00049	<0.00010	0.000522	<0.00050		<0.0010	<0.00020	0.000000037	
SW-08		L2756717-2	2024-07-18	Water	M																		
SW-08		VA24C1546-002	2024-08-22	Water	M	1.04	<0.000010	0.606	0.00287	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00042	<0.00010	0.000494	<0.00050		<0.0010	<0.00020	0.000000049	
SW-08		L2757144-2	2024-08-22	Water	M																		
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	1.07	<0.000010	0.683	0.00327	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00041	<0.00010	0.000521	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	1.49	<0.000010	0.719	0.00382	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00064	<0.00010	0.000657	<0.00050		<0.0010	<0.00020	<0.000000080	
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	1.68	<0.000010	0.624	0.00396	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00081	<0.00010	0.000658	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	1.7	<0.000010	0.725	0.0039	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00063	<0.00010	0.000594	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	1.31	<0.000010	0.452	0.00332	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00075	<0.00010	0.000447	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	1.49	<0.000010	0.866	0.00401	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00067	<0.00010	0.000543	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	3.71	<0.000010	1.34	0.012	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000111	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09		L2755503-4	2024-04-25	Water	M																		
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	4.01	<0.000010	1.34	0.0118	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000096	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09		L2755588-4	2024-05-02	Water	M																		
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	4.03	<0.000010	1.37	0.0122	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00119	<0.00010	0.000122	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09		L2755687-5	2024-05-09	Water	M																		
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	4.08	<0.000010	1.58	0.0135	0.52	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000081	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09		L2755820-4	2024-05-16	Water	M																		
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	4.09	<0.000010	1.56	0.0133	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000097	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09		L2755916-4	2024-05-23	Water	M																		
SW-09		VA24B4655-004	2024-06-20	Water	M	4.02	<0.000010	1.39	0.0133	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00009	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09		L2756326-4	2024-06-20	Water	M																		
SW-09		VA24B7579-004	2024-07-18	Water	M	4.82	<0.000010	1.74	0.0178	0.65	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000086	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09		L2756717-4	2024-07-18	Water	M																		
SW-09		VA24C1546-004	2024-08-22	Water	M	4.99	<0.000010	1.83	0.0188	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000086	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09		L2757144-4	2024-08-22	Water	M																		
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	5.4	<0.000010	1.91	0.0206	0.97	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000077	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	3.22	<0.000010	1.24	0.012	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00050	<0.00010	0.00017	<0.00050		0.001	<0.00020		
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	3.65	<0.000010	1.29	0.0116	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000156	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	3.65	<0.000010	1.22	0.011	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000158	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	3.78	<0.000010	1.28	0.0116	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000128	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M																		
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	3.09	<0.000010	1.06	0.00893	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000184	<0.00050		<0.0010	<0.00020	0.000000025	
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	3.2	<0.000010	1.08	0.00881	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000165	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M																		
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	3.32	<0.000010	1.09	0.00904	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00016	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	3.71	<0.000010	1.16	0.00936	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000102	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M																		
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	3.17	<0.000010	1.28	0.00858	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000129	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M																		
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	2.83	<0.000010	1.05	0.00776	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	0.00034	<0.00010	0.000186	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	3.82	<0.000010	1.14	0.0101	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000097	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	3.81	<0.000010	1.35	0.0106	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000099	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	4	<0.000010	1.44	0.012	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000096	<0.00050		<0.0010	<0.00020	<0.000000020	
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	4.41	<0.000010	1.76	0.0134	0.51	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.00009	<0.00050		<0.0010	<0.00020	<0.000000080	
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M	4.16	<0.000010	1.5	0.0129	<0.50	<0.00020	<0.000010	<0.00010	<0.00010	<0.00030	<0.00010	0.000104	<0.00050		<0.0010	<0.00020	<0.000000020	

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M															
OUT-01		VA24B1636-006	2024-05-23	Water	M															
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M															
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M															
OUT-01		661-455931031-0	2024-10-28	Water	F															
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M															
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M															
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M															
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M															
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M															
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M															
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M															
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M															
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M															
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M															
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M															
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M															
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M															
OUT-02		VA24B5289-006	2024-06-26	Water	M															
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M															
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M															
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M															
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M															
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M															
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M															
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M															
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M															
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M															
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M															
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M															
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M															
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M															
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M															
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M															
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M															
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M															
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M															
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M															
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M				<0.25	<0.25										
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M															
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M															
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M															
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M															
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M															
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M															
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M															
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M															
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M															
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M															
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M															
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M															
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M															
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M															
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M															
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M															
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M															
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M						<0.1	<0.1	<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-01		VA24A1299-001	2024-01-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2754353-1	2024-01-23	Water	M															
SW-01		L2754615-1	2024-02-15	Water	M															
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2755012-1	2024-03-19	Water	M															
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2755503-1	2024-04-25	Water	M															
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2755523-1	2024-04-29	Water	M															
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M				<0.25	<0.25	0.1	0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2755588-1	2024-05-02	Water	M															
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2755694-1	2024-05-10	Water	M															
SW-01		L2755695-1	2024-05-10	Water	M															
SW-01		L2755788-1	2024-05-15	Water	M															
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2755820-1	2024-05-16	Water	M															
SW-01		VA24B1628-001	2024-05-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2755902-1	2024-05-22	Water	M															
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2755916-1	2024-05-23	Water	M															
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		VA24B4655-001	2024-06-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2756326-1	2024-06-20	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2756419-1	2024-06-26	Water	M															
SW-01		VA24B7579-001	2024-07-18	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2756717-1	2024-07-18	Water	M															
SW-01		VA24B8974-001	2024-07-31	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2756871-1	2024-07-31	Water	M															
SW-01		VA24C1546-001	2024-08-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01		L2757144-1	2024-08-22	Water	M															
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	L2757209-1	2024-08-27	Water	M															
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	L2757584-1	2024-09-28	Water	M															
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	L2757664-2	2024-10-03	Water	M															
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M															
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	L2757873-1	2024-10-22	Water	M															
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	L2757942-2	2024-10-26	Water	M															
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	L2758119-1	2024-11-12	Water	M															
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	L2758350-1	2024-12-06	Water	M															
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M															
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M															
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M															
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	L2758769-1	2025-01-24	Water	M															
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M															
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	L2759042-1	2025-02-21	Water	M															
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	L2759255-1	2025-03-19	Water	M															
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M															
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M															
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M															
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M															
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M															
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M															
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW-02	23F0370-03	2023-06-02	Water	M															
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M															
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M															
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M						<0.1	<0.1	<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-02		VA24A1299-002	2024-01-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2754353-2	2024-01-23	Water	M															
SW-02		L2754615-2	2024-02-15	Water	M															
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2755012-2	2024-03-19	Water	M															
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2755316-6	2024-04-12	Water	M															
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2755504-1	2024-04-26	Water	M															
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2755521-2	2024-04-28	Water	M															
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2755598-1	2024-05-03	Water	M															
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2755677-1	2024-05-09	Water	M															
SW-02		L2755687-1	2024-05-09	Water	M															
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2755770-1	2024-05-14	Water	M															
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2755819-1	2024-05-17	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2755903-1	2024-05-23	Water	M															
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2755933-1	2024-05-24	Water	M															
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2755961-1	2024-05-26	Water	M															
SW-02		VA24B4698-001	2024-06-21	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2756349-1	2024-06-21	Water	M															
SW-02		VA24B5540-001	2024-06-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2756458-1	2024-06-27	Water	M															
SW-02		VA24B7689-001	2024-07-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2756726-1	2024-07-19	Water	M															
SW-02		VA24B8974-002	2024-07-31	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2756871-2	2024-07-31	Water	M															
SW-02		VA24C1605-001	2024-08-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02		L2757153-1	2024-08-23	Water	M															
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	L2757209-2	2024-08-27	Water	M															
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	L2757587-1	2024-09-29	Water	M															
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	L2757661-1	2024-10-04	Water	M															
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M															
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	L2757873-2	2024-10-22	Water	M															
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	L2757913-1	2024-10-25	Water	M															
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M															
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	L2758155-3	2024-11-16	Water	M															
SW-02		VA24D1587-001	2024-11-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M															
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	L2758371-1	2024-12-08	Water	M															
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M															
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M															
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	L2758769-2	2025-01-24	Water	M															
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	L2759009-1	2025-02-19	Water	M															
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M															
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	L2759254-1	2025-03-18	Water	M															
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M															
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M															
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M															
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M															
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M															
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M															
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M															
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M															
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M															
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M															
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M															
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M															
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M															
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M															
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M															
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M															
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M															
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M						<0.1	<0.1	<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-03		VA24A1299-003	2024-01-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2754353-3	2024-01-23	Water	M															
SW-03		L2754615-3	2024-02-15	Water	M															
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2755012-3	2024-03-19	Water	M															
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2755316-7	2024-04-12	Water	M															
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2755504-2	2024-04-26	Water	M															
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2755521-3	2024-04-28	Water	M															
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2755598-2	2024-05-03	Water	M															
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2755677-2	2024-05-09	Water	M															
SW-03		L2755687-2	2024-05-09	Water	M															
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2755770-2	2024-05-14	Water	M															
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2755819-2	2024-05-17	Water	M															
SW-03		VA24B1636-002	2024-05-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2755903-2	2024-05-23	Water	M															
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2755933-2	2024-05-24	Water	M															
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2755961-2	2024-05-26	Water	M															
SW-03		VA24B4698-002	2024-06-21	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2756349-2	2024-06-21	Water	M															
SW-03		VA24B5540-002	2024-06-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2756458-2	2024-06-27	Water	M															
SW-03		VA24B7689-002	2024-07-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2756726-2	2024-07-19	Water	M															
SW-03		L2756871-3	2024-07-31	Water	M															
SW-03		VA24B8974-003	2024-07-31	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		VA24C1605-002	2024-08-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		L2757153-2	2024-08-23	Water	M															
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	L2757229-1	2024-08-28	Water	M															
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	L2757587-3	2024-09-29	Water	M															
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	L2757661-3	2024-10-04	Water	M															
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M															
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	L2757873-3	2024-10-22	Water	M															
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	L2757913-3	2024-10-25	Water	M															
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M															
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	L2758155-2	2024-11-16	Water	M															
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03		VA24D1587-002	2024-11-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M															
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	L2758371-2	2024-12-08	Water	M															
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M															
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	L2758769-3	2025-01-24	Water	M															
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	L2759009-2	2025-02-19	Water	M															
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M															
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	L2759254-2	2025-03-18	Water	M															
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M															
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M															
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M															
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M															
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M															
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M															
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M															
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M						<0.1	<0.1	<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-04		VA24A1299-004	2024-01-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2754353-4	2024-01-23	Water	M															
SW-04		L2754615-4	2024-02-15	Water	M															
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2755012-4	2024-03-19	Water	M															
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2755503-3	2024-04-25	Water	M															
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2755523-2	2024-04-29	Water	M															
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2755588-3	2024-05-02	Water	M															
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2755687-4	2024-05-09	Water	M															
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2755695-2	2024-05-10	Water	M															
SW-04		L2755788-2	2024-05-15	Water	M															
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2755820-3	2024-05-16	Water	M															
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		VA24B1636-005	2024-05-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2755903-5	2024-05-23	Water	M															
SW-04		L2755916-3	2024-05-23	Water	M															
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2755961-4	2024-05-26	Water	M															
SW-04		VA24B4655-003	2024-06-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2756326-3	2024-06-20	Water	M															
SW-04		VA24B5289-002	2024-06-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2756419-2	2024-06-26	Water	M															
SW-04		VA24B7579-003	2024-07-18	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	0.00067	0.00067
SW-04		L2756717-3	2024-07-18	Water	M															
SW-04		VA24B8974-004	2024-07-31	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2756871-4	2024-07-31	Water	M															
SW-04		VA24C1546-003	2024-08-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04		L2757144-3	2024-08-22	Water	M															
SW-04	SW-04	L2757209-4	2024-08-27	Water	M															
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	L2757584-2	2024-09-28	Water	M															
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	L2757661-4	2024-10-04	Water	M															
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M															
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	L2757873-4	2024-10-22	Water	M															
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	L2757942-1	2024-10-26	Water	M															
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M															
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	L2758155-4	2024-11-17	Water	M															
SW-04		4-456131118-0	2024-11-17	Water	F															
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	L2758371-3	2024-12-08	Water	M															
SW-04		4-456441522-0	2024-12-18	Water	F															
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M															
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M															
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	L2758765-1	2025-01-25	Water	M															
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M															
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	L2759042-2	2025-02-21	Water	M															
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	L2759255-2	2025-03-19	Water	M															
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M															
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M															
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M															
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M															
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M															
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	0.00058	<0.00040	<0.00040	<0.00030	<0.00050
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M															
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M															
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M						<0.1	<0.1	<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M						<0.1	<0.1	<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M				<0.25	<0.25										
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M				<0.25	<0.25										
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M								<0.0005	<0.0010	<0.0010	<0.0010	<0.0005			<0.0020
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M						<0.1	<0.1	<0.0005	<0.0010	<0.0010	<0.0010	<0.0010			<0.0020
SW-07		VA24A1299-005	2024-01-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2754353-5	2024-01-23	Water	M															
SW-07		L2754615-5	2024-02-15	Water	M															
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2755012-5	2024-03-19	Water	M															
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2755504-3	2024-04-26	Water	M															
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2755521-1	2024-04-28	Water	M															
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2755598-3	2024-05-03	Water	M															
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2755677-3	2024-05-09	Water	M															
SW-07		L2755687-3	2024-05-09	Water	M															
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2755770-3	2024-05-14	Water	M															
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2755819-3	2024-05-17	Water	M															
SW-07		VA24B1636-003	2024-05-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2755903-3	2024-05-23	Water	M															
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2755933-3	2024-05-24	Water	M															
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2755961-3	2024-05-26	Water	M															
SW-07		VA24B4698-003	2024-06-21	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2756349-3	2024-06-21	Water	M															
SW-07		VA24B5289-003	2024-06-26	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2756419-3	2024-06-26	Water	M															
SW-07		VA24B7689-003	2024-07-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2756726-3	2024-07-19	Water	M															
SW-07		L2756871-5	2024-07-31	Water	M															
SW-07		VA24B8974-005	2024-07-31	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		VA24C1605-003	2024-08-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07		L2757153-3	2024-08-23	Water	M															
SW-07	SW-07	L2757209-5	2024-08-27	Water	M															
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	L2757587-4	2024-09-29	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	L2757664-1	2024-10-03	Water	M															
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M															
SW-07		492-455781017-0	2024-10-13	Water	F															
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	L2757873-5	2024-10-22	Water	M															
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	L2757913-4	2024-10-25	Water	M															
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M															
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	L2758155-1	2024-11-16	Water	M															
SW-07		VA24D1587-003	2024-11-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M															
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	L2758371-4	2024-12-08	Water	M															
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M															
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M															
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	L2758765-2	2025-01-25	Water	M															
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	L2759009-3	2025-02-19	Water	M															
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M															
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	L2759254-3	2025-03-18	Water	M															
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M															
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M															
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M															
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M															
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M															
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M															
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08		L2755503-2	2024-04-25	Water	M															
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08		L2755588-2	2024-05-02	Water	M															
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08		L2755694-2	2024-05-10	Water	M															
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Monobutyltin	Dibutyltin	Tributyltin	HEPH	LEPH	Volatile Hydrocarbons (VH6-10)	VPH(C6-C10)	Benzene	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	meta-para-Xylene	ortho-Xylene	Total Xylenes
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M															
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08		L2755916-2	2024-05-23	Water	M															
SW-08		VA24B4655-002	2024-06-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08		L2756326-2	2024-06-20	Water	M															
SW-08		VA24B7579-002	2024-07-18	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08		L2756717-2	2024-07-18	Water	M															
SW-08		VA24C1546-002	2024-08-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08		L2757144-2	2024-08-22	Water	M															
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09		L2755503-4	2024-04-25	Water	M															
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09		L2755588-4	2024-05-02	Water	M															
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09		L2755687-5	2024-05-09	Water	M															
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09		L2755820-4	2024-05-16	Water	M															
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09		L2755916-4	2024-05-23	Water	M															
SW-09		VA24B4655-004	2024-06-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09		L2756326-4	2024-06-20	Water	M															
SW-09		VA24B7579-004	2024-07-18	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09		L2756717-4	2024-07-18	Water	M															
SW-09		VA24C1546-004	2024-08-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09		L2757144-4	2024-08-22	Water	M															
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M															
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M															
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M															
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M															
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M				<0.25	<0.25	<0.1	<0.1	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00040	<0.00030	<0.00050

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M													
OUT-01		VA24B1636-006	2024-05-23	Water	M													
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M													
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M													
OUT-01		661-455931031-0	2024-10-28	Water	F													
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M													
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M													
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M													
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M													
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M													
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M													
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M													
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M													
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M													
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M													
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M													
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M													
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M													
OUT-02		VA24B5289-006	2024-06-26	Water	M													
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M													
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M													
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M													
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M													
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M													
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M													
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M													
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M													
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M													
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M													
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M													
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M													
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M													
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M													
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M													
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M													
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M													
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M													
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M													
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M													
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M													
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M													
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M													
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M													
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M													
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M													
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M													
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M													
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M													
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M													
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M													
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M													
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M													
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M													
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M													
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M													
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M	<0.00100												
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M	<0.00100												
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M	<0.00100												
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M	<0.00100												
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M	<0.00100												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M	<0.00100												
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M	<0.00100												
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M	<0.00100												
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M	<0.00100												
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M	<0.00100												
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M	<0.00100												
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M	<0.00100												
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M	<0.00100												
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M	<0.00100												
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M	<0.00100												
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M	<0.00100												
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	<0.00100												
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M													
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M	<0.00100												
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	<0.00100												
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	<0.00100												
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M	<0.00100												
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	<0.00100												
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M	<0.00100												
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	<0.00100												
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	<0.00100												
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M	<0.00100												
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	<0.00100												
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	<0.00100												
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	<0.00100												
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M	<0.00100												
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	<0.00100												
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M	<0.00100												
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M	<0.00100												
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	<0.00100												
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	<0.00100												
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	<0.00100												
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M	<0.00100												
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	<0.00100												
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M		<0.0010	<0.0010	<0.0005	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010
SW-01		VA24A1299-001	2024-01-23	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2754353-1	2024-01-23	Water	M													
SW-01		L2754615-1	2024-02-15	Water	M													
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2755012-1	2024-03-19	Water	M													
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2755503-1	2024-04-25	Water	M													
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2755523-1	2024-04-29	Water	M													
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2755588-1	2024-05-02	Water	M													
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2755694-1	2024-05-10	Water	M													
SW-01		L2755695-1	2024-05-10	Water	M													
SW-01		L2755788-1	2024-05-15	Water	M													
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2755820-1	2024-05-16	Water	M													
SW-01		VA24B1628-001	2024-05-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2755902-1	2024-05-22	Water	M													
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2755916-1	2024-05-23	Water	M													
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		VA24B4655-001	2024-06-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2756326-1	2024-06-20	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2756419-1	2024-06-26	Water	M													
SW-01		VA24B7579-001	2024-07-18	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2756717-1	2024-07-18	Water	M													
SW-01		VA24B8974-001	2024-07-31	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2756871-1	2024-07-31	Water	M													
SW-01		VA24C1546-001	2024-08-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01		L2757144-1	2024-08-22	Water	M													
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	L2757209-1	2024-08-27	Water	M													
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	L2757584-1	2024-09-28	Water	M													
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	L2757664-2	2024-10-03	Water	M													
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M													
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	L2757873-1	2024-10-22	Water	M													
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	L2757942-2	2024-10-26	Water	M													
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	L2758119-1	2024-11-12	Water	M													
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	L2758350-1	2024-12-06	Water	M													
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M													
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M													
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M													
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	L2758769-1	2025-01-24	Water	M													
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M													
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	L2759042-1	2025-02-21	Water	M													
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	L2759255-1	2025-03-19	Water	M													
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M													
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M													
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M													
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M													
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M													
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M	<0.00100												
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M	<0.00100												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M	<0.00100												
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M	<0.00100												
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M	<0.00100												
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M	<0.00100												
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M	<0.00100												
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M	<0.00100												
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M	<0.00100												
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M	<0.00100												
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M	<0.00100												
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M	<0.00100												
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M	<0.00100												
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M	<0.00100												
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M	<0.00100												
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M	<0.00100												
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	<0.00100												
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M													
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M	<0.00100												
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	<0.00100												
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M	<0.00100												
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	<0.00100												
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	<0.00100												
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M	<0.00100												
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	<0.00100												
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M	<0.00100												
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M	<0.00100												
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M	<0.00100												
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	<0.00100												
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M	<0.00100												
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M	<0.00100												
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M	<0.00100												
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M	<0.00100												
SW-02	SW-02	23F0370-03	2023-06-02	Water	M													
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M	<0.00100												
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M	<0.00100												
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M	<0.00100												
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	<0.00100												
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M													
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M													
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M	<0.00100												
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M		<0.0010	<0.0010	<0.0005	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010
SW-02		VA24A1299-002	2024-01-23	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2754353-2	2024-01-23	Water	M													
SW-02		L2754615-2	2024-02-15	Water	M													
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2755012-2	2024-03-19	Water	M													
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2755316-6	2024-04-12	Water	M													
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2755504-1	2024-04-26	Water	M													
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2755521-2	2024-04-28	Water	M													
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2755598-1	2024-05-03	Water	M													
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2755677-1	2024-05-09	Water	M													
SW-02		L2755687-1	2024-05-09	Water	M													
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2755770-1	2024-05-14	Water	M													
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2755819-1	2024-05-17	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2755903-1	2024-05-23	Water	M													
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2755933-1	2024-05-24	Water	M													
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2755961-1	2024-05-26	Water	M													
SW-02		VA24B4698-001	2024-06-21	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2756349-1	2024-06-21	Water	M													
SW-02		VA24B5540-001	2024-06-27	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2756458-1	2024-06-27	Water	M													
SW-02		VA24B7689-001	2024-07-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2756726-1	2024-07-19	Water	M													
SW-02		VA24B8974-002	2024-07-31	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2756871-2	2024-07-31	Water	M													
SW-02		VA24C1605-001	2024-08-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02		L2757153-1	2024-08-23	Water	M													
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	L2757209-2	2024-08-27	Water	M													
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	L2757587-1	2024-09-29	Water	M													
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	L2757661-1	2024-10-04	Water	M													
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M													
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	L2757873-2	2024-10-22	Water	M													
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	L2757913-1	2024-10-25	Water	M													
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M													
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	L2758155-3	2024-11-16	Water	M													
SW-02		VA24D1587-001	2024-11-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	0.001	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M													
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	L2758371-1	2024-12-08	Water	M													
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M													
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M													
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	L2758769-2	2025-01-24	Water	M													
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	L2759009-1	2025-02-19	Water	M													
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M													
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	L2759254-1	2025-03-18	Water	M													
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M													
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M													
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M													
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M													
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M													
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M													
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M													
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M													
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M													
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M													
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M													
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M													
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M													
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M													
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M													
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M													
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M	<0.00100												
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M	<0.00100												
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M	<0.00100												
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M	<0.00100												
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M	<0.00100												
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M	<0.00100												
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M	<0.00100												
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M	<0.00100												
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M	<0.00100												
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M	<0.00100												
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M	<0.00100												
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M	<0.00100												
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M	<0.00100												
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M	<0.00100												
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M	<0.00100												
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M	<0.00100												
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	<0.00100												
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M													
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	<0.00100												
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	<0.00100												
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M	<0.00100												
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	<0.00100												
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	<0.00100												
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M	<0.00100												
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M	<0.00100												
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M	<0.00100												
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	<0.00100												
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M	<0.00100												
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	<0.00100												
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M	<0.00100												
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	<0.00100												
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	<0.00100												
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M	<0.00100												
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	<0.00100												
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	<0.00100												
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	<0.00100												
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M	<0.00100												
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M	<0.00100												
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	<0.00100												
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M		<0.0010	<0.0010	<0.0005	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010
SW-03		VA24A1299-003	2024-01-23	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2754353-3	2024-01-23	Water	M													
SW-03		L2754615-3	2024-02-15	Water	M													
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2755012-3	2024-03-19	Water	M													
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2755316-7	2024-04-12	Water	M													
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2755504-2	2024-04-26	Water	M													
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2755521-3	2024-04-28	Water	M													
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2755598-2	2024-05-03	Water	M													
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2755677-2	2024-05-09	Water	M													
SW-03		L2755687-2	2024-05-09	Water	M													
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2755770-2	2024-05-14	Water	M													
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2755819-2	2024-05-17	Water	M													
SW-03		VA24B1636-002	2024-05-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2755903-2	2024-05-23	Water	M													
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2755933-2	2024-05-24	Water	M													
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2755961-2	2024-05-26	Water	M													
SW-03		VA24B4698-002	2024-06-21	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2756349-2	2024-06-21	Water	M													
SW-03		VA24B5540-002	2024-06-27	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2756458-2	2024-06-27	Water	M													
SW-03		VA24B7689-002	2024-07-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2756726-2	2024-07-19	Water	M													
SW-03		L2756871-3	2024-07-31	Water	M													
SW-03		VA24B8974-003	2024-07-31	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		VA24C1605-002	2024-08-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		L2757153-2	2024-08-23	Water	M													
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	L2757229-1	2024-08-28	Water	M													
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	L2757587-3	2024-09-29	Water	M													
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	L2757661-3	2024-10-04	Water	M													
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M													
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	L2757873-3	2024-10-22	Water	M													
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	L2757913-3	2024-10-25	Water	M													
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M													
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	L2758155-2	2024-11-16	Water	M													
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03		VA24D1587-002	2024-11-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M													
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	L2758371-2	2024-12-08	Water	M													
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M													
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	L2758769-3	2025-01-24	Water	M													
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	L2759009-2	2025-02-19	Water	M													
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M													
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	L2759254-2	2025-03-18	Water	M													
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M													
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M													
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M													
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M													
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M													
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M													
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M	<0.00100												
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M	<0.00100												
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M	<0.00100												
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M	<0.00100												
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M	<0.00100												
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M	<0.00100												
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M	<0.00100												
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M	<0.00100												
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M	<0.00100												
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M	<0.00100												
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M	<0.00100												
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M	<0.00100												
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M	<0.00100												
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M	<0.00100												
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M	<0.00100												
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M	<0.00100												
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M	<0.00100												
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M													
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M	<0.00100												
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M	<0.00100												
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M	<0.00100												
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M	<0.00100												
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M	<0.00100												
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M	<0.00100												
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M	<0.00100												
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M	<0.00100												
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M	<0.00100												
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M	<0.00100												
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M	<0.00100												
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M	<0.00100												
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M	<0.00100												
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M	<0.00100												
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M	<0.00100												
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M	<0.00100												
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M	<0.00100												
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M	<0.00100												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M	<0.00100												
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	<0.00100												
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M	<0.00100												
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M		<0.0010	<0.0010	<0.0005	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010
SW-04		VA24A1299-004	2024-01-23	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2754353-4	2024-01-23	Water	M													
SW-04		L2754615-4	2024-02-15	Water	M													
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2755012-4	2024-03-19	Water	M													
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2755503-3	2024-04-25	Water	M													
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2755523-2	2024-04-29	Water	M													
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2755588-3	2024-05-02	Water	M													
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2755687-4	2024-05-09	Water	M													
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2755695-2	2024-05-10	Water	M													
SW-04		L2755788-2	2024-05-15	Water	M													
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2755820-3	2024-05-16	Water	M													
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		VA24B1636-005	2024-05-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2755903-5	2024-05-23	Water	M													
SW-04		L2755916-3	2024-05-23	Water	M													
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2755961-4	2024-05-26	Water	M													
SW-04		VA24B4655-003	2024-06-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2756326-3	2024-06-20	Water	M													
SW-04		VA24B5289-002	2024-06-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2756419-2	2024-06-26	Water	M													
SW-04		VA24B7579-003	2024-07-18	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2756717-3	2024-07-18	Water	M													
SW-04		VA24B8974-004	2024-07-31	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2756871-4	2024-07-31	Water	M													
SW-04		VA24C1546-003	2024-08-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04		L2757144-3	2024-08-22	Water	M													
SW-04	SW-04	L2757209-4	2024-08-27	Water	M													
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	L2757584-2	2024-09-28	Water	M													
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	L2757661-4	2024-10-04	Water	M													
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M													
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	L2757873-4	2024-10-22	Water	M													
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	L2757942-1	2024-10-26	Water	M													
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M													
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	L2758155-4	2024-11-17	Water	M													
SW-04		4-456131118-0	2024-11-17	Water	F													
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	L2758371-3	2024-12-08	Water	M													
SW-04		4-456441522-0	2024-12-18	Water	F													
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M													
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M													
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	L2758765-1	2025-01-25	Water	M													
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M													
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	L2759042-2	2025-02-21	Water	M													
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	L2759255-2	2025-03-19	Water	M													
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M													
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M													
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M													
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M													
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M													
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	<0.00100												
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M	<0.00100												
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M	<0.00100												
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M	<0.00100												
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	<0.00100												
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M	<0.00100												
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M	<0.100												
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	<0.00100												
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	<0.00100												
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	<0.00100												
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M													
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M													
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M	<0.00100												
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M		<0.0010	<0.0010	<0.0005	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M	<0.00100												
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M	<0.00100												
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M	<0.00100												
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M	<0.00100												
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M	<0.00100												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M	<0.00100												
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M	<0.00100												
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M	<0.00100												
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M	<0.00100												
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M	<0.00100												
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M	<0.00100												
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M	<0.00100												
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M	<0.00100												
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M		<0.0010	<0.0010	<0.0005	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M													
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M													
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	<0.00100												
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M	<0.00100												
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M	<0.00100												
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M	<0.00100												
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M		<0.0010	<0.0010	<0.0005	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010
SW-07		VA24A1299-005	2024-01-23	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2754353-5	2024-01-23	Water	M													
SW-07		L2754615-5	2024-02-15	Water	M													
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2755012-5	2024-03-19	Water	M													
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2755504-3	2024-04-26	Water	M													
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2755521-1	2024-04-28	Water	M													
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2755598-3	2024-05-03	Water	M													
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2755677-3	2024-05-09	Water	M													
SW-07		L2755687-3	2024-05-09	Water	M													
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2755770-3	2024-05-14	Water	M													
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2755819-3	2024-05-17	Water	M													
SW-07		VA24B1636-003	2024-05-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2755903-3	2024-05-23	Water	M													
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2755933-3	2024-05-24	Water	M													
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2755961-3	2024-05-26	Water	M													
SW-07		VA24B4698-003	2024-06-21	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2756349-3	2024-06-21	Water	M													
SW-07		VA24B5289-003	2024-06-26	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2756419-3	2024-06-26	Water	M													
SW-07		VA24B7689-003	2024-07-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2756726-3	2024-07-19	Water	M													
SW-07		L2756871-5	2024-07-31	Water	M													
SW-07		VA24B8974-005	2024-07-31	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		VA24C1605-003	2024-08-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07		L2757153-3	2024-08-23	Water	M													
SW-07	SW-07	L2757209-5	2024-08-27	Water	M													
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	L2757587-4	2024-09-29	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	L2757664-1	2024-10-03	Water	M													
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M													
SW-07		492-455781017-0	2024-10-13	Water	F													
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	L2757873-5	2024-10-22	Water	M													
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	L2757913-4	2024-10-25	Water	M													
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M													
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	L2758155-1	2024-11-16	Water	M													
SW-07		VA24D1587-003	2024-11-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M													
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	L2758371-4	2024-12-08	Water	M													
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M													
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M													
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	L2758765-2	2025-01-25	Water	M													
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	L2759009-3	2025-02-19	Water	M													
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M													
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	L2759254-3	2025-03-18	Water	M													
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M													
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M													
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M													
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M													
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M													
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M													
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08		L2755503-2	2024-04-25	Water	M													
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08		L2755588-2	2024-05-02	Water	M													
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08		L2755694-2	2024-05-10	Water	M													
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total BTEX	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Dibromochloromethane	Dibromomethane	Chloroethane	Chloroform	Chloromethane	1-2-Dichlorobenzene	1-3-Dichlorobenzene	1-4-Dichlorobenzene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M													
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08		L2755916-2	2024-05-23	Water	M													
SW-08		VA24B4655-002	2024-06-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08		L2756326-2	2024-06-20	Water	M													
SW-08		VA24B7579-002	2024-07-18	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08		L2756717-2	2024-07-18	Water	M													
SW-08		VA24C1546-002	2024-08-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08		L2757144-2	2024-08-22	Water	M													
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09		L2755503-4	2024-04-25	Water	M													
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09		L2755588-4	2024-05-02	Water	M													
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09		L2755687-5	2024-05-09	Water	M													
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09		L2755820-4	2024-05-16	Water	M													
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09		L2755916-4	2024-05-23	Water	M													
SW-09		VA24B4655-004	2024-06-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09		L2756326-4	2024-06-20	Water	M													
SW-09		VA24B7579-004	2024-07-18	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09		L2756717-4	2024-07-18	Water	M													
SW-09		VA24C1546-004	2024-08-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09		L2757144-4	2024-08-22	Water	M													
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M													
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M													
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M													
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M													
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M		<0.00050	<0.00050	<0.00050	<0.00050			<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M												
OUT-01		VA24B1636-006	2024-05-23	Water	M												
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M												
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M												
OUT-01		661-455931031-0	2024-10-28	Water	F												
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M												
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M												
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M												
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M												
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M												
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M												
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M												
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M												
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M												
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M												
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M												
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M												
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M												
OUT-02		VA24B5289-006	2024-06-26	Water	M												
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M												
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M												
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M												
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M												
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M												
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M												
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M												
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M												
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M												
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M												
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M												
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M												
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M												
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M												
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M												
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M												
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M												
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M												
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M												
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M												
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M												
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M												
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M												
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M												
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M												
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M												
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M												
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M												
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M												
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M												
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M												
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M												
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M												
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M												
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M												
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M												
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M												
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M												
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M												
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M												
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M												
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M												
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M												
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M												
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M												
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M												
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M												
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M												
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M												
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M												
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M												
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M												
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M												
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M												
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M												
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M												
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M												
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M												
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M												
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M												
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M												
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M												
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M												
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M												
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M												
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M												
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M												
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M												
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M												
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M												
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M												
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M												
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M												
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M												
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005
SW-01		VA24A1299-001	2024-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2754353-1	2024-01-23	Water	M												
SW-01		L2754615-1	2024-02-15	Water	M												
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2755012-1	2024-03-19	Water	M												
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2755503-1	2024-04-25	Water	M												
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2755523-1	2024-04-29	Water	M												
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2755588-1	2024-05-02	Water	M												
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2755694-1	2024-05-10	Water	M												
SW-01		L2755695-1	2024-05-10	Water	M												
SW-01		L2755788-1	2024-05-15	Water	M												
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2755820-1	2024-05-16	Water	M												
SW-01		VA24B1628-001	2024-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2755902-1	2024-05-22	Water	M												
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2755916-1	2024-05-23	Water	M												
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		VA24B4655-001	2024-06-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2756326-1	2024-06-20	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2756419-1	2024-06-26	Water	M												
SW-01		VA24B7579-001	2024-07-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2756717-1	2024-07-18	Water	M												
SW-01		VA24B8974-001	2024-07-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2756871-1	2024-07-31	Water	M												
SW-01		VA24C1546-001	2024-08-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01		L2757144-1	2024-08-22	Water	M												
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	L2757209-1	2024-08-27	Water	M												
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	L2757584-1	2024-09-28	Water	M												
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	L2757664-2	2024-10-03	Water	M												
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M												
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	L2757873-1	2024-10-22	Water	M												
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	L2757942-2	2024-10-26	Water	M												
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	L2758119-1	2024-11-12	Water	M												
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	L2758350-1	2024-12-06	Water	M												
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M												
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M												
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M												
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	L2758769-1	2025-01-24	Water	M												
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M												
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	L2759042-1	2025-02-21	Water	M												
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	L2759255-1	2025-03-19	Water	M												
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M												
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M												
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M												
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M												
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M												
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M												
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M												
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M												
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M												
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M												
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M												
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M												
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M												
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M												
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M												
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M												
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M												
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M												
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M												
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M												
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M												
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M												
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M												
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M												
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M												
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M												
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M												
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M												
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M												
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M												
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M												
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M												
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M												
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M												
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M												
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M												
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M												
SW-02	SW-02	23F0370-03	2023-06-02	Water	M												
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M												
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M												
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M												
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M												
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M												
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M												
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M												
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005
SW-02		VA24A1299-002	2024-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2754353-2	2024-01-23	Water	M												
SW-02		L2754615-2	2024-02-15	Water	M												
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2755012-2	2024-03-19	Water	M												
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2755316-6	2024-04-12	Water	M												
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2755504-1	2024-04-26	Water	M												
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2755521-2	2024-04-28	Water	M												
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2755598-1	2024-05-03	Water	M												
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2755677-1	2024-05-09	Water	M												
SW-02		L2755687-1	2024-05-09	Water	M												
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2755770-1	2024-05-14	Water	M												
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2755819-1	2024-05-17	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2755903-1	2024-05-23	Water	M												
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2755933-1	2024-05-24	Water	M												
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2755961-1	2024-05-26	Water	M												
SW-02		VA24B4698-001	2024-06-21	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2756349-1	2024-06-21	Water	M												
SW-02		VA24B5540-001	2024-06-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2756458-1	2024-06-27	Water	M												
SW-02		VA24B7689-001	2024-07-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2756726-1	2024-07-19	Water	M												
SW-02		VA24B8974-002	2024-07-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2756871-2	2024-07-31	Water	M												
SW-02		VA24C1605-001	2024-08-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02		L2757153-1	2024-08-23	Water	M												
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	L2757209-2	2024-08-27	Water	M												
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	L2757587-1	2024-09-29	Water	M												
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	L2757661-1	2024-10-04	Water	M												
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M												
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	L2757873-2	2024-10-22	Water	M												
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	L2757913-1	2024-10-25	Water	M												
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M												
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	L2758155-3	2024-11-16	Water	M												
SW-02		VA24D1587-001	2024-11-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M												
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	L2758371-1	2024-12-08	Water	M												
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M												
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M												
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	L2758769-2	2025-01-24	Water	M												
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	L2759009-1	2025-02-19	Water	M												
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M												
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	L2759254-1	2025-03-18	Water	M												
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M												
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M												
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M												
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M												
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M												
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M												
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M												
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M												
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M												
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M												
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M												
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M												
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M												
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M												
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M												
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M												
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M												
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M												
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M												
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M												
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M												
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M												
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M												
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M												
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M												
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M												
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M												
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M												
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M												
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M												
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M												
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M												
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M												
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M												
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M												
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M												
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M												
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M												
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M												
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M												
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M												
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M												
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M												
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M												
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M												
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M												
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M												
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M												
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M												
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M												
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M												
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M												
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M												
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M												
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M												
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005
SW-03		VA24A1299-003	2024-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2754353-3	2024-01-23	Water	M												
SW-03		L2754615-3	2024-02-15	Water	M												
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2755012-3	2024-03-19	Water	M												
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2755316-7	2024-04-12	Water	M												
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2755504-2	2024-04-26	Water	M												
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2755521-3	2024-04-28	Water	M												
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2755598-2	2024-05-03	Water	M												
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2755677-2	2024-05-09	Water	M												
SW-03		L2755687-2	2024-05-09	Water	M												
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2755770-2	2024-05-14	Water	M												
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2755819-2	2024-05-17	Water	M												
SW-03		VA24B1636-002	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2755903-2	2024-05-23	Water	M												
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2755933-2	2024-05-24	Water	M												
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2755961-2	2024-05-26	Water	M												
SW-03		VA24B4698-002	2024-06-21	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2756349-2	2024-06-21	Water	M												
SW-03		VA24B5540-002	2024-06-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2756458-2	2024-06-27	Water	M												
SW-03		VA24B7689-002	2024-07-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2756726-2	2024-07-19	Water	M												
SW-03		L2756871-3	2024-07-31	Water	M												
SW-03		VA24B8974-003	2024-07-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		VA24C1605-002	2024-08-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		L2757153-2	2024-08-23	Water	M												
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	L2757229-1	2024-08-28	Water	M												
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	L2757587-3	2024-09-29	Water	M												
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	L2757661-3	2024-10-04	Water	M												
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M												
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	L2757873-3	2024-10-22	Water	M												
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	L2757913-3	2024-10-25	Water	M												
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M												
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	L2758155-2	2024-11-16	Water	M												
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03		VA24D1587-002	2024-11-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M												
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	L2758371-2	2024-12-08	Water	M												
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M												
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	L2758769-3	2025-01-24	Water	M												
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	L2759009-2	2025-02-19	Water	M												
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M												
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	L2759254-2	2025-03-18	Water	M												
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M												
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M												
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M												
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M												
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M												
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M												
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M												
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M												
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M												
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M												
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M												
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M												
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M												
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M												
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M												
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M												
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M												
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M												
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M												
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M												
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M												
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M												
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M												
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M												
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M												
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M												
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M												
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M												
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M												
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M												
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M												
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M												
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M												
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M												
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M												
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M												
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M												
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M												
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M												
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M												
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M												
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M												
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M												
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M												
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005
SW-04		VA24A1299-004	2024-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2754353-4	2024-01-23	Water	M												
SW-04		L2754615-4	2024-02-15	Water	M												
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2755012-4	2024-03-19	Water	M												
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2755503-3	2024-04-25	Water	M												
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2755523-2	2024-04-29	Water	M												
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2755588-3	2024-05-02	Water	M												
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2755687-4	2024-05-09	Water	M												
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2755695-2	2024-05-10	Water	M												
SW-04		L2755788-2	2024-05-15	Water	M												
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2755820-3	2024-05-16	Water	M												
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		VA24B1636-005	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2755903-5	2024-05-23	Water	M												
SW-04		L2755916-3	2024-05-23	Water	M												
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2755961-4	2024-05-26	Water	M												
SW-04		VA24B4655-003	2024-06-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2756326-3	2024-06-20	Water	M												
SW-04		VA24B5289-002	2024-06-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2756419-2	2024-06-26	Water	M												
SW-04		VA24B7579-003	2024-07-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2756717-3	2024-07-18	Water	M												
SW-04		VA24B8974-004	2024-07-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2756871-4	2024-07-31	Water	M												
SW-04		VA24C1546-003	2024-08-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04		L2757144-3	2024-08-22	Water	M												
SW-04	SW-04	L2757209-4	2024-08-27	Water	M												
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	L2757584-2	2024-09-28	Water	M												
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	L2757661-4	2024-10-04	Water	M												
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M												
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	L2757873-4	2024-10-22	Water	M												
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	L2757942-1	2024-10-26	Water	M												
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M												
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	L2758155-4	2024-11-17	Water	M												
SW-04		4-456131118-0	2024-11-17	Water	F												
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	L2758371-3	2024-12-08	Water	M												
SW-04		4-456441522-0	2024-12-18	Water	F												
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M												
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M												
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	L2758765-1	2025-01-25	Water	M												
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M												
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	L2759042-2	2025-02-21	Water	M												
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	L2759255-2	2025-03-19	Water	M												
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M												
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M												
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M												
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M												
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M												
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M												
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M												
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M												
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M												
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M												
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M												
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M												
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M												
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M												
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M												
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M												
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M												
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M												
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M												
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M												
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M												
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M												
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M												
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M												
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M												
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M												
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M												
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M												
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M												
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M												
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M												
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M												
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M												
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M												
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M												
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M												
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005
SW-07		VA24A1299-005	2024-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2754353-5	2024-01-23	Water	M												
SW-07		L2754615-5	2024-02-15	Water	M												
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2755012-5	2024-03-19	Water	M												
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2755504-3	2024-04-26	Water	M												
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2755521-1	2024-04-28	Water	M												
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2755598-3	2024-05-03	Water	M												
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2755677-3	2024-05-09	Water	M												
SW-07		L2755687-3	2024-05-09	Water	M												
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2755770-3	2024-05-14	Water	M												
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2755819-3	2024-05-17	Water	M												
SW-07		VA24B1636-003	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2755903-3	2024-05-23	Water	M												
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2755933-3	2024-05-24	Water	M												
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2755961-3	2024-05-26	Water	M												
SW-07		VA24B4698-003	2024-06-21	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2756349-3	2024-06-21	Water	M												
SW-07		VA24B5289-003	2024-06-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2756419-3	2024-06-26	Water	M												
SW-07		VA24B7689-003	2024-07-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2756726-3	2024-07-19	Water	M												
SW-07		L2756871-5	2024-07-31	Water	M												
SW-07		VA24B8974-005	2024-07-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		VA24C1605-003	2024-08-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07		L2757153-3	2024-08-23	Water	M												
SW-07	SW-07	L2757209-5	2024-08-27	Water	M												
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	L2757587-4	2024-09-29	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	L2757664-1	2024-10-03	Water	M												
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M												
SW-07		492-455781017-0	2024-10-13	Water	F												
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	L2757873-5	2024-10-22	Water	M												
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	L2757913-4	2024-10-25	Water	M												
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M												
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	L2758155-1	2024-11-16	Water	M												
SW-07		VA24D1587-003	2024-11-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M												
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	L2758371-4	2024-12-08	Water	M												
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M												
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M												
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	L2758765-2	2025-01-25	Water	M												
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	L2759009-3	2025-02-19	Water	M												
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M												
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	L2759254-3	2025-03-18	Water	M												
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M												
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M												
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M												
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M												
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M												
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M												
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08		L2755503-2	2024-04-25	Water	M												
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08		L2755588-2	2024-05-02	Water	M												
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08		L2755694-2	2024-05-10	Water	M												
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-1-Dichloroethane	1-2-Dichloroethane	1-1-Dichloroethylene	cis-1-2-Dichloroethylene	trans-1-2-Dichloroethylene	Dichloromethane	1-2-Dichloropropane	1-3-Dichloropropene (cis&trans)	cis-1-3-Dichloropropylene	trans-1-3-Dichloropropylene	1-1-1-2-Tetrachloroethane	1-1-2-2-Tetrachloroethane
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M												
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08		L2755916-2	2024-05-23	Water	M												
SW-08		VA24B4655-002	2024-06-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08		L2756326-2	2024-06-20	Water	M												
SW-08		VA24B7579-002	2024-07-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08		L2756717-2	2024-07-18	Water	M												
SW-08		VA24C1546-002	2024-08-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08		L2757144-2	2024-08-22	Water	M												
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09		L2755503-4	2024-04-25	Water	M												
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09		L2755588-4	2024-05-02	Water	M												
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09		L2755687-5	2024-05-09	Water	M												
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09		L2755820-4	2024-05-16	Water	M												
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09		L2755916-4	2024-05-23	Water	M												
SW-09		VA24B4655-004	2024-06-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09		L2756326-4	2024-06-20	Water	M												
SW-09		VA24B7579-004	2024-07-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09		L2756717-4	2024-07-18	Water	M												
SW-09		VA24C1546-004	2024-08-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09		L2757144-4	2024-08-22	Water	M												
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M												
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M												
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M												
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M												
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M												
OUT-01		VA24B1636-006	2024-05-23	Water	M												
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M												
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M												
OUT-01		661-455931031-0	2024-10-28	Water	F												
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M												
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M												
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M												
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M												
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M												
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M												
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M												
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M												
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M												
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M												
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M												
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M												
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M												
OUT-02		VA24B5289-006	2024-06-26	Water	M												
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M												
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M												
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M												
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M												
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M												
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M												
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M												
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M												
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M												
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M												
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M												
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M												
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M												
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M												
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M												
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.7	100	0.000073	<0.000010	<0.000010	<0.000010
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M												
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M												
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M												
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M												
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M									<0.000010	<0.000010	<0.000010	<0.000010
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.4	101	<0.000010	<0.000010	<0.000010	<0.000010
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M												
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M												
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M												
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M												
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M												
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M												
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M												
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M												
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M												
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M												
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M												
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M												
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M												
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M												
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M												
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M												
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M												
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M									0.000055	<0.000200	<0.000165	<0.000010
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			<0.000050	<0.000200	<0.000050	<0.000010
SW-01		VA24A1299-001	2024-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.9	97.1	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2754353-1	2024-01-23	Water	M												
SW-01		L2754615-1	2024-02-15	Water	M												
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.6	98.1	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755012-1	2024-03-19	Water	M												
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	76.7	96.1	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755503-1	2024-04-25	Water	M												
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.8	97.7	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755523-1	2024-04-29	Water	M												
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	98.3	95.3	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755588-1	2024-05-02	Water	M												
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.3	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.9	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755694-1	2024-05-10	Water	M												
SW-01		L2755695-1	2024-05-10	Water	M												
SW-01		L2755788-1	2024-05-15	Water	M												
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.5	94.4	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	85	94.4	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755820-1	2024-05-16	Water	M												
SW-01		VA24B1628-001	2024-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.8	98.3	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755902-1	2024-05-22	Water	M												
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	85.2	96.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755916-1	2024-05-23	Water	M												
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.4	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		VA24B4655-001	2024-06-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	76.8	99.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2756326-1	2024-06-20	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.7	97.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2756419-1	2024-06-26	Water	M												
SW-01		VA24B7579-001	2024-07-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.4	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2756717-1	2024-07-18	Water	M												
SW-01		VA24B8974-001	2024-07-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.5	94.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2756871-1	2024-07-31	Water	M												
SW-01		VA24C1546-001	2024-08-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2757144-1	2024-08-22	Water	M												
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2757209-1	2024-08-27	Water	M												
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.6	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.3	99.7	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2757584-1	2024-09-28	Water	M												
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.1	99.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2757664-2	2024-10-03	Water	M												
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.6	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M												
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	80.7	97.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2757873-1	2024-10-22	Water	M												
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	92.4	99.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.2	99.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2757942-2	2024-10-26	Water	M												
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.7	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91	99.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.2	104	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2758119-1	2024-11-12	Water	M												
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.3	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.4	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2758350-1	2024-12-06	Water	M												
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.4	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M												
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.7	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M												
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.5	99.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M												
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.4	99.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2758769-1	2025-01-24	Water	M												
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	103	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M												
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	92.5	99.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2759042-1	2025-02-21	Water	M												
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	102	104	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2759255-1	2025-03-19	Water	M												
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.3	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.4	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M												
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.7	104	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M												
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.5	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M												
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.5	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M												
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86	97.4	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.1	97.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M												
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.2	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.8	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	81.6	98.3	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	104	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.3	98.7	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M									<0.000050	<0.000200	<0.000050	0.000054
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M												
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M									<0.000050	<0.000200	<0.000124	<0.000010
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW-02	23F0370-03	2023-06-02	Water	M												
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M												
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M												
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			<0.000050	<0.000200	<0.000050	<0.000010
SW-02		VA24A1299-002	2024-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.7	97.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2754353-2	2024-01-23	Water	M												
SW-02		L2754615-2	2024-02-15	Water	M												
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.1	99.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.1	93.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755012-2	2024-03-19	Water	M												
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	79.3	96.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755316-6	2024-04-12	Water	M												
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	76.1	94	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755504-1	2024-04-26	Water	M												
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.7	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755521-2	2024-04-28	Water	M												
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	98.4	92.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755598-1	2024-05-03	Water	M												
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	85.7	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.1	99.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755677-1	2024-05-09	Water	M												
SW-02		L2755687-1	2024-05-09	Water	M												
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.5	98.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755770-1	2024-05-14	Water	M												
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.3	94.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755819-1	2024-05-17	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.2	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755903-1	2024-05-23	Water	M												
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.1	97.4	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755933-1	2024-05-24	Water	M												
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	92.4	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755961-1	2024-05-26	Water	M												
SW-02		VA24B4698-001	2024-06-21	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	76.1	98.3	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2756349-1	2024-06-21	Water	M												
SW-02		VA24B5540-001	2024-06-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	85.3	96.1	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2756458-1	2024-06-27	Water	M												
SW-02		VA24B7689-001	2024-07-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.2	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2756726-1	2024-07-19	Water	M												
SW-02		VA24B8974-002	2024-07-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.9	94.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2756871-2	2024-07-31	Water	M												
SW-02		VA24C1605-001	2024-08-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.8	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2757153-1	2024-08-23	Water	M												
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.6	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2757209-2	2024-08-27	Water	M												
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	82.8	95.1	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.7	99.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2757587-1	2024-09-29	Water	M												
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.2	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2757661-1	2024-10-04	Water	M												
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.7	99.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M												
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	81.2	96.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2757873-2	2024-10-22	Water	M												
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.2	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	97.7	97.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2757913-1	2024-10-25	Water	M												
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.8	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	99.9	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M												
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.9	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.1	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2758155-3	2024-11-16	Water	M												
SW-02		VA24D1587-001	2024-11-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	98.4	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M												
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	98	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2758371-1	2024-12-08	Water	M												
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.6	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M												
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.8	98.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M												
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.3	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2758769-2	2025-01-24	Water	M												
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	111	105	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2759009-1	2025-02-19	Water	M												
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	104	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M												
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.2	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2759254-1	2025-03-18	Water	M												
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.3	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.6	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M												
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.5	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M												
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.8	106	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M												
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.7	94.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M												
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	82	97.3	<0.000010	<0.000010	<0.000010	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.2	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M												
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.2	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.5	98.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	111	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M												
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	103	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.3	99.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M												
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M												
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M												
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M												
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M												
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M												
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M												
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M												
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M												
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M												
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M												
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M									<0.000050	<0.000200	<0.000080	<0.000010
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			<0.000050	<0.000200	<0.000050	<0.000010
SW-03		VA24A1299-003	2024-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.8	96.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2754353-3	2024-01-23	Water	M												
SW-03		L2754615-3	2024-02-15	Water	M												
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93	101	0.000019	<0.000010	<0.000010	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	81.4	94.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755012-3	2024-03-19	Water	M												
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	70.5	93.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755316-7	2024-04-12	Water	M												
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	81.7	95.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755504-2	2024-04-26	Water	M												
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.7	99.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755521-3	2024-04-28	Water	M												
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.9	94	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755598-2	2024-05-03	Water	M												
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	83.8	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.4	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755677-2	2024-05-09	Water	M												
SW-03		L2755687-2	2024-05-09	Water	M												
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.5	98.3	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755770-2	2024-05-14	Water	M												
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	85	94.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755819-2	2024-05-17	Water	M												
SW-03		VA24B1636-002	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	92.5	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755903-2	2024-05-23	Water	M												
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	78.5	95.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755933-2	2024-05-24	Water	M												
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	92.1	99.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755961-2	2024-05-26	Water	M												
SW-03		VA24B4698-002	2024-06-21	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	75.3	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2756349-2	2024-06-21	Water	M												
SW-03		VA24B5540-002	2024-06-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	79.8	97.4	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2756458-2	2024-06-27	Water	M												
SW-03		VA24B7689-002	2024-07-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	85.2	99.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2756726-2	2024-07-19	Water	M												
SW-03		L2756871-3	2024-07-31	Water	M												
SW-03		VA24B8974-003	2024-07-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.3	94.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		VA24C1605-002	2024-08-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.6	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2757153-2	2024-08-23	Water	M												
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	99.5	101	0.00004	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2757229-1	2024-08-28	Water	M												
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	80.4	95.5	0.000018	<0.000010	<0.000010	0.000018
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.3	101	0.000013	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2757587-3	2024-09-29	Water	M												
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.3	98.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2757661-3	2024-10-04	Water	M												
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.7	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M												
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	78.8	96.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2757873-3	2024-10-22	Water	M												
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	98.2	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	97.3	100	0.00001	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2757913-3	2024-10-25	Water	M												
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.6	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	105	104	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M												
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.2	99.7	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2758155-2	2024-11-16	Water	M												
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.4	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		VA24D1587-002	2024-11-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	101	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M												
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.3	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2758371-2	2024-12-08	Water	M												
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.4	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M												
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.4	98.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2758769-3	2025-01-24	Water	M												
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	109	104	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2759009-2	2025-02-19	Water	M												
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	104	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M												
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.5	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2759254-2	2025-03-18	Water	M												
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.2	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.2	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M												
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.2	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M												
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.6	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M												
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84	98.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M												
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	78.9	96.7	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.9	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M												
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	97.6	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	106	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M												
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	105	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.6	99.4	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M									<0.000064	<0.000257	<0.000064	<0.000013
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M												
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M									<0.000050	<0.000200	<0.000087	<0.000010
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			<0.000050	<0.000200	<0.000050	<0.000010
SW-04		VA24A1299-004	2024-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.8	97.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2754353-4	2024-01-23	Water	M												
SW-04		L2754615-4	2024-02-15	Water	M												
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.8	99	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.6	97.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755012-4	2024-03-19	Water	M												
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	80.2	95.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755503-3	2024-04-25	Water	M												
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.1	96.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755523-2	2024-04-29	Water	M												
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	99.2	93.7	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755588-3	2024-05-02	Water	M												
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	81.8	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755687-4	2024-05-09	Water	M												
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.4	104	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755695-2	2024-05-10	Water	M												
SW-04		L2755788-2	2024-05-15	Water	M												
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.9	94.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	83.4	94.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755820-3	2024-05-16	Water	M												
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	78.3	96.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		VA24B1636-005	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.7	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755903-5	2024-05-23	Water	M												
SW-04		L2755916-3	2024-05-23	Water	M												
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.3	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755961-4	2024-05-26	Water	M												
SW-04		VA24B4655-003	2024-06-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	77.3	99.1	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2756326-3	2024-06-20	Water	M												
SW-04		VA24B5289-002	2024-06-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	83.4	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2756419-2	2024-06-26	Water	M												
SW-04		VA24B7579-003	2024-07-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.9	99.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2756717-3	2024-07-18	Water	M												
SW-04		VA24B8974-004	2024-07-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.6	94.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2756871-4	2024-07-31	Water	M												
SW-04		VA24C1546-003	2024-08-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.9	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2757144-3	2024-08-22	Water	M												
SW-04	SW-04	L2757209-4	2024-08-27	Water	M												
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.9	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.5	99.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2757584-2	2024-09-28	Water	M												
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.1	99	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2757661-4	2024-10-04	Water	M												
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86	98.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M												
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	98.2	104	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	82	97.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2757873-4	2024-10-22	Water	M												
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.8	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.8	98.3	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2757942-1	2024-10-26	Water	M												
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.4	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	97.2	101	<0.000010	<0.000010	<0.000010	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M												
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.8	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.9	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2758155-4	2024-11-17	Water	M												
SW-04		4-456131118-0	2024-11-17	Water	F												
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	99.4	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.1	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2758371-3	2024-12-08	Water	M												
SW-04		4-456441522-0	2024-12-18	Water	F												
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M												
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.4	99	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M												
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	79.1	99.7	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2758765-1	2025-01-25	Water	M												
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	103	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M												
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.6	99.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2759042-2	2025-02-21	Water	M												
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	101	104	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2759255-2	2025-03-19	Water	M												
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.7	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M												
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.2	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M												
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.3	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M												
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.4	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M												
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.7	98	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	81.3	96.4	<0.000010	<0.000010	0.000012	<0.000010
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M												
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.4	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.9	99.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	81.3	98.1	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	102	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.2	98.4	<0.000010	<0.000010	<0.000010	<0.000010
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M												
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M												
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M									<0.000050	<0.000200	<0.000050	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			<0.000050	<0.000200	<0.000050	<0.000010
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M									<0.000010	<0.000010	<0.000010	<0.000010
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M									<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M									<0.000050	<0.000200	<0.000050	<0.000010
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010			<0.000050	<0.000200	<0.000050	<0.000010
SW-07		VA24A1299-005	2024-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	85.3	97.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2754353-5	2024-01-23	Water	M												
SW-07		L2754615-5	2024-02-15	Water	M												
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.5	99.4	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.6	95.3	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755012-5	2024-03-19	Water	M												
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.6	96.1	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755504-3	2024-04-26	Water	M												
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.9	99	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755521-1	2024-04-28	Water	M												
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	98.2	93.4	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755598-3	2024-05-03	Water	M												
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.2	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.1	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755677-3	2024-05-09	Water	M												
SW-07		L2755687-3	2024-05-09	Water	M												
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	78.7	97	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755770-3	2024-05-14	Water	M												
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	82.8	94.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755819-3	2024-05-17	Water	M												
SW-07		VA24B1636-003	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.9	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755903-3	2024-05-23	Water	M												
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	75.7	98.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755933-3	2024-05-24	Water	M												
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	92.6	99.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755961-3	2024-05-26	Water	M												
SW-07		VA24B4698-003	2024-06-21	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	80.2	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2756349-3	2024-06-21	Water	M												
SW-07		VA24B5289-003	2024-06-26	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	82.8	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2756419-3	2024-06-26	Water	M												
SW-07		VA24B7689-003	2024-07-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	85.8	99.4	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2756726-3	2024-07-19	Water	M												
SW-07		L2756871-5	2024-07-31	Water	M												
SW-07		VA24B8974-005	2024-07-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.9	95.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		VA24C1605-003	2024-08-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89	99.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2757153-3	2024-08-23	Water	M												
SW-07	SW-07	L2757209-5	2024-08-27	Water	M												
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.5	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	79.3	94.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	92.6	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2757587-4	2024-09-29	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	97.8	99	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2757664-1	2024-10-03	Water	M												
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.8	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M												
SW-07		492-455781017-0	2024-10-13	Water	F												
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	79.1	97.1	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2757873-5	2024-10-22	Water	M												
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.6	99.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	97.2	99.4	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2757913-4	2024-10-25	Water	M												
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.5	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	98.9	104	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M												
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.8	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.2	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2758155-1	2024-11-16	Water	M												
SW-07		VA24D1587-003	2024-11-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	102	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M												
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.2	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2758371-4	2024-12-08	Water	M												
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	97	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M												
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	92.5	99.1	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M												
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2758765-2	2025-01-25	Water	M												
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	108	104	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2759009-3	2025-02-19	Water	M												
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	103	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M												
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.9	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2759254-3	2025-03-18	Water	M												
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.2	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	92.7	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M												
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M												
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M												
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.5	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	76	95.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M												
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	78.7	95.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.8	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M												
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.5	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90.7	99.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	100	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M												
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	103	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	97	98.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	80.6	94.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2755503-2	2024-04-25	Water	M												
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	100	93.1	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2755588-2	2024-05-02	Water	M												
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.8	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2755694-2	2024-05-10	Water	M												
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	82.6	94.1	<0.000010	<0.000010	<0.000010	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Tetrachloroethylene	1-1-1-Trichloroethane	1-1-2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Surrogate-4-Bromofluorobenzene(SS)	Surrogate-1-4-Difluorobenzene(SS)	Acenaphthene	Acenaphthylene	Acridine	Anthracene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M												
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	77.5	96.7	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2755916-2	2024-05-23	Water	M												
SW-08		VA24B4655-002	2024-06-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	74.7	99.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2756326-2	2024-06-20	Water	M												
SW-08		VA24B7579-002	2024-07-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84	98.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2756717-2	2024-07-18	Water	M												
SW-08		VA24C1546-002	2024-08-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	91.2	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2757144-2	2024-08-22	Water	M												
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	90	98.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.5	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.5	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	92.4	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.7	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.6	99.3	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	79.5	93.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2755503-4	2024-04-25	Water	M												
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.9	92.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2755588-4	2024-05-02	Water	M												
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	88.5	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2755687-5	2024-05-09	Water	M												
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	83.8	94.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2755820-4	2024-05-16	Water	M												
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	85	95.5	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2755916-4	2024-05-23	Water	M												
SW-09		VA24B4655-004	2024-06-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	75.5	99.8	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2756326-4	2024-06-20	Water	M												
SW-09		VA24B7579-004	2024-07-18	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	82.1	98.6	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2756717-4	2024-07-18	Water	M												
SW-09		VA24C1546-004	2024-08-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.9	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2757144-4	2024-08-22	Water	M												
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.3	98.9	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.2	104	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.3	101	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.6	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	98.6	103	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M												
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	96.8	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	98.9	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M												
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	95.7	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	87.1	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M												
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	101	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M												
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	86.4	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	84.6	97.2	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	89.8	100	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	94.4	99.7	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	105	102	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	93.6	98	<0.000010	<0.000010	<0.000010	<0.000010

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M												
OUT-01		VA24B1636-006	2024-05-23	Water	M												
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M												
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M												
OUT-01		661-455931031-0	2024-10-28	Water	F												
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M												
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M												
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M												
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M												
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M												
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M												
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M												
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M												
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M												
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M												
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M												
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M												
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M												
OUT-02		VA24B5289-006	2024-06-26	Water	M												
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M												
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M												
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M												
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M												
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M												
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M												
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M												
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M												
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M												
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M												
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M												
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M												
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M												
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M												
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M												
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	0.000022	0.0000248	0.000028	0.000018	0.000013		0.000025	<0.0000050	0.000046	0.000038	0.000018	0.000034
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M												
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M												
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M												
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M												
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M												
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M												
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M												
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M												
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M												
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M												
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M												
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M												
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M												
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M												
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M												
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M												
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M												
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M												
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M												
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M												
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	0.000014	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M												
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	0.000071	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-01		VA24A1299-001	2024-01-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2754353-1	2024-01-23	Water	M												
SW-01		L2754615-1	2024-02-15	Water	M												
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755012-1	2024-03-19	Water	M												
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755503-1	2024-04-25	Water	M												
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755523-1	2024-04-29	Water	M												
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755588-1	2024-05-02	Water	M												
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755694-1	2024-05-10	Water	M												
SW-01		L2755695-1	2024-05-10	Water	M												
SW-01		L2755788-1	2024-05-15	Water	M												
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755820-1	2024-05-16	Water	M												
SW-01		VA24B1628-001	2024-05-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755902-1	2024-05-22	Water	M												
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2755916-1	2024-05-23	Water	M												
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		VA24B4655-001	2024-06-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2756326-1	2024-06-20	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2756419-1	2024-06-26	Water	M												
SW-01		VA24B7579-001	2024-07-18	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2756717-1	2024-07-18	Water	M												
SW-01		VA24B8974-001	2024-07-31	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2756871-1	2024-07-31	Water	M												
SW-01		VA24C1546-001	2024-08-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01		L2757144-1	2024-08-22	Water	M												
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2757209-1	2024-08-27	Water	M												
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2757584-1	2024-09-28	Water	M												
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2757664-2	2024-10-03	Water	M												
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M												
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2757873-1	2024-10-22	Water	M												
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2757942-2	2024-10-26	Water	M												
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2758119-1	2024-11-12	Water	M												
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2758350-1	2024-12-06	Water	M												
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M												
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M												
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M												
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2758769-1	2025-01-24	Water	M												
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M												
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2759042-1	2025-02-21	Water	M												
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	L2759255-1	2025-03-19	Water	M												
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M												
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M												
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M												
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M												
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M												
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M	0.000054	0.000023	0.000059	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	0.00013	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M												
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	0.000052	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW-02	23F0370-03	2023-06-02	Water	M												
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M												
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M												
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-02		VA24A1299-002	2024-01-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2754353-2	2024-01-23	Water	M												
SW-02		L2754615-2	2024-02-15	Water	M												
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755012-2	2024-03-19	Water	M												
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755316-6	2024-04-12	Water	M												
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755504-1	2024-04-26	Water	M												
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755521-2	2024-04-28	Water	M												
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755598-1	2024-05-03	Water	M												
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755677-1	2024-05-09	Water	M												
SW-02		L2755687-1	2024-05-09	Water	M												
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755770-1	2024-05-14	Water	M												
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755819-1	2024-05-17	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755903-1	2024-05-23	Water	M												
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755933-1	2024-05-24	Water	M												
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2755961-1	2024-05-26	Water	M												
SW-02		VA24B4698-001	2024-06-21	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2756349-1	2024-06-21	Water	M												
SW-02		VA24B5540-001	2024-06-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2756458-1	2024-06-27	Water	M												
SW-02		VA24B7689-001	2024-07-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2756726-1	2024-07-19	Water	M												
SW-02		VA24B8974-002	2024-07-31	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2756871-2	2024-07-31	Water	M												
SW-02		VA24C1605-001	2024-08-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02		L2757153-1	2024-08-23	Water	M												
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2757209-2	2024-08-27	Water	M												
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2757587-1	2024-09-29	Water	M												
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2757661-1	2024-10-04	Water	M												
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M												
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2757873-2	2024-10-22	Water	M												
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2757913-1	2024-10-25	Water	M												
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M												
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2758155-3	2024-11-16	Water	M												
SW-02		VA24D1587-001	2024-11-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M												
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2758371-1	2024-12-08	Water	M												
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M												
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M												
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2758769-2	2025-01-24	Water	M												
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2759009-1	2025-02-19	Water	M												
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M												
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	L2759254-1	2025-03-18	Water	M												
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M												
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M												
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M												
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M												
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M												
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M												
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M												
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M												
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M												
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M												
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M												
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M												
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M												
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M												
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M												
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M												
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M	<0.000010	0.000017	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M												
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	0.000051	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-03		VA24A1299-003	2024-01-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2754353-3	2024-01-23	Water	M												
SW-03		L2754615-3	2024-02-15	Water	M												
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	0.000033	0.000016	<0.000010	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755012-3	2024-03-19	Water	M												
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755316-7	2024-04-12	Water	M												
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755504-2	2024-04-26	Water	M												
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755521-3	2024-04-28	Water	M												
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755598-2	2024-05-03	Water	M												
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755677-2	2024-05-09	Water	M												
SW-03		L2755687-2	2024-05-09	Water	M												
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755770-2	2024-05-14	Water	M												
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755819-2	2024-05-17	Water	M												
SW-03		VA24B1636-002	2024-05-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755903-2	2024-05-23	Water	M												
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755933-2	2024-05-24	Water	M												
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2755961-2	2024-05-26	Water	M												
SW-03		VA24B4698-002	2024-06-21	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2756349-2	2024-06-21	Water	M												
SW-03		VA24B5540-002	2024-06-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2756458-2	2024-06-27	Water	M												
SW-03		VA24B7689-002	2024-07-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2756726-2	2024-07-19	Water	M												
SW-03		L2756871-3	2024-07-31	Water	M												
SW-03		VA24B8974-003	2024-07-31	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		VA24C1605-002	2024-08-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		L2757153-2	2024-08-23	Water	M												
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	0.000047	0.000056	<0.000010	0.000028
SW-03	SW-03	L2757229-1	2024-08-28	Water	M												
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	0.00003	0.0000122	0.000019	<0.000010	<0.000010		0.000039	<0.0000050	0.000134	0.000022	<0.000010	<0.000010
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	0.000018	0.000013	<0.000010	0.000012
SW-03	SW-03	L2757587-3	2024-09-29	Water	M												
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	0.000019	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2757661-3	2024-10-04	Water	M												
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M												
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2757873-3	2024-10-22	Water	M												
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	0.000012	0.000012	<0.000010	<0.000010
SW-03	SW-03	L2757913-3	2024-10-25	Water	M												
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M												
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2758155-2	2024-11-16	Water	M												
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03		VA24D1587-002	2024-11-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M												
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2758371-2	2024-12-08	Water	M												
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M												
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2758769-3	2025-01-24	Water	M												
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2759009-2	2025-02-19	Water	M												
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M												
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	L2759254-2	2025-03-18	Water	M												
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M												
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M												
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M												
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M												
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M												
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M												
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M	<0.000013	<0.000013	<0.000064	<0.000064	<0.000064	<0.000128	<0.000064	<0.000013	<0.000039	<0.000064	<0.000064	<0.000128
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M												
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-04		VA24A1299-004	2024-01-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2754353-4	2024-01-23	Water	M												
SW-04		L2754615-4	2024-02-15	Water	M												
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755012-4	2024-03-19	Water	M												
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755503-3	2024-04-25	Water	M												
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755523-2	2024-04-29	Water	M												
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755588-3	2024-05-02	Water	M												
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755687-4	2024-05-09	Water	M												
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755695-2	2024-05-10	Water	M												
SW-04		L2755788-2	2024-05-15	Water	M												
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755820-3	2024-05-16	Water	M												
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		VA24B1636-005	2024-05-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755903-5	2024-05-23	Water	M												
SW-04		L2755916-3	2024-05-23	Water	M												
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2755961-4	2024-05-26	Water	M												
SW-04		VA24B4655-003	2024-06-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2756326-3	2024-06-20	Water	M												
SW-04		VA24B5289-002	2024-06-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2756419-2	2024-06-26	Water	M												
SW-04		VA24B7579-003	2024-07-18	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2756717-3	2024-07-18	Water	M												
SW-04		VA24B8974-004	2024-07-31	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2756871-4	2024-07-31	Water	M												
SW-04		VA24C1546-003	2024-08-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04		L2757144-3	2024-08-22	Water	M												
SW-04	SW-04	L2757209-4	2024-08-27	Water	M												
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2757584-2	2024-09-28	Water	M												
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2757661-4	2024-10-04	Water	M												
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M												
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2757873-4	2024-10-22	Water	M												
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2757942-1	2024-10-26	Water	M												
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M												
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2758155-4	2024-11-17	Water	M												
SW-04		4-456131118-0	2024-11-17	Water	F												
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2758371-3	2024-12-08	Water	M												
SW-04		4-456441522-0	2024-12-18	Water	F												
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M												
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M												
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2758765-1	2025-01-25	Water	M												
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M												
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	L2759042-2	2025-02-21	Water	M												
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	0.000043
SW-04	SW-04	L2759255-2	2025-03-19	Water	M												
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	0.000018
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M												
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	0.000012
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M												
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	0.000011
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M												
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M												
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000012
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	0.000012
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M												
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	0.000011
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	0.000011
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M												
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M												
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100
SW-07		VA24A1299-005	2024-01-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2754353-5	2024-01-23	Water	M												
SW-07		L2754615-5	2024-02-15	Water	M												
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755012-5	2024-03-19	Water	M												
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755504-3	2024-04-26	Water	M												
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755521-1	2024-04-28	Water	M												
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755598-3	2024-05-03	Water	M												
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755677-3	2024-05-09	Water	M												
SW-07		L2755687-3	2024-05-09	Water	M												
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755770-3	2024-05-14	Water	M												
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755819-3	2024-05-17	Water	M												
SW-07		VA24B1636-003	2024-05-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755903-3	2024-05-23	Water	M												
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755933-3	2024-05-24	Water	M												
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2755961-3	2024-05-26	Water	M												
SW-07		VA24B4698-003	2024-06-21	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2756349-3	2024-06-21	Water	M												
SW-07		VA24B5289-003	2024-06-26	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2756419-3	2024-06-26	Water	M												
SW-07		VA24B7689-003	2024-07-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2756726-3	2024-07-19	Water	M												
SW-07		L2756871-5	2024-07-31	Water	M												
SW-07		VA24B8974-005	2024-07-31	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		VA24C1605-003	2024-08-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07		L2757153-3	2024-08-23	Water	M												
SW-07	SW-07	L2757209-5	2024-08-27	Water	M												
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2757587-4	2024-09-29	Water	M												

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2757664-1	2024-10-03	Water	M												
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M												
SW-07		492-455781017-0	2024-10-13	Water	F												
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2757873-5	2024-10-22	Water	M												
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2757913-4	2024-10-25	Water	M												
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M												
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2758155-1	2024-11-16	Water	M												
SW-07		VA24D1587-003	2024-11-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M												
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2758371-4	2024-12-08	Water	M												
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M												
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M												
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2758765-2	2025-01-25	Water	M												
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2759009-3	2025-02-19	Water	M												
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M												
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	L2759254-3	2025-03-18	Water	M												
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M												
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M												
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M												
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M												
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M												
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M												
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2755503-2	2024-04-25	Water	M												
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2755588-2	2024-05-02	Water	M												
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2755694-2	2024-05-10	Water	M												
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g-h-i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-cd)pyrene	1-methylnaphthalene
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M												
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2755916-2	2024-05-23	Water	M												
SW-08		VA24B4655-002	2024-06-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2756326-2	2024-06-20	Water	M												
SW-08		VA24B7579-002	2024-07-18	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2756717-2	2024-07-18	Water	M												
SW-08		VA24C1546-002	2024-08-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08		L2757144-2	2024-08-22	Water	M												
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2755503-4	2024-04-25	Water	M												
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2755588-4	2024-05-02	Water	M												
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2755687-5	2024-05-09	Water	M												
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2755820-4	2024-05-16	Water	M												
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2755916-4	2024-05-23	Water	M												
SW-09		VA24B4655-004	2024-06-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2756326-4	2024-06-20	Water	M												
SW-09		VA24B7579-004	2024-07-18	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2756717-4	2024-07-18	Water	M												
SW-09		VA24C1546-004	2024-08-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09		L2757144-4	2024-08-22	Water	M												
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M												
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M												
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M												
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M												
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M													
OUT-01		VA24B1636-006	2024-05-23	Water	M													
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M													
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M													
OUT-01		661-455931031-0	2024-10-28	Water	F									<1	<2	<2	<2	<2
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M													
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M									<1	<2	<2	<2	<2
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M													
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M													
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M									<1	<2	<2	<2	<2
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M									<1	<2	<2	<2	<2
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M													
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M									<1	<2	<2	<2	<2
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M													
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M									<1	<2	<2	<2	<2
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M									<1	<2	<2	<2	<2
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M									<1	<2	<2	<2	<2
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M													
OUT-02		VA24B5289-006	2024-06-26	Water	M									<1	<2	<2	<2	<2
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M									<1	<2	<2	<2	<2
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M													
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M									<1	<2	<2	<2	<2
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M													
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M													
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M									<1	<2	<2	<2	<2
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M													
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M													
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M									<1	<2	<2	<2	<2
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M													
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M									<1	<2	<2	<2	<2
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M													
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M									<1	<2	<2	<2	<2
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M													
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M													
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M	0.000063	0.000255	0.000055	0.000042	<0.000050		97.4	99.6					
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M													
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M									<1	<2	<2	<2	<2
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M													
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M									<1	<2	<2	<2	<2
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		77.6	84.2	<1	<2	<2	<2	<2
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		81.1	89.7	<0.15	0.17	<0.32	<0.28	<0.28
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M									<0.27	<0.35	<0.39	<0.40	<0.37
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M													
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M									<0.69	<0.43	<0.34	<0.33	<0.31
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M													
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M													
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M													
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M									<0.96	<0.88	<0.73	<0.73	<0.72
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M													
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M									<0.23	<0.20	<0.34	<0.33	<0.32
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M													
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M													
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M									<0.44	<0.40	<0.68	<0.67	<0.66
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M													
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M									<0.63	<0.57	<0.74	<0.70	<0.70
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M									<0.72	<0.56	<0.52	<0.53	<0.51
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M													
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.42	<0.41	<0.29	<0.29	<0.28
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.41	<0.42	<0.31	<0.28	0.43
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.65	<0.62	<0.76	<0.73	<0.71

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.15	<0.31	<0.19	<0.19	<0.19
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.19	2.8	<0.40	<0.39	<0.38
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.28	<0.42	<0.37	<0.34	<0.34
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.84	<0.87	<0.89	<0.86	<0.83
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.51	<0.44	<0.51	<0.51	<0.49
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1.8	<1.7	<1.4	<1.4	<1.4
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.65	<0.49	<0.57	<0.56	<0.56
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.67	<0.60	<0.45	<0.39	<0.41
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M									<0.40	<0.36	<0.38	<0.38	<0.36
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.18	<0.28	<0.30	<0.29	<0.27
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.30	<0.62	<0.33	<0.34	<0.33
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.21	<0.17	<0.24	<0.25	0.28
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.48	<0.35	<0.38	<0.37	<0.37
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.46	<0.65	<0.41	<0.41	<0.40
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.23	<0.17	<0.21	<0.20	<0.20
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.33	<0.25	<0.18	<0.18	<0.18
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.44	1.4	0.66	<0.66	0.77
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.30	<0.30	<0.36	<0.36	<0.35
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.21	<0.28	<0.22	<0.22	<0.21
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1.1	<0.24	<0.26	<0.26	<0.25
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.43	<0.55	<0.24	<0.26	<0.24
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000156	<0.000200							
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.50	<0.22	<0.25	<0.24	<0.23
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-01		VA24A1299-001	2024-01-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	106	105					
SW-01		L2754353-1	2024-01-23	Water	M									<0.21	<0.26	<0.29	<0.27	<0.28
SW-01		L2754615-1	2024-02-15	Water	M									<0.31	<0.39	<0.32	<0.33	<0.31
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	111	101					
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	99.8	97.8	<0.18	<0.31	<0.18	<0.16	<0.16
SW-01		L2755012-1	2024-03-19	Water	M													
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	107	108					
SW-01		L2755503-1	2024-04-25	Water	M									<1	<2	<2	<2	<2
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	105	113	<1	<2	<2	<2	<2
SW-01		L2755523-1	2024-04-29	Water	M													
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	80.2	109					
SW-01		L2755588-1	2024-05-02	Water	M													
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	93.1	107	<1	<2	<2	<2	<2
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	90.3	106					
SW-01		L2755694-1	2024-05-10	Water	M													
SW-01		L2755695-1	2024-05-10	Water	M													
SW-01		L2755788-1	2024-05-15	Water	M													
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	104	114					
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	102	105					
SW-01		L2755820-1	2024-05-16	Water	M													
SW-01		VA24B1628-001	2024-05-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	82.6	104					
SW-01		L2755902-1	2024-05-22	Water	M													
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	94.5	115					
SW-01		L2755916-1	2024-05-23	Water	M													
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	75.5	90.4					
SW-01		VA24B4655-001	2024-06-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	105	106	<1	<2	<2	<2	<2
SW-01		L2756326-1	2024-06-20	Water	M									<1	<2	<2	<2	<2

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-01		VA24B5289-001	2024-06-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	79.6	100	<1	<2	<2	<2	<2
SW-01		L2756419-1	2024-06-26	Water	M									<1	<2	<2	<2	<2
SW-01		VA24B7579-001	2024-07-18	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	100	112	<1	<2	<2	<2	<2
SW-01		L2756717-1	2024-07-18	Water	M									<1	<2	<2	<2	<2
SW-01		VA24B8974-001	2024-07-31	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	106	113	<1	<2	<2	<2	<2
SW-01		L2756871-1	2024-07-31	Water	M									<1	<2	<2	<2	<2
SW-01		VA24C1546-001	2024-08-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		99.8	111	<0.32	<0.34	<0.16	<0.16	<0.15
SW-01		L2757144-1	2024-08-22	Water	M									<1	<2	<2	<2	<2
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	91.6	102	<0.31	<0.23	<0.33	<0.32	<0.31
SW-01	SW-01	L2757209-1	2024-08-27	Water	M									<0.28	<0.21	<0.25	<0.24	<0.24
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		88.9	95.8	1.4	<0.25	<0.14	<0.14	<0.13
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		73.8	98	<0.35	<0.39	<0.39	<0.38	0.386
SW-01	SW-01	L2757584-1	2024-09-28	Water	M													
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		101	98.1					
SW-01	SW-01	L2757664-2	2024-10-03	Water	M									<0.64	<0.51	<0.55	<0.53	<0.53
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		72.4	76.3	<0.48	<0.29	<0.43	<0.42	<0.42
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M									<0.68	<0.49	<0.45	<0.44	<0.44
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		106	97.5	<0.41	<0.43	<0.51	<0.53	<0.50
SW-01	SW-01	L2757873-1	2024-10-22	Water	M													
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		95.4	98.3					
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		91.8	93.7					
SW-01	SW-01	L2757942-2	2024-10-26	Water	M									<0.66	<0.90	<0.78	<0.78	<0.77
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		91.8	95.6	<0.52	<0.48	<0.48	<0.46	<0.46
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		75	71.2	<0.47	<0.51	<0.45	<0.46	<0.45
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		87.6	83.6	<0.54	<0.59	<0.49	<0.51	<0.49
SW-01	SW-01	L2758119-1	2024-11-12	Water	M													
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		86.9	97.1	<0.40	<0.37	<0.32	<0.30	<0.30
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		109	106					
SW-01	SW-01	L2758350-1	2024-12-06	Water	M									<0.21	<0.24	<0.30	<0.30	<0.29
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		88.6	89.9					
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M									<0.18	<0.22	<0.15	<0.17	<0.16
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		79.8	80.7	<0.36	<0.32	<0.40	<0.40	<0.38
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M									<0.51	<0.42	<0.50	<0.49	<0.49
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		74.8	86.5	<0.31	<0.30	<0.29	<0.28	<0.27
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M													
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		74	83.6					
SW-01	SW-01	L2758769-1	2025-01-24	Water	M									<0.24	<0.24	<0.31	<0.30	<0.29
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		76.6	86.2					
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M													
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		83	101	<1.5	<1.2	<1.4	<1.4	<1.4
SW-01	SW-01	L2759042-1	2025-02-21	Water	M									<0.24	<0.23	<0.28	<0.27	<0.26
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		110	107	<0.35	<0.31	<0.38	<0.38	<0.37
SW-01	SW-01	L2759255-1	2025-03-19	Water	M													
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		93.1	97.8	<0.41	<0.38	<0.71	<0.66	<0.70
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		104	97.9					
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M													
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		109	103					
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M									<0.38	<0.47	<0.37	<0.37	<0.36
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		105	108	<0.27	<0.21	<0.17	<0.16	<0.16
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M													
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		108	104	<0.17	0.2	0.12	0.161	0.259
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M									<0.26	0.44	0.22	0.26	0.42
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		107	101					
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		102	102	<0.76	<0.41	<0.29	<0.30	<0.28
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M									<0.76	<0.69	<0.80	<0.84	<0.79
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		106	101					
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		125	104	<0.56	<0.82	<0.33	<0.34	<0.32
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		116	104	<0.57	<0.44	<0.61	<0.60	<0.58
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		110	102					
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		130	106					
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.29	<0.25	<0.22	<0.21	<0.21
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.55	<0.70	<0.29	<0.29	<0.29

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.27	<0.25	<0.18	<0.18	<0.17
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000100	<0.000050	0.00026							
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.45	<0.45	<0.47	<0.45	<0.45
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.54	<0.50	<0.44	<0.44	0.523
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.65	<0.51	<0.78	<0.79	<0.77
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.52	<0.64	<0.46	<0.45	<0.45
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.21	<0.19	<0.29	<0.28	<0.28
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.15	<0.18	<0.17	<0.16	<0.16
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.66	<0.60	<0.61	<0.57	<0.56
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M									<1	<2	<2	<2	<2
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.45	<0.32	<0.30	<0.29	<0.29
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1.4	<1.1	<0.83	<0.72	<0.76
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.19	<0.19	<0.16	<0.16	<0.15
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.42	<0.33	<0.57	<0.53	<0.54
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.39	<0.29	<0.21	<0.20	<0.20
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.40	<0.29	<0.36	<0.35	0.41
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.51	<0.18	<0.19	<0.21	<0.19
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.42	<0.74	<0.28	<0.27	<0.26
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2
SW-02	SW-02	23F0370-03	2023-06-02	Water	M									<1	<2	<2	<2	<2
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.53	<1.1	<0.58	<0.59	<0.58
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.62	<0.81	<0.65	<0.62	<0.63
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000124	<0.000200			<1	<2	<2	<2	<2
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M									<1	<2	<2	<2	<2
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M													
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-02		VA24A1299-002	2024-01-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	109	108	<1	<2	<2	<2	<2
SW-02		L2754353-2	2024-01-23	Water	M													
SW-02		L2754615-2	2024-02-15	Water	M									<0.22	<0.20	<0.17	<0.15	<0.15
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	101	98.2	<1	<2	<2	<2	<2
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	90.8	104	<1	<2	<2	<2	<2
SW-02		L2755012-2	2024-03-19	Water	M													
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	96.4	104	<0.28	<0.28	<0.30	<0.30	<0.29
SW-02		L2755316-6	2024-04-12	Water	M									<0.50	<0.37	<0.33	<0.35	<0.32
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	97.2	104					
SW-02		L2755504-1	2024-04-26	Water	M													
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	106	101	<1	<2	<2	<2	<2
SW-02		L2755521-2	2024-04-28	Water	M													
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	71.1	108					
SW-02		L2755598-1	2024-05-03	Water	M													
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	92.5	109	<0.44	<0.15	<0.14	<0.15	<0.14
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	95.4	109					
SW-02		L2755677-1	2024-05-09	Water	M									<0.62	<0.28	<0.32	<0.31	<0.30
SW-02		L2755687-1	2024-05-09	Water	M									<0.17	0.21	<0.20	<0.21	<0.20
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	96.6	117					
SW-02		L2755770-1	2024-05-14	Water	M													
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	96.8	101					
SW-02		L2755819-1	2024-05-17	Water	M									<0.43	<0.36	<0.35	<0.33	<0.33

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-02		VA24B1636-001	2024-05-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	98.2	103					
SW-02		L2755903-1	2024-05-23	Water	M									<1.5	<0.35	<0.29	<0.29	<0.28
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	94	92.9	<1	<2	<2	<2	<2
SW-02		L2755933-1	2024-05-24	Water	M													
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	102	109					
SW-02		L2755961-1	2024-05-26	Water	M									0.24	<0.22	<0.18	<0.18	<0.17
SW-02		VA24B4698-001	2024-06-21	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	122	106	<1	<2	<2	<2	<2
SW-02		L2756349-1	2024-06-21	Water	M													
SW-02		VA24B5540-001	2024-06-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	100	102	<1	<2	<2	<2	<2
SW-02		L2756458-1	2024-06-27	Water	M									<0.22	<0.25	<0.21	<0.21	<0.21
SW-02		VA24B7689-001	2024-07-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	109	97.9					
SW-02		L2756726-1	2024-07-19	Water	M													
SW-02		VA24B8974-002	2024-07-31	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	96.5	103	<0.51	<0.33	<0.43	<0.40	<0.41
SW-02		L2756871-2	2024-07-31	Water	M									<0.39	<0.56	<0.24	<0.23	<0.23
SW-02		VA24C1605-001	2024-08-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		87.8	98					
SW-02		L2757153-1	2024-08-23	Water	M													
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	94.2	104					
SW-02	SW-02	L2757209-2	2024-08-27	Water	M									<0.48	<0.28	<0.33	<0.31	<0.31
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		110	108					
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		93	111	<0.44	<0.55	<0.20	<0.20	<0.19
SW-02	SW-02	L2757587-1	2024-09-29	Water	M													
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		88.1	76.7	<0.21	<0.13	<0.20	<0.21	<0.20
SW-02	SW-02	L2757661-1	2024-10-04	Water	M													
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		82.6	74.3	<0.80	<0.54	<0.79	<0.80	<0.78
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M									<0.24	<0.17	<0.19	<0.20	0.2
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		105	98.3	<1	<2	<2	<2	<2
SW-02	SW-02	L2757873-2	2024-10-22	Water	M													
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		96	98.6	<1	<2	<2	<2	<2
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		95	97.9					
SW-02	SW-02	L2757913-1	2024-10-25	Water	M									<0.38	<0.35	<0.20	<0.20	<0.20
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		96.2	102	<1	<2	<2	<2	<2
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		83.3	76.6					
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M													
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		83.3	97.9	<1	<2	<2	<2	<2
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		94.8	96.4	<0.23	<0.20	<0.33	<0.33	<0.31
SW-02	SW-02	L2758155-3	2024-11-16	Water	M									<0.19	<0.19	<0.21	<0.21	<0.19
SW-02		VA24D1587-001	2024-11-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		106	104	<0.27	<0.20	<0.19	<0.19	<0.19
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M													
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		94.4	90.6	<1	<2	<2	<2	<2
SW-02	SW-02	L2758371-1	2024-12-08	Water	M									<0.33	<0.25	<0.35	<0.33	<0.32
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		85.6	86					
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M									<0.69	<0.35	<0.69	0.7	<0.65
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		84.3	88					
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M									<0.59	<0.59	<0.78	<0.77	<0.77
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		79.6	92					
SW-02	SW-02	L2758769-2	2025-01-24	Water	M									<1.5	<0.97	<0.98	<1.0	<1.0
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		85.8	94					
SW-02	SW-02	L2759009-1	2025-02-19	Water	M													
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		77.6	85.5	<0.46	<0.37	<0.36	<0.35	<0.34
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M									<0.23	<0.24	<0.35	<0.35	<0.34
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		71.3	82.4	<0.49	<0.48	<0.39	<0.37	<0.37
SW-02	SW-02	L2759254-1	2025-03-18	Water	M													
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		101	101					
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		115	108	<1	<2	<2	<2	<2
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M									<0.62	<0.49	<1.1	<1.0	<1.0
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		99.9	94.4	<1	<2	<2	<2	<2
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M													
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		102	104	<1	<2	<2	<2	<2
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M													
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		106	104					
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M									<0.26	<0.40	<0.72	<0.68	<0.66
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		115	108	<1	<2	<2	<2	<2

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		110	106					
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M									<0.32	0.74	<0.29	<0.28	<0.27
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		106	102	<1	<2	<2	<2	<2
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		124	103					
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		125	98.8	<1	<2	<2	<2	<2
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M									<0.24	<0.19	<0.40	<0.36	<0.37
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		122	104					
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		129	106					
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M									<0.47	<0.39	<0.49	<0.50	<0.46
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M									<0.58	<0.48	<0.63	<0.63	<0.62
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M									<0.64	<0.51	<0.40	<0.38	<0.38
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M													
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M									<0.35	<0.34	<0.36	<0.33	<0.33
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M													
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M													
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M									<0.48	<0.49	<0.40	<0.41	<0.40
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M									<0.26	<0.22	<0.25	<0.27	<0.25
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M													
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1.6	<1.4	<1.5	<1.5	<1.5
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.63	<0.67	<0.51	<0.49	<0.49
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.45	<0.29	<0.29	<0.29	<0.27
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.14	<0.14	<0.13	<0.13	<0.12
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.26	<0.49	<0.38	<0.37	<0.35
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.58	<0.60	<0.69	<0.65	<0.64
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.18	<0.20	<0.24	0.34	<0.22
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M													
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.30	<0.43	<0.25	<0.25	<0.25
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.54	<0.41	<0.42	<0.43	<0.43
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.23	<0.31	<0.24	<0.24	<0.23
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.50	0.96	1.18	0.9	1.9
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.49	<0.69	<0.59	<0.58	<0.56
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.36	<0.16	<0.16	<0.16	<0.16
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.76	<1.1	<0.62	<0.60	<0.58
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.18	<0.14	<0.18	<0.18	<0.17
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.66	<0.44	<0.46	<0.46	<0.45
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.32	<0.39	<0.20	<0.19	<0.18
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.31	<0.30	<0.27	<0.28	<0.26
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000147	<0.000200							
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.24	<0.41	<0.61	0.58	<0.56
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-03		VA24A1299-003	2024-01-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	108	102					
SW-03		L2754353-3	2024-01-23	Water	M									<0.60	<0.34	<0.61	<0.64	<0.61
SW-03		L2754615-3	2024-02-15	Water	M													
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M	<0.000010	<0.000050	0.000042	0.000018		<0.000050	111	101					

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	87.2	104					
SW-03		L2755012-3	2024-03-19	Water	M													
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	93.1	104					
SW-03		L2755316-7	2024-04-12	Water	M									<0.24	<0.27	<0.27	<0.26	<0.25
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	96.2	104					
SW-03		L2755504-2	2024-04-26	Water	M													
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	100	99	<0.23	<0.37	<0.22	<0.23	<0.22
SW-03		L2755521-3	2024-04-28	Water	M									<0.54	<0.52	<0.46	<0.47	<0.44
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	67.2	103					
SW-03		L2755598-2	2024-05-03	Water	M													
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	89.1	103	<0.35	<0.33	<0.37	<0.37	<0.36
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	99.7	112	<0.39	<0.45	<0.50	<0.48	<0.48
SW-03		L2755677-2	2024-05-09	Water	M									<0.57	<0.57	<0.80	<0.78	<0.77
SW-03		L2755687-2	2024-05-09	Water	M													
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	94.8	112					
SW-03		L2755770-2	2024-05-14	Water	M									<0.33	<0.39	<0.21	<0.23	<0.21
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	95.7	105	<1.4	<1.1	<1.4	<1.3	<1.4
SW-03		L2755819-2	2024-05-17	Water	M													
SW-03		VA24B1636-002	2024-05-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	92.6	106	<1.0	<0.73	<1.1	<1.1	<1.1
SW-03		L2755903-2	2024-05-23	Water	M									<0.55	<0.42	<0.36	<0.37	<0.36
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	94.1	93.1	<0.44	<0.36	<0.51	<0.47	<0.50
SW-03		L2755933-2	2024-05-24	Water	M													
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	102	116	<0.28	<0.27	<0.34	<0.32	<0.31
SW-03		L2755961-2	2024-05-26	Water	M									<0.27	<0.25	<0.28	<0.28	<0.27
SW-03		VA24B4698-002	2024-06-21	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	109	108					
SW-03		L2756349-2	2024-06-21	Water	M													
SW-03		VA24B5540-002	2024-06-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	99.2	102					
SW-03		L2756458-2	2024-06-27	Water	M									<0.33	<0.44	<0.31	<0.30	<0.29
SW-03		VA24B7689-002	2024-07-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	104	94.7					
SW-03		L2756726-2	2024-07-19	Water	M									<1	<2	<2	<2	<2
SW-03		L2756871-3	2024-07-31	Water	M													
SW-03		VA24B8974-003	2024-07-31	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	102	113					
SW-03		VA24C1605-002	2024-08-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		83.3	94.2	<1	<2	<2	<2	<2
SW-03		L2757153-2	2024-08-23	Water	M									<1	<2	<2	<2	<2
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	0.000028	0.000076	0.000098	0.00003	<0.000050		99.1	104	<1	<2	<2	<2	<2
SW-03	SW-03	L2757229-1	2024-08-28	Water	M													
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	<0.000010	<0.000050	0.000062	0.000088	<0.000050		115	113	<1	<2	<2	<2	<2
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	0.000021	<0.000050	0.000024	0.00001	<0.000050		87.7	107	<0.25	<0.20	<0.24	<0.24	<0.22
SW-03	SW-03	L2757587-3	2024-09-29	Water	M									<1	<2	<2	<2	<2
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	<0.000010	<0.000050	<0.000020	0.000013	<0.000050		90	76.5	<0.40	<0.47	0.45	0.38	<0.28
SW-03	SW-03	L2757661-3	2024-10-04	Water	M													
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		76.6	76					
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M													
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		102	93.2	<0.37	<0.51	<0.46	<0.44	<0.42
SW-03	SW-03	L2757873-3	2024-10-22	Water	M													
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		83.6	91.3	<0.44	<0.30	<0.48	<0.46	<0.45
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	<0.000010	<0.000050	0.000028	<0.000010	<0.000050		100	105	<1	<2	<2	<2	<2
SW-03	SW-03	L2757913-3	2024-10-25	Water	M													
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		92.9	98.3					
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		78.9	75.8	<1	<2	<2	<2	<2
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M									<1	<2	<2	<2	<2
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		80.6	94.8	<0.24	0.35	<0.22	<0.22	0.29
SW-03	SW-03	L2758155-2	2024-11-16	Water	M													
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		99.6	103					
SW-03		VA24D1587-002	2024-11-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		101	103	<1	<2	<2	<2	<2
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M									<0.36	<0.27	<0.41	<0.41	<0.40
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		103	99.7	<0.25	<0.22	<0.29	<0.28	<0.28
SW-03	SW-03	L2758371-2	2024-12-08	Water	M													
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		87.9	88.4					
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M									<0.43	<0.90	<0.59	<0.57	<0.55
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		77.8	87.7	<1	<2	<2	<2	<2
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		71.6	81.9	<1	<2	<2	<2	<2
SW-03	SW-03	L2758769-3	2025-01-24	Water	M									<0.24	<0.26	<0.22	<0.22	<0.22
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		94.4	102	<1	<2	<2	<2	<2
SW-03	SW-03	L2759009-2	2025-02-19	Water	M													
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		81.3	90.3					
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M									<0.31	<0.27	<0.26	<0.25	<0.25
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		72.2	86.9	<1	<2	<2	<2	<2
SW-03	SW-03	L2759254-2	2025-03-18	Water	M													
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		93.8	97.5	<0.42	<0.39	<0.38	<0.35	<0.34
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		106	107					
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M									<0.30	<0.37	<0.32	<0.33	<0.32
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		114	108					
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M													
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		108	109					
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M									<0.36	<0.39	<0.49	<0.47	<0.47
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		108	103	<0.78	<1.2	<0.46	<0.44	<0.43
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M									<0.39	<0.37	<0.30	0.31	<0.29
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		112	104					
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		109	105					
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M													
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		104	98.4	<0.41	<0.39	<0.43	<0.42	<0.40
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		112	104	<0.23	<0.25	<0.25	<0.23	<0.23
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		118	95.6	<0.37	<0.44	<0.28	<0.28	<0.27
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M									<0.33	0.38	<0.17	<0.17	<0.16
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		116	104	<0.29	0.45	<0.22	0.3	<0.20
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		128	103	<0.36	<0.49	<0.39	<0.39	<0.36
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M	<0.000128	<0.000257	<0.000128	<0.000026	<0.000064	<0.000257							
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M													
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000113	<0.000200			<0.81	<0.57	<0.88	<0.83	<0.81
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.40	<0.61	<0.29	<0.29	<0.29
SW-04		VA24A1299-004	2024-01-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	106	103					
SW-04		L2754353-4	2024-01-23	Water	M									<0.35	<0.42	<0.58	<0.54	<0.53
SW-04		L2754615-4	2024-02-15	Water	M									<0.33	<0.40	<0.37	<0.37	<0.37
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	104	99.5	<0.28	<0.26	<0.21	<0.21	<0.20
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	97.7	110	<0.24	<0.20	<0.23	<0.23	<0.22
SW-04		L2755012-4	2024-03-19	Water	M									<0.33	<0.32	<0.23	<0.22	<0.22
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	104	106	<0.45	<0.82	<0.32	<0.32	<0.30
SW-04		L2755503-3	2024-04-25	Water	M													
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	107	115					
SW-04		L2755523-2	2024-04-29	Water	M									<0.56	<0.49	<0.58	<0.59	<0.57
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	80.8	114	<0.24	<0.32	<0.30	<0.31	<0.29
SW-04		L2755588-3	2024-05-02	Water	M													
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	89.8	106	<0.27	0.34	<0.26	<0.26	<0.24
SW-04		L2755687-4	2024-05-09	Water	M									<0.14	<0.16	<0.17	<0.16	<0.16
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	91.3	106					
SW-04		L2755695-2	2024-05-10	Water	M													
SW-04		L2755788-2	2024-05-15	Water	M									<0.67	<0.71	<0.68	<0.73	<0.69
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	100	111					
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	95.6	104	<0.27	<0.41	<0.40	<0.39	<0.38
SW-04		L2755820-3	2024-05-16	Water	M									<0.36	<0.26	<0.38	<0.36	<0.36
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	92.2	113	<0.54	<0.52	0.57	<0.54	<0.51
SW-04		VA24B1636-005	2024-05-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	100	108					
SW-04		L2755903-5	2024-05-23	Water	M									<0.24	<0.35	<0.42	<0.41	<0.40
SW-04		L2755916-3	2024-05-23	Water	M									<0.38	<0.54	<0.45	<0.46	<0.44
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	98.2	108	<0.39	<0.39	<0.40	<0.37	0.38
SW-04		L2755961-4	2024-05-26	Water	M									<0.57	<0.17	<0.17	<0.16	<0.16
SW-04		VA24B4655-003	2024-06-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	118	103					
SW-04		L2756326-3	2024-06-20	Water	M									<0.22	<0.18	<0.12	<0.12	<0.19
SW-04		VA24B5289-002	2024-06-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	74.7	102	<0.30	<0.38	<0.20	<0.20	<0.19
SW-04		L2756419-2	2024-06-26	Water	M													
SW-04		VA24B7579-003	2024-07-18	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	98.1	114	<0.62	<0.95	<0.47	<0.47	<0.46
SW-04		L2756717-3	2024-07-18	Water	M													
SW-04		VA24B8974-004	2024-07-31	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	88.8	101					
SW-04		L2756871-4	2024-07-31	Water	M													
SW-04		VA24C1546-003	2024-08-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		88.5	97.5	<0.80	<0.52	<0.58	<0.57	<0.56
SW-04		L2757144-3	2024-08-22	Water	M													
SW-04	SW-04	L2757209-4	2024-08-27	Water	M													
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	94.4	111	<0.27	0.25	<0.15	0.18	0.17
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		94.8	102	<0.53	<0.26	<0.40	<0.40	<0.40
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		78.6	104	<0.29	<0.27	<0.31	<0.32	<0.31
SW-04	SW-04	L2757584-2	2024-09-28	Water	M													
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		79.8	87.2	<0.91	<0.39	<0.89	<0.93	<0.87
SW-04	SW-04	L2757661-4	2024-10-04	Water	M													
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		83	80.2	<0.25	<0.22	<0.24	0.245	<0.23
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M													
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		73.9	82.2	<0.17	<0.14	<0.24	<0.25	<0.23
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		115	104					
SW-04	SW-04	L2757873-4	2024-10-22	Water	M													
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		95.1	100	<0.44	<1.3	<1.2	<1.1	<1.1
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		92.4	96	<0.31	<0.34	<0.57	<0.58	<0.58
SW-04	SW-04	L2757942-1	2024-10-26	Water	M													
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		93.4	98.4	<0.27	<0.21	<0.18	<0.19	<0.18
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		101	97.6	<0.18	<0.17	0.29	<0.18	0.29

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M													
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		80.1	99.4					
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		98.2	101					
SW-04	SW-04	L2758155-4	2024-11-17	Water	M													
SW-04		4-456131118-0	2024-11-17	Water	F													
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		98.7	98.2	<0.17	0.29	<0.14	<0.14	0.37
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		88.2	95.5					
SW-04	SW-04	L2758371-3	2024-12-08	Water	M													
SW-04		4-456441522-0	2024-12-18	Water	F									<0.55	<0.47	<0.34	<0.32	<0.32
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		78.5	82.9					
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M													
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		80.1	89	<0.34	<0.27	<0.34	<0.34	<0.34
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M													
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		69.3	85.4					
SW-04	SW-04	L2758765-1	2025-01-25	Water	M													
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		75.6	85.4	<0.79	<1.5	<0.26	<0.26	<0.25
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M													
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		96.1	113					
SW-04	SW-04	L2759042-2	2025-02-21	Water	M													
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	0.000048	<0.000050	<0.000020	<0.000010	<0.000050		115	109	<0.60	<0.48	<0.77	<0.76	<0.73
SW-04	SW-04	L2759255-2	2025-03-19	Water	M													
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		97.5	104					
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	0.000027	<0.000050	<0.000020	<0.000010	<0.000050		115	107	<0.40	<0.28	<0.81	<0.77	<0.75
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M													
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	0.000015	<0.000050	<0.000020	<0.000010	<0.000050		107	103	<0.58	<0.88	<0.96	<0.94	<0.91
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M													
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M	0.000012	<0.000050	<0.000020	<0.000010	<0.000050		111	113					
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M									<0.37	0.5	<0.22	<0.22	0.24
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	0.000011	<0.000050	<0.000020	<0.000010	<0.000050		90	92.5	<0.44	<0.33	<0.48	<0.47	<0.46
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M													
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	0.000011	<0.000050	<0.000020	<0.000010	<0.000050		108	93.3	<0.24	<0.20	<0.18	<0.17	<0.17
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	0.000014	<0.000050	<0.000020	<0.000010	<0.000050		110	101	<0.74	<0.58	<1.1	<1.0	<0.98
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M													
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	0.000013	<0.000050	<0.000020	<0.000010	<0.000050		103	97.2	<0.25	<0.18	<0.34	<0.34	<0.33
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M	0.000012	<0.000050	<0.000020	<0.000010	<0.000050		116	98.5					
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		117	110					
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M	0.00001	<0.000050	<0.000020	<0.000010	<0.000050		119	108					
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		129	101	<0.23	<0.50	<0.18	<0.18	<0.17
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.22	0.34	<0.20	0.29	0.27
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.41	<0.49	<0.48	<0.48	<0.44
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1.0	<0.96	<0.98	<0.91	<0.90
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.54	<0.47	<0.64	<0.58	<0.58
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000097	<0.000200			<1	<2	<2	<2	<2
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M													
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M													
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.66	<0.85	<0.69	<0.72	<0.67
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.31	<0.22	<0.20	<0.19	<0.19
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<1	<2	<2	<2	<2
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000101	<0.000200							
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.17	<0.22	<0.21	<0.22	0.25
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		83.7	84.5	<0.30	<0.39	<0.28	<0.26	<0.25
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		113	108	<0.39	<0.65	<0.37	<0.35	<0.34
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200			<0.32	<0.45	<0.31	<0.30	0.32
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000072	<0.000200							
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<0.000200							
SW-07		VA24A1299-005	2024-01-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	100	101	<0.52	0.6	<0.29	<0.31	<0.29
SW-07		L2754353-5	2024-01-23	Water	M									<0.28	<0.18	<0.24	<0.25	<0.23
SW-07		L2754615-5	2024-02-15	Water	M									<1	<2	<2	<2	<2
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	104	101					
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	81.4	98.4					
SW-07		L2755012-5	2024-03-19	Water	M									<1	<2	<2	<2	<2
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	97.5	104					
SW-07		L2755504-3	2024-04-26	Water	M									<1	<2	<2	<2	<2
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	112	102					
SW-07		L2755521-1	2024-04-28	Water	M									<1	<2	<2	<2	<2
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	68.7	108	<0.25	<0.28	<0.26	<0.25	<0.25
SW-07		L2755598-3	2024-05-03	Water	M									<1	<2	<2	<2	<2
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	65	72.9					
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	92.9	106					
SW-07		L2755677-3	2024-05-09	Water	M									<1	<2	<2	<2	<2
SW-07		L2755687-3	2024-05-09	Water	M													
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	95.6	113	<0.17	<0.22	<0.21	<0.21	<0.20
SW-07		L2755770-3	2024-05-14	Water	M													
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	93.7	102					
SW-07		L2755819-3	2024-05-17	Water	M									<1	<2	<2	<2	<2
SW-07		VA24B1636-003	2024-05-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	98.6	103	<0.18	<0.22	<0.21	<0.19	0.21
SW-07		L2755903-3	2024-05-23	Water	M													
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	83.8	87.4	<0.69	<0.57	<0.64	<0.63	<0.62
SW-07		L2755933-3	2024-05-24	Water	M													
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	93.2	104					
SW-07		L2755961-3	2024-05-26	Water	M													
SW-07		VA24B4698-003	2024-06-21	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	114	110	<0.22	0.34	<0.14	0.22	0.25
SW-07		L2756349-3	2024-06-21	Water	M													
SW-07		VA24B5289-003	2024-06-26	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	83.4	100	<0.30	<0.29	<0.21	<0.23	<0.21
SW-07		L2756419-3	2024-06-26	Water	M									<1	<2	<2	<2	<2
SW-07		VA24B7689-003	2024-07-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	109	102	<1	<2	<2	<2	<2
SW-07		L2756726-3	2024-07-19	Water	M													
SW-07		L2756871-5	2024-07-31	Water	M									<1	<2	<2	<2	<2
SW-07		VA24B8974-005	2024-07-31	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	98.5	108	<1	<2	<2	<2	<2
SW-07		VA24C1605-003	2024-08-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		91.6	102	<1	<2	<2	<2	<2
SW-07		L2757153-3	2024-08-23	Water	M													
SW-07	SW-07	L2757209-5	2024-08-27	Water	M													
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	90.2	99.8					
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		103	102	<1	<2	<2	<2	<2
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		88.8	110					
SW-07	SW-07	L2757587-4	2024-09-29	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		101	101					
SW-07	SW-07	L2757664-1	2024-10-03	Water	M									<0.30	<0.27	<0.36	<0.37	<0.34
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		72.1	80.6	<1	<2	<2	<2	<2
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M													
SW-07		492-455781017-0	2024-10-13	Water	F													
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		100	92.8					
SW-07	SW-07	L2757873-5	2024-10-22	Water	M									<0.37	<0.25	0.3	<0.18	<0.16
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		82.1	90.6	<1	<2	<2	<2	<2
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		91.6	98.6					
SW-07	SW-07	L2757913-4	2024-10-25	Water	M													
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		98.1	105					
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		77.5	75	<0.25	<0.23	<0.26	<0.27	<0.26
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M									<0.43	<0.34	<0.30	<0.29	<0.28
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		86.3	100	<0.43	<0.33	<0.24	<0.24	<0.24
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		93.3	97					
SW-07	SW-07	L2758155-1	2024-11-16	Water	M									<0.48	0.5	<0.39	<0.42	<0.39
SW-07		VA24D1587-003	2024-11-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		94.6	104	<0.60	<0.52	<0.29	<0.28	<0.27
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M													
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		106	99.1	<1	<2	<2	<2	<2
SW-07	SW-07	L2758371-4	2024-12-08	Water	M									<0.68	<0.62	<0.37	<0.38	<0.36
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		84.1	83.8					
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M													
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		79.4	87.9	<0.32	<0.44	<0.39	<0.39	<0.36
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M									<0.16	0.49	0.17	<0.11	0.17
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		75.8	90.5					
SW-07	SW-07	L2758765-2	2025-01-25	Water	M													
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		76.9	112					
SW-07	SW-07	L2759009-3	2025-02-19	Water	M													
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		77.2	86.7	<0.30	<0.36	<0.32	<0.32	<0.30
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M													
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		69.9	85.4					
SW-07	SW-07	L2759254-3	2025-03-18	Water	M									<0.35	<0.46	<0.35	<0.37	<0.35
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		96.9	99.9					
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		111	107					
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M													
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		102	96.4	<0.18	<0.18	<0.14	<0.15	0.17
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M													
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M									<0.75	<0.59	<0.42	<0.41	<0.40
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		101	104					
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		103	101	<1	<2	<2	<2	<2
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M									<0.76	<0.52	<0.83	<0.81	<0.78
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		108	99					
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		111	107					
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M													
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		110	105	<0.29	<0.28	<0.27	<0.29	<0.27
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		126	107					
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		129	101	<0.70	<0.74	<0.57	<0.58	<0.56
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M													
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		113	100					
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		129	103					
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	111	112	<0.78	<0.70	<0.91	<0.91	<0.89
SW-08		L2755503-2	2024-04-25	Water	M									<0.55	<0.52	<0.89	<0.95	<0.88
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	77.6	109	<0.50	<0.38	<0.34	<0.32	<0.33
SW-08		L2755588-2	2024-05-02	Water	M									<0.23	<0.19	<0.16	<0.16	<0.16
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	90.2	104	<0.54	<0.41	<0.59	<0.61	<0.59
SW-08		L2755694-2	2024-05-10	Water	M													
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	102	104	<0.29	<0.26	<0.25	<0.26	<0.25

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	Total PAHs	Surrogate-Chrysene_d12	Surrogate-Phenanthrene_d10	2-3-7-8-TCDD	1-2-3-7-8-PeCDD	1-2-3-4-7-8-HxCDD	1-2-3-6-7-8-HxCDD	1-2-3-7-8-9-HxCDD
						mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	pg/L	pg/L	pg/L	pg/L	pg/L
SW-08		L2755820-2	2024-05-16	Water	M													
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	94.8	111	<0.31	<0.22	<0.15	<0.14	<0.14
SW-08		L2755916-2	2024-05-23	Water	M													
SW-08		VA24B4655-002	2024-06-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	115	113					
SW-08		L2756326-2	2024-06-20	Water	M													
SW-08		VA24B7579-002	2024-07-18	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	91.6	104					
SW-08		L2756717-2	2024-07-18	Water	M													
SW-08		VA24C1546-002	2024-08-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		96.9	106					
SW-08		L2757144-2	2024-08-22	Water	M									<1	<2	<2	<2	<2
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		100	105	<0.64	<0.59	<0.83	<0.81	<0.81
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		94.6	95.8					
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		90.9	96.3					
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		75.1	69.5	<0.16	<0.24	<0.22	<0.22	<0.21
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		86.2	98.2	<0.30	<0.29	<0.36	<0.33	<0.34
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		110	104	<1.1	<0.68	<0.55	<0.53	<0.53
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	106	106					
SW-09		L2755503-4	2024-04-25	Water	M													
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	73.6	105					
SW-09		L2755588-4	2024-05-02	Water	M									<0.38	<0.45	<0.30	<0.30	<0.29
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	90.4	106					
SW-09		L2755687-5	2024-05-09	Water	M													
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	98.8	107	<1	<2	<2	<2	<2
SW-09		L2755820-4	2024-05-16	Water	M									<0.38	0.65	0.41	<0.31	<0.31
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	103	122	<1	<2	<2	<2	<2
SW-09		L2755916-4	2024-05-23	Water	M													
SW-09		VA24B4655-004	2024-06-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	117	116	<1	<2	<2	<2	<2
SW-09		L2756326-4	2024-06-20	Water	M									<0.40	<0.59	<0.31	<0.28	<0.28
SW-09		VA24B7579-004	2024-07-18	Water	M	<0.000010	<0.000050	<0.000020	<0.000010		<0.000050	98.4	111					
SW-09		L2756717-4	2024-07-18	Water	M													
SW-09		VA24C1546-004	2024-08-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		90.5	98.7	<1	<2	<2	<2	<2
SW-09		L2757144-4	2024-08-22	Water	M									<0.51	<0.25	<0.20	<0.19	<0.19
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		93.3	101					
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		82.4	79.9	<0.48	<0.44	<0.32	<0.30	<0.29
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		95	96.1					
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		89.4	94.9					
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		79.7	78.7					
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M									<0.48	<0.43	<0.56	<0.53	<0.52
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		87	98					
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		100	97.4					
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M													
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		80.1	84.9	<1	<2	<2	<2	<2
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		75.2	87.7	<0.29	<0.17	<0.25	<0.24	<0.23
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M									<0.44	<0.34	<0.30	<0.32	<0.30
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		78.4	88.3					
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M													
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		93.6	97.3	<0.31	<0.36	<0.31	<0.32	<0.30
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		108	101	<1	<2	<2	<2	<2
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		108	105					
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		128	105					
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		119	105					
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050		127	99.6					

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M														
OUT-01		VA24B1636-006	2024-05-23	Water	M														
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M														
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M														
OUT-01		661-455931031-0	2024-10-28	Water	F	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M														
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M														
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M														
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M														
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M														
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M														
OUT-02		VA24B5289-006	2024-06-26	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M														
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M														
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M														
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M														
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M														
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M														
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M														
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M														
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M														
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M														
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M														
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M														
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	0.52	1.2	<0.22	0.23	<0.22	<0.19	<0.21	<0.28	<0.20	<0.30	<0.45	1.64	2	0
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M	0.41	<1.3	<0.27	<0.23	<0.23	<0.15	<0.15	<0.20	<0.15	<0.26	<0.27	<0.65	0	0
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M														
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M	<0.44	5.7	<0.32	0.39	<0.23	<0.13	<0.14	<0.19	<0.13	<0.27	<0.32	0.97	0	0
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M														
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M														
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M														
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M	1.6	16.1	<0.85	<0.53	<0.47	<0.30	<0.27	<0.36	<0.31	0.44	<0.48	1.6	0	0
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M														
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M	0.42	2.9	<0.20	0.38	<0.19	<0.12	<0.11	<0.17	<0.13	0.31	<0.19	1.06	0	0
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M														
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M														
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M	<1.1	<1.2	<0.46	0.42	<0.26	<0.24	<0.23	<0.31	<0.24	<0.32	<0.51	<1.2	0	0
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M														
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M	<0.70	<2.0	<0.54	<0.43	<0.39	<0.34	0.45	<0.44	<0.32	0.7	<0.60	<1.2	0	1
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M	0.87	4.8	<0.57	<0.42	<0.36	<0.24	<0.22	<0.29	<0.23	<0.38	<0.51	<1.4	1	0
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M														
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M														
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M	<0.78	5.2	<0.38	<0.36	<0.33	<0.24	<0.22	<0.28	<0.21	<0.61	<0.79	<0.80	0	0
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M	0.59	6.9	<0.48	0.51	<0.24	<0.22	<0.21	<0.30	<0.22	0.49	<0.39	1.8	0	0
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M														
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M	<0.74	4.8	<0.56	<0.44	<0.38	<0.38	<0.35	<0.53	<0.38	0.63	<0.59	3.4	0	0

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M	<0.29	2.57	<0.36	0.36	<0.12	<0.20	<0.20	<0.27	<0.21	1.3	<1.0	0.26	0	0
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M														
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M	<0.48	1.88	<0.29	0.54	<0.30	<0.22	<0.22	0.32	<0.23	<0.22	<0.30	1	0	0
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M	0.61	1.7	<0.32	<0.30	<0.28	<0.27	<0.25	<0.37	<0.29	<0.26	<0.30	<0.60	0	0
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M	<1.1	<4.1	<0.74	<0.49	<0.42	<0.55	<0.54	<0.90	<0.59	1.6	<1.4	<4.3	0	0
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M														
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M	<1.2	<2.4	<0.50	<0.30	<0.28	<0.25	<0.24	<0.33	<0.25	<0.36	<0.54	<1.7	0	0
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M														
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M	<1.5	<3.5	<1.8	<0.93	<0.84	<0.59	<0.62	<0.99	<0.62	<2.3	<3.5	<3.3	0	0
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M														
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M	1.4	17.6	<0.62	<0.37	0.31	<0.28	0.32	<0.46	<0.30	0.89	<0.68	2	0	1
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	0.95	10	<0.86	<0.34	<0.28	<0.32	<0.32	<0.42	<0.30	<0.93	<1.4	1.7	0	0
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M	<0.71	8	<0.45	<0.35	<0.28	<0.30	<0.28	<0.39	<0.29	<0.39	<0.54	<0.84	0	0
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M														
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	<0.38	3.98	<0.30	<0.31	<0.26	<0.23	<0.22	<0.28	<0.23	<0.31	<0.42	1.5	0	0
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	0.31	<0.58	<0.28	0.49	<0.24	0.17	<0.16	0.35	<0.14	0.36	<0.35	0.43	0	1
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M														
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	0.6	1.83	<0.31	0.47	<0.18	0.18	0.22	0.2	<0.14	0.34	0.22	0.93	0	1
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M														
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	0.84	3	<0.41	0.56	<0.26	<0.32	<0.32	<0.47	<0.32	<0.45	<0.77	<1.4	1	0
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	0.87	1.7	<0.38	<0.33	<0.27	<0.21	<0.20	<0.25	<0.21	<0.20	<0.27	<0.73	1	0
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M														
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	<0.22	1	<0.21	0.41	<0.13	<0.12	<0.12	<0.15	<0.12	0.15	<0.20	0.42	0	0
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	0.46	2.69	<0.27	<0.21	<0.17	<0.12	<0.12	0.31	<0.13	0.28	0.46	1.2	0	0
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	<2.4	3.4	<0.42	0.97	0.66	0.55	0.85	1.37	0.48	<0.54	<0.91	<1.5	0	0
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M														
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	<0.41	2.9	<0.50	<0.35	<0.31	<0.19	<0.19	<0.25	<0.17	<0.25	<0.34	0.6	0	0
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M														
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M														
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	<0.30	0.9	<0.24	0.42	<0.22	<0.082	<0.084	<0.12	<0.083	<0.19	<0.25	<0.41	0	0
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	<0.34	1.3	<0.25	0.21	0.15	<0.19	<0.19	<0.25	<0.19	<0.54	<0.59	<1.0	0	0
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	1.99	39.9	<0.24	0.32	<0.18	0.17	0.24	<0.19	0.2	0.37	<0.25	3	2	0
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M														
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	<0.35	1.4	<0.36	0.25	<0.18	<0.13	<0.14	0.19	<0.14	<0.16	<0.20	<0.53	0	0
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M														
SW-01		VA24A1299-001	2024-01-23	Water	M														
SW-01		L2754353-1	2024-01-23	Water	M	0.56	3.9	<0.23	<0.23	<0.24	<0.15	<0.13	<0.22	0.17	0.47	<0.30	<0.82	0	1
SW-01		L2754615-1	2024-02-15	Water	M	<0.35	<1.0	<0.27	0.36	<0.24	<0.21	<0.18	<0.25	<0.21	<0.26	<0.31	4.34	0	0
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M														
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	<0.36	1.2	<0.23	0.29	<0.14	<0.096	<0.10	<0.14	<0.10	<0.16	<0.22	0.4	0	0
SW-01		L2755012-1	2024-03-19	Water	M														
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M														
SW-01		L2755503-1	2024-04-25	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-01		L2755523-1	2024-04-29	Water	M														
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M														
SW-01		L2755588-1	2024-05-02	Water	M														
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M														
SW-01		L2755694-1	2024-05-10	Water	M														
SW-01		L2755695-1	2024-05-10	Water	M														
SW-01		L2755788-1	2024-05-15	Water	M														
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M														
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M														
SW-01		L2755820-1	2024-05-16	Water	M														
SW-01		VA24B1628-001	2024-05-22	Water	M														
SW-01		L2755902-1	2024-05-22	Water	M														
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M														
SW-01		L2755916-1	2024-05-23	Water	M														
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M														
SW-01		VA24B4655-001	2024-06-20	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-01		L2756326-1	2024-06-20	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-01		VA24B5289-001	2024-06-26	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-01		L2756419-1	2024-06-26	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-01		VA24B7579-001	2024-07-18	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-01		L2756717-1	2024-07-18	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-01		VA24B8974-001	2024-07-31	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-01		L2756871-1	2024-07-31	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-01		VA24C1546-001	2024-08-22	Water	M	0.544	<5.0	<0.24	0.322	<0.23	<0.14	<0.13	<0.18	<0.16	<0.22	<0.22	<1.6	1	0
SW-01		L2757144-1	2024-08-22	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	<0.39	11.7	<0.25	<0.48	<0.44	<0.17	<0.16	<0.21	<0.17	<1.1	<1.1	<1.6	0	0
SW-01	SW-01	L2757209-1	2024-08-27	Water	M	0.387	<1.4	<0.29	<0.27	<0.23	<0.22	<0.20	<0.26	<0.23	<0.21	<0.21	<0.89	1	0
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	<0.52	3.36	<0.56	<0.30	<0.25	<0.40	<0.36	<0.48	<0.40	<0.19	<0.25	<1.1	1	0
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	<0.37	<1.6	<0.40	<0.61	<0.36	<0.27	<0.25	<0.34	<0.29	<0.22	<0.30	<0.91	0	0
SW-01	SW-01	L2757584-1	2024-09-28	Water	M														
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M														
SW-01	SW-01	L2757664-2	2024-10-03	Water	M	<0.80	<3.3	<0.87	<0.38	<0.34	<0.39	<0.36	<0.54	<0.41	<0.46	<0.37	<1.7	0	0
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	<0.61	<3.0	<0.68	<0.24	<0.22	<0.29	<0.29	<0.38	<0.31	<0.36	<0.42	1.14	0	0
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M	<0.56	<2.4	<0.89	<0.44	<0.35	<0.28	<0.27	<0.40	<0.30	<0.37	<0.46	<1.0	0	0
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	0.91	10.9	<0.33	<0.22	<0.21	<0.23	0.284	<0.27	<0.24	<0.36	<0.49	<0.86	2	0
SW-01	SW-01	L2757873-1	2024-10-22	Water	M														
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M														
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M														
SW-01	SW-01	L2757942-2	2024-10-26	Water	M	<0.73	<2.7	<0.74	<0.74	<0.67	<0.39	<0.40	<0.47	<0.42	<0.53	<0.67	<1.0	0	0
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	<0.53	1.19	<0.70	<0.37	<0.31	<0.21	<0.21	<0.27	<0.22	<0.23	<0.30	<0.68	0	0
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	<0.55	1.31	<0.40	<0.35	<0.33	<0.26	<0.26	<0.34	<0.27	<0.40	<0.56	1.5	0	0
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	<0.57	<1.8	<0.74	<0.38	<0.33	<0.23	<0.23	<0.31	<0.24	<0.31	<0.46	<1.3	0	0
SW-01	SW-01	L2758119-1	2024-11-12	Water	M														
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	<0.45	1.3	<0.37	<0.26	0.26	<0.17	<0.17	<0.24	<0.18	<0.29	<0.44	<0.94	0	0
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M														
SW-01	SW-01	L2758350-1	2024-12-06	Water	M	<0.14	1.3	<0.15	<0.22	<0.21	<0.17	<0.17	<0.22	<0.18	<0.16	<0.21	<0.60	0	0
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M														
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M	0.37	1.7	<0.18	0.4	<0.18	<0.096	<0.097	0.12	<0.092	<0.25	<0.30	0.24	0	0
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	<0.47	3.2	<0.49	0.39	<0.23	<0.15	0.21	<0.21	<0.15	<0.27	<0.37	<0.78	0	0
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M	<0.52	<1.1	<0.41	<0.38	<0.34	<0.28	<0.27	<0.33	<0.27	<0.38	<0.49	<0.97	0	0
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	<0.48	3.5	<0.36	0.19	<0.16	0.22	<0.18	0.33	<0.19	0.28	<0.28	1.3	0	0
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M														
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M														
SW-01	SW-01	L2758769-1	2025-01-24	Water	M	<0.67	5.1	<0.17	0.26	<0.20	<0.14	<0.14	<0.19	<0.14	<0.24	<0.35	<1.0	0	0
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M														
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M														
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	<2.2	4.5	<2.0	<1.1	<0.98	<0.43	0.6	<0.81	<0.51	<1.5	<2.1	<3.2	0	0
SW-01	SW-01	L2759042-1	2025-02-21	Water	M	<0.45	<1.7	<0.20	0.28	<0.24	<0.20	<0.19	<0.28	<0.20	<0.27	<0.38	<1.2	0	0
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	0.48	2.2	<0.40	0.31	<0.24	0.39	<0.37	<0.48	<0.38	0.58	<0.48	1.2	0	1
SW-01	SW-01	L2759255-1	2025-03-19	Water	M														
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	1.4	12.2	<0.44	0.32	<0.23	<0.26	<0.31	0.47	<0.31	0.85	<0.63	<1.7	1	0
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M														
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M														
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M														
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M	0.35	<0.74	<0.28	<0.38	<0.28	<0.12	<0.12	<0.17	<0.11	<0.19	<0.31	<0.34	0	0
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	0.48	1.33	<0.30	0.28	<0.16	<0.15	<0.13	<0.19	<0.15	<0.12	<0.17	0.36	0	0
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M														
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	0.41	2.03	0.37	0.42	0.18	0.16	<0.11	0.24	0.18	0.2	0.2	0.69	0	0
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M	0.98	2.96	<0.29	0.37	<0.18	<0.19	<0.19	0.25	0.2	<0.13	0.45	1.51	2	0
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M														
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	1.02	<1.4	<0.31	<0.47	<0.42	<0.24	<0.23	<0.37	<0.23	<0.27	<0.51	<1.3	1	0
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M	<0.43	<2.3	<0.76	0.41	<0.27	<0.25	<0.26	<0.42	<0.25	<0.83	<1.5	<0.82	0	0
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M														
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	0.49	2.4	<0.77	<0.78	<0.72	<0.30	<0.33	<0.49	<0.30	<0.56	<0.90	<1.8	0	0
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	0.44	2	<0.30	0.38	<0.26	<0.25	<0.26	<0.37	<0.25	<0.27	<0.42	<0.74	0	0
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M														
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M														
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M	<0.42	<1.3	<0.47	<0.30	<0.26	<0.18	<0.18	<0.23	<0.20	<0.35	<0.34	<1.3	0	0
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M	0.93	9.3	<0.46	0.73	<0.33	<0.24	<0.23	<0.32	<0.25	<0.34	<0.40	<1.2	0	0

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M	<0.29	13.3	<0.28	0.404	<0.26	<0.15	<0.11	<0.15	<0.12	<0.49	<0.23	<2.2	0	0
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M														
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M														
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M														
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M	0.661	<1.6	<0.80	<0.33	<0.29	<0.22	<0.21	<0.38	<0.24	<0.30	<0.35	1.08	1	0
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M														
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M	<0.54	<1.8	<0.66	<0.47	<0.38	<0.27	<0.25	<0.34	<0.29	1.41	<0.46	<1.3	0	1
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M	<1.1	6.4	<0.67	<0.32	<0.29	<0.36	<0.34	<0.46	<0.36	<0.43	<0.56	<1.3	0	0
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M	<0.60	<2.0	<0.36	<0.34	<0.29	<0.30	<0.30	<0.41	<0.30	<0.28	<0.44	<1.2	0	0
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M														
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M	0.517	<1.0	<0.22	<0.62	<0.098	<0.15	<0.13	<0.19	<0.16	<0.24	<0.29	<0.60	1	0
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M	0.53	8.25	<0.16	1.29	<0.12	<0.11	<0.099	<0.14	<0.12	0.62	<0.19	0.72	1	1
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M														
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M														
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	<0.65	3.9	<0.57	<0.32	<0.28	<0.34	<0.32	<0.44	<0.33	0.56	<0.51	25.5	0	0
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M														
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	0.95	7.05	<0.27	<0.26	<0.24	<0.18	<0.16	<0.20	<0.17	<0.26	<0.32	<0.77	0	0
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M														
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	0.92	10.2	<3.1	<0.67	<0.60	<0.31	<0.27	<0.34	<0.30	0.52	<0.46	1.1	1	1
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	<0.43	2.3	<0.23	0.25	<0.12	<0.11	<0.093	<0.16	<0.12	<0.16	<0.23	<0.60	0	0
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M														
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	<0.84	2.1	<0.41	<0.34	<0.31	<0.26	<0.27	<0.34	<0.27	<0.43	<0.65	<0.95	0	0
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M														
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M	0.861	5.08	0.303	<0.26	<0.25	<0.22	<0.21	<0.28	<0.24	<0.19	<0.24	<0.63	2	0
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M														
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	0.5	4.6	<0.42	0.56	0.29	0.35	0.28	0.27	0.31	0.47	<0.22	1.5	0	1
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M	<0.32	1.58	<0.16	<0.31	<0.28	<0.072	<0.067	<0.093	<0.077	<0.13	<0.12	0.701	0	0
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M	<0.70	<8.2	<0.35	<0.26	<0.24	<0.25	<0.22	<0.28	<0.25	<0.40	<0.40	<2.1	0	0
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW-02	23F0370-03	2023-06-02	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M	<1.2	<3.0	<0.81	<0.77	<0.38	<0.34	<0.33	<0.49	<0.37	<0.44	<0.59	<1.1	0	0
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M														
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M	<0.86	6.88	<0.60	<0.54	<0.47	<0.29	<0.27	<0.36	<0.31	<0.38	<0.49	<0.80	1	0
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M														
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M														
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M														
SW-02		VA24A1299-002	2024-01-23	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02		L2754353-2	2024-01-23	Water	M														
SW-02		L2754615-2	2024-02-15	Water	M	<0.37	1	<0.12	0.29	<0.13	<0.18	<0.18	<0.24	<0.19	<0.12	<0.16	0.25	0	0
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02		L2755012-2	2024-03-19	Water	M														
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	<0.62	<3.2	<0.28	<0.29	<0.24	<0.18	<0.18	<0.23	<0.19	<0.33	<0.32	<2.1	0	0
SW-02		L2755316-6	2024-04-12	Water	M	1.5	5.2	4.1	1.2	<0.27	<0.17	<0.16	<0.22	<0.16	0.74	<0.30	<0.70	0	0
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M														
SW-02		L2755504-1	2024-04-26	Water	M														
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02		L2755521-2	2024-04-28	Water	M														
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M														
SW-02		L2755598-1	2024-05-03	Water	M														
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	0.358	1.57	<0.32	<0.26	<0.23	<0.085	<0.076	<0.14	<0.11	<0.43	<0.059	0.672	1	0
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M														
SW-02		L2755677-1	2024-05-09	Water	M	<0.56	2.1	<0.85	<0.17	<0.18	<0.13	<0.14	<0.18	<0.13	<0.36	<0.44	<0.68	0	0
SW-02		L2755687-1	2024-05-09	Water	M	0.41	2.4	<0.27	0.28	<0.13	<0.083	<0.087	<0.12	0.129	<0.15	<0.20	0.45	0	0
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M														
SW-02		L2755770-1	2024-05-14	Water	M														
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M														
SW-02		L2755819-1	2024-05-17	Water	M	<0.39	2.8	<0.49	<0.40	<0.36	<0.19	<0.18	<0.25	<0.18	<0.27	<0.35	1.18	0	0

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-02		VA24B1636-001	2024-05-23	Water	M														
SW-02		L2755903-1	2024-05-23	Water	M	<0.28	3.04	<0.87	0.37	<0.29	<0.21	<0.23	<0.33	<0.23	<1.6	<2.3	<0.53	0	0
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02		L2755933-1	2024-05-24	Water	M														
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M														
SW-02		L2755961-1	2024-05-26	Water	M	<0.23	1	<0.19	0.3	<0.13	<0.11	<0.11	0.22	<0.12	<0.13	<0.19	<0.39	0	0
SW-02		VA24B4698-001	2024-06-21	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02		L2756349-1	2024-06-21	Water	M														
SW-02		VA24B5540-001	2024-06-27	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02		L2756458-1	2024-06-27	Water	M	<0.30	1.2	<0.24	0.37	<0.11	0.18	<0.14	0.18	0.27	0.3	<0.20	0.67	0	0
SW-02		VA24B7689-001	2024-07-19	Water	M														
SW-02		L2756726-1	2024-07-19	Water	M														
SW-02		VA24B8974-002	2024-07-31	Water	M	<0.52	<1.6	<0.71	<0.33	<0.28	<0.30	<0.28	<0.40	<0.33	<0.59	<0.41	<0.89	0	0
SW-02		L2756871-2	2024-07-31	Water	M	0.5	2	<0.36	<0.34	<0.27	<0.14	<0.14	<0.18	<0.14	<0.30	<0.43	<0.57	0	0
SW-02		VA24C1605-001	2024-08-23	Water	M														
SW-02		L2757153-1	2024-08-23	Water	M														
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M														
SW-02	SW-02	L2757209-2	2024-08-27	Water	M	<0.48	3.5	<0.39	0.6	<0.22	<0.25	<0.25	<0.40	<0.27	<0.44	<0.73	<1.3	0	0
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M														
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	<0.77	<5.9	<0.29	<0.26	<0.25	<0.17	<0.18	<0.21	<0.18	<0.21	<0.21	0.914	0	0
SW-02	SW-02	L2757587-1	2024-09-29	Water	M														
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	<0.53	<4.3	<0.23	<0.40	<0.18	<0.23	<0.23	<0.31	<0.25	<0.35	<0.34	<2.6	0	0
SW-02	SW-02	L2757661-1	2024-10-04	Water	M														
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	<0.69	<3.2	<0.75	<0.39	<0.36	<0.24	<0.26	<0.30	<0.25	<0.35	<0.39	1.35	0	0
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M	0.45	2.1	<0.29	0.36	<0.13	<0.16	<0.15	<0.20	0.21	<0.17	<0.24	0.68	1	0
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW-02	L2757873-2	2024-10-22	Water	M														
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M														
SW-02	SW-02	L2757913-1	2024-10-25	Water	M	<0.35	0.94	<0.20	<0.34	<0.25	<0.11	<0.12	<0.17	<0.11	<0.17	<0.31	<0.26	0	0
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M														
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M														
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	<0.28	4.23	<0.25	<0.31	<0.21	<0.26	<0.24	<0.34	<0.28	<0.36	<0.25	<1.6	0	0
SW-02	SW-02	L2758155-3	2024-11-16	Water	M	0.65	3.3	<0.25	0.3	<0.16	0.15	<0.14	0.2	<0.13	<0.26	<0.35	0.85	1	0
SW-02		VA24D1587-001	2024-11-20	Water	M	<0.37	2.19	<0.23	<0.22	<0.21	<0.14	<0.14	<0.19	<0.15	<0.22	<0.25	<1.2	0	0
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M														
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW-02	L2758371-1	2024-12-08	Water	M	1	5.7	<0.37	0.68	<0.29	<0.23	<0.23	0.33	<0.23	<0.43	<0.58	<0.84	0	0
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M														
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M	8.2	38	<0.50	3.4	<0.39	<0.45	<0.49	<0.63	<0.47	<0.99	<1.4	1.3	1	0
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M														
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M	5	78	<0.55	0.97	<0.25	0.44	<0.42	<0.68	<0.43	4.1	<1.0	9	1	1
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M														
SW-02	SW-02	L2758769-2	2025-01-24	Water	M	<1.9	4.3	<1.8	<0.83	<0.75	<0.59	<0.62	<1.0	<0.66	<0.83	<1.2	<3.7	0	0
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M														
SW-02	SW-02	L2759009-1	2025-02-19	Water	M														
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	<0.83	7.76	<0.26	<0.29	<0.28	<0.16	<0.14	<0.21	<0.17	<0.40	<0.54	<0.61	0	0
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M	<0.53	<1.4	<0.30	<0.21	<0.19	<0.20	<0.19	<0.27	<0.20	<0.29	<0.42	<1.2	0	0
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	<0.55	<2.1	<0.61	<0.39	<0.33	<0.26	<0.27	<0.32	<0.28	<0.28	<0.33	<0.94	0	0
SW-02	SW-02	L2759254-1	2025-03-18	Water	M														
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M														
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M	1.7	<4.7	<0.48	<0.50	<0.44	<0.36	<0.39	<0.64	0.58	2.1	<1.1	9.5	0	0
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	8	<3	<4		
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M														
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M														
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M														
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M	<0.55	2.4	<0.29	0.74	<0.30	<0.31	<0.26	<0.43	<0.33	0.41	<0.38	1.2	0	0
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M														
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M	0.68	2.15	<0.38	0.45	<0.29	<0.18	<0.16	<0.21	<0.17	0.34	<0.27	<0.55	0	0
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M														
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M	<0.49	2.95	<0.30	0.24	<0.12	<0.10	<0.11	<0.15	<0.11	<0.17	<0.21	<0.30	0	0
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M														
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M														
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M	<0.79	8.4	<0.53	<0.38	<0.32	<0.31	<0.30	<0.39	<0.30	<0.42	<0.56	<1.2	0	0
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M	<0.52	4.7	<0.61	<0.41	<0.38	<0.24	<0.22	<0.30	<0.24	<0.30	<0.41	<1.2	0	0
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M	<0.42	1.2	<0.74	<0.30	<0.27	0.27	<0.17	0.31	<0.19	<0.21	<0.28	<0.53	0	0
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M														
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M	<0.74	12.3	<0.28	<0.19	<0.19	<0.30	<0.29	<0.40	<0.31	<0.27	<0.35	<0.62	0	0
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M														
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M														
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M	<0.32	1.84	<0.55	<0.44	<0.39	<0.31	<0.30	<0.37	<0.33	<0.27	<0.33	<0.68	0	0
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M	0.8	1.48	<0.29	0.49	<0.15	0.23	0.2	<0.18	<0.15	0.22	<0.30	0.38	1	0
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M														
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M	<2.4	<5.0	<2.0	<0.95	<0.87	<0.49	<0.50	<0.86	<0.55	<1.3	<2.0	<7.4	0	0
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M	1.1	14.4	<0.29	<0.23	<0.19	<0.40	<0.43	<0.53	<0.40	<0.54	<0.78	<1.0	0	0
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M														
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M														
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M	0.69	5.6	<0.52	0.61	<0.28	<0.23	<0.20	<0.29	<0.23	<0.21	<0.28	1.1	0	0
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M														
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M														
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M														
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M	0.53	4.58	0.2	0.29	<0.094	<0.10	0.129	0.13	<0.10	0.15	<0.17	0.7	1	0
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M	0.68	<1.0	<0.33	<0.33	<0.31	<0.32	<0.28	<0.44	<0.35	0.54	<0.25	<0.92	0	1
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M														
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M														
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M														
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M														
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M														
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M	<1.1	<6.6	<0.54	<0.33	<0.31	<0.37	<0.38	<0.65	<0.41	1.2	<0.90	<3.1	0	0
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	0.68	6.57	<0.22	0.37	<0.23	<0.17	0.17	0.26	0.22	<0.22	<0.29	1.59	2	0
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M														
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	<0.20	0.87	<0.19	<0.30	<0.23	<0.098	<0.095	0.2	<0.093	<0.15	<0.26	<0.30	0	0
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	1.8	27.5	<0.55	<0.35	<0.28	<0.30	<0.32	<0.46	<0.32	1	<0.55	2.9	0	1
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M														
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	<0.22	1.8	<0.19	0.26	<0.23	<0.095	<0.093	<0.13	<0.10	<0.23	<0.31	<0.53	0	0
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	6.49	123	<0.41	0.94	0.84	1.4	1	1.4	1.1	3.6	<0.74	11	2	0
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M														
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M														
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M														
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	<0.91	3	<0.66	<0.47	<0.40	<0.33	<0.34	<0.45	<0.34	<0.31	<0.44	15.1	0	0
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M														
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	<0.36	2.35	<0.22	<0.17	<0.16	<0.14	<0.14	<0.20	<0.15	<0.34	<0.43	<0.68	0	0
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M														
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	<1.2	<4.1	<0.60	<0.53	<0.49	<0.33	<0.29	<0.49	<0.36	<0.61	<0.95	<3.3	0	0
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	0.61	2.83	<0.19	0.24	<0.14	<0.13	<0.12	<0.19	<0.15	<0.16	<0.22	0.59	1	0
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M														
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	<1.2	<1.7	<0.39	0.51	<0.31	<0.29	<0.30	<0.40	<0.30	<0.50	<0.75	<1.6	0	0
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	0.53	1.43	<0.35	0.33	<0.16	<0.14	<0.14	<0.18	<0.15	<0.23	<0.27	<0.64	0	0
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	<0.42	<1.3	<0.31	<0.27	<0.26	<0.27	<0.26	<0.37	<0.26	0.71	<0.39	6.2	0	1
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M														
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M														
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	0.75	2.1	<0.33	<0.56	<0.51	<0.41	<0.27	<0.49	<0.38	<0.34	<0.34	1.09	0	0
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M														
SW-03		VA24A1299-003	2024-01-23	Water	M														
SW-03		L2754353-3	2024-01-23	Water	M	1.5	25	<0.55	<0.41	<0.38	<0.25	<0.24	<0.32	<0.25	0.69	<0.58	4	0	0
SW-03		L2754615-3	2024-02-15	Water	M														
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M														
SW-03		L2755012-3	2024-03-19	Water	M														
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M														
SW-03		L2755316-7	2024-04-12	Water	M	1.27	4.22	<0.20	0.24	<0.21	<0.15	<0.15	<0.19	<0.16	<0.25	<0.31	0.65	2	0
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M														
SW-03		L2755504-2	2024-04-26	Water	M														
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	0.39	2.73	<0.20	0.32	<0.17	0.175	0.14	0.23	<0.088	0.27	0.31	0.46	0	0
SW-03		L2755521-3	2024-04-28	Water	M	<0.75	2.8	<0.44	<0.35	<0.36	<0.30	<0.26	<0.42	<0.31	<0.47	<0.71	<1.7	0	0
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M														
SW-03		L2755598-2	2024-05-03	Water	M														
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	<0.40	<0.83	<0.45	<0.28	<0.30	<0.19	<0.19	<0.25	<0.18	<0.27	<0.35	<0.42	0	0
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	<0.67	1.57	<0.49	0.3	<0.28	<0.22	<0.22	<0.31	<0.22	<0.31	<0.39	<0.83	0	0
SW-03		L2755677-2	2024-05-09	Water	M	2.73	10.5	<0.51	<0.41	<0.35	<0.33	<0.33	<0.43	<0.34	0.8	<0.54	<1.0	1	0
SW-03		L2755687-2	2024-05-09	Water	M														
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M														
SW-03		L2755770-2	2024-05-14	Water	M	1.15	<6.0	<0.29	<0.18	<0.17	<0.25	<0.25	<0.33	<0.27	<0.15	<0.21	<1.0	1	0
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	2.3	4.8	<1.5	<0.84	<0.76	<0.43	<0.41	<0.67	<0.46	<1.0	<1.4	<3.6	0	0
SW-03		L2755819-2	2024-05-17	Water	M														
SW-03		VA24B1636-002	2024-05-23	Water	M	<1.2	5	<0.84	<0.49	<0.44	<0.52	<0.54	<0.86	<0.55	2.1	<1.7	<3.2	0	1
SW-03		L2755903-2	2024-05-23	Water	M	1.02	<5.0	<0.87	<0.44	<0.38	<0.22	<0.20	<0.27	0.392	<0.49	<0.68	<1.3	2	0
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	1.61	8.2	<0.49	0.32	0.35	<0.25	<0.26	<0.40	<0.29	<0.66	<0.96	<1.1	1	0
SW-03		L2755933-2	2024-05-24	Water	M														
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	1.5	7.63	<0.41	0.64	<0.18	0.31	<0.15	0.22	<0.16	<0.24	<0.33	1.4	1	0
SW-03		L2755961-2	2024-05-26	Water	M	<0.29	<0.67	<0.24	<0.43	<0.16	<0.11	<0.11	<0.15	<0.12	<0.32	<0.38	0.671	0	0
SW-03		VA24B4698-002	2024-06-21	Water	M														
SW-03		L2756349-2	2024-06-21	Water	M														
SW-03		VA24B5540-002	2024-06-27	Water	M														
SW-03		L2756458-2	2024-06-27	Water	M	<0.33	5.2	<0.36	<0.23	<0.21	<0.14	<0.13	<0.19	<0.15	<0.22	<0.20	<1.3	1	0
SW-03		VA24B7689-002	2024-07-19	Water	M														
SW-03		L2756726-2	2024-07-19	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03		L2756871-3	2024-07-31	Water	M														
SW-03		VA24B8974-003	2024-07-31	Water	M														
SW-03		VA24C1605-002	2024-08-23	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03		L2757153-2	2024-08-23	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW-03	L2757229-1	2024-08-28	Water	M														
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	0.53	1.78	<0.26	0.37	<0.16	0.13	0.17	<0.11	<0.081	0.17	<0.15	0.24	0	0
SW-03	SW-03	L2757587-3	2024-09-29	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	0.65	3.73	<0.48	0.65	<0.24	0.27	0.31	0.5	<0.22	0.3	<0.40	0.58	1	0
SW-03	SW-03	L2757661-3	2024-10-04	Water	M														
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M														
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M														
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	1.03	5.4	<0.50	<0.29	<0.28	<0.15	<0.16	<0.20	<0.15	<0.31	<0.35	0.97	1	0
SW-03	SW-03	L2757873-3	2024-10-22	Water	M														
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	1.1	2.6	<0.40	0.56	<0.31	<0.50	<0.55	<0.73	<0.57	<0.80	<1.0	1.9	0	0
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW-03	L2757913-3	2024-10-25	Water	M														
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M														
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	0.71	2.01	<0.26	0.4	<0.13	0.18	<0.14	0.22	0.21	0.21	0.23	0.95	1	0
SW-03	SW-03	L2758155-2	2024-11-16	Water	M														
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M														
SW-03		VA24D1587-002	2024-11-20	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M	<0.50	1	<0.51	<0.46	<0.42	<0.17	<0.18	<0.23	<0.16	<0.27	<0.39	<0.73	0	0
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	0.59	1.4	<0.43	<0.22	<0.17	<0.17	<0.17	0.23	<0.17	<0.14	<0.19	0.49	0	0
SW-03	SW-03	L2758371-2	2024-12-08	Water	M														
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M														
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M	<0.56	3.8	<0.28	<0.47	<0.40	<0.12	<0.12	<0.19	<0.12	<0.57	<1.0	<1.2	0	0
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW-03	L2758769-3	2025-01-24	Water	M	0.33	0.89	<0.19	0.29	<0.19	<0.13	0.18	<0.16	<0.13	<0.16	<0.22	0.43	0	0
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW-03	L2759009-2	2025-02-19	Water	M														
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M														
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M	<0.27	1.56	<0.26	0.31	<0.23	<0.12	<0.11	<0.15	<0.12	<0.27	<0.35	<0.54	0	0
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-03	SW-03	L2759254-2	2025-03-18	Water	M														
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	1.49	6	<0.46	0.69	<0.17	<0.21	0.22	<0.29	<0.20	0.38	<0.29	2	1	1
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M														
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M	0.47	1.5	<0.27	<0.29	<0.23	<0.17	<0.17	<0.21	<0.17	<0.25	<0.36	<0.53	1	0
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M														
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M														
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M														
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M	0.47	2	<0.34	0.47	<0.29	0.25	<0.21	<0.26	<0.22	<0.31	<0.37	<0.93	0	0
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	<0.61	<3.7	<0.87	<0.34	<0.31	<0.19	<0.22	<0.32	<0.19	<1.2	<2.0	<1.3	0	0
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M	<0.60	3.9	<0.42	<0.39	<0.33	<0.31	<0.32	<0.48	<0.33	<0.45	<0.75	<1.2	0	0
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M														
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M														
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M														
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	<0.78	3.8	<0.49	0.67	<0.35	<0.30	<0.31	<0.45	<0.35	<0.42	<0.57	1.3	0	0
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	<0.41	2.6	<0.22	0.2	<0.15	<0.15	<0.14	<0.21	<0.16	<0.21	<0.30	<1.1	0	0
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	<0.44	1	<0.30	<0.36	<0.24	<0.13	<0.14	<0.20	<0.13	<0.23	<0.38	<0.39	0	0
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M	0.66	2.79	<0.29	0.56	<0.14	0.15	0.22	0.27	0.14	0.419	0.3	1.32	2	1
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	0.65	2.19	<0.38	0.5	<0.19	<0.13	0.17	<0.16	<0.12	<0.15	<0.18	1.6	0	0
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	0.81	12.3	<0.36	0.33	<0.24	<0.26	<0.26	<0.33	<0.25	<0.49	<0.66	2.2	0	0
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M														
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M														
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M														
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M														
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M														
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M														
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M														
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M														
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M														
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M														
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M														
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M														
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M														
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M														
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M														
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M														
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M														
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M														
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M														
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M														
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M														
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M														
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M														
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M														
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M														
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M														
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M														
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M														
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M														
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M														
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M														
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M														
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	<0.78	8	<0.91	<0.56	<0.50	0.43	<0.44	0.83	<0.45	<0.88	<1.3	3.5	0	0
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M														
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	1.2	8.5	<0.29	0.45	<0.31	<0.27	<0.28	<0.40	<0.30	0.78	<0.63	1.4	0	0
SW-04		VA24A1299-004	2024-01-23	Water	M														
SW-04		L2754353-4	2024-01-23	Water	M	<0.86	4.8	<0.47	0.42	<0.27	0.21	<0.11	0.25	<0.11	<0.24	<0.32	<1.4	0	0
SW-04		L2754615-4	2024-02-15	Water	M	<0.38	1.5	<0.29	<0.24	<0.22	<0.20	<0.19	<0.25	<0.20	<0.20	<0.26	<0.75	0	0
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	0.73	2.89	<0.35	0.41	<0.21	<0.20	<0.19	<0.24	<0.20	<0.21	0.29	1.15	2	0
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	0.27	1.35	<0.33	0.41	<0.23	<0.13	<0.11	<0.15	<0.12	<0.11	0.21	<0.26	0	1
SW-04		L2755012-4	2024-03-19	Water	M	0.34	2.54	<0.19	0.27	<0.20	<0.15	<0.15	<0.19	<0.15	<0.13	<0.17	<0.60	0	0
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	<0.46	1.6	<0.39	0.44	<0.35	<0.39	<0.39	<0.53	<0.38	<0.46	<0.60	<1.5	0	0
SW-04		L2755503-3	2024-04-25	Water	M														
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M														
SW-04		L2755523-2	2024-04-29	Water	M	<0.81	<1.7	<0.47	<0.38	<0.32	<0.26	<0.26	<0.37	<0.27	<0.33	<0.52	<1.3	0	0
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	<0.35	2.6	<0.20	0.33	<0.19	<0.13	<0.13	<0.18	<0.14	<0.24	<0.35	<0.82	0	0
SW-04		L2755588-3	2024-05-02	Water	M														
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	0.65	4.6	<0.40	<0.30	<0.26	<0.22	0.21	0.33	<0.21	0.57	<0.38	1.9	0	0
SW-04		L2755687-4	2024-05-09	Water	M	0.56	3.68	<0.15	0.23	<0.14	<0.089	<0.079	<0.13	<0.10	<0.15	<0.21	0.92	0	0
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M														
SW-04		L2755695-2	2024-05-10	Water	M														
SW-04		L2755788-2	2024-05-15	Water	M	<0.60	<1.8	<0.61	<0.64	<0.58	<0.38	<0.35	<0.43	<0.39	<0.28	<0.36	<0.85	0	0
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M														
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	0.6	2.1	<0.20	0.53	<0.18	0.18	0.17	0.21	0.23	<0.16	<0.20	0.7	0	0
SW-04		L2755820-3	2024-05-16	Water	M	<0.42	<1.1	<0.25	<0.17	<0.16	<0.14	<0.14	<0.19	<0.15	<0.37	<0.45	<0.78	0	0
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	0.58	2.4	<0.54	0.61	<0.38	<0.22	<0.23	<0.32	<0.22	<0.37	<0.50	<0.64	1	0
SW-04		VA24B1636-005	2024-05-23	Water	M														
SW-04		L2755903-5	2024-05-23	Water	M	0.503	3.32	<0.27	<0.41	<0.23	<0.13	<0.12	<0.16	0.149	<0.32	<0.27	1.15	2	0
SW-04		L2755916-3	2024-05-23	Water	M	<0.43	<2.6	<0.39	<0.36	<0.31	<0.32	<0.31	<0.41	<0.35	<0.38	<0.37	<2.5	0	0
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	0.79	4.8	<0.40	0.36	<0.25	<0.19	<0.18	<0.26	<0.19	<0.29	<0.40	<1.5	2	0
SW-04		L2755961-4	2024-05-26	Water	M	0.79	<5.9	<0.17	0.327	<0.25	<0.19	<0.18	<0.26	<0.21	<0.35	<0.16	<2.3	2	0
SW-04		VA24B4655-003	2024-06-20	Water	M														
SW-04		L2756326-3	2024-06-20	Water	M	<0.39	8.79	<0.20	<0.17	<0.14	<0.15	<0.15	<0.20	<0.16	<0.91	<0.93	<2.2	0	0
SW-04		VA24B5289-002	2024-06-26	Water	M	1.19	17.7	<0.19	0.47	<0.26	0.17	0.19	<0.21	<0.13	<0.19	<0.26	<1.2	1	0
SW-04		L2756419-2	2024-06-26	Water	M														
SW-04		VA24B7579-003	2024-07-18	Water	M	1.19	12.8	<0.92	<0.48	<0.44	<0.32	<0.31	<0.39	<0.33	<0.64	<0.33	<2.7	1	0
SW-04		L2756717-3	2024-07-18	Water	M														
SW-04		VA24B8974-004	2024-07-31	Water	M														
SW-04		L2756871-4	2024-07-31	Water	M														
SW-04		VA24C1546-003	2024-08-22	Water	M	<0.67	3.01	<0.98	<0.52	<0.45	<0.35	<0.32	<0.50	<0.39	<0.48	<0.60	<1.2	0	0
SW-04		L2757144-3	2024-08-22	Water	M														
SW-04	SW-04	L2757209-4	2024-08-27	Water	M														
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	0.589	1	<0.19	0.46	0.16	0.2	0.237	0.2	0.15	0.31	<0.17	0.35	1	0
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	<0.54	0.992	<0.66	<0.63	<0.30	<0.22	<0.19	<0.28	<0.23	<0.35	<0.37	<0.93	0	0
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	<0.48	<2.1	<0.27	<0.26	<0.23	<0.22	<0.17	<0.26	<0.23	<0.37	<0.35	<1.2	0	0
SW-04	SW-04	L2757584-2	2024-09-28	Water	M														
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	<0.80	2.9	<0.63	0.5	<0.39	<0.39	<0.41	<0.58	<0.37	<1.1	<1.9	<1.6	0	0
SW-04	SW-04	L2757661-4	2024-10-04	Water	M														
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	0.476	<1.8	<0.43	<0.36	<0.16	<0.18	0.233	<0.24	<0.19	<0.29	<0.39	<0.65	1	0
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M														
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	<0.47	<4.6	<0.23	<0.38	<0.21	<0.10	<0.093	<0.12	<0.10	<0.34	<0.35	<2.1	0	0
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M														
SW-04	SW-04	L2757873-4	2024-10-22	Water	M														
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	<1.0	2	<0.84	<0.57	<0.52	<0.29	<0.31	<0.46	<0.29	<0.28	<0.46	<1.5	0	0
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	1.93	6.7	<0.33	<0.24	0.38	<0.20	<0.20	<0.30	<0.22	0.48	<0.65	<0.98	1	0
SW-04	SW-04	L2757942-1	2024-10-26	Water	M														
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	0.3	1	<0.33	0.33	<0.21	<0.15	<0.16	<0.19	<0.15	<0.12	<0.17	0.4	0	0
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	0.47	1.7	<0.17	0.45	0.14	0.24	0.2	0.22	<0.13	0.28	<0.14	0.63	1	0

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M														
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M														
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M														
SW-04	SW-04	L2758155-4	2024-11-17	Water	M														
SW-04		4-456131118-0	2024-11-17	Water	F														
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	0.52	1.87	<0.15	0.41	<0.12	0.21	0.18	0.24	<0.11	0.33	0.24	0.54	1	1
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M														
SW-04	SW-04	L2758371-3	2024-12-08	Water	M														
SW-04		4-456441522-0	2024-12-18	Water	F	<0.57	1.8	<0.40	<0.33	<0.28	0.22	<0.20	<0.29	<0.21	<0.29	<0.39	<0.97	0	0
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M														
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M														
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	<0.46	1.8	<0.34	<0.31	<0.26	<0.20	<0.19	<0.23	<0.19	<0.29	<0.37	<0.77	0	0
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M														
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M														
SW-04	SW-04	L2758765-1	2025-01-25	Water	M														
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	<0.86	4.5	<0.35	<0.30	<0.29	<0.22	<0.22	<0.31	<0.24	<0.24	<0.25	<1.3	0	0
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M														
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M														
SW-04	SW-04	L2759042-2	2025-02-21	Water	M														
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	<0.93	1.8	<0.36	0.41	<0.26	<0.25	<0.26	<0.37	<0.23	<0.39	<0.65	<1.0	0	0
SW-04	SW-04	L2759255-2	2025-03-19	Water	M														
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M														
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	0.84	23.3	<0.51	0.37	<0.37	<0.18	<0.19	<0.29	<0.19	<0.30	<0.44	<0.99	0	0
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M														
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	<0.46	1.7	<0.42	<0.31	<0.26	<0.23	<0.25	<0.37	<0.23	<0.33	<0.56	<0.76	0	0
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M														
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M														
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M	0.42	2.21	<0.40	0.45	<0.16	0.21	0.23	<0.24	<0.19	<0.19	<0.23	0.8	0	0
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	0.392	1.54	<0.57	<0.46	<0.40	<0.29	<0.32	<0.35	<0.31	<0.32	<0.39	<0.60	1	0
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M														
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	<0.49	1.36	<0.16	<0.27	<0.12	<0.11	<0.097	<0.14	<0.12	<0.23	<0.26	<0.48	0	0
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	<1.7	5.1	<0.56	<0.46	0.41	<0.40	<0.45	<0.72	<0.49	<0.84	<1.3	<2.4	0	0
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M														
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	<0.41	7.41	<0.37	<0.32	<0.14	<0.11	<0.099	<0.14	<0.12	<0.29	<0.31	<3.0	0	0
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M														
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M														
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M														
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	0.516	<6.7	<0.15	<0.32	<0.12	<0.15	<0.14	<0.19	<0.15	<0.42	<0.15	<1.3	1	0
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	0.75	4.47	<0.30	<0.21	<0.17	<0.16	0.17	0.28	<0.15	0.31	0.32	1.65	0	0
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M														
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M														
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M														
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	1.1	26.5	<0.61	<0.33	<0.25	<0.40	<0.31	<0.53	<0.38	0.56	<0.63	4.31	0	0
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M														
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M														
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	<2.2	<7.4	<0.92	<0.63	<0.55	<0.51	<0.56	<0.90	<0.54	2.9	<1.5	<3.8	0	0
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	0.91	5.8	<0.51	0.37	<0.25	<0.35	<0.36	<0.58	<0.38	3.9	<0.76	4.8	0	0
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M														
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M														
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M														
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M														
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M	<0.73	<6.8	<0.56	<0.79	<0.72	<0.50	<0.47	<0.64	<0.53	<0.55	<0.57	<2.2	0	0
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M	<0.57	<2.2	<0.27	<0.20	<0.18	<0.15	<0.13	<0.20	<0.15	<0.31	<0.32	<0.61	0	0
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M														
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M														
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M														
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M														
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M														
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	0.59	5.27	<0.21	0.39	<0.16	<0.14	<0.13	<0.20	<0.15	<0.20	<0.31	0.87	0	0
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	0.38	0.95	<0.21	<0.30	<0.27	<0.15	0.15	<0.19	0.16	<0.26	<0.35	0.82	0	0
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	<0.50	1.3	<0.34	<0.35	<0.33	<0.35	<0.25	<0.43	<0.34	<0.31	<0.29	<0.98	0	0
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	0.92	10.9	<0.29	0.57	0.3	<0.16	<0.15	0.31	<0.16	0.91	<0.44	4.59	1	0
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M														
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M														
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M														
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M														
SW-07		VA24A1299-005	2024-01-23	Water	M	0.81	5.4	<0.33	0.58	<0.28	<0.33	<0.32	<0.45	<0.32	<0.36	<0.45	<1.1	0	0
SW-07		L2754353-5	2024-01-23	Water	M	<0.35	6.75	<0.17	0.508	<0.21	<0.099	<0.090	<0.13	<0.10	<0.99	<0.98	<3.1	0	0
SW-07		L2754615-5	2024-02-15	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M														
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M														
SW-07		L2755012-5	2024-03-19	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M														
SW-07		L2755504-3	2024-04-26	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M														
SW-07		L2755521-1	2024-04-28	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	0.6	2.3	<0.28	0.33	0.25	<0.18	<0.18	<0.25	0.54	0.48	0.42	1.66	1	0
SW-07		L2755598-3	2024-05-03	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M														
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M														
SW-07		L2755677-3	2024-05-09	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07		L2755687-3	2024-05-09	Water	M														
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	0.59	8.82	<0.19	0.35	<0.15	<0.13	<0.11	<0.17	<0.14	0.27	<0.18	0.91	0	0
SW-07		L2755770-3	2024-05-14	Water	M														
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M														
SW-07		L2755819-3	2024-05-17	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07		VA24B1636-003	2024-05-23	Water	M	1.04	5	<0.26	0.5	<0.16	<0.16	<0.14	<0.23	<0.16	<0.35	<0.52	<0.88	1	0
SW-07		L2755903-3	2024-05-23	Water	M														
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	<0.78	3.41	<0.80	<0.47	<0.41	<0.37	<0.34	<0.52	<0.40	<0.62	<0.90	2.28	0	0
SW-07		L2755933-3	2024-05-24	Water	M														
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M														
SW-07		L2755961-3	2024-05-26	Water	M														
SW-07		VA24B4698-003	2024-06-21	Water	M	0.64	2.61	<0.25	<0.28	<0.21	<0.16	0.16	0.28	<0.15	<0.22	0.54	0.99	0	0
SW-07		L2756349-3	2024-06-21	Water	M														
SW-07		VA24B5289-003	2024-06-26	Water	M	0.26	2.83	<0.20	<0.22	<0.20	<0.16	<0.15	<0.20	<0.16	<0.24	<0.30	<0.66	0	0
SW-07		L2756419-3	2024-06-26	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07		VA24B7689-003	2024-07-19	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07		L2756726-3	2024-07-19	Water	M														
SW-07		L2756871-5	2024-07-31	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07		VA24B8974-005	2024-07-31	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07		VA24C1605-003	2024-08-23	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07		L2757153-3	2024-08-23	Water	M														
SW-07	SW-07	L2757209-5	2024-08-27	Water	M														
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M														
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M														
SW-07	SW-07	L2757587-4	2024-09-29	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M														
SW-07	SW-07	L2757664-1	2024-10-03	Water	M	0.52	1.3	<0.26	<0.22	<0.23	<0.17	<0.17	<0.21	<0.17	0.25	<0.20	<0.56	0	0
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M														
SW-07		492-455781017-0	2024-10-13	Water	F														
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M														
SW-07	SW-07	L2757873-5	2024-10-22	Water	M	1.5	20.6	<0.25	0.41	<0.18	0.26	<0.14	<0.20	0.2	<0.47	<0.60	1	0	0
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M														
SW-07	SW-07	L2757913-4	2024-10-25	Water	M														
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M														
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	0.33	7.7	<0.27	0.21	<0.19	<0.13	<0.13	<0.16	<0.13	<0.19	<0.23	<0.39	0	0
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M	<0.43	2	<0.47	0.47	<0.22	<0.20	<0.21	<0.28	<0.20	<0.23	<0.34	<0.66	0	0
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	0.94	6	<0.28	<0.31	<0.31	0.23	<0.18	<0.26	<0.19	0.83	<0.57	<1.1	0	0
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M														
SW-07	SW-07	L2758155-1	2024-11-16	Water	M	0.67	4.8	<0.26	<0.23	<0.18	<0.27	<0.27	<0.37	<0.27	<0.51	<0.78	<0.72	1	0
SW-07		VA24D1587-003	2024-11-20	Water	M	0.85	8.7	<0.51	0.7	<0.15	<0.11	<0.12	<0.18	<0.12	<0.60	<0.84	<0.61	1	0
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M														
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07	SW-07	L2758371-4	2024-12-08	Water	M	<0.72	3.4	<0.70	<0.36	<0.30	<0.40	<0.42	<0.60	<0.40	<0.43	<0.66	<3.6	0	0
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M														
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M														
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	0.71	3.6	<0.34	<0.22	<0.23	<0.14	<0.14	<0.19	<0.14	<0.25	<0.29	<0.88	1	0
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M	0.48	1.85	<0.22	0.43	<0.15	<0.15	<0.15	0.23	<0.15	0.28	0.3	0.58	1	0
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M														
SW-07	SW-07	L2758765-2	2025-01-25	Water	M														
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M														
SW-07	SW-07	L2759009-3	2025-02-19	Water	M														
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	0.55	0.98	<0.24	0.43	<0.24	<0.15	<0.14	<0.18	<0.14	0.41	<0.25	0.62	0	1
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M														
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M														
SW-07	SW-07	L2759254-3	2025-03-18	Water	M	1.28	2	<0.33	<0.37	0.37	<0.40	<0.41	<0.52	<0.41	<0.56	<0.73	<1.3	1	0
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M														
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M														
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M														
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	1.02	6.09	<0.20	0.31	<0.15	<0.18	<0.18	<0.23	<0.18	<0.21	<0.28	0.87	1	0
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M														
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M	<0.95	<4.0	<1.0	<0.33	<0.30	<0.33	<0.34	<0.42	<0.37	<0.72	<0.34	<1.2	0	0
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M														
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M	2	6.4	<0.62	<0.42	<0.37	<0.33	<0.33	<0.51	0.41	1	<0.90	<4.9	0	0
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M														
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M														
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M														
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	0.5	3.9	<0.25	0.4	<0.22	<0.16	<0.15	<0.20	<0.16	<0.20	<0.25	<0.59	0	0
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M														
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	<0.63	2.76	<0.79	<0.54	<0.47	<0.34	<0.32	<0.40	<0.35	<0.28	<0.37	<0.83	0	0
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M														
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M														
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M														
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	0.83	2.25	<0.78	<0.66	<0.60	<0.39	<0.39	<0.48	<0.42	<0.45	<0.56	<0.63	1	0
SW-08		L2755503-2	2024-04-25	Water	M	<1.5	11.6	<0.76	<0.40	<0.38	<0.37	<0.36	<0.47	<0.41	<0.45	<0.44	<5.1	0	0
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	0.601	<2.1	<0.73	<0.30	<0.27	<0.26	<0.26	<0.36	<0.30	<0.26	<0.34	<0.78	1	0
SW-08		L2755588-2	2024-05-02	Water	M	0.54	<8.7	<0.39	0.484	<0.10	<0.10	<0.096	<0.13	<0.11	<0.26	<0.26	<1.4	0	0
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	<0.98	<3.5	<0.86	0.78	<0.50	<0.62	0.696	<0.57	<0.61	<2.8	<0.69	<2.8	0	0
SW-08		L2755694-2	2024-05-10	Water	M														
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	<0.64	<2.9	<0.30	<0.37	<0.14	<0.15	<0.14	<0.20	0.182	<0.41	<0.49	<1.9	0	0

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	1-2-3-4-6-7-8-HpCDD	OCDD	2-3-7-8-TCDF	1-2-3-7-8-PeCDF	2-3-4-7-8-PeCDF	1-2-3-4-7-8-HxCDF	1-2-3-6-7-8-HxCDF	1-2-3-7-8-9-HxCDF	2-3-4-6-7-8-HxCDF	1-2-3-4-6-7-8-HpCDF	1-2-3-4-7-8-9-HpCDF	OCDF	Total HpCDD # of Homologues	Total HpCDF # of Homologues
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L		
SW-08		L2755820-2	2024-05-16	Water	M														
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	0.349	2.05	<0.21	<0.33	<0.16	<0.12	<0.11	<0.16	<0.12	<0.34	<0.45	<0.74	1	0
SW-08		L2755916-2	2024-05-23	Water	M														
SW-08		VA24B4655-002	2024-06-20	Water	M														
SW-08		L2756326-2	2024-06-20	Water	M														
SW-08		VA24B7579-002	2024-07-18	Water	M														
SW-08		L2756717-2	2024-07-18	Water	M														
SW-08		VA24C1546-002	2024-08-22	Water	M														
SW-08		L2757144-2	2024-08-22	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	<0.76	2	<0.60	<0.41	<0.34	<0.27	<0.27	<0.36	<0.28	<0.47	<0.72	<1.4	0	0
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M														
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M														
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	0.61	4.13	<0.20	0.34	<0.18	<0.10	<0.090	<0.14	<0.11	<0.14	<0.20	0.68	1	0
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	<0.77	<1.7	<0.29	<0.40	<0.36	<0.36	<0.41	<0.23	<0.59	5.32	<0.45	<2.3	0	1
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	<0.36	1.2	<1.6	<0.49	<0.42	<0.24	<0.23	0.3	<0.25	<0.25	<0.32	<0.58	0	0
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M														
SW-09		L2755503-4	2024-04-25	Water	M														
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M														
SW-09		L2755588-4	2024-05-02	Water	M	<0.57	<0.83	<0.52	0.36	<0.28	<0.20	<0.21	<0.29	<0.20	<0.24	<0.29	<0.41	0	0
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M														
SW-09		L2755687-5	2024-05-09	Water	M														
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-09		L2755820-4	2024-05-16	Water	M	0.92	2.9	<0.38	0.82	0.53	0.28	<0.14	0.35	0.5	0.6	<0.57	4.3	0	0
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-09		L2755916-4	2024-05-23	Water	M														
SW-09		VA24B4655-004	2024-06-20	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	<3	<3	<4		
SW-09		L2756326-4	2024-06-20	Water	M	1.64	14.5	<0.28	0.31	<0.15	<0.13	0.16	<0.20	0.28	<0.52	<0.74	<0.70	1	0
SW-09		VA24B7579-004	2024-07-18	Water	M														
SW-09		L2756717-4	2024-07-18	Water	M														
SW-09		VA24C1546-004	2024-08-22	Water	M	<3	19	<1	<2	<2	<2	<2	<2	<2	18	<3	19		
SW-09		L2757144-4	2024-08-22	Water	M	<0.37	0.87	<0.45	<0.31	<0.33	<0.13	<0.13	<0.17	0.16	<0.19	<0.23	<0.68	0	0
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M														
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	0.76	2.6	<0.35	0.42	<0.20	<0.16	<0.17	<0.23	<0.16	<0.34	<0.40	<0.72	0	0
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M														
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M														
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M														
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M	0.88	3.1	<0.47	<0.41	<0.42	<0.35	<0.34	<0.49	<0.35	<0.47	<0.62	0.98	1	0
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M														
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M														
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M														
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	7	<3	<4		
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	0.35	1.2	<0.22	0.39	<0.19	<0.17	<0.17	<0.24	<0.19	<0.22	<0.26	0.35	0	0
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M	1.03	16.5	<0.33	<0.34	<0.34	<0.17	<0.15	<0.20	<0.15	<0.62	<0.79	<0.77	2	0
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M														
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M														
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	<0.31	1.1	<0.32	0.32	<0.24	<0.14	<0.13	<0.17	<0.14	<0.21	<0.26	<0.57	0	0
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	<3	<4	<1	<2	<2	<2	<2	<2	<2	14	<3	<4		
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M														
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M														
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M														
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M														

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M														
OUT-01		VA24B1636-006	2024-05-23	Water	M														
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M														
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M														
OUT-01		661-455931031-0	2024-10-28	Water	F														
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M														
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M														
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M														
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M														
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M														
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M														
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M														
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M														
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M														
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M														
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M														
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M														
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M														
OUT-02		VA24B5289-006	2024-06-26	Water	M														
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M														
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M														
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M														
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M														
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M														
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M														
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M														
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M														
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M														
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M														
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M														
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M														
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M														
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M														
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M														
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M														
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M														
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M														
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M														
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M														
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M														
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	0	0	1	0	1	0	0.83	<0.45	<0.32	<0.28	0.17	<0.22	0.15	<0.22
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M	0	0	0	0	0	0	<0.29	<0.27	<0.40	<0.20	<0.35	<0.23	<0.27	<0.27
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M														
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M	0	0	0	0	0	0	<0.44	<0.32	<0.34	<0.19	<0.43	<0.24	<0.69	<0.32
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M														
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M														
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M														
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M	0	0	0	0	0	0	<0.56	<0.48	<0.73	<0.36	<0.88	<0.53	<0.96	<0.85
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M														
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M	0	0	0	1	0	0	<0.22	<0.19	<0.34	<0.17	<0.20	0.38	<0.23	<0.20
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M														
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M														
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M	0	0	0	0	0	0	<1.1	<0.51	<0.68	<0.31	<0.40	<0.31	<0.44	<0.46
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M														
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M	0	1	0	0	0	0	<0.70	0.7	<0.74	0.45	<0.57	<0.43	<0.63	<0.54
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M	0	0	0	0	0	0	0.87	<0.51	<0.53	<0.29	<0.56	<0.42	<0.72	<0.57
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M														
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M														
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M	0	0	0	0	0	0	<0.78	<0.79	<0.29	<0.28	<0.41	<0.36	<0.42	<0.38
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M	1	0	0	0	0	0	<0.53	<0.39	0.43	<0.30	<0.42	<0.28	<0.41	<0.48
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M														
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M	0	0	0	0	0	0	<0.74	<0.59	<0.76	<0.53	<0.62	<0.44	<0.65	<0.56

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M	0	0	0	0	0	0	<0.29	<1.0	<0.19	<0.27	<0.31	<0.14	<0.15	<0.36
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M														
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M	0	0	0	0	0	0	<0.48	<0.30	<0.40	<0.26	<0.20	<0.34	<0.19	<0.29
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M	0	0	0	0	0	0	<0.38	<0.30	<0.37	<0.37	<0.42	<0.30	<0.28	<0.32
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M	0	2	0	0	0	0	<1.1	<1.4	<0.89	1.27	<0.87	<0.49	<0.84	<0.74
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M														
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M	0	0	0	0	0	0	<1.2	<0.54	<0.51	<0.33	<0.44	<0.30	<0.51	<0.50
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M														
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M	0	0	0	0	0	0	<1.5	<3.5	<1.4	<0.99	<1.7	<0.93	<1.8	<1.8
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M														
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M	0	0	0	0	0	0	<0.62	0.89	<0.57	<0.46	<0.49	<0.37	<0.65	<0.62
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	0	0	0	0	0	0	<0.44	<1.4	<0.45	<0.42	<0.60	<0.34	<0.67	<0.86
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M	0	0	0	0	0	0	<0.71	<0.54	<0.38	<0.39	<0.36	<0.35	<0.40	<0.45
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M														
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	0	0	0	0	0	0	<0.38	<0.42	<0.30	<0.28	<0.28	<0.31	<0.18	<0.30
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	0	0	0	1	0	0	<0.30	0.36	<0.34	<0.23	<0.62	0.49	<0.30	<0.28
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M														
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	0	0	0	1	0	0	<0.25	0.34	<0.25	<0.18	<0.17	0.47	<0.21	<0.31
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M														
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	0	0	0	1	0	0	0.84	<0.77	<0.38	<0.47	<0.35	0.56	<0.48	<0.41
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	0	0	0	0	0	0	0.87	<0.27	<0.41	<0.25	<0.65	<0.33	<0.46	<0.38
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M														
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	0	0	0	1	0	0	<0.22	<0.20	<0.21	<0.15	<0.17	0.41	<0.23	<0.21
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	0	1	0	0	0	0	<0.27	<0.25	<0.18	0.31	<0.25	<0.21	<0.33	<0.27
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	0	2	0	0	0	0	<2.4	<0.91	<0.66	2.22	<0.83	<0.34	<0.44	<0.42
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M														
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	0	0	0	0	0	0	<0.41	<0.34	<0.36	<0.25	<0.30	<0.35	<0.30	<0.50
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M														
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M														
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	0	0	0	1	0	0	<0.30	<0.25	<0.22	<0.12	<0.28	0.42	<0.21	<0.24
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	0	0	0	0	0	0	<0.34	<0.59	<0.26	<0.25	<0.24	<0.13	<1.1	<0.25
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	0	3	0	0	0	0	4	<0.25	<0.26	0.57	<0.55	<0.18	<0.43	<0.24
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M														
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	0	0	0	0	0	0	<0.35	<0.20	<0.25	<0.18	<0.22	<0.18	<0.50	<0.36
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M														
SW-01		VA24A1299-001	2024-01-23	Water	M														
SW-01		L2754353-1	2024-01-23	Water	M	0	0	0	0	0	1	<0.41	0.31	<0.29	<0.22	<0.26	<0.24	<0.21	0.38
SW-01		L2754615-1	2024-02-15	Water	M	0	0	0	1	0	2	<0.35	<0.31	<0.33	<0.25	<0.39	0.36	<0.31	0.45
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M														
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	0	0	0	0	1	0	<0.36	<0.22	<0.18	<0.14	<0.31	<0.14	0.45	<0.23
SW-01		L2755012-1	2024-03-19	Water	M														
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M														
SW-01		L2755503-1	2024-04-25	Water	M														
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M														
SW-01		L2755523-1	2024-04-29	Water	M														
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M														
SW-01		L2755588-1	2024-05-02	Water	M														
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M														
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M														
SW-01		L2755694-1	2024-05-10	Water	M														
SW-01		L2755695-1	2024-05-10	Water	M														
SW-01		L2755788-1	2024-05-15	Water	M														
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M														
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M														
SW-01		L2755820-1	2024-05-16	Water	M														
SW-01		VA24B1628-001	2024-05-22	Water	M														
SW-01		L2755902-1	2024-05-22	Water	M														
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M														
SW-01		L2755916-1	2024-05-23	Water	M														
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M														
SW-01		VA24B4655-001	2024-06-20	Water	M														
SW-01		L2756326-1	2024-06-20	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-01		VA24B5289-001	2024-06-26	Water	M														
SW-01		L2756419-1	2024-06-26	Water	M														
SW-01		VA24B7579-001	2024-07-18	Water	M														
SW-01		L2756717-1	2024-07-18	Water	M														
SW-01		VA24B8974-001	2024-07-31	Water	M														
SW-01		L2756871-1	2024-07-31	Water	M														
SW-01		VA24C1546-001	2024-08-22	Water	M	0	0	0	1	0	0	0.544	<0.22	<0.16	<0.18	<0.34	0.322	<0.32	<0.24
SW-01		L2757144-1	2024-08-22	Water	M														
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M	0	0	0	0	0	0	<0.39	<1.1	<0.33	<0.21	<0.23	<0.48	<0.31	<0.25
SW-01	SW-01	L2757209-1	2024-08-27	Water	M	0	0	0	0	0	0	0.387	<0.21	<0.25	<0.26	<0.21	<0.27	<0.28	<0.29
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M	0	0	0	0	1	0	0.265	<0.25	<0.14	<0.48	<0.25	<0.30	1.4	<0.56
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M	2	0	0	0	0	0	<0.21	<0.30	0.663	<0.34	<0.39	<0.40	<0.35	<0.40
SW-01	SW-01	L2757584-1	2024-09-28	Water	M														
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M														
SW-01	SW-01	L2757664-2	2024-10-03	Water	M	0	0	0	0	0	0	<0.59	<0.37	<0.55	<0.54	<0.51	<0.38	<0.64	<0.87
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M	0	0	0	0	0	0	<0.61	<0.42	<0.43	<0.38	<0.29	<0.24	<0.48	<0.68
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M	0	0	0	0	0	0	<0.56	<0.46	<0.45	<0.40	<0.49	<0.39	<0.68	<0.89
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M	0	1	0	0	0	0	1.83	<0.49	<0.53	0.284	<0.43	<0.22	<0.41	<0.33
SW-01	SW-01	L2757873-1	2024-10-22	Water	M														
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M														
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M														
SW-01	SW-01	L2757942-2	2024-10-26	Water	M	0	0	0	0	0	0	<0.73	<0.67	<0.78	<0.47	<0.90	<0.74	<0.66	<0.74
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	0	0	0	0	0	0	<0.53	<0.30	<0.48	<0.27	<0.48	<0.37	<0.52	<0.70
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	0	0	0	0	0	0	<0.55	<0.56	<0.46	<0.34	<0.51	<0.35	<0.47	<0.40
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	0	0	0	0	0	0	<0.57	<0.46	<0.51	<0.31	<0.59	<0.38	<0.54	<0.74
SW-01	SW-01	L2758119-1	2024-11-12	Water	M														
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	0	0	0	0	0	0	<0.45	<0.44	<0.32	<0.24	<0.37	<0.26	<0.40	<0.37
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M														
SW-01	SW-01	L2758350-1	2024-12-06	Water	M	0	0	0	0	0	0	<0.14	<0.21	<0.30	<0.22	<0.24	<0.22	<0.21	<0.15
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M														
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M	0	0	0	1	0	0	<0.20	<0.30	<0.17	<0.12	<0.22	0.4	<0.18	<0.18
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	0	0	0	1	0	1	<0.47	<0.37	<0.40	<0.21	<0.32	0.39	<0.36	0.63
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M	0	0	0	0	0	0	<0.52	<0.49	<0.50	<0.33	<0.42	<0.38	<0.51	<0.41
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	0	0	0	0	0	0	<0.48	<0.28	<0.29	<0.25	<0.30	<0.17	<0.31	<0.36
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M														
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M														
SW-01	SW-01	L2758769-1	2025-01-24	Water	M	0	0	0	0	0	0	<0.67	<0.35	<0.31	<0.19	<0.24	<0.22	<0.24	<0.17
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M														
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M														
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	0	0	0	0	0	0	<2.2	<2.1	<1.4	<0.81	<1.2	<1.1	<1.5	<2.0
SW-01	SW-01	L2759042-1	2025-02-21	Water	M	0	0	0	0	0	0	<0.45	<0.38	<0.28	<0.28	<0.23	<0.26	<0.24	<0.20
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	0	0	0	0	0	0	<0.41	0.58	<0.38	<0.48	<0.31	<0.26	<0.35	<0.40
SW-01	SW-01	L2759255-1	2025-03-19	Water	M														
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	0	0	0	0	0	0	1.23	<0.63	<0.71	<0.45	<0.38	<0.23	<0.41	<0.44
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M														
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M														
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M														
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M	0	0	0	0	0	0	<0.25	<0.31	<0.37	<0.17	<0.47	<0.38	<0.38	<0.28
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	0	0	0	0	0	0	<0.24	<0.17	<0.17	<0.19	<0.21	<0.20	<0.27	<0.30
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M														
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	2	0	0	0	0	0	<0.11	<0.15	0.42	<0.14	<0.15	<0.11	<0.17	<0.19
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M	4	0	0	0	0	0	1.63	<0.19	1.18	<0.23	<0.27	<0.21	<0.26	<0.29
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M														
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	0	0	0	0	0	0	1.02	<0.51	<0.30	<0.37	<0.41	<0.47	<0.76	<0.31
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M	0	0	0	0	0	0	<0.43	<1.5	<0.84	<0.42	<0.69	<0.33	<0.76	<0.76
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M														
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	0	0	0	0	0	0	<0.39	<0.90	<0.34	<0.49	<0.82	<0.78	<0.56	<0.77
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	0	0	0	0	0	0	<0.42	<0.42	<0.61	<0.37	<0.44	<0.30	<0.57	<0.30
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M														
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M														
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M	0	0	0	0	0	0	<0.42	<0.35	<0.22	<0.23	<0.25	<0.30	<0.29	<0.47
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M	0	0	0	1	1	0	<0.69	<0.40	<0.29	<0.32	<0.70	0.73	0.64	<0.46

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M	0	0	0	1	0	0	<0.29	<0.24	<0.18	<0.15	<0.25	0.404	<0.27	<0.28
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M														
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M														
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M														
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M	0	0	0	0	0	0	0.661	<0.35	<0.47	<0.27	<0.31	<0.33	<0.45	<0.80
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M														
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M	1	0	0	0	0	0	<0.54	1.41	0.523	<0.34	<0.41	<0.45	<0.54	<0.66
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M	0	0	0	0	0	0	<1.1	<0.56	<0.79	<0.46	<0.51	<0.32	<0.65	<0.67
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M	0	0	0	0	0	0	<0.60	<0.44	<0.46	<0.41	<0.64	<0.34	<0.52	<0.36
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M														
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M	0	0	0	0	0	2	0.517	<0.29	<0.29	<0.19	<0.19	<0.10	<0.21	0.62
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M	0	0	0	1	0	0	0.77	0.62	<0.17	<0.14	<0.18	1.29	<0.15	<0.16
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M														
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M														
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	0	0	0	0	0	0	<0.65	<0.51	<0.61	<0.44	<0.60	<0.32	<0.66	<0.57
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M														
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M														
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	0	1	0	0	0	0	<0.23	<0.32	<0.30	0.26	<0.32	<0.26	<0.45	<0.27
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M														
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	0	0	0	0	0	0	1.02	0.52	<0.83	<0.34	<1.1	<0.67	<1.4	<3.1
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	0	0	0	0	0	0	<0.43	<0.23	<0.16	<0.16	<0.19	<0.13	<0.19	<0.23
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M														
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	0	0	0	0	0	0	<0.84	<0.65	<0.57	<0.34	<0.33	<0.34	<0.42	<0.41
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M														
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M	0	0	0	0	0	2	1.78	<0.24	<0.21	<0.28	<0.29	<0.26	<0.39	0.479
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M														
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	1	1	0	1	0	0	<0.42	0.47	0.41	0.35	<0.29	0.56	<0.40	<0.42
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M	0	0	0	0	0	0	<0.12	<0.12	<0.21	<0.093	<0.18	<0.31	<0.51	<0.16
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M	0	0	0	0	0	0	<0.70	<0.40	<0.28	<0.28	<0.74	<0.26	<0.42	<0.35
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M														
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M														
SW-02	SW-02	23F0370-03	2023-06-02	Water	M														
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M	0	0	0	0	0	0	<0.98	<0.59	<0.59	<0.49	<1.1	<0.44	<0.53	<0.81
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M														
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M	0	0	0	0	0	0	1.74	<0.49	<0.65	<0.36	<0.81	<0.54	<0.62	<0.60
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M														
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M														
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M														
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M														
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M														
SW-02		VA24A1299-002	2024-01-23	Water	M														
SW-02		L2754353-2	2024-01-23	Water	M														
SW-02		L2754615-2	2024-02-15	Water	M	0	0	0	1	0	0	<0.37	<0.16	<0.17	<0.24	<0.20	0.29	<0.22	<0.12
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M														
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M														
SW-02		L2755012-2	2024-03-19	Water	M														
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M	0	0	0	0	0	0	<0.23	<0.33	<0.30	<0.23	<0.28	<0.29	<0.28	<0.28
SW-02		L2755316-6	2024-04-12	Water	M	0	0	0	0	0	1	<0.51	<0.30	<0.35	<0.22	<0.37	<0.27	<0.50	4.1
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M														
SW-02		L2755504-1	2024-04-26	Water	M														
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M														
SW-02		L2755521-2	2024-04-28	Water	M														
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M														
SW-02		L2755598-1	2024-05-03	Water	M														
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M	0	0	0	0	0	0	0.358	<0.059	<0.15	<0.11	<0.15	<0.26	<0.44	<0.32
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M														
SW-02		L2755677-1	2024-05-09	Water	M	0	0	0	0	0	0	<0.56	<0.44	<0.32	<0.18	<0.28	<0.18	<0.62	<0.85
SW-02		L2755687-1	2024-05-09	Water	M	0	2	0	1	0	1	<0.23	<0.20	<0.21	0.2	<0.19	0.28	<0.17	0.33
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M														
SW-02		L2755770-1	2024-05-14	Water	M														
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M														
SW-02		L2755819-1	2024-05-17	Water	M	0	0	0	0	0	0	<0.39	<0.35	<0.35	<0.25	<0.36	<0.40	<0.43	<0.49

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-02		VA24B1636-001	2024-05-23	Water	M														
SW-02		L2755903-1	2024-05-23	Water	M	0	0	0	0	0	0	<0.28	<2.3	<0.29	<0.33	<0.35	<0.35	<1.5	<0.87
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M														
SW-02		L2755933-1	2024-05-24	Water	M														
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M														
SW-02		L2755961-1	2024-05-26	Water	M	0	0	0	0	2	0	<0.23	<0.19	<0.18	<0.15	<0.22	<0.17	0.43	<0.19
SW-02		VA24B4698-001	2024-06-21	Water	M														
SW-02		L2756349-1	2024-06-21	Water	M														
SW-02		VA24B5540-001	2024-06-27	Water	M														
SW-02		L2756458-1	2024-06-27	Water	M	0	2	0	1	0	0	<0.30	<0.20	<0.21	0.46	<0.25	0.37	<0.22	<0.24
SW-02		VA24B7689-001	2024-07-19	Water	M														
SW-02		L2756726-1	2024-07-19	Water	M														
SW-02		VA24B8974-002	2024-07-31	Water	M	0	0	0	0	0	0	<0.52	<0.41	<0.43	<0.40	<0.33	<0.33	<0.51	<0.71
SW-02		L2756871-2	2024-07-31	Water	M	0	0	0	0	0	0	<0.42	<0.43	<0.24	<0.18	<0.56	<0.34	<0.39	<0.36
SW-02		VA24C1605-001	2024-08-23	Water	M														
SW-02		L2757153-1	2024-08-23	Water	M														
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M														
SW-02	SW-02	L2757209-2	2024-08-27	Water	M	0	0	0	1	0	0	<0.48	<0.73	<0.33	<0.40	<0.28	0.6	<0.48	<0.39
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M														
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M	0	0	0	0	0	0	<0.77	<0.21	<0.20	<0.21	<0.55	<0.26	<0.44	<0.29
SW-02	SW-02	L2757587-1	2024-09-29	Water	M														
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M	0	0	0	0	0	0	<0.53	<0.35	<0.21	<0.31	<0.13	<0.21	<0.21	<0.23
SW-02	SW-02	L2757661-1	2024-10-04	Water	M														
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M	0	0	0	0	0	0	<0.69	<0.39	<0.80	<0.30	<0.54	<0.39	<0.80	<0.75
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M	0	1	0	0	0	0	0.45	<0.24	<0.20	0.21	<0.17	<0.16	<0.24	<0.29
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M														
SW-02	SW-02	L2757873-2	2024-10-22	Water	M														
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M														
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M														
SW-02	SW-02	L2757913-1	2024-10-25	Water	M	0	0	0	0	0	0	<0.35	<0.31	<0.20	<0.17	<0.35	<0.34	<0.38	<0.20
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M														
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M														
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M														
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M														
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M	0	0	0	0	0	0	<0.26	<0.27	<0.33	<0.34	<0.20	<0.22	<0.23	<0.25
SW-02	SW-02	L2758155-3	2024-11-16	Water	M	0	0	0	0	0	0	0.65	<0.35	<0.21	<0.16	<0.19	<0.20	<0.19	<0.25
SW-02		VA24D1587-001	2024-11-20	Water	M	0	0	0	0	0	0	<0.27	<0.25	<0.19	<0.19	<0.20	<0.22	<0.27	<0.23
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M														
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M														
SW-02	SW-02	L2758371-1	2024-12-08	Water	M	0	1	0	0	0	0	<0.68	<0.58	<0.35	0.33	<0.25	<0.34	<0.33	<0.37
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M														
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M	2	1	0	0	0	1	8.2	<1.4	6.12	1.13	<0.35	<0.46	<0.69	1.05
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M														
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M	0	1	0	1	0	2	9.91	3	<0.78	0.72	<0.59	0.32	<0.59	1.97
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M														
SW-02	SW-02	L2758769-2	2025-01-24	Water	M	0	0	0	0	0	0	<1.9	<1.2	<1.0	<1.0	<0.97	<0.83	<1.5	<1.8
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M														
SW-02	SW-02	L2759009-1	2025-02-19	Water	M														
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M	0	0	0	0	0	0	<0.36	<0.54	<0.36	<0.21	<0.37	<0.29	<0.46	<0.26
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M	0	0	0	0	0	0	<0.53	<0.42	<0.35	<0.27	<0.24	<0.21	<0.23	<0.30
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M	0	0	0	0	0	0	<0.36	<0.33	<0.39	<0.32	<0.48	<0.39	<0.49	<0.61
SW-02	SW-02	L2759254-1	2025-03-18	Water	M														
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M														
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M														
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M	0	0	0	0	0	0	<1.2	<1.1	<1.1	<0.64	<0.49	<0.50	<0.62	<0.48
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M														
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M														
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M														
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M														
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M														
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M	0	0	0	1	0	0	<0.55	<0.38	<0.72	<0.43	<0.40	0.74	<0.26	<0.29
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M														
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M	0	0	0	0	0	0	<0.37	<0.27	<0.29	<0.21	<0.34	<0.33	<0.32	<0.38
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M														
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M														
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M														
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M	0	0	0	0	0	0	<0.49	<0.21	<0.40	<0.15	<0.19	<0.14	<0.24	<0.30
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M														
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M														
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M	0	0	0	0	0	0	<0.79	<0.56	<0.50	<0.39	<0.39	<0.38	<0.47	<0.53
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M	0	0	0	0	0	0	<0.52	<0.41	<0.63	<0.30	<0.48	<0.41	<0.58	<0.61
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M	0	2	0	0	0	0	<0.42	<0.28	<0.40	0.58	<0.51	<0.30	<0.64	<0.74
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M														
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M	0	0	0	0	0	0	<0.39	<0.35	<0.36	<0.40	<0.34	<0.19	<0.35	<0.28
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M														
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M														
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M	0	0	0	0	0	0	<0.32	<0.33	<0.41	<0.37	<0.49	<0.44	<0.48	<0.55
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M	0	2	0	0	0	0	0.8	<0.30	<0.27	0.43	<0.22	<0.18	<0.26	<0.29
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M														
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M	0	0	0	0	0	0	<2.4	<2.0	<1.5	<0.86	<1.4	<0.95	<1.6	<2.0
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M	0	0	0	0	0	0	<0.87	<0.78	<0.51	<0.53	<0.67	<0.23	<0.63	<0.29
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M														
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M														
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M	0	0	0	0	0	0	<0.44	<0.28	<0.29	<0.29	<0.29	<0.30	<0.45	<0.52
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M														
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M														
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M														
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M	0	2	0	0	0	1	0.53	<0.17	<0.13	0.26	<0.14	<0.10	<0.14	0.2
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M	0	0	0	0	0	0	<0.45	0.54	<0.38	<0.44	<0.49	<0.33	<0.26	<0.33
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M														
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M														
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M														
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M														
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M														
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M	0	0	0	1	0	0	<1.1	<0.90	<0.69	<0.65	<0.60	0.38	<0.58	<0.54
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	1	1	0	0	0	0	1.01	<0.29	0.34	0.22	<0.20	<0.28	<0.18	<0.22
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M														
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	0	1	0	0	0	0	<0.20	<0.26	<0.25	0.2	<0.43	<0.30	<0.30	<0.19
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	0	0	0	0	0	0	<0.59	0.61	<0.43	<0.46	<0.41	<0.35	<0.54	<0.55
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M														
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	0	0	0	0	0	0	<0.22	<0.31	<0.24	<0.13	<0.31	<0.23	<0.23	<0.19
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	2	2	1	1	0	0	12.5	<0.74	2.41	2.22	0.75	0.84	<0.50	<0.41
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M														
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M														
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M														
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	0	0	0	0	0	0	<0.91	<0.44	<0.59	<0.45	<0.69	<0.47	<0.49	<0.66
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M														
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	0	0	0	0	0	0	<0.36	<0.43	<0.16	<0.20	<0.16	<0.17	<0.36	<0.22
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M														
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	0	0	0	0	0	0	<1.2	<0.95	<0.62	<0.49	<1.1	<0.53	<0.76	<0.60
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	0	0	0	0	0	0	0.61	<0.22	<0.18	<0.19	<0.14	<0.15	<0.18	<0.19
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M														
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	0	0	0	0	0	0	<1.2	<0.75	<0.46	<0.40	<0.44	<0.34	<0.66	<0.39
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	0	0	0	1	0	0	<0.41	<0.27	<0.20	<0.18	<0.39	0.33	<0.32	<0.35
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	0	0	0	0	0	0	<0.42	0.71	<0.28	<0.37	<0.30	<0.27	<0.31	<0.31
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M														
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M														
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	0	0	0	0	0	0	<0.66	<0.34	<0.61	<0.49	<0.41	<0.56	<0.24	<0.33
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M														
SW-03		VA24A1299-003	2024-01-23	Water	M														
SW-03		L2754353-3	2024-01-23	Water	M	0	0	0	0	0	0	<0.61	<0.58	<0.64	<0.32	<0.34	<0.41	<0.60	<0.55
SW-03		L2754615-3	2024-02-15	Water	M														
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M														
SW-03		L2755012-3	2024-03-19	Water	M														
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M														
SW-03		L2755316-7	2024-04-12	Water	M	0	0	0	0	0	0	1.75	<0.31	<0.27	<0.19	<0.27	<0.23	<0.24	<0.20
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M														
SW-03		L2755504-2	2024-04-26	Water	M														
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	0	2	0	0	0	0	<0.26	<0.26	<0.23	0.32	<0.37	<0.21	<0.23	<0.20
SW-03		L2755521-3	2024-04-28	Water	M	0	0	0	0	0	0	<0.75	<0.71	<0.47	<0.42	<0.52	<0.36	<0.54	<0.44
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M														
SW-03		L2755598-2	2024-05-03	Water	M														
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	0	0	0	0	0	0	<0.40	<0.35	<0.37	<0.25	<0.33	<0.30	<0.35	<0.45
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	0	0	0	0	0	0	<0.67	<0.39	<0.50	<0.31	<0.45	<0.28	<0.39	<0.49
SW-03		L2755677-2	2024-05-09	Water	M	1	0	3	0	0	0	2.73	<0.54	2.59	<0.43	3.02	<0.41	<0.57	<0.51
SW-03		L2755687-2	2024-05-09	Water	M														
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M														
SW-03		L2755770-2	2024-05-14	Water	M	0	0	0	0	0	0	1.15	<0.21	<0.23	<0.33	<0.39	<0.18	<0.33	<0.29
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	0	0	0	0	0	0	<2.1	<1.4	<1.4	<0.67	<1.1	<0.84	<1.4	<1.5
SW-03		L2755819-2	2024-05-17	Water	M														
SW-03		VA24B1636-002	2024-05-23	Water	M	0	0	0	0	0	0	<1.2	2.1	<1.1	<0.86	<0.73	<0.49	<1.0	<0.84
SW-03		L2755903-2	2024-05-23	Water	M	0	1	0	0	0	0	1.75	<0.48	<0.37	0.392	<0.42	<0.44	<0.55	<0.87
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	0	0	0	1	0	0	1.61	<0.96	<0.51	<0.40	<0.36	0.41	<0.44	<0.49
SW-03		L2755933-2	2024-05-24	Water	M														
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	0	1	0	0	0	1	0.69	<0.33	<0.34	0.31	<0.27	<0.22	<0.28	0.63
SW-03		L2755961-2	2024-05-26	Water	M	0	0	0	0	0	0	<0.29	<0.38	<0.28	<0.15	<0.25	<0.19	<0.27	<0.24
SW-03		VA24B4698-002	2024-06-21	Water	M														
SW-03		L2756349-2	2024-06-21	Water	M														
SW-03		VA24B5540-002	2024-06-27	Water	M														
SW-03		L2756458-2	2024-06-27	Water	M	0	0	0	1	0	0	<0.24	<0.20	<0.31	<0.19	<0.44	<0.23	<0.33	<0.36
SW-03		VA24B7689-002	2024-07-19	Water	M														
SW-03		L2756726-2	2024-07-19	Water	M														
SW-03		L2756871-3	2024-07-31	Water	M														
SW-03		VA24B8974-003	2024-07-31	Water	M														
SW-03		VA24C1605-002	2024-08-23	Water	M														
SW-03		L2757153-2	2024-08-23	Water	M														
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M														
SW-03	SW-03	L2757229-1	2024-08-28	Water	M														
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M														
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	0	1	0	0	0	0	<0.17	<0.15	<0.24	0.17	<0.20	<0.16	<0.25	<0.26
SW-03	SW-03	L2757587-3	2024-09-29	Water	M														
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	3	1	0	0	0	0	0.86	<0.40	1.22	0.31	<0.47	<0.29	<0.40	<0.48
SW-03	SW-03	L2757661-3	2024-10-04	Water	M														
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M														
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M														
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	0	0	0	0	0	0	1.03	<0.35	<0.46	<0.20	<0.51	<0.29	<0.37	<0.50
SW-03	SW-03	L2757873-3	2024-10-22	Water	M														
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	0	2	0	0	0	0	<0.79	<1.0	<0.48	1.05	<0.30	<0.31	<0.44	<0.40
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M														
SW-03	SW-03	L2757913-3	2024-10-25	Water	M														
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M														
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M														
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M														
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	2	2	1	1	0	0	0.71	<0.13	0.51	0.43	0.35	0.4	<0.24	<0.26
SW-03	SW-03	L2758155-2	2024-11-16	Water	M														
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M														
SW-03		VA24D1587-002	2024-11-20	Water	M														
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M	0	0	0	0	0	0	<0.50	<0.39	<0.41	<0.23	<0.27	<0.46	<0.36	<0.51
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	0	0	0	0	0	0	<0.23	<0.19	<0.29	<0.21	<0.22	<0.22	<0.25	<0.43
SW-03	SW-03	L2758371-2	2024-12-08	Water	M														
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M														
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M	0	0	0	0	0	0	<0.56	<1.0	<0.59	<0.19	<0.90	<0.47	<0.43	<0.28
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M														
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M														
SW-03	SW-03	L2758769-3	2025-01-24	Water	M	0	0	0	0	0	0	<0.23	<0.22	<0.22	<0.16	<0.26	<0.24	<0.24	<0.19
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M														
SW-03	SW-03	L2759009-2	2025-02-19	Water	M														
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M														
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M	0	0	0	0	0	0	<0.27	<0.35	<0.26	<0.15	<0.27	<0.28	<0.31	<0.26
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M														
SW-03	SW-03	L2759254-2	2025-03-18	Water	M														
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	2	0	0	0	0	0	1.49	0.38	0.75	<0.29	<0.39	<0.20	<0.42	<0.46
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M														
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M	1	0	0	0	0	0	0.47	<0.36	0.49	<0.21	<0.37	<0.29	<0.30	<0.27
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M														
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M														
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M														
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M	0	0	0	0	0	0	<0.45	<0.37	<0.49	<0.26	<0.39	<0.33	<0.36	<0.34
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	0	0	0	0	0	0	<0.61	<2.0	<0.46	<0.32	<1.2	<0.34	<0.78	<0.87
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M	0	0	0	0	0	0	<0.60	<0.75	<0.30	<0.48	<0.37	<0.39	<0.39	<0.42
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M														
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M														
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M														
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	0	0	0	0	0	0	<0.78	<0.57	<0.43	<0.45	<0.39	<0.40	<0.41	<0.49
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	0	0	0	0	0	0	<0.41	<0.30	<0.25	<0.21	<0.25	<0.17	<0.23	<0.22
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	0	0	0	0	0	0	<0.44	<0.38	<0.28	<0.20	<0.44	<0.36	<0.37	<0.30
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M	0	2	0	1	0	0	1.07	0.42	<0.17	0.49	<0.19	0.56	<0.33	<0.29
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	1	1	0	0	0	0	<0.25	<0.18	0.3	0.17	<0.33	<0.21	<0.29	<0.38
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	0	0	0	0	0	0	<0.70	<0.66	<0.39	<0.33	<0.49	<0.31	<0.36	<0.36
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M														
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M														
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M														
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M														
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M														
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M														
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M														
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M														
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M														
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M														
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M														
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M														
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M														
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M														
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M														
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M														
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M														
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M														
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M														
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M														
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M														
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M														
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M														
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M														
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M														
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M														
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M														
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M														
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M														
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M														
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M														
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M														
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M														
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M														
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M														
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M														
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	0	1	0	0	0	0	<0.78	<1.3	<0.88	0.83	<0.57	<0.56	<0.81	<0.91
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M														
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	0	0	0	0	0	0	<1.1	<0.63	<0.29	<0.40	<0.61	<0.33	<0.40	<0.29
SW-04		VA24A1299-004	2024-01-23	Water	M														
SW-04		L2754353-4	2024-01-23	Water	M	0	0	0	0	0	0	<0.86	<0.32	<0.58	<0.15	<0.42	<0.33	<0.35	<0.47
SW-04		L2754615-4	2024-02-15	Water	M	0	0	0	0	0	0	<0.38	<0.26	<0.37	<0.25	<0.40	<0.24	<0.33	<0.29
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	0	0	0	1	0	0	1.29	<0.27	<0.21	<0.24	<0.26	0.41	<0.28	<0.35
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	0	0	0	0	0	0	<0.18	0.21	<0.23	<0.15	<0.20	<0.28	<0.24	<0.33
SW-04		L2755012-4	2024-03-19	Water	M	0	0	0	0	0	0	<0.28	<0.17	<0.23	<0.19	<0.32	<0.21	<0.33	<0.19
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	0	0	0	0	0	0	<0.46	<0.60	<0.32	<0.53	<0.82	<0.35	<0.45	<0.39
SW-04		L2755503-3	2024-04-25	Water	M														
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M														
SW-04		L2755523-2	2024-04-29	Water	M	0	0	0	0	0	0	<0.81	<0.52	<0.59	<0.37	<0.49	<0.38	<0.56	<0.47
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	0	0	0	0	0	0	<0.35	<0.35	<0.31	<0.18	<0.32	<0.21	<0.24	<0.20
SW-04		L2755588-3	2024-05-02	Water	M														
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	0	0	0	0	0	0	<0.38	<0.38	<0.26	<0.25	<0.31	<0.30	<0.27	<0.40
SW-04		L2755687-4	2024-05-09	Water	M	0	0	0	0	0	0	<0.34	<0.21	<0.17	<0.13	<0.16	<0.14	<0.14	<0.15
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M														
SW-04		L2755695-2	2024-05-10	Water	M														
SW-04		L2755788-2	2024-05-15	Water	M	0	0	0	0	0	0	<0.60	<0.36	<0.73	<0.43	<0.71	<0.64	<0.67	<0.61
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M														
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	0	1	0	1	0	0	<0.36	<0.20	<0.40	0.18	<0.41	0.53	<0.27	<0.20
SW-04		L2755820-3	2024-05-16	Water	M	0	0	0	0	0	0	<0.42	<0.45	<0.38	<0.19	<0.26	<0.17	<0.36	<0.25
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	0	0	0	0	0	0	0.73	<0.50	<0.54	<0.32	<0.52	<0.38	<0.54	<0.54
SW-04		VA24B1636-005	2024-05-23	Water	M														
SW-04		L2755903-5	2024-05-23	Water	M	0	0	0	0	0	0	0.895	<0.27	<0.42	<0.16	<0.35	<0.25	<0.24	<0.27
SW-04		L2755916-3	2024-05-23	Water	M	0	0	0	0	0	0	<0.43	<0.38	<0.46	<0.41	<0.54	<0.36	<0.38	<0.39
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	0	0	0	0	0	0	1.42	<0.40	<0.40	<0.26	<0.39	<0.30	<0.39	<0.40
SW-04		L2755961-4	2024-05-26	Water	M	0	0	0	1	0	0	0.79	<0.16	<0.17	<0.26	<0.17	0.327	0.57	<0.17
SW-04		VA24B4655-003	2024-06-20	Water	M														
SW-04		L2756326-3	2024-06-20	Water	M	0	0	0	0	0	0	<0.19	<0.93	<0.12	<0.20	<0.18	<0.15	<0.22	<0.20
SW-04		VA24B5289-002	2024-06-26	Water	M	0	0	0	1	0	0	1.19	<0.26	<0.20	<0.21	<0.38	0.47	<0.30	<0.19
SW-04		L2756419-2	2024-06-26	Water	M														
SW-04		VA24B7579-003	2024-07-18	Water	M	0	0	0	0	0	0	1.19	<0.33	<0.47	<0.39	<0.95	<0.48	<0.62	<0.92
SW-04		L2756717-3	2024-07-18	Water	M														
SW-04		VA24B8974-004	2024-07-31	Water	M														
SW-04		L2756871-4	2024-07-31	Water	M														
SW-04		VA24C1546-003	2024-08-22	Water	M	0	0	0	0	0	0	<0.66	<0.60	<0.58	<0.50	<0.52	<0.52	<0.80	<0.98
SW-04		L2757144-3	2024-08-22	Water	M														
SW-04	SW-04	L2757209-4	2024-08-27	Water	M														
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	1	1	0	1	0	0	0.589	<0.17	0.17	0.24	<0.075	0.151	<0.27	<0.19
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M	0	0	0	0	0	0	<0.54	<0.37	<0.40	<0.28	<0.26	<0.34	<0.53	<0.66
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M	0	0	0	0	0	0	<0.34	<0.37	<0.32	<0.26	<0.27	<0.26	<0.29	<0.27
SW-04	SW-04	L2757584-2	2024-09-28	Water	M														
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	0	0	0	1	0	0	<0.80	<1.9	<0.93	<0.58	<0.39	0.5	<0.91	<0.63
SW-04	SW-04	L2757661-4	2024-10-04	Water	M														
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M	1	0	0	0	0	0	0.476	<0.39	0.245	<0.24	<0.22	<0.18	<0.25	<0.43
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M														
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M	0	0	0	0	0	0	<0.17	<0.35	<0.25	<0.12	<0.14	<0.23	<0.17	<0.23
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M														
SW-04	SW-04	L2757873-4	2024-10-22	Water	M														
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	0	0	0	0	0	0	<1.0	<0.46	<1.2	<0.46	<1.3	<0.57	<0.44	<0.84
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	0	0	0	1	0	1	1.93	<0.65	<0.58	<0.30	<0.34	0.47	<0.31	0.52
SW-04	SW-04	L2757942-1	2024-10-26	Water	M														
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	0	0	0	0	0	0	<0.25	<0.17	<0.19	<0.19	<0.21	<0.26	<0.27	<0.33
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	0	1	0	0	0	0	0.47	<0.14	<0.18	0.24	<0.17	<0.16	<0.18	<0.17

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M														
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M														
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M														
SW-04	SW-04	L2758155-4	2024-11-17	Water	M														
SW-04		4-456131118-0	2024-11-17	Water	F														
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	1	1	0	1	0	0	0.52	0.24	0.37	0.21	<0.14	0.41	<0.17	<0.15
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M														
SW-04	SW-04	L2758371-3	2024-12-08	Water	M														
SW-04		4-456441522-0	2024-12-18	Water	F	0	0	0	0	0	0	<0.57	<0.39	<0.34	<0.29	<0.47	<0.33	<0.55	<0.40
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M														
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M														
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	0	0	0	0	0	0	<0.46	<0.37	<0.34	<0.23	<0.27	<0.31	<0.34	<0.34
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M														
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M														
SW-04	SW-04	L2758765-1	2025-01-25	Water	M														
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	0	0	0	0	0	0	<0.86	<0.25	<0.26	<0.31	<1.5	<0.30	<0.79	<0.35
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M														
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M														
SW-04	SW-04	L2759042-2	2025-02-21	Water	M														
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	0	0	0	0	0	0	<0.93	<0.65	<0.77	<0.37	<0.48	<0.34	<0.60	<0.36
SW-04	SW-04	L2759255-2	2025-03-19	Water	M														
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M														
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	0	0	0	0	0	0	<0.36	<0.44	<0.81	<0.29	<0.28	<0.37	<0.40	<0.51
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M														
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	0	0	0	0	0	0	<0.46	<0.56	<0.96	<0.37	<0.88	<0.31	<0.58	<0.42
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M														
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M														
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M	1	0	0	1	0	0	<0.32	<0.23	0.24	<0.24	<0.30	0.45	<0.37	<0.40
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M	0	0	0	0	0	0	0.392	<0.39	<0.48	<0.35	<0.33	<0.46	<0.44	<0.57
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M														
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M	0	0	0	0	0	0	<0.36	<0.26	<0.18	<0.14	<0.20	<0.14	<0.24	<0.16
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	0	0	0	0	0	0	<1.7	<1.3	<1.1	<0.72	<0.58	<0.46	<0.74	<0.56
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M														
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M	0	0	0	0	0	0	<0.41	<0.31	<0.34	<0.14	<0.18	<0.15	<0.25	<0.37
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M														
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M														
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M														
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M	0	0	0	0	0	0	0.516	<0.17	<0.18	<0.19	<0.50	<0.13	<0.23	<0.15
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	2	0	0	0	0	0	<0.39	<0.27	0.56	<0.18	<0.25	<0.21	<0.22	<0.30
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M														
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M														
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M														
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	0	0	0	0	0	0	<0.72	<0.63	<0.48	<0.53	<0.49	<0.33	<0.41	<0.61
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M														
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M														
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	0	0	0	0	0	0	<2.2	<1.5	<0.98	<0.90	<0.96	<0.63	<1.0	<0.92
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	0	1	0	0	0	0	<0.85	<0.76	<0.64	0.66	<0.47	<0.28	<0.54	<0.51
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M														
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M														
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M														
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M														
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M														
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M	0	0	0	0	0	0	<0.73	<0.57	<0.72	<0.64	<0.85	<0.79	<0.66	<0.56
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M	0	0	0	0	0	0	<0.50	<0.32	<0.20	<0.20	<0.22	<0.20	<0.31	<0.27
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M														
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M														
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M														
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M														
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M														
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M														
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M														
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M														
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M														
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M														
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	1	0	0	1	0	0	<0.35	<0.31	0.25	<0.20	<0.22	0.39	<0.17	<0.21
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	0	2	0	0	0	0	<0.31	<0.35	<0.28	0.32	<0.39	<0.30	<0.30	<0.21
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	0	0	0	0	0	1	<0.50	<0.31	<0.37	<0.43	<0.65	<0.35	<0.39	0.49
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	0	0	0	1	0	0	0.92	<0.44	<0.31	<0.20	<0.45	0.3	<0.32	<0.29
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M														
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M														
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M														
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M														
SW-07		VA24A1299-005	2024-01-23	Water	M	0	0	2	0	0	0	<0.20	<0.45	<0.31	<0.45	0.89	<0.29	<0.52	<0.33
SW-07		L2754353-5	2024-01-23	Water	M	0	0	0	1	0	0	<0.32	<0.99	<0.25	<0.13	<0.18	0.508	<0.28	<0.17
SW-07		L2754615-5	2024-02-15	Water	M														
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M														
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M														
SW-07		L2755012-5	2024-03-19	Water	M														
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M														
SW-07		L2755504-3	2024-04-26	Water	M														
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M														
SW-07		L2755521-1	2024-04-28	Water	M														
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	0	1	0	0	0	0	0.6	<0.26	<0.26	0.54	<0.28	<0.20	<0.25	<0.28
SW-07		L2755598-3	2024-05-03	Water	M														
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M														
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M														
SW-07		L2755677-3	2024-05-09	Water	M														
SW-07		L2755687-3	2024-05-09	Water	M														
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	0	0	0	0	0	0	<0.31	<0.18	<0.21	<0.17	<0.22	<0.16	<0.17	<0.19
SW-07		L2755770-3	2024-05-14	Water	M														
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M														
SW-07		L2755819-3	2024-05-17	Water	M														
SW-07		VA24B1636-003	2024-05-23	Water	M	0	0	0	0	0	0	1.04	<0.52	<0.21	<0.23	<0.22	<0.16	<0.18	<0.26
SW-07		L2755903-3	2024-05-23	Water	M														
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M	0	0	0	0	0	0	<0.78	<0.90	<0.64	<0.52	<0.57	<0.47	<0.69	<0.80
SW-07		L2755933-3	2024-05-24	Water	M														
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M														
SW-07		L2755961-3	2024-05-26	Water	M														
SW-07		VA24B4698-003	2024-06-21	Water	M	1	1	1	0	0	0	<0.22	<0.29	0.25	0.28	0.34	<0.28	<0.22	<0.25
SW-07		L2756349-3	2024-06-21	Water	M														
SW-07		VA24B5289-003	2024-06-26	Water	M	0	0	0	0	0	1	<0.24	<0.30	<0.23	<0.20	<0.29	<0.22	<0.30	0.34
SW-07		L2756419-3	2024-06-26	Water	M														
SW-07		VA24B7689-003	2024-07-19	Water	M														
SW-07		L2756726-3	2024-07-19	Water	M														
SW-07		L2756871-5	2024-07-31	Water	M														
SW-07		VA24B8974-005	2024-07-31	Water	M														
SW-07		VA24C1605-003	2024-08-23	Water	M														
SW-07		L2757153-3	2024-08-23	Water	M														
SW-07	SW-07	L2757209-5	2024-08-27	Water	M														
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M														
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M														
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M														
SW-07	SW-07	L2757587-4	2024-09-29	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M														
SW-07	SW-07	L2757664-1	2024-10-03	Water	M	0	0	0	0	0	0	<0.37	<0.20	<0.37	<0.21	<0.27	<0.23	<0.30	<0.26
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M														
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M														
SW-07		492-455781017-0	2024-10-13	Water	F														
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M														
SW-07	SW-07	L2757873-5	2024-10-22	Water	M	1	1	0	0	0	0	<0.47	<0.60	0.3	0.26	<0.25	<0.18	<0.37	<0.25
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M														
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M														
SW-07	SW-07	L2757913-4	2024-10-25	Water	M														
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M														
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	0	0	0	0	0	1	<0.25	<0.23	<0.27	<0.16	<0.23	<0.19	<0.25	0.31
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M	0	0	0	0	0	0	<0.43	<0.34	<0.30	<0.28	<0.34	<0.26	<0.43	<0.47
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	0	0	0	0	0	0	<0.31	<0.57	<0.24	<0.26	<0.33	<0.31	<0.43	<0.28
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M														
SW-07	SW-07	L2758155-1	2024-11-16	Water	M	0	0	0	0	0	0	0.67	<0.78	<0.42	<0.37	<0.44	<0.23	<0.48	<0.26
SW-07		VA24D1587-003	2024-11-20	Water	M	0	0	0	1	0	0	0.85	<0.84	<0.29	<0.18	<0.52	0.7	<0.60	<0.51
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M														
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M														
SW-07	SW-07	L2758371-4	2024-12-08	Water	M	0	0	0	0	0	0	<0.72	<0.66	<0.38	<0.60	<0.62	<0.36	<0.68	<0.70
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M														
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M														
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	0	0	0	0	0	0	0.71	<0.29	<0.39	<0.19	<0.44	<0.23	<0.32	<0.34
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M	0	0	0	0	0	0	0.26	<0.20	<0.11	<0.18	<0.22	<0.19	<0.16	<0.22
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M														
SW-07	SW-07	L2758765-2	2025-01-25	Water	M														
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M														
SW-07	SW-07	L2759009-3	2025-02-19	Water	M														
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	0	0	0	0	0	1	<0.27	0.41	<0.32	<0.18	<0.36	<0.24	<0.30	0.26
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M														
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M														
SW-07	SW-07	L2759254-3	2025-03-18	Water	M	0	0	0	0	0	0	1.28	<0.73	<0.37	<0.52	<0.46	<0.37	<0.35	<0.33
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M														
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M														
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M														
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	0	0	0	0	0	0	1.02	<0.28	<0.15	<0.23	<0.18	<0.18	<0.18	<0.20
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M														
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M	0	0	0	0	0	0	<0.95	<0.34	<0.42	<0.42	<0.59	<0.33	<0.75	<1.0
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M														
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M														
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M	0	0	0	0	0	0	<1.4	<0.90	<0.83	<0.51	<0.52	<0.42	<0.76	<0.62
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M														
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M														
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M														
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	0	0	0	0	0	0	<0.22	<0.25	<0.29	<0.20	<0.28	<0.24	<0.29	<0.25
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M														
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M	0	0	0	0	0	0	<0.63	<0.37	<0.58	<0.40	<0.74	<0.54	<0.70	<0.79
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M														
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M														
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M														
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M	0	0	0	0	0	0	0.83	<0.56	<0.91	<0.48	<0.70	<0.66	<0.78	<0.78
SW-08		L2755503-2	2024-04-25	Water	M	0	0	0	0	0	0	<1.5	<0.45	<0.95	<0.47	<0.52	<0.40	<0.55	<0.76
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M	0	0	0	0	0	0	0.601	<0.34	<0.34	<0.36	<0.38	<0.30	<0.50	<0.73
SW-08		L2755588-2	2024-05-02	Water	M	0	0	0	0	0	0	0.794	<0.26	<0.16	<0.13	<0.19	0.484	<0.23	<0.39
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M	0	2	0	1	0	0	<0.98	<0.69	<0.61	1.64	<0.41	0.78	<0.54	<0.86
SW-08		L2755694-2	2024-05-10	Water	M														
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M	0	0	0	0	0	0	<0.64	<0.49	<0.26	<0.20	<0.26	<0.15	<0.29	<0.30

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total HxCDD # of Homologues	Total HxCDF # of Homologues	Total PeCDD # of Homologues	Total PeCDF # of Homologues	Total TCDD # of Homologues	Total TCDF # of Homologues	Total-HpCDD	Total-HpCDF	Total-HxCDD	Total-HxCDF	Total-PeCDD	Total-PeCDF	Total-TCDD	Total-TCDF
												pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
SW-08		L2755820-2	2024-05-16	Water	M														
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M	0	0	0	0	0	0	0.349	<0.45	<0.15	<0.16	<0.22	<0.18	<0.31	<0.21
SW-08		L2755916-2	2024-05-23	Water	M														
SW-08		VA24B4655-002	2024-06-20	Water	M														
SW-08		L2756326-2	2024-06-20	Water	M														
SW-08		VA24B7579-002	2024-07-18	Water	M														
SW-08		L2756717-2	2024-07-18	Water	M														
SW-08		VA24C1546-002	2024-08-22	Water	M														
SW-08		L2757144-2	2024-08-22	Water	M														
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	0	0	0	0	0	0	<0.76	<0.72	<0.83	<0.36	<0.59	<0.41	<0.64	<0.60
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M														
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M														
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	0	0	0	0	0	0	0.61	<0.20	<0.22	<0.14	<0.24	<0.19	<0.16	<0.20
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M	0	3	0	0	0	0	<0.40	5.32	<0.36	2.07	<0.29	<0.40	<0.30	<0.29
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	0	0	0	0	0	0	<0.36	<0.32	<0.55	<0.29	<0.68	<0.49	<1.1	<1.6
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M														
SW-09		L2755503-4	2024-04-25	Water	M														
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M														
SW-09		L2755588-4	2024-05-02	Water	M	0	0	0	0	0	0	<0.57	<0.29	<0.30	<0.29	<0.45	<0.28	<0.38	<0.52
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M														
SW-09		L2755687-5	2024-05-09	Water	M														
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M														
SW-09		L2755820-4	2024-05-16	Water	M	2	2	0	1	0	0	<0.33	<0.57	0.43	0.57	<0.28	0.82	<0.38	<0.38
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M														
SW-09		L2755916-4	2024-05-23	Water	M														
SW-09		VA24B4655-004	2024-06-20	Water	M														
SW-09		L2756326-4	2024-06-20	Water	M	0	2	0	0	0	0	1.64	<0.74	<0.31	0.4	<0.59	<0.15	<0.40	<0.28
SW-09		VA24B7579-004	2024-07-18	Water	M														
SW-09		L2756717-4	2024-07-18	Water	M														
SW-09		VA24C1546-004	2024-08-22	Water	M														
SW-09		L2757144-4	2024-08-22	Water	M	0	2	0	0	0	0	<0.37	<0.23	<0.20	0.29	<0.25	<0.33	<0.51	<0.45
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M														
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	0	0	0	1	0	0	<0.39	<0.40	<0.32	<0.23	<0.44	0.42	<0.48	<0.35
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M														
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M														
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M														
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M	0	0	0	0	0	0	0.88	<0.62	<0.56	<0.49	<0.43	<0.42	<0.48	<0.47
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M														
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M														
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M														
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M														
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	0	0	0	1	0	0	<0.15	<0.26	<0.25	<0.24	<0.17	0.39	<0.29	<0.22
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M	0	0	0	0	0	0	1.52	<0.79	<0.32	<0.20	<0.34	<0.34	<0.44	<0.33
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M														
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M														
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	0	0	0	0	0	0	<0.31	<0.26	<0.32	<0.17	<0.36	<0.24	<0.31	<0.32
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M														
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M														
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M														
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M														
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M														

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M													
OUT-01		VA24B1636-006	2024-05-23	Water	M													
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M													
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M													
OUT-01		661-455931031-0	2024-10-28	Water	F	0	0	0										
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M													
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M	0	0	0										
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M													
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M													
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M	0	0	0										
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M	0	0	0										
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M													
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M	0	0	0										
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M													
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M	0	0	0										
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M	0	0	0										
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M	0	0	0										
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M													
OUT-02		VA24B5289-006	2024-06-26	Water	M	0	0	0										
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M	0	0	0										
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M													
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M	0	0	0										
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M													
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M													
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M	0	0	0										
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M													
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M													
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M	0	0	0										
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M													
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M	0	0	0										
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M													
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M	0	0	0										
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M													
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M													
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M													
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M													
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M	0	0	0										
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M													
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M	0	0	0										
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M	0	0	0										
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M				0.179	0.397	0.607	100	98	97	94	104	101	95
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M				0	0.459	0.914	81	75	90	88	90	86	91
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M													
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M				0.0017	0.708	1.4	94	76	91	90	91	96	95
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M													
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M													
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M													
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M				0.00972	1.24	2.45	78	83	86	70	82	69	87
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M													
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M				0.0118	0.35	0.681	68	71	74	69	75	73	88
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M													
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M													
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M				0	0.656	1.3	67	80	69	79	82	77	87
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M													
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M				0.0518	0.913	1.77	63	70	64	70	75	73	76
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M				0.0102	0.871	1.73	66	78	78	69	79	66	81
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M													
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M													
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M				0.00155	0.592	1.18	56	51	51	59	55	59	57
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M				0.0459	0.626	1.18	85	82	90	78	79	85	85
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M													
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M				0	0.934	1.86	65	66	68	65	67	69	71

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M				0.000771	0.37	0.715	83	82	80	90	86	88	87
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M													
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M				0.000564	3.1	3.35	58	59	61	61	57	61	60
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M				0	0.534	1.06	78	72	81	84	83	84	87
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M				0	1.25	2.48	71	73	69	72	89	81	96
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M													
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M				0	0.687	1.37	53	55	55	57	60	59	62
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M													
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M				0	2.37	4.74	60	61	61	66	72	61	65
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M													
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M				0.0464	0.9	1.65	85	74	75	82	79	73	70
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M				0.00352	0.88	1.75	71	60	56	77	69	101	70
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M				0.00239	0.579	1.16	73	64	61	77	71	78	73
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M													
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M				0.00119	0.387	0.772	62	58	55	72	67	72	68
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M				0.0184	0.65	1.23	82	68	61	69	61	73	66
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M													
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M				0.018	0.378	0.642	82	80	69	86	82	83	85
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M													
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M				0.026	0.634	1.24	96	107	94	83	101	91	99
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M				0.0092	0.736	1.46	83	69	66	75	69	73	69
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M													
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M				0.0123	0.302	0.59	88	78	73	88	85	87	85
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M				0.0318	0.422	0.799	82	73	70	84	84	84	88
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M				0.222	2.39	2.68	78	70	57	87	89	85	83
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M													
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M				0	0.476	0.952	92	95	84	87	96	94	96
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M													
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M													
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M				0.0127	0.364	0.702	79	84	80	84	92	87	96
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M				0	0.821	1.59	82	70	84	90	86	90	87
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M				0.0773	0.684	1.26	78	69	69	75	71	82	77
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M													
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M				0	0.492	0.957	85	77	82	85	86	87	83
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M													
SW-01		VA24A1299-001	2024-01-23	Water	M													
SW-01		L2754353-1	2024-01-23	Water	M				0.00118	0.383	0.738	72	65	76	64	65	66	69
SW-01		L2754615-1	2024-02-15	Water	M				0.012	0.507	1	80	74	85	83	85	82	93
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M													
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M				0.000119	0.337	0.665	91	86	86	87	95	91	91
SW-01		L2755012-1	2024-03-19	Water	M													
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M													
SW-01		L2755503-1	2024-04-25	Water	M	0	0	0										
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M	0	0	0										
SW-01		L2755523-1	2024-04-29	Water	M													
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M													
SW-01		L2755588-1	2024-05-02	Water	M													
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M	0	0	0										
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M													
SW-01		L2755694-1	2024-05-10	Water	M													
SW-01		L2755695-1	2024-05-10	Water	M													
SW-01		L2755788-1	2024-05-15	Water	M													
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M													
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M													
SW-01		L2755820-1	2024-05-16	Water	M													
SW-01		VA24B1628-001	2024-05-22	Water	M													
SW-01		L2755902-1	2024-05-22	Water	M													
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M													
SW-01		L2755916-1	2024-05-23	Water	M													
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M													
SW-01		VA24B4655-001	2024-06-20	Water	M	0	0	0										
SW-01		L2756326-1	2024-06-20	Water	M	0	0	0										

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-01		VA24B5289-001	2024-06-26	Water	M	0	0	0										
SW-01		L2756419-1	2024-06-26	Water	M	0	0	0										
SW-01		VA24B7579-001	2024-07-18	Water	M	0	0	0										
SW-01		L2756717-1	2024-07-18	Water	M	0	0	0										
SW-01		VA24B8974-001	2024-07-31	Water	M	0	0	0										
SW-01		L2756871-1	2024-07-31	Water	M	0	0	0										
SW-01		VA24C1546-001	2024-08-22	Water	M				0.0151	0.456	0.882							
SW-01		L2757144-1	2024-08-22	Water	M	0	0	0										
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M				0.00351	0.456	0.908							
SW-01	SW-01	L2757209-1	2024-08-27	Water	M				0.00387	0.386	0.769							
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M				1.4	1.71	2.01							
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M				0.0386	0.604	1.15							
SW-01	SW-01	L2757584-1	2024-09-28	Water	M													
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M													
SW-01	SW-01	L2757664-2	2024-10-03	Water	M				0	0.857	1.7							
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M				0.000342	0.593	1.18							
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M				0	0.832	1.65							
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M				0.0408	0.63	1.22							
SW-01	SW-01	L2757873-1	2024-10-22	Water	M													
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M													
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M													
SW-01	SW-01	L2757942-2	2024-10-26	Water	M				0	1.14	2.28							
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M				0.000357	0.708	1.42	72	73	74	68	73	71	79
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M				0.000831	0.698	1.39	73	85	82	76	87	75	91
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M				0	0.789	1.58	65	74	67	74	79	75	82
SW-01	SW-01	L2758119-1	2024-11-12	Water	M													
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M				0	0.576	1.07	65	75	71	77	89	81	89
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M													
SW-01	SW-01	L2758350-1	2024-12-06	Water	M				0	0.352	0.703	73	72	77	68	73	71	74
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M													
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M				0.012	0.305	0.582	76	71	73	77	70	75	69
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M				0.0117	0.523	1.01	88	86	91	84	81	84	91
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M				0	0.681	1.36	59	65	66	68	69	66	70
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M				0.0227	0.476	0.887	82	81	85	79	80	83	83
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M													
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M													
SW-01	SW-01	L2758769-1	2025-01-24	Water	M				0.00152	0.37	0.73	71	71	72	70	74	73	75
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M													
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M													
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M				0	2	3.94	71	72	76	78	94	79	90
SW-01	SW-01	L2759042-1	2025-02-21	Water	M				0	0.379	0.75	54	59	57	63	68	69	73
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M				0.00576	0.566	1.07	77	77	82	82	83	82	82
SW-01	SW-01	L2759255-1	2025-03-19	Water	M													
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M				0.00366	0.685	1.29	63	61	65	73	90	70	75
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M													
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M													
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M													
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M				0	0.574	1.14	82	70	62	75	65	74	71
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M				0.000399	0.35	0.686	84	75	67	82	75	81	80
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M													
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M				0.0426	0.515	0.606	83	78	71	75	75	77	73
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M				0.101	0.793	0.984	80	85	76	76	81	74	81
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M													
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M				0.0102	0.782	1.55	71	65	42	82	75	79	76
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M				0	1.01	2.01	73	71	54	82	88	90	93
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M													
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M				0	0.982	1.96	77	68	58	83	86	88	86
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M				0	0.725	1.43	80	71	62	89	88	88	85
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M													
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M													
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M				0	0.414	0.829							
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M				0.0218	0.831	1.63	76	69	68	84	77	79	79

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M				0.0161	0.398	0.759							
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M													
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M													
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M													
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M				0.00693	0.914	1.33							
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M													
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M				0.0664	1.05	1.51							
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M				0.00192	0.867	1.73	57	68	66	60	69	58	72
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M				0	0.787	1.57	69	83	75	83	89	86	92
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M													
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M				0.00517	0.327	0.629							
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M				0.0474	0.293	0.533	73	73	79	73	75	76	83
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M													
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M													
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M				0.00883	0.884	1.75	79	80	83	78	81	82	83
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M	0	0	0										
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M													
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M				0.00212	0.533	1.05	74	71	71	76	73	73	73
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M													
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M				0.00822	1.7	3.39	87	91	91	68	79	73	89
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M				0	0.28	0.551	67	71	74	71	78	75	89
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M													
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M				0	0.596	1.19	65	75	68	75	81	82	82
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M													
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M				0.0404	0.503	0.964							
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M													
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M				0.098	0.68	1.08	85	83	91	79	76	80	84
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M				0.000684	0.45	0.896							
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M				0	0.751	1.47							
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M	0	0	0										
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M	0	0	0										
SW-02	SW-02	23F0370-03	2023-06-02	Water	M	0	0	0										
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M				0	1.12	2.2							
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M													
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M				0.00206	0.995	1.98							
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M	0	0	0										
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M	0	0	0										
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M													
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M													
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M													
SW-02		VA24A1299-002	2024-01-23	Water	M	0	0	0										
SW-02		L2754353-2	2024-01-23	Water	M													
SW-02		L2754615-2	2024-02-15	Water	M				0.00864	0.311	0.613	94	91	93	91	94	103	93
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M	0	0	0										
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M	0	0	0										
SW-02		L2755012-2	2024-03-19	Water	M													
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M				0	0.429	0.85							
SW-02		L2755316-6	2024-04-12	Water	M				0.41	1.03	1.6	93	79	90	96	95	95	97
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M													
SW-02		L2755504-1	2024-04-26	Water	M													
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M	0	0	0										
SW-02		L2755521-2	2024-04-28	Water	M													
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M													
SW-02		L2755598-1	2024-05-03	Water	M													
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M				0.00425	0.413	0.792							
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M													
SW-02		L2755677-1	2024-05-09	Water	M				0	0.605	1.21	88	79	87	90	87	93	87
SW-02		L2755687-1	2024-05-09	Water	M				0.0212	0.401	0.566	76	81	77	82	92	85	95
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M													
SW-02		L2755770-1	2024-05-14	Water	M													
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M													
SW-02		L2755819-1	2024-05-17	Water	M				0.000354	0.576	1.15	80	77	73	83	95	87	95

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-02		VA24B1636-001	2024-05-23	Water	M													
SW-02		L2755903-1	2024-05-23	Water	M				0.000912	1.14	2.26	84	76	63	95	98	93	92
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M	0	0	0										
SW-02		L2755933-1	2024-05-24	Water	M													
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M													
SW-02		L2755961-1	2024-05-26	Water	M				0.24	0.457	0.642	86	74	70	86	83	82	82
SW-02		VA24B4698-001	2024-06-21	Water	M	0	0	0										
SW-02		L2756349-1	2024-06-21	Water	M													
SW-02		VA24B5540-001	2024-06-27	Water	M	0	0	0										
SW-02		L2756458-1	2024-06-27	Water	M				0.0568	0.383	0.687	86	74	72	84	80	85	80
SW-02		VA24B7689-001	2024-07-19	Water	M													
SW-02		L2756726-1	2024-07-19	Water	M													
SW-02		VA24B8974-002	2024-07-31	Water	M				0	0.641	1.28							
SW-02		L2756871-2	2024-07-31	Water	M				0	0.613	1.22	82	69	66	72	66	72	69
SW-02		VA24C1605-001	2024-08-23	Water	M													
SW-02		L2757153-1	2024-08-23	Water	M													
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M													
SW-02	SW-02	L2757209-2	2024-08-27	Water	M				0.0179	0.566	1.11	91	101	89	79	95	86	96
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M													
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M				0.000274	0.634	1.25							
SW-02	SW-02	L2757587-1	2024-09-29	Water	M													
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M				0	0.31	0.606							
SW-02	SW-02	L2757661-1	2024-10-04	Water	M													
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M				0.000405	0.96	1.89							
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M				0.0264	0.343	0.63	83	79	73	86	86	86	87
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M	0	0	0										
SW-02	SW-02	L2757873-2	2024-10-22	Water	M													
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M	0	0	0										
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M													
SW-02	SW-02	L2757913-1	2024-10-25	Water	M				0.000281	0.478	0.955	82	68	60	71	61	74	69
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M	0	0	0										
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M													
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M													
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M	0	0	0										
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M				0.00127	0.382	0.747							
SW-02	SW-02	L2758155-3	2024-11-16	Water	M				0.00651	0.325	0.599	69	60	58	73	66	72	66
SW-02		VA24D1587-001	2024-11-20	Water	M				0.000657	0.357	0.691							
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M													
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M	0	0	0										
SW-02	SW-02	L2758371-1	2024-12-08	Water	M				0.0343	0.506	0.948	75	63	61	83	77	89	78
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M													
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M				0.0824	1.05	1.84	81	72	69	93	89	92	88
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M													
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M				0.0027	1.04	1.9	79	72	70	87	87	75	74
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M													
SW-02	SW-02	L2758769-2	2025-01-24	Water	M				0	1.76	3.53	59	61	61	69	78	66	74
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M													
SW-02	SW-02	L2759009-1	2025-02-19	Water	M													
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M				0.00233	0.576	1.14							
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M				0	0.383	0.766	66	69	68	72	77	76	82
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M				0	0.707	1.38							
SW-02	SW-02	L2759254-1	2025-03-18	Water	M													
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M													
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M	0	0	0										
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M				0.0612	0.982	1.87	68	75	67	79	99	89	107
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M	0.08	0.08	0										
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M													
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M	0	0	0										
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M													
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M													
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M				0.0221	0.591	1.15	80	76	82	90	87	88	98
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M	0	0	0										

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M													
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M				0.000645	1.07	1.37	86	79	88	83	80	83	80
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M	0	0	0										
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M													
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M	0	0	0										
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M				0.000885	0.34	0.673	83	82	82	88	89	89	83
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M													
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M													
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M				0.00253	0.659	1.32	67	58	57	72	67	72	68
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M				0	0.775	1.55	68	79	80	68	79	71	85
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M				0.0582	0.796	1.53	76	74	75	70	76	74	84
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M													
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M				0.00369	0.521	1.03							
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M													
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M													
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M				0.000552	0.709	1.42							
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M				0.0512	0.402	0.735	79	77	70	83	81	80	84
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M													
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M				0	2.12	4.24	58	61	61	69	77	69	74
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M				0.00432	0.881	1.75	78	70	66	89	79	84	79
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M													
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M													
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M				0.00169	0.558	1.09	82	81	88	78	74	80	87
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M													
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M													
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M													
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M				0.0526	0.247	0.431	67	69	74	72	68	70	74
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M				0.00537	0.581	1.15	76	72	79	85	83	83	94
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M													
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M													
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M													
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M													
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M													
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M				0	0.881	1.75	67	72	64	77	90	86	99
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M				0.0648	0.388	0.658	71	63	61	74	68	74	68
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M													
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M				0.0201	0.489	0.957	95	78	70	79	70	86	77
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M				0.00825	0.724	1.41	79	67	70	73	75	66	64
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M													
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M				0	0.383	0.757	74	73	77	70	74	71	76
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M				0.61	2.54	2.82	79	75	81	83	79	80	79
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M													
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M													
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M													
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M				0.00453	0.863	1.72	73	73	75	72	72	72	74
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M													
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M				0.000705	0.36	0.718	80	78	76	84	83	89	88
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M													
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M				0	1.22	2.44	43	47	45	42	46	48	59
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M				0.00692	0.263	0.511	70	76	76	72	78	78	93
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M													
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M				0	0.777	1.54	64	74	68	73	77	74	81
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M				0.0102	0.474	0.932	75	69	77	73	69	72	70
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M				0.00892	0.475	0.942	59	62	61	65	66	67	74
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M													
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M													
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M				0.0581	0.632	1.2	71	71	95	72	65	72	98
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M													
SW-03		VA24A1299-003	2024-01-23	Water	M													
SW-03		L2754353-3	2024-01-23	Water	M				0	0.74	1.45	71	82	85	72	85	72	88
SW-03		L2754615-3	2024-02-15	Water	M													
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M													
SW-03		L2755012-3	2024-03-19	Water	M													
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M													
SW-03		L2755316-7	2024-04-12	Water	M				0.014	0.392	0.763	78	77	82	76	81	77	82
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M													
SW-03		L2755504-2	2024-04-26	Water	M													
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M				0.0323	0.448	0.822	83	71	68	86	87	81	82
SW-03		L2755521-3	2024-04-28	Water	M				0.000837	0.755	1.51	63	69	67	63	70	68	78
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M													
SW-03		L2755598-2	2024-05-03	Water	M													
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M				0	0.512	1.02	84	82	83	82	85	85	89
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M				0.000471	0.624	1.24	75	82	80	78	94	85	97
SW-03		L2755677-2	2024-05-09	Water	M				0.0305	0.884	1.73	70	84	82	74	84	74	89
SW-03		L2755687-2	2024-05-09	Water	M													
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M													
SW-03		L2755770-2	2024-05-14	Water	M				0.0115	0.505	0.998							
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M				0	1.79	3.56	67	73	72	78	86	82	86
SW-03		L2755819-2	2024-05-17	Water	M													
SW-03		VA24B1636-002	2024-05-23	Water	M				0.0226	1.31	2.59	66	68	62	68	79	73	81
SW-03		L2755903-2	2024-05-23	Water	M				0.0494	0.744	1.43							
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M				0.0185	0.7	1.27	67	66	67	76	91	77	76
SW-03		L2755933-2	2024-05-24	Water	M													
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M				0.0333	0.479	0.869	68	65	62	70	68	70	69
SW-03		L2755961-2	2024-05-26	Water	M				0.000201	0.38	0.747							
SW-03		VA24B4698-002	2024-06-21	Water	M													
SW-03		L2756349-2	2024-06-21	Water	M													
SW-03		VA24B5540-002	2024-06-27	Water	M													
SW-03		L2756458-2	2024-06-27	Water	M				0.00156	0.522	1.04							
SW-03		VA24B7689-002	2024-07-19	Water	M													
SW-03		L2756726-2	2024-07-19	Water	M	0	0	0										
SW-03		L2756871-3	2024-07-31	Water	M													
SW-03		VA24B8974-003	2024-07-31	Water	M													
SW-03		VA24C1605-002	2024-08-23	Water	M	0	0	0										
SW-03		L2757153-2	2024-08-23	Water	M	0	0	0										
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M	0	0	0										
SW-03	SW-03	L2757229-1	2024-08-28	Water	M													
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M	0	0	0										
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M				0.0175	0.356	0.663	95	90	90	93	95	96	92
SW-03	SW-03	L2757587-3	2024-09-29	Water	M	0	0	0										
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M				0.115	0.743	1.26	89	74	69	80	73	78	77
SW-03	SW-03	L2757661-3	2024-10-04	Water	M													
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M													
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M													
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M				0.0119	0.626	1.24	97	81	98	90	92	97	97
SW-03	SW-03	L2757873-3	2024-10-22	Water	M													
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M				0	0.662	1.29	78	72	79	82	84	81	82
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M	0	0	0										
SW-03	SW-03	L2757913-3	2024-10-25	Water	M													
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M													
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M	0	0	0										
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M	0	0	0										
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M				0.442	0.646	0.828	84	88	81	78	84	75	83
SW-03	SW-03	L2758155-2	2024-11-16	Water	M													
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M													
SW-03		VA24D1587-002	2024-11-20	Water	M	0	0	0										
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M				0	0.515	1.03	84	89	77	85	93	90	93
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M				0	0.385	0.739	89	81	74	86	80	84	81
SW-03	SW-03	L2758371-2	2024-12-08	Water	M													
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M													
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M				0	0.871	1.74	74	69	56	88	91	88	90
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M	0	0	0										
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M	0	0	0										
SW-03	SW-03	L2758769-3	2025-01-24	Water	M				0	0.374	0.718	81	72	69	80	77	79	77
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M	0	0	0										
SW-03	SW-03	L2759009-2	2025-02-19	Water	M													
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M													
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M				0.000468	0.422	0.82	80	64	67	79	78	79	75
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M	0	0	0										
SW-03	SW-03	L2759254-2	2025-03-18	Water	M													
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M				0.0211	0.607	1.15	81	81	86	80	78	82	87
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M													
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M				0.00514	0.48	0.955	89	75	70	83	74	78	75
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M													
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M													
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M													
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M				0	0.589	1.13	49	53	57	58	60	58	61
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M				0	1.22	2.43	70	68	54	83	88	85	83
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M				0.00116	0.599	1.17	89	96	84	77	91	84	95
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M													
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M													
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M													
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M				0.00155	0.64	1.26	75	76	77	80	92	82	88
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M				0	0.354	0.7	59	64	63	68	72	72	80
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M				0	0.539	1.08	95	79	73	83	72	82	76
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M				0.0772	0.715	0.94	83	86	79	78	85	77	84
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M				0.0181	0.756	0.991	89	83	89	82	80	84	82
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M				0.00435	0.619	1.22	73	65	62	82	75	81	78
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M													
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M													
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M													
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M													
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M													
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M													
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M													
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M													
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M													
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M													
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M													
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M													
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M													
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M													
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M													
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M													
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M													
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M													
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M													
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M													
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M													
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M													
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M													
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M													
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M													
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M													
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M													
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M													
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M													
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M													
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M	0	0	0										
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M	0	0	0										
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M	0	0	0										
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M	0	0	0										
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M													
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M													
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M				0.0843	1.13	2.14	62	65	62	68	80	75	85
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M													
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M				0.00256	0.711	1.39	60	58	60	69	74	65	65
SW-04		VA24A1299-004	2024-01-23	Water	M													
SW-04		L2754353-4	2024-01-23	Water	M				0.00143	0.61	1.16	81	82	88	80	80	85	85
SW-04		L2754615-4	2024-02-15	Water	M				0	0.518	1.04	57	62	64	66	70	65	70
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M				0.0208	0.416	0.809	70	64	62	70	67	69	68
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M				0.00246	0.349	0.68	84	76	68	79	76	79	78
SW-04		L2755012-4	2024-03-19	Water	M				0.000762	0.444	0.875	68	68	72	65	68	66	70
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M				0	0.86	1.71	82	76	82	80	82	86	82
SW-04		L2755503-3	2024-04-25	Water	M													
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M													
SW-04		L2755523-2	2024-04-29	Water	M				0	0.756	1.51	65	76	69	75	81	75	83
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M				0.000789	0.408	0.805	75	75	77	74	76	72	77
SW-04		L2755588-3	2024-05-02	Water	M													
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M				0.00057	0.668	0.928	64	57	56	63	61	63	61
SW-04		L2755687-4	2024-05-09	Water	M				0.00138	0.239	0.463	68	73	73	72	79	78	90
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M													
SW-04		L2755695-2	2024-05-10	Water	M													
SW-04		L2755788-2	2024-05-15	Water	M				0	1.01	2.01							
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M													
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M				0.0335	0.539	0.976	89	81	88	84	80	85	82
SW-04		L2755820-3	2024-05-16	Water	M				0	0.442	0.883							
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M				0	0.802	1.52	75	80	78	79	88	80	92
SW-04		VA24B1636-005	2024-05-23	Water	M													
SW-04		L2755903-5	2024-05-23	Water	M				0.0213	0.463	0.889							
SW-04		L2755916-3	2024-05-23	Water	M				0	0.675	1.35							
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M				0.00931	0.589	1.12	80	81	87	78	79	84	88
SW-04		L2755961-4	2024-05-26	Water	M				0.0177	0.506	0.99							
SW-04		VA24B4655-003	2024-06-20	Water	M													
SW-04		L2756326-3	2024-06-20	Water	M				0.00264	0.316	0.602							
SW-04		VA24B5289-002	2024-06-26	Water	M				0.0501	0.505	0.942	73	65	68	74	75	78	75
SW-04		L2756419-2	2024-06-26	Water	M													
SW-04		VA24B7579-003	2024-07-18	Water	M				0.0157	1.07	2.11							
SW-04		L2756717-3	2024-07-18	Water	M													
SW-04		VA24B8974-004	2024-07-31	Water	M													
SW-04		L2756871-4	2024-07-31	Water	M													
SW-04		VA24C1546-003	2024-08-22	Water	M				0.000903	0.963	1.91							
SW-04		L2757144-3	2024-08-22	Water	M													
SW-04	SW-04	L2757209-4	2024-08-27	Water	M													
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M				0.0464	0.588	0.74	85	74	84	82	75	86	78
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M				0.000298	0.607	1.19							
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M				0	0.432	0.859							
SW-04	SW-04	L2757584-2	2024-09-28	Water	M													
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M				0.0157	0.997	1.98	79	72	59	91	90	95	92
SW-04	SW-04	L2757661-4	2024-10-04	Water	M													
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M				0.0526	0.402	0.74							
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M													
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M				0	0.276	0.534							
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M													
SW-04	SW-04	L2757873-4	2024-10-22	Water	M													
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M				0.000609	1.25	2.49	79	70	59	86	90	90	88
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M				0.0261	0.631	1.1	67	63	65	75	83	70	72
SW-04	SW-04	L2757942-1	2024-10-26	Water	M													
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M				0	0.363	0.712	77	70	62	76	69	73	69
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M				0.0289	0.387	0.587	88	84	78	84	84	80	83

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M													
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M													
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M													
SW-04	SW-04	L2758155-4	2024-11-17	Water	M													
SW-04		4-456131118-0	2024-11-17	Water	F													
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M				0.0792	0.544	0.674	88	84	77	85	84	84	85
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M													
SW-04	SW-04	L2758371-3	2024-12-08	Water	M													
SW-04		4-456441522-0	2024-12-18	Water	F				0	0.69	1.36	79	79	83	80	88	84	87
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M													
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M													
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M				0	0.463	0.926	62	70	71	73	75	71	79
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M													
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M													
SW-04	SW-04	L2758765-1	2025-01-25	Water	M													
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M				0.00134	1.31	2.61	72	60	73	76	75	84	77
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M													
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M													
SW-04	SW-04	L2759042-2	2025-02-21	Water	M													
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M				0	0.788	1.56	76	74	61	82	82	84	84
SW-04	SW-04	L2759255-2	2025-03-19	Water	M													
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M													
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M				0.0179	0.61	1.19	78	72	73	81	83	82	81
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M													
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M				0	0.997	1.99	75	73	58	86	87	86	89
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M													
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M													
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M				0.0592	0.861	1.14	88	79	89	79	75	79	77
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M				0.00438	0.638	1.24							
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M													
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M				0.000408	0.313	0.609							
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M				0	1.1	2.07	64	68	65	72	87	82	91
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M													
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M				0.00222	0.346	0.68							
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M													
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M													
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M													
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M				0.00516	0.471	0.92							
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M				0.0576	0.636	0.815	76	67	66	75	72	74	72
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M													
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M													
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M													
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M				0.00924	0.703	1.38	64	63	54	80	72	79	92
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M													
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M													
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M				0	1.43	2.84	59	60	55	58	67	65	73
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M				0.00173	0.808	1.55	69	72	68	77	92	83	92
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M	0	0	0										
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M													
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M													
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M													
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M													
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M				0	1.13	2.25							
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M				0	0.391	0.751							
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M													
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M													
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M	0	0	0										

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M	0	0	0										
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M													
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M	0	0	0										
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M	0	0	0										
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M	0	0	0										
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M	0	0	0										
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M													
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M													
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M				0.038	0.328	0.613	64	69	70	68	73	69	82
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M				0.0316	0.496	0.956	87	78	85	82	79	84	79
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M				0	0.719	1.44	61	61	85	62	59	64	78
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M				0.103	0.648	1.1	76	71	73	81	76	75	76
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M													
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M													
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M													
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M													
SW-07		VA24A1299-005	2024-01-23	Water	M				0.597	1.06	1.5	80	72	78	80	79	85	81
SW-07		L2754353-5	2024-01-23	Water	M				0.0173	0.358	0.695							
SW-07		L2754615-5	2024-02-15	Water	M	0	0	0										
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M													
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M													
SW-07		L2755012-5	2024-03-19	Water	M	0	0	0										
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M													
SW-07		L2755504-3	2024-04-26	Water	M	0	0	0										
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M													
SW-07		L2755521-1	2024-04-28	Water	M	0	0	0										
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M				0.0601	0.502	0.85	83	88	94	79	91	84	95
SW-07		L2755598-3	2024-05-03	Water	M	0	0	0										
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M													
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M													
SW-07		L2755677-3	2024-05-09	Water	M	0	0	0										
SW-07		L2755687-3	2024-05-09	Water	M													
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M				0.00265	0.308	0.595	63	63	68	64	69	66	73
SW-07		L2755770-3	2024-05-14	Water	M													
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M													
SW-07		L2755819-3	2024-05-17	Water	M	0	0	0										
SW-07		VA24B1636-003	2024-05-23	Water	M				0.0119	0.344	0.64	80	71	84	72	75	76	78
SW-07		L2755903-3	2024-05-23	Water	M													
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M				0.00171	0.954	1.85							
SW-07		L2755933-3	2024-05-24	Water	M													
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M													
SW-07		L2755961-3	2024-05-26	Water	M													
SW-07		VA24B4698-003	2024-06-21	Water	M				0.397	0.629	0.81	78	71	65	74	72	73	71
SW-07		L2756349-3	2024-06-21	Water	M													
SW-07		VA24B5289-003	2024-06-26	Water	M				0.000849	0.411	0.818	73	71	76	69	71	68	73
SW-07		L2756419-3	2024-06-26	Water	M	0	0	0										
SW-07		VA24B7689-003	2024-07-19	Water	M	0	0	0										
SW-07		L2756726-3	2024-07-19	Water	M													
SW-07		L2756871-5	2024-07-31	Water	M	0	0	0										
SW-07		VA24B8974-005	2024-07-31	Water	M	0	0	0										
SW-07		VA24C1605-003	2024-08-23	Water	M	0	0	0										
SW-07		L2757153-3	2024-08-23	Water	M													
SW-07	SW-07	L2757209-5	2024-08-27	Water	M													
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M													
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M	0	0	0										
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M													
SW-07	SW-07	L2757587-4	2024-09-29	Water	M													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M													
SW-07	SW-07	L2757664-1	2024-10-03	Water	M				0	0.434	0.861	87	85	93	88	91	88	93
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M	0	0	0										
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M													
SW-07		492-455781017-0	2024-10-13	Water	F													
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M													
SW-07	SW-07	L2757873-5	2024-10-22	Water	M				0.0617	0.498	0.887	75	68	74	78	80	82	81
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M	0	0	0										
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M													
SW-07	SW-07	L2757913-4	2024-10-25	Water	M													
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M													
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M				0.00231	0.363	0.714	74	63	69	80	72	78	70
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M				0.000594	0.549	1.08	85	86	76	87	94	90	98
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M				0.00181	0.558	1.07	76	81	87	74	83	78	93
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M													
SW-07	SW-07	L2758155-1	2024-11-16	Water	M				0.00812	0.917	1.33	79	71	62	84	83	89	84
SW-07		VA24D1587-003	2024-11-20	Water	M				0.0295	0.716	1.4	66	62	65	69	70	70	69
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M													
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M	0	0	0										
SW-07	SW-07	L2758371-4	2024-12-08	Water	M				0.00101	0.892	1.78	76	74	63	82	84	89	90
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M													
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M													
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M				0.00817	0.533	1.06	99	81	101	97	98	96	99
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M				0.00073	0.713	0.854	88	83	77	84	83	82	83
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M													
SW-07	SW-07	L2758765-2	2025-01-25	Water	M													
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M													
SW-07	SW-07	L2759009-3	2025-02-19	Water	M													
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M				0.00439	0.48	0.936	90	83	97	90	94	90	93
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M													
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M													
SW-07	SW-07	L2759254-3	2025-03-18	Water	M				0.0128	0.699	1.27	73	73	76	80	80	78	79
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M													
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M													
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M													
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M				0.012	0.307	0.574	74	69	64	73	69	69	67
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M													
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M				0	0.92	1.83							
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M													
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M	0	0	0										
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M				0.0411	0.991	1.91	67	71	68	78	87	79	90
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M													
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M													
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M													
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M				0	0.426	0.834	71	70	75	71	74	70	74
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M													
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M				0.000828	1	2							
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M													
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M													
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M													
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M				0.00898	1.11	2.22							
SW-08		L2755503-2	2024-04-25	Water	M				0.00348	0.869	1.73							
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M				0.00601	0.64	1.27							
SW-08		L2755588-2	2024-05-02	Water	M				0.0199	0.316	0.609							
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M				0.093	1.04	1.68							
SW-08		L2755694-2	2024-05-10	Water	M													
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M				0.0182	0.412	0.793							

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Total Furan TEQ	Total Dioxin & Furan TEQ	Total Dioxin TEQ	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	Surrogate-13C12-1-2-3-4-6-7-8-HpCDD	Surrogate-13C12-1-2-3-4-6-7-8-HpCDF	Surrogate-13C12-1-2-3-4-7-8-9-HpCDF	Surrogate-13C12-1-2-3-4-7-8-HxCDD	Surrogate-13C12-1-2-3-4-7-8-HxCDF	Surrogate-13C12-1-2-3-6-7-8-HxCDD	Surrogate-13C12-1-2-3-6-7-8-HxCDF
						pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	%	%	%	%	%	%	%
SW-08		L2755820-2	2024-05-16	Water	M													
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M				0.00411	0.365	0.715							
SW-08		L2755916-2	2024-05-23	Water	M													
SW-08		VA24B4655-002	2024-06-20	Water	M													
SW-08		L2756326-2	2024-06-20	Water	M													
SW-08		VA24B7579-002	2024-07-18	Water	M													
SW-08		L2756717-2	2024-07-18	Water	M													
SW-08		VA24C1546-002	2024-08-22	Water	M													
SW-08		L2757144-2	2024-08-22	Water	M	0	0	0										
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M				0	0.894	1.79	71	81	72	82	87	82	91
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M													
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M													
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M				0.00756	0.311	0.604	71	76	78	74	82	78	94
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M				0.0532	0.633	1.07							
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M				0	1.19	2.35	80	80	81	72	78	75	85
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M													
SW-09		L2755503-4	2024-04-25	Water	M													
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M													
SW-09		L2755588-4	2024-05-02	Water	M				0	0.589	1.17	81	74	80	79	84	84	82
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M													
SW-09		L2755687-5	2024-05-09	Water	M													
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M	0	0	0										
SW-09		L2755820-4	2024-05-16	Water	M				0.093	1.25	1.5	72	77	82	70	77	71	83
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M	0	0	0										
SW-09		L2755916-4	2024-05-23	Water	M													
SW-09		VA24B4655-004	2024-06-20	Water	M	0	0	0										
SW-09		L2756326-4	2024-06-20	Water	M				0.049	0.695	1.27	72	65	69	75	72	79	74
SW-09		VA24B7579-004	2024-07-18	Water	M													
SW-09		L2756717-4	2024-07-18	Water	M													
SW-09		VA24C1546-004	2024-08-22	Water	M	0.2	0.2	0.01										
SW-09		L2757144-4	2024-08-22	Water	M				0.0159	0.527	1.04	84	73	83	86	82	90	82
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M													
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M				0.0127	0.614	1.21	100	85	101	95	95	97	100
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M													
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M													
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M													
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M				0.00879	0.72	1.43	77	82	80	78	89	82	92
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M													
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M													
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M													
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M	0.07	0.07	0										
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M				0.0116	0.362	0.708	96	92	96	94	95	99	93
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M				0.0153	0.565	1.11	79	69	71	80	75	80	79
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M													
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M													
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M				0	0.476	0.943	84	82	86	79	81	79	82
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M	0.1	0.1	0										
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M													
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M													
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M													
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M													

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M														
OUT-01		VA24B1636-006	2024-05-23	Water	M														
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M														
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M														
OUT-01		661-455931031-0	2024-10-28	Water	F														
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M														
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M														
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M														
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M														
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M														
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M														
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M														
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M														
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M														
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M														
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M														
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M														
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M														
OUT-02		VA24B5289-006	2024-06-26	Water	M														
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M														
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M														
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M														
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M														
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M														
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M														
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M														
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M														
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M														
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M														
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M														
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M														
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M														
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M														
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M														
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M														
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M													<0.25	<0.25
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M														
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M														
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M														
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M														
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M	94	99	112	100	98	94	88	100	94					
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M	91	71	85	92	76	79	77	45	88					
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M														
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M	94	76	93	95	82	48	83	60	55					
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M													<0.25	<0.25
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M														
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M														
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M	82	69	79	78	80	59	69	71	66					
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M													<0.25	<0.25
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M	74	57	60	73	61	60	63	56	68					
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M													<0.25	<0.25
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M													<0.25	<0.25
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M	81	72	71	85	73	71	70	47	68					
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M													<0.25	<0.25
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M	75	66	67	78	68	64	61	47	67					
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M	79	64	71	80	72	57	65	51	65					
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M													<0.25	<0.25
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M													<0.25	<0.25
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M	56	60	56	60	59	57	57	38	54					
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M	82	92	89	83	93	75	76	69	74				<0.25	<0.25
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M													<0.25	<0.25
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M	69	82	78	69	81	65	66	52	75					

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M	82	84	82	84	81	88	81	77	77				<0.25	<0.25
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M													<0.25	<0.25
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M	61	95	65	59	69	71	70	40	76					
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M	78	106	96	79	101	83	83	55	80				<0.25	<0.25
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M	79	73	76	89	79	61	64	35	62					
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M													<0.25	<0.25
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M	59	41	42	61	42	38	41	35	39					
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M													<0.25	<0.25
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M	65	60	61	66	60	57	60	38	64					
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M													<0.25	<0.25
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M	79	74	64	78	73	71	68	69	81					
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M	71	70	58	76	64	75	74	52	84				<0.25	<0.25
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M	71	69	59	74	67	71	67	52	0					
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M													<0.25	<0.25
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M	65	56	50	67	53	63	57	42	70					
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M	66	68	58	67	66	65	59	86	81					
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M													<0.25	<0.25
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M	84	82	70	84	81	75	70	81	79					
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M													<0.25	<0.25
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M	100	78	79	102	87	76	79	85	82					
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M	72	70	60	71	69	69	67	68	80					
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M													<0.25	<0.25
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M	86	89	76	87	86	86	82	71	87					
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M	84	82	72	84	84	78	75	64	87					
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M	79	70	64	84	69	81	81	53	83					
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M													<0.25	<0.25
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M	96	68	73	105	78	78	81	63	80					
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M													<0.25	<0.25
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M													<0.25	<0.25
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M	84	70	81	95	74	77	78	56	80					
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M	83	82	85	83	76	86	85	52	86					
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M	73	70	73	75	64	71	69	55	80					
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M													<0.25	<0.25
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M	82	76	80	84	74	81	76	63	81					
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M													<0.25	<0.25
SW-01		VA24A1299-001	2024-01-23	Water	M													<0.25	<0.25
SW-01		L2754353-1	2024-01-23	Water	M	68	55	61	70	56	60	57	47	65					
SW-01		L2754615-1	2024-02-15	Water	M	86	68	84	87	73	75	73	50	87					
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M													<0.25	<0.25
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M	89	90	98	93	88	83	79	88	83					
SW-01		L2755012-1	2024-03-19	Water	M													<0.25	<0.25
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M														
SW-01		L2755503-1	2024-04-25	Water	M														
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M														
SW-01		L2755523-1	2024-04-29	Water	M														
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M														
SW-01		L2755588-1	2024-05-02	Water	M														
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M														
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M														
SW-01		L2755694-1	2024-05-10	Water	M														
SW-01		L2755695-1	2024-05-10	Water	M														
SW-01		L2755788-1	2024-05-15	Water	M														
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M														
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M														
SW-01		L2755820-1	2024-05-16	Water	M														
SW-01		VA24B1628-001	2024-05-22	Water	M														
SW-01		L2755902-1	2024-05-22	Water	M														
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M														
SW-01		L2755916-1	2024-05-23	Water	M														
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M														
SW-01		VA24B4655-001	2024-06-20	Water	M														
SW-01		L2756326-1	2024-06-20	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M														
SW-01		L2756419-1	2024-06-26	Water	M														
SW-01		VA24B7579-001	2024-07-18	Water	M														
SW-01		L2756717-1	2024-07-18	Water	M														
SW-01		VA24B8974-001	2024-07-31	Water	M														
SW-01		L2756871-1	2024-07-31	Water	M														
SW-01		VA24C1546-001	2024-08-22	Water	M													<0.25	<0.25
SW-01		L2757144-1	2024-08-22	Water	M														
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M													<0.25	<0.25
SW-01	SW-01	L2757209-1	2024-08-27	Water	M													<0.25	<0.25
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M													<0.25	<0.25
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M													<0.25	<0.25
SW-01	SW-01	L2757584-1	2024-09-28	Water	M													<0.25	<0.25
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M													<0.25	<0.25
SW-01	SW-01	L2757664-2	2024-10-03	Water	M														
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M														
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M														
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M														
SW-01	SW-01	L2757873-1	2024-10-22	Water	M													<0.25	<0.25
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M													<0.25	<0.25
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M													<0.25	<0.25
SW-01	SW-01	L2757942-2	2024-10-26	Water	M													<0.25	<0.25
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M	75	63	68	73	70	60	64	64	65					
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M	85	62	72	89	69	70	71	55	71					
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M	79	70	71	82	71	68	66	39	73					
SW-01	SW-01	L2758119-1	2024-11-12	Water	M													<0.25	<0.25
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M	80	73	74	85	74	68	71	45	65					
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M													<0.25	<0.25
SW-01	SW-01	L2758350-1	2024-12-06	Water	M	74	59	63	73	61	60	63	59	73					
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M													<0.25	<0.25
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M	71	75	71	72	72	77	70	72	71					
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M	84	94	92	84	94	73	75	69	76				<0.25	<0.25
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M	70	78	70	72	72	68	68	40	63				<0.25	<0.25
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M	81	94	90	83	94	77	78	65	80					
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M													<0.25	<0.25
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M													<0.25	<0.25
SW-01	SW-01	L2758769-1	2025-01-24	Water	M	75	65	67	76	67	63	69	53	66				<0.25	<0.25
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M													<0.25	<0.25
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M													<0.25	<0.25
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M	80	73	74	81	74	70	72	46	72					
SW-01	SW-01	L2759042-1	2025-02-21	Water	M	66	51	55	70	54	57	61	32	63					
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M	82	83	83	83	87	79	80	53	79					
SW-01	SW-01	L2759255-1	2025-03-19	Water	M													<0.25	<0.25
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M	76	55	57	70	54	60	62	39	63				<0.25	<0.25
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M													<0.25	<0.25
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M													<0.25	<0.25
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M													<0.25	<0.25
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M	69	70	56	72	66	65	62	82	78					
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M	78	79	65	78	76	74	68	79	84					
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M													<0.25	<0.25
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M	78	67	59	78	68	61	60	81	67					
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M	83	76	71	83	82	68	74	75	78					
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M													<0.25	<0.25
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M	58	78	75	80	78	74	79	49	81					
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M	77	73	73	88	77	79	84	45	85					
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M													<0.25	<0.25
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M	79	69	67	87	68	79	82	51	86					
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M	79	74	71	87	73	85	85	52	86					
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M													<0.25	<0.25
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M													<0.25	<0.25
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M													<0.25	<0.25
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M	75	73	66	79	69	75	70	50	61					

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M													<0.25	<0.25
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M													<0.25	<0.25
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M													<0.25	<0.25
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M													<0.25	<0.25
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M													<0.25	<0.25
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M													<0.25	<0.25
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M														
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M	69	59	64	70	65	53	58	42	56					
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M	86	77	77	91	78	78	74	47	70					
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M													<0.25	<0.25
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M														
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M	77	63	67	72	65	63	69	57	61					
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M													<0.25	<0.25
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M													<0.25	<0.25
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M	80	102	92	81	99	78	78	64	79					
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M														
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M													<0.25	<0.25
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M	73	72	68	74	71	73	70	64	78					
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M													<0.25	<0.25
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M	87	54	57	86	58	37	25	78	38					
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M	77	59	63	74	64	65	72	54	64					
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M													<0.25	<0.25
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M	79	70	73	80	72	73	71	43	67					
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M													<0.25	<0.25
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M														
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M													<0.25	<0.25
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M	79	84	82	79	81	64	64	72	74				<0.25	<0.25
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M													<0.25	<0.25
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M														
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M														
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M														
SW-02	SW-02	23F0370-03	2023-06-02	Water	M														
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M														
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M													<0.25	<0.25
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M													<0.25	<0.25
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M														
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M														
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M														
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M														
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M														
SW-02		VA24A1299-002	2024-01-23	Water	M														
SW-02		L2754353-2	2024-01-23	Water	M														
SW-02		L2754615-2	2024-02-15	Water	M	92	95	103	95	93	89	86	94	83					
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M														
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M														
SW-02		L2755012-2	2024-03-19	Water	M													<0.25	<0.25
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M													<0.25	<0.25
SW-02		L2755316-6	2024-04-12	Water	M	97	80	101	99	87	82	91	57	87					
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M														
SW-02		L2755504-1	2024-04-26	Water	M													<0.25	<0.25
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M														
SW-02		L2755521-2	2024-04-28	Water	M													<0.25	<0.25
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M														
SW-02		L2755598-1	2024-05-03	Water	M													<0.25	<0.25
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M													<0.25	<0.25
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M														
SW-02		L2755677-1	2024-05-09	Water	M	85	81	86	84	75	89	86	69	86					
SW-02		L2755687-1	2024-05-09	Water	M	82	70	81	93	72	78	78	58	75					
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M														
SW-02		L2755770-1	2024-05-14	Water	M													<0.25	<0.25
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M														
SW-02		L2755819-1	2024-05-17	Water	M	89	65	71	97	73	73	76	41	71					

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M														
SW-02		L2755903-1	2024-05-23	Water	M	87	75	68	93	72	88	89	56	95					
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M														
SW-02		L2755933-1	2024-05-24	Water	M													<0.25	<0.25
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M														
SW-02		L2755961-1	2024-05-26	Water	M	84	84	73	83	84	80	75	66	87					
SW-02		VA24B4698-001	2024-06-21	Water	M														
SW-02		L2756349-1	2024-06-21	Water	M													<0.25	<0.25
SW-02		VA24B5540-001	2024-06-27	Water	M														
SW-02		L2756458-1	2024-06-27	Water	M	84	83	74	84	83	82	78	69	87					
SW-02		VA24B7689-001	2024-07-19	Water	M													<0.25	<0.25
SW-02		L2756726-1	2024-07-19	Water	M													<0.25	<0.25
SW-02		VA24B8974-002	2024-07-31	Water	M														
SW-02		L2756871-2	2024-07-31	Water	M	71	68	60	70	68	68	65	72	80					
SW-02		VA24C1605-001	2024-08-23	Water	M													<0.25	<0.25
SW-02		L2757153-1	2024-08-23	Water	M													<0.25	<0.25
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M														
SW-02	SW-02	L2757209-2	2024-08-27	Water	M	93	74	75	96	84	71	75	80	85					
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M													<0.25	<0.25
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M														
SW-02	SW-02	L2757587-1	2024-09-29	Water	M													<0.25	<0.25
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M													<0.25	<0.25
SW-02	SW-02	L2757661-1	2024-10-04	Water	M													<0.25	<0.25
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M														
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M	83	83	73	87	84	80	77	83	81					
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M														
SW-02	SW-02	L2757873-2	2024-10-22	Water	M													<0.25	<0.25
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M														
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M													<0.25	<0.25
SW-02	SW-02	L2757913-1	2024-10-25	Water	M	66	69	58	67	65	62	61	90	75					
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M														
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M														
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M													<0.25	<0.25
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M														
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M													<0.25	<0.25
SW-02	SW-02	L2758155-3	2024-11-16	Water	M	65	59	52	68	56	69	63	51	71					
SW-02		VA24D1587-001	2024-11-20	Water	M														
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M													<0.25	<0.25
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M														
SW-02	SW-02	L2758371-1	2024-12-08	Water	M	75	70	61	80	67	81	75	50	85					
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M														
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M	84	77	64	89	72	81	82	58	74				<0.25	<0.25
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M													<0.25	<0.25
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M	80	71	63	81	70	69	67	58	77					
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M													<0.25	<0.25
SW-02	SW-02	L2758769-2	2025-01-24	Water	M	66	62	63	69	63	60	62	40	67					
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M													<0.25	<0.25
SW-02	SW-02	L2759009-1	2025-02-19	Water	M													<0.25	<0.25
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M														
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M	75	56	59	78	59	60	65	43	66					
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M													<0.25	<0.25
SW-02	SW-02	L2759254-1	2025-03-18	Water	M													<0.25	<0.25
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M														
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M														
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M	84	78	82	96	83	72	76	32	73					
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M														
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M													<0.25	<0.25
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M														
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M														
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M														
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M	82	109	99	82	103	86	85	54	82				<0.25	<0.25
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b) fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M														
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M	82	93	86	82	90	78	77	62	78					
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M														
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M														
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M														
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M	85	88	83	84	85	84	87	73	78				<0.25	<0.25
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M														
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M												<2.6		
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M	66	61	53	69	58	62	60	50	0					
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M	78	65	75	81	72	58	64	52	63					
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M	77	64	69	75	70	55	57	69	63					
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M													<0.25	<0.25
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M														
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M													<0.25	<0.25
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M													<0.25	<0.25
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M													<0.25	<0.25
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M	84	81	71	83	82	74	72	80	82					
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M													<0.25	<0.25
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M	67	64	64	70	64	60	63	34	70					
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M	80	73	61	84	69	77	75	59	70				<0.25	<0.25
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M													<0.25	<0.25
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M													<0.25	<0.25
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M	79	85	82	79	84	67	68	68	71				<0.25	<0.25
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M													<0.25	<0.25
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M													<0.25	<0.25
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M													<0.25	<0.25
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M	73	59	63	67	62	58	66	57	66					
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M	79	103	94	78	96	79	79	51	79				<0.25	<0.25
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M													<0.25	<0.25
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M													<0.25	<0.25
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M													<0.25	<0.25
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M													<0.25	<0.25
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M													<0.25	<0.25
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M	77	76	82	88	80	69	73	28	67					
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M	68	60	53	70	57	70	63	56	73					
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M													<0.25	<0.25
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M	74	75	63	76	70	71	68	99	81					
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M	73	63	59	71	64	63	62	62	79					
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M													<0.25	<0.25
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M	74	60	65	74	62	61	66	60	74					
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M	80	76	72	80	73	72	69	57	64					
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M													<0.25	<0.25
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M													<0.25	<0.25
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M													<0.25	<0.25
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M	73	94	83	73	88	72	73	62	76					
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M													<0.25	<0.25
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M	80	81	76	84	79	83	80	69	80				<0.25	<0.25
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M													<0.25	<0.25
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M	47	37	42	49	40	36	42	31	41					
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M	77	62	67	75	66	63	65	59	76					
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M													<0.25	<0.25
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M	78	67	68	80	69	67	66	45	67					
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M	71	84	79	70	80	70	69	55	72					
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M	67	49	51	70	51	48	52	40	48					
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M														
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M													<0.25	<0.25
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M	72	82	73	72	78	75	74	62	77					
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M													<0.25	<0.25
SW-03		VA24A1299-003	2024-01-23	Water	M													<0.25	<0.25
SW-03		L2754353-3	2024-01-23	Water	M	84	71	78	85	78	65	71	53	64					
SW-03		L2754615-3	2024-02-15	Water	M													<0.25	<0.25
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M														
SW-03		L2755012-3	2024-03-19	Water	M														
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M														
SW-03		L2755316-7	2024-04-12	Water	M	81	68	73	80	71	71	75	63	72					
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M													<0.25	<0.25
SW-03		L2755504-2	2024-04-26	Water	M													<0.25	<0.25
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M	83	83	76	83	82	78	74	65	90					
SW-03		L2755521-3	2024-04-28	Water	M	71	55	65	71	59	60	65	45	61					
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M													<0.25	<0.25
SW-03		L2755598-2	2024-05-03	Water	M													<0.25	<0.25
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M	82	72	81	89	73	76	75	63	85					
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M	84	71	84	94	76	74	79	55	78					
SW-03		L2755677-2	2024-05-09	Water	M	83	55	68	87	70	69	70	51	68					
SW-03		L2755687-2	2024-05-09	Water	M													<0.25	<0.25
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M													<0.25	<0.25
SW-03		L2755770-2	2024-05-14	Water	M														
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M	81	76	77	82	78	75	77	43	74					
SW-03		L2755819-2	2024-05-17	Water	M													<0.25	<0.25
SW-03		VA24B1636-002	2024-05-23	Water	M	69	71	73	78	74	60	64	32	61					
SW-03		L2755903-2	2024-05-23	Water	M														
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M	78	60	62	75	58	68	69	43	70				<0.25	<0.25
SW-03		L2755933-2	2024-05-24	Water	M													<0.25	<0.25
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M	68	59	55	70	60	64	62	55	70					
SW-03		L2755961-2	2024-05-26	Water	M													<0.25	<0.25
SW-03		VA24B4698-002	2024-06-21	Water	M													<0.25	<0.25
SW-03		L2756349-2	2024-06-21	Water	M													<0.25	<0.25
SW-03		VA24B5540-002	2024-06-27	Water	M													<0.25	<0.25
SW-03		L2756458-2	2024-06-27	Water	M													<0.25	<0.25
SW-03		VA24B7689-002	2024-07-19	Water	M														
SW-03		L2756726-2	2024-07-19	Water	M														
SW-03		L2756871-3	2024-07-31	Water	M														
SW-03		VA24B8974-003	2024-07-31	Water	M													<0.25	<0.25
SW-03		VA24C1605-002	2024-08-23	Water	M														
SW-03		L2757153-2	2024-08-23	Water	M														
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M														
SW-03	SW-03	L2757229-1	2024-08-28	Water	M														
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M														
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M	90	93	101	94	89	88	85	95	87					
SW-03	SW-03	L2757587-3	2024-09-29	Water	M														
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M	77	76	67	77	75	74	70	74	84					
SW-03	SW-03	L2757661-3	2024-10-04	Water	M														
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M														
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M														
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M	98	80	99	97	87	81	85	65	91					
SW-03	SW-03	L2757873-3	2024-10-22	Water	M														
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M	78	71	77	77	68	74	72	60	74					
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M														
SW-03	SW-03	L2757913-3	2024-10-25	Water	M														
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M													<0.25	<0.25
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M														
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M														
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M	87	74	70	85	83	67	78	80	79					
SW-03	SW-03	L2758155-2	2024-11-16	Water	M													<0.25	<0.25
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M														
SW-03		VA24D1587-002	2024-11-20	Water	M														
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M	89	66	71	100	73	77	78	61	77					
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M	84	83	65	82	78	70	52	82	71					
SW-03	SW-03	L2758371-2	2024-12-08	Water	M													<0.25	<0.25
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M														
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M	80	70	68	88	70	82	85	51	83					
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M														
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M													<0.25	<0.25

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M														
SW-03	SW-03	L2758769-3	2025-01-24	Water	M	79	79	67	78	78	74	70	65	84					
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M														
SW-03	SW-03	L2759009-2	2025-02-19	Water	M													<0.25	<0.25
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M														
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M	78	87	73	78	86	81	68	60	85					
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M														
SW-03	SW-03	L2759254-2	2025-03-18	Water	M													<0.25	<0.25
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M	82	91	86	82	91	76	75	62	70				<0.25	<0.25
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M														
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M	79	77	67	79	77	78	76	72	82					
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M													<0.25	<0.25
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M													<0.25	<0.25
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M													<0.25	<0.25
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M	62	61	59	63	59	61	61	30	58				<0.25	<0.25
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M	75	66	66	86	64	79	81	44	87					
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M	91	73	73	93	82	73	76	82	86					
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M													<0.25	<0.25
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M													<0.25	<0.25
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M													<0.25	<0.25
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M	81	101	93	83	100	75	77	58	80					
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M	71	57	61	74	60	61	65	39	60					
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M	75	83	65	77	80	75	70	105	81					
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M	87	76	70	85	82	56	54	76	63					
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M	82	102	95	81	98	75	73	79	73				<0.25	<0.25
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M	75	72	63	79	70	79	74	54	0					
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M														
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M														
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M														
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M														
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M														
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M														
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M														
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M														
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M														
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M														
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M														
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M														
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M														
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M														
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M														
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M														
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M														
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M														
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M														
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M														
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M														
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M														
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M														
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M														
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M														
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M														
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M														
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M														
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M														
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M												<2.6		
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M														
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M														
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M														
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M														
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M														
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M														
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M	71	68	70	77	73	58	61	30	63				<0.25	<0.25
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M													<0.25	<0.25
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M	68	52	53	64	51	58	59	38	64				<0.25	<0.25
SW-04		VA24A1299-004	2024-01-23	Water	M													<0.25	<0.25
SW-04		L2754353-4	2024-01-23	Water	M	85	95	91	82	94	78	77	62	75				<0.25	<0.25
SW-04		L2754615-4	2024-02-15	Water	M	69	66	64	72	63	62	63	36	60				<0.25	<0.25
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M	67	59	55	68	61	62	60	57	70					
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M	77	76	64	77	74	69	64	79	80					
SW-04		L2755012-4	2024-03-19	Water	M	70	54	59	69	56	53	57	55	71					
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M	78	71	76	80	68	73	72	66	76					
SW-04		L2755503-3	2024-04-25	Water	M													<0.25	<0.25
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M													<0.25	<0.25
SW-04		L2755523-2	2024-04-29	Water	M	76	71	69	82	73	68	68	46	68					
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M	77	65	66	78	66	61	66	54	66				<0.25	<0.25
SW-04		L2755588-3	2024-05-02	Water	M													<0.25	<0.25
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M	60	52	48	63	51	57	55	51	66					
SW-04		L2755687-4	2024-05-09	Water	M	78	60	66	75	65	66	70	57	72					
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M													<0.25	<0.25
SW-04		L2755695-2	2024-05-10	Water	M													<0.25	<0.25
SW-04		L2755788-2	2024-05-15	Water	M													<0.25	<0.25
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M													<0.25	<0.25
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M	84	103	95	82	97	75	74	63	79				<0.25	<0.25
SW-04		L2755820-3	2024-05-16	Water	M													<0.25	<0.25
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M	81	69	83	92	74	71	75	55	80					
SW-04		VA24B1636-005	2024-05-23	Water	M													<0.25	<0.25
SW-04		L2755903-5	2024-05-23	Water	M													<0.25	<0.25
SW-04		L2755916-3	2024-05-23	Water	M													<0.25	<0.25
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M	83	90	88	83	90	72	73	57	75				<0.25	<0.25
SW-04		L2755961-4	2024-05-26	Water	M													<0.25	<0.25
SW-04		VA24B4655-003	2024-06-20	Water	M													<0.25	<0.25
SW-04		L2756326-3	2024-06-20	Water	M													<0.25	<0.25
SW-04		VA24B5289-002	2024-06-26	Water	M	70	68	71	73	63	73	69	54	80					
SW-04		L2756419-2	2024-06-26	Water	M														
SW-04		VA24B7579-003	2024-07-18	Water	M														
SW-04		L2756717-3	2024-07-18	Water	M														
SW-04		VA24B8974-004	2024-07-31	Water	M													<0.25	<0.25
SW-04		L2756871-4	2024-07-31	Water	M														
SW-04		VA24C1546-003	2024-08-22	Water	M														
SW-04		L2757144-3	2024-08-22	Water	M														
SW-04	SW-04	L2757209-4	2024-08-27	Water	M														
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M	80	73	73	80	65	75	68	65	82					
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M														
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M													<0.25	<0.25
SW-04	SW-04	L2757584-2	2024-09-28	Water	M														
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M	85	72	69	93	69	85	85	52	89					
SW-04	SW-04	L2757661-4	2024-10-04	Water	M														
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M													<0.25	<0.25
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M														
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M														
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M													<0.25	<0.25
SW-04	SW-04	L2757873-4	2024-10-22	Water	M														
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M	80	66	67	88	65	79	79	51	86					
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M	76	58	58	71	54	62	61	42	65				<0.25	<0.25
SW-04	SW-04	L2757942-1	2024-10-26	Water	M														
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M	72	72	60	72	69	64	61	73	73					
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M	86	77	70	85	79	75	75	85	81					

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M														
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M													<0.25	<0.25
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M													<0.25	<0.25
SW-04	SW-04	L2758155-4	2024-11-17	Water	M														
SW-04		4-456131118-0	2024-11-17	Water	F													<0.25	<0.25
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M	88	78	69	88	80	78	79	85	80					
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M													<0.25	<0.25
SW-04	SW-04	L2758371-3	2024-12-08	Water	M														
SW-04		4-456441522-0	2024-12-18	Water	F	83	95	88	85	95	71	74	61	74					
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M													<0.25	<0.25
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M														
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M	78	77	71	78	75	72	72	40	68				<0.25	<0.25
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M														
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M													<0.25	<0.25
SW-04	SW-04	L2758765-1	2025-01-25	Water	M														
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M	73	78	78	73	72	83	80	45	94					
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M														
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M													<0.25	<0.25
SW-04	SW-04	L2759042-2	2025-02-21	Water	M														
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M	80	72	67	87	75	78	81	50	87					
SW-04	SW-04	L2759255-2	2025-03-19	Water	M														
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M													<0.25	<0.25
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M	75	71	78	78	68	78	76	58	78					
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M														
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M	81	73	72	90	74	81	87	48	89					
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M														
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M													<0.25	<0.25
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M	78	94	89	77	91	73	70	76	84				<0.25	<0.25
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M													<0.25	<0.25
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M														
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M														
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M	74	76	77	81	78	64	67	32	67				<0.25	<0.25
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M														
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M													<0.25	<0.25
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M													<0.25	<0.25
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M													<0.25	<0.25
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M													<0.25	<0.25
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M													<0.25	<0.25
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M	70	62	56	73	61	66	62	59	74					
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M													<0.25	<0.25
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M													<0.25	<0.25
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M													<0.25	<0.25
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M	68	76	68	76	77	71	65	45	0					
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M													<0.25	<0.25
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M													<0.25	<0.25
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M	61	63	64	71	66	51	57	28	51					
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M	78	82	80	86	85	67	68	31	69				<0.25	<0.25
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M														
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M													<0.25	<0.25
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M													<0.25	<0.25
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M										<0.0003				
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M													<0.25	<0.25
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M													<0.25	<0.25
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M														
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M													<0.25	<0.25
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M													<0.25	<0.25
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M														
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M													<0.25	<0.25
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M														
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M														
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M														
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M														
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M													<0.25	<0.25
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M														
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M	70	54	58	69	57	57	61	51	65					
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M	82	107	95	81	98	77	74	60	79				<0.25	<0.25
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M	62	68	58	60	61	63	62	49	71					
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M	74	75	69	77	72	72	68	59	63					
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M														
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M													<0.25	<0.25
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M													<0.25	<0.25
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M													<0.25	<0.25
SW-07		VA24A1299-005	2024-01-23	Water	M	78	72	78	80	70	76	74	61	77					
SW-07		L2754353-5	2024-01-23	Water	M													<0.25	<0.25
SW-07		L2754615-5	2024-02-15	Water	M														
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M														
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M													<0.25	<0.25
SW-07		L2755012-5	2024-03-19	Water	M														
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M													<0.25	<0.25
SW-07		L2755504-3	2024-04-26	Water	M														
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M														
SW-07		L2755521-1	2024-04-28	Water	M														
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M	91	75	90	96	82	75	80	56	84					
SW-07		L2755598-3	2024-05-03	Water	M														
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M													<0.25	<0.25
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M													<0.25	<0.25
SW-07		L2755677-3	2024-05-09	Water	M														
SW-07		L2755687-3	2024-05-09	Water	M														
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M	67	54	56	64	55	55	61	57	64					
SW-07		L2755770-3	2024-05-14	Water	M														
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M													<0.25	<0.25
SW-07		L2755819-3	2024-05-17	Water	M														
SW-07		VA24B1636-003	2024-05-23	Water	M	77	65	71	79	64	70	66	51	72					
SW-07		L2755903-3	2024-05-23	Water	M														
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M														
SW-07		L2755933-3	2024-05-24	Water	M														
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M													<0.25	<0.25
SW-07		L2755961-3	2024-05-26	Water	M														
SW-07		VA24B4698-003	2024-06-21	Water	M	74	64	56	73	64	67	62	75	74					
SW-07		L2756349-3	2024-06-21	Water	M														
SW-07		VA24B5289-003	2024-06-26	Water	M	72	58	61	72	60	57	61	60	73					
SW-07		L2756419-3	2024-06-26	Water	M														
SW-07		VA24B7689-003	2024-07-19	Water	M														
SW-07		L2756726-3	2024-07-19	Water	M														
SW-07		L2756871-5	2024-07-31	Water	M														
SW-07		VA24B8974-005	2024-07-31	Water	M														
SW-07		VA24C1605-003	2024-08-23	Water	M														
SW-07		L2757153-3	2024-08-23	Water	M										<0.0003				
SW-07	SW-07	L2757209-5	2024-08-27	Water	M													<0.25	<0.25
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M										<0.0003				
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M														
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M													<0.25	<0.25
SW-07	SW-07	L2757587-4	2024-09-29	Water	M													<0.25	<0.25

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M													<0.25	<0.25
SW-07	SW-07	L2757664-1	2024-10-03	Water	M	91	72	87	94	78	79	75	62	86					
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M														
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M													<0.25	<0.25
SW-07		492-455781017-0	2024-10-13	Water	F													<0.25	<0.25
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M													<0.25	<0.25
SW-07	SW-07	L2757873-5	2024-10-22	Water	M	76	71	74	78	67	68	68	57	71					
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M														
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M													<0.25	<0.25
SW-07	SW-07	L2757913-4	2024-10-25	Water	M													<0.25	<0.25
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M										<0.0003				
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M	69	71	66	72	63	70	65	52	64					
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M	89	71	73	100	76	76	78	52	83					
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M	85	71	85	89	78	69	73	53	74					
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M														
SW-07	SW-07	L2758155-1	2024-11-16	Water	M	81	69	66	85	71	80	81	54	85					
SW-07		VA24D1587-003	2024-11-20	Water	M	66	61	66	67	58	69	64	51	71					
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M													<0.25	<0.25
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M														
SW-07	SW-07	L2758371-4	2024-12-08	Water	M	81	77	76	89	78	81	85	49	92					
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M													<0.25	<0.25
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M													<0.25	<0.25
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M	98	82	104	98	86	87	89	65	99					
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M	86	76	69	86	80	78	78	86	80					
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M														
SW-07	SW-07	L2758765-2	2025-01-25	Water	M													<0.25	<0.25
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M														
SW-07	SW-07	L2759009-3	2025-02-19	Water	M													<0.25	<0.25
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M	96	75	92	97	81	83	81	52	94					
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M													<0.25	<0.25
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M													<0.25	<0.25
SW-07	SW-07	L2759254-3	2025-03-18	Water	M	79	81	81	81	85	81	83	49	78					
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M													<0.25	<0.25
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M														
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M													<0.25	<0.25
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M	70	63	55	70	62	64	62	73	75					
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M													<0.25	<0.25
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M														
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M													<0.25	<0.25
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M														
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M	76	76	77	84	78	64	68	31	66				<0.25	<0.25
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M													<0.25	<0.25
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M													<0.25	<0.25
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M													<0.25	<0.25
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M	74	63	68	74	65	66	70	56	71					
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M														
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M													<0.25	<0.25
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M													<0.25	<0.25
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M													<0.25	<0.25
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M													<0.25	<0.25
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M													<0.25	<0.25
SW-08		L2755503-2	2024-04-25	Water	M													<0.25	<0.25
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M														
SW-08		L2755588-2	2024-05-02	Water	M													<0.25	<0.25
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M														
SW-08		L2755694-2	2024-05-10	Water	M														
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M														

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Surrogate-13C12-1-2-3-7-8-9-HxCDF	Surrogate-13C12-1-2-3-7-8-PeCDD	Surrogate-13C12-1-2-3-7-8-PeCDF	Surrogate-13C12-2-3-4-6-7-8-HxCDF	Surrogate-13C12-2-3-4-7-8-PeCDF	Surrogate-13C12-2-3-7-8-TCDD	Surrogate-13C12-2-3-7-8-TCDF	Surrogate-13C12-OCDD	Surrogate-37Cl4-2-3-7-8-TCDD(Cleanup)	1-2-Dibromoethane	Benzo(b)fluoranthene	BOD5	EPH10-19	EPH19-32
						%	%	%	%	%	%	%	%	%	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M														
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M													<0.25	<0.25
SW-08		L2755916-2	2024-05-23	Water	M														
SW-08		VA24B4655-002	2024-06-20	Water	M													<0.25	<0.25
SW-08		L2756326-2	2024-06-20	Water	M										<0.0003				
SW-08		VA24B7579-002	2024-07-18	Water	M													<0.25	<0.25
SW-08		L2756717-2	2024-07-18	Water	M														
SW-08		VA24C1546-002	2024-08-22	Water	M													<0.25	<0.25
SW-08		L2757144-2	2024-08-22	Water	M														
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M	85	73	73	88	76	72	71	50	73					
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M													<0.25	<0.25
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M													<0.25	<0.25
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M	80	62	67	78	65	67	74	58	76					
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M													<0.25	<0.25
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M	82	59	60	81	61	31	28	72	32					
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M														
SW-09		L2755503-4	2024-04-25	Water	M													<0.25	<0.25
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M													<0.25	<0.25
SW-09		L2755588-4	2024-05-02	Water	M	79	71	75	79	66	73	71	60	75					
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M														
SW-09		L2755687-5	2024-05-09	Water	M													<0.25	<0.25
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M														
SW-09		L2755820-4	2024-05-16	Water	M	78	66	77	83	71	61	63	51	77					
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M														
SW-09		L2755916-4	2024-05-23	Water	M													<0.25	<0.25
SW-09		VA24B4655-004	2024-06-20	Water	M														
SW-09		L2756326-4	2024-06-20	Water	M	71	67	69	73	62	70	68	51	78					
SW-09		VA24B7579-004	2024-07-18	Water	M														
SW-09		L2756717-4	2024-07-18	Water	M													<0.25	<0.25
SW-09		VA24C1546-004	2024-08-22	Water	M														
SW-09		L2757144-4	2024-08-22	Water	M	80	79	84	79	72	85	81	66	94					
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M														
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M	100	82	104	99	89	63	90	69	68					
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M														
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M										<0.0003				
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M													<0.25	<0.25
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M	84	68	81	92	73	72	75	56	76					
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M													<0.25	<0.25
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M													<0.25	<0.25
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M													<0.25	<0.25
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M														
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M	93	93	102	95	90	89	85	97	91					
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M	73	76	73	78	72	78	72	53	66					
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M														
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M													<0.25	<0.25
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M	84	64	76	85	68	69	67	68	83					
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M														
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M										<0.0003				
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M														
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M														
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M														

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OUT-01	OUT-01	VA24A9285-003	2024-04-29	Water	M	<0.005														
OUT-01		VA24B1636-006	2024-05-23	Water	M	<0.005														
OUT-01	OUT-01	VA24C6562-005	2024-10-04	Water	M	<0.005														
OUT-01	OUT-01	VA24C8965-004	2024-10-27	Water	M	<0.005														
OUT-01		661-455931031-0	2024-10-28	Water	F															
OUT-01	OUT-01	VA24D0618-001	2024-11-12	Water	M															
OUT-01	OUT-01	VA24D4181-001	2024-12-20	Water	M															
OUT-01	OUT-01	VA25A2292-001	2025-01-31	Water	M	<0.005														
OUT-01	OUT-01	VA25A3846-001	2025-02-23	Water	M	<0.005														
OUT-01	OUT-01	VA25A5181-001	2025-03-09	Water	M															
OUT-01	OUT-01	VA25A5326-001	2025-03-11	Water	M															
OUT-01	OUT-01	VA25A7638-004	2025-04-07	Water	M	<0.005														
OUT-01	OUT-01	VA25A8149-001	2025-04-11	Water	M															
OUT-01	Out-01	VA25B1692-001	2025-05-20	Water	M	<0.005														
OUT-02	OUT-02	VA24A9285-004	2024-04-29	Water	M															
OUT-02	OUT-02	VA24B0452-003	2024-05-10	Water	M															
OUT-02	OUT-02	VA24B1054-003	2024-05-16	Water	M															
OUT-02	OUT-02	VA24B1929-002	2024-05-27	Water	M															
OUT-02		VA24B5289-006	2024-06-26	Water	M															
OUT-02	OUT-02	VA24C6562-006	2024-10-04	Water	M															
OUT-02	OUT-02	VA24C8483-001	2024-10-23	Water	M															
OUT-02	OUT-02	VA24C8965-003	2024-10-26	Water	M															
OUT-02	OUT-02	VA24D0618-002	2024-11-12	Water	M															
OUT-02	OUT-02	VA24D3590-001	2024-12-15	Water	M															
OUT-02	OUT-02	VA25A2292-002	2025-01-31	Water	M															
OUT-02	OUT-02	VA25A3846-002	2025-02-23	Water	M															
OUT-02	OUT-02	VA25A5181-002	2025-03-09	Water	M															
OUT-02	OUT-02	VA25A5326-002	2025-03-11	Water	M															
OUT-02	OUT-02	VA25A7638-005	2025-04-06	Water	M															
OUT-02	OUT-02	VA25A8149-002	2025-04-11	Water	M															
OUT-02	OUT-02	VA25A8563-001	2025-04-16	Water	M															
OUT-02	OUT-02	VA25A8974-001	2025-04-22	Water	M															
OUT-06	OUT-06	VA24A7873-AB-006	2024-04-12	Water	M															
OUT-06	OUT-06	VA24A9263-003	2024-04-28	Water	M															
OUT-06	OUT-06	VA24C8159-007	2024-10-20	Water	M															
OUT-06	OUT-06	L2757853-5	2024-10-20	Water	M		94.4													
OUT-06	OUT-06	VA24C8964-001	2024-10-27	Water	M			92	0.14	-3.3	<0.0500	<0.0500	84.1							
OUT-06	OUT-06	VA24D0615-001	2024-11-11	Water	M															
OUT-06	OUT-06	VA24D3590-002	2024-12-15	Water	M															
OUT-06	OUT-06	VA25A2339-001	2025-02-01	Water	M															
OUT-06	OUT-06 (Keystone)	VA25A3650-001	2025-02-20	Water	M															
OUT-06	OUT-06 (Keystone)	L2759039-1	2025-02-20	Water	M															
OUT-06	OUT-06	VA25A3682-001	2025-02-20	Water	M			615	2400	-5	0.066	0.0811	86.9							
OUT-06	OUT-06	VA25A5181-003	2025-03-09	Water	M															
OUT-06	OUT-06	VA25A5326-003	2025-03-11	Water	M		105						75.7							
OUT-06	OUT-06	VA25A7638-006	2025-04-07	Water	M															
OUT-06	OUT-06	VA25A8149-003	2025-04-11	Water	M			108	920	-4.7	0.095	0.095	83.1		<0.0020					
SW-01	Creek_1(WFC)	8081420Cr1WFC	2018-08-14	Water	M															
SW-01	Creek_1(WFC)	8111898Cr1WFC	2018-11-21	Water	M		96.7													
SW-01	Creek_1(WFC)	9030342Cr1WFC	2019-03-05	Water	M															
SW-01	Creek_1(WFC)	9052469Cr1WFC	2019-05-27	Water	M		91													
SW-01	Creek_1(WFC)	9092849Cr1WFC	2019-09-26	Water	M		94.6													
SW-01	Creek_1(WFC)	9122088Cr1WFC	2019-12-27	Water	M															
SW-01	Creek_1(WFC)	22242Cr1WFC	2020-02-26	Water	M		94.5													
SW-01	Creek_1(WFC)	60168Cr1WFC	2020-06-01	Water	M															
SW-01	Creek_1(WFC)	92623Cr1WFC	2020-09-18	Water	M															
SW-01	Woodfibre_Creek	20L0649WFC	2020-12-04	Water	M		108													
SW-01	SW21-1	21A2594-01	2021-01-27	Water	M		106													
SW-01	SW21-1	21B2778-17	2021-02-25	Water	M															
SW-01	SW21-1	21C3502-01	2021-03-25	Water	M		77.8													
SW-01	SW21-1	21D2478-13	2021-04-22	Water	M		91.2													
SW-01	SW21-1	21E1990-15	2021-05-18	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01	SW21-1	21E2917-15	2021-05-26	Water	M		106													
SW-01	SW21-1	21F0167-15	2021-06-01	Water	M		102									<5.0	<5.0	<5.0	<10	<5.0
SW-01	SW21-1	21F1056-15	2021-06-08	Water	M															
SW-01	SW21-1	21F2014-13	2021-06-15	Water	M		113													
SW-01	SW21-1	21G2414-13	2021-07-20	Water	M															
SW-01	SW21-1	21H3040-13	2021-08-25	Water	M		109									<5.0	<5.0	<5.0	<10	<5.0
SW-01	SW21-1	21I3814-13	2021-09-28	Water	M															
SW-01	SW21-1	21J2995-01	2021-10-21	Water	M		98									<5.0	<5.0	<5.0	<10	<5.0
SW-01	SW21-1	21K3046-13	2021-11-23	Water	M															
SW-01	SW21-1	21L2125-13	2021-12-14	Water	M		116									<5.0	<5.0	<5.0	<10	<5.0
SW-01	SW21-01	22A2312-13	2022-01-20	Water	M															
SW-01	SW21-1	22B2487-13	2022-02-17	Water	M		117													
SW-01	SW21-1	22B3076-01	2022-02-22	Water	M															
SW-01	SW21-1	22C3145-13	2022-03-22	Water	M		126													
SW-01	SW21-01	22D2212-08	2022-04-19	Water	M															
SW-01	SW21-1	22E2480-13	2022-05-18	Water	M															
SW-01	SW21-01	22F3538-01	2022-06-22	Water	M		108													
SW-01	SW21-1	22G1944-01	2022-07-14	Water	M															
SW-01	SW21-1	22H2790-01	2022-08-18	Water	M		91.9													
SW-01	SW21-1	22I2095-01	2022-09-15	Water	M															
SW-01	SW21-1	22J1763-01	2022-10-13	Water	M															
SW-01	SW21-1	22K1308-01	2022-11-09	Water	M		83.8													
SW-01	SW21-1	22L0650-01	2022-12-06	Water	M															
SW-01	SW21-1	23A2725-01	2023-01-26	Water	M															
SW-01	SW21-1	23B2818-01	2023-02-27	Water	M															
SW-01	SW21-1	23C1944-01	2023-03-16	Water	M		89.8													
SW-01	SW21-1	23D3227-01	2023-04-27	Water	M															
SW-01	SW21-1	23E2501-01	2023-05-18	Water	M		90.3													
SW-01	SW21-1	23F3813-01	2023-06-28	Water	M		85.9													
SW-01	SW21-1	23G2576-01	2023-07-20	Water	M															
SW-01	SW21-1	23H3444-01	2023-08-25	Water	M															
SW-01	SW21-1	23I2541-01	2023-09-20	Water	M															
SW-01	SW21-1	23J2428-01	2023-10-19	Water	M		91.3													
SW-01	SW21-1	23K2005-01	2023-11-16	Water	M															
SW-01	SW21-1	23L1794-01	2023-12-13	Water	M		97.4									<5.0	<5.0	<5.0	<10	<5.0
SW-01		VA24A1299-001	2024-01-23	Water	M		113													
SW-01		L2754353-1	2024-01-23	Water	M															
SW-01		L2754615-1	2024-02-15	Water	M															
SW-01	SW21-1	VA24A3090-001	2024-02-15	Water	M		95.6													
SW-01	SW21-1	VA24A5796-001	2024-03-19	Water	M															
SW-01		L2755012-1	2024-03-19	Water	M		124													
SW-01	SW21-1	VA24A9057-001	2024-04-25	Water	M															
SW-01		L2755503-1	2024-04-25	Water	M															
SW-01	SW-01	VA24A9285-001	2024-04-29	Water	M															
SW-01		L2755523-1	2024-04-29	Water	M															
SW-01	SW21-1	VA24A9687-001	2024-05-02	Water	M															
SW-01		L2755588-1	2024-05-02	Water	M															
SW-01	SW-01	VA24B0452-001	2024-05-10	Water	M															
SW-01	SW21-1	VA24B0401-001	2024-05-10	Water	M															
SW-01		L2755694-1	2024-05-10	Water	M															
SW-01		L2755695-1	2024-05-10	Water	M															
SW-01		L2755788-1	2024-05-15	Water	M															
SW-01	SW-01	VA24B1054-001	2024-05-16	Water	M															
SW-01	SW21-1	VA24B1087-001	2024-05-16	Water	M															
SW-01		L2755820-1	2024-05-16	Water	M															
SW-01		VA24B1628-001	2024-05-22	Water	M															
SW-01		L2755902-1	2024-05-22	Water	M															
SW-01	SW21-1	VA24B1693-001	2024-05-23	Water	M															
SW-01		L2755916-1	2024-05-23	Water	M															
SW-01	SW-01	VA24B1929-001	2024-05-27	Water	M															
SW-01		VA24B4655-001	2024-06-20	Water	M															
SW-01		L2756326-1	2024-06-20	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-01		VA24B5289-001	2024-06-26	Water	M															
SW-01		L2756419-1	2024-06-26	Water	M															
SW-01		VA24B7579-001	2024-07-18	Water	M															
SW-01		L2756717-1	2024-07-18	Water	M															
SW-01		VA24B8974-001	2024-07-31	Water	M															
SW-01		L2756871-1	2024-07-31	Water	M															
SW-01		VA24C1546-001	2024-08-22	Water	M		97.9	46	100											
SW-01		L2757144-1	2024-08-22	Water	M															
SW-01	SW-01	VA24C2197-001	2024-08-27	Water	M		99.3													
SW-01	SW-01	L2757209-1	2024-08-27	Water	M		94													
SW-01	SW21-1	VA24C4878-001	2024-09-19	Water	M		92.2													
SW-01	SW-01	VA24C5909-001	2024-09-28	Water	M		78.6													
SW-01	SW-01	L2757584-1	2024-09-28	Water	M		99.1													
SW-01	SW-01	VA24C6390-002	2024-10-03	Water	M		105													
SW-01	SW-01	L2757664-2	2024-10-03	Water	M															
SW-01	SW21-01	VA24C7381-001	2024-10-12	Water	M															
SW-01	SW21-01	L2757756-1	2024-10-12	Water	M															
SW-01	SW-01	VA24C8331-001	2024-10-22	Water	M															
SW-01	SW-01	L2757873-1	2024-10-22	Water	M		104													
SW-01	SW21-1	VA24C8719-001	2024-10-24	Water	M		107													
SW-01	SW-01	VA24C8965-002	2024-10-26	Water	M		97.4													
SW-01	SW-01	L2757942-2	2024-10-26	Water	M		105													
SW-01	SW21-1	VA24C9586-001	2024-10-31	Water	M															
SW-01	SW21-1	VA24D0326-001	2024-11-07	Water	M															
SW-01	SW-01	VA24D0618-003	2024-11-12	Water	M															
SW-01	SW-01	L2758119-1	2024-11-12	Water	M		96.6													
SW-01	SW21-1	VA24D0970-001	2024-11-14	Water	M															
SW-01	SW21-1	VA24D1404-001	2024-11-19	Water	M		74													
SW-01	SW-01	L2758350-1	2024-12-06	Water	M															
SW-01	SW-01	VA24D3006-001	2024-12-06	Water	M		91.1													
SW-01	SW-01	VA24D3920-001	2024-12-18	Water	M															
SW-01	SW21-1	VA24D4023-006	2024-12-19	Water	M		95.7													
SW-01	SW21-1	L2758504-5	2024-12-19	Water	M		106													
SW-01	SW21-1	VA25A1591-006	2025-01-23	Water	M															
SW-01	SW21-1	L2758768-5	2025-01-23	Water	M		89.6									<5.0	<5.0	<5.0	<10	<5.0
SW-01	SW-01	VA25A1730-001	2025-01-24	Water	M		110									<5.0	<5.0	<5.0	<10	<5.0
SW-01	SW-01	L2758769-1	2025-01-24	Water	M		90.2													
SW-01	SW21-1	VA25A3665-005	2025-02-20	Water	M		122									<5.0	<5.0	<5.0	<10	<5.0
SW-01	SW21-1	L2759041-4	2025-02-20	Water	M		105									<5.0	<5.0	<5.0	<10	<5.0
SW-01	SW-01	VA25A3804-001	2025-02-21	Water	M															
SW-01	SW-01	L2759042-1	2025-02-21	Water	M															
SW-01	SW-01	VA25A6069-001	2025-03-19	Water	M															
SW-01	SW-01	L2759255-1	2025-03-19	Water	M		118									<5.0	<5.0	<5.0	<10	<5.0
SW-01	SW21-1	VA25A6812-005	2025-03-27	Water	M		115													
SW-01	SW-01	VA25A7260-001	2025-04-02	Water	M		111													
SW-01	SW-01	VA25A7262-001	2025-04-02	Water	M		114									<5.0	<5.0	<5.0	<10	<5.0
SW-01	SW-01	VA25A7741-001	2025-04-08	Water	M		78.3						80.2							
SW-01	SW-01	VA25A7742-001	2025-04-08	Water	M															
SW-01	SW-01	VA25A8192-004	2025-04-13	Water	M															
SW-01	SW-01	VA25A8193-004	2025-04-13	Water	M		110													
SW-01	SW-01	VA25A8975-002	2025-04-22	Water	M															
SW-01	SW-01	VA25A8977-002	2025-04-22	Water	M															
SW-01	SW21-1	VA25A9265-005	2025-04-24	Water	M		111													
SW-01	SW-01	VA25A9703-002	2025-04-29	Water	M															
SW-01	SW-01	VA25A9710-002	2025-04-29	Water	M															
SW-01	SW21-1	VA25A9648-005	2025-04-29	Water	M		85.2						76.6							
SW-01	SW21-1	VA25B0655-005	2025-05-08	Water	M															
SW-01	SW-01	VA25B0930-001	2025-05-12	Water	M															
SW-01	SW21-1	VA25B1182-005	2025-05-14	Water	M		97.9													
SW-01	SW21-1	VA25B1920-005	2025-05-22	Water	M		90.7													
SW-02	SW21-2	21A2594-02	2021-01-27	Water	M		104													
SW-02	SW21-2	21B2778-18	2021-02-25	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW21-2	21C3502-02	2021-03-25	Water	M		105													
SW-02	SW21-2	21D2478-14	2021-04-22	Water	M		89.2													
SW-02	SW21-2	21E1990-16	2021-05-18	Water	M		76.4													
SW-02	SW21-2	21E2917-16	2021-05-26	Water	M		90.2													
SW-02	SW21-2	21F0167-16	2021-06-01	Water	M		83													
SW-02	SW21-2	21F1056-16	2021-06-08	Water	M		90.6													
SW-02	SW21-2	21F2014-14	2021-06-15	Water	M															
SW-02	SW21-2	21G2414-14	2021-07-20	Water	M															
SW-02	SW21-2	21H3040-14	2021-08-25	Water	M															
SW-02	SW21-2	21I3814-14	2021-09-28	Water	M		95.7													
SW-02	SW21-2	21J2995-02	2021-10-21	Water	M															
SW-02	SW21-2	21K3046-14	2021-11-23	Water	M															
SW-02	SW21-2	21L2125-14	2021-12-14	Water	M		129													
SW-02	SW21-02	22A2312-14	2022-01-20	Water	M		107													
SW-02	SW21-2	22B2487-14	2022-02-17	Water	M															
SW-02	SW21-2	22B3076-02	2022-02-22	Water	M															
SW-02	SW21-2	22C3145-14	2022-03-22	Water	M		104													
SW-02	SW21-02	22D2212-16	2022-04-20	Water	M															
SW-02	SW21-2	22E2480-14	2022-05-18	Water	M		81.9													
SW-02	SW21-02	22F3538-02	2022-06-22	Water	M															
SW-02	SW21-2	22G1944-02	2022-07-14	Water	M															
SW-02	SW21-2	22H2790-02	2022-08-18	Water	M		113													
SW-02	SW21-2	22I2095-02	2022-09-15	Water	M															
SW-02	SW21-2	22J1763-02	2022-10-13	Water	M		105													
SW-02	SW21-2	22K1308-02	2022-11-09	Water	M															
SW-02	SW21-2	22L0650-02	2022-12-06	Water	M		97.9													
SW-02	SW21-2	23A2725-02	2023-01-26	Water	M		123													
SW-02	SW21-2	23B2818-02	2023-02-27	Water	M		52.7													
SW-02	SW21-2	23C1944-02	2023-03-16	Water	M															
SW-02	SW21-2	23D3227-02	2023-04-27	Water	M															
SW-02	SW21-2	23E2501-02	2023-05-18	Water	M															
SW-02	SW-02	23F0370-03	2023-06-02	Water	M															
SW-02	SW21-2	23F3813-02	2023-06-28	Water	M															
SW-02	SW21-2	23G2576-02	2023-07-20	Water	M		100													
SW-02	SW21-2	23H3444-02	2023-08-25	Water	M		115													
SW-02	SW21-2	23J2428-02	2023-10-19	Water	M															
SW-02	SW21-2	23J2428-02RE1	2023-10-19	Water	M															
SW-02	SW21-2	23J2428-02RE2	2023-10-19	Water	M															
SW-02	SW21-2	23K2005-02	2023-11-16	Water	M															
SW-02	SW21-2	23L1794-02	2023-12-13	Water	M															
SW-02		VA24A1299-002	2024-01-23	Water	M															
SW-02		L2754353-2	2024-01-23	Water	M															
SW-02		L2754615-2	2024-02-15	Water	M															
SW-02	SW21-2	VA24A3090-002	2024-02-15	Water	M															
SW-02	SW21-2	VA24A5796-002	2024-03-19	Water	M															
SW-02		L2755012-2	2024-03-19	Water	M		124													
SW-02	SW-02	VA24A7873-AA-007	2024-04-12	Water	M		105													
SW-02		L2755316-6	2024-04-12	Water	M															
SW-02	SW21-2	VA24A9134-001	2024-04-26	Water	M	<0.005														
SW-02		L2755504-1	2024-04-26	Water	M		95.9													
SW-02	SW-02	VA24A9263-002	2024-04-28	Water	M															
SW-02		L2755521-2	2024-04-28	Water	M		108													
SW-02	SW21-2	VA24A9747-001	2024-05-03	Water	M	<0.005														
SW-02		L2755598-1	2024-05-03	Water	M		95.5													
SW-02	SW21-2	VA24B0355-001	2024-05-09	Water	M		86.4													
SW-02	SW-02	VA24B0330-001	2024-05-09	Water	M	<0.005														
SW-02		L2755677-1	2024-05-09	Water	M															
SW-02		L2755687-1	2024-05-09	Water	M															
SW-02	SW-02	VA24B0795-001	2024-05-14	Water	M															
SW-02		L2755770-1	2024-05-14	Water	M		92.3													
SW-02	SW21-2	VA24B1168-001	2024-05-17	Water	M															
SW-02		L2755819-1	2024-05-17	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02		VA24B1636-001	2024-05-23	Water	M															
SW-02		L2755903-1	2024-05-23	Water	M															
SW-02	SW21-2	VA24B1780-001	2024-05-24	Water	M															
SW-02		L2755933-1	2024-05-24	Water	M		90.1													
SW-02	SW-02	VA24B1914-001	2024-05-26	Water	M															
SW-02		L2755961-1	2024-05-26	Water	M															
SW-02		VA24B4698-001	2024-06-21	Water	M															
SW-02		L2756349-1	2024-06-21	Water	M		94.1													
SW-02		VA24B5540-001	2024-06-27	Water	M															
SW-02		L2756458-1	2024-06-27	Water	M															
SW-02		VA24B7689-001	2024-07-19	Water	M		127													
SW-02		L2756726-1	2024-07-19	Water	M		85.1													
SW-02		VA24B8974-002	2024-07-31	Water	M															
SW-02		L2756871-2	2024-07-31	Water	M															
SW-02		VA24C1605-001	2024-08-23	Water	M		109													
SW-02		L2757153-1	2024-08-23	Water	M		94.5													
SW-02	SW-02	VA24C2197-002	2024-08-27	Water	M	<0.005														
SW-02	SW-02	L2757209-2	2024-08-27	Water	M															
SW-02	SW21-2	VA24C5009-001	2024-09-20	Water	M		74.4													
SW-02	SW-02	VA24C5953-001	2024-09-29	Water	M															
SW-02	SW-02	L2757587-1	2024-09-29	Water	M		81.2													
SW-02	SW-02	VA24C6562-001	2024-10-04	Water	M		108													
SW-02	SW-02	L2757661-1	2024-10-04	Water	M		79.8													
SW-02	SW21-02	VA24C7381-002	2024-10-12	Water	M															
SW-02	SW21-02	L2757756-2	2024-10-12	Water	M															
SW-02	SW-02	VA24C8331-002	2024-10-22	Water	M															
SW-02	SW-02	L2757873-2	2024-10-22	Water	M		114													
SW-02	SW21-2	VA24C8780-001	2024-10-25	Water	M															
SW-02	SW-02	VA24C8832-001	2024-10-25	Water	M		96.1													
SW-02	SW-02	L2757913-1	2024-10-25	Water	M															
SW-02	SW21-2	VA24C9642-001	2024-11-01	Water	M															
SW-02	SW21-2	VA24D0423-001	2024-11-08	Water	M	<0.005														
SW-02	SW21-2	L2758092-1	2024-11-08	Water	M		82.6													
SW-02	SW21-2	VA24D1013-001	2024-11-15	Water	M															
SW-02	SW-02	VA24D1148-003	2024-11-16	Water	M		108													
SW-02	SW-02	L2758155-3	2024-11-16	Water	M															
SW-02		VA24D1587-001	2024-11-20	Water	M															
SW-02	SW21-2	L2758201-1	2024-11-20	Water	M		105									<5.0	<5.0	<5.0	<10	<5.0
SW-02	SW-02	VA24D3099-001	2024-12-08	Water	M															
SW-02	SW-02	L2758371-1	2024-12-08	Water	M															
SW-02	SW21-2	VA24D4023-001	2024-12-19	Water	M															
SW-02	SW21-2	L2758504-1	2024-12-19	Water	M		118													
SW-02	SW21-2	VA25A1591-001	2025-01-23	Water	M		90.1													
SW-02	SW21-2	L2758768-1	2025-01-23	Water	M															
SW-02	SW-02	VA25A1730-002	2025-01-24	Water	M		87													
SW-02	SW-02	L2758769-2	2025-01-24	Water	M															
SW-02	SW-02	VA25A3569-001	2025-02-19	Water	M		95.2													
SW-02	SW-02	L2759009-1	2025-02-19	Water	M		107									<5.0	<5.0	<5.0	<10	<5.0
SW-02	SW21-2	VA25A3665-001	2025-02-20	Water	M															
SW-02	SW21-2	L2759041-1	2025-02-20	Water	M															
SW-02	SW-02	VA25A5938-001	2025-03-18	Water	M		94.4													
SW-02	SW-02	L2759254-1	2025-03-18	Water	M		106									<5.0	<5.0	<5.0	<10	<5.0
SW-02	SW21-2	VA25A6812-001	2025-03-27	Water	M															
SW-02	SW-02	VA25A7260-002	2025-04-02	Water	M															
SW-02	SW-02	VA25A7262-002	2025-04-02	Water	M															
SW-02	SW-02	VA25A7638-001	2025-04-07	Water	M															
SW-02	SW-02	VA25A7640-001	2025-04-07	Water	M		104									<5.0	<5.0	<5.0	<10	<5.0
SW-02	SW-02	VA25A8192-001	2025-04-12	Water	M															
SW-02	SW-02	VA25A8193-001	2025-04-12	Water	M															
SW-02	SW-02	VA25A8840-001	2025-04-20	Water	M															
SW-02	SW-02	VA25A8841-001	2025-04-20	Water	M		116													
SW-02	SW21-2	VA25A9265-001	2025-04-24	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-02	SW-02	VA25A9553-002	2025-04-28	Water	M															
SW-02	SW-02	VA25A9554-002	2025-04-28	Water	M															
SW-02	SW21-2	VA25A9648-001	2025-04-29	Water	M															
SW-02	SW21-2	VA25B0655-001	2025-05-08	Water	M															
SW-02	SW-02	VA25B1050-001	2025-05-13	Water	M															
SW-02	SW-02	VA25B1052-001	2025-05-13	Water	M		115													
SW-02	SW21-2	VA25B1182-001	2025-05-14	Water	M															
SW-02	SW21-2	VA25B1920-001	2025-05-22	Water	M															
SW-03	Creek_2(MC)	8081420Cr2MC	2018-08-14	Water	M															
SW-03	Creek_2(MC)	8111898Cr2MC	2018-11-21	Water	M															
SW-03	Creek_2(MC)	9030342Cr2MC	2019-03-05	Water	M															
SW-03	Creek_2(MC)	9052469Cr2MC	2019-05-27	Water	M		126		10				78.3							
SW-03	Creek_2(MC)	9092849Cr2MC	2019-09-26	Water	M															
SW-03	Creek_2(MC)	9122088Cr2MC	2019-12-27	Water	M		104	167	14				86.1							
SW-03	Creek_2(MC)	22242Cr2MC	2020-02-26	Water	M		84.8													
SW-03	Creek_2(MC)	60168Cr2MC	2020-06-01	Water	M		107	99	900				79.4							
SW-03	Creek_2(WFC)	92623Cr2WFC	2020-09-18	Water	M															
SW-03	Mill_Creek	20L0648MC	2020-12-04	Water	M		85.7						85.3							
SW-03	SW21-3	21A2594-03	2021-01-27	Water	M															
SW-03	SW21-3	21B2778-19	2021-02-25	Water	M		115													
SW-03	SW21-3	21C3502-03	2021-03-25	Water	M		97.4									<5.0	<5.0	<5.0	<10	<5.0
SW-03	SW21-3	21D2478-15	2021-04-22	Water	M		98.8													
SW-03	SW21-3	21E1990-17	2021-05-18	Water	M		128													
SW-03	SW21-3	21E2917-17	2021-05-26	Water	M		109													
SW-03	SW21-3	21F0167-17	2021-06-01	Water	M		103													
SW-03	SW21-3	21F1056-17	2021-06-08	Water	M		98.5													
SW-03	SW21-3	21F2014-15	2021-06-15	Water	M															
SW-03	SW21-3	21G2414-15	2021-07-20	Water	M		130	46	8	-3.99			90.8							
SW-03	SW21-3	21H3040-15	2021-08-25	Water	M		108													
SW-03	SW21-3	21I3814-15	2021-09-28	Water	M		103													
SW-03	SW21-3	21J2995-03	2021-10-21	Water	M		89.2													
SW-03	SW21-3	21K3046-15	2021-11-23	Water	M		130									<5.0	<5.0	<5.0	<10	<5.0
SW-03	SW21-3	21L2125-15	2021-12-14	Water	M		108													
SW-03	SW21-03	22A2312-15	2022-01-20	Water	M															
SW-03	SW21-3	22B2487-15	2022-02-17	Water	M															
SW-03	SW21-3	22B3076-03	2022-02-22	Water	M		98.3													
SW-03	SW21-3	22C3145-15	2022-03-22	Water	M															
SW-03	SW21-03	22D2212-09	2022-04-19	Water	M															
SW-03	SW21-3	22E2480-15	2022-05-18	Water	M		101									<5.0	<5.0	<5.0	<10	<5.0
SW-03	SW21-03	22F3538-03	2022-06-22	Water	M															
SW-03	SW21-3	22G1944-03	2022-07-14	Water	M															
SW-03	SW21-3	22H2790-03	2022-08-18	Water	M		103									<5.0	<5.0	<5.0	<10	<5.0
SW-03	SW21-3	22I2095-03	2022-09-15	Water	M		125									<5.0	<5.0	<5.0	<10	<5.0
SW-03	SW21-3	22J1763-03	2022-10-13	Water	M		108									<5.0	<5.0	<5.0	<10	<5.0
SW-03	SW21-3	22K1308-03	2022-11-09	Water	M															
SW-03	SW21-3	22L0650-03	2022-12-06	Water	M		76.4													
SW-03	SW21-3	23A2725-03	2023-01-26	Water	M		104													
SW-03	SW21-3	23B2818-03	2023-02-27	Water	M		99.2													
SW-03	SW21-3	23C1944-03	2023-03-16	Water	M															
SW-03	SW21-3	23D3227-03	2023-04-27	Water	M															
SW-03	SW21-3	23E2501-03	2023-05-18	Water	M		106													
SW-03	SW21-3	23F3813-03	2023-06-28	Water	M															
SW-03	SW21-3	23G2576-03	2023-07-20	Water	M															
SW-03	SW21-3	23H3444-03	2023-08-25	Water	M															
SW-03	SW21-3	23I2541-02	2023-09-20	Water	M															
SW-03	SW21-3	23J2428-03	2023-10-19	Water	M		112													
SW-03	SW21-3	23K2005-03	2023-11-16	Water	M															
SW-03	SW21-3	23L1794-03	2023-12-13	Water	M		118									<5.0	<5.0	<5.0	<10	<5.0
SW-03		VA24A1299-003	2024-01-23	Water	M		104													
SW-03		L2754353-3	2024-01-23	Water	M															
SW-03		L2754615-3	2024-02-15	Water	M		85.9													
SW-03	SW21-3	VA24A3090-003	2024-02-15	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW21-3	VA24A5796-003	2024-03-19	Water	M															
SW-03		L2755012-3	2024-03-19	Water	M															
SW-03	SW-03	VA24A7873-AA-008	2024-04-12	Water	M															
SW-03		L2755316-7	2024-04-12	Water	M															
SW-03	SW21-3	VA24A9134-002	2024-04-26	Water	M		90.5													
SW-03		L2755504-2	2024-04-26	Water	M		93.3													
SW-03	SW-03	VA24A9263-004	2024-04-28	Water	M															
SW-03		L2755521-3	2024-04-28	Water	M															
SW-03	SW21-3	VA24A9747-002	2024-05-03	Water	M		102									<5.0	<5.0	<5.0	<10	<5.0
SW-03		L2755598-2	2024-05-03	Water	M		90.7													
SW-03	SW21-3	VA24B0355-002	2024-05-09	Water	M															
SW-03	SW-03	VA24B0330-002	2024-05-09	Water	M															
SW-03		L2755677-2	2024-05-09	Water	M															
SW-03		L2755687-2	2024-05-09	Water	M		95.4													
SW-03	SW-03	VA24B0795-002	2024-05-14	Water	M		86.4									<5.0	<5.0	<5.0	<10	<5.0
SW-03		L2755770-2	2024-05-14	Water	M															
SW-03	SW21-3	VA24B1168-002	2024-05-17	Water	M															
SW-03		L2755819-2	2024-05-17	Water	M		82.6													
SW-03		VA24B1636-002	2024-05-23	Water	M															
SW-03		L2755903-2	2024-05-23	Water	M															
SW-03	SW21-3	VA24B1780-002	2024-05-24	Water	M		116													
SW-03		L2755933-2	2024-05-24	Water	M		97.5													
SW-03	SW-03	VA24B1914-002	2024-05-26	Water	M															
SW-03		L2755961-2	2024-05-26	Water	M		90													
SW-03		VA24B4698-002	2024-06-21	Water	M		85.3									<5.0	<5.0	<5.0	<10	<5.0
SW-03		L2756349-2	2024-06-21	Water	M		75.5													
SW-03		VA24B5540-002	2024-06-27	Water	M		86.8													
SW-03		L2756458-2	2024-06-27	Water	M		113	328	25700											
SW-03		VA24B7689-002	2024-07-19	Water	M															
SW-03		L2756726-2	2024-07-19	Water	M															
SW-03		L2756871-3	2024-07-31	Water	M															
SW-03		VA24B8974-003	2024-07-31	Water	M		101													
SW-03		VA24C1605-002	2024-08-23	Water	M															
SW-03		L2757153-2	2024-08-23	Water	M															
SW-03	SW-03	VA24C2397-001	2024-08-28	Water	M															
SW-03	SW-03	L2757229-1	2024-08-28	Water	M															
SW-03	SW21-3	VA24C5009-002	2024-09-20	Water	M															
SW-03	SW-03	VA24C5953-003	2024-09-29	Water	M															
SW-03	SW-03	L2757587-3	2024-09-29	Water	M															
SW-03	SW-03	VA24C6562-003	2024-10-04	Water	M															
SW-03	SW-03	L2757661-3	2024-10-04	Water	M															
SW-03	SW21-03	VA24C7381-003	2024-10-12	Water	M															
SW-03	SW21-03	L2757756-3	2024-10-12	Water	M															
SW-03	SW-03	VA24C8331-003	2024-10-22	Water	M															
SW-03	SW-03	L2757873-3	2024-10-22	Water	M															
SW-03	SW21-3	VA24C8780-002	2024-10-25	Water	M															
SW-03	SW-03	VA24C8832-003	2024-10-25	Water	M															
SW-03	SW-03	L2757913-3	2024-10-25	Water	M															
SW-03	SW21-3	VA24C9642-002	2024-11-01	Water	M		107													
SW-03	SW21-3	VA24D0423-002	2024-11-08	Seawater	M															
SW-03	SW21-3	L2758092-2	2024-11-08	Water	M															
SW-03	SW21-3	VA24D1013-002	2024-11-15	Water	M															
SW-03	SW-03	L2758155-2	2024-11-16	Water	M		82.5													
SW-03	SW-03	VA24D1148-002	2024-11-16	Water	M															
SW-03		VA24D1587-002	2024-11-20	Water	M															
SW-03	SW21-3	L2758201-2	2024-11-20	Water	M															
SW-03	SW-03	VA24D3099-002	2024-12-08	Water	M															
SW-03	SW-03	L2758371-2	2024-12-08	Water	M		79.5													
SW-03	SW21-3	VA24D4023-002	2024-12-19	Seawater	M															
SW-03	SW21-3	L2758504-2	2024-12-19	Water	M															
SW-03	SW21-3	VA25A1591-002	2025-01-23	Seawater	M															
SW-03	SW21-3	L2758768-2	2025-01-23	Water	M		84.7													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-03	SW-03	VA25A1730-003	2025-01-24	Seawater	M															
SW-03	SW-03	L2758769-3	2025-01-24	Water	M															
SW-03	SW-03	VA25A3569-002	2025-02-19	Water	M															
SW-03	SW-03	L2759009-2	2025-02-19	Water	M		90.6													
SW-03	SW21-3	VA25A3665-002	2025-02-20	Seawater	M															
SW-03	SW21-3	L2759041-2	2025-02-20	Water	M															
SW-03	SW-03	VA25A5938-002	2025-03-18	Water	M															
SW-03	SW-03	L2759254-2	2025-03-18	Water	M		58.3													
SW-03	SW21-3	VA25A6812-002	2025-03-27	Water	M		87.4													
SW-03	SW-03	VA25A7260-003	2025-04-02	Water	M															
SW-03	SW-03	VA25A7262-003	2025-04-02	Water	M															
SW-03	SW-03	VA25A7638-002	2025-04-07	Water	M		101													
SW-03	SW-03	VA25A7640-002	2025-04-07	Water	M		76.3													
SW-03	SW-03	VA25A8192-002	2025-04-12	Water	M		77													
SW-03	SW-03	VA25A8193-002	2025-04-12	Water	M		111													
SW-03	SW-03	VA25A8840-002	2025-04-20	Water	M															
SW-03	SW-03	VA25A8841-002	2025-04-20	Water	M															
SW-03	SW21-3	VA25A9265-002	2025-04-24	Water	M		115									<5.0	<5.0	<5.0	<10	<5.0
SW-03	SW-03	VA25A9553-001	2025-04-28	Water	M		88.3									<5.0	<5.0	<5.0	<10	<5.0
SW-03	SW-03	VA25A9554-001	2025-04-28	Water	M		86.8													
SW-03	SW21-3	VA25A9648-002	2025-04-29	Water	M															
SW-03	SW21-3	VA25B0655-002	2025-05-08	Water	M															
SW-03	SW-03	VA25B1050-002	2025-05-13	Water	M															
SW-03	SW-03	VA25B1052-002	2025-05-13	Water	M															
SW-03	SW21-3	VA25B1182-002	2025-05-14	Water	M		112													
SW-03	SW21-3	VA25B1920-002	2025-05-22	Water	M															
SW-04	SW21-4	21A2594-04	2021-01-27	Water	M															
SW-04	SW21-4	21B2778-20	2021-02-25	Water	M															
SW-04	SW21-4	21C3502-04	2021-03-25	Water	M															
SW-04	SW21-4	21D2478-16	2021-04-22	Water	M															
SW-04	SW21-4	21E1990-18	2021-05-18	Water	M															
SW-04	SW21-4	21E2917-18	2021-05-26	Water	M															
SW-04	SW21-4	21F0167-18	2021-06-01	Water	M															
SW-04	SW21-4	21F1056-18	2021-06-08	Water	M															
SW-04	SW21-4	21F2014-16	2021-06-15	Water	M															
SW-04	SW21-4	21G2414-16	2021-07-20	Water	M															
SW-04	SW21-4	21H3040-16	2021-08-25	Water	M															
SW-04	SW21-4	21I3814-16	2021-09-28	Water	M															
SW-04	SW21-4	21J2995-04	2021-10-21	Water	M															
SW-04	SW21-4	21K3046-16	2021-11-23	Water	M															
SW-04	SW21-4	21L2125-16	2021-12-14	Water	M															
SW-04	SW21-04	22A2312-16	2022-01-20	Water	M															
SW-04	SW21-4	22B2487-16	2022-02-17	Water	M															
SW-04	SW21-4	22B3076-04	2022-02-22	Water	M															
SW-04	SW21-4	22C3145-16	2022-03-22	Water	M															
SW-04	SW21-04	22D2212-17	2022-04-20	Water	M															
SW-04	SW21-4	22E2480-16	2022-05-18	Water	M															
SW-04	SW21-04	22F3538-04	2022-06-22	Water	M															
SW-04	SW21-4	22G1944-04	2022-07-14	Water	M															
SW-04	SW21-4	22H2790-04	2022-08-18	Water	M															
SW-04	SW21-4	22I2095-04	2022-09-15	Water	M															
SW-04	SW21-4	22J1763-04	2022-10-13	Water	M															
SW-04	SW21-4	22K1308-04	2022-11-09	Water	M															
SW-04	SW21-4	22L0650-04	2022-12-06	Water	M															
SW-04	SW21-4	23A2725-04	2023-01-26	Water	M															
SW-04	SW21-4	23B2818-04	2023-02-27	Water	M															
SW-04	SW21-4	23C1944-04	2023-03-16	Water	M															
SW-04	SW21-4	23D3227-04	2023-04-27	Water	M															
SW-04	SW21-4	23E2501-04	2023-05-18	Water	M															
SW-04	SW21-4	23F3813-04	2023-06-28	Water	M															
SW-04	SW21-4	23G2576-04	2023-07-20	Water	M															
SW-04	SW21-4	23H3444-04	2023-08-25	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	23I2541-03	2023-09-20	Water	M															
SW-04	SW21-4	23J2428-04	2023-10-19	Water	M		89.8													
SW-04	SW21-4	23K2005-04	2023-11-16	Water	M		101													
SW-04	SW21-4	23L1794-04	2023-12-13	Water	M		99.4													
SW-04		VA24A1299-004	2024-01-23	Water	M		90.7													
SW-04		L2754353-4	2024-01-23	Water	M		94.4													
SW-04		L2754615-4	2024-02-15	Water	M		119													
SW-04	SW21-4	VA24A3090-004	2024-02-15	Water	M															
SW-04	SW21-4	VA24A5796-004	2024-03-19	Water	M															
SW-04		L2755012-4	2024-03-19	Water	M															
SW-04	SW21-4	VA24A9057-003	2024-04-25	Water	M															
SW-04		L2755503-3	2024-04-25	Water	M		65.7													
SW-04	SW-04	VA24A9285-002	2024-04-29	Water	M		90													
SW-04		L2755523-2	2024-04-29	Water	M															
SW-04	SW21-4	VA24A9687-003	2024-05-02	Water	M		96.2													
SW-04		L2755588-3	2024-05-02	Water	M		85.9													
SW-04	SW21-4	VA24B0355-006	2024-05-09	Water	M															
SW-04		L2755687-4	2024-05-09	Water	M															
SW-04	SW-04	VA24B0452-002	2024-05-10	Water	M		105													
SW-04		L2755695-2	2024-05-10	Water	M		109													
SW-04		L2755788-2	2024-05-15	Water	M		91.4													
SW-04	SW-04	VA24B1054-002	2024-05-16	Water	M		75													
SW-04	SW21-4	VA24B1087-003	2024-05-16	Water	M		105													
SW-04		L2755820-3	2024-05-16	Water	M		83.9													
SW-04	SW21-4	VA24B1693-003	2024-05-23	Water	M															
SW-04		VA24B1636-005	2024-05-23	Water	M		83.6													
SW-04		L2755903-5	2024-05-23	Water	M		84.4													
SW-04		L2755916-3	2024-05-23	Water	M		86.7													
SW-04	SW-04	VA24B1914-004	2024-05-26	Water	M		95													
SW-04		L2755961-4	2024-05-26	Water	M		110													
SW-04		VA24B4655-003	2024-06-20	Water	M		82.5													
SW-04		L2756326-3	2024-06-20	Water	M		107	50	200											
SW-04		VA24B5289-002	2024-06-26	Water	M															
SW-04		L2756419-2	2024-06-26	Water	M											<5.0	<5.0	<5.0	<10	<5.0
SW-04		VA24B7579-003	2024-07-18	Water	M															
SW-04		L2756717-3	2024-07-18	Water	M											<5.0	<5.0	<5.0	<10	<5.0
SW-04		VA24B8974-004	2024-07-31	Water	M		105													
SW-04		L2756871-4	2024-07-31	Water	M															
SW-04		VA24C1546-003	2024-08-22	Water	M															
SW-04		L2757144-3	2024-08-22	Water	M															
SW-04	SW-04	L2757209-4	2024-08-27	Water	M															
SW-04	SW-04	VA24C2197-004	2024-08-27	Water	M															
SW-04	SW21-4	VA24C4878-003	2024-09-19	Water	M															
SW-04	SW-04	VA24C5909-002	2024-09-28	Water	M		116	23	800				89.9							
SW-04	SW-04	L2757584-2	2024-09-28	Water	M															
SW-04	SW-04	VA24C6562-004	2024-10-04	Water	M															
SW-04	SW-04	L2757661-4	2024-10-04	Water	M															
SW-04	SW21-04	VA24C7381-004	2024-10-12	Water	M		94	16	300				86.5							
SW-04	SW21-04	L2757756-4	2024-10-12	Water	M															
SW-04	SW21-4	VA24C7996-014	2024-10-19	Water	M															
SW-04	SW-04	VA24C8331-004	2024-10-22	Water	M		78.4													
SW-04	SW-04	L2757873-4	2024-10-22	Water	M															
SW-04	SW21-4	VA24C8719-003	2024-10-24	Water	M															
SW-04	SW-04	VA24C8965-001	2024-10-26	Water	M		114													
SW-04	SW-04	L2757942-1	2024-10-26	Water	M															
SW-04	SW21-4	VA24C9586-003	2024-10-31	Water	M															
SW-04	SW21-4	VA24D0423-007	2024-11-08	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-04	SW21-4	L2758092-5	2024-11-08	Water	M															
SW-04	SW21-4	VA24D0970-003	2024-11-14	Water	M		92.8													
SW-04	SW-04	VA24D1148-004	2024-11-17	Water	M		76.9													
SW-04	SW-04	L2758155-4	2024-11-17	Water	M															
SW-04		4-456131118-0	2024-11-17	Water	F		91													
SW-04	SW21-4	VA24D1404-003	2024-11-19	Water	M															
SW-04	SW-04	VA24D3099-003	2024-12-08	Water	M		91.5													
SW-04	SW-04	L2758371-3	2024-12-08	Water	M															
SW-04		4-456441522-0	2024-12-18	Water	F															
SW-04	SW21-4	VA24D4023-008	2024-12-19	Water	M		88.5													
SW-04	SW21-4	L2758504-7	2024-12-19	Water	M															
SW-04	SW21-4	VA25A1591-007	2025-01-23	Water	M		81.6													
SW-04	SW21-4	L2758768-6	2025-01-23	Water	M											<5.0	<5.0	<5.0	<10	<5.0
SW-04	SW-04	VA25A1755-001	2025-01-25	Water	M		89.8													
SW-04	SW-04	L2758765-1	2025-01-25	Water	M											<5.0	<5.0	<5.0	<10	<5.0
SW-04	SW21-4	VA25A3665-006	2025-02-20	Water	M															
SW-04	SW21-4	L2759041-5	2025-02-20	Water	M											62.8	<5.0	<5.0	63	<5.0
SW-04	SW-04	VA25A3804-002	2025-02-21	Water	M		118													
SW-04	SW-04	L2759042-2	2025-02-21	Water	M											<5.0	<5.0	<5.0	<10	<5.0
SW-04	SW-04	VA25A6069-002	2025-03-19	Water	M															
SW-04	SW-04	L2759255-2	2025-03-19	Water	M											<5.0	<5.0	<5.0	<10	<5.0
SW-04	SW21-4	VA25A6812-006	2025-03-27	Water	M		82.6													
SW-04	SW-04	VA25A7260-004	2025-04-02	Water	M															
SW-04	SW-04	VA25A7262-004	2025-04-02	Water	M															
SW-04	SW-04	VA25A7741-002	2025-04-08	Water	M															
SW-04	SW-04	VA25A7742-002	2025-04-08	Water	M															
SW-04	SW-04	VA25A8192-005	2025-04-13	Water	M		101													
SW-04	SW-04	VA25A8193-005	2025-04-13	Water	M		104													
SW-04	SW-04	VA25A8975-001	2025-04-22	Water	M		77.4	21	600				88.7							
SW-04	SW-04	VA25A8977-001	2025-04-22	Water	M															
SW-04	SW21-4	VA25A9265-006	2025-04-24	Water	M															
SW-04	SW-04	VA25A9703-001	2025-04-29	Water	M		110													
SW-04	SW-04	VA25A9710-001	2025-04-29	Water	M															
SW-04	SW21-4	VA25A9648-007	2025-04-29	Water	M		99.3	91	200				89.9							
SW-04	SW21-4	VA25B0655-006	2025-05-08	Water	M		92.9													
SW-04	SW-04	VA25B0930-002	2025-05-12	Water	M		101													
SW-04	SW21-4	VA25B1182-006	2025-05-14	Water	M		87.5													
SW-04	SW21-4	VA25B1920-006	2025-05-22	Water	M		93.1	22	100				88.7							
SW-05	SW21-05	22D2212-23	2022-04-20	Water	M															
SW-05	SW21-5	22E2480-17	2022-05-18	Water	M		77.5													
SW-05	SW21-05	22F3538-05	2022-06-22	Water	M		78.4	73					79.6							
SW-05	SW21-5	22K1308-05	2022-11-09	Water	M		105													
SW-05	SW21-5	22L0650-05	2022-12-06	Water	M															
SW-05	SW21-5	23A2725-05	2023-01-26	Water	M		105						77.3							
SW-05	SW21-5	23B2818-05	2023-02-27	Water	M		101									<5.0	<5.0	<5.0	<10	<5.0
SW-05	SW21-5	23C1944-05	2023-03-16	Water	M															
SW-05	SW21-5	23D3227-05	2023-04-27	Water	M		103													
SW-05	SW21-5	23J2428-05	2023-10-19	Water	M															
SW-05	SW21-5	23J2428-05RE1	2023-10-19	Water	M		102						75							
SW-05	SW21-5	23J2428-05RE2	2023-10-19	Water	M		97.3													
SW-05	SW21-05	23K2005-05	2023-11-16	Water	M															
SW-05	SW21-5	23L1794-05	2023-12-13	Water	M		121													
SW-06	SW21-06	22D2212-24	2022-04-20	Water	M		91.6													
SW-06	SW21-6	22E2480-18	2022-05-18	Water	M															
SW-06	SW21-06	22F3538-06	2022-06-22	Water	M		82													
SW-06	SW21-6	22G1944-05	2022-07-14	Water	M		99.4													
SW-06	SW21-6	22K1308-06	2022-11-09	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-06	SW21-6	22L0650-06	2022-12-06	Water	M															
SW-06	SW21-6	23A2725-06	2023-01-26	Water	M		91.5													
SW-06	SW21-6	23B2818-06	2023-02-27	Water	M															
SW-06	SW21-6	23C1944-06	2023-03-16	Water	M															
SW-06	SW21-6	23D3227-06	2023-04-27	Water	M															
SW-06	SW21-6	23E2501-06	2023-05-18	Water	M															
SW-06	SW21-6	23J2428-06	2023-10-19	Water	M		100													
SW-06	SW21-6	23K2005-06	2023-11-16	Water	M															
SW-06	SW21-6	23L1794-06	2023-12-13	Water	M															
SW-06	SW-06	VA25A3845-009	2025-02-22	Water	M		108													
SW-06	SW-06	VA25A6440-010	2025-03-23	Water	M															
SW-07	SW21-7	23H3444-05	2023-08-25	Water	M															
SW-07	SW21-7	23I2541-04	2023-09-20	Water	M															
SW-07	SW21-7	23J2428-07	2023-10-19	Water	M		101													
SW-07	SW21-7	23K2005-07	2023-11-16	Water	M		104									<5.0	<5.0	<5.0	<10	<5.0
SW-07	SW21-7	23L1794-07	2023-12-13	Water	M		103													
SW-07		VA24A1299-005	2024-01-23	Water	M															
SW-07		L2754353-5	2024-01-23	Water	M		102													
SW-07		L2754615-5	2024-02-15	Water	M															
SW-07	SW21-7	VA24A3090-005	2024-02-15	Water	M	<0.005														
SW-07	SW21-7	VA24A5796-005	2024-03-19	Water	M		113									<5.0	<5.0	<5.0	<10	<5.0
SW-07		L2755012-5	2024-03-19	Water	M															
SW-07	SW21-7	VA24A9134-003	2024-04-26	Water	M		99.8													
SW-07		L2755504-3	2024-04-26	Water	M															
SW-07	SW-07	VA24A9263-001	2024-04-28	Water	M															
SW-07		L2755521-1	2024-04-28	Water	M															
SW-07	SW21-7	VA24A9747-003	2024-05-03	Water	M															
SW-07		L2755598-3	2024-05-03	Water	M															
SW-07	SW21-7	VA24B0355-003	2024-05-09	Water	M		92.4													
SW-07	SW-07	VA24B0330-003	2024-05-09	Water	M		113									<5.0	<5.0	<5.0	<10	<5.0
SW-07		L2755677-3	2024-05-09	Water	M															
SW-07		L2755687-3	2024-05-09	Water	M															
SW-07	SW-07	VA24B0795-003	2024-05-14	Water	M															
SW-07		L2755770-3	2024-05-14	Water	M															
SW-07	SW21-7	VA24B1168-003	2024-05-17	Water	M		91.2													
SW-07		L2755819-3	2024-05-17	Water	M															
SW-07		VA24B1636-003	2024-05-23	Water	M															
SW-07		L2755903-3	2024-05-23	Water	M															
SW-07	SW21-7	VA24B1780-003	2024-05-24	Water	M															
SW-07		L2755933-3	2024-05-24	Water	M															
SW-07	SW-07	VA24B1914-003	2024-05-26	Water	M		92									<5.0	<5.0	<5.0	<10	<5.0
SW-07		L2755961-3	2024-05-26	Water	M															
SW-07		VA24B4698-003	2024-06-21	Water	M															
SW-07		L2756349-3	2024-06-21	Water	M															
SW-07		VA24B5289-003	2024-06-26	Water	M															
SW-07		L2756419-3	2024-06-26	Water	M															
SW-07		VA24B7689-003	2024-07-19	Water	M															
SW-07		L2756726-3	2024-07-19	Water	M															
SW-07		L2756871-5	2024-07-31	Water	M															
SW-07		VA24B8974-005	2024-07-31	Water	M															
SW-07		VA24C1605-003	2024-08-23	Water	M															
SW-07		L2757153-3	2024-08-23	Water	M															
SW-07	SW-07	L2757209-5	2024-08-27	Water	M		114													
SW-07	SW-07	VA24C2197-005	2024-08-27	Water	M															
SW-07	SW21-7	VA24C5009-003	2024-09-20	Water	M															
SW-07	SW-07	VA24C5953-004	2024-09-29	Water	M		104													
SW-07	SW-07	L2757587-4	2024-09-29	Water	M		92.3													

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-07	SW-07	VA24C6390-001	2024-10-03	Water	M		82													
SW-07	SW-07	L2757664-1	2024-10-03	Water	M															
SW-07	SW21-07	VA24C7381-005	2024-10-12	Water	M															
SW-07	SW21-07	L2757756-5	2024-10-12	Water	M		120													
SW-07		492-455781017-0	2024-10-13	Water	F		106													
SW-07	SW-07	VA24C8331-005	2024-10-22	Water	M		88.1													
SW-07	SW-07	L2757873-5	2024-10-22	Water	M															
SW-07	SW21-7	VA24C8780-003	2024-10-25	Water	M															
SW-07	SW-07	VA24C8832-004	2024-10-25	Water	M		83.7													
SW-07	SW-07	L2757913-4	2024-10-25	Water	M		92.8													
SW-07	SW21-7	VA24C9642-003	2024-11-01	Water	M															
SW-07	SW21-7	VA24D0423-003	2024-11-08	Water	M															
SW-07	SW21-7	L2758092-3	2024-11-08	Water	M															
SW-07	SW21-7	VA24D1013-003	2024-11-15	Water	M															
SW-07	SW-07	VA24D1148-001	2024-11-16	Water	M	<0.005														
SW-07	SW-07	L2758155-1	2024-11-16	Water	M															
SW-07		VA24D1587-003	2024-11-20	Water	M															
SW-07	SW21-7	L2758201-3	2024-11-20	Water	M		66.1									<5.0	<5.0	<5.0	<10	<5.0
SW-07	SW-07	VA24D3099-004	2024-12-08	Water	M															
SW-07	SW-07	L2758371-4	2024-12-08	Water	M															
SW-07	SW21-7	VA24D4023-003	2024-12-19	Water	M		120													
SW-07	SW21-7	L2758504-3	2024-12-19	Water	M		114									<5.0	<5.0	<5.0	<10	<5.0
SW-07	SW21-7	VA25A1591-003	2025-01-23	Water	M															
SW-07	SW21-7	L2758768-3	2025-01-23	Water	M															
SW-07	SW-07	VA25A1755-002	2025-01-25	Water	M															
SW-07	SW-07	L2758765-2	2025-01-25	Water	M		102									<5.0	<5.0	<5.0	<10	<5.0
SW-07	SW-07	VA25A3569-003	2025-02-19	Water	M															
SW-07	SW-07	L2759009-3	2025-02-19	Water	M		64.7													
SW-07	SW21-7	VA25A3665-003	2025-02-20	Water	M															
SW-07	SW21-7	L2759041-3	2025-02-20	Water	M		117													
SW-07	SW-07	VA25A5938-003	2025-03-18	Water	M		83													
SW-07	SW-07	L2759254-3	2025-03-18	Water	M															
SW-07	SW21-7	VA25A6812-003	2025-03-27	Water	M		132									<5.0	<5.0	<5.0	<10	<5.0
SW-07	SW-07	VA25A7260-005	2025-04-02	Water	M	<0.005														
SW-07	SW-07	VA25A7262-005	2025-04-02	Water	M		119									<5.0	<5.0	<5.0	<10	<5.0
SW-07	SW-07	VA25A7638-003	2025-04-07	Water	M															
SW-07	SW-07	VA25A7640-003	2025-04-07	Water	M		103									<5.0	<5.0	<5.0	<10	<5.0
SW-07	SW-07	VA25A8193-003	2025-04-12	Water	M															
SW-07	SW-07	VA25A8192-003	2025-04-12	Water	M		87.5													
SW-07	SW-07	VA25A8840-003	2025-04-20	Water	M															
SW-07	SW-07	VA25A8841-003	2025-04-20	Water	M		115													
SW-07	SW21-7	VA25A9265-003	2025-04-24	Water	M		72.4													
SW-07	SW-07	VA25A9553-003	2025-04-28	Water	M		123													
SW-07	SW-07	VA25A9554-003	2025-04-28	Water	M		102									<5.0	<5.0	<5.0	<10	<5.0
SW-07	SW21-7	VA25A9648-003	2025-04-29	Water	M															
SW-07	SW21-7	VA25B0655-003	2025-05-08	Water	M															
SW-07	SW-07	VA25B1050-003	2025-05-13	Water	M		110													
SW-07	SW-07	VA25B1052-003	2025-05-13	Water	M		86.2													
SW-07	SW21-7	VA25B1182-003	2025-05-14	Water	M		87.6													
SW-07	SW21-7	VA25B1920-003	2025-05-22	Water	M		112													
SW-08	SW21-8	VA24A9057-002	2024-04-25	Water	M		112													
SW-08		L2755503-2	2024-04-25	Water	M		73.8													
SW-08	SW21-8	VA24A9687-002	2024-05-02	Water	M															
SW-08		L2755588-2	2024-05-02	Water	M		103													
SW-08	SW21-8	VA24B0401-002	2024-05-10	Water	M															
SW-08		L2755694-2	2024-05-10	Water	M															
SW-08	SW21-8	VA24B1087-002	2024-05-16	Water	M															

Appendix 3.6-1: Fresh and Estuarine Water Quality Results

Station ID	Extra ID	Sample No.	Sample Date/Time	Sample Matrix	Sample Class	Phosphate	Surrogate-3-4-Dichlorotoluene(SS)	Total Coliforms	Heterotrophic Plate Count	Langelier Index	Nitrogen-Organic	Nitrogen-Total	UV Transmittance	2-6-Dichlorosyringaldehyde	Total Cyanide	1-2-Propylene Glycol	Diethylene Glycol	Ethylene Glycol	Total Glycols	Triethylene Glycol
							%	MPN/100 mL	MPN/100 mL		mg/L	mg/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SW-08		L2755820-2	2024-05-16	Water	M															
SW-08	SW21-8	VA24B1693-002	2024-05-23	Water	M		85.1													
SW-08		L2755916-2	2024-05-23	Water	M															
SW-08		VA24B4655-002	2024-06-20	Water	M		87.1													
SW-08		L2756326-2	2024-06-20	Water	M															
SW-08		VA24B7579-002	2024-07-18	Water	M		96.3													
SW-08		L2756717-2	2024-07-18	Water	M															
SW-08		VA24C1546-002	2024-08-22	Water	M		105													
SW-08		L2757144-2	2024-08-22	Water	M															
SW-08	SW21-8	VA24C4878-002	2024-09-19	Water	M															
SW-08	SW21-8	VA24C8719-002	2024-10-24	Water	M		98.7													
SW-08	SW21-8	VA24C9586-002	2024-10-31	Water	M		104													
SW-08	SW21-8	VA24D0326-002	2024-11-07	Water	M															
SW-08	SW21-8	VA24D0970-002	2024-11-14	Water	M		92.6													
SW-08	SW21-8	VA24D1404-002	2024-11-19	Water	M															
SW-09	SW21-9	VA24A9057-004	2024-04-25	Water	M															
SW-09		L2755503-4	2024-04-25	Water	M		106													
SW-09	SW21-9	VA24A9687-004	2024-05-02	Water	M															
SW-09		L2755588-4	2024-05-02	Water	M															
SW-09	SW21-9	VA24B0355-007	2024-05-09	Water	M															
SW-09		L2755687-5	2024-05-09	Water	M		70.6													
SW-09	SW21-9	VA24B1087-004	2024-05-16	Water	M															
SW-09		L2755820-4	2024-05-16	Water	M															
SW-09	SW21-9	VA24B1693-004	2024-05-23	Water	M															
SW-09		L2755916-4	2024-05-23	Water	M		97.3													
SW-09		VA24B4655-004	2024-06-20	Water	M															
SW-09		L2756326-4	2024-06-20	Water	M															
SW-09		VA24B7579-004	2024-07-18	Water	M															
SW-09		L2756717-4	2024-07-18	Water	M		72.7													
SW-09		VA24C1546-004	2024-08-22	Water	M															
SW-09		L2757144-4	2024-08-22	Water	M															
SW-09	SW21-9	VA24C4878-004	2024-09-19	Water	M															
SW-09	SW21-9	VA24C7996-015	2024-10-19	Water	M															
SW-09	SW21-9	VA24C8719-004	2024-10-24	Water	M															
SW-09	SW21-9	VA24C9586-004	2024-10-31	Water	M															
SW-09	SW21-9	VA24D0423-006	2024-11-08	Water	M															
SW-09	SW21-9	L2758092-4	2024-11-08	Water	M															
SW-09	SW21-9	VA24D0970-004	2024-11-14	Water	M		67													
SW-09	SW21-9	VA24D1404-004	2024-11-19	Water	M		124													
SW-09	SW21-9	L2758504-6	2024-12-19	Water	M		78.5													
SW-09	SW21-9	VA24D4023-007	2024-12-19	Water	M															
SW-09	SW21-9	VA25A1591-008	2025-01-23	Water	M															
SW-09	SW21-9	L2758768-7	2025-01-23	Water	M															
SW-09	SW21-9	VA25A3665-007	2025-02-20	Water	M															
SW-09	SW21-9	L2759041-6	2025-02-20	Water	M		77.3													
SW-09	SW21-9	VA25A6812-007	2025-03-27	Water	M															
SW-09	SW21-9	VA25A9265-007	2025-04-24	Water	M															
SW-09	SW21-9	VA25A9648-006	2025-04-29	Water	M															
SW-09	SW21-9	VA25B0655-007	2025-05-08	Water	M															
SW-09	SW21-9	VA25B1182-007	2025-05-14	Water	M															
SW-09	SW21-9	VA25B1920-007	2025-05-22	Water	M															

Notes:
Sample Class 'M' = monitoring, 'F' = field measurements only.
Values with '<' preceeding the result are below the analytical detection limit.

Appendix 3.7: Groundwater Quality

3.7-1: GROUNDWATER QUALITY RESULTS

Appendix 3.7-1: Groundwater Quality Results

Sample ID		BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	MW21-01	MW21-01	MW21-01	MW21-01	MW21-02	MW21-02	MW21-02	MW21-03	MW21-03	MW21-03	MW21-04	MW21-04	MW21-04	MW21-05	MW21-05
Laboratory Work Order				C108616	G158471	C195403	C219928	C109869	C195403	C219928	C108616	C195403	C219928	C115037	C195403	C219928	C108616	G158471
Laboratory Sample ID				ZH4427	AAS380	AME213	AQS045	ZI0904	AME214	AQS039	ZH4428	AME215	AQS040	ZL3483	AME216	AQS046	ZH4429	AAS381
Sample Date				09-Feb-21	28-Jun-21	30-Nov-21	28-Mar-22	09-Feb-21	30-Nov-21	28-Mar-22	09-Feb-21	30-Nov-21	28-Mar-22	08-Mar-21	30-Nov-21	28-Mar-22	09-Feb-21	28-Jun-21
Physical Parameters and Anions																		
Alkalinity, Total (as CaCO3)	mg/L	-	-	6.3	20	1.8	5.4	180	67	120	66	33	53	55	34	36	130	240
Chloride	mg/L	1,500	-	1.3	<1	<1	<1	1.3	<1	<1	3.3	<1	2.6	1.4	<1	<1	<1	<1
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity, Lab	µS/cm	-	-	24	49	11	19	360	120	240	160	63	130	120	78	82	290	510
Fluoride[1]	mg/L	2 - 3[1]	15	-	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	0.13	-	<0.05	<0.05	-	-
Hardness (as CaCO3), Dissolved	mg/L	-	-	9.24	19.1	3.98	7.19	151	52.4	120	64.8	26.2	55.2	53.6	32.6	34.2	137	217
Hardness (as CaCO3), Total	mg/L	-	-	9.59	19.7	4.6	7.12	148	56.7	118	71.8	29.3	55	54.2	35.5	37.7	137	232
Nitrate (as N)	mg/L	400	400	0.084	0.067	<0.02	0.07	0.138	0.021	0.291	0.026	<0.02	0.063	0.419	0.365	0.347	0.747	0.572
Nitrite (as N)[2]	mg/L	0.2 - 2[2]	0.2 - 2[2]	<0.005	<0.005	<0.005	<0.005	0.0382	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0056	<0.005
pH, lab	S.U.	-	-	6.92	6.89	5.92	6.48	6.66	6.88	7.59	7.53	6.74	6.9	7.36	6.75	6.98	7.65	7.64
Sulfate[1]	mg/L	1,280 - 4,290[1]	1,280 - 4,290[1]	1.8	4.1	<1	<1	17	1.2	4.7	8.3	2.4	7.2	3.7	6.6	4.4	12	22
Total Dissolved Solids (TDS)	mg/L	-	-	12	26	12	14	200	68	140	84	46	74	65	62	72	160	270
Turbidity, Lab	NTU	-	-	-	-	0.3	0.15	-	2.3	1.9	-	7.9	11	-	0.81	2.7	-	-
Microbiological Parameters																		
Escherichia coli (E.Coli)	cfu/100mL	-	-	-	-	28	0	-	0	0	-	0	0	-	0	0	-	-
Total Coliforms	cfu/100mL	-	-	-	-	28	4	-	110	64	-	53	25	-	7	8	-	-
Volatile Organic Compounds (VOCs)																		
Benzene	µg/L	400	1,000	-	-	<0.4	<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	-	-
Toluene	µg/L	5	2,000	-	-	<0.4	<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	-	-
Ethylbenzene	µg/L	2,000	2,500	-	-	<0.4	<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	-	-
Xylenes, Total	µg/L	300	300	-	-	<0.4	<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	-	-
Methyl tert-butyl ether (MTBE)	µg/L	34,000	4,400	-	-	<4	<4	-	<4	<4	-	<4	<4	<4	<4	<4	-	-
Styrene	µg/L	720	720	-	-	<0.4	<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	-	-
Petroleum Hydrocarbons																		
VH (C6-C10)[4,6]	µg/L	15,000[4,6]	15,000[4,6]	-	-	<300	<300	-	<300	<300	-	<300	<300	<300	<300	<300	-	-
VPH (C6-C10 Minus BTEX)	µg/L	1,500[8]	1,500[8]	-	-	<300	<300	-	<300	<300	-	<300	<300	<300	<300	<300	-	-
EPH C10-C19[4,5]	mg/L	5[4,5]	5[4,5]	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
EPH C19-C32	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
LEPH (C10-C19 less PAH)[7]	mg/L	0.5	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
HEPH (C19-C32 less PAH)	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	µg/L	60	60	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acridine	µg/L	0.5	0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	µg/L	0.1	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(b)pyridine (Quinoline)	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(b/j)fluoranthene	µg/L	-	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(g,h,i)perylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	1	1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fluoranthene	µg/L	2	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluorene	µg/L	120	120	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 1-	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 2-	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	µg/L	10	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	0.2	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dioxins and Furans																		

Appendix 3.7-1: Groundwater Quality Results

Sample ID		BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	MW21-01	MW21-01	MW21-01	MW21-01	MW21-02	MW21-02	MW21-02	MW21-03	MW21-03	MW21-03	MW21-04	MW21-04	MW21-04	MW21-05	MW21-05
Laboratory Work Order				C108616	G158471	C195403	C219928	C109869	C195403	C219928	C108616	C195403	C219928	C115037	C195403	C219928	C108616	G158471
Laboratory Sample ID				ZH4427	AAS380	AME213	AQS045	ZI0904	AME214	AQS039	ZH4428	AME215	AQS040	ZL3483	AME216	AQS046	ZH4429	AAS381
Sample Date				09-Feb-21	28-Jun-21	30-Nov-21	28-Mar-22	09-Feb-21	30-Nov-21	28-Mar-22	09-Feb-21	30-Nov-21	28-Mar-22	08-Mar-21	30-Nov-21	28-Mar-22	09-Feb-21	28-Jun-21
Lower Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																		
Aluminum	µg/L	-	-	187	73.2	225	210	217	5.9	<3	76	9.6	<3	18.8	27.1	20.9	5.2	4.3
Antimony	µg/L	90	2,500	<0.5	<0.5	<0.5	<0.5	1.15	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.73	1.02
Arsenic	µg/L	50	125	<0.1	<0.1	<0.1	<0.1	0.54	0.18	0.21	0.14	<0.1	<0.1	0.27	<0.1	0.16	0.14	<0.1
Barium	µg/L	10,000	5,000	2.3	4.5	1.1	1.7	52.2	11.4	29	15.3	5.9	5.5	20.6	14.3	13.5	47.2	87
Beryllium	µg/L	1.5	1,000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	µg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Boron	µg/L	12,000	12,000	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	67
Cadmium[1]	µg/L	0.5 - 4[1]	15	<0.01	<0.01	<0.01	<0.01	0.057	<0.01	<0.01	0.017	<0.01	<0.01	0.046	<0.01	<0.01	0.011	0.014
Calcium	mg/L	-	-	3.27	6.55	1.41	2.53	55.4	20.4	46.4	23.2	10	19.8	19.5	12	12.4	51.3	82
Chromium[3]	µg/L	10[3]	15[3]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	40	40	<0.2	<0.2	<0.2	<0.2	1.36	<0.2	<0.2	0.26	0.23	<0.2	0.49	<0.2	<0.2	0.39	<0.2
Copper[1]	µg/L	20 - 90[1]	20	1.74RD	0.59	0.64	0.54	1.02	0.46	0.56	0.33	0.53	<0.2	2.32	0.73	0.44	0.75	1.11
Iron	µg/L	-	-	13.9	5.7	23.2	13.8	174	<5	<5	28.2	5.2	<5	16.2	5.6	5.1	6.1	<5
Lead[1]	µg/L	40 - 160[1]	20	<0.2	<0.2	<0.2	<0.2	0.41	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lithium	µg/L	-	-	<2	<2	<2	<2	<2	<2	<2	4.5	<2	3.8	<2	<2	<2	<2	<2
Magnesium	mg/L	-	-	0.262	0.667	0.113	0.212	3	0.351	0.95	1.68	0.261	1.36	1.18	0.622	0.772	2.11	3.07
Manganese	µg/L	-	-	2.5	1.8	<1	<1	224	<1	<1	69.3	<1	3.5	28.9	<1	<1	35.1	2.8
Mercury	µg/L	0.25	0.25	<0.0019	0.003	-	0.0045	<0.0019	-	<0.0019	<0.0019	-	<0.0019	<0.0019	-	0.0022	<0.0019	<0.0019
Molybdenum	µg/L	10,000	10,000	1.6	4.2	<1	1.5	7.5	<1	1.4	11.5	<1	10.8	<1	<1	<1	7.3	9
Nickel[1]	µg/L	250 - 1,500[1]	83	<1	<1	<1	<1	1.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Potassium	mg/L	-	-	0.169	0.283	0.099	0.154	2.82	0.937	1.8	0.748	0.617	0.426	1.65	0.571	0.658	2.6	4.32
Selenium	µg/L	20	20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.14	0.33
Silicon	µg/L	-	-	2,070	3510	1,110	1680	5,200	584	1930	4,790	1,440	4590	2,930	2,480	2930	3,070	4350
Silver[1]	µg/L	0.5 - 15[1]	15	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	0.892	1.56	0.471	0.756	13.2	1.22	3.82	6.95	0.748	4.24	1.79	1.41	1.57	7.65	10.1
Strontium	µg/L	-	-	9.9	16	4.5	8.5	222	57.5	133	64.2	26.2	56.8	79	54.8	48.4	190	313
Sulfur	mg/L	-	-	<3	<3	<3	<3	5.3	<3	<3	3.5	<3	<3	<3	<3	<3	4.8	6
Thallium	µg/L	3	3	<0.01	<0.01	<0.01	<0.01	0.018	<0.01	0.011	<0.01	<0.01	<0.01	0.014	<0.01	<0.01	0.012	0.021
Tin	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Titanium	µg/L	1,000	1,000	<5	<5	<5	<5	5.9	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Uranium	µg/L	85	85	0.38	0.31	0.19	0.3	4.6	0.49	1.61	2.84	0.18	3.75	0.16	0.1	0.1	2.62	5.14
Vanadium	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc[1]	µg/L	75 - 2,400[1]	100	<5	<5	<5	<5	13.8	<5	<5	<5	<5	<5	<5	<5	<5	<5	5.5
Zirconium	µg/L	-	-	0.12	<0.1	<0.1	0.13	0.3	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Metals																		
Aluminum	µg/L	-	-	201	81.8	253	213	447	80.1	38.8	1,080	389	302	802	65.8	149	545	1310
Antimony	µg/L	-	-	<0.5	<0.5	<0.5	<0.5	1.18	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.66	1
Arsenic	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	0.65	0.23	0.24	0.31	0.26	0.15	0.84	0.1	0.27	0.22	0.17
Barium	µg/L	-	-	2.5	4.5	1.3	1.7	54.9	13.1	29	20.9	10.1	8	24.8	15.9	15.4	50.7	91.5
Beryllium	µg/L	-	-	<0.1	<0.1	-	-	<0.1	-	-	0.18	-	-	<0.1	-	-	<0.1	<0.1
Bismuth	µg/L	-	-	<1	<1	-	-	<1	-	-	<1	-	-	<1	-	-	<1	<1
Boron	µg/L	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	63
Cadmium	µg/L	-	-	<0.01	<0.01	0.017	<0.01	0.058	<0.01	<0.01	0.025	0.026	<0.01	0.023	<0.01	<0.01	0.014	0.016
Calcium	mg/L	-	-	3.39	6.76	1.63	2.51	54.1	22	45.9	25.6	11.2	19.8	19.4	13.1	13.7	51.4	87.3
Chromium	µg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	-	-	<0.2	<0.2	<0.2	<0.2	1.36	<0.2	<0.2	0.46	0.72	0.33	0.71	<0.2	0.3	0.48	0.56
Copper	µg/L	-	-	0.54	0.62	0.7	0.51	1.42	0.72	0.76	4.63	1.32	0.48	1.47	0.73	0.65	1.43	1.39
Iron	µg/L	-	-	21	16	23.4	17.8	437	71.4	49.1	456	241	183	885	42.5	112	243	382
Lead	µg/L	-	-	<0.2	<0.2	<0.2	<0.2	0.64	<0.2	<0.2	1.06	0.79	0.48	0.7	<0.2	<0.2	0.58	0.75
Lithium	µg/L	-	-	<2	<2	-	-	<2	-	-	5.4	-	-	<2	-	-	<2	<2

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-01	MW21-01	MW21-01	MW21-01	MW21-02	MW21-02	MW21-02	MW21-03	MW21-03	MW21-03	MW21-04	MW21-04	MW21-04	MW21-05	MW21-05
Laboratory Work Order				C108616	G158471	C195403	C219928	C109869	C195403	C219928	C108616	C195403	C219928	C115037	C195403	C219928	C108616	G158471
Laboratory Sample ID				ZH4427	AAS380	AME213	AQS045	ZI0904	AME214	AQS039	ZH4428	AME215	AQS040	ZL3483	AME216	AQS046	ZH4429	AAS381
Sample Date				09-Feb-21	28-Jun-21	30-Nov-21	28-Mar-22	09-Feb-21	30-Nov-21	28-Mar-22	09-Feb-21	30-Nov-21	28-Mar-22	08-Mar-21	30-Nov-21	28-Mar-22	09-Feb-21	28-Jun-21
Magnesium	mg/L	-	-	0.272	0.682	0.126	0.209	3.09	0.393	0.907	1.89	0.319	1.36	1.41	0.676	0.858	2.15	3.33
Manganese	µg/L	-	-	3.1	1.9	<1	<1	212	3.9	2.8	79.1	12.3	10.4	41.5	1.5	11.8	40.7	27.1
Mercury	µg/L	-	-	0.0021	<0.0019	0.0048	0.0042	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	0.0031	<0.0019	<0.0019
Molybdenum	µg/L	-	-	1.7	4.1	<1	1.6	8	<1	1.3	10.7	<1	11.3	1.1	<1	<1	7.1	8.8
Nickel	µg/L	-	-	<1	<1	<1	<1	1.7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Potassium	mg/L	-	-	0.172	0.29	0.112	0.15	2.96	1.01	1.71	0.838	0.705	0.47	1.7	0.613	0.699	2.55	4.46
Selenium	µg/L	-	-	<0.1	<0.1	0.14	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.12	0.37
Silicon	µg/L	-	-	2,100	3230	1,260	1610	5,450	766	1890	6,500	2,100	4750	3,720	2,920	2770	3,930	8020
Silver	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.029	<0.02	<0.02	0.072	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	0.903	1.56	0.505	0.718	13.4	1.32	3.77	6.53	0.782	4.6	1.74	1.43	1.63	7.03	10.5
Strontium	µg/L	-	-	10	15.7	5	8.4	238	64.3	122	71.1	31	56.6	80.9	61.7	51.9	192	318
Sulfur	mg/L	-	-	<3	<3	<3	<3	5.8	<3	<3	3.1	<3	<3	<3	<3	<3	3.9	6.5
Thallium	µg/L	-	-	<0.01	<0.01	-	-	0.02	-	-	0.015	-	-	0.019	-	-	0.014	0.027
Tin	µg/L	-	-	<5	<5	-	-	<5	-	-	<5	-	-	<5	-	-	<5	<5
Titanium	µg/L	-	-	<5	<5	-	-	18.5	-	-	18.3	-	-	29.7	-	-	7.6	14.1
Uranium	µg/L	-	-	0.38	0.32	0.22	0.31	4.4	0.56	1.54	4.27	0.55	4.44	0.32	0.12	0.15	2.76	5.83
Vanadium	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc	µg/L	-	-	8.8	<5	<5	<5	18.1	<5	8.6	8.4	<5	<5	6.9	<5	<5	<5	<5
Zirconium	µg/L	-	-	0.12	<0.1	-	-	0.48	-	-	0.54	-	-	<0.1	-	-	0.19	1.05

Notes:

Shaded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect freshwater aquatic life.

Bolded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect marine and estuarine aquatic life.

Values preceded by < indicate a detection limit. Detection limits were screened against BC CSR standards using their full value.

1: BC CSR standard is calculated based on mean water hardness calculated from 'dissolved' mineral content – Hardness, mg equivalent CaCO3/L. Hardness is for the aquatic receiving environment.

2: The BC CSR standard for nitrite is calculated based on chloride concentration.

3: The BC CSR standard for hexavalent chromium (Cr(IV)) is conservatively applied to dissolved chromium.

4: BC CSR standard is applicable at all sites, irrespective of water use.

5: EPHw10-19 – Extractable Petroleum Hydrocarbons (nC10-nC19) in water includes all the extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods, where approved methods are specified by a

6: VHw6-10 – Volatile Hydrocarbons (nC6-nC10) in water are hydrocarbons that elute between n-hexane and n-decane obtained by approved methods, where approved methods are specified by a director's protocol.

7: LEPHw – Light Extractable Petroleum Hydrocarbons in water, is the sum of extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods minus the sum of napthalene and phenanthrene, where approved methods are specified by a director's protocol.

8: VPHw – Volatile Petroleum Hydrocarbons in water includes the sum of volatile hydrocarbons with a carbon range from 6 to 10 (VHw6-10) obtained by approved methods minus the sum of benzene, ethylbenzene, styrene, toluene and xylenes, where approved methods are specified by a director's protocol.

Appendix 3.7-1: Groundwater Quality Results

Sample ID		BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	MW21-05	MW21-05	MW21-06	MW21-06	MW21-06	MW21-06	MW21-07D	MW21-07D	MW21-07S	MW21-07S	MW21-07S	MW21-07S	MW21-08	MW21-08	MW21-08
Laboratory Work Order				C195403	C219928	C108616	G158471	C195403	C219928	C195403	C219928	C109104	G158471	C195403	C219928	G158471	C195403	C219928
Laboratory Sample ID				AME217	AQS041	ZH4430	AAS382	AME218	AQS047	AME220	AQS043	ZH7251	AAS383	AME219	AQS042	AAX017	AME222	AQS048
Sample Date				30-Nov-21	28-Mar-22	09-Feb-21	28-Jun-21	30-Nov-21	28-Mar-22	30-Nov-21	28-Mar-22	10-Feb-21	28-Jun-21	30-Nov-21	28-Mar-22	28-Jun-21	30-Nov-21	28-Mar-22
Physical Parameters and Anions																		
Alkalinity, Total (as CaCO3)	mg/L	-	-	66	81	82	120	100	61	99	130	170	250	62	130	-	130	110
Chloride	mg/L	1,500	-	<1	<1	1.5	<1	<1	<1	5.3	8.1	12	13	<1	2	-	5.1	3.6
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity, Lab	µS/cm	-	-	130	170	190	240	210	130	600	300	680	830	160	410	-	250	250
Fluoride[1]	mg/L	2 - 3[1]	15	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	0.092	-	-	<0.05	<0.05	-	0.19	<0.05
Hardness (as CaCO3), Dissolved	mg/L	-	-	52.7	62.1	83.9	81.7	92.3	62.2	204	24.1	28.8	39.7	81.7	62.3	-	75.2	56.7
Hardness (as CaCO3), Total	mg/L	-	-	57	83.5	84.5	84.5	98	66.5	218	24.8	30.9	54.7	85.7	69	-	78.5	58.3
Nitrate (as N)	mg/L	400	400	0.136	0.179	0.612	0.393	0.556	0.308	0.167	0.046	0.15	0.4	0.035	0.326	-	0.299	0.551
Nitrite (as N)[2]	mg/L	0.2 - 2[2]	0.2 - 2[2]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.505	**3.32**	0.0618	0.135	-	0.0646	0.0226
pH, lab	S.U.	-	-	6.99	7.37	7.52	7.55	7.13	6.99	11.3	8.59	10.6	10.7	10.1	11	-	10.1	10.1
Sulfate[1]	mg/L	1,280 - 4,290[1]	1,280 - 4,290[1]	6.1	7.7 MSP	7.2	7.1	8.5	5.8	6.8	14	110	89	4.7	9.8	-	9.3	9.7
Total Dissolved Solids (TDS)	mg/L	-	-	120	160	97	110	130	86	690	160	360	420	240	270	-	180	130
Turbidity, Lab	NTU	-	-	160	120	-	-	0.67	0.36	0.57	0.17	-	-	0.31	0.64	-	2.6	0.46
Microbiological Parameters																		
Escherichia coli (E.Coli)	cfu/100mL	-	-	0	<2	-	-	0	0	0	0	-	-	0	0	-	0	0
Total Coliforms	cfu/100mL	-	-	920	370	-	-	24	3	10	1	-	-	34	1	-	2	2
Volatile Organic Compounds (VOCs)																		
Benzene	µg/L	400	1,000	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4
Toluene	µg/L	5	2,000	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4
Ethylbenzene	µg/L	2,000	2,500	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4
Xylenes, Total	µg/L	300	300	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4
Methyl tert-butyl ether (MTBE)	µg/L	34,000	4,400	<4	<4	-	-	<4	<4	<4	<4	-	-	<4	<4	<4	<4	<4
Styrene	µg/L	720	720	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4
Petroleum Hydrocarbons																		
VH (C6-C10)[4,6]	µg/L	15,000[4,6]	15,000[4,6]	<300	<300	-	-	<300	<300	<300	<300	-	-	<300	<300	<300	<300	<300
VPH (C6-C10 Minus BTEX)	µg/L	1,500[8]	1,500[8]	<300	<300	-	-	<300	<300	<300	<300	-	-	<300	<300	<300	<300	<300
EPH C10-C19[4,5]	mg/L	5[4,5]	5[4,5]	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	-
EPH C19-C32	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.31	<0.2	<0.2	-	<0.2	-
LEPH (C10-C19 less PAH)[7]	mg/L	0.5	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	-
HEPH (C19-C32 less PAH)	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.31	<0.2	<0.2	-	<0.2	-
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	µg/L	60	60	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.055	<0.05	<0.05	-	0.088	-
Acenaphthylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	-
Acridine	µg/L	0.5	0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	-
Anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	-
Benzo(a)anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.028	<0.01	<0.01	-	<0.01	-
Benzo(a)pyrene	µg/L	0.1	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.03	<0.005	<0.005	-	<0.005	-
Benzo(b)pyridine (Quinoline)	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.04	<0.08	<0.02	<0.02	-	0.022	-
Benzo(b/j)fluoranthene	µg/L	-	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	-	<0.03	-
Benzo(g,h,i)perylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	-
Benzo(k)fluoranthene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	-
Chrysene	µg/L	1	1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.065	<0.02	<0.02	-	<0.02	-
Dibenzo(a,h)anthracene	µg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0069	<0.003	<0.003	-	<0.003	-
Fluoranthene	µg/L	2	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.058	<0.02	<0.02	-	0.023	-
Fluorene	µg/L	120	120	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	-
Indeno(1,2,3-cd)pyrene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	-
Methylnaphthalene, 1-	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.12	0.066	<0.05	<0.05	-	<0.05	-
Methylnaphthalene, 2-	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
Naphthalene	µg/L	10	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
Phenanthrene	µg/L	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.051	0.059	<0.05	<0.05	-	0.06	-
Pyrene	µg/L	0.2	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.085	<0.02	<0.02	-	<0.02	-
Dioxins and Furans																		

Appendix 3.7-1: Groundwater Quality Results

Sample ID		BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	MW21-05	MW21-05	MW21-06	MW21-06	MW21-06	MW21-06	MW21-07D	MW21-07D	MW21-07S	MW21-07S	MW21-07S	MW21-07S	MW21-08	MW21-08	MW21-08
Laboratory Work Order				C195403	C219928	C108616	G158471	C195403	C219928	C195403	C219928	C109104	G158471	C195403	C219928	G158471	C195403	C219928
Laboratory Sample ID				AME217	AQS041	ZH4430	AAS382	AME218	AQS047	AME220	AQS043	ZH7251	AAS383	AME219	AQS042	AAX017	AME222	AQS048
Sample Date				30-Nov-21	28-Mar-22	09-Feb-21	28-Jun-21	30-Nov-21	28-Mar-22	30-Nov-21	28-Mar-22	10-Feb-21	28-Jun-21	30-Nov-21	28-Mar-22	28-Jun-21	30-Nov-21	28-Mar-22
Lower Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																		
Aluminum	µg/L	-	-	1,550	<3	11.3	4.8	5.2	6.3	5,680	142	2,940	3510	1,370	2090	-	811	1620
Antimony	µg/L	90	2,500	<0.5	0.74	<0.5	<0.5	0.72	<0.5	1.11	<0.5	43.6	31.8	2.46	7.64	-	2.07	1.68
Arsenic	µg/L	50	125	0.59	0.46	<0.1	<0.1	<0.1	<0.1	0.63	3.61	28.3	24.8	3.49	6.35	-	5.29	2.63
Barium	µg/L	10,000	5,000	23.3	17.3	31.1	33.8	36.4	20.6	36.6	<1	2.9	3.5	3.2	2.5	-	5.1	13
Beryllium	µg/L	1.5	1,000	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1
Bismuth	µg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1
Boron	µg/L	12,000	12,000	<50	<50	<50	<50	57	<50	<50	83	107	104	<50	<50	-	53	107
Cadmium[1]	µg/L	0.5 - 4[1]	15	0.012	<0.01	<0.01	<0.01	0.012	0.018	<0.01	<0.01	0.017	<0.01	<0.01	<0.01	-	<0.01	<0.01
Calcium	mg/L	-	-	18.2	22.4	30.8	29.7	34.2	23.2	81.5	6.53	11.5	15.9	32.7	24.9	-	29.8	22.1
Chromium[3]	µg/L	10[3]	15[3]	<1	<1	<1	<1	<1	<1	**22**	<1	**25**	**29**	4.4	11.5	-	4.8	5.3
Cobalt	µg/L	40	40	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2.35	<0.2	1.47	1.99	0.4	0.42	-	0.39	0.72
Copper[1]	µg/L	20 - 90[1]	20	0.86	1.09	0.32	0.4	0.4	0.34	9.82	0.37	**29.6**	**32**	3.22	4.9	-	2.04	4.42
Iron	µg/L	-	-	575	<5	<5	<5	<5	<5	15.2	<5	62.3	31.3	<5	5.1	-	<5	5.7
Lead[1]	µg/L	40 - 160[1]	20	1.14	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.84	1.07	<0.2	<0.2	-	<0.2	<0.2
Lithium	µg/L	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	<2	<2
Magnesium	mg/L	-	-	1.78	1.48	1.72	1.85	1.68	1.02	<0.05	1.9	<0.05	<0.05	<0.05	<0.05	-	0.208	0.396
Manganese	µg/L	-	-	7.2	1.7	18.7	10.2	1.4	<1	<1	34.3	1.6	2.9	<1	<1	-	<1	<1
Mercury	µg/L	0.25	0.25	-	<0.0019	<0.0019	<0.0019	-	<0.0019	-	<0.0019	0.004	0.0083	-	<0.0019	-	-	<0.0019
Molybdenum	µg/L	10,000	10,000	2.4	4.8	6.3	6.6	5.8	6.1	15.4	10.7	101	49.5	1.8	6.5	-	10.4	17.4
Nickel[1]	µg/L	250 - 1,500[1]	83	<1	<1	<1	<1	<1	<1	1	<1	3.3	3.6	<1	<1	-	<1	<1
Potassium	mg/L	-	-	0.608	0.882	1.1	1.25	1.48	0.83	13.2	1.28	6.32	9.75	3.3	4.08	-	4.25	5.34
Selenium	µg/L	20	20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.28	<0.1	5.17	3.39	0.12	0.37	-	0.15	0.13
Silicon	µg/L	-	-	6,460	1780	2,400	2500	2,060	1940	2,210	1510	7,520	12200	6,920	11500	-	4,190	3010
Silver[1]	µg/L	0.5 - 15[1]	15	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02
Sodium	mg/L	-	-	10.7	13.9	3.06	3.07	3.48	2.21	46.1	57.4	116	120	19.7	35.2	-	22.8	30.5
Strontium	µg/L	-	-	66.8	75.3	104	106	116	80.1	929	26.3	38	66.2	179	112	-	192	231
Sulfur	mg/L	-	-	<3	<3	<3	<3	<3	<3	<3	4.8	36.5	22.4	<3	<3	-	<3	3.1
Thallium	µg/L	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01
Tin	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<5
Titanium	µg/L	1,000	1,000	22.3	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<5
Uranium	µg/L	85	85	2.1	1.67	0.24	0.21	0.56	0.25	0.21	23.6	0.83	0.46	<0.1	<0.1	-	0.96	2.64
Vanadium	µg/L	-	-	<5	<5	<5	<5	<5	<5	7.4	<5	73.4	67.7	<5	16.7	-	8.1	8.5
Zinc[1]	µg/L	75 - 2,400[1]	100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<5
Zirconium	µg/L	-	-	2.12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.12	<0.1	<0.1	<0.1	-	<0.1	<0.1
Total Metals																		
Aluminum	µg/L	-	-	2,300	846	87.9	67	28.6	48.3	6,240	159	3,480	6180	1,550	2230	-	911	1690
Antimony	µg/L	-	-	<0.5	0.73	<0.5	<0.5	0.77	<0.5	1.17	<0.5	42.1	31.5	2.73	6.49	-	2.25	1.69
Arsenic	µg/L	-	-	0.67	1.29	0.12	<0.1	<0.1	<0.1	0.66	3.54	25.8	27.7	3.99	6.16	-	6.18	2.66
Barium	µg/L	-	-	28.4	51.8	31.8	34.2	39.5	22	39.5	<1	6.1	22.4	3.6	3	-	6.2	13.1
Beryllium	µg/L	-	-	-	-	<0.1	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-	-
Bismuth	µg/L	-	-	-	-	<1	<1	-	-	-	-	<1	<1	-	-	-	-	-
Boron	µg/L	-	-	<50	<50	<50	<50	57	<50	<50	81	103	97	<50	<50	-	56	105
Cadmium	µg/L	-	-	0.01	0.029	0.012	<0.01	0.012	<0.01	<0.01	<0.01	0.032	0.079	<0.01	<0.01	-	<0.01	<0.01
Calcium	mg/L	-	-	19.5	29.8	31	30.8	36.2	24.8	87.5	6.7	12.2	21.2	34.3	27.6	-	31	22.6
Chromium	µg/L	-	-	<1	<1	<1	<1	<1	<1	22.2	<1	26.2	29.4	4.5	11.7	-	4.7	5.3
Cobalt	µg/L	-	-	<0.2	0.39	<0.2	<0.2	<0.2	<0.2	2.27	<0.2	1.65	2.29	0.33	0.42	-	0.32	0.75
Copper	µg/L	-	-	0.92	4.53	<0.5	<0.5	0.4	0.42	9.55	0.79	32.6	42.9	3.25	5.09	-	2.11	5.08
Iron	µg/L	-	-	679	840	57	56	10.5	30.6	20.5	10.7	302	1480	20.2	18	-	40.1	14.1
Lead	µg/L	-	-	1.37	8.96	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	8.59	56.9	0.47	0.5	-	0.24	<0.2
Lithium	µg/L	-	-	-	-	<2	<2	-	-	-	-	<2	<2	-	-	-	-	-

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-05	MW21-05	MW21-06	MW21-06	MW21-06	MW21-06	MW21-07D	MW21-07D	MW21-07S	MW21-07S	MW21-07S	MW21-07S	MW21-08	MW21-08	MW21-08
Laboratory Work Order				C195403	C219928	C108616	G158471	C195403	C219928	C195403	C219928	C109104	G158471	C195403	C219928	G158471	C195403	C219928
Laboratory Sample ID				AME217	AQS041	ZH4430	AAS382	AME218	AQS047	AME220	AQS043	ZH7251	AAS383	AME219	AQS042	AAX017	AME222	AQS048
Sample Date				30-Nov-21	28-Mar-22	09-Feb-21	28-Jun-21	30-Nov-21	28-Mar-22	30-Nov-21	28-Mar-22	10-Feb-21	28-Jun-21	30-Nov-21	28-Mar-22	28-Jun-21	30-Nov-21	28-Mar-22
Magnesium	mg/L	-	-	1.98	2.21	1.73	1.87	1.82	1.14	<0.05	1.95	0.081	0.447	<0.05	<0.05	-	0.269	0.427
Manganese	µg/L	-	-	8.5	22.3	20.5	11.6	1.8	2.5	<1	64.2	11.8	70.1	<1	5.4	-	1.8	<1
Mercury	µg/L	-	-	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	0.0067	0.0245	<0.0019	0.0021	-	<0.0019	<0.0019
Molybdenum	µg/L	-	-	2.6	2.8	6.5	6.9	5.9	6.5	15.5	10.8	92	58.1	1.9	6.2	-	11.8	17.5
Nickel	µg/L	-	-	<1	<1	<1	<1	<1	<1	1	<1	3.8	5.4	<1	<1	-	<1	<1
Potassium	mg/L	-	-	0.714	1.43	1.12	1.27	1.52	0.867	13.9	1.34	5.96	9.79	3.44	4.12	-	4.56	5.43
Selenium	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.26	<0.1	5.03	4.08	0.13	0.34	-	0.16	0.15
Silicon	µg/L	-	-	8,350	2430	2,400	2520	2,380	1900	2,530	1450	8,220	15100	8,060	11100	-	4,630	2870
Silver	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	0.027	<0.02	<0.02	<0.02	0.076	<0.02	<0.02	-	<0.02	<0.02
Sodium	mg/L	-	-	11.3	15.4	3.15	3.19	3.51	2.23	46.6	58.4	116	128	21.2	36.1	-	25	31
Strontium	µg/L	-	-	78.7	102	108	109	128	82.1	1,040	26.8	37.8	86.7	193	132	-	210	232
Sulfur	mg/L	-	-	<3	<3	<3	<3	<3	<3	<3	5	36.4	25.7	<3	3.2	-	<3	3.5
Thallium	µg/L	-	-	-	-	<0.01	<0.01	-	-	-	-	<0.01	0.022	-	-	-	-	-
Tin	µg/L	-	-	-	-	<5	<5	-	-	-	-	<5	<5	-	-	-	-	-
Titanium	µg/L	-	-	-	-	<5	<5	-	-	-	-	17.1	94.8	-	-	-	-	-
Uranium	µg/L	-	-	2.37	4.97	0.25	0.24	0.58	0.25	0.23	23.8	1.11	2.46	<0.1	<0.1	-	1.18	2.63
Vanadium	µg/L	-	-	<5	<5	<5	<5	<5	<5	6.8	<5	71.9	68.4	5	14.9	-	8.3	8.6
Zinc	µg/L	-	-	<5	13.9	<5	<5	<5	<5	<5	<5	6.1	24.7	<5	6.4	-	<5	<5
Zirconium	µg/L	-	-	-	-	<0.1	<0.1	-	-	-	-	0.13	0.89	-	-	-	-	-

Notes:

Shaded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect freshwater aquatic life.

Bolded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect marine and estuarine aquatic life.

Values preceded by < indicate a detection limit. Detection limits were screened against BC CSR standards using their full value.

1: BC CSR standard is calculated based on mean water hardness calculated from 'dissolved' mineral content – Hardness, mg equivalent CaCO3/L. Hardness is for the aquatic receiving environment.

2: The BC CSR standard for nitrite is calculated based on chloride concentration.

3: The BC CSR standard for hexavalent chromium (Cr(IV)) is conservatively applied to dissolved chromium.

4: BC CSR standard is applicable at all sites, irrespective of water use.

5: EPHw10-19 – Extractable Petroleum Hydrocarbons (nC10-nC19) in water includes all the extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods, where approved methods are specified by a

6: VHw6-10 – Volatile Hydrocarbons (nC6-nC10) in water are hydrocarbons that elute between n-hexane and n-decane obtained by approved methods, where approved methods are specified by a director's protocol.

7: LEPHw – Light Extractable Petroleum Hydrocarbons in water, is the sum of extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods minus the sum of napthalene and phenanthrene, where approved methods are specified by a director's protocol.

8: VPHw – Volatile Petroleum Hydrocarbons in water includes the sum of volatile hydrocarbons with a carbon range from 6 to 10 (VHw6-10) obtained by approved methods minus the sum of benzene, ethylbenzene, styrene, toluene and xylenes, where approved methods are specified by a director's protocol.

Appendix 3.7-1: Groundwater Quality Results

Sample ID		BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	MW21-11	MW21-11	MW21-11	MW21-11	MW21-12D	MW21-12D	MW21-12S	MW21-12S	MW21-12S	MW21-12S	MW21-13	MW21-13	MW21-13	MW21-13	MW21-14
Laboratory Work Order				C115416	G158471	C195403	C219928	C195731	C220320	C109104	C146592	C195731	C220320	C109104	C146592	C195731	C219928	C109104
Laboratory Sample ID				ZL5417	AAS385	AME226	AQS102	AMF728	AQU083	ZH7247	AAZ308	AMF729	AQU082	ZH7249	AAZ310	AMF735	AQS044	ZH7248
Sample Date				09-Mar-21	28-Jun-21	30-Nov-21	28-Mar-22	01-Dec-21	29-Mar-22	10-Feb-21	30-Jun-21	01-Dec-21	29-Mar-22	10-Feb-21	30-Jun-21	01-Dec-21	28-Mar-22	10-Feb-21
Physical Parameters and Anions																		
Alkalinity, Total (as CaCO3)	mg/L	-	-	240	130	-	160	71	67	70	79	85	56	120	130	53	35	46
Chloride	mg/L	1,500	-	5	9.6	<1	2.3	<1	1.5	<1	<1	<1	<1	23	3.4	7.3	<1	1.6
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity, Lab	µS/cm	-	-	910	570	160	600	160	160	150	-	180	130	320	270	110	71	110
Fluoride[1]	mg/L	2 - 3[1]	15	-	-	<0.05	<0.05	0.051	0.054	-	-	<0.05	<0.05	-	-	<0.05	<0.05	-
Hardness (as CaCO3), Dissolved	mg/L	-	-	217	144	27	171	72.6	67.8	69.2	75.4	81.8	56.3	109	119	31.8	16.7	46.4
Hardness (as CaCO3), Total	mg/L	-	-	229	244	87.5	179	66.3	67.8	65.5	74	83.9	55.3	101	73.3	33.4	18.4	47.3
Nitrate (as N)	mg/L	400	400	0.221	1.79	0.031	0.194	0.842	0.508	0.371	0.085	0.516	0.346	0.092	0.288	0.103	0.119	0.518
Nitrite (as N)[2]	mg/L	0.2 - 2[2]	0.2 - 2[2]	0.0403	0.601	0.0084	0.0392	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pH, lab	S.U.	-	-	11.5	11.1	10.5	11.4	7.24	7.62	7.47	-	7.34	7.56	7.58	7.46	7.32	6.99	7.22
Sulfate[1]	mg/L	1,280 - 4,290[1]	1,280 - 4,290[1]	7.9	11	4.1	6.9	7.3	12	5.5	7.4	6.8	5.7	6.1	2.2	17	2.3	3.7
Total Dissolved Solids (TDS)	mg/L	-	-	270	210	98	400	110	120	79	89	100	84	180	140	64	58	56
Turbidity, Lab	NTU	-	-	-	-	3.1	15	<0.1	1	-	-	<0.1	2	-	-	1	0.63	-
Microbiological Parameters																		
Escherichia coli (E.Coli)	cfu/100mL	-	-	-	-	0	0	0	0	-	-	0	0	-	-	0	0	-
Total Coliforms	cfu/100mL	-	-	-	-	17	2	0	2	-	-	5	7	-	-	9	13	-
Volatile Organic Compounds (VOCs)																		
Benzene	µg/L	400	1,000	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-
Toluene	µg/L	5	2,000	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-
Ethylbenzene	µg/L	2,000	2,500	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-
Xylenes, Total	µg/L	300	300	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-
Methyl tert-butyl ether (MTBE)	µg/L	34,000	4,400	-	-	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	-
Styrene	µg/L	720	720	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	-
Petroleum Hydrocarbons																		
VH (C6-C10)[4,6]	µg/L	15,000[4,6]	15,000[4,6]	-	-	<300	<300	-	<300	<300	<300	-	<300	<300	<300	-	<300	-
VPH (C6-C10 Minus BTEX)	µg/L	1,500[8]	1,500[8]	-	-	<300	<300	-	<300	<300	<300	-	<300	<300	<300	-	<300	-
EPH C10-C19[4,5]	mg/L	5[4,5]	5[4,5]	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
EPH C19-C32	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
LEPH (C10-C19 less PAH)[7]	mg/L	0.5	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
HEPH (C19-C32 less PAH)	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	µg/L	60	60	<0.05	0.073	0.11	0.14	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acridine	µg/L	0.5	0.5	<0.05	0.087	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	µg/L	0.1	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(b)pyridine (Quinoline)	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(b/j)fluoranthene	µg/L	-	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(g,h,i)perylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	1	1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fluoranthene	µg/L	2	2	<0.02	0.15	0.3	0.25	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluorene	µg/L	120	120	<0.05	0.068	0.062	0.054	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 1-	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 2-	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	µg/L	10	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	3	3	<0.05	<0.05	0.059	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	0.2	0.2	<0.02	0.077	0.16	0.13	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dioxins and Furans																		

Appendix 3.7-1: Groundwater Quality Results

Sample ID		BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	MW21-11	MW21-11	MW21-11	MW21-11	MW21-12D	MW21-12D	MW21-12S	MW21-12S	MW21-12S	MW21-12S	MW21-13	MW21-13	MW21-13	MW21-13	MW21-14
Laboratory Work Order				C115416	G158471	C195403	C219928	C195731	C220320	C109104	C146592	C195731	C220320	C109104	C146592	C195731	C219928	C109104
Laboratory Sample ID				ZL5417	AAS385	AME226	AQS102	AMF728	AQU083	ZH7247	AAZ308	AMF729	AQU082	ZH7249	AAZ310	AMF735	AQS044	ZH7248
Sample Date				09-Mar-21	28-Jun-21	30-Nov-21	28-Mar-22	01-Dec-21	29-Mar-22	10-Feb-21	30-Jun-21	01-Dec-21	29-Mar-22	10-Feb-21	30-Jun-21	01-Dec-21	28-Mar-22	10-Feb-21
Lower Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																		
Aluminum	µg/L	-	-	4600	6220	1,650	2600	3.8	3.9	4.2	4.9	5.7	4.9	4.7	7.1	6.5	17.7	19.7
Antimony	µg/L	90	2,500	1.89	2.92	3.94	3.34	<0.5	<0.5	0.66	<0.5	<0.5	<0.5	0.65	0.65	0.54	0.66	<0.5
Arsenic	µg/L	50	125	2.42	3.63	1.31	1.89	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.13	<0.1	<0.1	<0.1	<0.1
Barium	µg/L	10,000	5,000	6.8	7.1	8.6	7.8	19.6	19.8	23.1	24.8	27.4	19.2	31.9	28.4	5.4	4.2	21.9
Beryllium	µg/L	1.5	1,000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	µg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Boron	µg/L	12,000	12,000	<50	66	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium[1]	µg/L	0.5 - 4[1]	15	0.021	<0.01	<0.01	<0.01	0.012	<0.01	0.013	<0.01	<0.01	<0.01	0.013	<0.01	<0.01	<0.01	<0.01
Calcium	mg/L	-	-	87	57.5	7.87	68.5	26.7	25	24.9	28.6	31	21.3	40.4	44	12.1	5.94	17.5
Chromium[3]	µg/L	10[3]	15[3]	**17.4**	**28**	5.2	13.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	40	40	0.93	2.56	0.32	0.54	<0.2	0.34	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Copper[1]	µg/L	20 - 90[1]	20	8.75	14.6	1.36	3.16	0.3	0.3	0.34	0.34	0.4	0.38	0.32	0.21	0.23	0.52	2.21
Iron	µg/L	-	-	19.9	14.8	<5	8.3	<5	<5	<5	<5	<5	<5	<5	<5	<5	8.2	<5
Lead[1]	µg/L	40 - 160[1]	20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lithium	µg/L	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Magnesium	mg/L	-	-	<0.05	<0.05	1.79	<0.05	1.43	1.3	0.803	0.957	1.05	0.766	1.96	2.17	0.411	0.45	0.628
Manganese	µg/L	-	-	<1	<1	<1	<1	<1	<1	21.2	3.2	<1	<1	12.4	2.6	<1	<1	5.7
Mercury	µg/L	0.25	0.25	<0.0019	0.0184	-	<0.0019	-	<0.0019	<0.0019	<0.0019	-	<0.0019	<0.0019	<0.0019	-	<0.0019	<0.0019
Molybdenum	µg/L	10,000	10,000	12.4	20.9	2	6.9	12.2	8.1	6.9	8.8	8.2	5.1	2.2	1.2	1.7	2.3	3.9
Nickel[1]	µg/L	250 - 1,500[1]	83	<1	1.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Potassium	mg/L	-	-	3.85	6.3	1.89	2.2	0.942	0.884	0.989	1.05	1.05	0.766	2.57	1.87	0.58	0.648	0.767
Selenium	µg/L	20	20	0.47	1	<0.1	0.17	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silicon	µg/L	-	-	3410	4600	5,120	6210	3,570	3510	1,890	2280	2,720	2230	1,080	1290	569	473	2,390
Silver[1]	µg/L	0.5 - 15[1]	15	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	16.7	30.2	45.1	6.14	4.84	3.69	2.76	2.87	2.97	2.27	27.5	4.17	1.67	8.18	1.93
Strontium	µg/L	-	-	442	337	194	273	114	102	92.4	107	124	76.7	90.2	80.7	22.2	12.4	85.5
Sulfur	mg/L	-	-	<3	3.7	4.6	<3	<3	3.4	<3	<3	<3	<3	<3	<3	<3	<3	<3
Thallium	µg/L	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.014	0.012	<0.01	<0.01	<0.01
Tin	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Titanium	µg/L	1,000	1,000	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Uranium	µg/L	85	85	<0.1	<0.1	<0.1	<0.1	13.6	9.35	0.2	0.81	0.8	0.34	0.56	0.29	<0.1	<0.1	0.37
Vanadium	µg/L	-	-	6.6	16.3	<5	5.2	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc[1]	µg/L	75 - 2,400[1]	100	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zirconium	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Metals																		
Aluminum	µg/L	-	-	9600	42100	1,570	3070	9.9	70.4	137	176	88.3	173	5,630	187	48.9	53	259
Antimony	µg/L	-	-	1.98	2.9	2.73	3.36	<0.5	<0.5	0.67	<0.5	<0.5	<0.5	0.62	0.64	0.62	0.65	<0.5
Arsenic	µg/L	-	-	4.57	13.5	3.97	2.04	<0.1	<0.1	0.13	<0.1	<0.1	<0.1	1.16	<0.1	<0.1	<0.1	0.14
Barium	µg/L	-	-	37	253	3.7	12.3	25.6	20	24.6	24.1	28.6	19.5	38.2	28.9	5.6	4.3	21.3
Beryllium	µg/L	-	-	<0.1	0.59	-	-	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	<0.1
Bismuth	µg/L	-	-	<1	<2	-	-	-	-	<1	<1	-	-	<1	<1	-	-	<1
Boron	µg/L	-	-	<50	<100	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cadmium	µg/L	-	-	0.068	0.448	<0.01	<0.01	<0.01	0.011	0.014	<0.01	<0.01	<0.01	0.024	<0.01	<0.01	<0.01	0.02
Calcium	mg/L	-	-	90.4	89.8	35.1	71.5	24.6	25	26.3	28.1	31.9	20.9	36.1	45.9	12.7	6.57	17.8
Chromium	µg/L	-	-	19.5	41.9	4.5	13.9	<1	<1	<1	<1	<1	<1	2.2	<1	<1	<1	<1
Cobalt	µg/L	-	-	2.3	12.3	0.33	0.7	0.22	0.38	<0.2	<0.2	<0.2	<0.2	0.73	<0.2	<0.2	<0.2	<0.2
Copper	µg/L	-	-	14.9	66.2	3.24	4.26	0.44	0.38	0.79	<0.5	0.43	0.48	2.68	<0.5	<0.2	0.36	0.93
Iron	µg/L	-	-	2920	17200	20.5	265	<5	81.2	90	83	16.6	49.1	2,140	79	9.6	19.9	187
Lead	µg/L	-	-	1.64	12	0.58	0.22	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	1.16	<0.2	<0.2	<0.2	<0.2
Lithium	µg/L	-	-	3.1	18.2	-	-	-	-	<2	<2	-	-	<2	<2	-	-	<2

Appendix 3.7-1: Groundwater Quality Results

Sample ID		BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	MW21-11	MW21-11	MW21-11	MW21-11	MW21-12D	MW21-12D	MW21-12S	MW21-12S	MW21-12S	MW21-12S	MW21-13	MW21-13	MW21-13	MW21-13	MW21-14
Laboratory Work Order				C115416	G158471	C195403	C219928	C195731	C220320	C109104	C146592	C195731	C220320	C109104	C146592	C195731	C219928	C109104
Laboratory Sample ID				ZL5417	AAS385	AME226	AQS102	AMF728	AQU083	ZH7247	AAZ308	AMF729	AQU082	ZH7249	AAZ310	AMF735	AQS044	ZH7248
Sample Date				09-Mar-21	28-Jun-21	30-Nov-21	28-Mar-22	01-Dec-21	29-Mar-22	10-Feb-21	30-Jun-21	01-Dec-21	29-Mar-22	10-Feb-21	30-Jun-21	01-Dec-21	28-Mar-22	10-Feb-21
Magnesium	mg/L	-	-	0.859	4.78	<0.05	0.061	1.19	1.31	0.868	0.962	1.06	0.777	2.63	2.19	0.388	0.479	0.665
Manganese	µg/L	-	-	56.7	342	1.1	5.1	<1	1.7	24.7	4.4	1.1	1.7	49.9	5.5	<1	<1	9.6
Mercury	µg/L	-	-	0.0029	0.0208	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019
Molybdenum	µg/L	-	-	13.4	16.2	1.8	6.9	8.1	8	6.6	8.2	8.2	5.1	1.9	1.2	1.5	2.3	3.7
Nickel	µg/L	-	-	2.2	12.4	<1	<1	<1	<1	<1	<1	<1	<1	1.3	<1	<1	<1	<1
Potassium	mg/L	-	-	4.37	9.21	3.45	2.26	0.966	0.866	1.02	1.05	1.07	0.787	2.35	1.86	0.604	0.702	0.759
Selenium	µg/L	-	-	0.53	0.8	0.12	0.17	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silicon	µg/L	-	-	8400	38900	8,180	6440	3,430	3330	2,020	2430	3,020	2230	4,290	1450	629	479	2,480
Silver	µg/L	-	-	0.024	0.221	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	17	30.7	21.3	6.22	3.7	3.67	2.88	2.78	2.96	2.23	22.7	4.04	1.33	7.89	2.03
Strontium	µg/L	-	-	507	577	200	278	112	99.9	87.8	104	129	76.7	74.4	79.6	23.1	13.6	78.1
Sulfur	mg/L	-	-	3.6	<6	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Thallium	µg/L	-	-	0.03	0.159	-	-	-	-	0.011	<0.01	-	-	0.033	0.014	-	-	<0.01
Tin	µg/L	-	-	<5	<10	-	-	-	-	<5	<5	-	-	<5	<5	-	-	<5
Titanium	µg/L	-	-	154	835	-	-	-	-	<5	<5	-	-	76.2	<5	-	-	5
Uranium	µg/L	-	-	1.15	11.6	<0.1	0.17	5.24	9.56	0.26	0.8	0.88	0.46	1.29	0.34	<0.1	<0.1	0.61
Vanadium	µg/L	-	-	12.9	49	5.1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc	µg/L	-	-	12.2	80	<5	<5	<5	<5	<5	<5	<5	<5	8.6	<5	<5	<5	<5
Zirconium	µg/L	-	-	1.05	4.1	-	-	-	-	<0.1	<0.1	-	-	0.12	<0.1	-	-	<0.1

Notes:

Shaded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect freshwater aquatic life.

Bolded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect marine and estuarine aquatic life.

Values preceded by < indicate a detection limit. Detection limits were screened against BC CSR standards using their full value.

1: BC CSR standard is calculated based on mean water hardness calculated from 'dissolved' mineral content – Hardness, mg equivalent CaCO3/L. Hardness is for the aquatic receiving environment.

2: The BC CSR standard for nitrite is calculated based on chloride concentration.

3: The BC CSR standard for hexavalent chromium (Cr(IV)) is conservatively applied to dissolved chromium.

4: BC CSR standard is applicable at all sites, irrespective of water use.

5: EPHw10-19 – Extractable Petroleum Hydrocarbons (nC10-nC19) in water includes all the extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods, where approved methods are specified by a

6: VHw6-10 – Volatile Hydrocarbons (nC6-nC10) in water are hydrocarbons that elute between n-hexane and n-decane obtained by approved methods, where approved methods are specified by a director's protocol.

7: LEPHw – Light Extractable Petroleum Hydrocarbons in water, is the sum of extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods minus the sum of napthalene and phenanthrene, where approved methods are specified by a director's protocol.

8: VPHw – Volatile Petroleum Hydrocarbons in water includes the sum of volatile hydrocarbons with a carbon range from 6 to 10 (VHw6-10) obtained by approved methods minus the sum of benzene, ethylbenzene, styrene, toluene and xylenes, where approved methods are specified by a director's protocol.

Appendix 3.7-1: Groundwater Quality Results

Sample ID		BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	MW21-14	MW21-14	MW21-14	MW21-15	MW21-15	MW21-15	MW21-15	MW21-16D	MW21-16D	MW21-16S	MW21-16S	MW21-16S	MW21-16S	MW21-17D	MW21-17D
Laboratory Work Order				C146592	C195731	C220320	C109104	C146592	C195731	C219928	C195731	C220320	C115421	C146116	C195731	C220320	C146592	C195731
Laboratory Sample ID				AAZ309	AMF734	AQU076	ZH7250	AAZ311	AMF730	AQS103	AMF726	AQU079		AAX016	AMF727	AQU078	AAZ313	AMF722
Sample Date				30-Jun-21	01-Dec-21	29-Mar-22	10-Feb-21	30-Jun-21	01-Dec-21	28-Mar-22	01-Dec-21	29-Mar-22	09-Mar-21	29-Jun-21	01-Dec-21	29-Mar-22	30-Jun-21	01-Dec-21
Physical Parameters and Anions																		
Alkalinity, Total (as CaCO3)	mg/L	-	-	54	60	38	80	78	81	68	55	48	56	55	60	47	-	92
Chloride	mg/L	1,500	-	<1	<1	<1	16	15	21	5.6	3.1	<10	2.3	1.5	2.7	<10	-	61
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity, Lab	µS/cm	-	-	120	130	87	240	220	260	170	150	140	180	200	190	150	-	450
Fluoride[1]	mg/L	2 - 3[1]	15	-	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	<0.05	-	-	<0.05	<0.05	-	<0.05
Hardness (as CaCO3), Dissolved	mg/L	-	-	49.7	58.6	38	76.1	74.1	68	63.8	46.1	42.8	62.7	70.5	64.5	50.9	-	84.7
Hardness (as CaCO3), Total	mg/L	-	-	49.7	60	38.8	79.4	73.3	70.2	64.1	48	44.2	65.3	69.2	68.2	52.7	-	86.1
Nitrate (as N)	mg/L	400	400	0.649	0.414	0.443	0.771	0.52	1.08	0.384	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02
Nitrite (as N)[2]	mg/L	0.2 - 2[2]	0.2 - 2[2]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005
pH, lab	S.U.	-	-	7.04	7.36	7.35	7.06	7.08	7.11	7.64	6.98	7.22	6.77	6.78	6.98	7.29	-	7.32
Sulfate[1]	mg/L	1,280 - 4,290[1]	1,280 - 4,290[1]	4.5	5.6	4	11	9.4	15	8.6	17	21	27	39	29	26	-	44
Total Dissolved Solids (TDS)	mg/L	-	-	62	84	52	120	120	150	120	100	88	100	110	130	110	-	250
Turbidity, Lab	NTU	-	-	-	0.25	<0.1	-	-	0.46	0.38	34	26	-	-	3.7	69	-	0.29
Microbiological Parameters																		
Escherichia coli (E.Coli)	cfu/100mL	-	-	-	0	0	-	-	0	0	0	0	-	-	0	0	-	0
Total Coliforms	cfu/100mL	-	-	-	0	0	-	-	0	1	100	30	-	-	5	600	-	14
Volatile Organic Compounds (VOCs)																		
Benzene	µg/L	400	1,000	-	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	-	<0.4
Toluene	µg/L	5	2,000	-	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	-	<0.4
Ethylbenzene	µg/L	2,000	2,500	-	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	-	<0.4
Xylenes, Total	µg/L	300	300	-	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	-	<0.4
Methyl tert-butyl ether (MTBE)	µg/L	34,000	4,400	-	<4	<4	-	-	<4	<4	<4	<4	-	-	<4	<4	-	<4
Styrene	µg/L	720	720	-	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	-	<0.4
Petroleum Hydrocarbons																		
VH (C6-C10)[4,6]	µg/L	15,000[4,6]	15,000[4,6]	-	-	<300	-	-	-	<300	-	<300	-	-	-	<300	-	-
VPH (C6-C10 Minus BTEX)	µg/L	1,500[8]	1,500[8]	-	-	<300	-	-	-	<300	-	<300	-	-	-	<300	-	-
EPH C10-C19[4,5]	mg/L	5[4,5]	5[4,5]	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2
EPH C19-C32	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2
LEPH (C10-C19 less PAH)[7]	mg/L	0.5	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2
HEPH (C19-C32 less PAH)	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	µg/L	60	60	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	0.061
Acenaphthylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05
Acridine	µg/L	0.5	0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05
Anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01
Benzo(a)anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01
Benzo(a)pyrene	µg/L	0.1	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005
Benzo(b)pyridine (Quinoline)	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.025
Benzo(b/j)fluoranthene	µg/L	-	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	<0.03
Benzo(g,h,i)perylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05
Benzo(k)fluoranthene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05
Chrysene	µg/L	1	1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02
Dibenzo(a,h)anthracene	µg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	<0.003
Fluoranthene	µg/L	2	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02
Fluorene	µg/L	120	120	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	0.081
Indeno(1,2,3-cd)pyrene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05
Methylnaphthalene, 1-	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05
Methylnaphthalene, 2-	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1
Naphthalene	µg/L	10	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1
Phenanthrene	µg/L	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05
Pyrene	µg/L	0.2	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02
Dioxins and Furans																		

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-14	MW21-14	MW21-14	MW21-15	MW21-15	MW21-15	MW21-15	MW21-16D	MW21-16D	MW21-16S	MW21-16S	MW21-16S	MW21-16S	MW21-17D	MW21-17D
Laboratory Work Order				C146592	C195731	C220320	C109104	C146592	C195731	C219928	C195731	C220320	C115421	C146116	C195731	C220320	C146592	C195731
Laboratory Sample ID				AAZ309	AMF734	AQU076	ZH7250	AAZ311	AMF730	AQS103	AMF726	AQU079		AAX016	AMF727	AQU078	AAZ313	AMF722
Sample Date				30-Jun-21	01-Dec-21	29-Mar-22	10-Feb-21	30-Jun-21	01-Dec-21	28-Mar-22	01-Dec-21	29-Mar-22	09-Mar-21	29-Jun-21	01-Dec-21	29-Mar-22	30-Jun-21	01-Dec-21
Lower Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.7	-
Upper Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.2	-
Dissolved Metals																		
Aluminum	µg/L	-	-	16.4	15.8	13.9	9.3	8.9	9.1	8.9	<3	5.8	8.3	9.2	9.1	6.9	-	33.8
Antimony	µg/L	90	2,500	<0.5	<0.5	<0.5	1.52	1.28	0.9	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
Arsenic	µg/L	50	125	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.29	0.13	0.18	0.22	0.14	-	0.11
Barium	µg/L	10,000	5,000	23.9	24.1	15	16.1	14.8	16.9	11.6	18	18.4	14	16.2	18.3	14.2	-	3.1
Beryllium	µg/L	1.5	1,000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1
Bismuth	µg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1
Boron	µg/L	12,000	12,000	<50	<50	<50	75	75	<50	72	<50	<50	<50	<50	<50	<50	-	69
Cadmium[1]	µg/L	0.5 - 4[1]	15	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01
Calcium	mg/L	-	-	18.6	22.3	14.4	26.3	26	23.8	22.9	16.4	15.1	22.8	25.1	23.1	18.1	-	23.7
Chromium[3]	µg/L	10[3]	15[3]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1
Cobalt	µg/L	40	40	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2
Copper[1]	µg/L	20 - 90[1]	20	0.48	0.53	0.47	0.39	0.37	0.49	0.46	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	0.93
Iron	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	79.5	4470	4210	4720	5210	4180	-	203
Lead[1]	µg/L	40 - 160[1]	20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	0.71
Lithium	µg/L	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	<2
Magnesium	mg/L	-	-	0.775	0.698	0.49	2.53	2.22	2.06	1.63	1.27	1.22	1.4	1.87	1.65	1.39	-	6.21
Manganese	µg/L	-	-	2.4	<1	<1	5.2	1.5	<1	<1	352	548	396	394	455	394	-	57
Mercury	µg/L	0.25	0.25	<0.0019	-	<0.0019	<0.0019	<0.0019	-	<0.0019	-	<0.0019	<0.0019	<0.0019	-	<0.0019	-	-
Molybdenum	µg/L	10,000	10,000	2.9	4.3	3.4	8.8	8.1	8.9	8.9	<1	<1	<1	<1	<1	<1	-	<1
Nickel[1]	µg/L	250 - 1,500[1]	83	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1
Potassium	mg/L	-	-	0.844	0.784	0.584	1.81	1.65	2.69	1.24	1.42	1.32	1.25	1.46	1.56	1.31	-	4.47
Selenium	µg/L	20	20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	0.95
Silicon	µg/L	-	-	2630	2,700	2470	1,870	1900	2,870	1790	3130	3270	3380	3870	3900	3570	-	6610
Silver[1]	µg/L	0.5 - 15[1]	15	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02
Sodium	mg/L	-	-	2.22	2.18	1.51	13.4	11.9	21	9.05	10.1	8.92	7.11	7.79	9.3	8.1	-	50.1
Strontium	µg/L	-	-	89.5	104	67.3	118	106	107	87	70	65.6	84.5	100	101	72.5	-	105
Sulfur	mg/L	-	-	<3	<3	<3	3.9	3.2	4.8	<3	5.1	4.9	8.7	12	10.8	7.4	-	15
Thallium	µg/L	3	3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01
Tin	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5
Titanium	µg/L	1,000	1,000	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5
Uranium	µg/L	85	85	0.38	0.86	0.41	0.22	0.21	0.18	0.16	<0.1	<0.1	0.12	<0.1	<0.1	<0.1	-	0.11
Vanadium	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5
Zinc[1]	µg/L	75 - 2,400[1]	100	<5	<5	<5	<5	<5	5.8	<5	16.7	<5	<5	<5	<5	<5	-	<5
Zirconium	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1
Total Metals																		
Aluminum	µg/L	-	-	183	30.6	14.1	231	50.8	15.4	14.3	66.7	25.9	185	43.9	32.5	130	-	72
Antimony	µg/L	-	-	<0.5	<0.5	<0.5	1.38	1.25	0.93	2.03	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
Arsenic	µg/L	-	-	<0.1	<0.1	<0.1	0.13	<0.1	<0.1	<0.1	0.9	0.58	0.25	0.21	0.2	0.72	-	0.14
Barium	µg/L	-	-	23.9	25.3	14.5	16.3	14.5	17.6	11.5	21	17.5	15.4	16.4	19.8	16.1	-	3.4
Beryllium	µg/L	-	-	<0.1	-	-	<0.1	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-
Bismuth	µg/L	-	-	<1	-	-	<1	<1	-	-	-	-	<1	<1	-	-	-	-
Boron	µg/L	-	-	<50	<50	<50	75	70	<50	71	<50	<50	<50	<50	<50	<50	-	68
Cadmium	µg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.025	<0.01	<0.01	<0.01	<0.01	0.011	-	<0.01
Calcium	mg/L	-	-	18.6	22.8	14.8	27.3	25.9	24.6	23.1	17.1	15.8	23.7	24.6	24.5	18.9	-	24.4
Chromium	µg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1
Cobalt	µg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2
Copper	µg/L	-	-	0.61	0.5	0.47	0.55	<0.5	0.48	0.33	0.24	<0.2	<0.5	<0.5	<0.2	0.37	-	3.1
Iron	µg/L	-	-	133	<5	<5	75	14	<5	<5	6450	6940	4360	4680	5170	14600	-	246
Lead	µg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	1.3	<0.2	<0.2	<0.2	<0.2	0.31	-	2.25
Lithium	µg/L	-	-	<2	-	-	<2	<2	-	-	-	-	<2	<2	-	-	-	-

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-14	MW21-14	MW21-14	MW21-15	MW21-15	MW21-15	MW21-15	MW21-16D	MW21-16D	MW21-16S	MW21-16S	MW21-16S	MW21-16S	MW21-17D	MW21-17D
Laboratory Work Order				C146592	C195731	C220320	C109104	C146592	C195731	C219928	C195731	C220320	C115421	C146116	C195731	C220320	C146592	C195731
Laboratory Sample ID				AAZ309	AMF734	AQU076	ZH7250	AAZ311	AMF730	AQS103	AMF726	AQU079		AAX016	AMF727	AQU078	AAZ313	AMF722
Sample Date				30-Jun-21	01-Dec-21	29-Mar-22	10-Feb-21	30-Jun-21	01-Dec-21	28-Mar-22	01-Dec-21	29-Mar-22	09-Mar-21	29-Jun-21	01-Dec-21	29-Mar-22	30-Jun-21	01-Dec-21
Magnesium	mg/L	-	-	0.791	0.722	0.473	2.74	2.1	2.13	1.58	1.29	1.17	1.51	1.89	1.73	1.37	-	6.11
Manganese	µg/L	-	-	4.4	<1	<1	6.4	1.7	<1	<1	396	542	382	411	442	396	-	56.9
Mercury	µg/L	-	-	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	0.0025	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	-	0.0038
Molybdenum	µg/L	-	-	3	4.4	3.2	8.6	7.7	8.9	8.8	<1	<1	<1	<1	<1	<1	-	<1
Nickel	µg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1
Potassium	mg/L	-	-	0.875	0.806	0.526	1.77	1.59	2.8	1.27	1.47	1.19	1.26	1.48	1.64	1.19	-	4.51
Selenium	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	0.77MSP
Silicon	µg/L	-	-	2770	2,880	2320	2,000	1930	3,070	1710	3590	3100	3590	3710	4230	3730	-	6900
Silver	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02MSP
Sodium	mg/L	-	-	2.2	2.16	1.56	15.2	11.5	21.7	9.25	10.2	8.71	7.14	8.04	9.2	7.99	-	49.3
Strontium	µg/L	-	-	91.1	109	63.5	112	105	112	86.8	76.1	62.9	92.4	102	111	72.4	-	109
Sulfur	mg/L	-	-	<3	<3	<3	<3	<3	4.9	<3	5.8	5.1	9.7	11.9	12.2	7.1	-	14.9
Thallium	µg/L	-	-	<0.01	-	-	<0.01	<0.01	-	-	-	-	<0.01	<0.01	-	-	-	-
Tin	µg/L	-	-	<5	-	-	<5	<5	-	-	-	-	<5	<5	-	-	-	-
Titanium	µg/L	-	-	<5	-	-	<5	<5	-	-	-	-	8.5	<5	-	-	-	-
Uranium	µg/L	-	-	0.54	0.92	0.39	0.33	0.23	0.19	0.17	0.16	0.1	0.19	0.12	<0.1	0.22	-	0.14
Vanadium	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	<5
Zinc	µg/L	-	-	<5	<5	<5	<5	<5	6.1	<5	25	<5	<5	<5	<5	<5	-	<5
Zirconium	µg/L	-	-	<0.1	-	-	<0.1	<0.1	-	-	-	-	<0.1	<0.1	-	-	-	-

Notes:

Shaded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect freshwater aquatic life.

Bolded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect marine and estuarine aquatic life.

Values preceded by < indicate a detection limit. Detection limits were screened against BC CSR standards using their full value.

1: BC CSR standard is calculated based on mean water hardness calculated from 'dissolved' mineral content – Hardness, mg equivalent CaCO3/L. Hardness is for the aquatic receiving environment.

2: The BC CSR standard for nitrite is calculated based on chloride concentration.

3: The BC CSR standard for hexavalent chromium (Cr(IV)) is conservatively applied to dissolved chromium.

4: BC CSR standard is applicable at all sites, irrespective of water use.

5: EPHw10-19 – Extractable Petroleum Hydrocarbons (nC10-nC19) in water includes all the extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods, where approved methods are specified by a

6: VHw6-10 – Volatile Hydrocarbons (nC6-nC10) in water are hydrocarbons that elute between n-hexane and n-decane obtained by approved methods, where approved methods are specified by a director's protocol.

7: LEPHw – Light Extractable Petroleum Hydrocarbons in water, is the sum of extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods minus the sum of napthalene and phenanthrene, where approved methods are specified by a director's protocol.

8: VPHw – Volatile Petroleum Hydrocarbons in water includes the sum of volatile hydrocarbons with a carbon range from 6 to 10 (VHw6-10) obtained by approved methods minus the sum of benzene, ethylbenzene, styrene, toluene and xylenes, where approved methods are specified by a director's protocol.

Appendix 3.7-1: Groundwater Quality Results

Sample ID		BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	MW21-17D	MW21-17S	MW21-17S	MW21-17S	MW21-17S DUP03	MW21-18	MW21-18	MW21-18	MW21-21D	MW21-21D	MW21-21D	MW21-21s	MW21-21S	MW21-21S	MW21-21S
Laboratory Work Order				C220320	C115423	C195731	C220320	C146592	C146592	C195731	C220320	C146116	C195809	C220519	C115037	C146592	C195809	C220519
Laboratory Sample ID				AQU138		AMF736	AQU085	AAZ321	AAZ314	AMF723	AQU077	AAX031	AMG233	AQU848	ZL3420	AAZ317	AMG232	AQU847
Sample Date				29-Mar-22	09-Mar-21	01-Dec-21	29-Mar-22	30-Jun-21	30-Jun-21	01-Dec-21	29-Mar-22	29-Jun-21	02-Dec-21	30-Mar-22	09-Mar-21	30-Jun-21	02-Dec-21	30-Mar-22
Physical Parameters and Anions																		
Alkalinity, Total (as CaCO3)	mg/L	-	-	80	93	63	72	91	-	130	85	-	160	150	180	180	170	170
Chloride	mg/L	1,500	-	410	180	<1	120	150	-	85	300	-	1.6	2	3.4	3.6	2.6	3.5
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity, Lab	µS/cm	-	-	1600	890	180	670	800	-	550	1200	-	330	350	410	400	360	390
Fluoride[1]	mg/L	2 - 3[1]	15	<0.05	-	0.085	0.063	-	-	<0.05	<0.05	-	0.73	0.98	-	-	0.61	0.61
Hardness (as CaCO3), Dissolved	mg/L	-	-	265	186	51.1	112	132	-	91.7	187	-	48.8	31.3	48.8	51	61.1	57.5
Hardness (as CaCO3), Total	mg/L	-	-	267	184	53.5	110	131	-	94.1	181	-	48.8	32	47.5	52	61.9	58.4
Nitrate (as N)	mg/L	400	400	<0.02	<0.02	0.021	0.025	0.042	-	0.105	0.046	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Nitrite (as N)[2]	mg/L	0.2 - 2[2]	0.2 - 2[2]	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pH, lab	S.U.	-	-	7.7	6.99	7.52	7.49	6.83	-	7.23	7.6	-	7.69	7.87	7.64	7.73	7.69	7.67
Sulfate[1]	mg/L	1,280 - 4,290[1]	1,280 - 4,290[1]	100	59	2.5	70	72	-	28	53	-	22	22	27	25	25	26
Total Dissolved Solids (TDS)	mg/L	-	-	910	460	120	370	420	-	290	660	-	220	240	230	230	230	270
Turbidity, Lab	NTU	-	-	2.5	-	4.1	0.75	-	-	2.3	0.25	-	5.5	5	-	-	2.3	1.5
Microbiological Parameters																		
Escherichia coli (E.Coli)	cfu/100mL	-	-	0	-	40	0	-	-	0	0	-	0	0	-	-	0	0
Total Coliforms	cfu/100mL	-	-	0	-	50	1	-	-	5	3	-	5	10	-	-	3	5
Volatile Organic Compounds (VOCs)																		
Benzene	µg/L	400	1,000	<0.4	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4
Toluene	µg/L	5	2,000	<0.4	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4
Ethylbenzene	µg/L	2,000	2,500	<0.4	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4
Xylenes, Total	µg/L	300	300	<0.4	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4
Methyl tert-butyl ether (MTBE)	µg/L	34,000	4,400	<4	<4	<4	<4	<4	-	<4	<4	<4	<4	<4	-	-	<4	<4
Styrene	µg/L	720	720	<0.4	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4
Petroleum Hydrocarbons																		
VH (C6-C10)[4,6]	µg/L	15,000[4,6]	15,000[4,6]	<300	<300	-	<300	<300	-	-	<300	<300	<300	<300	-	-	<300	<300
VPH (C6-C10 Minus BTEX)	µg/L	1,500[8]	1,500[8]	<300	<300	-	<300	<300	-	-	<300	<300	<300	<300	-	-	<300	<300
EPH C10-C19[4,5]	mg/L	5[4,5]	5[4,5]	<0.2	<0.2	<0.2	<0.2	1.8	-	0.29	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2
EPH C19-C32	mg/L	-	-	<0.2	<0.2	0.24	<0.2	6.5	-	1	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2
LEPH (C10-C19 less PAH)[7]	mg/L	0.5	0.5	<0.2	<0.2	<0.2	<0.2	**1.8**	-	0.29	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2
HEPH (C19-C32 less PAH)	mg/L	-	-	<0.2	<0.2	0.24	<0.2	6.5	-	1	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	µg/L	60	60	0.052ST	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acridine	µg/L	0.5	0.5	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	0.077	-	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	0.13	-	0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	µg/L	0.1	0.1	<0.005	<0.005	<0.005	<0.005	0.06	-	0.026	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(b)pyridine (Quinoline)	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(b/j)fluoranthene	µg/L	-	-	<0.03	<0.03	<0.03	<0.03	0.062	-	<0.03	<0.03	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(g,h,i)perylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	0.063	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	1	1	<0.02	<0.02	<0.02	<0.02	0.28	-	0.065	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/L	-	-	<0.003	<0.003	<0.003	<0.003	0.017	-	0.0054	<0.003	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fluoranthene	µg/L	2	2	<0.02	<0.02	<0.02	<0.02	0.18	-	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluorene	µg/L	120	120	0.057	<0.05	<0.05	<0.05	0.16	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 1-	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 2-	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	µg/L	10	10	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	0.2	0.2	<0.02	<0.02	<0.02	<0.02	**0.26**	-	0.062	<0.02	-	0.024	<0.02	**0.31**	0.027	0.042	<0.02
Dioxins and Furans																		

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-17D	MW21-17S	MW21-17S	MW21-17S	MW21-17S DUP03	MW21-18	MW21-18	MW21-18	MW21-21D	MW21-21D	MW21-21D	MW21-21s	MW21-21S	MW21-21S	MW21-21S
Laboratory Work Order				C220320	C115423	C195731	C220320	C146592	C146592	C195731	C220320	C146116	C195809	C220519	C115037	C146592	C195809	C220519
Laboratory Sample ID				AQU138		AMF736	AQU085	AAZ321	AAZ314	AMF723	AQU077	AAX031	AMG233	AQU848	ZL3420	AAZ317	AMG232	AQU847
Sample Date				29-Mar-22	09-Mar-21	01-Dec-21	29-Mar-22	30-Jun-21	30-Jun-21	01-Dec-21	29-Mar-22	29-Jun-21	02-Dec-21	30-Mar-22	09-Mar-21	30-Jun-21	02-Dec-21	30-Mar-22
Lower Bound PCDD/F TEQ	pg/L	-	-	-	0.7	-	-	637	0.7	-	-	-	-	-	-	-	-	-
Upper Bound PCDD/F TEQ	pg/L	-	-	-	5.0	-	-	788	5.1	-	-	-	-	-	-	-	-	-
Dissolved Metals																		
Aluminum	µg/L	-	-	15.4	11.8	12.8	39.8	15.2	-	3.1	<3	-	41.5	31.2	22.4	31.2	25.9	21.9
Antimony	µg/L	90	2,500	<0.5	0.82	2.69	1.17	0.98	-	0.96	0.95	-	<0.5	<0.5	<0.5	<0.5	0.56	<0.5
Arsenic	µg/L	50	125	0.11	0.34	0.37	0.13	0.14	-	0.12	<0.1	-	3.31	4.08	4.32	4.28	3.85	4.62
Barium	µg/L	10,000	5,000	13.5	15.6	3.1	10.4	13.1	-	12.6	25.1	-	8.3	6.5	10.2	10.2	8.5	8.8
Beryllium	µg/L	1.5	1,000	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	µg/L	-	-	<1	<1	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	<1
Boron	µg/L	12,000	12,000	101	65	<50	64	100	-	115	95	-	207	271	266	268	177	240
Cadmium[1]	µg/L	0.5 - 4[1]	15	<0.01	0.093	0.098	0.13	0.13	-	<0.01	0.026	-	0.01	<0.01	0.012	0.011	0.013	0.014
Calcium	mg/L	-	-	68.9	55	17.1	30.3	38.3	-	22.8	44	-	16.5	10.4	15.9	16.6	20.6	18.6
Chromium[3]	µg/L	10[3]	15[3]	<1	<1	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	40	40	<0.2	0.49	0.35	0.7	0.5	-	<0.2	0.41	-	0.4	0.43	0.71	0.71	0.59	0.33
Copper[1]	µg/L	20 - 90[1]	20	<0.2	0.69	5.5	14.9	3.8	-	0.54	0.48	-	1.08	0.75	0.79	0.48	0.85	0.73
Iron	µg/L	-	-	551	226	16	66.4	81.6	-	153	7.9	-	164	140	196	208	186	81.5
Lead[1]	µg/L	40 - 160[1]	20	<0.2	<0.2	0.82	2.17	0.47	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lithium	µg/L	-	-	<2	<2	<2	<2	2.1	-	<2	<2	-	<2	<2	<2	<2	<2	<2
Magnesium	mg/L	-	-	22.5	11.7	2.04	8.83	8.76	-	8.44	18.7	-	1.82	1.3	2.23	2.32	2.34	2.68
Manganese	µg/L	-	-	271	58.7	2.8	14.5	19.7	-	6.8	9.5	-	128	178	366	372	239	295
Mercury	µg/L	0.25	0.25	<0.0019	<0.0019	-	<0.0019	<0.0019	-	-	<0.0019	-	-	<0.0019	0.0031	<0.0019	-	0.0021
Molybdenum	µg/L	10,000	10,000	<1	2.3	3.2	2.4	1.7	-	2.8	2.7	-	20.6	21.7	31.2	28.8	20.5	23.8
Nickel[1]	µg/L	250 - 1,500[1]	83	<1	1.2	<1	1.6	1.7	-	<1	<1	-	<1	<1	<1	<1	<1	<1
Potassium	mg/L	-	-	10.5	6.15	2.19	5.32	6.03	-	4.95	7.74	-	2.67	2.5	3.32	2.94	2.75	3
Selenium	µg/L	20	20	0.44	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silicon	µg/L	-	-	6480	6280	5200	6190	5330	-	4680	3860	-	6,130	6,600	7900	7280	6,810	8,180
Silver[1]	µg/L	0.5 - 15[1]	15	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	196	90.3	14.9	81.6	88.2	-	66.7	153	-	52.7	68.3	71.1	67.1	48	65.8
Strontium	µg/L	-	-	351	220	53.4	136	159	-	162	329	-	84	66.6	121	120	114	118
Sulfur	mg/L	-	-	33	19.5	6.2	22.2	22.9	-	9.3	18.6	-	6.4	7.1	8.7	8.1	6.5	8.3
Thallium	µg/L	3	3	<0.01	<0.01	<0.01	0.011	0.01	-	<0.01	0.012	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tin	µg/L	-	-	<5	<5	<5	<5	<5	-	<5	<5	-	<5	<5	<5	<5	<5	<5
Titanium	µg/L	1,000	1,000	<5	<5	<5	<5	<5	-	<5	<5	-	<5	<5	<5	<5	<5	<5
Uranium	µg/L	85	85	<0.1	0.5	0.17	0.21	0.2	-	0.44	0.4	-	14.6	15	41.7	30.1	20.2	24.1
Vanadium	µg/L	-	-	<5	<5	<5	<5	<5	-	<5	<5	-	6.2	5.5	<5	<5	<5	<5
Zinc[1]	µg/L	75 - 2,400[1]	100	<5	22.3	17.2	38.6	38.9	-	<5	<5	-	<5	<5	<5	<5	<5	<5
Zirconium	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	1.22	0.99	0.94	0.7	0.89	0.79
Total Metals																		
Aluminum	µg/L	-	-	125	29.7	141	10.4	572	-	41.4	4.9	-	210	217	259	335	173	78.1
Antimony	µg/L	-	-	<0.5	0.89	2.82	1.17	1.2	-	1.05	0.92	-	0.52	<0.5	<0.5	<0.5	0.5	0.74
Arsenic	µg/L	-	-	0.21	0.47	0.43	<0.1	0.37	-	0.25	0.12	-	4.2	5.49	5.4	5.64	5.63	4.75
Barium	µg/L	-	-	13.9	16.2	4.4	9.9	17.4	-	13.6	23.8	-	11.5	13.7	12.1	14	11.9	11
Beryllium	µg/L	-	-	-	<0.1	-	-	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-
Bismuth	µg/L	-	-	-	<1	-	-	<1	-	-	-	-	-	-	<1	<1	-	-
Boron	µg/L	-	-	99	68	<50	63	100	-	112	96	-	200	256	291	242	185	231
Cadmium	µg/L	-	-	<0.01	0.098	0.139	0.123	0.262	-	0.011	0.025	-	0.017	0.014	0.034	0.016	0.017	0.015
Calcium	mg/L	-	-	69.9	54.9	17.9	29.3	38.2	-	23.5	44.3	-	16.5	10.6	15.6	17.1	20.8	18.8
Chromium	µg/L	-	-	<1	<1	<1	<1	<1	-	<1	<1	-	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	-	-	<0.2	0.47	0.39	0.69	0.84	-	<0.2	0.38	-	0.66	1.42	0.83	0.88	0.83	0.54
Copper	µg/L	-	-	0.95	4.07	16.9	6.04	34.8	-	0.82	0.59	-	2.02	1.82	1.88	1.59	1.57	1.16
Iron	µg/L	-	-	720	318	177	12.2	990	-	574	58.8	-	861	1,130	523	855	769	192
Lead	µg/L	-	-	0.59	1.56	8.06	0.32	16.5	-	<0.2	<0.2	-	1.22	0.63	0.25	0.21	0.2	0.24
Lithium	µg/L	-	-	-	<2	-	-	3	-	-	-	-	-	-	<2	<2	-	-

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-17D	MW21-17S	MW21-17S	MW21-17S	MW21-17S DUP03	MW21-18	MW21-18	MW21-18	MW21-21D	MW21-21D	MW21-21D	MW21-21s	MW21-21S	MW21-21S	MW21-21S
Laboratory Work Order				C220320	C115423	C195731	C220320	C146592	C146592	C195731	C220320	C146116	C195809	C220519	C115037	C146592	C195809	C220519
Laboratory Sample ID				AQU138		AMF736	AQU085	AAZ321	AAZ314	AMF723	AQU077	AAX031	AMG233	AQU848	ZL3420	AAZ317	AMG232	AQU847
Sample Date				29-Mar-22	09-Mar-21	01-Dec-21	29-Mar-22	30-Jun-21	30-Jun-21	01-Dec-21	29-Mar-22	29-Jun-21	02-Dec-21	30-Mar-22	09-Mar-21	30-Jun-21	02-Dec-21	30-Mar-22
Magnesium	mg/L	-	-	22.4	11.4	2.11	9.03	8.63	-	8.61	17.1	-	1.84	1.37	2.05	2.26	2.42	2.78
Manganese	µg/L	-	-	281	55.4	4.4	14.1	29.5	-	7.3	8.3	-	155	287	343	375	292	320
Mercury	µg/L	-	-	<0.0019	0.0044	0.015	0.0067	0.0052	-	<0.0019	<0.0019	-	0.0039	0.0029	0.0038	<0.0019	0.0033	0.0029
Molybdenum	µg/L	-	-	<1	2.7	3.2	2.3	2	-	3	2.7	-	20.7	21.5	33.8	27	21.9	23.6
Nickel	µg/L	-	-	<1	1.1	<1	1.6	2.1	-	<1	<1	-	<1	<1	<1	<1	<1	<1
Potassium	mg/L	-	-	10.3	6.22	2.28	5.2	6.22	-	5.01	7.3	-	2.68	2.52	3.18	2.89	2.82	2.95
Selenium	µg/L	-	-	1.01	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silicon	µg/L	-	-	6020	6190	5820	5400	6010	-	4910	3580	-	6,070	6,190	8300	7630	7,230	7,360
Silver	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	194	92.5	15	79.9	87	-	67.3	149	-	50.9	68.8	69.1	63.7	50.2	64.4
Strontium	µg/L	-	-	345	249	57.9	130	160	-	171	322	-	87.7	69	126	117	126	118
Sulfur	mg/L	-	-	32.3	23.2	6.3	22	22.8	-	9.4	17.6	-	6.4	6.3	9.9	7.4	6.3	8.5
Thallium	µg/L	-	-	-	<0.01	-	-	0.026	-	-	-	-	-	-	<0.01	<0.01	-	-
Tin	µg/L	-	-	-	<5	-	-	<5	-	-	-	-	-	-	<5	<5	-	-
Titanium	µg/L	-	-	-	<5	-	-	28.9	-	-	-	-	-	-	12.5	15.8	-	-
Uranium	µg/L	-	-	0.21	0.54	0.22	0.18	0.38	-	0.5	0.39	-	14.4	15.9	40.6	30.4	21	23.6
Vanadium	µg/L	-	-	<5	<5	<5	<5	<5	-	<5	<5	-	7.2	7.1	5	<5	6	<5
Zinc	µg/L	-	-	<5	22.1	20.8	38.4	57.9	-	<5	<5	-	<5	5.5	<5	<5	<5	<5
Zirconium	µg/L	-	-	-	<0.1	-	-	<0.1	-	-	-	-	-	-	1.23	0.98	-	-

Notes:

Shaded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect freshwater aquatic life.

Bolded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect marine and estuarine aquatic life.

Values preceded by < indicate a detection limit. Detection limits were screened against BC CSR standards using their full value.

1: BC CSR standard is calculated based on mean water hardness calculated from 'dissolved' mineral content – Hardness, mg equivalent CaCO3/L. Hardness is for the aquatic receiving environment.

2: The BC CSR standard for nitrite is calculated based on chloride concentration.

3: The BC CSR standard for hexavalent chromium (Cr(IV)) is conservatively applied to dissolved chromium.

4: BC CSR standard is applicable at all sites, irrespective of water use.

5: EPHw10-19 – Extractable Petroleum Hydrocarbons (nC10-nC19) in water includes all the extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods, where approved methods are specified by a

6: VHw6-10 – Volatile Hydrocarbons (nC6-nC10) in water are hydrocarbons that elute between n-hexane and n-decane obtained by approved methods, where approved methods are specified by a director's protocol.

7: LEPHw – Light Extractable Petroleum Hydrocarbons in water, is the sum of extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods minus the sum of napthalene and phenanthrene, where approved methods are specified by a director's protocol.

8: VPHw – Volatile Petroleum Hydrocarbons in water includes the sum of volatile hydrocarbons with a carbon range from 6 to 10 (VHw6-10) obtained by approved methods minus the sum of benzene, ethylbenzene, styrene, toluene and xylenes, where approved methods are specified by a director's protocol.

Appendix 3.7-1: Groundwater Quality Results

Sample ID		BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	MW21-22	MW21-22	MW21-22	MW21-22	MW21-23	MW21-23	MW21-23	MW21-23S	MW21-24D	MW21-24D	MW21-24D DUP22-04	MW21-24S	MW21-24S	MW21-24S	MW21-24S
Laboratory Work Order				C115037	C146592	C195809	C220519	C115037	C195809	C220519	C146592	C146116	C195809	C220519	C115037	C146592	C195809	C220519
Laboratory Sample ID				ZL3486	AAZ316	AMG234	AQU841	ZL3485	AMG235	AQU844	AAZ318	AAX031	AMG240	AQU849	ZL3484	AAZ319	AMG238	AQU843
Sample Date				08-Mar-21	30-Jun-21	02-Dec-21	30-Mar-22	08-Mar-21	02-Dec-21	30-Mar-22	30-Jun-21	29-Jun-21	02-Dec-21	30-Mar-22	08-Mar-21	30-Jun-21	02-Dec-21	30-Mar-22
Physical Parameters and Anions																		
Alkalinity, Total (as CaCO3)	mg/L	-	-	160	250	180	180	190	170	170	180	-	250	160	230	220	270	140
Chloride	mg/L	1,500	-	1.6	<1	<1	1.3	1,900	96	430	1800	-	19	8.9	25	66	20	29
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity, Lab	µS/cm	-	-	350	510	360	360	6,200	680	1,800	6500	-	580	380	620	700	600	420
Fluoride[1]	mg/L	2 - 3[1]	15	-	-	<0.05	0.057	-	0.14	0.21	-	-	0.085	0.089	-	-	0.073	0.053
Hardness (as CaCO3), Dissolved	mg/L	-	-	146	212	169	167	713	153	229	732	-	189	152	223	219	186	157
Hardness (as CaCO3), Total	mg/L	-	-	142	216	167	166	713	151	219	770	-	191	146	224	217	190	154
Nitrate (as N)	mg/L	400	400	0.257	0.184	0.46	0.25	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02	0.158	0.049
Nitrite (as N)[2]	mg/L	0.2 - 2[2]	0.2 - 2[2]	0.0068	0.0083	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pH, lab	S.U.	-	-	7.58	7.74	7.72	7.67	7.68	7.85	7.67	7.49	-	7.75	7.4	7.37	6.88	7.82	7.16
Sulfate[1]	mg/L	1,280 - 4,290[1]	1,280 - 4,290[1]	18	22	18	14	310	53	94	320	-	40	23	56	48	37	29
Total Dissolved Solids (TDS)	mg/L	-	-	190	270	220	190	3,500	380	930	3500	-	310	210	340	380	350	220
Turbidity, Lab	NTU	-	-	-	-	1.4	1.7	-	7.7	17	-	-	14	7.8	-	-	0.55	0.25
Microbiological Parameters																		
Escherichia coli (E.Coli)	cfu/100mL	-	-	-	-	0	0	-	0	0	-	-	0	0	-	-	0	0
Total Coliforms	cfu/100mL	-	-	-	-	2	0	-	5	70	-	-	2	3	-	-	0	0
Volatile Organic Compounds (VOCs)																		
Benzene	µg/L	400	1,000	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	-	-	<0.4	<0.4
Toluene	µg/L	5	2,000	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	-	-	<0.4	<0.4
Ethylbenzene	µg/L	2,000	2,500	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	-	-	<0.4	<0.4
Xylenes, Total	µg/L	300	300	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	-	-	<0.4	<0.4
Methyl tert-butyl ether (MTBE)	µg/L	34,000	4,400	<4	<4	<4	<4	-	<4	<4	-	<4	<4	<4	-	-	<4	<4
Styrene	µg/L	720	720	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	-	<0.4	<0.4	<0.4	-	-	<0.4	<0.4
Petroleum Hydrocarbons																		
VH (C6-C10)[4,6]	µg/L	15,000[4,6]	15,000[4,6]	<300	<300	<300	<300	-	<300	<300	-	<300	<300	<300	-	-	<300	<300
VPH (C6-C10 Minus BTEX)	µg/L	1,500[8]	1,500[8]	<300	<300	<300	<300	-	<300	<300	-	<300	<300	<300	-	-	<300	<300
EPH C10-C19[4,5]	mg/L	5[4,5]	5[4,5]	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
EPH C19-C32	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
LEPH (C10-C19 less PAH)[7]	mg/L	0.5	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
HEPH (C19-C32 less PAH)	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	µg/L	60	60	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acridine	µg/L	0.5	0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	µg/L	0.1	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(b)pyridine (Quinoline)	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(b/j)fluoranthene	µg/L	-	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(g,h,i)perylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	1	1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fluoranthene	µg/L	2	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluorene	µg/L	120	120	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 1-	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 2-	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	µg/L	10	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	0.2	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dioxins and Furans																		

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-22	MW21-22	MW21-22	MW21-22	MW21-23	MW21-23	MW21-23	MW21-23S	MW21-24D	MW21-24D	MW21-24D DUP22-04	MW21-24S	MW21-24S	MW21-24S	MW21-24S
Laboratory Work Order				C115037	C146592	C195809	C220519	C115037	C195809	C220519	C146592	C146116	C195809	C220519	C115037	C146592	C195809	C220519
Laboratory Sample ID				ZL3486	AAZ316	AMG234	AQU841	ZL3485	AMG235	AQU844	AAZ318	AAX031	AMG240	AQU849	ZL3484	AAZ319	AMG238	AQU843
Sample Date				08-Mar-21	30-Jun-21	02-Dec-21	30-Mar-22	08-Mar-21	02-Dec-21	30-Mar-22	30-Jun-21	29-Jun-21	02-Dec-21	30-Mar-22	08-Mar-21	30-Jun-21	02-Dec-21	30-Mar-22
Lower Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																		
Aluminum	µg/L	-	-	8.2	7	8.6	6.5	15	32.7	26.9	19	-	8.4	5.2	14	24.1	14.3	19.9
Antimony	µg/L	90	2,500	<0.5	0.56	<0.5	<0.5	<2.5	<0.5	<0.5	<2.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	µg/L	50	125	0.57	0.64	0.3	0.39	0.5	0.35	0.57	0.59	-	0.88	0.72	0.31	0.4	0.23	0.16
Barium	µg/L	10,000	5,000	38.9	66.4	41.7	38.8	82.8	19.3	20.4	85.6	-	31.1	14.2	29.1	34.1	25.3	19.1
Beryllium	µg/L	1.5	1,000	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	<0.1	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	µg/L	-	-	<1	<1	<1	<1	<5	<1	<1	<5	-	<1	<1	<1	<1	<1	<1
Boron	µg/L	12,000	12,000	<50	64	<50	53	430	209	321	752	-	343	140	282	385	414	208
Cadmium[1]	µg/L	0.5 - 4[1]	15	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.05	-	<0.01	0.05	0.043	<0.01	<0.01	<0.01
Calcium	mg/L	-	-	53.8	77.4	62.3	61.4	107	42.3	41.8	96.6	-	58.6	50	72.8	68.5	53.6	50.8
Chromium[3]	µg/L	10[3]	15[3]	<1	<1	<1	<1	<5	<1	<1	<5	-	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	40	40	<0.2	<0.2	<0.2	<0.2	<1	0.24	<0.2	<1	-	2.11	0.46	0.43	0.3	<0.2	<0.2
Copper[1]	µg/L	20 - 90[1]	20	1.72	0.7	0.77	0.76	<1	0.25	<0.2	<1	-	<0.2	0.6	0.93	0.41	1.02	0.68
Iron	µg/L	-	-	11.3	20.3	13.4	6.4	3,310	343	1,560	3340	-	1,550	23.9	127	1020	13.6	25.2
Lead[1]	µg/L	40 - 160[1]	20	<0.2	<0.2	<0.2	<0.2	<1	0.28	<0.2	<1	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lithium	µg/L	-	-	<2	2.4	<2	<2	<10	2.9	4.6	16	-	<2	<2	<2	<2	<2	<2
Magnesium	mg/L	-	-	2.92	4.41	3.34	3.33	108	11.5	30.3	119	-	10.4	6.46	10.1	11.6	12.7	7.36
Manganese	µg/L	-	-	27.1	7.7	5.2	2.4	580	131	206	596	-	864	984	214	630	57.8	79.1
Mercury	µg/L	0.25	0.25	<0.0019	<0.0019	-	<0.0019	<0.0019	-	<0.0019	<0.0019	-	-	<0.0019	<0.0019	<0.0019	-	<0.0019
Molybdenum	µg/L	10,000	10,000	3.5	3.7	1.1	2	5.9	9.2	9.3	<5	-	9.8	10.7	5	5.4	4	3.2
Nickel[1]	µg/L	250 - 1,500[1]	83	<1	<1	<1	<1	<5	<1	<1	<5	-	<1	<1	<1	<1	<1	<1
Potassium	mg/L	-	-	2.03	2.69	2.3	2.06	35.8	6.77	13.6	44.1	-	7.21	3.81	5.81	6.84	7.75	4.23
Selenium	µg/L	20	20	0.13	0.11	<0.1	<0.1	<0.5	<0.1	<0.1	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silicon	µg/L	-	-	3,950	5510	4,760	4590	6,350	6,480	6,550	6470	-	6,640	6,120	4,980	5500	6,800	5,430
Silver[1]	µg/L	0.5 - 15[1]	15	<0.02	<0.02	<0.02	<0.02	<0.1	<0.02	<0.02	<0.1	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	13.2	18.4	6.66	8.21	932	99.2	274	1000	-	40.7	16.7	34.3	46.6	46.9	22
Strontium	µg/L	-	-	178	264	244	209	951	175	261	925	-	324	209	358	349	339	258
Sulfur	mg/L	-	-	6.3	6.5	5.4	4.6	107	17.6	32.1	105	-	10.1	7.3	18.3	12.8	11	9.9
Thallium	µg/L	3	3	0.019	0.027	0.015	0.012	<0.05	<0.01	<0.01	<0.05	-	<0.01	0.011	0.011	<0.01	<0.01	<0.01
Tin	µg/L	-	-	<5	<5	<5	<5	<25	<5	<5	<25	-	<5	<5	<5	<5	<5	<5
Titanium	µg/L	1,000	1,000	<5	<5	<5	<5	<25	<5	<5	<25	-	<5	<5	<5	<5	<5	<5
Uranium	µg/L	85	85	3.18	4.2	1.47	2.75	0.61	0.37	0.57	<0.5	-	4.29	7.43	3.9	2.07	3	1.2
Vanadium	µg/L	-	-	<5	<5	<5	<5	<25	<5	<5	<25	-	<5	<5	<5	<5	<5	<5
Zinc[1]	µg/L	75 - 2,400[1]	100	<5	<5	<5	<5	<25	<5	<5	<25	-	<5	<5	<5	<5	<5	<5
Zirconium	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.5	0.22	0.2	<0.5	-	0.14	0.11	0.15	0.15	<0.1	<0.1
Total Metals																		
Aluminum	µg/L	-	-	77.8	173	25.3	69.5	282	79.4	75.4	46	-	41.6	71.7	532	30.7	18.7	25.3
Antimony	µg/L	-	-	<0.5	0.53	<0.5	<0.5	<5	0.51	<0.5	<2.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	µg/L	-	-	0.65	0.62	0.28	0.39	<1	0.42	1.13	<0.5	-	1.43	1.99	0.58	0.31	0.23	0.13
Barium	µg/L	-	-	40.3	68	42.1	38.9	86	20.5	22.3	90.1	-	33	24.3	31.9	33.1	26	18.5
Beryllium	µg/L	-	-	<0.1	<0.1	-	-	<1	-	-	<0.5	-	-	-	<0.1	<0.1	-	-
Bismuth	µg/L	-	-	<1	<1	-	-	<10	-	-	<5	-	-	-	<1	<1	-	-
Boron	µg/L	-	-	<50	57	<50	<50	<500	196	301	716	-	354	134	280	366	414	191
Cadmium	µg/L	-	-	0.011	0.015	0.01	<0.01	<0.1	<0.01	<0.01	<0.05	-	<0.01	0.085	0.028	<0.01	<0.01	<0.01
Calcium	mg/L	-	-	52.1	79.1	61.4	61	103	42.9	41.2	104	-	58.6	47.7	73.1	68.5	54.8	49.3
Chromium	µg/L	-	-	<1	<1	<1	<1	<10	<1	<1	<5	-	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	-	-	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<1	-	2.28	0.99	0.55	0.29	<0.2	<0.2
Copper	µg/L	-	-	0.81	0.85	0.79	0.86	<5	0.5	0.5	<2.5	-	<0.2	1.31	1.56	<0.5	1.02	0.7
Iron	µg/L	-	-	65	185	34.4	41.3	3,650	859	3,360	3790	-	2,480	890	675	1080	37.8	38.8
Lead	µg/L	-	-	<0.2	0.48	<0.2	0.46	<2	1.16	1.44	<1	-	<0.2	0.36	0.37	<0.2	<0.2	<0.2
Lithium	µg/L	-	-	<2	2.2	-	-	<20	-	-	16	-	-	-	<2	<2	-	-

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-22	MW21-22	MW21-22	MW21-22	MW21-23	MW21-23	MW21-23	MW21-23S	MW21-24D	MW21-24D	MW21-24D DUP22-04	MW21-24S	MW21-24S	MW21-24S	MW21-24S
Laboratory Work Order				C115037	C146592	C195809	C220519	C115037	C195809	C220519	C146592	C146116	C195809	C220519	C115037	C146592	C195809	C220519
Laboratory Sample ID				ZL3486	AAZ316	AMG234	AQU841	ZL3485	AMG235	AQU844	AAZ318	AAX031	AMG240	AQU849	ZL3484	AAZ319	AMG238	AQU843
Sample Date				08-Mar-21	30-Jun-21	02-Dec-21	30-Mar-22	08-Mar-21	02-Dec-21	30-Mar-22	30-Jun-21	29-Jun-21	02-Dec-21	30-Mar-22	08-Mar-21	30-Jun-21	02-Dec-21	30-Mar-22
Magnesium	mg/L	-	-	2.97	4.39	3.31	3.32	111	10.6	28.1	123	-	10.7	6.38	9.95	11.2	12.8	7.42
Manganese	µg/L	-	-	25.6	18.8	8.7	9.6	620	132	225	693	-	916	1,390	220	596	58.1	79.1
Mercury	µg/L	-	-	<0.0019	<0.0019	<0.0019	<0.0019	0.002	<0.0019	<0.0019	<0.0019	-	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019
Molybdenum	µg/L	-	-	3.8	3.4	1.2	2.1	<10	9.3	9.1	5	-	10.1	5.8	5.3	5.1	3.7	3.1
Nickel	µg/L	-	-	<1	<1	<1	<1	<10	<1	<1	<5	-	<1	<1	<1	<1	<1	<1
Potassium	mg/L	-	-	2.01	2.71	2.31	2.05	35.4	6.48	12.8	45.6	-	7.51	3.74	5.74	6.59	7.93	4.26
Selenium	µg/L	-	-	0.13	0.12	<0.1	<0.1	<1	<0.1	<0.1	<0.5	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Silicon	µg/L	-	-	7,650	5980	4,790	4250	6,290	6,430	5,970	7410	-	6,600	5,400	5,550	5620	6,800	4,840
Silver	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02	<0.1	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	12.7	17.5	6.53	8.13	925	91.5	255	1020	-	42.1	16.4	33.3	46.4	46.4	22.3
Strontium	µg/L	-	-	179	262	254	206	906	178	250	989	-	340	206	378	345	350	248
Sulfur	mg/L	-	-	5	6	5.2	4.5	96	15.9	31.7	103	-	10.5	7.1	18	13.2	10.9	9.7
Thallium	µg/L	-	-	0.02	0.032	-	-	<0.1	-	-	<0.05	-	-	-	<0.01	<0.01	-	-
Tin	µg/L	-	-	<5	<5	-	-	<50	-	-	<25	-	-	-	<5	<5	-	-
Titanium	µg/L	-	-	<5	5.7	-	-	<50	-	-	<25	-	-	-	21	<5	-	-
Uranium	µg/L	-	-	3.2	4.21	1.4	2.83	<1	0.35	0.6	0.51	-	4.27	7.75	4.16	2.09	2.91	1.2
Vanadium	µg/L	-	-	<5	<5	<5	<5	<50	<5	<5	<25	-	<5	<5	<5	<5	<5	<5
Zinc	µg/L	-	-	<5	<5	<5	5.5	<50	<5	<5	<25	-	<5	16.8	<5	<5	7.7	<5
Zirconium	µg/L	-	-	0.11	0.11	-	-	<1	-	-	<0.5	-	-	-	0.46	0.12	-	-

Notes:

Shaded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect freshwater aquatic life.

Bolded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect marine and estuarine aquatic life.

Values preceded by < indicate a detection limit. Detection limits were screened against BC CSR standards using their full value.

1: BC CSR standard is calculated based on mean water hardness calculated from 'dissolved' mineral content – Hardness, mg equivalent CaCO3/L. Hardness is for the aquatic receiving environment.

2: The BC CSR standard for nitrite is calculated based on chloride concentration.

3: The BC CSR standard for hexavalent chromium (Cr(IV)) is conservatively applied to dissolved chromium.

4: BC CSR standard is applicable at all sites, irrespective of water use.

5: EPHw10-19 – Extractable Petroleum Hydrocarbons (nC10-nC19) in water includes all the extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods, where approved methods are specified by a

6: VHw6-10 – Volatile Hydrocarbons (nC6-nC10) in water are hydrocarbons that elute between n-hexane and n-decane obtained by approved methods, where approved methods are specified by a director's protocol.

7: LEPHw – Light Extractable Petroleum Hydrocarbons in water, is the sum of extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods minus the sum of napthalene and phenanthrene, where approved methods are specified by a director's protocol.

8: VPHw – Volatile Petroleum Hydrocarbons in water includes the sum of volatile hydrocarbons with a carbon range from 6 to 10 (VHw6-10) obtained by approved methods minus the sum of benzene, ethylbenzene, styrene, toluene and xylenes, where approved methods are specified by a director's protocol.

Appendix 3.7-1: Groundwater Quality Results

Sample ID		BC CSR AL Freshwater	BC CSR AL Marine and Estuarine	MW21-25D	MW21-25D	MW21-25D	MW21-25D	MW21-28	MW21-28	MW21-28	MW21-28	MW21-30	MW21-30	MW21-32	MW21-32	MW21-32	MW21-32	MW21-33
Laboratory Work Order				C109185	C146116	C195809	C220519	C109104	C146116	C195731	C220519	C109185	C195731	C115417	C146116	C195809	C220320	C109869
Laboratory Sample ID				ZH7697	AAX010	AMG245	AQU846	ZH7253	AAX011	AMF733	AQU845	ZH7698	AMF732	Zl5417	AAX014	AMG229	AQU140	ZI0905
Sample Date				11-Feb-21	29-Jun-21	02-Dec-21	30-Mar-22	10-Feb-21	29-Jun-21	01-Dec-21	30-Mar-22	11-Feb-21	01-Dec-21	09-Mar-21	29-Jun-21	02-Dec-21	29-Mar-22	16-Feb-21
Physical Parameters and Anions																		
Alkalinity, Total (as CaCO3)	mg/L	-	-	230	270	220	240	98	100	86	84	110	49	110	160	110	94	240
Chloride	mg/L	1,500	-	1.5	<1	<1	1.6	1.4	1.1	1.2	1.8	1.1	<1	5.3	9.2	3.6	5.2	8.9
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity, Lab	µS/cm	-	-	480	550	450	500	260	250	220	230	270	150	240	380	240	210	460
Fluoride[1]	mg/L	2 - 3[1]	15	-	-	<0.05	<0.05	-	-	<0.05	<0.05	-	<0.05	-	-	0.2	0.17	-
Hardness (as CaCO3), Dissolved	mg/L	-	-	217	251	225	231	98.2	96.40	72.4	89.1	96.4	29	72.4	105.00	68.4	65.2	90
Hardness (as CaCO3), Total	mg/L	-	-	221	257	216	225	97.7	94.90	85.3	85.9	111	30.4	73.3	105.00	70.1	64.9	89.9
Nitrate (as N)	mg/L	400	400	<0.02	0.109	0.084	0.021	0.178	0.195	0.262	0.265	<0.02	0.222	0.084	0.086	0.132	0.065	0.099
Nitrite (as N)[2]	mg/L	0.2 - 2[2]	0.2 - 2[2]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0077
pH, lab	S.U.	-	-	7.25	7.05	7.47	7.17	6.97	7.02	7.16	6.85	7.82	7.31	8.14	7.89	7.44	7.98	6.79
Sulfate[1]	mg/L	1,280 - 4,290[1]	1,280 - 4,290[1]	18	36	18	22	30	28.00	24	24	20	27	9.9	16.00	11	8.7	20
Total Dissolved Solids (TDS)	mg/L	-	-	260	310	250	300	140	140.00	110	160	140	100	130	200.00	150	140	270
Turbidity, Lab	NTU	-	-	-	-	11	1.8	-	-	0.79	0.24	-	8.2	-	-	1.1	0.61	-
Microbiological Parameters																		
Escherichia coli (E.Coli)	cfu/100mL	-	-	-	-	0	0	-	-	0	0	-	0	-	-	0	0	-
Total Coliforms	cfu/100mL	-	-	-	-	5	11	-	-	4	0	-	22	-	-	10	3	-
Volatile Organic Compounds (VOCs)																		
Benzene	µg/L	400	1,000	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Toluene	µg/L	5	2,000	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Ethylbenzene	µg/L	2,000	2,500	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Xylenes, Total	µg/L	300	300	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Methyl tert-butyl ether (MTBE)	µg/L	34,000	4,400	<4	<4	<4	<4	-	-	<4	<4	<4	<4	<4	<4	<4	<4	<4
Styrene	µg/L	720	720	<0.4	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Petroleum Hydrocarbons																		
VH (C6-C10)[4,6]	µg/L	15,000[4,6]	15,000[4,6]	<300	<300	<300	<300	-	-	-	<300	<300	-	<300	<300	<300	<300	<300
VPH (C6-C10 Minus BTEX)	µg/L	1,500[8]	1,500[8]	<300	<300	<300	<300	-	-	-	<300	<300	-	<300	<300	<300	<300	<300
EPH C10-C19[4,5]	mg/L	5[4,5]	5[4,5]	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
EPH C19-C32	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
LEPH (C10-C19 less PAH)[7]	mg/L	0.5	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
HEPH (C19-C32 less PAH)	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene	µg/L	60	60	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acridine	µg/L	0.5	0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	µg/L	0.1	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(b)pyridine (Quinoline)	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(b/j)fluoranthene	µg/L	-	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(g,h,i)perylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	1	1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fluoranthene	µg/L	2	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluorene	µg/L	120	120	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 1-	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 2-	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	µg/L	10	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	0.2	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dioxins and Furans																		

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-25D	MW21-25D	MW21-25D	MW21-25D	MW21-28	MW21-28	MW21-28	MW21-28	MW21-30	MW21-30	MW21-32	MW21-32	MW21-32	MW21-32	MW21-33
Laboratory Work Order				C109185	C146116	C195809	C220519	C109104	C146116	C195731	C220519	C109185	C195731	C115417	C146116	C195809	C220320	C109869
Laboratory Sample ID				ZH7697	AAX010	AMG245	AQU846	ZH7253	AAX011	AMF733	AQU845	ZH7698	AMF732	Zl5417	AAX014	AMG229	AQU140	ZI0905
Sample Date				11-Feb-21	29-Jun-21	02-Dec-21	30-Mar-22	10-Feb-21	29-Jun-21	01-Dec-21	30-Mar-22	11-Feb-21	01-Dec-21	09-Mar-21	29-Jun-21	02-Dec-21	29-Mar-22	16-Feb-21
Lower Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Upper Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																		
Aluminum	µg/L	-	-	7.8	5.7	7.4	6.2	<6	3.2	<3	<3	21.9	6.2	4.8	3.5	4.5	3.6	8.1
Antimony	µg/L	90	2,500	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	µg/L	50	125	0.63	0.11	0.11	<0.1	<0.2	<0.1	<0.1	<0.1	0.53	0.12	0.15	0.25	0.27	0.22	0.49
Barium	µg/L	10,000	5,000	53.5	47.7	57.6	39	36.2	33.2	26.7	30.9	19.5	11.5	21.6	29.3	17.2	14.5	30.1
Beryllium	µg/L	1.5	1,000	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	µg/L	-	-	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Boron	µg/L	12,000	12,000	<50	53	54	62	<100	<50	<50	<50	<50	<50	<50	84	<50	<50	<50
Cadmium[1]	µg/L	0.5 - 4[1]	15	0.016	0.032	0.022	0.029	<0.02	0.022	0.065	0.02	0.012	0.012	<0.01	<0.01	<0.01	<0.01	0.012
Calcium	mg/L	-	-	80.6	92.7	84.3	84.2	30.7	30.3	23.3	28.4	32.1	9.45	26.4	38	24.6	23.5	31.6
Chromium[3]	µg/L	10[3]	15[3]	<1	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	40	40	1.75	0.39	<0.2	<0.2	<0.4	<0.2	<0.2	<0.2	0.24	0.32	0.31	<0.2	<0.2	<0.2	0.37
Copper[1]	µg/L	20 - 90[1]	20	<0.2	0.65	0.6	0.55	<0.4	0.63	<0.2	<0.2	2.31	0.6	0.6	0.82	0.7	0.61	1.39
Iron	µg/L	-	-	1,890	39.4	15	14.7	<10	<5	<5	<5	12	<5	<5	<5	<5	<5	<5
Lead[1]	µg/L	40 - 160[1]	20	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lithium	µg/L	-	-	<2	<2	<2	<2	<4	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Magnesium	mg/L	-	-	3.76	4.68	3.59	5.04	5.25	5.01	3.43	4.41	3.93	1.32	1.58	2.39	1.67	1.62	2.68
Manganese	µg/L	-	-	650	157	23.2	282	76.7	174	66.7	89.6	72	3	11.7	<1	<1	<1	89
Mercury	µg/L	0.25	0.25	<0.0019	<0.0019	-	<0.0019	<0.0019	<0.0019	-	<0.0019	<0.0019	-	<0.0019	<0.0019	-	<0.0019	<0.0019
Molybdenum	µg/L	10,000	10,000	2.4	1.7	1.2	1.1	2.4	2.5	2	2.2	3.8	9	18.8	27.6	26.8	19.8	28.6
Nickel[1]	µg/L	250 - 1,500[1]	83	1.3	<1	<1	<1	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Potassium	mg/L	-	-	4.06	3.92	3.32	3	1.78	1.75	1.42	1.72	3.06	1.66	2.34	2.8	2.15	1.91	3.74
Selenium	µg/L	20	20	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	0.47	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Silicon	µg/L	-	-	4,300	4560	5,170	6440	9,420	9500	8,530	11,200	5,720	3,290	4230	5070	4,460	4470	3,940
Silver[1]	µg/L	0.5 - 15[1]	15	<0.02	<0.02	<0.02	<0.02	<0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	8.29	11.2	8.12	12.5	11.7	11.1	8.76	10.6	16.2	19	18.4	36.6	22.8	19.1	61
Strontium	µg/L	-	-	402	352	317	372	275	265	205	244	99.5	29.3	96.4	153	86.2	83.4	148
Sulfur	mg/L	-	-	6.5	8.5	5.7	6.9	10.4	8.2	7.3	7.6	6.5	9	<3	4.4	3.5	3.2	6.5
Thallium	µg/L	3	3	<0.01	0.031	0.026	0.023	<0.02	<0.01	<0.01	<0.01	0.013	0.014	0.015	0.014	<0.01	<0.01	0.024
Tin	µg/L	-	-	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Titanium	µg/L	1,000	1,000	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Uranium	µg/L	85	85	0.58	0.73	0.84	0.85	<0.2	<0.1	<0.1	<0.1	1.43	<0.1	12.2	29.6	9.14	8.59	37.5
Vanadium	µg/L	-	-	<5	<5	<5	<5	<10	<5	<5	<5	5.6	49.3	<5	<5	<5	<5	<5
Zinc[1]	µg/L	75 - 2,400[1]	100	<5	<5	<5	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zirconium	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Metals																		
Aluminum	µg/L	-	-	2,160	3210	346	63.3	38.7	6.1	12.5	4.7	15,500	424	159	114	32.2	13.6	233
Antimony	µg/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	µg/L	-	-	0.95	1.31	0.31	0.11	<0.1	<0.1	<0.1	<0.1	2.87	0.18	0.29	0.31	0.29	0.21	0.57
Barium	µg/L	-	-	68.3	80.3	65.7	39.2	34.3	33.2	30.3	30.9	136	17.3	21.8	30.5	18.1	14.3	31.8
Beryllium	µg/L	-	-	<0.1	<0.1	-	-	<0.1	<0.1	-	-	0.2	-	<0.1	<0.1	-	-	<0.1
Bismuth	µg/L	-	-	<1	<1	-	-	<1	<1	-	-	<1	-	<1	<1	-	-	<1
Boron	µg/L	-	-	<50	56	54	58	<50	<50	<50	<50	<50	<50	<50	87	<50	<50	<50
Cadmium	µg/L	-	-	0.036	0.064	0.028	0.026	0.117	0.025	0.037	0.021	0.091	0.022	0.01	0.011	<0.01	<0.01	0.031
Calcium	mg/L	-	-	82.1	94.7	80.8	81.6	30.8	29.9	27.5	27.2	34.1	9.88	26.7	38.2	25.3	23.3	31.5
Chromium	µg/L	-	-	1.4	2	<1	<1	<1	<1	<1	<1	11.9	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	-	-	2.21	1.23	0.26	0.2	0.23	<0.2	<0.2	<0.2	4.03	0.46	0.42	1.11	<0.2	<0.2	0.45
Copper	µg/L	-	-	2.56	3.6	0.99	0.65	0.75	<0.5	0.22	<0.2	16.4	1.07	0.77	1.05	0.77	0.63	1.63
Iron	µg/L	-	-	3,290	5560	872	121	43	<10	10.4	<5	8,500	207	108	86	22.7	13.2	326
Lead	µg/L	-	-	1.89	2.2	0.47	<0.2	0.3	<0.2	<0.2	<0.2	3.11	0.37	<0.2	<0.2	<0.2	<0.2	0.21
Lithium	µg/L	-	-	<2	<2	-	-	<2	<2	-	-	5.6	-	<2	<2	-	-	<2

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-25D	MW21-25D	MW21-25D	MW21-25D	MW21-28	MW21-28	MW21-28	MW21-28	MW21-30	MW21-30	MW21-32	MW21-32	MW21-32	MW21-32	MW21-33
Laboratory Work Order				C109185	C146116	C195809	C220519	C109104	C146116	C195731	C220519	C109185	C195731	C115417	C146116	C195809	C220320	C109869
Laboratory Sample ID				ZH7697	AAX010	AMG245	AQU846	ZH7253	AAX011	AMF733	AQU845	ZH7698	AMF732	Zl5417	AAX014	AMG229	AQU140	ZI0905
Sample Date				11-Feb-21	29-Jun-21	02-Dec-21	30-Mar-22	10-Feb-21	29-Jun-21	01-Dec-21	30-Mar-22	11-Feb-21	01-Dec-21	09-Mar-21	29-Jun-21	02-Dec-21	29-Mar-22	16-Feb-21
Magnesium	mg/L	-	-	3.93	5.03	3.46	5.09	5.05	4.93	4.04	4.35	6.31	1.39	1.6	2.45	1.65	1.61	2.72
Manganese	µg/L	-	-	657	194	31.1	281	71.2	174	111	83.5	201	8.9	14.8	15.7	1.7	1.4	102
Mercury	µg/L	-	-	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019
Molybdenum	µg/L	-	-	2.4	2.3	1.2	1.1	2.3	2.4	2.2	2.2	4.4	8.6	20.5	28.5	26.4	19.4	28.6
Nickel	µg/L	-	-	1.9	2	<1	<1	<1	<1	<1	<1	5.2	<1	<1	<1	<1	<1	1
Potassium	mg/L	-	-	4.08	4.23	3.22	3.03	1.68	1.76	1.64	1.65	4.52	1.71	2.31	2.82	2.18	1.93	3.88
Selenium	µg/L	-	-	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.54	0.22	<0.1	<0.1	<0.1	<0.1	<0.1
Silicon	µg/L	-	-	6,360	7200	5,130	5780	9,650	9400	10100	9570	21,800	4,170	4230	5240	4,600	4100	4,620
Silver	µg/L	-	-	<0.02	<0.02	0.022	<0.02	<0.02	<0.02	<0.02	<0.02	0.054	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	8.24	11.7	7.65	12.3	11.2	11.2	9.68	10.3	18	18.6	18.7	37.5	22.5	18.5	58.4
Strontium	µg/L	-	-	349	364	316	362	254	268	241	242	115	31.8	105	154	89.7	84	148
Sulfur	mg/L	-	-	4.9	8.8	5.3	7.4	9	7.8	7.8	7.7	5.3	9.3	3.6	4.8	3.4	<3	6.2
Thallium	µg/L	-	-	0.019	0.038	-	-	<0.01	<0.01	-	-	0.095	-	0.015	0.016	-	-	0.027
Tin	µg/L	-	-	<5	<5	-	-	<5	<5	-	-	<5	-	<5	<5	-	-	<5
Titanium	µg/L	-	-	76.1	113	-	-	<5	<5	-	-	514	-	5	<5	-	-	15.6
Uranium	µg/L	-	-	0.82	1.08	0.89	0.89	<0.1	<0.1	<0.1	<0.1	2.75	0.21	12.3	30.6	8.6	8.52	33.6
Vanadium	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	40.6	50.9	<5	<5	<5	<5	<5
Zinc	µg/L	-	-	8.8	9.1	<5	<5	<5	<5	<5	<5	29.6	<5	<5	<5	<5	<5	<5
Zirconium	µg/L	-	-	1.06	0.72	-	-	<0.1	<0.1	-	-	3.96	-	<0.1	<0.1	-	-	0.15

Notes:

Shaded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect freshwater aquatic life.

Bolded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect marine and estuarine aquatic life.

Values preceded by < indicate a detection limit. Detection limits were screened against BC CSR standards using their full value.

1: BC CSR standard is calculated based on mean water hardness calculated from 'dissolved' mineral content – Hardness, mg equivalent CaCO3/L. Hardness is for the aquatic receiving environment.

2: The BC CSR standard for nitrite is calculated based on chloride concentration.

3: The BC CSR standard for hexavalent chromium (Cr(IV)) is conservatively applied to dissolved chromium.

4: BC CSR standard is applicable at all sites, irrespective of water use.

5: EPHw10-19 – Extractable Petroleum Hydrocarbons (nC10-nC19) in water includes all the extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods, where approved methods are specified by a

6: VHw6-10 – Volatile Hydrocarbons (nC6-nC10) in water are hydrocarbons that elute between n-hexane and n-decane obtained by approved methods, where approved methods are specified by a director's protocol.

7: LEPHw – Light Extractable Petroleum Hydrocarbons in water, is the sum of extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods minus the sum of napthalene and phenanthrene, where approved methods are specified by a director's protocol.

8: VPHw – Volatile Petroleum Hydrocarbons in water includes the sum of volatile hydrocarbons with a carbon range from 6 to 10 (VHw6-10) obtained by approved methods minus the sum of benzene, ethylbenzene, styrene, toluene and xylenes, where approved methods are specified by a director's protocol.

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-33	MW21-33	MW21-33	MW21-34	MW21-34	MW21-34	MW21-34	MW21-35	MW21-35
Laboratory Work Order				C146116	C195809	C220320	C115419	C146116	C195731	C220320	C115420	C195731
Laboratory Sample ID				AAX012	AMG230	AQU081		AAX013	AMF725	AQU139		AMF724
Sample Date				29-Jun-21	02-Dec-21	29-Mar-22	09-Mar-21	29-Jun-21	01-Dec-21	29-Mar-22	09-Mar-21	01-Dec-21
Physical Parameters and Anions												
Alkalinity, Total (as CaCO3)	mg/L	-	-	290	67	140	150	130	150	150	180	410
Chloride	mg/L	1,500	-	13	<1	5.7	4.3	4.3	11	3.6	3.4	3.1
Dissolved Organic Carbon (DOC)	mg/L	-	-	-	-	-	-	-	-	-	-	-
Conductivity, Lab	µS/cm	-	-	620	130	310	480	460	480	410	410	940
Fluoride[1]	mg/L	2 - 3[1]	15	-	0.11	0.11	-	-	0.097	0.057	-	0.12
Hardness (as CaCO3), Dissolved	mg/L	-	-	105	35	68	189	171	141	161	48.8	191
Hardness (as CaCO3), Total	mg/L	-	-	102	36.6	67.9	181	189	146	159	47.5	216
Nitrate (as N)	mg/L	400	400	0.02	0.022	0.096	<0.02	<0.02	<0.02	<0.02	<0.02	0.117
Nitrite (as N)[2]	mg/L	0.2 - 2[2]	0.2 - 2[2]	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
pH, lab	S.U.	-	-	7.68	7.06	8.06	7.32	7.44	7.48	8	7.64	7.91
Sulfate[1]	mg/L	1,280 - 4,290[1]	1,280 - 4,290[1]	25	4.3	13	91	110	83	62	27	98
Total Dissolved Solids (TDS)	mg/L	-	-	350	80	200	280	290	300	260	230	480
Turbidity, Lab	NTU	-	-	-	1.2	0.79	-	-	12	4.8	-	4,500
Microbiological Parameters												
Escherichia coli (E.Coli)	cfu/100mL	-	-	-	0	0	-	-	0	0	-	0
Total Coliforms	cfu/100mL	-	-	-	9	10	-	-	5	4	-	18
Volatile Organic Compounds (VOCs)												
Benzene	µg/L	400	1,000	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	-	<0.4
Toluene	µg/L	5	2,000	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	-	<0.4
Ethylbenzene	µg/L	2,000	2,500	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	-	<0.4
Xylenes, Total	µg/L	300	300	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	-	<0.4
Methyl tert-butyl ether (MTBE)	µg/L	34,000	4,400	<4	<4	<4	-	-	<4	<4	-	<4
Styrene	µg/L	720	720	<0.4	<0.4	<0.4	-	-	<0.4	<0.4	-	<0.4
Petroleum Hydrocarbons												
VH (C6-C10)[4,6]	µg/L	15,000[4,6]	15,000[4,6]	<300	<300	<300	-	-	-	<300	-	-
VPH (C6-C10 Minus BTEX)	µg/L	1,500[8]	1,500[8]	<300	<300	<300	-	-	-	<300	-	-
EPH C10-C19[4,5]	mg/L	5[4,5]	5[4,5]	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
EPH C19-C32	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
LEPH (C10-C19 less PAH)[7]	mg/L	0.5	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
HEPH (C19-C32 less PAH)	mg/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Polycyclic Aromatic Hydrocarbons (PAHs)												
Acenaphthene	µg/L	60	60	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acridine	µg/L	0.5	0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	µg/L	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	µg/L	0.1	0.1	<0.005	<0.005	<0.005	<0.005	0.0075	<0.005	<0.005	<0.005	<0.005
Benzo(b)pyridine (Quinoline)	µg/L	-	-	<0.02	<0.02	<0.02	<0.02	0.034	<0.02	<0.02	<0.02	<0.02
Benzo(b/j)fluoranthene	µg/L	-	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(g,h,i)perylene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chrysene	µg/L	1	1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(a,h)anthracene	µg/L	-	-	<0.003	<0.003	<0.003	<0.003	0.0036	<0.003	<0.003	<0.003	<0.003
Fluoranthene	µg/L	2	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluorene	µg/L	120	120	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-cd)pyrene	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 1-	µg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methylnaphthalene, 2-	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Naphthalene	µg/L	10	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	3	3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pyrene	µg/L	0.2	0.2	<0.02	<0.02	<0.02	<0.02	0.026	<0.02	<0.02	0.031	<0.02
Dioxins and Furans												

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-33	MW21-33	MW21-33	MW21-34	MW21-34	MW21-34	MW21-34	MW21-35	MW21-35
Laboratory Work Order				C146116	C195809	C220320	C115419	C146116	C195731	C220320	C115420	C195731
Laboratory Sample ID				AAX012	AMG230	AQU081		AAX013	AMF725	AQU139		AMF724
Sample Date				29-Jun-21	02-Dec-21	29-Mar-22	09-Mar-21	29-Jun-21	01-Dec-21	29-Mar-22	09-Mar-21	01-Dec-21
Lower Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-
Upper Bound PCDD/F TEQ	pg/L	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals												
Aluminum	µg/L	-	-	7.9	20.5	7.7	6	28.2	7.9	<3	22.4	10.2
Antimony	µg/L	90	2,500	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.08
Arsenic	µg/L	50	125	0.82	0.37	0.53	0.57	1.24	2.88	0.35	4.32	0.31
Barium	µg/L	10,000	5,000	33.1	6.9	15.3	58.2	47.3	31.2	32.1	10.2	53.8
Beryllium	µg/L	1.5	1,000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bismuth	µg/L	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Boron	µg/L	12,000	12,000	<50	<50	<50	<50	<50	163	<50	266	193
Cadmium[1]	µg/L	0.5 - 4[1]	15	<0.01	<0.01	<0.01	0.048	0.03	0.011	0.024	0.012	<0.01
Calcium	mg/L	-	-	37.2	12.8	24.1	69.3	62.5	50.9	59.3	15.9	69.9
Chromium[3]	µg/L	10[3]	15[3]	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cobalt	µg/L	40	40	<0.2	<0.2	<0.2	1.68	1.48	0.39	0.72	0.71	<0.2
Copper[1]	µg/L	20 - 90[1]	20	2.46	1.68	1.78	0.23	0.76	<0.2	<0.2	0.79	0.51
Iron	µg/L	-	-	19.5	12.9	<5	303	7580	3,240	740	196	21
Lead[1]	µg/L	40 - 160[1]	20	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lithium	µg/L	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2
Magnesium	mg/L	-	-	2.99	0.748	1.9	3.79	3.63	3.35	3.22	2.23	3.93
Manganese	µg/L	-	-	23.1	<1	<1	561	767	211	348	366	1.9
Mercury	µg/L	0.25	0.25	<0.0019	-	<0.0019	<0.0019	<0.0019	-	<0.0019	0.0031	-
Molybdenum	µg/L	10,000	10,000	69.1	10.1	22.3	2.2	1	5.5	2.2	31.2	19.2
Nickel[1]	µg/L	250 - 1,500[1]	83	<1	<1	<1	1.7	1.4	<1	<1	<1	<1
Potassium	mg/L	-	-	3.78	1.14	2.09	4.09	2.82	3.42	2.87	3.32	6.38
Selenium	µg/L	20	20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2
Silicon	µg/L	-	-	4830	2,530	4160	5030	5590	6,150	4850	7900	3,360
Silver[1]	µg/L	0.5 - 15[1]	15	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	94.6	12.3	42.1	20.6	22.4	40.1	18.4	71.1	54.9
Strontium	µg/L	-	-	192	50.3	109	230	251	183	166	121	515
Sulfur	mg/L	-	-	6.6	<3	3.9	30.4	29.7	25.4	18.8	8.7	14.6
Thallium	µg/L	3	3	0.028	<0.01	<0.01	0.018	0.017	<0.01	<0.01	<0.01	0.016
Tin	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5
Titanium	µg/L	1,000	1,000	<5	<5	<5	<5	<5	<5	<5	<5	<5
Uranium	µg/L	85	85	53.8	3.82	22.1	3.74	1.7	2.45	1.41	41.7	14.2
Vanadium	µg/L	-	-	<5	<5	<5	<5	<5	<5	<5	<5	<5
Zinc[1]	µg/L	75 - 2,400[1]	100	<5	<5	<5	<5	7.3	<5	<5	<5	<5
Zirconium	µg/L	-	-	0.15	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.94	<0.1
Total Metals												
Aluminum	µg/L	-	-	133	72.5	43.5	1320	2250	157	86.6	259	1,300
Antimony	µg/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.22
Arsenic	µg/L	-	-	0.88	0.44	0.54	1.68	3.2	3.33	0.54	5.4	1.1
Barium	µg/L	-	-	34.1	7.5	15.1	68.5	72	34	31.1	12.1	72.1
Beryllium	µg/L	-	-	<0.1	-	-	<0.1	<0.1	-	-	<0.1	-
Bismuth	µg/L	-	-	<1	-	-	<1	<1	-	-	<1	-
Boron	µg/L	-	-	<50	<50	<50	<50	<50	161	<50	291	241
Cadmium	µg/L	-	-	0.014	<0.01	<0.01	0.104	0.096	0.024	0.021	0.034	0.022
Calcium	mg/L	-	-	35.7	13.4	24	65.9	68	53.1	58.3	15.6	78.7
Chromium	µg/L	-	-	<1	<1	<1	1.4	2.8	<1	<1	<1	<1
Cobalt	µg/L	-	-	0.59	<0.2	<0.2	2.17	2.62	0.46	0.72	0.83	0.35
Copper	µg/L	-	-	3.04	1.91	2.01	2.99	5.36	0.55	0.2	1.88	1.55
Iron	µg/L	-	-	182	59.6	50.2	2170	12800	3,460	791	523	549
Lead	µg/L	-	-	<0.2	<0.2	0.23	1.58	3.28	0.32	<0.2	0.25	1.63
Lithium	µg/L	-	-	<2	-	-	<2	<2	-	-	<2	-

Appendix 3.7-1: Groundwater Quality Results

Sample ID		**BC CSR AL Freshwater**	**BC CSR AL Marine and Estuarine**	MW21-33	MW21-33	MW21-33	MW21-34	MW21-34	MW21-34	MW21-34	MW21-35	MW21-35
Laboratory Work Order				C146116	C195809	C220320	C115419	C146116	C195731	C220320	C115420	C195731
Laboratory Sample ID				AAX012	AMG230	AQU081		AAX013	AMF725	AQU139		AMF724
Sample Date				29-Jun-21	02-Dec-21	29-Mar-22	09-Mar-21	29-Jun-21	01-Dec-21	29-Mar-22	09-Mar-21	01-Dec-21
Magnesium	mg/L	-	-	3.11	0.776	1.96	4.05	4.61	3.36	3.18	2.05	4.84
Manganese	µg/L	-	-	82.3	5.4	14.3	571	867	208	332	343	24.5
Mercury	µg/L	-	-	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	0.0038	<0.0019
Molybdenum	µg/L	-	-	70.5	10.5	22.1	2.6	1.7	5.8	2.1	33.8	21.1
Nickel	µg/L	-	-	<1	<1	<1	2.4	3.1	<1	<1	<1	<1
Potassium	mg/L	-	-	3.83	1.15	2.09	4.11	3.23	3.53	2.82	3.18	7.91
Selenium	µg/L	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.34
Silicon	µg/L	-	-	4940	2,710	3770	6780	8340	6,580	4360	8300	4,520
Silver	µg/L	-	-	<0.02	0.032	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sodium	mg/L	-	-	96.1	12.6	41.4	20.4	24.4	39.7	18	69.1	83.4
Strontium	µg/L	-	-	189	53.1	106	253	274	193	164	126	652
Sulfur	mg/L	-	-	7	<3	3.5	29.4	32.3	26.4	18.8	9.9	25.5
Thallium	µg/L	-	-	0.029	-	-	0.028	0.031	-	-	<0.01	-
Tin	µg/L	-	-	<5	-	-	<5	<5	-	-	<5	-
Titanium	µg/L	-	-	6.9	-	-	60.2	104	-	-	12.5	-
Uranium	µg/L	-	-	55.1	3.91	21.9	3.73	2.58	2.6	1.45	40.6	20.6
Vanadium	µg/L	-	-	<5	<5	<5	<5	6.3	<5	<5	5	<5
Zinc	µg/L	-	-	<5	<5	<5	16.3	36.9	<5	<5	<5	<5
Zirconium	µg/L	-	-	0.11	-	-	0.2	0.53	-	-	1.23	-

Notes:

Shaded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect freshwater aquatic life.

Bolded values exceed the British Columbia (BC) Contaminated Site Regulation (CSR) Generic Numerical Water Quality Standards (Schedule 3.2) to protect marine and estuarine aquatic life.

Values preceded by < indicate a detection limit. Detection limits were screened against BC CSR standards using their full value.

1: BC CSR standard is calculated based on mean water hardness calculated from 'dissolved' mineral content – Hardness, mg equivalent CaCO3/L. Hardness is for the aquatic receiving environment.

2: The BC CSR standard for nitrite is calculated based on chloride concentration.

3: The BC CSR standard for hexavalent chromium (Cr(IV)) is conservatively applied to dissolved chromium.

4: BC CSR standard is applicable at all sites, irrespective of water use.

5: EPHw10-19 – Extractable Petroleum Hydrocarbons (nC10-nC19) in water includes all the extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods, where approved methods are specified by a

6: VHw6-10 – Volatile Hydrocarbons (nC6-nC10) in water are hydrocarbons that elute between n-hexane and n-decane obtained by approved methods, where approved methods are specified by a director's protocol.

7: LEPHw – Light Extractable Petroleum Hydrocarbons in water, is the sum of extractable petroleum hydrocarbons with a carbon range from 10 to 19 obtained by the approved methods minus the sum of napthalene and phenanthrene, where approved methods are specified by a director's protocol.

8: VPHw – Volatile Petroleum Hydrocarbons in water includes the sum of volatile hydrocarbons with a carbon range from 6 to 10 (VHw6-10) obtained by approved methods minus the sum of benzene, ethylbenzene, styrene, toluene and xylenes, where approved methods are specified by a director's protocol.

Appendix 3.8: Marine Sediments

3.8-1: Marine Sediment Quality Results

Table 1: Baseline Marine Sediment Monitoring Results (2006 – 2025)

Table 2: Summary Statistics for Marine Sediment Monitoring Results (2006 – 2025)

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Depth - Top (m)	Depth - Bottom (m)	Sampling Method	1-1-1-2-Tetrachloroethane-Solid (mg/kg)	1-1-1-Trichloroethane-Solid (mg/kg)	1-1-2-2-Tetrachloroethane-Solid (mg/kg)	1-1-2-Trichloroethane-Solid (mg/kg)	1-1-Dichloroethane-Solid (mg/kg)	1-1-dichloroethylene-solid (mg/kg)	1-2-3-4-6-7-8-HpCDD-Solid (ng/kg)	1-2-3-4-6-7-8-HpCDF-Solid (ng/kg)	1-2-3-4-7-8-9-HpCDF-Solid (ng/kg)	1-2-3-4-7-8-HxCDD-Solid (ng/kg)	1-2-3-4-7-8-HxCDF-Solid (ng/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2	0	0	Ponar grab sampler							53	13	<0.7	<0.5	1
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3	0	0	Ponar grab sampler							180	52	2.1	<0.5	7.9
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4	0	0	Ponar grab sampler							250	48	2.1	2.1	3.9
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5	0	0	Ponar grab sampler							120	14	<0.7	13	<0.5
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6	0	0	Ponar grab sampler							170	64	1	<0.5	2.1
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7	0	0	Ponar grab sampler							48	11	<0.7	<0.5	0.8
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01	0	0	Hand sampler by diver											
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02	0	0	Hand sampler by diver											
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03	0	0	Hand sampler by diver											
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04	0	0	Hand sampler by diver											
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05	0	0	Hand sampler by diver											
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06	0	0	Hand sampler by diver											
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07	0	0	Hand sampler by diver											
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08	0	0	Hand sampler by diver											
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09	0	0	Hand sampler by diver											
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10	0	0	Hand sampler by diver											
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11	0	0	Hand sampler by diver											
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200	0	0	Ponar grab sampler											
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202	0	0	Ponar grab sampler											
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203	0	0	Ponar grab sampler											
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204	0	0	Ponar grab sampler											
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206	0	0	Ponar grab sampler											
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207	0	0	Ponar grab sampler											
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208	0	0	Ponar grab sampler											
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209	0	0	Ponar grab sampler											
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210	0	0	Ponar grab sampler											
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211	0	0	Ponar grab sampler											
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212	0	0	Ponar grab sampler											
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)	0.5	0.5	Ponar grab sampler											
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234	0	0	Ponar grab sampler											
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236	0	0	Ponar grab sampler											
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66	0	0.2	Ponar grab sampler											
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68	0	0	Ponar grab sampler											
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69	0	0	Ponar grab sampler											
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70	0	0	Ponar grab sampler											
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71	0	0.2	Ponar grab sampler											
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73	0	0.2	Ponar grab sampler											
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74	0	0.2	Ponar grab sampler											
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76	0	0.2	Ponar grab sampler											
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77	0	0.2	Ponar grab sampler											
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79	0	0.2	Ponar grab sampler											
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81	0	0.2	Ponar grab sampler											
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83	0	0.2	Ponar grab sampler											
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84	0	0.2	Ponar grab sampler											
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85	0	0.2	Ponar grab sampler											
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86	0	0	Ponar grab sampler											
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87	0	0	Ponar grab sampler											
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91	0	0.2	Ponar grab sampler											
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92	0	0.2	Ponar grab sampler											
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93	0	0.2	Ponar grab sampler											
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95	0	0.2	Ponar grab sampler											
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1	0	0	Van Veen grab sampler/vibracorer											
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2	0	0	Van Veen grab sampler/vibracorer											

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Depth - Top (m)	Depth - Bottom (m)	Sampling Method	1-1-1-2-Tetrachloroethane-Solid (mg/kg)	1-1-1-Trichloroethane-Solid (mg/kg)	1-1-2-2-Tetrachloroethane-Solid (mg/kg)	1-1-2-Trichloroethane-Solid (mg/kg)	1-1-Dichloroethane-Solid (mg/kg)	1-1-dichloroethylene-solid (mg/kg)	1-2-3-4-6-7-8-HpCDD-Solid (ng/kg)	1-2-3-4-6-7-8-HpCDF-Solid (ng/kg)	1-2-3-4-7-8-9-HpCDF-Solid (ng/kg)	1-2-3-4-7-8-HxCDD-Solid (ng/kg)	1-2-3-4-7-8-HxCDF-Solid (ng/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3	0	0	Van Veen grab sampler/vibracorer											
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6	0	0	Van Veen grab sampler/vibracorer											
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7	0	0	Van Veen grab sampler/vibracorer											
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9	0	0	Van Veen grab sampler/vibracorer											
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12	0	0	Van Veen grab sampler/vibracorer											
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1	0	0	Van Veen grab sampler/vibracorer											
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1	0	0	Van Veen grab sampler/vibracorer											
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1	0	0	Van Veen grab sampler/vibracorer											
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2	0	0	Van Veen grab sampler/vibracorer											
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4	0	0	Van Veen grab sampler/vibracorer											
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72	0	0.2	Ponar grab sampler							379	303	2.66	1.96	4.15
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89	0	0.2	Ponar grab sampler							9.83	<1.2	<0.4	0.57	0.75
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)	0.5	0.5	Sonic drilling											
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)	0.5	0.5	Sonic drilling											
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)	0.5	0.5	Sonic drilling											
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)	0.5	0.5	Sonic drilling											
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)	0.5	0.5	Sonic drilling											
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)	0.5	0.5	Sonic drilling											
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)	0.5	0.5	Sonic drilling											
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	0	0	Ponar grab sampler							86.9	16.3	0.56	2.15	1.49
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	0	0	Ponar grab sampler							162	84.2	1.27	1.71	2.51
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	0	0	Ponar grab sampler							235	17.8	0.78	1.01	0.873
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	0	0	Ponar grab sampler							578	57.7	1.93	1.8	2.97
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	0	0	Ponar grab sampler							266	28.5	1.07	0.8	0.855
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E	0	0	Ponar grab sampler	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050					
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	0	0	Ponar grab sampler	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	12.2	7.92	0.19	0.19	0.22
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	0	0	Ponar grab sampler	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	51.7	12	0.41	0.62	0.81
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	0	0	Ponar grab sampler	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	45.4	10.6	0.47	0.79	0.83
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F	0	0	Ponar grab sampler	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050					
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G	0	0	Ponar grab sampler	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050					
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H	0	0	Ponar grab sampler	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050					
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I	0	0	Ponar grab sampler	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050					
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2	0	0	Van Veen grab sampler							40.2	59.8	0.99	<1.1	1.89
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4	0	0	Van Veen grab sampler											
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6	0	0	Van Veen grab sampler											
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7	0	0	Van Veen grab sampler							24.1	11.9	0.385	<0.22	0.895
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8	0	0	Van Veen grab sampler							119	20.4	0.946	<1.2	2.34
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10	0	0	Van Veen grab sampler											
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11	0	0	Van Veen grab sampler											
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12	0	0	Van Veen grab sampler							9.07	4.93	0.225	<0.18	0.32
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102	0	0	Van Veen grab sampler											
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103	0	0	Van Veen grab sampler											
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104	0	0	Van Veen grab sampler											
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105	0	0	Van Veen grab sampler											
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107	0	0	Van Veen grab sampler											
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108	0	0	Van Veen grab sampler											
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109	0	0	Van Veen grab sampler											
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110	0	0	Van Veen grab sampler											
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111	0	0	Van Veen grab sampler											
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112	0	0	Van Veen grab sampler											
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114	0	0.2	Van Veen grab sampler							0.966	0.243	0.012	0.204	<1
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116	0	0	Van Veen grab sampler											
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117	0	0	Van Veen grab sampler											

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Depth - Top (m)	Depth - Bottom (m)	Sampling Method	1-1-1-2-Tetrachloroethane-Solid (mg/kg)	1-1-1-Trichloroethane-Solid (mg/kg)	1-1-2-2-Tetrachloroethane-Solid (mg/kg)	1-1-2-Trichloroethane-Solid (mg/kg)	1-1-Dichloroethane-Solid (mg/kg)	1-1-dichloroethylene-solid (mg/kg)	1-2-3-4-6-7-8-HpCDD-Solid (ng/kg)	1-2-3-4-6-7-8-HpCDF-Solid (ng/kg)	1-2-3-4-7-8-9-HpCDF-Solid (ng/kg)	1-2-3-4-7-8-HxCDD-Solid (ng/kg)	1-2-3-4-7-8-HxCDF-Solid (ng/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118	0	0.2	Van Veen grab sampler							1.03	0.123	0.0025	0.013	<1
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)	0.1	0.1	Ponar grab sampler											
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01	0	0	Ponar grab sampler											
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01	0	0	Ponar grab sampler											
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02	0	0	Ponar grab sampler											
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A	0	0	Ponar grab sampler											
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03	0	0	Ponar grab sampler											
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03	0	0	Ponar grab sampler											
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04	0	0	Ponar grab sampler											
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05	0	0	Ponar grab sampler											
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05	0	0	Ponar grab sampler											
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06	0	0	Ponar grab sampler											
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A	0	0	Ponar grab sampler											
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08	0	0	Ponar grab sampler											
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09	0	0	Ponar grab sampler											
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10	0	0	Ponar grab sampler											
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11	0	0	Ponar grab sampler											
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	98.3	21.7	0.61	1.92	1.485
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	0	0	Ponar grab sampler	0.05	0.05	0.05	0.05	0.05	0.05	70.5	17.9	<0.57333	<1.08	<1.19
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1470	320.5	6.49	6.72	15.25
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	0	0	Ponar grab sampler	0.05	0.05	0.05	0.05	0.05	0.05	1133	103.3	3.04	<1.59667	2.6
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	0	0	Ponar grab sampler							174	33.7	1.12	2.02	1.83
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	0	0	Ponar grab sampler							264	55.7	1.57	<1.0	4.19
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	0	0	Ponar grab sampler							107	43.8	0.63	0.73	1.64
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	0	0	Ponar grab sampler							63.6	<13.0	0.75	0.45	<0.73
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	0	0	Ponar grab sampler							368	66	1.01	<1.650	2.20
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07	0	0	Ponar grab sampler											
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	0	0	Ponar grab sampler							161	27.3	0.86	0.75	1.36
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08	0	0	Ponar grab sampler											
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	0	0	Ponar grab sampler							79	13.66	0.39	1.04	0.98
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	0	0	Ponar grab sampler							30.5	7.8	<0.2943	<0.78	0.666
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	0	0	Ponar grab sampler							44.7	11.1	<0.31	<0.55	0.854
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	0	0	Ponar grab sampler							56	5.46	0.277	<0.21	0.5
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	0	0	Ponar grab sampler							89.7	34	1.01	1.43	2.98
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	0	0	Ponar grab sampler							87.2	20.2	0.557	0.907	1.52
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	0	0	Ponar grab sampler							78.6	13.5	0.439	0.989	0.972
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	81.2	26.9	1.22	2.23	2.91
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	161	43.9	<0.69	<0.7	1.3
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	281	69.1	<1.3	1.76	2.54
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	587	180	2.6	4.2	5.48
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	446	134	<1.9	<1.7	3.74
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	689	148	<2.5	4.09	5.23
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	83.8	27.9	<0.64	1.98	2.14
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	80.5	37.2	1.27	2.25	3.01
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	116	43.3	1.64	<1.6	2.94
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	0	0	Ponar grab sampler	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	450	24.8	<0.86	<1.0	1.37

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	1-2-3-6-7-8-HxCDD-Solid (ng/kg)	1-2-3-6-7-8-HxCDF-Solid (ng/kg)	1-2-3-7-8-9-HxCDD-Solid (ng/kg)	1-2-3-7-8-9-HxCDF-Solid (ng/kg)	1-2-3-7-8-PeCDD-Solid (ng/kg)	1-2-3-7-8-PeCDF-Solid (ng/kg)	1-2-3-trichlorobenzene-Solid (mg/kg)	1-2-4-trichlorobenzene-Solid (mg/kg)	12-Chlorodehydroabietic Acid-Solid (mg/kg)	1-2-Dibromoethane-Solid (mg/kg)	1-2-Dichlorobenzene-Solid (mg/kg)	1-2-Dichloroethane-Solid (mg/kg)	1-2-Dichloropropane-Solid (mg/kg)	1-3-5-trimethylbenzene-Solid (mg/kg)	1-3-Dichlorobenzene-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2	24	0.7	11	0.6	2.4	1.4									
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3	51	3.4	21	1.2	4.9	5.5									
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4	40	8.5	19	2.9	4.1	2.5									
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5	9.6	0.8	<0.5	0.8	<0.3	<0.3									
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6	65	1.9	30	0.8	5.9	2.5									
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7	16	<0.5	8.9	<0.5	2	0.9									
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01															
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02															
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03															
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05															
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06															
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07															
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08															
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09															
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10															
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11															
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200															
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202															
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204															
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206															
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208															
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209															
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210															
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212															
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)															
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234															
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236															
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66															
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68															
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69															
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70															
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71															
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73															
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74															
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76															
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77															
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79															
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81															
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83															
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84															
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85															
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86															
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87															
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91															
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92															
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93															
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95															
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1															
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2															

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	1-2-3-6-7-8-HxCDD-Solid (ng/kg)	1-2-3-6-7-8-HxCDF-Solid (ng/kg)	1-2-3-7-8-9-HxCDD-Solid (ng/kg)	1-2-3-7-8-9-HxCDF-Solid (ng/kg)	1-2-3-7-8-PeCDD-Solid (ng/kg)	1-2-3-7-8-PeCDF-Solid (ng/kg)	1-2-3-trichlorobenzene-Solid (mg/kg)	1-2-4-trichlorobenzene-Solid (mg/kg)	12-Chlorodehydroabietic Acid-Solid (mg/kg)	1-2-Dibromoethane-Solid (mg/kg)	1-2-Dichlorobenzene-Solid (mg/kg)	1-2-Dichloroethane-Solid (mg/kg)	1-2-Dichloropropane-Solid (mg/kg)	1-3-5-trimethylbenzene-Solid (mg/kg)	1-3-Dichlorobenzene-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3															
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6															
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7															
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9															
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12															
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1															
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1															
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1															
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2															
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4															
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72	64.8	3.35	32.7	<0.2	5.84	2.39			<0.020						
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89	3.48	<0.4	2.37	0.32	0.81	0.69			<0.050						
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)															
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)															
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)															
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)															
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)															
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)															
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)															
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	16.3	1.51	8.42	0.4	2.65	3.99									
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	13.3	3.05	4.93	1.46	2.86	25.6									
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	7.38	1.36	2.8	0.569	0.964	10.1									
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	21.5	2.71	7.55	1.88	2.72	19.2									
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	16.8	0.908	7.4	0.53	1.31	9.75									
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E							<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	3.29	0.283	1.68	0.11	0.409	0.8	<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	28.9	0.79	12.8	0.25	2.67	1.2	<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	22.8	0.79	10.9	0.32	1.7	1.78	<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F							<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G							<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H							<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I							<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2	65.9	1.44	148	0.632	4.46	1.76									
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4															
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6															
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7	29.9	0.734	51.3	0.284	2.4	1.12									
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8	159	1.6	163	0.75	13.3	7.96									
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10															
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11															
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12	11	0.29	16.5	0.14	1.02	0.71									
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102															
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103															
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104															
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105															
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107															
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108															
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109															
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110															
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111															
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112															
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114	10.5	<1	4.99	<1	4.69	0.181			0.014						
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116															
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117															

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	1-2-3-6-7-8-HxCDD-Solid (ng/kg)	1-2-3-6-7-8-HxCDF-Solid (ng/kg)	1-2-3-7-8-9-HxCDD-Solid (ng/kg)	1-2-3-7-8-9-HxCDF-Solid (ng/kg)	1-2-3-7-8-PeCDD-Solid (ng/kg)	1-2-3-7-8-PeCDF-Solid (ng/kg)	1-2-3-trichlorobenzene-Solid (mg/kg)	1-2-4-trichlorobenzene-Solid (mg/kg)	12-Chlorodehydroabietic Acid-Solid (mg/kg)	1-2-Dibromoethane-Solid (mg/kg)	1-2-Dichlorobenzene-Solid (mg/kg)	1-2-Dichloroethane-Solid (mg/kg)	1-2-Dichloropropane-Solid (mg/kg)	1-3-5-trimethylbenzene-Solid (mg/kg)	1-3-Dichlorobenzene-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118	14.6	<1	6.6	<1	4.275	0.14			0.024						
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)															
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01															
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01															
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02															
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A															
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03															
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03															
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04															
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05															
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05															
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06															
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A															
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08															
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09															
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10															
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11															
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	82.7	1.62	37.5	0.53	7.79	3.9					<0.05	<0.05	<0.05		<0.05
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	13.9	<0.99733	5.8	0.5	2.15	<5.0333					0.05	0.05	0.05		0.05
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	85.5	14.29	36	6.7	13.04	18.7					<0.05	<0.05	<0.05		<0.05
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	63.7	<2.7667	27	1.3	<5.010	<8.933					0.05	0.05	0.05		0.05
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	70.5	1.74	31.3	0.8	6.12	8.5									
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	53.9	2.74	20	1.5	4.52	9.6									
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	26.3	<1.1	11.3	<0.59	2.40	5.7									
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	10.8	0.62	4.58	0.3	1.28	1.3									
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	28.7	1.72	11.43	0.8	3.18	3.9									
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07															
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	80.8	<1.2	31.1	0.5	5.98	4.2									
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08															
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	18.5	0.67	7.7	0.4	1.69	2.1									
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	17.1	<0.652	7.65	0.2	2.04	2.08									
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	19.9	0.607	9.18	0.4	1.74	2.5									
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	14.7	0.426	7.13	0.2	1.10	2.52									
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	84.3	1.86	36.6	0.928	5.65	9.6									
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	31.8	1.07	12.8	0.887	3.24	3.06									
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	43.2	<0.99	17.8	0.319	3.68	2.36									
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	26.9	2.48	11.8	<0.89	4.17	<7.7					<0.05	<0.05	<0.05		<0.05
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	98.1	<1.8	41.4	<0.67	6.21	<3.2					<0.05	<0.05	<0.05		<0.05
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	26.7	<2.6	10.8	<1.1	<2.7	<5.7					<0.05	<0.05	<0.05		<0.05
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	44.3	<6.6	18.8	<2.2	<6.9	<16.0					<0.05	<0.05	<0.05		<0.05
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	73	<2.9	31	2.39	<3.9	<20.0					<0.05	<0.05	<0.05		<0.05
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	47.8	<7.0	19.7	3.13	6.78	<16.0					<0.05	<0.05	<0.05		<0.05
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	41	2.56	18.9	<0.67	4.83	<9.8					<0.05	<0.05	<0.05		<0.05
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	37.9	2.53	17.6	<0.85	3.99	<6.1					<0.05	<0.05	<0.05		<0.05
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	31.7	<2.4	13.7	1.56	3.55	<6.2					<0.05	<0.05	<0.05		<0.05
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	27.2	<1.0	11.2	<0.4	2.32	<4.4					<0.05	<0.05	<0.05		<0.05

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	1-3-Dichloropropane-solid (mg/kg)	1-3-dichloropropylene(cis+trans)-solid (mg/kg)	1-3-dichloropropylene,cis-solid (mg/kg)	1-3-dichloropropylene,trans-solid (mg/kg)	14-Chlorodehydroabietic Acid-Solid (mg/kg)	1-4-Dichlorobenzene-Solid (mg/kg)	1-Methylnaphthalene-Solid (mg/kg)	2,3,4,5-Tetrachlorophenol-Solid (mg/kg)	2-3-4-6-7-8-HxCDF-Solid (ng/kg)	2,3,4,6-Tetrachlorophenol-Solid (mg/kg)	2-3-4-7-8-PeCDF-Solid (ng/kg)	2,3,4-Trichlorophenol-Solid (mg/kg)	2,3,5,6-Tetrachlorophenol-Solid (mg/kg)	2,3,5-Trichlorophenol-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2									0.8		1.5			
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3									4		4.7			
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4									9.1		5.9			
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5									0.9		1.1			
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6									2.5		3.1			
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7									0.6		1.2			
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01							0.9							
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02							0.1							
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03							0.3							
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04														
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05							2							
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06							0.9							
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07							1.8							
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08							3.6							
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09							0.2							
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10							0.2							
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11							0.06							
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200														
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202														
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203														
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204														
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206														
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207														
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208														
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209														
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210														
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211														
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212														
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)														
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234														
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236														
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66														
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68														
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69														
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70														
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71														
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73														
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74														
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76														
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77														
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79														
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81														
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83														
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84														
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85														
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86														
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87														
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91														
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92														
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93														
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95														
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1														
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2														

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	1-3-Dichloropropane-solid (mg/kg)	1-3-dichloropropylene(cis+trans)-solid (mg/kg)	1-3-dichloropropylene,cis-solid (mg/kg)	1-3-dichloropropylene,trans-solid (mg/kg)	14-Chlorodehydroabietic Acid-Solid (mg/kg)	1-4-Dichlorobenzene-Solid (mg/kg)	1-Methylnaphthalene-Solid (mg/kg)	2,3,4,5-Tetrachlorophenol-Solid (mg/kg)	2-3-4-6-7-8-HxCDF-Solid (ng/kg)	2,3,4,6-Tetrachlorophenol-Solid (mg/kg)	2-3-4-7-8-PeCDF-Solid (ng/kg)	2,3,4-Trichlorophenol-Solid (mg/kg)	2,3,5,6-Tetrachlorophenol-Solid (mg/kg)	2,3,5-Trichlorophenol-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3														
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6														
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7														
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9														
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12														
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1														
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1														
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1														
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2														
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4														
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72					0.028			<0.020	2.72	<0.020	3.26	<0.020	<0.020	<0.020
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89					<0.020			<0.020	0.37	<0.020	0.92	<0.020	<0.020	<0.020
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)														
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)														
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)														
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)														
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)														
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)														
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)														
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E							0.038		1.2		2.84			
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F							0.173		2.62		2.99			
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H							0.064		0.9		3.76			
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I							0.06		2.54		6.06			
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J							0.134		0.587		2.62			
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E	<0.050	<0.075	<0.050	<0.050		<0.050	0.013							
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	<0.050	<0.075	<0.050	<0.050		<0.050	<0.010		0.4		0.468			
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	<0.050	<0.075	<0.050	<0.050		<0.050	0.029		0.75		1.67			
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	<0.050	<0.075	<0.050	<0.050		<0.050	<0.010		0.884		2.08			
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F	<0.050	<0.075	<0.050	<0.050		<0.050	0.096							
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G	<0.050	<0.075	<0.050	<0.050		<0.050	0.096							
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H	<0.050	<0.075	<0.050	<0.050		<0.050	0.15							
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I	<0.050	<0.075	<0.050	<0.050		<0.050	0.146							
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2									1.87		3.99			
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4														
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6														
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7									0.802		1.93			
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8									2.08		9.24			
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10														
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11														
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12									0.407		0.931			
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102														
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103														
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104														
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105														
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107														
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108														
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109														
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110														
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111														
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112														
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114					0.036				<1		2.16			
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116														
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117														

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	1-3-Dichloropropane-solid (mg/kg)	1-3-dichloropropylene(cis+trans)-solid (mg/kg)	1-3-dichloropropylene,cis-solid (mg/kg)	1-3-dichloropropylene,trans-solid (mg/kg)	14-Chlorodehydroabietic Acid-Solid (mg/kg)	1-4-Dichlorobenzene-Solid (mg/kg)	1-Methylnaphthalene-Solid (mg/kg)	2,3,4,5-Tetrachlorophenol-Solid (mg/kg)	2-3-4-6-7-8-HxCDF-Solid (ng/kg)	2,3,4,6-Tetrachlorophenol-Solid (mg/kg)	2-3-4-7-8-PeCDF-Solid (ng/kg)	2,3,4-Trichlorophenol-Solid (mg/kg)	2,3,5,6-Tetrachlorophenol-Solid (mg/kg)	2,3,5-Trichlorophenol-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118					0.062				<1		1.895			
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)														
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01														
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01														
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02														
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A														
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03														
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03														
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04														
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05														
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05														
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06														
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A														
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08														
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09														
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10														
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11														
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED		<0.075	<0.05	<0.05		<0.05	0.03		1.12		6.0			
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A		<0.075	0.05	0.05		0.05	0.02		<1.117		3.3			
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED		<0.075	<0.05	<0.05		<0.05	1.83		15.35		35.3			
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A		<0.075	0.05	0.05		0.05	0.26		4.89		<10.09			
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02							0.06		<2.1		6.22			
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03							0.12		<3.2		10.0			
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04							0.10		<2.0		5.0			
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05							0.06		<0.94		1.7			
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A							0.17		2.44		4.4			
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07														
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07							0.03		<1.7		5.2			
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08														
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A							0.01		0.97		1.9			
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A							0.01		0.73		1.9			
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10							0.02		0.90		2.2			
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11							0.05		<0.59		1.8			
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12							0.08		2.47		6.0			
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13							<0.01		0.99		3.3			
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14							0.012		<1.2		3.2			
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E		<0.075	<0.05	<0.05		<0.05	0.036		<2.9		7.37			
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F		<0.075	<0.05	<0.05		<0.05	0.035		2.78		6.03			
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G		<0.075	<0.05	<0.05		<0.05	0.197		4.65		11.1			
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H		<0.075	<0.05	<0.05		<0.05	0.487		11.8		25.8			
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I		<0.075	<0.05	<0.05		<0.05	0.138		5.62		13.1			
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J		<0.075	<0.05	<0.05		<0.05	0.319		12.4		24.3			
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K		<0.075	<0.05	<0.05		<0.05	0.029		<3.8		8.38			
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L		<0.075	<0.05	<0.05		<0.05	0.04		<1.8		6.69			
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M		<0.075	<0.05	<0.05		<0.05	0.03		<2.5		5.48			
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N		<0.075	<0.05	<0.05		<0.05	0.04		<1.7		3.81			

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	2,3,6-Trichlorophenol-Solid (mg/kg)	2-3-7-8-TCDD-Solid (ng/kg)	2-3-7-8-TCDF-Solid (ng/kg)	2,3-Dichlorophenol-Solid (mg/kg)	2,4 & 2,5 Dichlorophenol-Solid (mg/kg)	2,4,5-Trichlorophenol-Solid (mg/kg)	2,4,6-Trichlorophenol-Solid (mg/kg)	2,4-Dimethylphenol-Solid (mg/kg)	2,6-Dichlorophenol-Solid (mg/kg)	2,6-Dichlorosyringaldehyde-Solid (mg/kg)	2-Chlorophenol-Solid (mg/kg)	2-Chlorosyringaldehyde-Solid (mg/kg)	2-Methylnaphthalene-Solid (mg/kg)	3,4,5-Trichlorocatechol-Solid (mg/kg)	3,4,5-Trichloroguaiacol-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2		<0.2	24										0.06		
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3		<0.2	55										0.191		
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4		0.8	40										0.26		
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5		<0.2	3.9										0.126		
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6		1	42										0.23		
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7		0.5	17										0.046		
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01													0.7		
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02													0.1		
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03													0.3		
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05													2		
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06													1.2		
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07													4.7		
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08													4		
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09													0.2		
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10													0.08		
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11													0.07		
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200													<0.050		
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202													<0.050		
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204													<0.050		
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206													<0.050		
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208													<0.050		
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209													<0.050		
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210													<0.050		
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212															
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)													0.063		
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234													<0.050		
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236													<0.050		
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66													0.111		
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68													0.431		
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69													0.636		
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70													0.424		
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71													0.341		
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73													0.451		
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74													0.427		
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76													0.342		
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77													0.453		
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79													0.169		
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81													0.148		
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83													0.357		
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84													<0.050		
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85													0.136		
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86													<0.050		
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87													0.155		
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91													<0.050		
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92													<0.050		
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93													0.064		
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95													<0.050		
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1													<0.5		
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2													0.12		

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	2,3,6-Trichlorophenol-Solid (mg/kg)	2-3-7-8-TCDD-Solid (ng/kg)	2-3-7-8-TCDF-Solid (ng/kg)	2,3-Dichlorophenol-Solid (mg/kg)	2,4 & 2,5 Dichlorophenol-Solid (mg/kg)	2,4,5-Trichlorophenol-Solid (mg/kg)	2,4,6-Trichlorophenol-Solid (mg/kg)	2,4-Dimethylphenol-Solid (mg/kg)	2,6-Dichlorophenol-Solid (mg/kg)	2,6-Dichlorosyringaldehyde-Solid (mg/kg)	2-Chlorophenol-Solid (mg/kg)	2-Chlorosyringaldehyde-Solid (mg/kg)	2-Methylnaphthalene-Solid (mg/kg)	3,4,5-Trichlorocatechol-Solid (mg/kg)	3,4,5-Trichloroguaiacol-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3													<0.05		
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6													<0.05		
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7													<0.05		
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9													<0.5		
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12													<0.05		
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1													<0.5		
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1													<0.5		
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1													0.11		
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2													0.3		
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4													0.15		
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72	<0.020	1.26	40	<0.020	<0.040	<0.020	<0.020	<0.30	<0.020	<0.020	<0.020	<0.020		0.098	<0.020
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89	<0.020	<0.2	2.33	<0.020	<0.020	<0.020	<0.020	<0.20	<0.020	<0.020	<0.020	<0.020		<0.020	<0.020
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)													<0.0010		
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)													<0.0010		
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)													1		
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)													0.0024		
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)													0.13		
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)													0.081		
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)													0.2		
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E		0.702	10.4										0.046		
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F		0.236	3.37										0.248		
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H		0.09	1.4										0.095		
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I		0.29	4.11										0.092		
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J		0.18	4.36										0.17		
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E													0.016		
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L		0.081	2.64										0.01		
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M		0.41	23.4										0.035		
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N		0.33	17.9										0.012		
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F													0.126		
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G													0.138		
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H													0.201		
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I													0.204		
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2		0.74	19.8										0.15		
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4													0.067		
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6													0.048		
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7		0.6	15										0.049		
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8		2.07	111										0.184		
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10													0.087		
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11													0.024		
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12		0.32	6.98										<0.010		
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102															
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103													0.053		
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104													0.063		
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105															
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107															
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108															
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109															
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110															
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111															
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112															
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114		1.84	9.98										0.191		
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116													0.057		
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117								0.05					2.7		

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	2,3,6-Trichlorophenol-Solid (mg/kg)	2-3-7-8-TCDD-Solid (ng/kg)	2-3-7-8-TCDF-Solid (ng/kg)	2,3-Dichlorophenol-Solid (mg/kg)	2,4 & 2,5 Dichlorophenol-Solid (mg/kg)	2,4,5-Trichlorophenol-Solid (mg/kg)	2,4,6-Trichlorophenol-Solid (mg/kg)	2,4-Dimethylphenol-Solid (mg/kg)	2,6-Dichlorophenol-Solid (mg/kg)	2,6-Dichlorosyringaldehyde-Solid (mg/kg)	2-Chlorophenol-Solid (mg/kg)	2-Chlorosyringaldehyde-Solid (mg/kg)	2-Methylnaphthalene-Solid (mg/kg)	3,4,5-Trichlorocatechol-Solid (mg/kg)	3,4,5-Trichloroguaiacol-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118		2.61	9.59										0.422	0.128	
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)															
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01															
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01															
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02															
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A															
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03															
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03															
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04															
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05															
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05															
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06															
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A															
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08															
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09															
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10															
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11															
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED		2.3	107.5										0.035		
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A		0.545	17.8										0.032		
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED		1.775	30.7										2.210		
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A		0.6667	22.4										0.374		
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02		1.44	69.1										0.081		
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03		0.9	88.5										0.163		
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04		0.6	63.4										0.146		
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05		<0.21	5.7										0.073		
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A		0.842	25.9										0.223		
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07															
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07		1.81	81										0.035		
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08															
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A		0.436	16.0										0.018		
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A		<0.537	15.8										0.012		
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10		0.601	27.2										0.021		
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11		0.418	14.6										0.053		
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12		1.11	58.0										0.088		
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13		0.627	22.8										0.013		
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14		0.772	28.2										0.017		
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E		1.17	26.3										0.041		
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F		0.929	37.6										0.043		
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G		0.532	18.6										0.248		
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H		1.65	24.2										0.628		
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I		1.03	40.4										0.171		
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J		0.972	21.1										0.44		
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K		1.4	39.6										0.035		
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L		1.37	32.4										0.056		
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M		1.04	50										0.05		
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N		<0.61	27.1										0.053		

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	3,4,5-Trichlorophenol-Solid (mg/kg)	3,4,5-Trichlorosyringol-Solid (mg/kg)	3,4,5-Trichloroveratrole-Solid (mg/kg)	3,4,6-Trichlorocatechol-Solid (mg/kg)	3,4,6-Trichloroguaiacol-Solid (mg/kg)	3,4,6-Trichloroveratrole-Solid (mg/kg)	3,4-Dichlorocatechol-Solid (mg/kg)	3,4-Dichloroguaiacol-Solid (mg/kg)	3,4-Dichlorophenol-Solid (mg/kg)	3,5-Dichlorocatechol-Solid (mg/kg)	3,5-Dichlorophenol-Solid (mg/kg)	3,5-Dichlorosyringol-Solid (mg/kg)	3,6-Dichlorocatechol-Solid (mg/kg)	3-Chlorocatechol-Solid (mg/kg)	3-Chlorophenol-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2															
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3															
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4															
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5															
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6															
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7															
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01															
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02															
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03															
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05															
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06															
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07															
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08															
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09															
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10															
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11															
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200															
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202															
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204															
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206															
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208															
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209															
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210															
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212															
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)															
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234															
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236															
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66															
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68															
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69															
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70															
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71															
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73															
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74															
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76															
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77															
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79															
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81															
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83															
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84															
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85															
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86															
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87															
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91															
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92															
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93															
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95															
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1															
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2															

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	3,4,5-Trichlorophenol-Solid (mg/kg)	3,4,5-Trichlorosyringol-Solid (mg/kg)	3,4,5-Trichloroveratrole-Solid (mg/kg)	3,4,6-Trichlorocatechol-Solid (mg/kg)	3,4,6-Trichloroguaiacol-Solid (mg/kg)	3,4,6-Trichloroveratrole-Solid (mg/kg)	3,4-Dichlorocatechol-Solid (mg/kg)	3,4-Dichloroguaiacol-Solid (mg/kg)	3,4-Dichlorophenol-Solid (mg/kg)	3,5-Dichlorocatechol-Solid (mg/kg)	3,5-Dichlorophenol-Solid (mg/kg)	3,5-Dichlorosyringol-Solid (mg/kg)	3,6-Dichlorocatechol-Solid (mg/kg)	3-Chlorocatechol-Solid (mg/kg)	3-Chlorophenol-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3															
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6															
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7															
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9															
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12															
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1															
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1															
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1															
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2															
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4															
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.10	<0.020	<0.020	<0.020	<0.020	0.023	<0.020	<0.020
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)															
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)															
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)															
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)															
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)															
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)															
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)															
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E															
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F															
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H															
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I															
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J															
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E															
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L															
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M															
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N															
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F															
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G															
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H															
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I															
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2															
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4															
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6															
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7															
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8															
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10															
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11															
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12															
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102															
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103															
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104															
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105															
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107															
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108															
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109															
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110															
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111															
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112															
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114															
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116															
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117															

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	3,4,5-Trichlorophenol-Solid (mg/kg)	3,4,5-Trichlorosyringol-Solid (mg/kg)	3,4,5-Trichloroveratrole-Solid (mg/kg)	3,4,6-Trichlorocatechol-Solid (mg/kg)	3,4,6-Trichloroguaiacol-Solid (mg/kg)	3,4,6-Trichloroveratrole-Solid (mg/kg)	3,4-Dichlorocatechol-Solid (mg/kg)	3,4-Dichloroguaiacol-Solid (mg/kg)	3,4-Dichlorophenol-Solid (mg/kg)	3,5-Dichlorocatechol-Solid (mg/kg)	3,5-Dichlorophenol-Solid (mg/kg)	3,5-Dichlorosyringol-Solid (mg/kg)	3,6-Dichlorocatechol-Solid (mg/kg)	3-Chlorocatechol-Solid (mg/kg)	3-Chlorophenol-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118				0.029									0.027		
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)															
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01															
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01															
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02															
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A															
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03															
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03															
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04															
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05															
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05															
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06															
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A															
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08															
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09															
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10															
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11															
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED															
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A															
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED															
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A															
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02															
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03															
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04															
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05															
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A															
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07															
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07															
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08															
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A															
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A															
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10															
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11															
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12															
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13															
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14															
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E															
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F															
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G															
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H															
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I															
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J															
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K															
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L															
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M															
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N															

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	3-Chlorosyringol-Solid (mg/kg)	4,5,6-Trichloroguaiacol-Solid (mg/kg)	4,5-Dichlorocatechol-Solid (mg/kg)	4,5-Dichloroguaiacol-Solid (mg/kg)	4,5-Dichloroveratrole-Solid (mg/kg)	4,6-Dichloroguaiacol-Solid (mg/kg)	4-Chloro-3-methylphenol-Solid (mg/kg)	4-Chlorocatechol-Solid (mg/kg)	4-Chloroguaiacol-Solid (mg/kg)	4-Chlorophenol-Solid (mg/kg)	5,6-Dichlorovanillin-Solid (mg/kg)	5-Chloroguaiacol-Solid (mg/kg)	5-Chlorovanillin-Solid (mg/kg)	6-Chloroguaiacol-Solid (mg/kg)	6-Chlorovanillin-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2															
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3															
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4															
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5															
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6															
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7															
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01															
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02															
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03															
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05															
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06															
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07															
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08															
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09															
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10															
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11															
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200															
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202															
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204															
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206															
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208															
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209															
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210															
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212															
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)															
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234															
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236															
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66															
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68															
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69															
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70															
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71															
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73															
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74															
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76															
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77															
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79															
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81															
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83															
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84															
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85															
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86															
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87															
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91															
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92															
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93															
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95															
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1															
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2															

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	3-Chlorosyringol-Solid (mg/kg)	4,5,6-Trichloroguaiacol-Solid (mg/kg)	4,5-Dichlorocatechol-Solid (mg/kg)	4,5-Dichloroguaiacol-Solid (mg/kg)	4,5-Dichloroveratrole-Solid (mg/kg)	4,6-Dichloroguaiacol-Solid (mg/kg)	4-Chloro-3-methylphenol-Solid (mg/kg)	4-Chlorocatechol-Solid (mg/kg)	4-Chloroguaiacol-Solid (mg/kg)	4-Chlorophenol-Solid (mg/kg)	5,6-Dichlorovanillin-Solid (mg/kg)	5-Chloroguaiacol-Solid (mg/kg)	5-Chlorovanillin-Solid (mg/kg)	6-Chloroguaiacol-Solid (mg/kg)	6-Chlorovanillin-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3															
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6															
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7															
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9															
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12															
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1															
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1															
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1															
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2															
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4															
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72	<0.020	<0.020	0.023	<0.020	<0.020	<1.0	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.024
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.101
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)															
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)															
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)															
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)															
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)															
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)															
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)															
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E															
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F															
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H															
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I															
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J															
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E															
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L															
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M															
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N															
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F															
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G															
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H															
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I															
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2															
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4															
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6															
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7															
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8															
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10															
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11															
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12															
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102															
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103															
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104															
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105															
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107															
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108															
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109															
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110															
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111															
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112															
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114															
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116															
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117															

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	3-Chlorosyringol-Solid (mg/kg)	4,5,6-Trichloroguaiacol-Solid (mg/kg)	4,5-Dichlorocatechol-Solid (mg/kg)	4,5-Dichloroguaiacol-Solid (mg/kg)	4,5-Dichloroveratrole-Solid (mg/kg)	4,6-Dichloroguaiacol-Solid (mg/kg)	4-Chloro-3-methylphenol-Solid (mg/kg)	4-Chlorocatechol-Solid (mg/kg)	4-Chloroguaiacol-Solid (mg/kg)	4-Chlorophenol-Solid (mg/kg)	5,6-Dichlorovanillin-Solid (mg/kg)	5-Chloroguaiacol-Solid (mg/kg)	5-Chlorovanillin-Solid (mg/kg)	6-Chloroguaiacol-Solid (mg/kg)	6-Chlorovanillin-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118			0.03												
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)															
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01															
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01															
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02															
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A															
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03															
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03															
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04															
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05															
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05															
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06															
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A															
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08															
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09															
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10															
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11															
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED															
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A															
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED															
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A															
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02															
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03															
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04															
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05															
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A															
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07															
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07															
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08															
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A															
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A															
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10															
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11															
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12															
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13															
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14															
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E															
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F															
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G															
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H															
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I															
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J															
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K															
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L															
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M															
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N															

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Abietic Acid-Solid (mg/kg)	Acenaphthene-Solid (mg/kg)	Acenaphthylene-d8-Solid (%)	Acenaphthylene-Solid (mg/kg)	Acridine-Solid (mg/kg)	Silver-Solid (mg/kg)	Aluminum-Solid (mg/kg)	Ammonia-Solid (mg/kg)	Anthracene-d10-Solid (%)	Anthracene-Solid (mg/kg)	Arachidic Acid-Solid (mg/kg)	Aroclor1016-Solid (mg/kg)	Aroclor1221-Solid (mg/kg)	Aroclor1232-Solid (mg/kg)	Aroclor1242-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2		0.09		0.056						0.165					
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3		0.454		0.237						0.666					
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4		0.51		0.361						0.805					
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5		0.537		0.104						0.29					
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6		0.443		0.316						0.655					
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7		0.052		0.059						0.113					
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01		4.6		0.4						3.8					
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02		0.2		0.07						0.27					
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03		1.7		0.06						1.1					
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05		6.3		0.5						6.2					
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06		3		0.2						1.1					
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07		14		0.9						33					
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08		12		0.4						3.6					
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09		1		0.2						0.8					
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10		1.2		<0.050						0.5					
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11		0.3		0.1						0.9					
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200		<0.050	84	<0.050					92	<0.050					
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202		<0.050	81	<0.050					78	<0.050					
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204		<0.050	78	<0.050					83	<0.050					
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206		<0.050	85	<0.050					84	<0.050					
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208		<0.050	79	<0.050					69	<0.050					
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209		<0.050	83	<0.050					80	<0.050					
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210		<0.050	72	<0.050					61	<0.050					
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212															
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)		0.071	83	<0.050					71	0.11					
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234		<0.050	97	<0.050					97	<0.050					
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236		0.059	98	<0.050					98	<0.050					
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66		0.143		0.072						0.132					
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68		1.08		0.17						0.392					
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69		0.985		0.252						0.45					
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70		0.765		0.169						0.338					
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71		0.507		0.139						0.293					
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73		0.891		0.122						0.344					
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74		0.69		0.169		<2.0	19200			0.404					
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76		0.828		0.16		<2.0	17500			0.433					
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77		0.821		0.162		<2.0	19100			0.351					
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79		0.3		0.11		<2.0	19700			0.17					
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81		0.237		0.102		<2.0	18500			0.108					
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83		0.816		0.114		<2.0	15200			0.226					
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84		0.101		0.055		<2.0	14800			0.064					
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85		0.224		0.142		<2.0	15100			0.329					
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86		<0.040		0.053						<0.050					
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87		0.231		0.096						0.157					
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91		<0.040		<0.050		<2.0	11900			<0.050					
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92		0.053		<0.050		<2.0	10500			<0.050					
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93		0.069		0.194		<2.0	10200			<0.050					
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95		0.052		0.075		<2.0	16000			<0.050					
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1		<0.5		<0.5						<0.5					
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2		0.21		0.2						0.47					

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Abietic Acid-Solid (mg/kg)	Acenaphthene-Solid (mg/kg)	Acenaphthylene-d8-Solid (%)	Acenaphthylene-Solid (mg/kg)	Acridine-Solid (mg/kg)	Silver-Solid (mg/kg)	Aluminum-Solid (mg/kg)	Ammonia-Solid (mg/kg)	Anthracene-d10-Solid (%)	Anthracene-Solid (mg/kg)	Arachidic Acid-Solid (mg/kg)	Aroclor1016-Solid (mg/kg)	Aroclor1221-Solid (mg/kg)	Aroclor1232-Solid (mg/kg)	Aroclor1242-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3		<0.05		<0.05						0.13					
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6		<0.05		<0.05						<0.05					
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7		<0.05		<0.05						0.12					
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9		<0.5		<0.5						1.2					
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12		0.07		0.28						0.72					
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1		1.6		1.2						1.6					
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1		<0.5		<0.5						<0.5					
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1		0.36		0.09						0.43					
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2		0.62		<0.05						0.26					
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4		0.4		<0.05						0.2					
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72	0.872										2.76	<0.060	<0.060	<0.060	<0.060
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89	2.77										1.7	<0.080	<0.080	<0.080	<0.080
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)		0.00053	84	<0.00050		0.088	19500		86	0.0016					
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)		0.00084		<0.00050		<0.050	12100			<0.0010					
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)		3		0.11		0.288	14300			0.71					
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)		0.0033		0.0028		<0.050	8030			0.0099					
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)		0.55		0.028		0.129	10400			0.37					
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)		0.29		0.026		0.125	14400			0.22					
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)		0.18		0.073		0.121	15200			0.39					
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E		0.129		0.029	0.019	0.1	24400			0.0963		<0.0169	<0.0169	<0.0169	<0.0169
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F		0.42		0.0492	0.068	0.255	26700			0.393		<0.0040	<0.0040	<0.0040	<0.0040
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H		0.263		0.0591	0.043	0.391	26300			0.433		<0.0040	<0.0040	<0.0040	<0.0040
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I		0.229		0.129	0.098	0.158	27200			0.805		<0.0040	<0.0040	<0.0040	<0.0040
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J		0.368		0.178	0.129	0.087	23800			1.32		<0.0040	<0.0040	<0.0040	<0.0040
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E		0.0501		0.0142	0.016	0.086	23000			0.0668		<0.0144	<0.0144	<0.0144	<0.0144
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L		0.0307		0.0106	<0.010	0.096	21000			0.038		<0.0098	<0.0098	<0.0098	<0.0098
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M		0.0931		0.0322	0.024	0.086	21300			0.122		<0.0121	<0.0121	<0.0121	<0.0121
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N		0.0316		0.0171	<0.010	0.097	22400			0.0575		<0.0127	<0.0127	<0.0127	<0.0127
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F		0.164		0.125	0.027	0.13	22000			0.283		<0.0100	<0.0100	<0.0100	<0.0100
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G		0.384		0.111	0.086	0.11	21500			0.604		<0.0089	<0.0089	<0.0089	<0.0089
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H		0.556		0.138	0.093	0.177	21600			0.585		<0.0095	<0.0095	<0.0095	<0.0095
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I		0.516		0.233	0.106	0.092	20300			0.785		<0.0097	<0.0097	<0.0097	<0.0097
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2		0.307		0.056		<0.10				0.128		<0.020	<0.020	<0.020	<0.020
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4		0.13		0.0345		0.13				0.0659		<0.020	<0.020	<0.020	<0.020
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6		0.114		0.0316		0.14				0.0672		<0.020	<0.020	<0.020	<0.020
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7		0.0995		0.0245		0.11				0.0533		<0.020	<0.020	<0.020	<0.020
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8		0.368		0.0663		0.13				0.0907		<0.020	<0.020	<0.020	<0.020
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10		0.222		0.0249		0.12				0.0996		<0.020	<0.020	<0.020	<0.020
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11		0.0421		0.0339		0.13				0.0213		<0.020	<0.020	<0.020	<0.020
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12		0.0124		0.0069		0.12				0.0128		<0.020	<0.020	<0.020	<0.020
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102							22200								
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103		0.086					20000	13							
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104		0.126		0.069			21200	11		0.054					
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105							21100	12							
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107							11800								
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108							25100								
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109							25400								
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110							24100								
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111		0.046		0.067			22300	12							
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112		0.079					20400			0.085					
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114	0.751	0.371		0.121			16700	7		0.177	2.83				
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116		0.126		0.055			19900	5		0.054					
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117		0.683		8.57			7020	8		3.28					

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Abietic Acid-Solid (mg/kg)	Acenaphthene-Solid (mg/kg)	Acenaphthylene-d8-Solid (%)	Acenaphthylene-Solid (mg/kg)	Acridine-Solid (mg/kg)	Silver-Solid (mg/kg)	Aluminum-Solid (mg/kg)	Ammonia-Solid (mg/kg)	Anthracene-d10-Solid (%)	Anthracene-Solid (mg/kg)	Arachidic Acid-Solid (mg/kg)	Aroclor1016-Solid (mg/kg)	Aroclor1221-Solid (mg/kg)	Aroclor1232-Solid (mg/kg)	Aroclor1242-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118	1.01	0.191		0.87			20000	8		0.233	1.8				
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)															
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01						0.127	22200								
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01						0.102	21700								
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02						0.163	24400								
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A						0.149	21567								
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03						0.106	20000								
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03						0.105	22200								
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04						0.139	22750								
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05						0.115	21000								
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05						0.135	21100								
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06						0.13	21200								
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A						0.0957	26567								
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08						0.098	24000								
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09						0.089	24000								
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10						0.102	19600								
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11						0.092	24000								
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED		0.07935		0.0285	0.025	0.1245	22850			0.129		<0.09965	<0.09965	<0.09965	<0.09965
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A		0.0722		0.0301	0.0207	0.1277	23033			0.1381		<0.0253	<0.0253	<0.0253	<0.0253
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED		9.74		0.386	0.97	0.237	25850			11.095		<0.2	<0.2	<0.2	<0.2
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A		1.578		0.1778	0.3253	0.1597	24367			2.5557		<0.01967	<0.01967	<0.01967	<0.01967
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02		0.284		0.065	0.057	0.132	19700			0.38					
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03		0.431		0.158	0.073	0.139	27500			0.638					
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04		0.267		0.0753	0.073	0.142	21200			0.445					
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05		0.235		0.039	<0.06	0.125	22500			0.374					
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A		0.34067		0.1433	<0.0593	0.103	22067			0.4413					
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07						0.111	21700								
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07		0.0878		0.0388	<0.016	0.106	20400			0.0959					
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08						0.118	23500								
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A		0.02217		0.0222	<0.01	0.1037	23800			0.0763					
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A		0.0309		0.0197	<0.01	0.1137	22967			0.03					
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10		0.0527		0.017	<0.01	0.089	22000			0.0759					
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11		0.157		0.0344		0.095	20300			0.0503					
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12		0.257		0.0341	<0.025	0.098	20600			0.164					
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13		0.0286		0.019	<0.01	0.117	21100			0.0599					
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14		0.0331		0.0247	<0.01	0.12	23100			0.0748					
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E		0.097		0.0492	<0.018	0.133	23100			0.124		<0.0246	<0.0246	<0.0246	<0.0246
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F		0.126		0.0186	0.026	0.317	19600			0.152		<0.0145	<0.0145	<0.0145	<0.0145
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G		0.74		0.0974	0.17	0.162	23900			1.01		<0.0184	<0.0184	<0.0184	<0.0184
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H		2.02		0.273	0.386	0.209	25400			3.49		<0.0252	<0.0252	<0.0252	<0.0252
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I		0.454		0.123	0.126	0.111	25200			1.58		<0.0179	<0.0179	<0.0179	<0.0179
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J		1.48		0.179	0.422	0.183	26000			3.87		<0.0192	<0.0192	<0.0192	<0.0192
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K		0.085		0.0268	0.019	0.132	23300			0.104		<0.026	<0.026	<0.026	<0.026
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L		0.165		0.0341	0.032	0.122	22600			0.164		<0.0259	<0.0259	<0.0259	<0.0259
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M		0.0924		0.0441	<0.046	0.131	23400			0.2		<0.031	<0.031	<0.031	<0.031
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N		0.155		0.0509	0.03	0.114	22200			0.198		<0.025	<0.025	<0.025	<0.025

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Aroclor1248-Solid (mg/kg)	Aroclor1254-Solid (mg/kg)	Aroclor1260-Solid (mg/kg)	Aroclor1262-Solid (mg/kg)	Aroclor1268-Solid (mg/kg)	Arsenic-Solid (mg/kg)	Acid Volatile Sulfide-Solid (umol/g)	Acid Volatile Sulfide-Solid-mg/kg (mg/kg)	Benzo(a)pyrene Equivalancy-Solid (mg/kg)	Barium-Solid (mg/kg)	Behenic Acid-Solid (mg/kg)	Benz(a)anthracene-Solid (mg/kg)	Benzene-Solid (mg/kg)	Benzo(a)anthracene-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2						4.97	39					0.158		
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3						5.31	10					0.579		
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4						6.6	35					0.731		
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5						3.59	18					0.221		
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6						7.22	20					0.527		
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7						5.55	7.3					0.102		
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01												11		
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02												0.9		
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03												1.3		
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04														
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05												5.1		
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06												0.5		
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07												14		
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08												4.7		
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09												2.9		
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10												0.4		
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11												2.9		
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200												<0.050		<0.050
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202												0.079		0.079
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203														
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204												<0.050		<0.050
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206												<0.050		<0.050
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207														
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208												<0.050		<0.050
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209												<0.050		<0.050
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210												<0.050		<0.050
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211														
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212														
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)												0.11		
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234												0.14		
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236												0.1		
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66														0.08
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68														0.444
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69														0.339
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70														0.398
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71														0.204
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73														0.4
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74						5.5				153				0.428
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76						7				166				0.433
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77						5.9				154				0.228
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79						<5.0				163				0.144
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81						<5.0				146				0.135
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83						<5.0				138				0.275
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84						<5.0				140				<0.050
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85						<5.0				133				0.154
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86														<0.050
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87														0.166
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91						7.8				98.2				<0.050
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92						<5.0				72.8				<0.050
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93						<5.0				103				<0.050
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95						<5.0				157				<0.050
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1														0.7
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2														3.1

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Aroclor1248-Solid (mg/kg)	Aroclor1254-Solid (mg/kg)	Aroclor1260-Solid (mg/kg)	Aroclor1262-Solid (mg/kg)	Aroclor1268-Solid (mg/kg)	Arsenic-Solid (mg/kg)	Acid Volatile Sulfide-Solid (umol/g)	Acid Volatile Sulfide-Solid-mg/kg (mg/kg)	Benzo(a)pyrene Equivalancy-Solid (mg/kg)	Barium-Solid (mg/kg)	Behenic Acid-Solid (mg/kg)	Benz(a)anthracene-Solid (mg/kg)	Benzene-Solid (mg/kg)	Benzo(a)anthracene-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3														0.39
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6														0.13
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7														0.48
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9														3.6
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12														4.9
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1														4.6
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1														1.4
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1														1.5
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2														0.25
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4														0.32
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72	<0.060	<0.060	<0.060								5.6			
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89	<0.080	<0.080	<0.080								4.35			
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)						4.77			<0.010	135				0.0062
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)						2.71			<0.010	78.5				0.0012
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)						4.14			0.15	112				0.37
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)						1.23			0.033	53.1				0.0098
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)						3.33			0.61	47.8				0.57
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)						3.09			0.29	102				0.22
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)						3.52			0.58	183				0.35
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	<0.0169	0.0112	<0.0040	<0.0040	<0.0040	5.42	5.41	173	0.159	217		0.137		
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	35.2	1.63	52.2	0.948	262		1.7		
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	17.5	1.04	33.3	1.49	246		1.2		
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	9.53	13.6	437	2.52	230		3.04		
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	6.65	7	224	3.72	205		3.64		
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E	<0.0144	<0.0144	<0.0144	<0.0144	<0.0144	4.52			0.106	184		0.117	<0.0075	
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	<0.0098	<0.0098	<0.0098	<0.0098	<0.0098	4.17			0.057	181		0.051	<0.0065	
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	<0.0121	<0.0121	<0.0121	<0.0121	<0.0121	5.09			0.332	175		0.242	0.0143	
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	<0.0127	<0.0127	<0.0127	<0.0127	<0.0127	4.75			0.103	189		0.091	<0.0060	
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F	<0.0100	0.017	<0.0100	<0.0100	<0.0100	8.53			0.505	187		0.376	<0.210	
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G	<0.0089	<0.0089	<0.0089	<0.0089	<0.0089	7.62			2.31	162		0.961	0.0188	
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H	<0.0095	<0.0095	<0.0095	<0.0095	<0.0095	7.38			1.55	186		1.37	0.0225	
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I	<0.0097	<0.0097	<0.0097	<0.0097	<0.0097	6.61			2.1	175		1.96	<0.0050	
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2	<0.020	0.036	<0.020	<0.020	<0.020	4.35	42.8		0.224	105		0.234		
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4	<0.020	<0.020	<0.020	<0.020	<0.020	6.08	14.4		0.202	132		0.19		
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6	<0.020	0.069	<0.020	<0.020	<0.020	5.88	26.4		0.18	135		0.138		
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7	<0.020	<0.020	<0.020	<0.020	<0.020	5.58	15		0.076	119		0.091		
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8	<0.020	<0.020	<0.020	<0.020	<0.020	5.15	3.11		0.063	129		0.066		
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10	<0.020	0.027	<0.020	<0.020	<0.020	7.28	103		0.112	127		0.124		
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11	<0.020	<0.020	<0.020	<0.020	<0.020	5	25.4		0.036	161		0.034		
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12	<0.020	<0.020	<0.020	<0.020	<0.020	5.21	6.76		<0.020	186		0.016		
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102						6				189				
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103								11.2		162				
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104								38.2		173				0.06
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105								18.8		170				
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107										94.6				
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108						5.8				227				
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109						5.1				226				
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110										215				
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111						17.5		18.3		205				
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112						6.1				164		0.094		
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114								14.8		119	6.9	0.145		
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116								17.6		157		0.068		
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117								49.6		34.4		3.76		

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Aroclor1248-Solid (mg/kg)	Aroclor1254-Solid (mg/kg)	Aroclor1260-Solid (mg/kg)	Aroclor1262-Solid (mg/kg)	Aroclor1268-Solid (mg/kg)	Arsenic-Solid (mg/kg)	Acid Volatile Sulfide-Solid (umol/g)	Acid Volatile Sulfide-Solid-mg/kg (mg/kg)	Benzo(a)pyrene Equivalancy-Solid (mg/kg)	Barium-Solid (mg/kg)	Behenic Acid-Solid (mg/kg)	Benz(a)anthracene-Solid (mg/kg)	Benzene-Solid (mg/kg)	Benzo(a)anthracene-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118								14.8		156	5.9	0.167		
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)														
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01						5.67		63.7		172				
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01						5.99	14.5	463		169				
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02						5.9		876		188				
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A						6.7	13.6	435.3		174.7				
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03						4.72		128		155				
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03						5.2	8.53	273		163				
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04						6.795		520.5		184.5				
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05						4.92		99		165				
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05						6.38	5	160		158				
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06						7.9		6.6		159				
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A						6.4	33.4	1070.3		199.7				
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08						4.41	26.1	835		185				
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09						5.13	13.6	437		178				
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10						5	2.4	76.9		155				
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11						4.96	13.9	446		188				
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	<0.09965	<0.09965	<0.09965	<0.09965	<0.09965	5.375			0.328	175		0.2395	0.02555	
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	<0.0253	<0.0253	<0.0253	<0.0253	<0.0253	6.16			0.354	160.7		0.288	0.0201	
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	<0.2	<0.2	<0.2	<0.2	<0.2	19.45			6.725	247.5		11.005	0.0336	
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	<0.01967	<0.01967	<0.01967	<0.01967	<0.01967	11.5			2.4	208.7		3.34	0.0702	
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02						5.95	15.1	482	1.07	152		0.747	0.065	
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03						7.71	21.2	677	2.38	213		1.86	0.0287	
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04						8.61	13.3	426	1.16	153		0.901	0.0221	
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05						7.74	21.6	692	0.555	170		0.747	0.0232	
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A						6.21	15.9	509.3	1.086	167.7		0.943	0.0606	
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07						4.34		183		177				
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07						4.73	5.19	166	0.233	144		0.245	0.0408	
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08						6.03		266		182				
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A						5.67	4.76	152.3	0.1467	177.3		0.126	<0.00893	
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A						5.3	11.7	373	0.051	186.7		0.05133	0.089	
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10						5.03	13	416	0.175	172		0.148	0.0418	
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11						5.18	1.12	35.8	<0.02	162		0.042	0.0617	
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12						5.48	7.19	230	0.176	164		0.276	0.0325	
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13						5.12	5.66	181	0.147	150		0.131	0.0176	
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14						5.91	12.8	411	0.166	163		0.169	0.0277	
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	<0.0246	<0.0246	<0.0246	<0.0246	<0.0246	5.96			0.375	169		0.184	0.0353	
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	<0.0145	<0.0145	<0.0145	<0.0145	<0.0145	9.67			0.214	181		0.258	0.179	
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	<0.0184	<0.0184	<0.0184	<0.0184	<0.0184	10.9			1.14	203		1.62	0.0116	
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	<0.0252	<0.0252	<0.0252	<0.0252	<0.0252	19.1			2.62	239		3.77	0.0866	
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	<0.0179	<0.0179	<0.0179	<0.0179	<0.0179	6.23			1.82	192		2.3	0.0249	
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	<0.0192	0.0996	0.025	<0.0192	<0.0192	12.6			2.53	225		3.8	0.0157	
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	<0.026	<0.026	<0.026	<0.026	<0.026	5.32			0.254	168		0.198	0.0388	
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	<0.0259	<0.0259	<0.0259	<0.0259	<0.0259	5.18			0.615	168		0.408	0.0558	
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	<0.031	0.0542	<0.031	<0.031	<0.031	6.03			0.448	181		0.364	0.0138	
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	<0.025	<0.025	<0.025	<0.025	<0.025	4.95			0.468	172		0.32	0.0288	

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Benzo(a)pyrene-Solid (mg/kg)	Benzo(b)fluoranthene-Solid (mg/kg)	Benzo(b+j)fluoranthene-Solid (mg/kg)	Benzo(b+j+k)fluoranthene-Solid (mg/kg)	Benzo(g-h-i)perylene-Solid (mg/kg)	Benzo(k)fluoranthene-Solid (mg/kg)	Beryllium-Solid (mg/kg)	Bi-Solid (mg/kg)	Bisphenol-A-Solid (mg/kg)	Bromobenzene-Solid (mg/kg)	Bromoform-Solid (mg/kg)	Bromomethane-Solid (mg/kg)	Bromide (Br) (mg/kg)	Boron-Solid (mg/kg)	Carbon Tetrachloride-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2	0.083	0.119	0.185		0.041	0.055									
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3	0.265	0.337	0.534		0.115	0.221									
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4	0.364	0.437	0.695		0.154	0.239									
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5	0.107	0.152	0.234		0.042	0.065									
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6	0.291	0.49	0.727		0.144	0.23									
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7	0.046	0.071	0.107		0.023	0.033									
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01	4.4		6.2		1.7	3									
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02	0.59		0.9		0.2	0.3									
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03	0.49		0.7		0.1	0.4									
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05	3		5.6		0.8	1.41									
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06	0.2		0.4		<0.054	0.079									
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07	4.5		8		1.3	3.65									
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08	1.5		3.6		0.9	1.79									
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09	0.7		2.2		0.3	1.09									
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10	0.1		0.2		0.07	0.06									
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11	1.2		1.7		0.3	0.89									
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200	<0.050	<0.050	<0.050		<0.050	<0.050									
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202	0.051	0.061	0.094		<0.050	<0.050									
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204	<0.050	<0.050	<0.050		<0.050	<0.050									
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206	<0.050	<0.050	<0.050		<0.050	<0.050									
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208	<0.050	<0.050	<0.050		<0.050	<0.050									
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209	<0.050	<0.050	<0.050		<0.050	<0.050									
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210	<0.050	<0.050	<0.050		<0.050	<0.050									
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212															
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)	0.059	0.071	0.11		<0.050	<0.050									
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234	0.071	0.093	0.14		<0.050	<0.050									
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236	0.051	0.076	0.11		<0.050	<0.050									
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66	<0.050	0.091			<0.050	<0.050									
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68	0.278	0.55			0.124	0.231									
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69	0.154	0.317			0.052	0.136									
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70	0.203	0.414			0.083	0.159									
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71	0.097	0.218			<0.050	0.078									
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73	0.196	0.375			0.081	0.153									
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74	0.205	0.393			<0.050	0.161	<0.50								
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76	0.175	0.367			0.068	0.148	<0.50								
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77	0.096	0.222			<0.050	0.085	<0.50								
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79	0.061	0.136			<0.050	0.073	<0.50								
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81	0.057	0.119			<0.050	0.064	<0.50								
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83	0.16	0.296			0.072	0.115	<0.50								
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84	<0.050	<0.050			<0.050	<0.050	<0.50								
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85	0.064	0.143			<0.050	0.066	<0.50								
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86	<0.050	<0.050			<0.050	<0.050									
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87	0.095	0.186			<0.050	0.077									
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91	<0.050	<0.050			<0.050	<0.050	<0.50								
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92	<0.050	<0.050			<0.050	<0.050	<0.50								
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93	<0.050	<0.050			<0.050	<0.050	<0.50								
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95	<0.050	<0.050			<0.050	<0.050	<0.50								
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1	<0.5	0.9			<0.5	<0.5									
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2	1.1	2.5			0.48	0.89									

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Benzo(a)pyrene-Solid (mg/kg)	Benzo(b)fluoranthene-Solid (mg/kg)	Benzo(b+j)fluoranthene-Solid (mg/kg)	Benzo(b+j+k)fluoranthene-Solid (mg/kg)	Benzo(g-h-i)perylene-Solid (mg/kg)	Benzo(k)fluoranthene-Solid (mg/kg)	Beryllium-Solid (mg/kg)	Bi-Solid (mg/kg)	Bisphenol-A-Solid (mg/kg)	Bromobenzene-Solid (mg/kg)	Bromoform-Solid (mg/kg)	Bromomethane-Solid (mg/kg)	Bromide (Br) (mg/kg)	Boron-Solid (mg/kg)	Carbon Tetrachloride-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3	0.19	0.41			0.08	0.16									
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6	0.06	0.1			<0.05	<0.05									
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7	0.26	0.53			0.1	0.32									
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9	1.6	3.5			0.7	1.6									
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12	2.4	3.9			0.69	1.5									
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1	4.7	11			1.8	3.7									
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1	0.8	1.7			<0.5	0.7									
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1	0.47	1.2			0.16	0.41									
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2	0.12	0.29			<0.05	0.1									
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4	0.12	0.29			0.05	0.14									
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72									2.6						
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89									24						
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)	0.0014	0.002	0.0031		<0.0020	<0.0010	0.2							14.4	
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)	<0.0010	0.0013	0.0013		<0.0020	<0.0010	<0.20							11.8	
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)	0.077	0.12	0.17		0.03	0.049	0.2							22	
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)	0.024	0.018	0.027		0.0099	0.0097	<0.20							4.6	
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)	0.38	0.4	0.6		0.22	0.2	<0.20							79.1	
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)	0.19	0.2	0.3		0.11	0.094	<0.20							49.1	
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)	0.38	0.31	0.48		0.21	0.16	0.29							94.1	
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	0.1		0.184	0.24	0.05	0.056	0.22	<0.10						29.3	
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	0.559		0.928	1.29	0.147	0.364	0.48	0.3						76.5	
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	0.98		1.67	2.29	0.373	0.616	0.3	0.17						41.1	
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	1.58		2.71	3.66	0.546	0.954	0.28	0.18						31.8	
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	2.39		3.9	5.11	0.906	1.21	0.23	0.15						27.1	
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E	0.07		0.119	0.162	0.027	0.043	0.21	<0.10		<0.050	<0.050	<0.050		24.7	<0.050
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	0.037		0.068	0.093	0.02	0.025	0.2	<0.10		<0.050	<0.050	<0.050		15	<0.050
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	0.219		0.335	0.451	0.102	0.116	0.2	<0.10		<0.050	<0.050	<0.050		20.8	<0.050
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	0.064		0.118	0.153	0.033	0.035	0.21	<0.10		<0.050	<0.050	<0.050		17.3	<0.050
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F	0.328		0.514	0.722	0.18	0.208	0.21	0.17		<0.050	<0.050	<0.050		21.3	<0.050
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G	1.6		2.48	3.26	0.654	0.777	0.22	0.31		<0.050	<0.050	<0.050		21	<0.050
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H	1		1.65	2.23	0.382	0.584	0.24	0.12		<0.050	<0.050	<0.050		23.5	<0.050
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I	1.35		2.41	3.26	0.407	0.854	0.22	0.14		<0.050	<0.050	<0.050		22.8	<0.050
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2	0.14	0.295		0.398	0.062	0.103	<0.20						51		
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4	0.122	0.286		0.398	0.037	0.112	0.24						46		
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6	0.105	0.294		0.394	0.043	0.101	0.23						61		
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7	0.045	0.104		0.145	0.023	0.041	<0.20						45		
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8	0.034	0.106		0.149	0.016	0.044	<0.20						65		
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10	0.069	0.151		0.218	0.036	0.067	<0.20						113		
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11	0.022	0.044		0.065	0.013	0.022	0.21						60		
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12	<0.010	0.023		0.023	<0.010	<0.010	0.23						60		
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102															
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103		0.052													
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104		0.058													
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105															
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107															
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108															
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109															
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110															
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111															
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112	0.064	0.144													
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114	0.078	0.176				0.064			0.0298						
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116		0.055													
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117	2.07	3.78			0.667	1.52									

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Benzo(a)pyrene-Solid (mg/kg)	Benzo(b)fluoranthene-Solid (mg/kg)	Benzo(b+j)fluoranthene-Solid (mg/kg)	Benzo(b+j+k)fluoranthene-Solid (mg/kg)	Benzo(g-h-i)perylene-Solid (mg/kg)	Benzo(k)fluoranthene-Solid (mg/kg)	Beryllium-Solid (mg/kg)	Bi-Solid (mg/kg)	Bisphenol-A-Solid (mg/kg)	Bromobenzene-Solid (mg/kg)	Bromoform-Solid (mg/kg)	Bromomethane-Solid (mg/kg)	Bromide (Br) (mg/kg)	Boron-Solid (mg/kg)	Carbon Tetrachloride-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118	0.081	0.162				0.053			0.0156						
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)															
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01							0.23	0.13						21.2	
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01							0.23	0.11						21.7	
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02							0.24	0.15						28.2	
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A							0.2567	0.1533						25.7	
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03							0.2	0.1						17.9	
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03							0.23	0.16						22.3	
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04							0.26	0.155						35.05	
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05							0.22	0.13						20	
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05							0.23	0.16						28.6	
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06							0.25	0.21						38.6	
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A							0.25	0.1133						38.2	
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08							0.23	<0.1						25.7	
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09							0.23	<0.1						27.9	
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10							0.2	0.14						22.4	
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11							0.24	<0.1						27.8	
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	0.2145		0.294	0.421	0.1015	0.127	0.23	0.115			<0.05			25.7	
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	0.2253		0.353	0.485	0.1097	0.132	0.2333	0.13			0.05			30.7	
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	4.155		6.21	8.42	1.135	2.21	0.44	0.49			<0.05			59.3	
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	1.46		2.18	2.95	0.454	0.7737	0.3367	0.3033			0.05			41.6	
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	0.71		1.02	1.39	0.322	0.371	0.21	0.11					74.1	27.2	
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	1.59		2.1	2.86	0.802	0.764	0.27	0.13					76.9	27	
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	0.771		1.17	1.54	0.293	0.374	0.24	0.18					70.6	53.8	
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	0.342		0.563	0.775	0.097	0.212	0.22	0.19					40.6	27.8	
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	0.6617		1.32	1.81	0.3047	0.4937	0.24	0.1633					51.5	31.5	
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07							0.22	<0.1						18.4	
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	0.139		0.277	0.385	0.056	0.108	0.2	0.11					39	19.4	
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08							0.23	0.12						19.6	
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	0.0893		0.1653	0.2317	0.0383	0.0663	0.22	0.1133					52.2	19.0	
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	0.0317		0.0607	0.0863	0.021	0.0257	0.233	0.1267					44.2	24.3	
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	0.113		0.18	0.241	0.051	0.061	0.22	<0.1					64.8	19.5	
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	<0.019		0.046	0.046	0.017	<0.018	0.21	0.17					93	22.4	
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	0.102		0.198	0.265	0.036	0.067	0.23	0.12					29.2	23.4	
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	0.092		0.166	0.234	0.033	0.068	0.2	0.15					33.3	18.5	
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	0.099		0.203	0.282	0.037	0.079	0.22	0.15					38.6	20.5	
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	0.251		0.362	0.484	0.154	0.122	0.23	0.12			<0.05			29.3	
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	0.132		0.204	0.277	0.056	0.073	0.24	0.21			<0.05			26.8	
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	0.696		1.13	1.53	0.236	0.401	0.3	0.3			<0.05			42	
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	1.55		2.69	3.63	0.592	0.944	0.42	0.42			<0.05			56	
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	1.15		1.73	2.39	0.326	0.663	0.24	0.17			<0.05			29.7	
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	1.52		2.62	3.55	0.43	0.933	0.35	0.3			<0.05			45.1	
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	0.165		0.26	0.341	0.087	0.081	0.22	0.13			<0.05			32.8	
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	0.5		0.383	0.493	0.238	0.11	0.22	0.11			<0.05			29.2	
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	0.318		0.518	0.702	0.128	0.184	0.24	0.12			<0.05			31.1	
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	0.315		0.478	0.646	0.111	0.168	0.22	0.1			<0.05			25	

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Calcium-Solid (mg/kg)	Cadmium - SEM-Solid (umol/g)	Cadmium-SEM-mg/kg (mg/kg)	Cadmium-Solid (mg/kg)	Chlorobenzene-Solid (mg/kg)	Chloroethane-Solid (mg/kg)	Chloroform-Solid (mg/kg)	Chloromethane-Solid (mg/kg)	Chloronapthalene-2-Solid (mg/kg)	Chrysene-Solid (mg/kg)	cis-1-2-dichloroethylene-solid (mg/kg)	Clay-Solid (%)	Chloride-Solid (mg/kg)	Cobalt-Solid (mg/kg)	Chromium-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2		<0.0050		0.405						0.134		12			
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3		<0.0050		0.571						0.606		10			
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4		<0.0050		0.294						0.647		6			
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5		<0.0050		0.118						0.194		9			
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6		<0.0050		0.412						0.773		13			
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7		<0.0050		0.192						0.131		11			
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01									<0.050	11					
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02									<0.050	1.1					
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03									<0.050	1.5					
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05									<0.055	7.5					
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06									<0.054	0.464					
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07									<0.050	10.4					
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08									<0.069	5.14					
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09									<0.050	3.12					
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10									<0.050	0.306					
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11									<0.050	7.15					
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200										<0.050					
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202										0.075					
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204										<0.050					
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206										<0.050					
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208										<0.050					
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209										<0.050					
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210										<0.050					
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212															
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)										0.16					
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234										0.19					
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236										0.15					
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66										0.118					
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68										0.679		27.7			
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69										0.409					
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70										0.497		24			
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71										0.255					
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73										0.466		25.3			
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74	11300			<0.50						0.635				8.5	24.2
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76	7910			<0.50						0.744		28.1		9.3	21.1
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77	11300			<0.50						0.28				8.8	24.8
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79	10900			<0.50						0.227				9.1	23.4
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81	18900			<0.50						0.152				8.6	25.6
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83	7840			<0.50						0.361		22.5		8.4	18.4
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84	12300			<0.50						<0.050				8.5	25.6
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85	7530			<0.50						0.229		24.2		7.7	15.8
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86										0.055					
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87										0.241		7.8			
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91	4490			<0.50						<0.050		14.4		6.3	10.4
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92	6890			<0.50						<0.050		4.3		5.4	9.3
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93	13700			<0.50						<0.050		<0.01		5.3	16.4
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95	8720			<0.50						<0.050		30		8.7	19.2
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1										1.2					
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2										2.9					

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Calcium-Solid (mg/kg)	Cadmium - SEM-Solid (umol/g)	Cadmium-SEM-mg/kg (mg/kg)	Cadmium-Solid (mg/kg)	Chlorobenzene-Solid (mg/kg)	Chloroethane-Solid (mg/kg)	Chloroform-Solid (mg/kg)	Chloromethane-Solid (mg/kg)	Chloronapthalene-2-Solid (mg/kg)	Chrysene-Solid (mg/kg)	cis-1-2-dichloroethylene-solid (mg/kg)	Clay-Solid (%)	Chloride-Solid (mg/kg)	Cobalt-Solid (mg/kg)	Chromium-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3										0.54					
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6										0.12					
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7										0.73					
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9										5.9					
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12										4.7					
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1										12					
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1										1.6					
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1										2					
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2										0.27					
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4										0.4					
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72												15.7			
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89												<0.01			
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)				0.162						0.0046				10.2	17
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)				0.104						0.0021				6.27	9.8
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)				1.55						0.43				7.6	32.5
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)				0.077						0.018				3.94	5.72
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)				0.573						0.67				7.18	27.7
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)				0.972						0.23				7.44	23.2
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)				0.702						0.42				7.14	18.1
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	9800	<0.0050	<0.50	0.249						0.202		19.5		11.2	21.7
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	18800	<0.0050	<0.50	0.332						1.53		4.1		15.2	57.5
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	53000	<0.0050	<0.50	1.02						1.72		6.3		13.8	34.1
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	12500	<0.0050	<0.50	0.272						4.37		15.7		13.2	27
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	9800	<0.0050	<0.50	0.154						5.27		11.9		11	21.4
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E	9240			0.13	<0.050	<0.020	<0.050	<0.020		<0.140	<0.050	25.3		10.9	20.3
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	9060			0.125	<0.050	<0.020	<0.050	<0.020		0.069	<0.050	16.2		10	18.7
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	9120			0.208	<0.050	<0.020	<0.050	<0.020		0.304	<0.050	21.1		10.6	20.8
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	9870			0.159	<0.050	<0.020	<0.050	<0.020		0.129	<0.050	24.8		10.8	20.3
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F	11400			0.53	<0.050	<0.020	<0.050	<0.020		0.615	<0.050	11.9		11.7	22.6
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G	9740			0.216	<0.050	<0.020	<0.050	<0.020		<2.00	<0.050	3.7		11	23.6
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H	9510			0.132	<0.050	<0.020	<0.050	<0.020		2.04	<0.050	8.6		10.8	20.9
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I	10300			0.201	<0.050	<0.020	<0.050	<0.020		3.08	<0.050	14.3		10.8	21.1
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2		<0.0050		0.406						0.286			14500	7.42	17.2
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4		<0.0050		0.318						0.196			13100	9.1	18.5
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6		<0.0050		0.442						0.205			17700	9.33	19
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7		<0.0050		0.273						0.13			13100	8.52	16.7
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8		<0.0050		0.425						0.115			18900	8.6	36.8
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10		0.0076		0.912						0.126			32500	8.59	23.5
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11		<0.0050		0.283						0.046			16500	10.1	21.9
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12		<0.0050		0.194						0.025			16800	10.8	19.2
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102	10100													11.4	21
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103	11600											17.66		9.4	23.8
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104	9260									0.097		18.4		9.6	21.9
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105	8130											15.61		10.2	18.8
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107	24300													8.1	37.9
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108	11300													11.9	22.5
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109	10100													12.1	22.7
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110	11900													11.3	23.4
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111	8570			0.51								23.67		11	38.5
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112	9700									0.131				9.6	21.6
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114	11400			0.78						0.18		12.48		7.8	23.8
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116	9000									0.093		16.11		9.3	20.7
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117	3400									4.73		17.52		3.5	10.3

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Calcium-Solid (mg/kg)	Cadmium - SEM-Solid (umol/g)	Cadmium-SEM-mg/kg (mg/kg)	Cadmium-Solid (mg/kg)	Chlorobenzene-Solid (mg/kg)	Chloroethane-Solid (mg/kg)	Chloroform-Solid (mg/kg)	Chloromethane-Solid (mg/kg)	Chloronapthalene-2-Solid (mg/kg)	Chrysene-Solid (mg/kg)	cis-1-2-dichloroethylene-solid (mg/kg)	Clay-Solid (%)	Chloride-Solid (mg/kg)	Cobalt-Solid (mg/kg)	Chromium-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118	43100			0.93						0.156		19.48		9.6	40.2
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)															
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01	13100			0.215								4.8		10.8	23.5
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01	11100	<0.005	<0.5	0.256								4.6		10.8	22.6
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02	31700			0.505								14.7		11.6	30.9
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A	9943	<0.005	<0.5	0.290								12.6		10.9	24.7
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03	9010			0.164								19.4		9.88	19.9
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03	10000	<0.005	<0.5	0.168								19		10.1	20.6
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04	12200			0.306								10.95		11.05	22.4
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05	13000			0.218								11.9		10.2	23.1
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05	25300	<0.005	<0.5	0.285								16.6		10	26.3
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06	10500			0.189								<1.0		10.7	33
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A	10500	<0.005	<0.5	0.201								13.9		12.5	22.4
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08	10400	<0.005	<0.5	0.123								22.5		10.9	19.8
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09	10500	<0.005	<0.5	0.151								19.8		10.8	20
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10	9180	<0.005	<0.5	0.183								17.6		9.76	20.8
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11	10400	<0.005	<0.5	0.095								17.9		11.2	20.5
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	10650			0.2415	<0.05	<0.05	<0.05	<0.05		0.2705	<0.05	22		11.75	27.6
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	10967			0.285	0.05	0.05	0.05	0.05		0.381	0.05	13.4		13.0	40.5
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	18150			0.672	<0.05	<0.05	<0.05	0.0525		11.995	<0.05	15.8		16.15	40.15
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	15767			0.363	0.05	0.05	0.05	0.05		4.4	0.05	11.2		13.0	30.9
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	9110	<0.005	<0.5	0.408						1.13		20.6	21400	10.7	24.6
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	11700	<0.005	<0.5	0.287						2.32		22	22400	13.4	30.8
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	10500	<0.005	0.51	0.318						1.19		9.3	19600	11.5	30.1
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	9640	<0.005	<0.5	0.216						0.966		15.6	12400	11.8	21.7
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	11700	<0.005	<0.5	0.274						1.89		13.6	15433	10.3	21.8
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07	10200			0.124								21.7		10.3	20.1
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	11100	<0.005	<0.5	0.158						0.368		15.8	11000	9.76	21.7
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08	10600			0.143								24.6		11.1	20.1
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	9790	<0.005	<0.5	0.136						0.217		22.1	15600	11.4	20.9
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	11333	<0.005	<0.5	0.201						0.071		22.3	13067	11.1	21.8
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	9850	<0.005	<0.5	0.2						0.226		27.4	19000	10.4	20.5
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	18800	<0.005	<0.5	0.247						<0.054		14	26800	10.7	27.8
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	19700	<0.005	<0.5	0.189						0.442		8.6	8680	10.6	23.5
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	9350	<0.005	<0.5	0.156						0.248		16.2	8570	10.3	18.8
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	11000	<0.005	<0.5	0.171						0.336		17.2	12000	11.2	21.3
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	9790			0.268	<0.05	<0.05	<0.05	<0.05		<0.211	<0.05	14.8		11.6	28.2
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	17100			0.287	<0.05	<0.05	<0.05	<0.05		0.39	<0.05	6.8		11.1	28.4
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	13000			0.279	<0.05	<0.05	<0.05	<0.05		2.15	<0.05	15.1		12.4	28.8
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	15100			0.535	<0.05	<0.05	<0.05	<0.05		5.33	<0.05	10.9		15.4	40.5
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	10800			0.311	<0.05	<0.05	<0.05	<0.05		3.21	<0.05	14.3		11.9	24.9
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	13700			0.356	<0.05	<0.05	<0.05	<0.05		5.24	<0.05	11.8		14.1	32.5
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	11400			0.322	<0.05	<0.05	<0.05	<0.05		0.179	<0.05	17.5		12	32.7
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	10200			0.291	<0.05	<0.05	<0.05	<0.05		0.58	<0.05	15.2		11.4	28.2
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	11000			0.315	<0.05	<0.05	<0.05	<0.05		0.382	<0.05	21.5		12.2	32.6
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	9650			0.216	<0.05	<0.05	<0.05	<0.05		0.343	<0.05	20.8		11	24.6

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Copper - SEM-Solid (umol/g)	Copper-SEM-Solid-mg/kg (mg/kg)	Copper-Solid (mg/kg)	d8-Naphthalene-Solid (%)	Dehydroabietic Acid-Solid (mg/kg)	Dibenz(a-h)Anthracene-Solid (mg/kg)	Dibromochloromethane-Solid (mg/kg)	Dibutyltin-Solid (mg/kg)	Dichlorodehydroabietic Acid-Solid (mg/kg)	Dichlorodifluoromethane-Solid (mg/kg)	Dichloromethane-Solid (mg/kg)	EPH(C10-C19)-Solid (mg/kg)	EPH(C19-C32)-Solid (mg/kg)	Ethylbenzene-Solid (mg/kg)	F1(C6-C10)-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2	0.084		74.9			0.01		<0.001							
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3	0.26		58.1			0.034		<0.001							
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4	0.13		74.7			0.041		<0.001							
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5	0.096		33			0.012		<0.001							
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6	0.054		74.5			0.037		<0.001							
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7	0.11		49.4			0.007		<0.001							
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01			109			0.5									
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02			106			0.07									
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03			34			<0.050									
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05			52			0.2									
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06			99			<0.054									
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07			48			0.378									
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08			105			0.177									
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09			43			0.068									
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10			32			<0.050									
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11			56			0.181									
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200			49.9			<0.050									
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202			73.6			<0.050									
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204			47.7			<0.050									
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206			60.3			<0.050									
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208			59.9			<0.050									
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209			151			<0.050									
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210			57.1			<0.050									
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212			46.4												
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)			40.9			<0.050		<0.001							
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234						<0.050									
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236						<0.050									
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66						<0.050									
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68						<0.050									
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69						<0.050									
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70						<0.050									
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71						<0.050									
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73						<0.050									
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74			92.4			<0.050									
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76			108			<0.050									
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77			90.4			<0.050									
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79			87			<0.050									
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81			84.5			<0.050									
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83			69			<0.050									
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84			85.7			<0.050									
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85			59.3			<0.050									
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86						<0.050									
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87						<0.050									
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91			29.2			<0.050									
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92			19.7			<0.050									
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93			39.3			<0.050									
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95			73.1			<0.050									
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1						<0.5									
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2						0.16									

Appendix 3.8-1: Marine Sediment Quality Results
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Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Copper - SEM-Solid (umol/g)	Copper-SEM-Solid-mg/kg (mg/kg)	Copper-Solid (mg/kg)	d8-Naphthalene-Solid (%)	Dehydroabietic Acid-Solid (mg/kg)	Dibenz(a-h)Anthracene-Solid (mg/kg)	Dibromochloromethane-Solid (mg/kg)	Dibutyltin-Solid (mg/kg)	Dichlorodehydroabietic Acid-Solid (mg/kg)	Dichlorodifluoromethane-Solid (mg/kg)	Dichloromethane-Solid (mg/kg)	EPH(C10-C19)-Solid (mg/kg)	EPH(C19-C32)-Solid (mg/kg)	Ethylbenzene-Solid (mg/kg)	F1(C6-C10)-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3						<0.05									
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6						<0.05									
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7						<0.05									
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9						<0.5									
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12						0.25									
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1						<0.5		<0.001							
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1						<0.5									
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1						0.06									
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2						<0.05									
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4						<0.05									
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72					1.05			0.003	<0.040						
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89					1.28			<0.001	<0.010						
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)			35.4	79		<0.00050						<100	<100		
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)			16.9			<0.00050						<100	<100		
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)			189			0.0093						360	1400		
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)			8.35			0.0035						<100	<100		
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)			53.9			0.063						150	2900		
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)			70.6			0.028						<100	490		
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)			190			0.076						100	1500		
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	0.117	7.45	56.3	112		0.0133						<200	240		
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	0.5	31.8	713	108		0.056						<200	<200		
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	0.529	33.6	494	108		0.101						<200	<200		
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	0.11	6.97	106	106		0.165						<200	<200		
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	0.102	6.47	61.2	112		0.296						<200	<200		
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E			44.3	111		<0.0088	<0.050			<0.050	<0.045	<200	360	<0.016	<5.0
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L			41.5	97.1		<0.0059	<0.050			<0.050	<0.045	<200	<200	<0.015	<5.0
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M			47.2			0.0287	<0.050			<0.050	<0.045	280	820	<0.015	<5.0
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N			44.8	93.8		0.009	<0.050			<0.050	<0.045	<200	<200	<0.015	<5.0
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F			75.7	96		0.0407	<0.050			<0.050	<0.045	<200	<200	<0.015	<5.0
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G			51.9	91.8		0.195	<0.050			<0.050	<0.045	<200	<200	<0.015	<5.0
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H			66.5	93.3		0.121	<0.050			<0.050	<0.045	<200	<200	<0.015	<5.0
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I			59	99.8		0.141	<0.050			<0.050	<0.045	<200	<200	<0.015	<5.0
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2	0.064		52.5	91.2		<0.020						<200	<200		
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4	0.15		52.7	81.8		0.014						<200	<200		
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6	0.155		56.4	70.3		0.0139						<200	<200		
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7	0.182		43	75.7		<0.0070						<200	<200		
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8	0.142		62.2	89.2		<0.0070						<200	<200		
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10	0.031		72.5	86		<0.0090						<360	<360		
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11	0.099		63.9	74.9		<0.0050						<200	<200		
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12	0.38		53.7	80.8		<0.0050						<200	<200		
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102			69.2												
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103		0.292	78.9					<0.001							
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104		0.157	79.3					<0.001							
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105		0.303	59.3					<0.001							
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107			31.5												
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108			71.6												
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109			82.8												
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110			78.9												
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111		0.747	111					<0.001							
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112			96.6												
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114		0.467	86.8		0.732			<0.001							
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116		0.304	63.5					0.001							
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117		0.806	10.4			0.188		0.001							

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Copper - SEM-Solid (umol/g)	Copper-SEM-Solid-mg/kg (mg/kg)	Copper-Solid (mg/kg)	d8-Naphthalene-Solid (%)	Dehydroabietic Acid-Solid (mg/kg)	Dibenz(a-h)Anthracene-Solid (mg/kg)	Dibromochloromethane-Solid (mg/kg)	Dibutyltin-Solid (mg/kg)	Dichlorodehydroabietic Acid-Solid (mg/kg)	Dichlorodifluoromethane-Solid (mg/kg)	Dichloromethane-Solid (mg/kg)	EPH(C10-C19)-Solid (mg/kg)	EPH(C19-C32)-Solid (mg/kg)	Ethylbenzene-Solid (mg/kg)	F1(C6-C10)-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118		1.6	196		1.09			0.003	0.086						
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)								<0.001							
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01	0.096	6.13	58.2												
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01	0.072	4.61	59.8												
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02	0.152	9.67	111												
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A	0.134	8.55	82.3												
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03	0.059	3.74	48.4												
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03	0.059	3.75	51.9												
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04	0.146	9.265	66.1												
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05	0.124	7.85	53.3												
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05	0.332	21.1	76.8												
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06	0.049	3.1	53.4												
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A	0.062	3.91	49												
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08	0.117	7.44	45.6												
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09	0.11	7	44												
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10	0.214	13.6	57.3												
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11	0.092	5.86	45.4												
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED			59.7	100		0.0324					<0.045	<200.0	<200.0	<0.0195	<5.8
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A			65.4	95.3		0.035					0.045	<200.0	240	<0.015667	<8.7000
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED			412	99		0.3655					<0.045	250	950	0.0365	<6.45
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A			193.7	98.5		0.173					0.045	<200.0	340	<0.015	<7.0
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	0.077	4.89	59.4	118		0.0972						<200.0	300	<0.021	
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	0.175	11.1	69.5	116		0.203						<200.0	270	<0.02	
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	0.278	17.7	73.6	103		0.0979						<200.0	280	<0.023	
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	0.146	9.28	98	126		0.0386						<200.0	<200.0	<0.015	
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	0.089	5.66	61.5	109.7		0.093						<200.0	<200.0	<0.015	
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07	0.141	8.98	44.5												
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	0.153	9.73	52	111		0.0194						<200.0	<200.0	<0.015	
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08	0.186	11.8	46.9												
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	0.120	7.6	48.7	106.3		0.014						<200.0	<200.0	<0.015	
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	0.093	5.9	57.6	100.3		<0.00767						<200.0	<200.0	<0.01867	
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	0.138	8.74	47.8	116		0.0145						<200.0	<200.0	<0.018	
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	0.139	8.82	55.4	68.2		<0.0055						<200.0	260	<0.024	
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	0.118	7.53	56.5	118		0.0115						<200.0	<200.0	<0.015	
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	0.098	6.22	45.4	102		0.0113						<200.0	<200.0	<0.015	
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	0.113	7.18	52.4	108		0.0132						<200.0	<200.0	<0.015	
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E			59.1	92.7		0.0408					<0.045	<200.0	<200.0	<0.019	<10.8
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F			158	83.3		0.0184					<0.045	<200.0	<200.0	<0.015	<6.5
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G			182	99.9		0.0832					<0.045	<200.0	<200.0	<0.015	<6.0
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H			414	90.8		0.206					<0.045	<200.0	300	<0.016	<9.4
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I			91.2	94.9		0.129					<0.045	<200.0	<200.0	<0.015	<5.8
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J			246	116		0.172					<0.045	<200.0	320	<0.015	<7.1
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K			66.3	89.7		0.0246					<0.045	<200.0	360	<0.019	<10.9
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L			63.8	101		<0.126					<0.045	<200.0	360	<0.017	<9.9
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M			62.4	93.9		<0.048					<0.045	<200.0	280	<0.022	<13.0
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N			53.2	126		0.0388					<0.045	<200.0	410	<0.017	<9.6

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	F1-BTEX-Solid (mg/kg)	F2(C10-C16)-Solid (mg/kg)	F3(C16-C34)-Solid (mg/kg)	F4(C34-C50)-Solid (mg/kg)	Iron-Solid (mg/kg)	Fluoranthene-Solid (mg/kg)	Fluorene-Solid (mg/kg)	Freon113-Solid (mg/kg)	Fluoride (F) (mg/kg)	Gravel (>2mm)-Solid (%)	HEPH-Solid (mg/kg)	Hexachlorobutadiene-Solid (mg/kg)	Hexavalent Chromium_Cr-Solid (mg/kg)	Mercury-SEM-Solid (umol/g)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2						0.531								
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3						2.8								
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4						3.05								
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5						1.23								
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6						2.73								
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7						0.375								
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01						34	2.6							
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02						1.8	0.1							
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03						6.6	1.8							
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04														
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05						27	5							
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06						6.25	2							
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07						67.5	21							
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08						22.5	7							
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09						12.9	0.3							
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10						3.15	0.5							
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11						4.84	0.2							
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200						<0.050	<0.050							
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202						0.085	<0.050							
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203														
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204						<0.050	<0.050							
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206						<0.050	<0.050							
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207														
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208						<0.050	<0.050							
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209						<0.050	<0.050							
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210						<0.050	<0.050							
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211														
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212														
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)						0.53	0.085							
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234						0.32	<0.050							
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236						0.43	<0.050							
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66						0.551	0.123							
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68						2.16	0.596			1.7				
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69						1.96	0.633							
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70						1.68	0.501			<0.10				
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71						1.08	0.337							
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73						1.92	0.56			0.6				
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74					24600	1.3	0.414							
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76					22800	1.47	0.454			6.4				
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77					25100	1.55	0.466							
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79					25200	0.65	0.168							
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81					23800	0.395	0.136							
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83					20600	1.77	0.493			0.7				
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84					20000	0.225	0.061							
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85					19700	0.597	0.201			1.1				
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86						0.119	<0.050							
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87						0.779	0.178			6.7				
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91					15800	0.066	<0.050			4				
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92					13900	0.062	<0.050			0.8				
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93					13700	0.123	<0.050			7.6				
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95					21700	0.109	<0.050			3.8				
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1						2.8	<0.5							
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2						4.9	0.29							

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	F1-BTEX-Solid (mg/kg)	F2(C10-C16)-Solid (mg/kg)	F3(C16-C34)-Solid (mg/kg)	F4(C34-C50)-Solid (mg/kg)	Iron-Solid (mg/kg)	Fluoranthene-Solid (mg/kg)	Fluorene-Solid (mg/kg)	Freon113-Solid (mg/kg)	Fluoride (F) (mg/kg)	Gravel (>2mm)-Solid (%)	HEPH-Solid (mg/kg)	Hexachlorobutadiene-Solid (mg/kg)	Hexavalent Chromium_Cr-Solid (mg/kg)	Mercury-SEM-Solid (umol/g)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3						0.45	0.07							
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6						0.22	<0.05							
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7						0.98	<0.05							
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9						7.7	<0.5							
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12						4.3	0.19							
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1						53	2.4							
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1						1.8	<0.5							
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1						1.8	0.26							
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2						1.5	0.45							
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4						0.66	0.27							
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72										7.2				
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89										3.9				
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)					28600	0.058	<0.0010				<100			
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)					21400	0.009	<0.0010				<100			
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)					23800	3.8	2.3				1400			
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)					17400	0.035	0.0035			41.7	<100			
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)					24000	2.3	0.47				2900			
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)					20000	1.2	0.23				490			
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)					20600	1.1	0.25				1500			
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E					27800	0.492	0.098			15	240			<0.000050
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F					74000	5.45	0.355			65.4	<200			<0.000050
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H					48200	1.16	0.194			37.5	<200			<0.000050
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I					37900	8.19	0.378			14.8	<200			<0.000050
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J					30800	6.84	0.454			9.9	<200			<0.000050
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E	<5.0	<36	376	348	27400	0.478	0.034	<0.079		1	360	<0.050	<0.10	
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	<5.0	<25	56	57	25400	0.194	0.021	<0.057		29.5	<200	<0.050	<0.10	
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	<5.0	65	367	156	29000	0.467	0.076	<0.065		1.8	820	<0.050	<0.10	
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	<5.0	<29	91	50	27700	0.345	0.03	<0.070		7.6	<200	<0.050	<0.10	
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F	<5.0	<25	101	51	33200	0.95	0.182	<0.053		19.3	<200	<0.050	<0.10	
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G	<5.0	<25	176	73	31100	1.86	0.321	<0.050		8.9	<200	<0.050	<0.10	
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H	<5.0	<25	117	<50	29300	2.15	0.392	<0.054		33.9	<200	<0.050	<0.10	
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I	<5.0	<25	170	60	29500	5.71	0.469	<0.057		24.4	<200	<0.050	<0.10	
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2						0.685	0.195		19		<200			0.096
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4						0.341	0.083		17		<200			0.071
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6						0.44	0.084		18		<200			0.073
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7						0.368	0.076		19		<200			0.067
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8						0.521	0.187		15		<200			0.084
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10						0.664	0.15		13		<360			0.081
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11						0.13	0.032		13		<200			0.083
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12						0.055	0.012		11		<200			0.071
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102					28000	0.14								
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103					25800	0.185	0.064							
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104					26500	0.274	0.083							
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105					27200	0.06								
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107					27400									
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108					31000	0.068								
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109					31300	0.067								
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110					29900	0.089								
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111					28200	0.133								
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112					25600	0.275	0.071							
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114					22000	0.993	0.277							
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116					25800	0.241	0.087							
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117					14600	21.4	5.17							

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	F1-BTEX-Solid (mg/kg)	F2(C10-C16)-Solid (mg/kg)	F3(C16-C34)-Solid (mg/kg)	F4(C34-C50)-Solid (mg/kg)	Iron-Solid (mg/kg)	Fluoranthene-Solid (mg/kg)	Fluorene-Solid (mg/kg)	Freon113-Solid (mg/kg)	Fluoride (F) (mg/kg)	Gravel (>2mm)-Solid (%)	HEPH-Solid (mg/kg)	Hexachlorobutadiene-Solid (mg/kg)	Hexavalent Chromium_Cr-Solid (mg/kg)	Mercury-SEM-Solid (umol/g)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118					24100	1.21	0.526							
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)														
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01					30400					8.3				
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01					29400					47.1				<5e-05
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02					32000					1.3				
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A					31033					3.8				<5e-05
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03					26800					<1.0				
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03					27300					<1.0				<5e-05
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04					31000					2.85				
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05					28700					<1.0				
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05					28300					<1.0				<5e-05
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06					30500					97.1				
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A					33267					<1.0				<5e-05
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08					27700					<1.0				<5e-05
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09					29200					2				<5e-05
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10					26600					<1.0				<5e-05
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11					29400					<1.0				<5e-05
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	<5.8	<28.5	137	97	31300	0.6425	0.074			3.35				
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A		<44.0	241	193	37333	0.78	0.069			3.9				
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	<6.45	<155.0	1149	683.5	53350	46.5	12.05			<1.0				
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A		45	453	283	40633	12.9	1.4			7.3				
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02					30400	1.18	0.209		2.41	<1.0	300			<5e-05
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03					37800	4.4	0.293		2.83	<1.0	260			<5e-05
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04					34000	2.32	0.211		1.94	41	270			<5e-05
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05					33600	2.3	0.209		1.45	<1.0	<200.0			<5e-05
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A					29433	3.3	0.281		1.9	1.5	<200.0			<5e-05
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07					28000					<1.0				
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07					27300	0.535	0.069		1.63	<1.0	<200.0			<5e-05
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08					30400					<1.0				
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A					30600	0.276	0.06		1.9	<1.0	<200.0			<5e-05
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A					29800	0.151	0.024		1.4	2.4	<200.0			<5e-05
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10					28400	0.305	0.048		2.08	<1.0	<200.0			<5e-05
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11					29600	0.353	0.079		3.69	<1.0	260			<5e-05
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12					28800	0.833	0.171		1.11	3.9	<200.0			<5e-05
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13					28200	0.234	0.031		0.911	<1.0	<200.0			<5e-05
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14					31400	0.342	0.039		1.31	<1.0	<200.0			<5e-05
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E		<47.0	187	134	33500	0.48	0.073			2.8				
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F		<29.0	50	<50.0	38300	0.83	0.102			13.7				
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G		<36.0	244	142	39200	6.12	0.668			<1.0				
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H		50	456	206	52800	14.7	1.8			4.8				
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I		<32.0	236	115	32800	4.54	0.478			1.7				
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J		36	336	174	44400	13.6	2.24			3.7				
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K		<48.0	314	219	35700	0.548	0.064			1.1				
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L		<49.0	395	241	33300	0.694	0.12			2.5				
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M		<53.0	264	203	35800	1.24	0.081			<1.0				
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N		<48.0	358	236	30700	0.672	0.112			1.6				

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Mercury-SEM-Solid-mg/kg (mg/kg)	Mercury-Solid (mg/kg)	Index of Additive Cancer Risk (IACR) ()	Indeno(1-2-3-Cd)pyrene-Solid (mg/kg)	Isopimaric & Palustric Acids-Solid (mg/kg)	Isopropylbenzene-Solid (mg/kg)	Available Potassium (mg/kg)	Potassium-Solid (mg/kg)	Lauric Acid-Solid (mg/kg)	LEPH-Solid (mg/kg)	Levopimaric Acid-Solid (mg/kg)	Lignoceric Acid-Solid (mg/kg)	Linoleic Acid-Solid (mg/kg)	Linolenic Acid-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2				0.032										
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3				0.103										
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4				0.128										
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5				0.039										
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6				0.118										
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7				<0.020										
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01		0.04		1.4										
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02		0.05		0.3										
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03		0.04		0.1										
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04														
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05				1										
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06				<0.054										
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07				1.5										
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08				0.7										
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09				0.3										
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10				0.06										
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11				0.5										
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200				<0.050										
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202				<0.050										
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203														
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204				<0.050										
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206				<0.050										
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207														
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208				<0.050										
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209				<0.050										
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210				<0.050										
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211														
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212														
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)		0.103		<0.050										
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234				<0.050										
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236				<0.050										
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66				<0.050										
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68				0.144										
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69				0.073										
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70				0.097										
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71				<0.050										
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73				0.087										
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74		0.057		0.069				5670						
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76		0.071		0.074				5800						
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77		<0.050		<0.050				5670						
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79		<0.050		<0.050				5860						
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81		<0.050		<0.050				5400						
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83		<0.050		0.08				4710						
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84		<0.050		<0.050				4480						
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85		<0.050		<0.050				4680						
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86				<0.050										
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87				<0.050										
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91		<0.050		<0.050				3520						
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92		<0.050		<0.050				2630						
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93		<0.050		<0.050				3630						
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95		0.068		<0.050				5490						
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1				<0.5										
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2				0.62										

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Mercury-SEM-Solid-mg/kg (mg/kg)	Mercury-Solid (mg/kg)	Index of Additive Cancer Risk (IACR) ()	Indeno(1-2-3-Cd)pyrene-Solid (mg/kg)	Isopimaric & Palustric Acids-Solid (mg/kg)	Isopropylbenzene-Solid (mg/kg)	Available Potassium (mg/kg)	Potassium-Solid (mg/kg)	Lauric Acid-Solid (mg/kg)	LEPH-Solid (mg/kg)	Levopimaric Acid-Solid (mg/kg)	Lignoceric Acid-Solid (mg/kg)	Linoleic Acid-Solid (mg/kg)	Linolenic Acid-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3				0.1										
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6				<0.05										
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7				0.13										
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9				1										
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12				0.96										
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1				2.5										
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1				0.5										
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1				0.23										
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2				0.06										
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4				<0.05										
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72					0.307				<0.90		<0.010	9.1	<0.050	<0.050
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89					0.245				<1.0		<0.050	4.46	<0.90	0.523
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)		<0.050	<0.10	<0.0020						<100				
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)		<0.050	<0.10	<0.0020						<100				
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)		0.822	3	0.029						350				
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)		<0.050	0.35	0.011						<100				
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)		0.097	8.5	0.2						150				
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)		0.095	3.9	0.1						<100				
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)		0.116	6.7	0.21						<100				
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	<0.010	0.0892	2.37	0.053				6360		<200				
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	<0.010	0.124	15.8	0.168				4760		<200				
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	<0.010	0.124	22	0.375				6640		<200				
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	<0.010	0.0481	39.5	0.597				6660		<200				
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	<0.010	0.0468	53.7	0.994				6100		<200				
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E		0.041	1.62	0.033		<0.050		5930		<200				
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L		0.031	0.892	0.022		<0.050		5380		<200				
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M		0.0465	4.47	0.114		<0.050		5710		280				
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N		0.0327	1.52	0.04		<0.050		5830		<200				
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F		0.0471	7.1	0.186		<0.050		5590		<200				
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G		0.0333	29.3	0.73		<0.050		5420		<200				
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H		0.0368	22.5	0.435		<0.050		5580		<200				
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I		0.0404	32.3	0.5		<0.050		5420		<200				
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2		0.0318	3.79	0.074			590			<200				
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4		0.037	3.57	0.056			762			<200				
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6		0.054	3.35	0.06			693			<200				
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7		0.0282	1.39	0.027			604			<200				
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8		0.0466	1.3	0.018			762			<200				
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10		0.0709	2.02	<0.050			1180			<360				
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11		0.0461	0.61	<0.020			790			<200				
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12		0.0291	0.26	<0.010			801			<200				
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102								6880						
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103								5750						
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104		0.061						6150						
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105								5990						
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107								2810						
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108		0.055						7540						
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109								7560						
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110		0.056						7310						
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111								6810						
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112		0.093						6140						
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114		0.298			0.258			4520	0.376			10		0.117
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116		0.051						5650						
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117				0.789				590						

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Mercury-SEM-Solid-mg/kg (mg/kg)	Mercury-Solid (mg/kg)	Index of Additive Cancer Risk (IACR) ()	Indeno(1-2-3-Cd)pyrene-Solid (mg/kg)	Isopimaric & Palustric Acids-Solid (mg/kg)	Isopropylbenzene-Solid (mg/kg)	Available Potassium (mg/kg)	Potassium-Solid (mg/kg)	Lauric Acid-Solid (mg/kg)	LEPH-Solid (mg/kg)	Levopimaric Acid-Solid (mg/kg)	Lignoceric Acid-Solid (mg/kg)	Linoleic Acid-Solid (mg/kg)	Linolenic Acid-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118		0.08			0.382			4870	0.459			7.2		0.055
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)														
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01								5740						
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01	<0.01	0.063						5600						
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02								6380						
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A	<0.01	0.084						5387						
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03								5300						
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03	<0.01	0.0351						5030						
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04								5835						
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05								5330						
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05	<0.01	0.117						5020						
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06								4990						
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A	<0.01	0.0346						7037						
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08	<0.01	0.0289						5820						
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09	<0.01	0.0238						5810						
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10	<0.01	0.0708						5090						
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11	<0.01	0.0256						6000						
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED		0.1001	4.265	0.1145				5760						
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A		0.0846	4.9	0.12				5040						
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED		0.3005	104.9	1.27				5225						
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A		0.153	35.6	0.503				5537						
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	<0.01	0.0786		0.335				5040		<200.0				
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	<0.01	0.162		0.859				6890		<200.0				
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	<0.01	0.213		0.336				4900		<200.0				
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	<0.01	0.0762		0.117				5780		<200.0				
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	<0.01	0.0473		0.347				5283		<200.0				
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07								5700						
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	<0.01	0.0382		0.071				5210		<200.0				
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08								5900						
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	<0.01	0.032		0.049				6210		<200.0				
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	<0.01	0.0362		0.021				5840		<200.0				
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	<0.01	0.0312		0.059				5320		<200.0				
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	<0.01	0.093		<0.015				5160		<200.0				
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	<0.01	0.113		0.039				5120		<200.0				
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	<0.01	0.0339		0.044				5380		<200.0				
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	<0.01	0.0349		0.048				5930		<200.0				
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E		0.0976	4.52	0.152				5570						
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F		0.176	3.16	0.058				4570						
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G		0.163	17.9	0.247				5440						
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H		0.208	42.1	0.618				5610						
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I		0.0792	27.3	0.375				5930						
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J		0.136	41.3	0.491				5710						
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K		0.086	3.41	0.082				5320						
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L		0.529	6.04	0.145				5290						
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M		0.0904	6.62	0.156				5610						
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N		0.0767	6.26	0.136				5480						

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Lithium-Solid (mg/kg)	Lower Bound PCDD/F TEQ Solid (WHO 2005) (ng/kg)	m-Cresol-Solid (mg/kg)	meta-para-Xylene-Solid (mg/kg)	Methyl-tert-butyl-ether-Solid (mg/kg)	Magnesium-Solid (mg/kg)	Mid Point PCDD/F TEQ Solid (WHO 2005) (ng/kg)	Manganese-Solid (mg/kg)	Moisture (%)	Monobutyltin-Solid (mg/kg)	Molybdenum-Solid (mg/kg)	Myristic Acid-Solid (mg/kg)	Naphthalene-d8-Solid (%)	Naphthalene-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2		9.85					9.98		46.75616837	<0.001				0.096
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3		23.4					23.6		64.54698944	<0.001				0.83
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4		22.7					22.7		43.47977066	<0.001				0.844
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5		4.84					5.15		28.40267181	<0.001				0.274
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6		25					25		44.5359993	<0.001				0.696
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7		7.9					7.98		30.4343338	<0.001				0.076
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01									42.9					1.6
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02									28.3					0.1
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03									23.4					0.4
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04														
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05									54.4					8
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06									53.3					7.6
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07									48.8					5.6
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08									63.6					11
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09									36.4					1.2
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10									30.6					0.3
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11									42.1					0.4
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200									44				94	<0.050
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202									47				83	<0.050
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203									41					
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204									44				80	<0.050
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206									46				88	<0.050
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207									41					
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208									43				78	<0.050
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209									35				82	<0.050
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210									49				69	<0.050
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211									49					
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212														
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)									34	<0.001			83	0.28
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234									37				98	<0.050
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236									36				99	<0.050
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66														0.546
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68														1.32
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69														2.22
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70														1.42
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71														1.15
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73														1.44
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74						12000		464			<4.0			1.44
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76						12300		458			<4.0			1.44
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77						12100		479			<4.0			1.31
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79						12400		481			<4.0			0.656
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81						11600		476			<4.0			0.698
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83						10900		418			<4.0			1.15
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84						11300		531			<4.0			0.368
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85						10600		423			<4.0			0.861
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86														0.318
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87														0.694
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91						7600		319			<4.0			0.225
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92						6290		353			<4.0			0.326
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93						11200		481			<4.0			1.08
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95						12800		485			<4.0			0.398
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1														<0.5
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2														0.39

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Lithium-Solid (mg/kg)	Lower Bound PCDD/F TEQ Solid (WHO 2005) (ng/kg)	m-Cresol-Solid (mg/kg)	meta-para-Xylene-Solid (mg/kg)	Methyl-tert-butyl-ether-Solid (mg/kg)	Magnesium-Solid (mg/kg)	Mid Point PCDD/F TEQ Solid (WHO 2005) (ng/kg)	Manganese-Solid (mg/kg)	Moisture (%)	Monobutyltin-Solid (mg/kg)	Molybdenum-Solid (mg/kg)	Myristic Acid-Solid (mg/kg)	Naphthalene-d8-Solid (%)	Naphthalene-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3														<0.05
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6														<0.05
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7														<0.05
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9														<0.5
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12														<0.05
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1										<0.001				<0.5
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1														<0.5
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1														0.27
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2														0.78
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4														0.38
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72		30.7	<0.020				30.7			<0.001		1.55		
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89		2.23	<0.030				2.36			<0.001		1.35		
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)	29.7							419	5.9		4.62			0.0014
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)	25.6							320	17		2.14			<0.0010
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)	13.3							462	60		9.12			1.7
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)	12.3							349	8		1.74			0.0063
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)	11.5							270	65		8.29			0.32
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)	12.7							421	68		7.27			0.21
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)	20.4							422	71		8.31			0.32
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	18.4	9.73				13400	9.77	590	56.2		3.78			0.249
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	22.9	10.8				13500	10.8	1260	33		15.2			0.326
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	21.4	6.92				14300	7.07	736	31.7		8.88			0.212
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	20.7	16.9				14300	17.3	706	37.5		3.02			0.159
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	18.7	8.93				12900	9.24	585	44.2		2.31			0.39
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E	16			<0.030	<0.200	12300		509	63.6		1.91			0.068
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	14.5	1.58		<0.030	<0.200	10800	1.76	476	47.8		1.79			0.064
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	15.2	10.6		<0.030	<0.200	11400	11.2	513	58.4		4.05			0.142
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	15.4	6.63		<0.030	<0.200	11600	8.86	523	58.5		2.51			0.042
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F	17.1			<0.030	<0.200	11600		526	48.4		3.4			1
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G	17.9			<0.030	<0.200	10800		512	46.3		3.86			0.309
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H	17.3			<0.030	<0.200	11300		554	46.4		2.18			0.557
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I	17.7			<0.030	<0.200	10800		501	48.5		3.84			0.435
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2		21.3					22.1		51.6		4.52			0.759
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4									50.2		2.16			0.278
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6									57		2.64			0.215
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7		11.5					11.5		48.6		2.64			0.186
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8		59.9					60		59.4		4.2			0.722
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10									73.3		11			0.395
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11									55		2.7			0.211
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12		4.63					4.71		55.9		1.22			0.046
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102	23.9					13900		513	53.1					0.128
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103	22.3					11700		481	45.9	<0.001				0.234
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104	21.9					12700		505	47.2	<0.001				0.38
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105	21.1					11900		480	41.9	<0.001				0.105
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107	12.4					11000		743	21.6		6.5			0.061
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108	20.3					14900		600	45.3					0.135
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109	22					14900		596	49.2					0.121
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110	21					14500		583	50.7					0.175
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111	21.6					13700		543	48.7	<0.001				0.428
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112	19.7					13200		486	62.4		4.4			0.25
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114	27.2	9.76				9530	9.96	386	52.2	<0.001	9.1	0.692		0.948
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116	20.4					11800		487	51.7	<0.001				0.362
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117	3					2880		165	59.8	<0.001				7.21

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Lithium-Solid (mg/kg)	Lower Bound PCDD/F TEQ Solid (WHO 2005) (ng/kg)	m-Cresol-Solid (mg/kg)	meta-para-Xylene-Solid (mg/kg)	Methyl-tert-butyl-ether-Solid (mg/kg)	Magnesium-Solid (mg/kg)	Mid Point PCDD/F TEQ Solid (WHO 2005) (ng/kg)	Manganese-Solid (mg/kg)	Moisture (%)	Monobutyltin-Solid (mg/kg)	Molybdenum-Solid (mg/kg)	Myristic Acid-Solid (mg/kg)	Naphthalene-d8-Solid (%)	Naphthalene-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118	21.3	10.5	0.053			11300	10.7	520	52.4	<0.001	7.3	1.29		1.5
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)										<0.001				
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01	20.7					11400		531	29.4		3.2			
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01	20.9					11100		502	39.1		2.45			
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02	22.1					12800		617	54.2		5.08			
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A	22.4					10933		529	54.9		4.46			
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03	17.6					10600		484	43.9		1.9			
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03	18					11400		499	49.1		2.43			
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04	21.4					11700		543.5	60.8		3.71			
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05	18					10400		524	46.2		1.59			
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05	18.1					11400		508	50		3.74			
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06	18.8					10200		550	19.5		2.98			
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A	21.2					13500		601	58.7		3.01			
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08	17.8					12600		556	53		3.04			
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09	19					12100		546	54		2.6			
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10	19.1					10400		470	53.2		1.86			
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11	19					12800		555	48		2.1			
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	18.3	35.8		<0.05	<0.04	12500	36.8	531.5	64.65		3.225			0.115
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	18.0	7.5		0.05	<0.04	12333	9.09	541	60.8		5.5			0.117
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	29	67.7		0.0855	<0.04	13650	67.7	1430	55.85		13.665			2.865
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	24.6	32.1		0.05	<0.04	12400	35.7	750	48.7		6.83			0.87
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	18.4	29.8		<0.031	<0.04	10800	30	486	63.4		6.32			0.383
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	22.8	29.5		<0.031	<0.04	14200	29.9	639	63.2		7.55			0.452
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	19.6	16.7		<0.034	<0.04	11800	17.1	520	66		5.04			0.358
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	19.8	4.89		<0.03	<0.04	11500	5.4	550	44.7		4.42			0.183
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	20.5	17.7		0.034	<0.04	11233	17.9	503	51.4		3.66			0.496
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07	17.9					11200		513	48.8		1.3			
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	17.2	31.3		<0.03	<0.04	10600	31.6	480	44.2		1.86			0.105
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08	20.2					11800		565	54.1		3.3			
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	20.5	8.4		<0.03	<0.04	12233	8.48	560	49.5		3.2			0.035
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	18.7	7.59		<0.0307	<0.04	12667	8.0	564	53.2		2.52			0.084
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	16.3	9.61		<0.03	<0.04	11700	9.67	525	55.4		2.28			0.062
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	16.9	6.6		<0.036	<0.04	11200	6.68	622	68.3		3.68			0.211
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	17.6	29.1		<0.03	<0.04	10900	29.1	524	39.2		2.39			0.333
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	18.5	13.5		<0.03	<0.04	10900	13.5	483	41.1		2.13			0.039
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	20	15.7		<0.03	<0.04	11800	15.9	535	42.2		2.34			0.045
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	18	16		<0.05	<0.04	12200	16.6	544	58.7		4.68			0.142
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	18.6	29.4		<0.05	<0.04	9760	29.8	567	32.9		6.65			0.098
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	22.5	14.3		<0.05	<0.04	12000	17.6	650	46.2		6.18			0.502
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	26	28.9		<0.05	<0.04	12900	37.2	823	60.8		11.9			1.5
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	20.3	27.2		<0.05	<0.04	12000	32.1	603	46.1		4.75			0.388
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	24.7	35.8		<0.05	<0.04	12900	37.1	775	48.8		7.76			1.04
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	20.1	20.6		<0.05	<0.04	12400	21.3	558	62.5		4.09			0.145
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	18.7	18.3		<0.05	<0.04	11900	18.7	544	61.9		4.79			0.219
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	18	18		<0.05	<0.04	12800	18.9	565	67.8		4.65			0.13
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	18.3	15.5		<0.05	<0.04	11400	16.6	524	60.8		3.36			0.234

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Sodium-Solid (mg/kg)	Neoabietic Acid-Solid (mg/kg)	Nickel - SEM-Solid (umol/g)	Nickel-SEM-Solid-mg/kg (mg/kg)	Nickel-Solid (mg/kg)	n-Nonylphenol monoethoxylate-Solid (mg/kg)	n-Nonylphenol-Solid (mg/kg)	Nitrite (as N) (mg/kg)	Available Nitrate-N (mg/kg)	Nitrate (as N) (mg/kg)	Nonylphenol & Ethoxylate TEQ-Solid (mg/kg)	Nonylphenol diethoxylates-Solid (mg/kg)	Nonylphenol monoethoxylates-Solid (mg/kg)	Nonylphenol-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2			<0.050											
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3			<0.050											
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4			<0.050											
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5			<0.050											
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6			<0.050											
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7			<0.050											
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01														
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02														
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03														
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04														
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05														
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06														
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07														
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08														
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09														
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10														
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11														
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200														
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202														
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203														
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204														
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206														
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207														
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208														
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209														
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210														
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211														
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212														
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)														
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234														
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236														
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66														
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68														
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69														
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70														
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71														
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73														
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74	15000				12.8									
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76	15500				13.3									
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77	15000				13.4									
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79	13300				13.2									
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81	14700				12.4									
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83	13100				11.5									
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84	15600				16.5									
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85	14900				10.5									
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86														
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87														
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91	7680				7									
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92	6250				5.6									
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93	26900				12.5									
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95	18300				14.4									
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1														
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2														

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Sodium-Solid (mg/kg)	Neoabietic Acid-Solid (mg/kg)	Nickel - SEM-Solid (umol/g)	Nickel-SEM-Solid-mg/kg (mg/kg)	Nickel-Solid (mg/kg)	n-Nonylphenol monoethoxylate-Solid (mg/kg)	n-Nonylphenol-Solid (mg/kg)	Nitrite (as N) (mg/kg)	Available Nitrate-N (mg/kg)	Nitrate (as N) (mg/kg)	Nonylphenol & Ethoxylate TEQ-Solid (mg/kg)	Nonylphenol diethoxylates-Solid (mg/kg)	Nonylphenol monoethoxylates-Solid (mg/kg)	Nonylphenol-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3														
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6														
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7														
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9														
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12														
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1														
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1														
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1														
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2														
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4														
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72		<0.010				1	1				230	69	200	92
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89		0.113				1	1				60.5	1	1	56
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)					9.36									
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)					4.96									
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)					26.6									
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)					2.11									
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)					21.4									
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)					13.6									
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)					28.4									
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	6800		<0.050	<2.9	15.6									
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	12600		<0.050	<2.9	56.1									
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	9750		<0.050	<2.9	26.6									
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	8940		<0.050	<2.9	19.5									
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	7240		<0.050	<2.9	14.3									
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E	6080				14									
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	5080				12.6									
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	6150				14.1									
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	5640				13.6									
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F	5690				17.6									
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G	5880				14.2									
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H	6660				14.7									
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I	6000				14									
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2			<0.050		10.3			<0.50	<4.0	<2.5				
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4			<0.050		11.2			<0.50	<6.0	<2.5				
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6			<0.050		11.6			<0.50	<4.0	<2.5				
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7			<0.050		9.89			<0.50	<4.0	<2.5				
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8			0.053		21.2			<0.50	<6.0	<2.5				
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10			0.055		15.4			<0.50	<6.0	<2.5				
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11			<0.050		14.4			<0.50	<6.0	<2.5				
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12			<0.050		13.6			<0.50	<6.0	<2.5				
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102	13700				13.1									
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103	11300				13									
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104	13300				13.5									
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105	11000				11									
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107	8490				21.1									
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108	15400				14.8									
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109	12500				14.6									
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110	14000				15.1									
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111	14000				13.1									
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112	19600				13.7									
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114	10400				12.2	0.00015	0.00346				0.08141	0.00325	0.05	
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116	13000				12.2									
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117	330													

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Sodium-Solid (mg/kg)	Neoabietic Acid-Solid (mg/kg)	Nickel - SEM-Solid (umol/g)	Nickel-SEM-Solid-mg/kg (mg/kg)	Nickel-Solid (mg/kg)	n-Nonylphenol monoethoxylate-Solid (mg/kg)	n-Nonylphenol-Solid (mg/kg)	Nitrite (as N) (mg/kg)	Available Nitrate-N (mg/kg)	Nitrate (as N) (mg/kg)	Nonylphenol & Ethoxylate TEQ-Solid (mg/kg)	Nonylphenol diethoxylates-Solid (mg/kg)	Nonylphenol monoethoxylates-Solid (mg/kg)	Nonylphenol-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118	13400	0.034			15.5	0.00015	0.003335				0.10191	0.0032	0.036	
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)														
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01	5940				13.9									
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01	6470		<0.05	<2.9	14.9									
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02	6600				16.3									
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A	6490		0.05	<2.9	18.3									
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03	4860				12.3									
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03	5530		<0.05	<2.9	13.3									
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04	7840				15.7									
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05	5110				12.4									
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05	6470		<0.05	<2.9	15.9									
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06	7170				17.8									
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A	8197		0.05	<2.9	15.1									
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08	6770		<0.05	<2.9	14									
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09	6790		<0.05	<2.9	13.8									
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10	5530		<0.05	<2.9	12.7									
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11	6700		<0.05	<2.9	14.1									
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	7910				17.15									
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	6257				21.9									
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	11300				57									
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	7357				31.5									
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	6170		<0.05	2.9	16.1									
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	8130		<0.05	<2.9	19.2									
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	7290		<0.05	<2.9	17.7									
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	7200		<0.05	<2.9	19.7									
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	7040		0.05	<2.9	15.3									
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07	5190				12.4									
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	5490		<0.05	<2.9	12.9									
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08	5510				13									
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	6050		0.05	<2.9	14.0									
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	6167		0.05	<2.9	14.7									
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	5590		<0.05	<2.9	14									
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	6910		0.063	3.7	17.3									
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	6060		<0.05	<2.9	14.9									
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	5590		<0.05	<2.9	12.3									
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	5660		<0.05	<2.9	13.7									
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	6160				17.6									
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	5460				34.3									
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	8000				33.2									
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	9130				55.5									
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	6680				19									
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	7990				42.8									
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	6700				19.9									
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	5910				17.7									
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	6760				19.9									
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	5910				15.8									

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Nonylphenols-Solid (mg/kg)	OCDD-Solid (ng/kg)	OCDF-Solid (ng/kg)	o-Cresol-Solid (mg/kg)	Oleic Acid-Solid (mg/kg)	ORP (mV)	ortho-Xylene-Solid (mg/kg)	o-Terphenyl (%)	Palmitic Acid-Solid (mg/kg)	Percent Passing 0.063mm - Solid (%)	Percent Passing 0.125mm - Solid (%)	Percent Passing 0.250mm - Solid (%)	Percent Passing 0.50mm - Solid (%)	Percent Passing 1.0mm - Solid (%)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2		270	14											
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3		900	45											
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4		1400	52											
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5		880	15											
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6		870	37											
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7		310	13											
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01														
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02														
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03														
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04														
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05														
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06														
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07														
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08														
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09														
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10														
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11														
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200														
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202														
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203														
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204														
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206														
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207														
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208														
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209														
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210														
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211														
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212														
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)														
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234														
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236														
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66														
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68														
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69														
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70														
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71														
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73														
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74														
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76														
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77														
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79														
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81														
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83														
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84														
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85														
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86														
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87														
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91														
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92														
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93														
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95														
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1														
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2														

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Nonylphenols-Solid (mg/kg)	OCDD-Solid (ng/kg)	OCDF-Solid (ng/kg)	o-Cresol-Solid (mg/kg)	Oleic Acid-Solid (mg/kg)	ORP (mV)	ortho-Xylene-Solid (mg/kg)	o-Terphenyl (%)	Palmitic Acid-Solid (mg/kg)	Percent Passing 0.063mm - Solid (%)	Percent Passing 0.125mm - Solid (%)	Percent Passing 0.250mm - Solid (%)	Percent Passing 0.50mm - Solid (%)	Percent Passing 1.0mm - Solid (%)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3														
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6														
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7														
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9														
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12														
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1														
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1														
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1														
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2														
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4														
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72	92	2180	146	<0.030	<0.90				4.2					
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89	56	32.1	<1.7	<0.040	1.75				9.59					
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)								91						
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)														
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)														
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)														
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)														
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)														
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)														
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E		728	14.9							71.1	75.8	81.2	83.7	84.5
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F		957	50.8							15.8	20.9	26.4	28.7	30.9
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H		1360	38.2							25	33.7	44.2	49.6	55.6
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I		3360	90							54	64.7	77.4	81.9	83.5
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J		1590	51.2							47.6	61.2	80.8	86.7	88.6
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E							<0.030			98	98.4	99.3	99.5	99.6
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L		69.8	7.18				<0.030			62.8	63.5	65	66.9	68.9
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M		254	11.8				<0.030			88.3	91.1	95.5	97.2	97.9
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N		207	10.5				<0.030			88.6	89.5	90.4	91.4	92
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F							<0.030			43.2	52.5	69.4	76.9	79
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G							<0.030			15.7	28.6	64.7	82.9	88.7
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H							<0.030			26.8	34.3	47	53.9	59.9
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I							<0.030			36.5	46.1	63.4	70.2	73.1
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2		1120	50.8											
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4														
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6														
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7		275	9.84											
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8		364	14.8											
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10														
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11														
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12		61.9	3.67											
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102														
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103														
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104														
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105														
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107														
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108														
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109														
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110														
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111														
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112														
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114	0.0496	0.514	0.0402		1.26	-160			3.24					
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116														
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117				0.073										

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Nonylphenols-Solid (mg/kg)	OCDD-Solid (ng/kg)	OCDF-Solid (ng/kg)	o-Cresol-Solid (mg/kg)	Oleic Acid-Solid (mg/kg)	ORP (mV)	ortho-Xylene-Solid (mg/kg)	o-Terphenyl (%)	Palmitic Acid-Solid (mg/kg)	Percent Passing 0.063mm - Solid (%)	Percent Passing 0.125mm - Solid (%)	Percent Passing 0.250mm - Solid (%)	Percent Passing 0.50mm - Solid (%)	Percent Passing 1.0mm - Solid (%)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118	0.0786	0.447	0.0155	0.053	0.887									
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)														
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01										22.7	36	55.1	75.9	89.5
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01										19.6	26.7	37.5	45.5	49.6
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02										64.5	74.9	87.3	93.9	96.9
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A										58.8	70.8	87.6	94.4	95.8
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03										78.4	90.8	98.8	99.7	99.9
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03										78.2	91.2	98.6	99.7	100
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04										45.1	60.65	80.65	91.95	95.2
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05										49.3	67.4	95.2	99.7	100
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05										69.5	86.3	97.5	99.2	99.6
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06										<1.0	<1.0	1.2	1.5	1.8
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A										51.7	55.3	66.9	87.3	97.9
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08										73.3	77.6	88.9	98.7	99.9
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09										69.8	77.8	89.4	95.8	96.7
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10										75.1	90.1	98.6	99.2	99.3
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11										62.2	67.3	82.9	97.6	99.8
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED		394	18.2				<0.05			76.85	83.5	89.85	94.15	95.85
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A		426.7	20.2				0.05			60.4	70	82.7	91.7	94.9
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED		9040	281.5				0.0575			87.05	93.7	97.85	99.55	99.95
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A		5410	167.1				0.05			49.3	60.1	72.5	81.0	86.9
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02		841	37.1				<0.03			86.3	91.4	95.9	98.1	99
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03		1450	66.9				<0.03			89.9	95.4	99	99.7	99.9
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04		555	33.2				<0.03			47.3	50	53.6	56.2	57.7
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05		572	32.4				<0.03			53.2	62.8	87.9	98.4	99.8
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A		1900	52.6				0.032			61.9	73.3	88.9	95.9	97.7
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07										79.3	90.5	98.5	99.5	99.7
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07		1080	32.4				<0.03			68.1	82.7	93.3	97.6	98.8
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08										81.4	90.6	98.6	99.8	100
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A		548	18				<0.03			76.9	87.9	97.4	99.6	99.9
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A		123	7.67				<0.03			84.1	91.5	95.8	97.0	97.5
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10		238	10.5				<0.03			95	98.4	99.4	99.8	99.9
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11		357	8.19				<0.03			70.3	79.8	93.5	98.7	99.8
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12		401	22.5				<0.03			38	47.3	71.8	87.7	92
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13		498	23.9				<0.03			65.9	81.3	96.6	99.8	100
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14		420	17.6				<0.03			75.2	89.3	99.1	99.9	99.9
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E		380	26.1				<0.05			72.5	78.8	89.2	95.4	96.8
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F		804	36.2				<0.05			30.3	43.5	66	79.4	83.6
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G		1400	61.7				<0.05			63.6	75	93.6	97.8	99
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H		3110	144				<0.05			52	63.4	75.4	85.3	93.5
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I		2500	110				<0.05			59.7	70.8	85.6	94.3	97.4
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J		3480	151				<0.05			52.6	65.3	83.6	92.7	94.4
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K		368	26				<0.05			74.5	81	89.3	96	98.2
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L		400	22.4				<0.05			64.2	73.4	86.4	94.8	96.9
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M		581	29.8				<0.05			84	89.5	94.7	98	98.9
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N		1860	51.3				<0.05			78.5	85.4	92.2	96.4	97.7

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Percent Passing 2.0mm - Solid (%)	Lead - SEM-Solid (umol/g)	Lead-SEM-Solid-mg/kg (mg/kg)	Lead-Solid (mg/kg)	p-Cresol-Solid (mg/kg)	Pentachlorophenol-Solid (mg/kg)	Phenanthrene-Solid (mg/kg)	Phenol-Solid (mg/kg)	pH (1:2 H2O Solution)-Solid (pH units)	Pimaric Acid-Solid (mg/kg)	Available Phosphate-P (mg/kg)	Propylbenzene-n-solid (mg/kg)	PSA%>75um (%)	Phosphorus-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2		0.042		12.9			0.268		7.42					
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3		0.082		35.7			0.766		6.57					
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4		0.096		25.5			1.04		7.58					
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5		0.026		75.8			0.474		7.82					
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6		0.045		18.2			1.01		7.73					
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7		<0.020		9.29			0.159		7.66					
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01				103			12		7.97					
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02				56.2			0.7		8.06					
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03				28			4.5		8.39					
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04														
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05							20		7.81					
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06							4.7		7.82					
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07							107		8.12					
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08							18		8.33					
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09							2.2		8.22					
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10							3.7		8.13					
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11							0.8		6.71					
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200							<0.050		7.89					
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202							<0.050		7.64					
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203														
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204							<0.050		7.85					
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206							<0.050		7.69					
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207														
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208							<0.050		7.9					
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209							<0.050		7.53					
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210							<0.050		7.7					
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211														
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212									7.61					
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)				32.2			0.43		8.38					
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234							0.085							
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236							0.17							
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66							0.497							
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68							1.68							
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69							1.97							
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70							1.59							
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71							1.01							
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73							1.64							
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74				11.3			1.3		7.73					1220
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76				13.2			1.39		7.63					1120
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77				10.8			1.35		7.69					1350
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79				8.6			0.57		7.81					1250
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81				9.1			0.387		7.85					1190
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83				11.7			1.39		7.78					1090
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84				15.6			0.189		7.97					1430
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85				8.2			0.641		7.76					1040
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86							0.1							
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87							0.718							
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91				5			0.077		7.96					578
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92				4.6			0.075		8.11					711
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93				5.3			0.143		8.47					1550
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95				7.2			0.112		7.94					1190
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1							0.9							
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2							1.5							

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SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3							0.34							
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6							0.06							
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7							0.3							
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9							4.1							
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12							1.2							
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1							35							
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1							0.8							
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1							0.82							
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2							1.1							
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4							0.63							
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72					<0.090	<0.020		<0.040		<0.090				
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89					<0.30	<0.020		0.568		<0.090				
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)				3.09			0.0013		8.04					
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)				2.24			0.0029		8.43					
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)				71.9			6.4		8.33					
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)				3.73			0.012		6.98					
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)				13.9			1.4		7.75					
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)				10.2			0.69		8.27					
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)				151			1.1		7.06					
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	85	0.03	6.2	13.5			0.317		6.97					1070
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	34.6	0.156	32.4	407			1.49		7.71					2820
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	62.5	0.207	42.9	96			0.647		8.21					1320
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	85.2	0.07	14.4	63.6			2.14		7.85					1380
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	90.1	0.025	5.1	28.4			1.9		7.65					1150
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E	99.7			9.75			0.143		7.08			<0.050		927
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	70.5			6.84			0.067		7.21			<0.050		892
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	98.2			9.24			0.242		6.97			<0.050		934
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	92.4			7.67			0.13		7.26			<0.050		918
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F	80.7			32.5			0.924		7.51			<0.050		958
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G	91.1			14.5			0.942		7.72			<0.050		1010
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H	66.1			30			1.05		7.51			<0.050		1110
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I	75.6			21			2.82		7.68			<0.050		921
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2		<0.000050		13			0.533		8.07		12.6		57.5	
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4		<0.000050		7.94			0.222		7.95		32.7		23.9	
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6		<0.000050		8.47			0.254		7.69		32.3		21.7	
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7		<0.000050		7.84			0.26		7.95		34.2		44.7	
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8		<0.000050		9.03			0.516		8.04		21.8		32.9	
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10		<0.000050		10.9			0.314		7.81		18.1		7.68	
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11		<0.000050		7.42			0.093		7.97		10.8		8.53	
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12		<0.000050		6.6			0.032		7.89		16.5		2.17	
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102				7.4			0.098							1000
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103				7.6	0.229		0.178	0.627						1020
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104				7.7	0.153		0.251	0.139	7.91					1120
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105				7.4	0.138		0.065	0.139	7.68					950
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107				4.1			0.054		8.61					2420
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108				7.6			0.06		7.72					1210
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109				8.1			0.059		7.68					1140
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110				8			0.069		7.77					1220
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111				10.7	0.044		0.163		7.5					1040
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112				12.7			0.194		7.53					1050
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114				19.6	0.106		0.926	0.174	7.68					759
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116				8.4	0.214		0.226	0.345	7.73					1120
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117					0.87		15.4	0.236	7.38					332

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SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118			0.048	16.3	4.36		1.35	0.203	8.6	0.085				966
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)														
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01	91.7			11.4										1110
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01	52.9	0.042	8.7	17.3					7.91					1120
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02	98.7			18										1120
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A	96.4	0.094	19.5	34.3					7.74					968.3
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03	100			8.08										1040
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03	100	<0.02	<4.0	8.26					7.57					1090
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04	97.15			20.7										1125
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05	100			9.41										1090
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05	99.8	0.081	16.7	20.7					7.89					1190
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06	2.9			23.4										967
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A	99.7	0.027	5.5	10.35					7.2					1073.3
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08	100	0.025	5.2	7.58					7.35					1040
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09	98	0.02	4.2	6.77					7.19					1140
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10	99.4	0.026	5.4	8.26					7.58					1080
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11	99.9	<0.02	<4.0	6.48					7.28					1160
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	97			14.8			0.2825		7.315					1105
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	96.1			24.0			0.313		7.54					1270
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	100			268.5			40.2		7.795					2155
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	92.9			125.3			4.1		8.1					1516.7
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	99.6	0.044	9.1	13.1			0.664		7.49					998
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	100	0.076	15.8	22.1			1.23		7.25					1330
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	59	0.087	18.1	39.1			0.814		7.57					1280
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	99.9	0.096	19.9	43.8			0.514		7.84					1180
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	98.5	0.065	13.5	18.9			1.3		7.46					1170
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07	100			6.69										1060
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	99.4	0.025	5.2	8.57			0.223		7.8					1110
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08	100			6.61										1040
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	100	0.021	4.3	6.9			0.12		7.3					1034.7
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	97.8	<0.02	4.0	6.8			0.08		7.6					1126.7
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	100	0.024	5	7.16			0.154		7.43					1100
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	99.9	0.036	7.4	13.9			0.206		7.6					1140
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	96.1	0.038	7.9	16.3			0.48		8.04					1140
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	100	0.021	4.4	8.18			0.115		7.77					1040
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	100	0.022	4.5	7.48			0.151		7.85					1150
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	97.2			19.4			0.215		7.5					1210
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	86.3			88.1			0.303		8.23					1410
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	99.5			108			1.6		8.02					1440
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	95.2			234			4.87		7.85					2230
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	98.3			42.2			2.04		7.97					1150
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	96.3			146			6.64		7.97					1620
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	98.9			23.7			0.223		7.45					948
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	97.5			23.6			0.446		7.37					989
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	99.2			20.2			0.271		7.47					1210
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	98.4			15.6			0.359		7.39					985

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Pyrene-Solid (mg/kg)	Quinoline-Solid (mg/kg)	Sandaracopimaric Acid-Solid (mg/kg)	Sand-Solid (%)	Antimony-Solid (mg/kg)	Selenium-Solid (mg/kg)	Silt-Solid (%)	Tin-Solid (mg/kg)	Available Sulfate-S (mg/kg)	Sulphate-Solid (mg/kg)	Strontium-Solid (mg/kg)	Sulphur-Solid (mg/kg)	Stearic Acid-Solid (mg/kg)	Styrene-Solid (mg/kg)	Sulphide-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2	0.473			36			52								
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3	1.96			59			31								
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4	2.01			76			18								
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5	0.787			55			36								
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6	1.66			36			51								
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7	0.234			44			45								
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01	30														
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02	1.9														
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03	4.3														
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05	16														
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06	3.6														
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07	35														
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08	15														
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09	5.8														
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10	2.2														
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11	2.8														
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200	<0.050														
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202	0.066														
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204	<0.050														
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206	<0.050														
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208	<0.050														
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209	<0.050														
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210	<0.050														
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212															
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)	0.41														
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234	0.18														
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236	0.26														
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66	0.351														
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68	1.17			24.7			45.9								
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69	1.15														
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70	0.992			25.3			50.7								
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71	0.648														
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73	1.1			27.9			46.2								
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74	0.75				<10	0.39		<5.0			97.7				
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76	0.869			15	<10	0.33	50.5	<5.0			76.5				
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77	0.92				<10	0.48		<5.0			98.1				
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79	0.387				<10	0.3		<5.0			95.4				
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81	0.246				<10	0.35		<5.0			108				
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83	1.12			43.3	<10	0.22	33.5	<5.0			69.4				
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84	0.146				<10	0.21		<5.0			80.2				
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85	0.357			43.8	<10	0.24	30.9	<5.0			68.9				
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86	0.077														
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87	0.49			69.1			16.4								
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91	<0.050			61.1	<10	0.17	21.5	<5.0			38				
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92	<0.050			90	<10	<0.10	4.9	<5.0			46.8				
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93	0.104			92.4	<10	0.17	<0.01	<5.0			106				
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95	0.073			23.6	<10	0.28	42.6	<5.0			74.3				
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1	2.1														
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2	3.7														

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Pyrene-Solid (mg/kg)	Quinoline-Solid (mg/kg)	Sandaracopimaric Acid-Solid (mg/kg)	Sand-Solid (%)	Antimony-Solid (mg/kg)	Selenium-Solid (mg/kg)	Silt-Solid (%)	Tin-Solid (mg/kg)	Available Sulfate-S (mg/kg)	Sulphate-Solid (mg/kg)	Strontium-Solid (mg/kg)	Sulphur-Solid (mg/kg)	Stearic Acid-Solid (mg/kg)	Styrene-Solid (mg/kg)	Sulphide-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3	0.35														
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6	0.11														
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7	0.77														
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9	6.2														
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12	4.4														
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1	32														
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1	1.4														
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1	1.2														
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2	0.77														
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4	0.41														
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72			0.193	54.9			22.2						3.17		
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89			0.45	96.1			<0.01						7.58		
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)	0.036				0.13	<0.50		0.36			67.6				
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)	0.0065				0.13	<0.50		0.29			34.5				
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)	2.1				0.69	<0.50		4.5			142				
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)	0.088			57.2	<0.10	<0.50	1.1	0.38			14.4				
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)	1.6				0.37	<0.50		1.34			71.5				
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)	0.79				0.34	<0.50		1.57			97.4				
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)	0.95				1.55	<0.50		10.2			256				
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	0.395	<0.010		13.9	0.32	0.27	51.6	2.14			122	5430			
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	2.74	<0.010		18.8	14.2	0.94	11.7	66.8			350	4300			
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	1.74	<0.010		37.5	3.8	0.61	18.7	29.2			371	4180			
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	5.61	<0.010		31.2	2.42	0.4	38.3	9.01			154	5290			
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	3.97	<0.018		42.5	0.69	0.32	35.7	2.82			120	5740			
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E	0.342	<0.010		1	0.24	0.21	72.7	1.2			116	4840	<0.050		
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	0.144	<0.010		7.7	0.21	0.15	46.6	0.72			106	6930	<0.050		
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	0.613	<0.010		9.9	0.27	0.21	67.2	0.98			112	10400	<0.050		
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	0.257	<0.010		3.8	0.22	0.18	63.8	0.74			117	6840	<0.050		
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F	0.745	<0.021		37.5	0.87	0.3	31.3	16.4			125	5320	<0.050		
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G	1.62	<0.016		75.4	0.49	0.29	12	3.02			109	4470	<0.050		
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H	1.98	<0.033		39.3	0.82	0.24	18.2	4.41			124	7400	<0.050		
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I	5.48	<0.027		39.1	0.55	0.25	22.2	3.36			113	4060	<0.050		
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2	0.481				0.46	0.25		4	561	1940					
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4	0.21				0.27	0.32		<2.0	523	1760					
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6	0.31				0.27	0.39		<2.0	611	2430					
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7	0.242				0.26	0.27		<2.0	490	1770					
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8	0.33				0.35	0.32		2	727	2680					
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10	0.461				0.41	0.66		<2.0	2040	4320					
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11	0.082				0.29	0.31		<2.0	749	2210					
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12	0.037				0.22	0.29		<2.0	551	2280					
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102	0.087					0.31					90.4				
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103	0.117			23.82		0.28	58.52				84.2				43.4
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104	0.171			17.44		0.32	64.16				88.9				60.8
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105				32.47		0.25	51.92				80.5				35.9
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107											135				
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108						0.21					112				
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109						0.27					102				
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110	0.064					0.26					105				
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111	0.1			7.45		0.28	68.88				88.3				41.3
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112	0.181					0.41					97				
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114	0.614		0.336	51.28		0.34	36.24				72.3				18.3
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116	0.146			31.71		0.3	52.18				82.1				36.4
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117	12.1			41.74			40.74				23				47.9

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Pyrene-Solid (mg/kg)	Quinoline-Solid (mg/kg)	Sandaracopimaric Acid-Solid (mg/kg)	Sand-Solid (%)	Antimony-Solid (mg/kg)	Selenium-Solid (mg/kg)	Silt-Solid (%)	Tin-Solid (mg/kg)	Available Sulfate-S (mg/kg)	Sulphate-Solid (mg/kg)	Strontium-Solid (mg/kg)	Sulphur-Solid (mg/kg)	Stearic Acid-Solid (mg/kg)	Styrene-Solid (mg/kg)	Sulphide-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118	0.738		0.146	18.84		0.32	61.68				144		0.728		20.2
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)															
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01				69	0.47	0.26	17.9	1.46			120	5450			
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01				33.3	0.43	0.32	15	2.13			110	6190			
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02				34.2	0.31	0.3	49.8	1.68			160	11200			
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A				37	0.75	0.27	46	4.43			119	10057			
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03				20.4	0.24	0.21	59	0.92			97	4770			
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03				21.5	0.29	0.2	59.2	1.13			112	4190			
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04				52.05	0.54	0.39	34.15	3.105			140	13100			
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05				50.4	0.33	0.25	37.4	1.42			113	6430			
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05				29.7	0.74	0.3	52.9	3.16			136	6250			
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06				2	0.77	0.3		6.96			112	5130			
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A				48	0.30	0.29	37.8	1.43			131	8513			
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08				26.6	0.27	0.21	50.8	0.94			131	4740			
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09				27.3	0.25	0.24	50	0.83			126	4230			
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10				23.5	0.23	0.3	57.5	1.71			98	4760			
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11				37.6	0.21	0.19	44.3	0.65			129	4550			
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	0.549	<0.01		20.15	0.415	0.245	54.85	1.775			118	13175		<0.05	
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	0.69	<0.01		35	0.58	0.28	47	3.73			106.6	8390		0.05	
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	29.9	<0.078		12.5	13.95	0.71	71.25	42.5			230	11635		<0.05	
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	7.557	0.030		43	5.48	0.45	38	18			158	8700		0.05	
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	1.5	<0.01		11.8	0.4	0.29	65.7	1.92		3280	95.9	13200		<0.05	
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	3.91	<0.01		9.1	0.76	0.37	67.9	3.05		3750	138	8210		<0.05	
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	1.61	<0.01		11.7	0.85	0.33	38	4.7		2800	113	9080		<0.05	
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	1.45	<0.01		46.6	2.52	0.31	37.6	7.69		1580	119	9210		<0.05	
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	2.5	<0.0123		36	0.50	0.29	48	2		2350	126	8020		0.05	
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07				20.2	0.22	0.22	57.6	0.76			116	4970			
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	0.38	<0.01		30.7	0.36	0.23	52.3	1.23		1560	104	4780		<0.05	
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08				18.4	0.29	0.25	56.8	0.67			122	7920			
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	0.19	<0.01		23	0.27	0.26	54.8	0.89		2317	114	6753		0.05	
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	0.106	<0.01		13	0.25	0.31	61.8	0.98		1887	116	6533		0.05	
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	0.239	<0.01		4.4	0.23	0.24	67.6	0.82		2790	112	5010		<0.05	
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	0.221	<0.01		29.5	0.45	0.21	56.3	2.19		4010	128	9840		<0.05	
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	0.565	<0.01		58.1	0.52	0.22	29.4	2.17		1280	119	5420		<0.05	
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	0.152	<0.01		33.9	0.29	0.28	49.7	0.97		1210	102	4970		<0.05	
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	0.247	<0.01		23.9	0.24	0.35	58	0.86		1740	108	5430		<0.05	
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	0.55	<0.01		24.3	0.46	0.35	57.7	2.45			107	8660		<0.05	
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	0.488	<0.01		56	6.58	0.27	23.5	22.9			144	8170		<0.05	
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	3.68	0.02		35.4	5.81	0.4	48.5	19.3			156	12700		<0.05	
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	8.42	0.059		43.2	12.5	0.6	41.1	39.7			206	13000		<0.05	
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	3.1	0.016		37.7	1.67	0.34	45.4	5.92			119	9180		<0.05	
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	7.99	0.034		43.7	7.72	0.48	40.8	24.3			174	9820		<0.05	
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	0.454	<0.01		23.7	0.5	0.23	57	3.38			137	7840		<0.05	
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	0.689	<0.01		32.7	0.39	0.23	49	2.63			109	9570		<0.05	
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	1.08	<0.01		14	0.52	0.34	62.5	2.68			116	9040		<0.05	
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	0.635	<0.01		19.2	0.35	0.23	57.7	1.98			107	7080		<0.05	

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Carbon, Total - Solid (%)	Terphenyl-d14-Solid (%)	Tetrachlorocatechol-Solid (mg/kg)	Tetrachloroethylene-Solid (mg/kg)	Tetrachloroguaiacol-Solid (mg/kg)	Tetrachloroveratrole-Solid (mg/kg)	Texture-Solid (%)	Carbon, Total Inorganic - Solid (%)	Titanium-Solid (mg/kg)	Thallium-Solid (mg/kg)	Total Methylmercury-Solid (mg/kg)	Carbon, Total Organic-Solid (%)	t-Octylphenol diethoxylate-Solid (mg/kg)	t-Octylphenol monoethoxylate-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2							Silt Loam					15.6		
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3							Sandy Loam					26.5		
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4							Sandy Loam					11.1		
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5							Sandy Loam					3.15		
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6							Silt Loam					6.83		
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7							Loam					2.31		
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01														
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02														
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03														
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04														
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05														
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06														
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07														
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08														
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09														
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10														
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11														
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200		95												
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202		92												
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203														
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204		88												
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206		86												
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207														
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208		78												
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209		86												
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210		71												
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211														
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212														
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)		76												
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234		99												
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236		99												
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66														
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68														
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69														
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70														
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71														
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73														
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74									1250					
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76									811					
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77									1220					
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79									1260					
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81									1180					
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83									708					
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84									631					
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85									683					
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86														
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87														
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91									592					
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92									434					
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93									383					
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95									752					
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1												1.4		
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2														

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Carbon, Total - Solid (%)	Terphenyl-d14-Solid (%)	Tetrachlorocatechol-Solid (mg/kg)	Tetrachloroethylene-Solid (mg/kg)	Tetrachloroguaiacol-Solid (mg/kg)	Tetrachloroveratrole-Solid (mg/kg)	Texture-Solid (%)	Carbon, Total Inorganic - Solid (%)	Titanium-Solid (mg/kg)	Thallium-Solid (mg/kg)	Total Methylmercury-Solid (mg/kg)	Carbon, Total Organic-Solid (%)	t-Octylphenol diethoxylate-Solid (mg/kg)	t-Octylphenol monoethoxylate-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3														
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6														
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7												1.52		
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9														
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12														
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1														
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1														
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1												2.5		
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2														
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4														
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72			0.168		<0.020	<0.020							1	1
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89			<0.020		<0.020	<0.020					0.000214		1	1
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)		81							1390	0.201				
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)									884	0.153				
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)									889	0.235				
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)									512	0.09				
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)									688	0.141				
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)									1030	0.256				
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)									984	0.142				
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	2.36							0.156	1690	0.212		2.2		
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	2.9							0.238	1510	0.192		2.66		
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	2.16							0.263	1730	0.235		1.9		
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	2.41							0.257	1870	0.21		2.15		
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	4.44							0.272	1500	0.182		4.17		
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E	4.98			<0.050				0.194	1800	0.189	0.000312	4.79		
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	4.98			<0.050				0.199	1680	0.171	<0.000050	4.78		
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	3.79			<0.050				0.168	1680	0.203	<0.000050	3.62		
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	2.68			<0.050				0.165	1840	0.19	0.000054	2.52		
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F	1.74			<0.050				0.199	1680	0.221	<0.000050	1.54		
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G	1.72			<0.050				0.182	1720	0.187	<0.000050	1.54		
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H	3.84			<0.050				0.459	1550	0.178	<0.000050	3.38		
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I	1.96			<0.050				0.244	1590	0.198	<0.000050	1.72		
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2	4.7									0.169				
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4	3.3									0.198				
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6	5.3									0.198				
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7	2.9									0.189				
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8	8.3									0.179				
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10	13									0.247				
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11	5.6									0.166				
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12	1.6									0.183				
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102									1460					
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103									1270			2.5		
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104									1350			2.3		
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105									1330			2.5		
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107									584					
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108									1640					
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109									1630					
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110									1530					
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111									1440			2		
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112									1300					
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114									1110		0.0239	2.5	0.00015	0.00015
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116									1240			3.41		
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117									502			5.28		

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Carbon, Total - Solid (%)	Terphenyl-d14-Solid (%)	Tetrachlorocatechol-Solid (mg/kg)	Tetrachloroethylene-Solid (mg/kg)	Tetrachloroguaiacol-Solid (mg/kg)	Tetrachlorovератrole-Solid (mg/kg)	Texture-Solid (%)	Carbon, Total Inorganic - Solid (%)	Titanium-Solid (mg/kg)	Thallium-Solid (mg/kg)	Total Methylmercury-Solid (mg/kg)	Carbon, Total Organic-Solid (%)	t-Octylphenol diethoxylate-Solid (mg/kg)	t-Octylphenol monoethoxylate-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118			0.455						1220		0.579	4.15	0.00015	0.00015
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)														
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01	3.89							0.775	1650	0.206		3.12		
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01	2.88							0.28	1540	0.206		2.6		
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02	8.5							1.03	1660	0.304		7.47		
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A	5.41							0.2087	1095	0.2233		5.2		
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03	1.75							0.167	1320	0.17		1.58		
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03	1.23							0.139	1630	0.196		1.09		
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04	8.91							0.548	1620	0.2065		8.365		
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05	2.15							0.207	1560	0.202		1.94		
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05	3.63							0.486	1570	0.235		3.14		
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06	5.16							0.285	1330	0.178		4.88		
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A	2.7							0.1527	1917	0.208		2.5		
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08	1.07							0.132	1860	0.178		0.938		
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09	1.68							0.138	1820	0.175		1.54		
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10	3							0.157	1430	0.179		2.84		
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11	0.925							0.126	1860	0.19		0.799		
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	3.625			<0.05				0.2045	1810	0.2065	0.001173	3.42		
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	2.2			0.05				0.1963	1473	0.1917	<5e-05	2.01		
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	4.79			<0.05				0.529	1540	0.217	0.000218	4.26		
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	3.08			0.05				0.428	1517	0.2113	0.000053	2.7		
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	3.85							0.164	1450	0.232	0.000218	3.69		
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	2.71							0.192	2330	0.263	0.000778	2.52		
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	5.98							0.244	1560	0.211	0.00116	5.74		
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	1.51							0.175	1480	0.188	0.000747	1.34		
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	3.6							0.2607	1553	0.2017	0.003346667	3.3		
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07	1.47							0.154	1710	0.171		1.32		
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	1.36							0.174	1440	0.191	0.00223	1.19		
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08	1.55							0.144	1780	0.185		1.41		
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	1.3							0.1327	1560	0.1853	0.001559333	1.18		
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	1.89							0.162	1837	0.207	0.000864333	1.7		
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	2.1							0.129	1700	0.195	0.00159	1.97		
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	6							0.374	1420	0.198	0.000362	5.63		
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	2.32							0.435	1520	0.195	0.00147	1.88		
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	1.27							0.148	1480	0.198	0.00157	1.12		
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	1.17							0.166	1570	0.218	0.000429	1		
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	2.58			<0.05				0.178	1570	0.209	<5e-05	2.4		
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	3.51			<0.05				0.599	1300	0.185	<5e-05	2.91		
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	2.84			<0.05				0.386	1370	0.191	0.000756	2.45		
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	3.78			<0.05				0.346	1570	0.217	<5e-05	3.43		
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	2.64			<0.05				0.376	1750	0.224	<5e-05	2.26		
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	2.63			<0.05				0.337	1390	0.212	0.000236	2.29		
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	2.42			<0.05				0.2	983	0.216	<5e-05	2.22		
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	2.76			<0.05				0.187	1300	0.207	<5e-05	2.57		
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	2.33			<0.05				0.171	1670	0.228	<5e-05	2.16		
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	2.2			<0.05				0.154	1340	0.202	<5e-05	2.05		

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	t-Octylphenol-Solid (mg/kg)	Toluene-Solid (mg/kg)	Total Fatty Acids-Solid (mg/kg)	Total_HMW-PAHs-Solid (mg/kg)	Total_LMW-PAHs-Solid (mg/kg)	Total_PAHs-Solid (mg/kg)	Total PCBs-Solid (mg/kg)	Total Resin Acids-Solid (mg/kg)	Total_Xylenes-Solid (mg/kg)	Total-HpCDD-Solid (ng/kg)	Total-HpCDF-Solid (ng/kg)	Total-HxCDD-Solid (ng/kg)	Total-HxCDF-Solid (ng/kg)	Total PCB (BC CSR) (mg/kg)	Total-PeCDD-Solid (ng/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2				1.39	0.824	2.21									
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3				6.25	3.43	9.68									
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4				6.84	4.17	11									
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5				2.55	2	4.55									
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6				6.02	3.67	9.69									
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7				0.894	0.55	1.44									
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01						129									
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02						9.6									
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03						25.6									
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05						117									
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06						31.9									
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07						333									
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08						114									
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09						35.3									
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10						12.9									
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11						25.3									
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200				<0.050	<0.050	<0.050									
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202				0.51	<0.050	0.51									
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204				<0.050	<0.050	<0.050									
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206				<0.050	<0.050	<0.050									
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208				<0.050	<0.050	<0.050									
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209				<0.050	<0.050	<0.050									
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210				<0.050	<0.050	<0.050									
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212															
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)				1.3	1	2.3									
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234				0.9	0.085	0.98									
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236				0.98	0.22	1.2									
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66															
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68															
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69															
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70															
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71															
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73															
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74															
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76															
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77															
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79															
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81															
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83															
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84															
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85															
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86															
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87															
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91															
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92															
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93															
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95															
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1				7.7	0.9	8.6									
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2				20.4	3.19	23.5									

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	t-Octylphenol-Solid (mg/kg)	Toluene-Solid (mg/kg)	Total Fatty Acids-Solid (mg/kg)	Total_HMW-PAHs-Solid (mg/kg)	Total_LMW-PAHs-Solid (mg/kg)	Total_PAHs-Solid (mg/kg)	Total PCBs-Solid (mg/kg)	Total Resin Acids-Solid (mg/kg)	Total_Xylenes-Solid (mg/kg)	Total-HpCDD-Solid (ng/kg)	Total-HpCDF-Solid (ng/kg)	Total-HxCDD-Solid (ng/kg)	Total-HxCDF-Solid (ng/kg)	Total PCB (BC CSR) (mg/kg)	Total-PeCDD-Solid (ng/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3				2.67	0.54	3.21									
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6				0.75	0.06	0.81									
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7				4.3	0.42	4.72									
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9				31.8	5.3	37.1									
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12				28	2.46	30.5									
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1				125	41.8	167									
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1				9.9	0.8	10.7									
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1				9.02	2.34	11.4									
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2				3.37	3.52	6.89									
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4				2.38	2.03	4.4									
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72	1		26.4				<0.060	2.45		1510	782	585	175		86.3
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89	1		31.3				<0.080	4.86		24.8	1.63	41.4	1.92		31
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)				0.11	0.0048	0.11									
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)				0.019	0.0037	0.023									
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)				6.8	15	22									
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)				0.18	0.04	0.22									
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)				5.5	3.2	8.8									
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)				2.6	1.7	4.4									
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)				3.3	2.5	5.8									
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E							<0.039			169	32	169	24.3		74.7
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F							<0.015			497	150	146	110		57.7
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H							<0.015			451	92.9	191	66.8		75.8
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I							<0.015			160	23.5	161	18.7		44.6
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J							<0.015			142	17.9	95.8	11.1		24.2
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E		<0.050				1.6	<0.043		<0.050						
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L		<0.050				0.861	<0.029		<0.050	47.7	13	28.9	4.99		4.75
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M		<0.050				3.25	<0.036		<0.050	148	23.6	218	16.4		26.7
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N		<0.050				1.43	<0.038		<0.050	128	21.2	183	14.1		36.8
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F		<0.100				6.82	<0.030		<0.050						
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G		<0.050				13.5	<0.027		<0.050						
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H		<0.050				15	<0.028		<0.050						
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I		<0.050				27.2	<0.029		<0.050						
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2							0.036			689	116	565	49	0.036	47.5
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4							<0.020							<0.020	
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6							0.069							0.069	
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7							<0.020			186	23.8	273	13.7	<0.020	32.9
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8							<0.020			367	40.5	1240	32.5	<0.020	126
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10							0.027							0.027	
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11							<0.020							<0.020	
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12							<0.020			42.7	9.86	101	5.05	<0.020	18.7
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102						0.453									
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103						0.969									
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104						1.686									
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105						0.23									
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107						0.115									
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108						0.263									
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109						0.247									
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110						0.397									
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111						0.937									
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112						1.568									
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114	0.0015		25.4			5.261		2.13							
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116						1.57									
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117						94.017									

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	t-Octylphenol-Solid (mg/kg)	Toluene-Solid (mg/kg)	Total Fatty Acids-Solid (mg/kg)	Total_HMW-PAHs-Solid (mg/kg)	Total_LMW-PAHs-Solid (mg/kg)	Total_PAHs-Solid (mg/kg)	Total PCBs-Solid (mg/kg)	Total Resin Acids-Solid (mg/kg)	Total_Xylenes-Solid (mg/kg)	Total-HpCDD-Solid (ng/kg)	Total-HpCDF-Solid (ng/kg)	Total-HxCDD-Solid (ng/kg)	Total-HxCDF-Solid (ng/kg)	Total PCB (BC CSR) (mg/kg)	Total-PeCDD-Solid (ng/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118	0.00015		18.3			7.659		2.92							
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)															
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01															
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01															
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02															
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A															
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03															
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03															
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04															
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05															
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05															
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06															
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A															
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08															
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09															
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10															
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11															
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED		<0.05							<0.075	242	42	592	29.1		124.5
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A		0.05							<0.075	212	33	131	21		37
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED		0.0835							0.1305	4505	628	979.5	483.5		207.5
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A		0.0533							<0.075	4157	224	763	110		51
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02		0.07							<0.05	507	64.6	573	44.8		76.7
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03		<0.05							<0.05	1020	113	506	92.1		55.6
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04		<0.05							<0.05	347	76.2	238	40.2		37.3
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05		<0.05							<0.05	280	19.4	94.4	19.3		29.4
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A		0.0533							0.059	1292	120	349	68		42.9
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07															
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07		<0.05							<0.05	689	55.3	638	33.5		59.7
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08															
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A		0.05							0.05	315	27.8	157.3	18		21
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A		0.05							0.05	86	13	163	12.14		63
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10		<0.05							<0.05	142	20.2	173	15.6		27.5
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11		<0.05							<0.05	216	12	118	9.14		13.7
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12		<0.05							<0.05	272	58.4	627	43.4		62.1
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13		<0.05							<0.05	325	38.6	271	27.2		43.6
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14		<0.05							<0.05	297	26.8	336	16.6		53.9
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E		<0.05							<0.075	215	49.4	248	46.9		68.1
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F		0.068							<0.075	605	79.2	730	58.3		81.1
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G		<0.05							<0.075	1010	125	292	89.7		48.5
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H		0.053							<0.075	2160	324	544	246		105
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I		<0.05							<0.075	1480	243	604	148		73.9
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J		<0.05							<0.075	2600	281	589	237		95.1
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K		0.053							<0.075	220	50.2	367	52		87.4
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L		<0.05							<0.075	209	60.4	329	34.3		95.9
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M		<0.05							<0.075	338	74.3	248	41.6		68.1
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N		<0.05							<0.075	1220	55	307	27.7		36.4

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Total-PeCDF-Solid (ng/kg)	Total-TCDD-Solid (ng/kg)	Total-TCDF-Solid (ng/kg)	trans-1-2-dichloroethylene-solid (mg/kg)	Tributyltin-Solid (mg/kg)	Trichloroethylene-Solid (mg/kg)	Trichlorofluoromethane-Solid (mg/kg)	Trivalent Chromium_Cr-Solid (mg/kg)	Upper Bound PCDD/F TEQ Solid (WHO 2005) (ng/kg)	Uranium-Solid (mg/kg)	VHC6-C10-Solid (mg/kg)	Vinyl Chloride-Solid (mg/kg)	VPHs-Solid (mg/kg)	Vanadium-Solid (mg/kg)	Tungsten-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2					<0.001				10.1						
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3					<0.001				23.7						
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4					<0.001				22.7						
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5					<0.001				5.45						
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6					<0.001				25						
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7					<0.001				8.06						
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01					0.002										
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02					<0.001										
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03					0.001										
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05															
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06															
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07															
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08															
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09															
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10															
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11															
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200															
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202															
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204															
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206															
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208															
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209															
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210															
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212															
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)					<0.001										
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234															
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236															
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66															
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68															
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69															
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70															
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71															
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73															
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74														66.8	
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76														55.5	
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77														65.8	
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79														67.8	
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81														60.5	
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83														46.4	
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84														47.7	
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85														44.6	
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86															
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87															
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91														34.3	
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92														25.6	
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93														28.5	
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95														49.9	
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1															
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2															

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Total-PeCDF-Solid (ng/kg)	Total-TCDD-Solid (ng/kg)	Total-TCDF-Solid (ng/kg)	trans-1-2-dichloroethylene-solid (mg/kg)	Tributyltin-Solid (mg/kg)	Trichloroethylene-Solid (mg/kg)	Trichlorofluoromethane-Solid (mg/kg)	Trivalent Chromium_Cr-Solid (mg/kg)	Upper Bound PCDD/F TEQ Solid (WHO 2005) (ng/kg)	Uranium-Solid (mg/kg)	VHC6-C10-Solid (mg/kg)	Vinyl Chloride-Solid (mg/kg)	VPHs-Solid (mg/kg)	Vanadium-Solid (mg/kg)	Tungsten-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3															
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6															
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7															
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9															
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12															
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1															
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1															
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1															
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2															
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4															
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72	105	71.8	167		0.022				30.7						
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89	6.98	55.3	20.2		0.007				2.49						
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)										2.09				73.5	<0.50
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)					<0.20					1.11				49.3	<0.50
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)										1.92				55.4	<0.50
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)										0.73				33.2	<0.50
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)										2.06				40	<0.50
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)										1.56				49.9	<0.50
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)					<0.20					2.56				56.3	0.55
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	37.1	51.4	64.4						9.77	1.49				77.8	
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	183	29.1	161						10.8	3.42				136	
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	33.8	59	51.4						7.07	2.65				100	
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	23.8	29.1	50.2						17.3	2.31				99.8	
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	14.9	15.4	34.4						9.24	1.44				80	
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E				<0.050		<0.016	<0.050	18.3		1.38	<10	<0.050	<10	76.4	
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L	6.04	3.4	10.7	<0.050		<0.011	<0.050	20.8	1.76	1.08	<10	<0.050	<10	70.5	
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M	17.4	13.9	57.4	<0.050		<0.013	<0.050	19.9	11.2	1.24	<10	<0.050	<10	72.6	
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N	21	20.8	51.7	<0.050		<0.014	<0.050	21.4	8.86	1.24	<10	<0.050	<10	76.8	
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F				<0.050		<0.010	<0.050	19.6		1.43	<10	<0.050	<10	78.3	
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G				<0.050		<0.010	<0.050	14.1		1.71	<10	<0.050	<10	81.8	
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H				<0.050		<0.011	<0.050	19.9		1.38	<10	<0.050	<10	76.8	
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I				<0.050		<0.011	<0.050	16.8		1.46	<10	<0.050	<10	76.4	
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2	34.5	28.6	91.2						22.2	1.11				53.5	
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4										1.48				65.6	
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6										1.54				69.4	
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7	16.4	24.4	62						11.5	1.26				64.6	
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8	49.6	66.4	281						60	1.26				60.3	
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10										1.7				58.9	
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11										1.26				65.7	
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12	4.92	22.3	25.8						4.72	0.962				72.5	
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102														73.2	
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103					0.008									66.3	
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104					<0.001									72.9	
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105					0.004									71.4	
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107														49.1	
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108														84.5	
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109														85.9	
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110														79.5	
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111					0.001									75.7	
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112														67.8	
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114					0.011				10.2					62.5	
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116					0.014									67.8	
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117					0.049									46.2	

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Total-PeCDF-Solid (ng/kg)	Total-TCDD-Solid (ng/kg)	Total-TCDF-Solid (ng/kg)	trans-1-2-dichloroethylene-solid (mg/kg)	Tributyltin-Solid (mg/kg)	Trichloroethylene-Solid (mg/kg)	Trichlorofluoromethane-Solid (mg/kg)	Trivalent Chromium_Cr-Solid (mg/kg)	Upper Bound PCDD/FTEQ Solid (WHO 2005) (ng/kg)	Uranium-Solid (mg/kg)	VHC6-C10-Solid (mg/kg)	Vinyl Chloride-Solid (mg/kg)	VPHs-Solid (mg/kg)	Vanadium-Solid (mg/kg)	Tungsten-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118					0.02				10.9					65.6	
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)					0.003										
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01										1.93				79.9	
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01										1.46				77.4	
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02										1.67				80.8	
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A										2				76.2	
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03										1.11				71.9	
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03										1.32				73.4	
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04										1.855				77.9	
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05										1.21				77.8	
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05										1.84				75	
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06										2.32				78.6	
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A										1.8				83.3	
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08										1.45				76.2	
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09										1.57				78.1	
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10										1.43				70	
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11										1.46				79.8	
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	41.25	299	233	<0.05		<0.0195			36.8	1.525	<10.0		<10.0	80.4	
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	35	30.17	61	0.05		<0.015			9.09	1.6	<10.0		<10.0	89.1	
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	767	152	427.5	<0.05		0.0225			67.7	4.835	<10.0		<10.0	107.5	
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	132	41.6	165	0.05		<0.0127			35.7	2.6	<10.0		<10.0	89	
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	63.3	76	190		0.00236				30	1.6				69.4	
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	90	52.2	209		0.00243				29.9	2.42				97.3	
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	41	32.5	137		0.00128				17.1	2.59				83.1	
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	16.4	41.6	22.4		0.00963				5.4	1.62				79.8	
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	46.4	48	119		0.00652				18	1.7				74.2	
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07										1.15				76.4	
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	39.5	71	213		0.00837				31.6	1.2				69.1	
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08										1.59				76.6	
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	17	21	49		0.0030				8.48	1.7				74.1	
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	14.7	79.1	58		0.0021				8.0	1.1				77.7	
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	19.7	29.5	76.7		0.00241				9.67	1.09				74.2	
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	16.1	17.4	42.7		0.00296				6.68	1.42				68.7	
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	59.1	36.4	172		0.001				29.1	1.3				73.4	
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	30.7	44.7	73.9		0.00416				13.5	1.21				70.4	
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	28.5	77.6	94.4		0.00611				15.9	1.24				75.6	
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	74.8	81.3	133	<0.05		<0.019			16.6	1.77	<11.0		<11.0	78.8	
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	75.2	55.7	127	<0.05		<0.011			29.8	1.98	<10.0		<10.0	83.9	
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	118	36.7	126	<0.05		<0.01			17.6	2.28	<10.0		<10.0	89.7	
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	351	98.6	371	<0.05		<0.016			37.2	3.05	<10.0		<10.0	106	
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	153	51.8	225	<0.05		<0.01			32.1	1.73	<10.0		<10.0	86.6	
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	343	74.2	303	<0.05		<0.012			37.1	2.73	<10.0		<10.0	101	
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	109	72.5	192	<0.05		<0.019			21.3	1.52	<11.0		<11.0	79.4	
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	65.9	72.8	118	<0.05		<0.017			18.7	1.66	<10.0		<10.0	74.8	
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	49.4	51.2	156	<0.05		<0.022			18.9	1.44	<13.0		<13.0	82.3	
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	32.9	21.4	94.6	<0.05		<0.017			16.6	1.49	<10.0		<10.0	74.4	

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Zinc - SEM-Solid (umol/g)	Zinc-SEM-Solid-mg/kg (mg/kg)	Zinc-Solid (mg/kg)	Zirconium-Solid (mg/kg)	AVS (umol/g)	Br (mg/L)	Bromodichloromethane-Solid (mg/kg)	CarbonTetrachloride-Solid (mg/kg)	Chlorodibromomethane-Solid (mg/kg)	Chromium(+3)-Solid (mg/kg)	Chromium(+6)-Solid (mg/kg)	Cl (mg/L)	Collection Date	Decachlorobiphenyl-solid (%)	F (mg/L)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2	0.61		75												
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3	0.56		87												
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4	0.46		78												
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5	0.24		60												
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6	0.42		85												
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7	0.26		66												
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01			90												
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02			83												
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03			66												
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04															
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05			75												
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06			97												
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07			87												
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08			117												
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09			85												
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10			57												
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11			77												
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200															
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202															
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203															
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204															
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206															
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207															
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208															
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209															
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210															
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211															
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212															
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)			66												
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234															
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236															
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66															
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68															
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69															
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70															
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71															
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73															
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74			85												
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76			100												
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77			87												
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79			84												
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81			85												
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83			97												
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84			85												
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85			77												
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86															
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87															
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91			51												
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92			49												
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93			62												
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95			81												
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1															
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2															

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Zinc - SEM-Solid (umol/g)	Zinc-SEM-Solid-mg/kg (mg/kg)	Zinc-Solid (mg/kg)	Zirconium-Solid (mg/kg)	AVS (umol/g)	Br (mg/L)	Bromodichloromethane-Solid (mg/kg)	CarbonTetrachloride-Solid (mg/kg)	Chlorodibromomethane-Solid (mg/kg)	Chromium(+3)-Solid (mg/kg)	Chromium(+6)-Solid (mg/kg)	Cl (mg/L)	Collection Date	Decachlorobiphenyl-solid (%)	F (mg/L)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3															
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6															
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7															
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9															
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12															
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1															
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1															
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1															
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2															
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4															
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72															
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89															
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)			60												
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)			40												
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)			200												
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)			34												
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)			161												
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)			101												
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)			144												
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E	0.454	29.7	106	3.9											
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F	0.278	18.2	201	8.2											
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H	0.63	41.2	209	4.4											
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I	0.667	43.6	117	3.2											
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J	0.219	14.3	87	2.5											
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E			87	3.5											
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L			79	3.3											
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M			99	3.3											
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N			85	3.4											
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F			198	3.2											
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G			90	2.8											
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H			95	3.3											
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I			98	3.0											
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2	0.592		79												
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4	0.328		76												
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6	0.354		83												
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7	0.31		71												
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8	0.395		84												
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10	1.13		140												
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11	0.409		86												
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12	0.357		84												
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102			85												
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103			80												
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104		0.434	84												
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105		0.43	78												
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107			65												
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108			91												
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109			94												
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110			94												
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111		0.56	96												
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112			98												
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114		0.68	87												
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116		0.57	79												
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117		1.61	19												

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Zinc - SEM-Solid (umol/g)	Zinc-SEM-Solid-mg/kg (mg/kg)	Zinc-Solid (mg/kg)	Zirconium-Solid (mg/kg)	AVS (umol/g)	Br (mg/L)	Bromodichloromethane-Solid (mg/kg)	CarbonTetrachloride-Solid (mg/kg)	Chlorodibromomethane-Solid (mg/kg)	Chromium(+3)-Solid (mg/kg)	Chromium(+6)-Solid (mg/kg)	Cl (mg/L)	Collection Date	Decachlorobiphenyl-solid (%)	F (mg/L)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118		1.03	110												
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)															
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01			89	3.4	1.99										
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01	0.375	24.5	91	3.2											
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02			116	4.1	27.4										
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A	0.506	33.1	101	2.1											
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03			76	2.7	4										
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03	0.21	13.7	75	3.5											
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04			95	4.1	16.3										
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05			80	3.0	3.09										
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05	0.574	37.5	96	3.4											
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06			82	2.5	0.21										
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A	0.32	20.8	84	4.0											
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08	0.309	20.2	75	3.8											
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09	0.28	18.3	75	3.5											
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10	0.353	23.1	78	3.1											
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11	0.234	15.3	80	3.8											
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED			90	4.1			<0.05	<0.05	<0.05	30.55	<0.1				
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A			111	3.1			0.05	0.05	0.05	30.93333333	0.1			127	
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED			233	5.0			<0.05	<0.05	<0.05	39.75	<0.1				
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A			149	4.1			0.05	0.05	0.05	26.1	0.1			101	
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	0.88	57.5	105	3.5		44.9						13000			1.46
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	0.642	42	112	4.6		41.8						12200			1.54
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	1.02	66.9	116	4.1		33						9160			0.909
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	0.393	25.7	93	3.0		46.3						14100			1.65
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	0.49	32.1	89	3.5		39.9						11967			1.5
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07			76	3.6	5.72										
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	0.413	27	78	3.1		43.7						12300			1.83
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08			79	3.4	8.31										
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	0.23	15.3	77	2.8		46						13767			1.7
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	0.388	25.4	84	3.9		39.3						11667			1.24
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	0.492	32.2	81	3.8		48						14100			1.54
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	0.5	32.7	94	3.5		37.8						10900			1.5
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	0.326	21.3	84	3.0		45.1						13400			1.71
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	0.248	16.2	72	3.0		43.1						11100			1.18
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	0.31	20.3	80	3.6		43.6						13500			1.48
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E			105	3.6			<0.05	<0.05	<0.05	22.7	<0.1			130	
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F			120	3.5			<0.05	<0.05	<0.05	20.6	<0.1			94.9	
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G			133	3.2			<0.05	<0.05	<0.05	17.6	<0.1			94	
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H			231	4.9			<0.05	<0.05	<0.05	37.6	<0.1			96.5	
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I			104	3.6			<0.05	<0.05	<0.05	21.3	<0.1			92.8	
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J			160	3.6			<0.05	<0.05	<0.05	23.9	<0.1			100	
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K			197	2.1			<0.05	<0.05	<0.05	24.5	<0.1			123	
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L			113	2.7			<0.05	<0.05	<0.05	14.7	0.17			128	
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M			108	4.1			<0.05	<0.05	<0.05	14.3	<0.1			137	
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N			99	2.9			<0.05	<0.05	<0.05	22.4	<0.1			129	

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	F4G-sg-Solid (mg/kg)	IACR-Solid ()	N-NO2 (mg/L)	N-NO2-solid (mg/kg)	N-NO3 (mg/L)	N-NO3-solid (mg/kg)	Percent Passing (0.002mm)-Solid (%)	Percent Passing (0.004mm)-Solid (%)	Percent Passing (0.005mm)-Solid (%)	Percent Passing (0.020mm)-Solid (%)	Percent Passing (0.0312mm)-Solid (%)	Percent Passing (0.05mm)-Solid (%)	Percent Passing (0.075mm)-Solid (%)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2													
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3													
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4													
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5													
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6													
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7													
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01													
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02													
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03													
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04													
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05													
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06													
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07													
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08													
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09													
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10													
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11													
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200													
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202													
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203													
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204													
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206													
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207													
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208													
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209													
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210													
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211													
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212													
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)													
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234													
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236													
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66													
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68													
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69													
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70													
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71													
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73													
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74													
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76													
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77													
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79													
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81													
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83													
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84													
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85													
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86													
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87													
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91													
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92													
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93													
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95													
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1													
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2													

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	F4G-sg-Solid (mg/kg)	IACR-Solid ()	N-NO2 (mg/L)	N-NO2-solid (mg/kg)	N-NO3 (mg/L)	N-NO3-solid (mg/kg)	Percent Passing (0.002mm)-Solid (%)	Percent Passing (0.004mm)-Solid (%)	Percent Passing (0.005mm)-Solid (%)	Percent Passing (0.020mm)-Solid (%)	Percent Passing (0.0312mm)-Solid (%)	Percent Passing (0.05mm)-Solid (%)	Percent Passing (0.075mm)-Solid (%)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3													
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6													
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7													
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9													
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12													
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1													
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1													
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1													
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2													
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4													
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72													
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89													
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)													
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)													
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)													
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)													
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)													
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)													
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)													
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E													
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F													
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H													
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I													
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J													
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E													
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L													
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M													
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N													
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F													
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G													
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H													
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I													
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2													
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4													
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6													
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7													
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8													
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10													
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11													
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12													
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102													
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103													
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104													
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105													
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107													
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108													
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109													
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110													
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111													
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112													
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114													
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116													
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117													

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	F4G-sg-Solid (mg/kg)	IACR-Solid ()	N-NO2 (mg/L)	N-NO2-solid (mg/kg)	N-NO3 (mg/L)	N-NO3-solid (mg/kg)	Percent Passing (0.002mm)-Solid (%)	Percent Passing (0.004mm)-Solid (%)	Percent Passing (0.005mm)-Solid (%)	Percent Passing (0.020mm)-Solid (%)	Percent Passing (0.0312mm)-Solid (%)	Percent Passing (0.05mm)-Solid (%)	Percent Passing (0.075mm)-Solid (%)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118													
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)													
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01							3.5	4.8	5.4	12.1	15	19.9	25.2
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01							3.5	4.6	5.2	11.2	13.8	18.1	21
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02							11	14.7	16.6	37.4	46.7	62.4	66.6
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A							9.83	13	14	31	40	56.3	61
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03							13.9	19.4	22.1	49.8	59.5	75.8	80.8
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03							13.9	19	21.5	48.2	58.4	75.5	80.7
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04							8.55	10.95	12.2	25.7	31.7	41.8	48.1
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05							8.8	11.9	13.4	29.4	35.4	45.5	52.8
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05							12	16.6	18.8	42.4	51.2	66	72.8
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06							<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A							10.7	14	15.6	33	39.7	51	52.4
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08							16.8	22.5	25.4	52.8	60.1	72.4	74.1
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09							14.8	19.8	22.4	47.4	55.2	68.2	71.4
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10							12.9	17.6	20	45.1	55.1	72	78
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11							12.8	17.9	20.5	44.9	51	61.2	63.2
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED							16.4	22	24.8	52.55	61.1	75.4	78.1
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	<755.0						10.2	13	15	33	43	58	62
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	2095						10.05	15.8	18.6	49.75	63.15	85.6	88.3
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	885						8.17	11	13	29	35.7	47.1	51
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02		14	<0.1	<0.165	<0.5	<0.82	15	20.6	23.4	53.3	65.2	85.2	87.3
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03		30.2	<0.1	<0.184	<0.5	<0.92	17.2	22	24.4	52	65.7	88.7	90.9
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04		15.6	<0.1	<0.214	<0.5	<1.07	6.9	9.3	10.4	25	33.1	46.7	47.8
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05		8.72	<0.1	<0.0878	<0.5	<0.5	11.4	15.6	17.7	37.6	42.6	51.1	55
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A		17.5	0.1	<0.1293	<0.5	<0.6467	10.7	14	15.1	33	42.9	59.5	64.1
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07							15.5	21.7	24.7	54.4	62.8	76.9	81.4
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07		3.82	<0.1	<0.0893	<0.5	<0.5	11.3	15.8	18	41.4	50.2	65.1	71
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08							18.2	24.6	27.9	58.7	66.5	79.5	83.2
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A		2.26	0.1	<0.113	<0.5	<0.567	16.2	22.1	25	53	61	75	79
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A		0.84	0.1	<0.1113	<0.5	<0.5567	15.9	22.3	25	57	67	83	86
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10		2.46	<0.1	<0.135	<0.5	<0.67	19	27.4	31.6	70.5	79.4	94.2	95.6
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11		0.477	<0.1	<0.246	<0.5	<1.23	10.6	14	15.7	36.6	48.5	68.4	72.2
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12		3.05	<0.1	<0.0648	<0.5	<0.5	6.4	8.6	9.7	22.1	27.3	36.1	39.8
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13		2.3	<0.1	<0.0772	<0.5	<0.5	11.4	16.2	18.5	42.1	49.8	62.6	68.9
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14		2.78	<0.1	<0.0886	<0.5	<0.5	12	17.2	19.8	46.7	56.2	72.2	77.9
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E							11.2	14.8	16.6	38.6	50.7	71.1	73.7
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F							5.1	6.8	7.7	17	21	27.6	32.9
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	<590.0						11.2	15.1	17.1	38.3	46.8	61.2	65.8
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	<830.0						7.8	10.9	12.5	29.5	37	49.6	54.2
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I							10.9	14.3	16	34.9	43.3	57.3	61.8
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	<560.0						8.7	11.8	13.3	30.3	37.6	49.9	55
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	<800.0						13.4	17.5	19.6	43	54.2	73.2	75.8
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	<810.0						11.2	15.2	17.2	38.7	47.5	62.3	66
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	<880.0						16.2	21.5	24.2	52.6	63.9	82.8	85
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	<800.0						16.2	20.8	23.2	48.5	59.2	77.1	79.8

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Percent Passing (0.149mm)-Solid (%)	Percent Passing (0.420mm)-Solid (%)	Percent Passing (0.841mm)-Solid (%)	Percent Passing (19mm)-Solid (%)	Percent Passing (25.4mm)-Solid (%)	Percent Passing (38.1mm)-Solid (%)	Percent Passing (4.75mm)-Solid (%)	Percent Passing (50.8mm)-Solid (%)	Percent Passing (76.2mm)-Solid (%)	Percent Passing (9.5mm)-Solid (%)	SO4 (mg/L)	Sand (Passing 0.125-0.063mm)-Solid (%)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2												
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3												
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4												
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5												
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6												
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7												
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01												
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02												
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03												
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04												
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05												
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06												
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07												
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08												
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09												
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10												
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11												
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200												
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202												
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203												
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204												
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206												
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207												
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208												
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209												
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210												
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211												
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212												
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)												
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234												
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236												
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66												
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68												
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69												
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70												
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71												
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73												
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74												
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76												
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77												
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79												
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81												
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83												
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84												
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85												
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86												
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87												
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91												
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92												
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93												
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95												
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1												
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2												

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Percent Passing (0.149mm)-Solid (%)	Percent Passing (0.420mm)-Solid (%)	Percent Passing (0.841mm)-Solid (%)	Percent Passing (19mm)-Solid (%)	Percent Passing (25.4mm)-Solid (%)	Percent Passing (38.1mm)-Solid (%)	Percent Passing (4.75mm)-Solid (%)	Percent Passing (50.8mm)-Solid (%)	Percent Passing (76.2mm)-Solid (%)	Percent Passing (9.5mm)-Solid (%)	SO4 (mg/L)	Sand (Passing 0.125-0.063mm)-Solid (%)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3												
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6												
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7												
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9												
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12												
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1												
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1												
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1												
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2												
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4												
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72												
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89												
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)												
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)												
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)												
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)												
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)												
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)												
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)												
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E												
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F												
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H												
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I												
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J												
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E												
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L												
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M												
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N												
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F												
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G												
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H												
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I												
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2												
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4												
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6												
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7												
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8												
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10												
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11												
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12												
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102												
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103												
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104												
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105												
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107												
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108												
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109												
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110												
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111												
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112												
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114												
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116												
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117												

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Percent Passing (0.149mm)-Solid (%)	Percent Passing (0.420mm)-Solid (%)	Percent Passing (0.841mm)-Solid (%)	Percent Passing (19mm)-Solid (%)	Percent Passing (25.4mm)-Solid (%)	Percent Passing (38.1mm)-Solid (%)	Percent Passing (4.75mm)-Solid (%)	Percent Passing (50.8mm)-Solid (%)	Percent Passing (76.2mm)-Solid (%)	Percent Passing (9.5mm)-Solid (%)	SO4 (mg/L)	Sand (Passing 0.125-0.063mm)-Solid (%)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118												
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)												
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01	39.6	69.3	85.2	100	100	100	96.2	100	100	98		13.3
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01	28.8	43	48.3	65.7	78.5	100	56.8	100	100	61		7.1
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02	77.3	91.8	96	100	100	100	99.9	100	100	100		10.4
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A	74	92	95	98	100	100	97.2	100	100	98		12.0
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03	92.3	99.4	99.8	100	100	100	100	100	100	100		12.4
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03	92.6	99.4	99.9	100	100	100	100	100	100	100		13
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04	64.5	88.35	94.15	100	100	100	99.7	100	100	100		15.55
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05	72.7	98.2	99.9	100	100	100	100	100	100	100		18.1
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05	88.5	98.6	99.4	100	100	100	100	100	100	100		16.8
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06	1	1.4	1.7	66	79.7	100	5.7	100	100	12		<1.0
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A	57	80.8	94.5	100	100	100	100	100	100	100		3.5
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08	79.8	95.6	99.5	100	100	100	100	100	100	100		4.3
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09	80	93.7	96.4	100	100	100	99	100	100	100		8
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10	91.8	99	99.3	100	100	100	100	100	100	100		15
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11	70.3	92.9	99.1	100	100	100	100	100	100	100		5.1
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	84.7	92.75	95.3	100	100	100	97.2	100	100	97		6.65
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	72	89	94	100	100	100	97	100	100	98		9.6
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	94.5	99	99.8	100	100	100	100	100	100	100		6.65
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	62.5	78	85	100	100	100	96.7	100	100	100		11
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	92.2	97.4	98.7	100	100	100	100	100	100	100	1990	5.1
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	96.1	99.5	99.9	100	100	100	100	100	100	100	2040	5.5
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	50.7	55.4	57.3	64	64	100	60.4	100	100	63	1310	2.7
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	67.6	95	99.3	100	100	100	100	100	100	100	1800	9.6
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	76	93.7	97	100	100	100	100	100	100	100	1816.7	11.4
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07	92.1	99.2	99.7	100	100	100	100	100	100	100		11.2
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	84.8	96.2	98.4	100	100	100	99.8	100	100	100	1750	14.6
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08	92.1	99.4	99.9	100	100	100	100	100	100	100		9.2
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	90	99	99.8	100	100	100	100	100	100	100	2047	11
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	92	97	97.3	100	100	100	98.4	100	100	99	1687	7.4
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	98.6	99.7	99.8	100	100	100	100	100	100	100	2070	3.4
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	82.4	97.1	99.4	100	100	100	100	100	100	100	1630	9.5
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	52	82.6	90.7	100	100	100	97.4	100	100	98	1980	9.3
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	84.2	98.8	99.9	100	100	100	100	100	100	100	1570	15.4
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	91.2	99.6	99.9	100	100	100	100	100	100	100	1970	14.1
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	80.8	93.4	96.3	100	100	100	97.6	100	100	98		6.3
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	47.8	75.1	82.2	100	100	100	89.1	100	100	92		13.2
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	78.6	96.5	98.6	100	100	100	99.8	100	100	100		11.4
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	65.7	82.1	90.9	100	100	100	96	100	100	97		11.4
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	73.6	91.5	96.4	100	100	100	99.6	100	100	100		11.1
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	68.8	89.8	93.9	100	100	100	98.4	100	100	100		12.7
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	82.6	93.8	97.5	100	100	100	99.9	100	100	100		6.5
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	75.9	92.1	96.2	100	100	100	98.3	100	100	98		9.2
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	90.5	97	98.6	100	100	100	99.8	100	100	100		5.5
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	86.7	95	97.3	100	100	100	98.9	100	100	100		6.9

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Sand (Passing 0.25-0.125mm)-Solid (%)	Sand (Passing 0.5-0.25mm)-Solid (%)	Sand (Passing 1.0-0.50mm)-Solid (%)	Sand (Passing 2.0-1.0mm)-Solid (%)	Saturation (%)	Silt (Passing 0.0312-0.004mm)-Solid (%)	Silt (Passing 0.063-0.0312mm)-Solid (%)	Tetrachloro-m-xylene-solid (%)	Total_BTEX+Styrene-Solid (mg/kg)	Total_BTEX-solid (mg/kg)	Total_PCB-Solid (mg/kg)	Trichlorotrifluoroethane-Solid (mg/kg)	VinylChloride-Solid (mg/kg)
SED21-02	SED21-02	2021-05-25 00:00:00	21E2914-01	SED21-2													
SED21-03	SED21-03	2021-05-25 00:00:00	21E2914-02	SED21-3													
SED21-04	SED21-04	2021-05-25 00:00:00	21E2914-03	SED21-4													
SED21-05	SED21-05	2021-05-25 00:00:00	21E2914-04	SED21-5													
SED21-06	SED21-06	2021-05-25 00:00:00	21E2914-05	SED21-6													
SED21-07	SED21-07	2021-05-25 00:00:00	21E2914-06	SED21-7													
SED19-01	SED19-01	2019-05-07 00:00:00	9050792-1	SED19-01													
SED19-02	SED19-02	2019-05-07 00:00:00	9050792-2	SED19-02													
SED19-03	SED19-03	2019-05-07 00:00:00	9050792-3	SED19-03													
SED19-04	SED19-04	2019-05-07 00:00:00	9050792-4	SED19-04													
SED19-05	SED19-05	2019-05-07 00:00:00	9050792-5	SED19-05													
SED19-06	SED19-06	2019-05-07 00:00:00	9050792-6	SED19-06													
SED19-07	SED19-07	2019-05-07 00:00:00	9050792-7	SED19-07													
SED19-08	SED19-08	2019-05-07 00:00:00	9050792-8	SED19-08													
SED19-09	SED19-09	2019-05-07 00:00:00	9050792-9	SED19-09													
SED19-10	SED19-10	2019-05-07 00:00:00	9050792-10	SED19-10													
SED19-11	SED19-11	2019-05-07 00:00:00	9050792-11	SED19-11													
SED13-200	SED13-200	2013-02-26 00:00:00	FS7090	SED13-200													
SED13-202	SED13-202	2013-02-25 00:00:00	FS7092	SED13-202													
SED13-203	SED13-203	2013-02-26 00:00:00	FS7093	SED13-203													
SED13-204	SED13-204	2013-02-25 00:00:00	FS7094	SED13-204													
SED13-206	SED13-206	2013-02-26 00:00:00	FS7096	SED13-206													
SED13-207	SED13-207	2013-02-26 00:00:00	FS7097	SED13-207													
SED13-208	SED13-208	2013-02-26 00:00:00	FS7098	SED13-208													
SED13-209	SED13-209	2013-02-26 00:00:00	FS7099	SED13-209													
SED13-210	SED13-210	2013-02-26 00:00:00	FS7100	SED13-210													
SED13-211	SED13-211	2013-02-26 00:00:00	FS7101	SED13-211													
SED13-212	SED13-212	2013-02-26 00:00:00	FS7104	SED13-212													
SED13-221(0.5)	SED13-221	2013-07-05 00:00:00	GV5878	#2 SED13-221(0.5)													
SED13-234	SED13-234	2013-07-05 00:00:00	GV5952	SED13-234													
SED13-236	SED13-236	2013-07-05 00:00:00	GV5954	SED13-236													
SED06-66	SED06-66	2006-05-15 00:00:00	X5969-2	SED06-66													
SED06-68	SED06-68	2006-05-15 00:00:00	X5969-3	SED06-68													
SED06-69	SED06-69	2006-05-15 00:00:00	X5969-4	SED06-69													
SED06-70	SED06-70	2006-05-15 00:00:00	X5969-5	SED06-70													
SED06-71	SED06-71	2006-05-15 00:00:00	X5969-6	SED06-71													
SED06-73	SED06-73	2006-05-15 00:00:00	X5969-8	SED06-73													
SED06-74	SED06-74	2006-05-15 00:00:00	X5969-9	SED06-74													
SED06-76	SED06-76	2006-05-15 00:00:00	X5969-11	SED06-76													
SED06-77	SED06-77	2006-05-15 00:00:00	X5969-12	SED06-77													
SED06-79	SED06-79	2006-05-15 00:00:00	X5969-14	SED06-79													
SED06-81	SED06-81	2006-05-15 00:00:00	X5969-16	SED06-81													
SED06-83	SED06-83	2006-05-16 00:00:00	X5969-18	SED06-83													
SED06-84	SED06-84	2006-05-16 00:00:00	X5969-19	SED06-84													
SED06-85	SED06-85	2006-05-16 00:00:00	X5969-20	SED06-85													
SED06-86	SED06-86	2006-05-16 00:00:00	X5969-21	SED06-86													
SED06-87	SED06-87	2006-05-15 00:00:00	X5969-1	SED06-87													
SED06-91	SED06-91	2006-05-17 00:00:00	X5969-25	SED06-91													
SED06-92	SED06-92	2006-05-16 00:00:00	X5969-26	SED06-92													
SED06-93	SED06-93	2006-05-16 00:00:00	X5969-27	SED06-93													
SED06-95	SED06-95	2006-05-17 00:00:00	X5969-28	SED06-95													
SED07-A1	SED07-A1	2007-10-12 00:00:00	710180460	SED07-A1													
SED07-A2	SED07-A2	2007-10-12 00:00:00	710180461	SED07-A2													

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Sand (Passing 0.25-0.125mm)-Solid (%)	Sand (Passing 0.5-0.25mm)-Solid (%)	Sand (Passing 1.0-0.50mm)-Solid (%)	Sand (Passing 2.0-1.0mm)-Solid (%)	Saturation (%)	Silt (Passing 0.0312-0.004mm)-Solid (%)	Silt (Passing 0.063-0.0312mm)-Solid (%)	Tetrachloro-m-xylene-solid (%)	Total_BTEX+Styrene-Solid (mg/kg)	Total_BTEX-solid (mg/kg)	Total_PCB-Solid (mg/kg)	Trichlorotrifluoroethane-Solid (mg/kg)	VinylChloride-Solid (mg/kg)
SED07-A3	SED07-A3	2007-10-12 00:00:00	710180462	SED07-A3													
SED07-A6	SED07-A6	2007-10-12 00:00:00	710180471	SED07-A6													
SED07-A7	SED07-A7	2007-10-12 00:00:00	710180464	SED07-A7													
SED07-A9	SED07-A9	2007-10-12 00:00:00	710180465	SED07-A9													
SED07-A12	SED07-A12	2007-10-12 00:00:00	710180472	SED07-A12													
SED07-A14-1	SED07-A14-1	2007-10-12 00:00:00	710180470	SED07-A14-1													
SED07-A15-1	SED07-A15-1	2007-10-12 00:00:00	710180466	SED07-A15-1													
SED07-C1	SED07-C1	2007-10-11 00:00:00	710230053	SED07-C1													
SED07-C2	SED07-C2	2007-10-11 00:00:00	710230054	SED07-C2													
SED07-C4	SED07-C4	2007-10-11 00:00:00	710230056	SED07-C4													
SED06-72	SED06-72	2006-05-15 00:00:00	X5969-7	SED06-72													
SED06-89	SED06-89	2006-05-16 00:00:00	X5969-23	SED06-89													
MBH22-09(0.5)	MBH22-09	2022-02-28 00:00:00	APO062	MBH22-09 (0.5)													
MBH22-04(0.5)	MBH22-04	2022-02-18 00:00:00	APM912	MBH22-04 (0.5)													
MBH22-05(0.5)	MBH22-05	2022-02-20 00:00:00	APM913	MBH22-05 (0.5)													
MBH22-06(0.5)	MBH22-06	2022-02-23 00:00:00	APM915	MBH22-06 (0.5)													
MBH22-07(0.5)	MBH22-07	2022-02-20 00:00:00	APM917	MBH22-07 (0.5)													
MBH22-08(0.5)	MBH22-08	2022-02-25 00:00:00	APM918	MBH22-08 (0.5)													
MBH22-03(0.5)	MBH22-03	2022-02-17 00:00:00	APM920	MBH22-03 (0.5)													
IDZ-R1-GrabE	GrabE	2023-11-02 00:00:00	VA23C6609-006	Grab E													
IDZ-R1-GrabF	GrabF	2023-11-01 00:00:00	VA23C6609-007	Grab F													
IDZ-R1-GrabH	GrabH	2023-11-01 00:00:00	VA23C6609-010	Grab H													
IDZ-R1-GrabI	GrabI	2023-11-01 00:00:00	VA23C6609-011	Grab I													
IDZ-R1-GrabJ	GrabJ	2023-11-03 00:00:00	VA23C6609-012	Grab J													
IDZ-R2-GrabE	GrabE	2023-12-13 00:00:00	VA23C9976-001	Grab E													
IDZ-R2-GrabL	GrabL	2023-12-13 00:00:00	VA23C9976-004	Grab L													
IDZ-R2-GrabM	GrabM	2023-12-13 00:00:00	VA23C9976-005	Grab M													
IDZ-R2-GrabN	GrabN	2023-12-13 00:00:00	VA23C9976-006	Grab N													
IDZ-R2-GrabF	GrabF	2023-12-13 00:00:00	VA23C9976-007	Grab F													
IDZ-R2-GrabG	GrabG	2023-12-13 00:00:00	VA23C9976-008	Grab G													
IDZ-R2-GrabH	GrabH	2023-12-13 00:00:00	VA23C9976-009	Grab H													
IDZ-R2-GrabI	GrabI	2023-12-13 00:00:00	VA23C9976-010	Grab I													
WMB02	WMB02	2014-06-30 16:00:00	L1480456-1	WMB2													
WMB04	WMB04	2014-06-26 12:28:00	L1480456-2	WMB4													
WMB06	WMB06	2014-06-26 10:55:00	L1480456-3	WMB6													
WMB07	WMB07	2014-06-28 09:29:00	L1480456-4	WMB7													
WMB08	WMB08	2014-06-26 13:50:00	L1480456-5	WMB8													
WMB10	WMB10	2014-06-27 09:42:00	L1480456-6	WMB10													
WMB11	WMB11	2014-06-27 11:40:00	L1480456-7	WMB11													
WMB12	WMB12	2014-06-28 11:05:00	L1480456-8	WMB12													
SED06-102	SED06-102	2006-08-29 00:00:00	140814-02	SED06-102													
SED06-103	SED06-103	2006-08-30 00:00:00	140814-03	SED06-103													
SED06-104	SED06-104	2006-08-29 00:00:00	140814-04	SED06-104													
SED06-105	SED06-105	2006-08-30 00:00:00	140814-05	SED06-105													
SED06-107	SED06-107	2006-08-29 00:00:00	140814-07	SED06-107													
SED06-108	SED06-108	2006-08-29 00:00:00	140814-08	SED06-108													
SED06-109	SED06-109	2006-08-29 00:00:00	140814-09	SED06-109													
SED06-110	SED06-110	2006-08-29 00:00:00	140814-10	SED06-110													
SED06-111	SED06-111	2006-08-30 00:00:00	140814-11	SED06-111													
SED06-112	SED06-112	2006-08-29 00:00:00	140814-12	SED06-112													
SED06-114	SED06-114	2006-08-28 00:00:00	140814-14	SED06-114													
SED06-116	SED06-116	2006-08-28 00:00:00	140814-16	SED06-116													
SED06-117	SED06-117	2006-08-29 00:00:00	140814-17	SED06-117													

Appendix 3.8-1: Marine Sediment Quality Results
Table 1: Baseline Marine Sediment Monitoring Results (2006 - 2025)

Station Code	Station Name	Collection Date/Time	Laboratory Sample ID	Original Sampling ID	Sand (Passing 0.25-0.125mm)-Solid (%)	Sand (Passing 0.5-0.25mm)-Solid (%)	Sand (Passing 1.0-0.50mm)-Solid (%)	Sand (Passing 2.0-1.0mm)-Solid (%)	Saturation (%)	Silt (Passing 0.0312-0.004mm)-Solid (%)	Silt (Passing 0.063-0.0312mm)-Solid (%)	Tetrachloro-m-xylene-solid (%)	Total_BTEX+Styrene-Solid (mg/kg)	Total_BTEX-solid (mg/kg)	Total_PCB-Solid (mg/kg)	Trichlorotrifluoroethane-Solid (mg/kg)	VinylChloride-Solid (mg/kg)
SED06-118	SED06-118	2006-08-28 00:00:00	140814-18	SED06-118													
SED13-231(0.1)	SED13-231	2013-07-05 00:00:00	PR131607	SED13-231(0.1)													
FLO-01	FLO-01	2024-08-29 09:36:59	VA24C2558-001	FLO-01	19.1	20.8	13.6	2.2		10.2	7.7						
FLO-01	FLO-01	2025-07-15 11:26:59	VA25B7404-004	FLO-01	10.8	8	4.1	3.3		9.2	5.8						
FLO-02	FLO-02	2024-08-29 10:27:00	VA24C2558-002	FLO-02	12.4	6.6	3	1.8		32	17.8						
FLO-02	FLO-02	2025-07-15 13:12:00	VA25B7404-007	FLO-02-A	16.8	6.8	1.4	<1.0		27.8	18						
FLO-03	FLO-03	2024-08-29 09:04:59	VA24C2558-003	FLO-03	8	<1.0	<1.0	<1.0		40.1	18.9						
FLO-03	FLO-03	2025-07-17 15:11:00	VA25B7587-013	FLO-03	7.4	1.1	<1.0	<1.0		39.4	19.8						
FLO-04	FLO-04	2024-08-28 14:55:00	VA24C2558-004	FLO-04	20	11.3	3.25	1.95		20.75	13.4						
FLO-05	FLO-05	2024-08-28 12:49:00	VA24C2558-008	FLO-05	27.8	4.5	<1.0	<1.0		23.5	13.9						
FLO-05	FLO-05	2025-07-17 15:29:59	VA25B7587-014	FLO-05	11.2	1.7	<1.0	<1.0		34.6	18.3						
FLO-06	FLO-06	2024-08-28 11:57:00	VA24C2558-009	FLO-06	1.2	<1.0	<1.0	1.1		<1.0	<1.0						
FLO-07	FLO-07	2025-07-16 12:56:59	VA25B7444-009	FLO-07A	11.7	20.4	10.6	1.9		25.8	12.0						
FLO-08	FLO-08	2025-07-17 12:45:00	VA25B7587-007	FLO-08	11.3	9.8	1.2	<1.0		37.6	13.2						
FLO-09	FLO-09	2025-07-17 12:58:00	VA25B7587-008	FLO-09	11.6	6.4	<1.0	1.3		35.4	14.6						
FLO-10	FLO-10	2025-07-15 11:53:00	VA25B7404-005	FLO-10	8.5	<1.0	<1.0	<1.0		37.5	20						
FLO-11	FLO-11	2025-07-17 12:45:00	VA25B7587-015	FLO-11	15.6	14.7	2.2	<1.0		33.1	11.2						
IDZ-E-Sed	IDZ-E-Sed	2024-12-23 13:14:59	VA24D4379-001	IDZ-E-SED	6.35	4.3	1.7	1.15		39.1	15.75				<0.299	0.077	<0.05
IDZ-E-Sed	IDZ-E-Sed	2025-07-11 12:24:59	VA25B7089-001	IDZ-E-SED-A	12.7	9.0	3.2	1.3		29.4	18	95		0.1	<0.0756	0.05	0.05
IDZ-W-Sed	IDZ-W-Sed	2024-12-23 11:15:00	VA24D4379-003	IDZ-W-SED	4.15	1.7	<1.0	<1.0		47.35	23.9				<0.6	<0.05	<0.05
IDZ-W-Sed	IDZ-W-Sed	2025-07-12 09:49:59	VA25B7092-001	IDZ-W-SED-A	12	8.5	6.1	6.3		25	14	98		0.12	<0.059	0.05	0.05
SED-02	SED-02	2025-07-15 10:43:59	VA25B7404-003	SED-02	4.5	2.2	<1.0	<1.0	165	44.6	21.1		<0.15	0.14			
SED-03	SED-03	2025-07-15 09:45:00	VA25B7404-001	SED-03	3.6	<1.0	<1.0	<1.0	184	43.7	24.2		<0.15	<0.1			
SED-04	SED-04	2025-07-15 10:14:59	VA25B7404-002	SED-04	3.6	2.6	1.5	1.3	214	23.8	14.2		<0.15	<0.1			
SED-05	SED-05	2025-07-16 13:52:00	VA25B7444-012	SED-05	25.1	10.5	1.4	<1.0	87.8	27	10.6		<0.15	<0.1			
SED-06	SED-06	2025-07-17 10:32:59	VA25B7587-004	SED-06A	15.6	7.0	1.7	1.1	129.3	29.3	19		0.17	0.13			
SED-07	SED-07	2024-08-28 09:47:00	VA24C2558-006	SED-07	8	1	<1.0	<1.0		41.1	16.5						
SED-07	SED-07	2025-07-16 11:17:00	VA25B7444-005	SED-07	10.6	4.3	1.2	<1.0	89.3	34.4	17.9		<0.15	<0.1			
SED-08	SED-08	2024-08-28 10:11:00	VA24C2558-007	SED-08	8	1.2	<1.0	<1.0		41.9	14.9						
SED-08	SED-08	2025-07-16 11:48:00	VA25B7444-006	SED-08A	9.6	2.2	<1.0	<1.0	113	39.3	15.5		<0.15	0.1			
SED-09	SED-09	2025-07-17 07:54:00	VA25B7587-001	SED-09A	4.3	1.2	<1.0	<1.0	111	44.2	17.6		<0.15	0.11			
SED-10	SED-10	2025-07-17 14:37:59	VA25B7587-012	SED-10	1	<1.0	<1.0	<1.0	135	52	15.6		<0.15	<0.1			
SED-11	SED-11	2025-07-17 14:12:00	VA25B7587-010	SED-11	13.7	5.2	1.1	<1.0	246	34.5	21.8		<0.15	<0.1			
SED-12	SED-12	2025-07-17 13:52:00	VA25B7587-011	SED-12	24.5	15.9	4.3	4.1	64.8	18.7	10.7		<0.15	<0.1			
SED-13	SED-13	2025-07-16 10:16:00	VA25B7444-003	SED-13	15.3	3.2	<1.0	<1.0	77.2	33.6	16.1		<0.15	<0.1			
SED-14	SED-14	2025-07-16 10:39:00	VA25B7444-004	SED-14	9.8	<1.0	<1.0	<1.0	88.6	39	19		<0.15	<0.1			
SED-E	SED-E	2025-07-11 10:05:00	VA25B7089-004	SED-E	10.4	6.2	1.4	<1.0		35.9	21.8	95		<0.1	<0.074	<0.05	<0.05
SED-F	SED-F	2025-07-12 13:45:00	VA25B7092-004	SED-F	22.5	13.4	4.2	2.7		14.2	9.3	93.4		0.25	<0.044	<0.05	<0.05
SED-G	SED-G	2025-07-12 11:39:59	VA25B7092-005	SED-G	18.6	4.2	1.2	<1.0		31.7	16.8	98.6		<0.1	<0.055	<0.05	<0.05
SED-H	SED-H	2025-07-12 14:44:59	VA25B7092-006	SED-H	12	9.9	8.2	1.7		26.1	15	97.1		0.14	<0.076	<0.05	<0.05
SED-I	SED-I	2025-07-12 15:15:00	VA25B7092-007	SED-I	14.8	8.7	3.1	<1.0		29	16.4	94.6		<0.1	<0.054	<0.05	<0.05
SED-J	SED-J	2025-07-12 15:45:00	VA25B7092-008	SED-J	18.3	9.1	1.7	1.9		25.8	15	96.1		<0.1	0.125	<0.05	<0.05
SED-K	SED-K	2025-07-11 11:05:00	VA25B7089-005	SED-K	8.3	6.7	2.2	<1.0		36.7	20.3	90.9		<0.1	<0.078	<0.05	<0.05
SED-L	SED-L	2025-07-11 09:15:00	VA25B7089-006	SED-L	13	8.4	2.1	<1.0		32.3	16.7	93.6		<0.1	<0.078	<0.05	<0.05
SED-M	SED-M	2025-07-11 11:44:59	VA25B7089-007	SED-M	5.2	3.3	<1.0	<1.0		42.4	20.1	95.6		<0.1	<0.093	<0.05	<0.05
SED-N	SED-N	2025-07-11 11:30:00	VA25B7089-008	SED-N	6.8	4.2	1.3	<1.0		38.4	19.3	92.2		<0.1	<0.075	<0.05	<0.05

Notes:
Samples measured below method detection limit are indicated by <
Duplicate and triplicate samples are averaged

Appendix 3.8: Marine Sediment Quality Results

Table 2: Summary Statistics for Marine Sediment Monitoring Results (2006 - 2025)

Parameter	Units	Minimum	Median	Maximum	Number of Samples	Number of Samples Below DL
1-1-1-2-Tetrachloroethane	mg/kg	0.05	0.05	0.05	22	20
1-1-1-Trichloroethane	mg/kg	0.05	0.05	0.05	22	20
1-1-2-2-Tetrachloroethane	mg/kg	0.05	0.05	0.05	22	20
1-1-2-Trichloroethane	mg/kg	0.05	0.05	0.05	22	20
1-1-Dichloroethane	mg/kg	0.05	0.05	0.05	22	20
1-1-dichloroethylene	mg/kg	0.05	0.05	0.05	22	20
1-2-3-4-6-7-8-HpCDD	ng/kg	0.966	98.3	1470	49	0
1-2-3-4-6-7-8-HpCDF	ng/kg	0.123	26.9	320.5	49	2
1-2-3-4-7-8-9-HpCDF	ng/kg	0.0025	0.78	6.49	49	13
1-2-3-4-7-8-HxCDD	ng/kg	0.013	1.01	13	49	19
1-2-3-4-7-8-HxCDF	ng/kg	0.22	1.49	15.25	49	5
1-2-3-6-7-8-HxCDD	ng/kg	3.29	28.7	159	49	0
1-2-3-6-7-8-HxCDF	ng/kg	0.283	1.44	14.285	49	17
1-2-3-7-8-9-HxCDD	ng/kg	0.5	12.8	163	49	1
1-2-3-7-8-9-HxCDF	ng/kg	0.11	0.67	6.65	49	12
1-2-3-7-8-PeCDD	ng/kg	0.3	3.24	13.3	49	5
1-2-3-7-8-PeCDF	ng/kg	0.14	3.87	25.6	49	13
1-2-3-trichlorobenzene	mg/kg	0.05	0.05	0.05	8	8
1-2-4-trichlorobenzene	mg/kg	0.05	0.05	0.05	8	8
12-Chlorodehydroabietic Acid	mg/kg	0.014	0.022	0.05	4	2
1-2-Dibromoethane	mg/kg	0.05	0.05	0.05	8	8
1-2-Dichlorobenzene	mg/kg	0.05	0.05	0.05	22	20
1-2-Dichloroethane	mg/kg	0.05	0.05	0.05	22	20
1-2-Dichloropropane	mg/kg	0.05	0.05	0.05	22	20
1-3-5-trimethylbenzene	mg/kg	0.05	0.05	0.05	8	8
1-3-Dichlorobenzene	mg/kg	0.05	0.05	0.05	22	20
1-3-Dichloropropane	mg/kg	0.05	0.05	0.05	8	8
1-3-dichloropropylene(cis+trans)	mg/kg	0.075	0.075	0.075	22	22
1-3-dichloropropylene,cis	mg/kg	0.05	0.05	0.05	22	20
1-3-dichloropropylene,trans	mg/kg	0.05	0.05	0.05	22	20
14-Chlorodehydroabietic Acid	mg/kg	0.02	0.032	0.062	4	1
1-4-Dichlorobenzene	mg/kg	0.05	0.05	0.05	22	20
1-Methylnaphthalene	mg/kg	0.01	0.07	3.6	50	3
2,3,4,5-Tetrachlorophenol	mg/kg	0.02	0.02	0.02	2	2
2-3-4-6-7-8-HxCDF	ng/kg	0.37	1.7	15.35	49	15
2,3,4,6-Tetrachlorophenol	mg/kg	0.02	0.02	0.02	2	2
2-3-4-7-8-PeCDF	ng/kg	0.468	3.76	35.325	49	1
2,3,4-Trichlorophenol	mg/kg	0.02	0.02	0.02	2	2
2,3,5,6-Tetrachlorophenol	mg/kg	0.02	0.02	0.02	2	2
2,3,5-Trichlorophenol	mg/kg	0.02	0.02	0.02	2	2
2,3,6-Trichlorophenol	mg/kg	0.02	0.02	0.02	2	2
2-3-7-8-TCDD	ng/kg	0.081	0.67	2.61	49	7
2-3-7-8-TCDF	ng/kg	1.4	23.4	111	49	0
2,3-Dichlorophenol	mg/kg	0.02	0.02	0.02	2	2
2,4 & 2,5 Dichlorophenol	mg/kg	0.02	0.03	0.04	2	2
2,4,5-Trichlorophenol	mg/kg	0.02	0.02	0.02	2	2
2,4,6-Trichlorophenol	mg/kg	0.02	0.02	0.02	2	2
2,4-Dimethylphenol	mg/kg	0.05	0.2	0.3	3	2
2,6-Dichlorophenol	mg/kg	0.02	0.02	0.02	2	2
2,6-Dichlorosyringaldehyde	mg/kg	0.02	0.02	0.02	2	2
2-Chlorophenol	mg/kg	0.02	0.02	0.02	2	2
2-Chlorosyringaldehyde	mg/kg	0.02	0.02	0.02	2	2
2-Methylnaphthalene	mg/kg	0.001	0.088	4.7	119	25
3,4,5-Trichlorocatechol	mg/kg	0.02	0.098	0.128	3	1
3,4,5-Trichloroguaiacol	mg/kg	0.02	0.02	0.02	2	2
3,4,5-Trichlorophenol	mg/kg	0.02	0.02	0.02	2	2
3,4,5-Trichlorosyringol	mg/kg	0.02	0.02	0.02	2	2
3,4,5-Trichloroveratrole	mg/kg	0.02	0.02	0.02	2	2
3,4,6-Trichlorocatechol	mg/kg	0.02	0.02	0.029	3	2
3,4,6-Trichloroguaiacol	mg/kg	0.02	0.02	0.02	2	2
3,4,6-Trichloroveratrole	mg/kg	0.02	0.02	0.02	2	2
3,4-Dichlorocatechol	mg/kg	0.02	0.02	0.02	2	2
3,4-Dichloroguaiacol	mg/kg	0.02	0.06	0.1	2	2
3,4-Dichlorophenol	mg/kg	0.02	0.02	0.02	2	2
3,5-Dichlorocatechol	mg/kg	0.02	0.02	0.02	2	2
3,5-Dichlorophenol	mg/kg	0.02	0.02	0.02	2	2
3,5-Dichlorosyringol	mg/kg	0.02	0.02	0.02	2	2
3,6-Dichlorocatechol	mg/kg	0.02	0.023	0.027	3	1
3-Chlorocatechol	mg/kg	0.02	0.02	0.02	2	2
3-Chlorophenol	mg/kg	0.02	0.02	0.02	2	2
3-Chlorosyringol	mg/kg	0.02	0.02	0.02	2	2
4,5,6-Trichloroguaiacol	mg/kg	0.02	0.02	0.02	2	2
4,5-Dichlorocatechol	mg/kg	0.02	0.023	0.03	3	1
4,5-Dichloroguaiacol	mg/kg	0.02	0.02	0.02	2	2
4,5-Dichloroveratrole	mg/kg	0.02	0.02	0.02	2	2
4,6-Dichloroguaiacol	mg/kg	0.02	0.51	1	2	2
4-Chloro-3-methylphenol	mg/kg	0.02	0.02	0.02	2	2
4-Chlorocatechol	mg/kg	0.02	0.02	0.02	2	2
4-Chloroguaiacol	mg/kg	0.02	0.02	0.02	2	2
4-Chlorophenol	mg/kg	0.02	0.02	0.02	2	2
5,6-Dichlorovanillin	mg/kg	0.02	0.02	0.02	2	2
5-Chloroguaiacol	mg/kg	0.02	0.02	0.02	2	2
5-Chlorovanillin	mg/kg	0.02	0.02	0.02	2	2
6-Chloroguaiacol	mg/kg	0.02	0.02	0.02	2	2
6-Chlorovanillin	mg/kg	0.024	0.0625	0.101	2	0
Abietic Acid	mg/kg	0.751	0.941	2.77	4	0
Acenaphthene	mg/kg	0.00053	0.21	14	121	16
Acenaphthylene-d8	%	72	83	98	11	0
Acenaphthylene	mg/kg	0.0005	0.06	8.57	119	23
Acridine	mg/kg	0.01	0.032	0.97	39	13
Silver	mg/kg	0.05	0.126	2	84	15
Aluminum	mg/kg	7020	21583	27500	90	0
Ammonia	mg/kg	5	9.5	13	8	0
Anthracene-d10	%	61	83	98	11	0
Anthracene	mg/kg	0.001	0.198	33	119	18
Arachidic Acid	mg/kg	1.7	2.28	2.83	4	0
Aroclor1016	mg/kg	0.004	0.02	0.2	37	37

Appendix 3.8: Marine Sediment Quality Results

Table 2: Summary Statistics for Marine Sediment Monitoring Results (2006 - 2025)

Parameter	Units	Minimum	Median	Maximum	Number of Samples	Number of Samples Below DL
Aroclor1221	mg/kg	0.004	0.02	0.2	37	37
Aroclor1232	mg/kg	0.004	0.02	0.2	37	37
Aroclor1242	mg/kg	0.004	0.02	0.2	37	37
Aroclor1248	mg/kg	0.004	0.02	0.2	37	37
Aroclor1254	mg/kg	0.004	0.02	0.2	37	30
Aroclor1260	mg/kg	0.004	0.02	0.2	37	36
Aroclor1262	mg/kg	0.004	0.020	0.2	35	35
Aroclor1268	mg/kg	0.004	0.020	0.2	35	35
Arsenic	mg/kg	1.23	5.55	35.2	95	8
Acid Volatile Sulfide	umol/g	1.04	14	103	41	0
Acid Volatile Sulfide-mg/kg	mg/kg	6.6	183	1070	43	0
Benzo(a)pyrene Equivalancy	mg/kg	0.01	0.328	6.725	55	4
Barium	mg/kg	34.4	168	262	98	0
Behenic Acid	mg/kg	4.35	5.75	6.9	4	0
Benz(a)anthracene	mg/kg	0.016	0.245	14	79	6
Benzene	mg/kg	0.005	0.0277	0.21	35	6
Benzo(a)anthracene	mg/kg	0.0012	0.204	4.9	47	12
Benzo(a)pyrene	mg/kg	0.001	0.154	4.7	117	17
Benzo(b)fluoranthene	mg/kg	0.0013	0.1475	11	70	12
Benzo(b+j)fluoranthene	mg/kg	0.0013	0.362	8	73	6
Benzo(b+j+k)fluoranthene	mg/kg	0.023	0.4675	8.42	48	0
Benzo(g-h-i)perylene	mg/kg	0.002	0.065	1.8	114	32
Benzo(k)fluoranthene	mg/kg	0.001	0.109	3.7	116	23
Beryllium	mg/kg	0.2	0.23	0.5	84	20
Bi	mg/kg	0.1	0.13	0.49	57	10
Bisphenol-A	mg/kg	0.0156	1.3149	24	4	0
Bromobenzene	mg/kg	0.05	0.05	0.05	8	8
Bromoform	mg/kg	0.05	0.05	0.05	22	20
Bromomethane	mg/kg	0.05	0.05	0.05	8	8
Bromide (Br)	mg/kg	29.2	52	113	21	0
Boron	mg/kg	4.6	26	94.1	64	0
Carbon Tetrachloride	mg/kg	0.05	0.05	0.05	8	8
Calcium	mg/kg	3400	10500	53000	83	0
Cadmium - SEM	umol/g	0.005	0.005	0.0076	41	40
Cadmium-SEM-mg/kg	mg/kg	0.5	0.5	0.51	27	26
Cadmium	mg/kg	0.077	0.285	1.55	93	12
Chlorobenzene	mg/kg	0.05	0.05	0.05	22	20
Chloroethane	mg/kg	0.02	0.05	0.05	22	20
Chloroform	mg/kg	0.05	0.05	0.05	22	20
Chloromethane	mg/kg	0.02	0.05	0.0525	22	19
Chloronapthalene-2	mg/kg	0.05	0.05	0.069	10	10
Chrysene	mg/kg	0.0021	0.336	12	119	15
cis-1-2-dichloroethylene	mg/kg	0.05	0.05	0.05	22	20
Clay	%	0.01	15.655	30	84	3
Chloride	mg/kg	8570	15600	32500	21	0
Cobalt	mg/kg	3.5	10.7	16.15	98	0
Chromium	mg/kg	5.72	22.45	57.5	98	0
Copper - SEM	umol/g	0.031	0.118	0.529	49	0
Copper-SEM-mg/kg	mg/kg	0.157	7	33.6	43	0
Copper	mg/kg	8.35	59.8	713	123	0
d8-Naphthalene	%	68.2	99.4	126	48	0
Dehydroabietic Acid	mg/kg	0.732	1.07	1.28	4	0
Dibenz(a-h)Anthracene	mg/kg	0.0005	0.05	0.5	114	56
Dibromochloromethane	mg/kg	0.05	0.05	0.05	8	8
Dibutyltin	mg/kg	0.001	0.001	0.003	19	15
Dichlorodehydroabietic Acid	mg/kg	0.01	0.04	0.086	3	2
Dichlorodifluoromethane	mg/kg	0.05	0.05	0.05	8	8
Dichloromethane	mg/kg	0.045	0.045	0.045	22	20
EPH(C10-C19)	mg/kg	100	200	360	55	50
EPH(C19-C32)	mg/kg	100	200	2900	55	35
Ethylbenzene	mg/kg	0.015	0.015	0.0365	35	34
F1(C6-C10)	mg/kg	5	6.225	13	22	22
F1-BTEX	mg/kg	5	5	6.45	10	10
F2(C10-C16)	mg/kg	25	36	155	22	18
F3(C16-C34)	mg/kg	50	242	1149	22	0
F4(C34-C50)	mg/kg	50	149	683.5	22	2
Iron	mg/kg	13700	28900	74000	90	0
Fluoranthene	mg/kg	0.009	0.7365	67.5	126	6
Fluorene	mg/kg	0.001	0.1745	21	114	21
Freon113	mg/kg	0.05	0.057	0.079	8	8
Fluoride (F)	mg/kg	0.911	2.41	19	21	0
Gravel (>2mm)	%	0.1	2	97.1	71	23
HEPH	mg/kg	100	200	2900	41	30
Hexachlorobutadiene	mg/kg	0.05	0.05	0.05	8	8
Hexavalent Chromium_Cr	mg/kg	0.1	0.1	0.1	8	8
Mercury-SEM	umol/g	0.00005	5	5	35	27
Mercury-SEM-mg/kg	mg/kg	0.01	0.01	0.01	27	27
Mercury	mg/kg	0.0238	0.051	0.822	87	12
Index of Additive Cancer Risk (IACR)		0.1	4.495	104.9	42	2
Indeno(1-2-3-Cd)pyrene	mg/kg	0.002	0.0735	2.5	114	34
Isopimaric & Palustric Acids	mg/kg	0.245	0.2825	0.382	4	0
Isopropylbenzene	mg/kg	0.05	0.05	0.05	8	8
Available Potassium	mg/kg	590	762	1180	8	0
Potassium	mg/kg	590	5590	7560	83	0
Lauric Acid	mg/kg	0.376	0.6795	1	4	2
LEPH	mg/kg	100	200	360	41	38
Levopimaric Acid	mg/kg	0.01	0.03	0.05	2	2
Lignoceric Acid	mg/kg	4.46	8.15	10	4	0
Linoleic Acid	mg/kg	0.05	0.475	0.9	2	2
Linolenic Acid	mg/kg	0.05	0.086	0.523	4	1
Lithium	mg/kg	3	19.05	29.7	78	0
Lower Bound PCDD/F TEQ Solid (WHO 2005)	ng/kg	1.58	15.7	67.7	49	0
m-Cresol	mg/kg	0.02	0.03	0.053	3	2
meta-para-Xylene	mg/kg	0.03	0.031	0.0855	35	31
Methyl-tert-butyl-ether	mg/kg	0.04	0.04	0.2	35	35
Magnesium	mg/kg	2880	11800	14900	83	0
Mid Point PCDD/F TEQ Solid (WHO 2005)	ng/kg	1.76	16.6	67.7	49	0

Appendix 3.8: Marine Sediment Quality Results

Table 2: Summary Statistics for Marine Sediment Monitoring Results (2006 - 2025)

Parameter	Units	Minimum	Median	Maximum	Number of Samples	Number of Samples Below DL
Manganese	mg/kg	165	524	1430	90	0
Moisture	%	5.9	48.8	73.3	115	0
Monobutyltin	mg/kg	0.001	0.001	0.001	19	19
Molybdenum	mg/kg	1.22	4	15.2	88	12
Myristic Acid	mg/kg	0.692	1.32	1.55	4	0
Naphthalene-d8	%	69	83	99	10	0
Naphthalene	mg/kg	0.001	0.32	11	127	18
Sodium	mg/kg	330	6910	26900	83	0
Neoabietic Acid	mg/kg	0.01	0.034	0.113	3	1
Nickel - SEM	umol/g	0.05	0.05	0.063	41	33
Nickel-SEM-mg/kg	mg/kg	2.9	2.9	3.7	27	25
Nickel	mg/kg	2.11	14.3	57	97	0
n-Nonylphenol monoethoxylate	mg/kg	0.00015	0.500075	1	4	0
n-Nonylphenol	mg/kg	0.003335	0.50173	1	4	0
Nitrite (as N)	mg/kg	0.5	0.5	0.5	8	8
Available Nitrate-N	mg/kg	4	6	6	8	8
Nitrate (as N)	mg/kg	2.5	2.5	2.5	8	8
Nonylphenol & Ethoxylate TEQ	mg/kg	0.08141	30	230	4	0
Nonylphenol diethoxylates	mg/kg	0.0032	0.501625	69	4	0
Nonylphenol monoethoxylates	mg/kg	0.036	0.525	200	4	0
Nonylphenol	mg/kg	56	74	92	2	0
Nonylphenols	mg/kg	0.0496	28	92	4	0
OCDD	ng/kg	0.447	572	9040	49	0
OCDF	ng/kg	0.0155	26.1	281.5	49	1
o-Cresol	mg/kg	0.03	0.0465	0.073	4	2
Oleic Acid	mg/kg	0.887	1.08	1.75	4	1
ORP (mV)	mV	160	160	160	1	0
ortho-Xylene	mg/kg	0.03	0.03	0.0575	35	31
o-Terphenyl	%	91	91	91	1	0
Palmitic Acid	mg/kg	3.24	4.2	9.59	3	0
Percent Passing 0.063mm	%	1	64.2	98	57	1
Percent Passing 0.125mm	%	1	74.9	98.4	57	1
Percent Passing 0.250mm	%	1.2	88.9	99.4	57	0
Percent Passing 0.50mm	%	1.5	95.4	99.9	57	0
Percent Passing 1.0mm	%	1.8	97.4	100	57	0
Percent Passing 2.0mm	%	2.9	98.2	100	57	0
Lead - SEM	umol/g	0.00005	0.026	0.207	41	12
Lead-SEM-mg/kg	mg/kg	0.048	5.85	42.9	28	2
Lead	mg/kg	2.24	12.7	407	107	0
p-Cresol	mg/kg	0.044	0.1835	4.36	10	2
Pentachlorophenol	mg/kg	0.02	0.02	0.02	2	2
Phenanthrene	mg/kg	0.0013	0.48	107	127	7
Phenol	mg/kg	0.04	0.203	0.627	9	1
pH (1:2 H2O Solution)	pH units	6.57	7.73	8.61	113	0
Pimaric Acid	mg/kg	0.085	0.09	0.09	3	2
Available Phosphate-P	mg/kg	10.8	19.95	34.2	8	0
Propylbenzene-n	mg/kg	0.05	0.05	0.05	8	8
PSA%>75um	%	2.17	22.8	57.5	8	0
Phosphorus	mg/kg	332	1120	2820	83	0
Pyrene	mg/kg	0.0065	0.614	35	123	8
Quinoline	mg/kg	0.01	0.01	0.078	40	35
Sandaracopimaric Acid	mg/kg	0.146	0.2645	0.45	4	0
Sand	%	1	32.7	96.1	85	0
Antimony	mg/kg	0.1	0.465	14.2	84	13
Selenium	mg/kg	0.1	0.29	0.94	96	8
Silt	%	0.01	47	72.7	84	2
Tin	mg/kg	0.29	2.46	66.8	84	18
Available Sulfate-S	mg/kg	490	586	2040	8	0
Sulphate	mg/kg	1210	2280	4320	21	0
Strontium	mg/kg	14.4	112	371	90	0
Sulphur	mg/kg	4060	6840	13200	57	0
Stearic Acid	mg/kg	0.728	3.17	7.58	3	0
Styrene	mg/kg	0.05	0.05	0.05	35	30
Sulphide	mg/kg	18.3	38.85	60.8	8	0
Carbon, Total	%	0.925	2.71	13	65	0
Terphenyl-d14	%	71	86	99	11	0
Tetrachlorocatechol	mg/kg	0.02	0.168	0.455	3	1
Tetrachloroethylene	mg/kg	0.05	0.05	0.05	22	20
Tetrachloroguaiacol	mg/kg	0.02	0.02	0.02	2	2
Tetrachloroveratrole	mg/kg	0.02	0.02	0.02	2	2
Carbon, Total Inorganic	%	0.126	0.199	1.03	57	0
Titanium	mg/kg	383	1480	2330	90	0
Thallium	mg/kg	0.09	0.198	0.304	72	0
Total Methylmercury	mg/kg	0.00005	0.0013	5.4	38	15
Carbon, Total Organic	%	0.799	2.5	26.5	74	0
t-Octylphenol diethoxylate	mg/kg	0.00015	0.50	1	4	0
t-Octylphenol monoethoxylate	mg/kg	0.00015	0.50	1	4	0
t-Octylphenol	mg/kg	0.00015	0.50	1	4	0
Toluene	mg/kg	0.05	0.05	0.1	35	25
Total Fatty Acids	mg/kg	18.3	25.9	31.3	4	0
Total_HMW-PAHs	mg/kg	0.019	2.55	125	35	6
Total_LMW-PAHs	mg/kg	0.0037	0.824	41.8	35	7
Total_PAHs	mg/kg	0.023	4.4	333	67	6
Total PCBs	mg/kg	0.015	0.028	0.08	23	20
Total Resin Acids	mg/kg	2.13	2.685	4.86	4	0
Total_Xylenes	mg/kg	0.05	0.05	0.1305	35	31
Total-HpCDD	ng/kg	24.8	315	4505	41	0
Total-HpCDF	ng/kg	1.63	50.2	782	41	0
Total-HxCDD	ng/kg	28.9	273	1240	41	0
Total-HxCDF	ng/kg	1.92	33.5	483.5	41	0
Total PCB (BC CSR)	mg/kg	0.02	0.02	0.069	8	5
Total-PeCDD	ng/kg	4.75	53.9	207.5	41	0
Total-PeCDF	ng/kg	4.92	39.5	767	41	0
Total-TCDD	ng/kg	3.4	48	299	41	0
Total-TCDF	ng/kg	10.7	118	427.5	41	0
trans-1-2-dichloroethylene	mg/kg	0.05	0.05	0.05	22	20
Tributyltin	mg/kg	0.001	0.0027	0.2	36	11

Appendix 3.8: Marine Sediment Quality Results

Table 2: Summary Statistics for Marine Sediment Monitoring Results (2006 - 2025)

Parameter	Units	Minimum	Median	Maximum	Number of Samples	Number of Samples Below DL
Trichloroethylene	mg/kg	0.01	0.0135	0.0225	22	21
Trichlorofluoromethane	mg/kg	0.05	0.05	0.05	8	8
Trivalent Chromium_Cr	mg/kg	14.1	19.75	21.4	8	0
Upper Bound PCDD/F TEQ Solid (WHO 2005)	ng/kg	1.76	16.6	67.7	49	0
Uranium	mg/kg	0.73	1.5325	4.835	72	0
VHC6-C10	mg/kg	10	10	13	22	22
Vinyl Chloride	mg/kg	0.05	0.05	0.05	8	8
VPHs	mg/kg	10	10	13	22	22
Vanadium	mg/kg	25.6	74	136	98	0
Tungsten	mg/kg	0.5	0.5	0.55	7	6
Zinc - SEM	umol/g	0.21	0.393	1.13	41	0
Zinc-SEM-mg/kg	mg/kg	0.43	21.05	66.9	34	0
Zinc	mg/kg	19.2	85.5	232.5	115	0
Zirconium	mg/kg	2.1	3.5	8.2	57	0
Year		2006	2013	2023	108	0
AVS	umol/g	0.21	4.86	27.4	8	0
Br	mg/L	33	43.6	48	13	0
Bromodichloromethane	mg/kg	0.05	0.05	0.05	14	12
CarbonTetrachloride	mg/kg	0.05	0.05	0.05	14	12
Chlorodibromomethane	mg/kg	0.05	0.05	0.05	14	12
Chromium(+3)	mg/kg	14.3	23.3	39.75	14	0
Chromium(+6)	mg/kg	0.1	0.1	0.17	14	11
Cl	mg/L	9160	12300	14100	13	0
Decachlorobiphenyl	%	92.8	112	137	12	0
F	mg/L	0.909	1.5	1.83	13	0
F4G-sg	mg/kg	560	805	2095	10	8
IACR		0.477	3.05	30.2	13	0
Lab Rec.		2024	2025	2025	44	0
Nitrite	mg/L	0.1	0.1	0.1	13	10
Nitrite	mg/kg	0.0648	0.11	0.246	13	13
Nitrate	mg/L	0.5	0.5	0.5	13	13
Nitrate	mg/kg	0.5	0.57	1.23	13	13
Percent Passing (0.002mm)	%	1	11.25	19	44	1
Percent Passing (0.004mm)	%	1	15.7	27.4	44	1
Percent Passing (0.005mm)	%	1	17.85	31.6	44	1
Percent Passing (0.020mm)	%	1	40.05	70.5	44	1
Percent Passing (0.0312mm)	%	1	50	79.4	44	1
Percent Passing (0.05mm)	%	1	63.85	94.2	44	1
Percent Passing (0.075mm)	%	1	69.95	95.6	44	1
Percent Passing (0.149mm)	%	1	79.9	98.6	44	0
Percent Passing (0.420mm)	%	1.4	94.4	99.7	44	0
Percent Passing (0.841mm)	%	1.7	97.4	99.9	44	0
Percent Passing (19mm)	%	64	100	100	44	0
Percent Passing (25.4mm)	%	64	100	100	44	0
Percent Passing (38.1mm)	%	100	100	100	44	0
Percent Passing (4.75mm)	%	5.7	99.8	100	44	0
Percent Passing (50.8mm)	%	100	100	100	44	0
Percent Passing (76.2mm)	%	100	100	100	44	0
Percent Passing (9.5mm)	%	11.9	100	100	44	0
Sulphate	mg/L	1310	1817	2070	13	0
Sand (Passing 0.125-0.063mm)	%	1	9.6	18.1	44	1
Sand (Passing 0.25-0.125mm)	%	1	11.25	27.8	44	0
Sand (Passing 0.5-0.25mm)	%	1	4.85	20.8	44	6
Sand (Passing 1.0-0.50mm)	%	1	1.25	13.6	44	18
Sand (Passing 2.0-1.0mm)	%	1	1	6.3	44	28
Saturation	%	64.8	113	246	13	0
Silt (Passing 0.0312-0.004mm)	%	1	34	52	44	1
Silt (Passing 0.063-0.0312mm)	%	1	16.45	24.2	44	1
Tetrachloro-m-xylene	%	90.9	95	98.6	12	0
Total_BTEX+Styrene	mg/kg	0.15	0.15	0.17	13	12
Total_BTEX	mg/kg	0.1	0.1	0.25	25	17
Total_PCB	mg/kg	0.044	0.08	0.6	14	13
Trichlorotrifluoroethane	mg/kg	0.05	0.05	0.077	14	11
VinylChloride	mg/kg	0.05	0.05	0.05	14	12

Appendix 3.9: Marine Water Quality

3.9-1: MARINE WATER QUALITY RESULTS

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ1-1	0051710-01	2020-05-20	M		31840			5.80	9.4			7.41	7.51	29.9		8.6		<2.0	5330	
WQ1-1	0062209-01	2020-06-22	M		32111			5.95	8.6			7.38	7.67	29.9		8.8		<2.0	5910	
WQ1-1	0071996-01	2020-07-21	M		45569			6.57	9.4			7.75	7.62	29.3		9.5		3.4	5360	
WQ1-1	0082292-01	2020-08-24	M		32941			5.77	8.9			7.51	7.64	30.1		9.6		3.4	5730	
WQ1-1	0093017-01	2020-09-28	M		31303			6.96	8.8			7.32	7.49			10.0		2.6	5020	
WQ1-1	20J1961-01	2020-10-20	M		32191			5.04	9.4			7.32	7.49	29.2		9.8		3.4	6060	
WQ1-1	20J2778-01	2020-10-27	M		31848			5.77	10.0			7.63	7.52	28.9		9.8		<2.0	5440	
WQ1-1	20K0360-01	2020-11-03	M		32434			5.09	9.8			7.52	7.61	29.6		9.6		2.6	5020	
WQ1-1	20K1261-01	2020-11-10	M		32922			4.80	8.0			7.38	7.46	30.1		9.6		3.2	5730	
WQ1-1	20K2100-01	2020-11-18	M						9.3				7.38					3.8	5930	
WQ1-1	20L1589-01	2020-12-14	M		32599			4.42	8.9				7.33	29.7		9.7		5	6300	
WQ1-1	21A2590-01	2021-01-27	M		31248			7.12	9.4			7.60	7.47	29.0		8.8		3	5540	
WQ1-1	21B2778-01	2021-02-25	M						10.6				7.43					3.4	6020	
WQ1-1	21C3505-01	2021-03-25	M			45598		7.24	9.4			7.68	7.46			8.3		2.4	5810	
WQ1-1	21D2478-01	2021-04-22	M		31293	45755		6.43	9.5			7.46	7.39	29.4		8.5		2.8	6410	
WQ1-1	21E1990-01	2021-05-18	M		31522	45948		6.30	9.1			7.32	7.69	29.5		8.6		8.4	6020	
WQ1-1	21E2917-01	2021-05-26	M		31588	45993		6.12	9.3			7.43	7.55	29.6		8.6		7	4860	
WQ1-1	21F0167-01	2021-06-01	M		31923	46558		5.54	9.4			7.53	7.56	30.0		8.5		6.7	3660	
WQ1-1	21F1056-01	2021-06-08	M		32086	46814		5.15	10.0			7.37	7.34	30.1		8.5		3.4	6770	
WQ1-1	21F2014-01	2021-06-15	M		31697	46266		5.76	9.5			7.43	7.35	29.7		8.5		2.6	5700	
WQ1-1	21G2414-01	2021-07-20	M		30730	42454		7.26	9.3			7.50	7.51	27.2		10.5		2.4	5590	
WQ1-1	21H3040-01	2021-08-25	M			45596			8.9			7.60	7.65			9.8		2.6	5520	
WQ1-1	21I3814-01	2021-09-28	M			33976		5.25	9.2				7.56	32.0		9.1		<2.0	5390	
WQ1-1	21J3514-01	2021-10-26	M		31837	43939		4.89	8.2			7.29	7.49	28.2		10.6		2	5470	
WQ1-1	21K3046-01	2021-11-23	M		31161	43861		6.74	9.4			7.54	7.44	28.1		9.8		3.2	5710	
WQ1-1	21L2125-01	2021-12-14	M		32208	45556		7.50	10.1			7.57	7.31	29.3		9.7		<2.0	2520	
WQ1-1	22A2312-01	2022-01-20	M		30606	44928		7.60	10.3			7.61	7.23	28.8		8.3		3.2	5280	
WQ1-1	22B2487-01	2022-02-17	M		29748	43530		7.00	10.1			7.70	7.36	27.8		8.4		2.6	5510	
WQ1-1	22C3145-01	2022-03-22	M		30906	45362		7.84	9.6			7.61	7.63	29.1		8.3		10.8	5700	
WQ1-1	22D2212-01	2022-04-19	M		30910	45364		6.11	9.7			7.50	7.50	29.1		8.3		5.7	5740	
WQ1-1	22E2480-03	2022-05-17	M		31297	45754		4.79	8.6				7.63	29.4		8.5		12	5420	
WQ1-1	22F3212-01	2022-06-21	M		30346	43922		6.20	9.4			7.45	7.70	28.1		8.8		58	5310	
WQ1-1	22G1763-01	2022-07-13	M		31300	44963		6.39	9.4			7.55	7.63	28.9		9.1		<4.0	5580	5580
WQ1-1	22H2453-01	2022-08-16	M		31232	43796		6.28	8.9			7.62	7.54	28.1		10.0		7.9	4980	5130
WQ1-1	22I1926-01	2022-09-14	M		31582	44325		6.05	8.7			7.55	7.55	28.5		9.9		2.4	4960	5230
WQ1-1	22J1560-03	2022-10-12	M		31824	45646		5.96	7.8			7.49	7.66	29.4		9.1		16.7	5450	5060
WQ1-1	22K1453-01	2022-11-10	M		32538	46761		3.63	9.1			7.35	7.40	30.1		9.1		18.8	6130	6150
WQ1-1	22L0774-01	2022-12-07	M		32424	46364		3.06	8.0			7.38	7.59	29.9		9.3		8.0	6110	6010
WQ1-1	23A2847-01	2023-01-27	M					8.91	10.4			7.25	7.28			8.0		9.6	5530	5890
WQ1-1	23C0060-01	2023-02-28	M		28704	43463		8.06	10.7			7.67	7.63	27.7		7.2		21.6	5830	5960
WQ1-1	23C1797-01	2023-03-15	M		29130	44405		9.42	10.7			7.74	7.70	28.3		7.0		25.6	5250	6140
WQ1-1	23D2945-01	2023-04-26	M		31542	46793	43400	6.51				7.48	7.46	30.1		7.9		18.0	5330	5760
WQ1-1	23E2392-01	2023-05-17	M		31451	46448	41600	7.23				7.54	7.60	29.8		8.1		121	5810	6140
WQ1-1	23F3614-01	2023-06-27	M		31471	45845	43000	6.82				7.63	7.63	29.5		8.6		41.3	5790	5480
WQ1-1	23G2415-01	2023-07-19	M		31452	45749	42200	6.84				7.62	7.72	29.4		8.6		7.0	5460	5900
WQ1-1	23H3309-03	2023-08-24	M		32053	44951	41800	6.48				7.50	7.71			10.0		<5.0	5560	5460
WQ1-1	23I2271-03	2023-09-19	M		31924	45856	43500	6.44				7.55	7.72	29.5		9.1		12.4	5750	4950
WQ1-1	23J2236-03	2023-10-18	M		32089	46148	42300	5.64				7.58	7.55	29.7		9.1		9.3	4830	5560
WQ1-1	23K1909-01	2023-11-15	M	113	33406	47269	41900	4.92				7.42	7.67	30.5		9.6		<2.0	5900	5990
WQ1-1	23L1905-04	2023-12-14	M	121	34157	48127	41000	5.00				7.61	7.43	31.2		9.8		114	5850	5400
WQ1-1	L2754366-7	2024-01-24	M																	
WQ1-1	VA24A1422-007	2024-01-24	M	108	31488	45856		7.63				7.46	7.80	29.5		8.6	35800	<2.0	5860	5810
WQ1-1	L2754594-4	2024-02-13	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ1-1	VA24A2858-004	2024-02-13	M	70.3	30786	45099		8.05				7.68	7.75	29.0		8.4	18300	2.6	3250	2920
WQ1-1	L2755033-4	2024-03-20	M																	
WQ1-1	VA24A5955-004	2024-03-20	M	107	32501	47087	46000	6.91				7.48	7.94		30.3	8.8	38300	<2.0	5650	5580
WQ1-1	L2755461-4	2024-04-23	M																	
WQ1-1	VA24A8736-004	2024-04-23	M	101	66212	96360	46400	4.88				7.59	7.92		30.1	8.6	32200	<2.0	6300	5690
WQ1-1	L2755553-4	2024-04-30	M																	
WQ1-1	VA24A9418-004	2024-04-30	M	106	20594	29929	44900	7.80				7.50	7.68	18.4	30.1	8.7	29300	<2.0	6080	6100
WQ1-1	L2755641-4	2024-05-07	M																	
WQ1-1	VA24B0040-004	2024-05-07	M	105	21796	31664	47400	6.85				7.49	7.82	19.6	30.2	8.7	33700	3.9	5380	5160
WQ1-1	L2755769-4	2024-05-14	M																	
WQ1-1	VA24B0738-004	2024-05-14	M	108	21512	31267	45900	6.51				7.41	8.02	19.4	29.9	8.7	35400	<2.0	5310	5430
WQ1-1	L2755874-4	2024-05-21	M																	
WQ1-1	VA24B1351-004	2024-05-21	M	104	21675	31490	46200	6.82				7.38	7.88	19.5	29.3	8.7	34000	<2.0	5650	5870
WQ1-1	L2756277-4	2024-06-18	M																	
WQ1-1	VA24B4257-004	2024-06-18	M	105	22381	46053	45200	6.40				7.70	7.75	29.6	29.7	8.7	34100	<2.0	6270	6000
WQ1-1	L2756678-4	2024-07-16	M																	
WQ1-1	VA24B7237-004	2024-07-16	M	106	30220	43578	43700	6.38				7.62	7.54	27.9	28.6	9.0	33400	5.0	6160	5930
WQ1-1	L2757095-4	2024-08-20	M																	
WQ1-1	VA24C1101-004	2024-08-20	M	106	34455	49351	45900	5.87				7.50	7.90	32.0	29.8	9.2	32600	<2.0	5850	5880
WQ1-1	VA24C4483-004	2024-09-17	M	106	32969	47095	46200	6.78				7.55	7.94	30.4	29.8	9.3	41400	9.7	6240	5040
WQ1-1	VA24C8360-004	2024-10-22	M	104	28776	41324	46100	6.16				7.54	7.79	26.3	29.7	9.1	32800	<2.0	5940	5520
WQ1-1	VA24C9197-004	2024-10-29	M	106	29206	41921	46500	5.56				7.48	7.92	26.7	30.4	9.1	33900	<2.0	5410	5210
WQ1-1	VA24D0009-004	2024-11-05	M	106	29168	41728	46600	5.77				7.52	7.77	26.6	30.0	9.2	32500	<2.0	5560	5280
WQ1-1	VA24D0813-011	2024-11-13	M	110	28106	40112	44900	5.71				7.42	7.86	25.5	29.9	9.3	33800	3.8	5950	5760
WQ1-1	VA24D1720-004	2024-11-21	M	107	32441	46418	45700	5.74				7.37	7.83	29.9	29.8	9.2	30800	<2.0	6440	5440
WQ1-1	L2758465-4	2024-12-17	M																	
WQ1-1	VA24D3769-004	2024-12-17	M	107	32911	46481	46200	5.51				7.49	7.75	30.0	30.2	9.7	32800	<2.0	4680	4660
WQ1-1	L2758719-4	2025-01-21	M																	
WQ1-1	VA25A1408-004	2025-01-21	M	105	31770	45465	45300	6.94					7.78	29.2	30.0	9.2	31800	<2.0	6310	3460
WQ1-1	L2758994-4	2025-02-18	M																	
WQ1-1	VA25A3430-004	2025-02-18	M	106	24798	36122	45700	7.37				7.74	7.80	22.7	30.2	8.6	38100	2.9	6030	5680
WQ1-1	VA25A6550-004	2025-03-25	M	105	29780	43184	45100	6.07				7.51	7.63	27.6	29.2	8.8	31200	<2.0	6930	6160
WQ1-1	VA25A8962-004	2025-04-22	M	101	29302	42742	44200	7.66				7.67	7.96	27.3	28.8	8.5	34600	3.8	6000	5850
WQ1-1	VA25A9878-004	2025-04-30	M	104	54921	80259	44300	5.74				7.66	7.77	55.2	29.7	8.5	35200	<2.0	5700	6190
WQ1-1	VA25B0358-004	2025-05-06	M	107	30147	43900	45700	6.57				7.59	7.96	28.1	29.1	8.6	33500	<2.0	4850	5230
WQ1-1	VA25B1026-004	2025-05-13	M	106	28643	41668	46500	6.75				7.58	7.90	26.5	30.4	8.6	31300	4.6	6320	6190
WQ1-1	VA25B1711-004	2025-05-20	M	106	57878	84169	45300	6.07				7.60	7.81	58.3	30.0	8.7	32300	<2.0	6790	6910
WQ1-2	0051710-02	2020-05-20	M		2510			10.03	10.7			8.58	7.60	1.8		10.5		4.8	417	
WQ1-2	0062209-02	2020-06-22	M		8804			10.22	8.9			7.81	7.01	6.9		11.1		14	278	
WQ1-2	0071996-02	2020-07-21	M		3574			10.00	10.3			8.86	7.18	1.9		13.6		11	356	
WQ1-2	0082292-02	2020-08-24	M		21193			8.82	9.2			7.80	7.92	16.1		15.0		2.2	3220	
WQ1-2	0093017-02	2020-09-28	M		8669			10.37	9.4			7.81	7.38			12.1		12.4	1120	
WQ1-2	20J1961-02	2020-10-20	M		12262			9.98	9.6			7.86	7.56	10.1		10.2		2.6	1790	
WQ1-2	20J2778-02	2020-10-27	M		16676			9.48	10.3			7.90	7.58	15.2		7.4		2	2500	
WQ1-2	20K0360-02	2020-11-03	M		22812			9.00	9.6			7.74	7.65	20.4		9.0		3	2290	
WQ1-2	20K1261-02	2020-11-10	M		10509			10.50	9.9			7.83	7.32	9.9		5.1		3.8	1680	
WQ1-2	20K2100-02	2020-11-18	M						9.9				7.18					9.8	1230	
WQ1-2	20L1589-02	2020-12-14	M		17838			9.60	10.6				7.60	17.1		5.9		<2.0	3130	
WQ1-2	21A2590-02	2021-01-27	M		27952			8.35	9.7			7.71	7.53	26.6		7.6		3	5070	
WQ1-2	21B2778-02	2021-02-25	M						10.6				7.63					<2.0	4600	
WQ1-2	21C3505-02	2021-03-25	M			32274		12.71	11.1			8.33	7.86			8.0		<2.0	<0.100	
WQ1-2	21D2478-02	2021-04-22	M		7810	11429		12.81	11.3			8.22	7.89	6.5		8.4		4.6	1320	
WQ1-2	21E1990-02	2021-05-18	M		1365	2001		11.86	10.8			7.27	6.99	1.0		8.3		13	157	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ1-2	21E2917-02	2021-05-26	M		1747	2446		11.64	9.9			7.53	7.04	1.3		10.0		4.7	246	
WQ1-2	21F0167-02	2021-06-01	M		14741	20046		10.67	10.5			8.04	7.27	12.0		11.2		3.6	1040	
WQ1-2	21F1056-02	2021-06-08	M		1961	2722		11.55	10.6			7.32	6.88	1.4		10.2		8	218	
WQ1-2	21F2014-02	2021-06-15	M		5089	7302		11.35	10.1			7.37	7.09	4.0		9.1		21.4	754	
WQ1-2	21G2414-02	2021-07-20	M		21846	28398		7.56	9.8			7.61	7.36	17.5		12.9		5.6	533	
WQ1-2	21H3040-02	2021-08-25	M			35341			10.1			8.26	7.93			16.4		4	2200	
WQ1-2	21I3814-02	2021-09-28	M			14509		9.69	10.7				7.61	11.4		12.2		7.2	1960	
WQ1-2	21J3514-02	2021-10-26	M		3680	5474		11.24	10.2			7.40	7.11	3.0		7.8		9.2	568	
WQ1-2	21K3046-02	2021-11-23	M		23076	34127		8.84	9.8			7.66	7.50	21.3		8.0		3.8	4480	
WQ1-2	21L2125-02	2021-12-14	M		24971	37289		9.66	10.5			7.63	7.37	23.4		7.7		<2.0	2810	
WQ1-2	22A2312-02	2022-01-20	M		26531	40879		9.70	10.8			7.70	7.29	25.8		6.6		3.8	4790	
WQ1-2	22B2487-02	2022-02-17	M		25904	39024		10.40	11.4			8.00	7.73	24.9		7.4		5.8	4680	
WQ1-2	22C3145-02	2022-03-22	M		27000	40505		11.80	13.6			8.20	8.03	25.6		7.5		8.4	5000	
WQ1-2	22D2212-02	2022-04-19	M		26342	38612		12.40	10.7			8.30	8.13	24.4		8.4		5	5060	
WQ1-2	22E2480-04	2022-05-17	M		6135	9055		11.90	9.8				7.50	5.1		8.1		6.4	668	
WQ1-2	22F3212-02	2022-06-21	M		4851	6788		11.18	9.5			8.16	7.80	3.7		10.1		12.5	478	
WQ1-2	22G1763-02	2022-07-13	M		8398	10913		10.76	9.5			7.96	7.53	6.2		12.9		12.8	1050	1070
WQ1-2	22H2453-02	2022-08-16	M		6608	8102		10.12	9.6			8.43	7.38	4.5		15.3		8.8	428	459
WQ1-2	22I1926-02	2022-09-14	M		22574	28510		10.33	9.3			8.14	8.15	17.6		14.1		4.0	3390	3210
WQ1-2	22J1560-04	2022-10-12	M		29792	38696		9.45	9.0			8.08	7.94	24.6		13.0		14.7	3920	3760
WQ1-2	22K1453-02	2022-11-10	M		27135	41156		6.28	10.6			7.50	7.46	26.1		7.2		14.0	5350	5150
WQ1-2	22L0774-02	2022-12-07	M		27665	41955		6.53	8.3			7.55	7.60	26.6		7.2		9.3	5340	5270
WQ1-2	23A2847-02	2023-01-27	M					9.45	11.5			7.30	7.46			7.0		2.4	3000	3100
WQ1-2	23C0060-02	2023-02-28	M		25953	40735		9.27	10.8			7.75	7.67	25.7		6.0		28.4	5520	5590
WQ1-2	23C1797-02	2023-03-15	M		27506	42084		10.94	10.5			7.89	7.77	26.7		6.9		19.2	5060	5580
WQ1-2	23D2945-02	2023-04-26	M		27012	38696	24000	11.20				8.35	7.48	24.5		9.2		12.0	2780	3230
WQ1-2	23E2392-02	2023-05-17	M		2808	4036	3590	10.99				8.17	6.39	2.2		9.1		32.5	385	381
WQ1-2	23F3614-02	2023-06-27	M		6226	7555	5840	9.94				8.14	7.34	4.2		15.8		14.7	576	595
WQ1-2	23G2415-02	2023-07-19	M		6123	7439	8180	10.13				8.04	7.39	4.1		15.7		11.3	886	858
WQ1-2	23H3309-04	2023-08-24	M		30934	37770	36100	9.63				7.96	7.94			15.5		8.3	4310	4660
WQ1-2	23I2271-04	2023-09-19	M		25363	31199	28800	9.91				8.12	7.98	19.5		15.2		8.0	3570	3110
WQ1-2	23J2236-04	2023-10-18	M		9337	13014	11500	10.18				7.99	6.75	7.5		10.2		11.0	1210	1280
WQ1-2	23K1909-02	2023-11-15	M	100	28947	40723	34100	8.03				7.64	7.52	25.9		9.9		2.0	4570	4410
WQ1-2	23L1905-05	2023-12-14	M	118	31462	45047	38400	6.30				7.68	7.45	28.9		9.2		22.8	5570	5040
WQ1-2	L2754366-8	2024-01-24	M																	
WQ1-2	VA24A1422-008	2024-01-24	M	99.3	29748	44132		8.21				7.53	7.81	28.2		7.9	34700	<2.0	5390	5310
WQ1-2	L2754594-5	2024-02-13	M																	
WQ1-2	VA24A2858-005	2024-02-13	M	79.1	23453	35413		9.13				7.72	7.81	22.1		7.3	21400	<2.0	3860	3280
WQ1-2	L2755033-5	2024-03-20	M																	
WQ1-2	VA24A5955-005	2024-03-20	M	73.5	20051	29169	31000	13.01				8.23	7.99		19.6	8.6	23300	4.2	3580	3660
WQ1-2	L2755461-5	2024-04-23	M																	
WQ1-2	VA24A8736-005	2024-04-23	M	81.8	49689	69459	34700	9.54				8.43	8.06		21.8	10.1	23800	7.4	4450	4150
WQ1-2	L2755553-5	2024-04-30	M																	
WQ1-2	VA24A9418-005	2024-04-30	M	42.8	17891	24324	15400	13.80				8.44	7.92	14.8	9.3	11.2	10400	<2.0	1950	1950
WQ1-2	L2755641-5	2024-05-07	M																	
WQ1-2	VA24B0040-005	2024-05-07	M	76.2	16518	22389	33400	11.22				8.30	8.02	13.5	20.5	11.2	22800	3.9	3580	3400
WQ1-2	L2755769-5	2024-05-14	M																	
WQ1-2	VA24B0738-005	2024-05-14	M	34.4	12548	16895	13100	11.15				8.22	7.65	10.0	7.6	11.6	8190	8.6	1410	1400
WQ1-2	L2755874-5	2024-05-21	M																	
WQ1-2	VA24B1351-005	2024-05-21	M	76.8	16192	21312	33200	12.07				8.26	8.05	12.8	20.3	12.4	23600	9.4	3850	4060
WQ1-2	L2756277-5	2024-06-18	M																	
WQ1-2	VA24B4257-005	2024-06-18	M	60.8	12010	15157	23600	9.90				8.40	8.01	8.9	14.5	14.1	16900	2.3	3050	2890
WQ1-2	L2756678-5	2024-07-16	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ1-2	VA24B7237-005	2024-07-16	M	37.1	9121	11364	14300	9.81				8.05	7.62	6.5	8.4	14.7	9290	21.4	1680	1570
WQ1-2	L2757095-5	2024-08-20	M																	
WQ1-2	VA24C1101-005	2024-08-20	M	35.6	15093	18301	13200	9.85				8.24	7.71	10.9	7.6	15.8	8890	7.0	1500	1480
WQ1-2	VA24C4483-005	2024-09-17	M	53.6	29509	36949	22000	9.73				8.12	7.80	23.4	13.2	14.5	15300	9.6	2690	2550
WQ1-2	VA24C8360-005	2024-10-22	M	84.6	24396	32840	36400	7.92				7.84	7.86	20.5	22.8	11.5	25500	<2.0	4450	4420
WQ1-2	VA24C9197-005	2024-10-29	M	68.6	20412	28511	28500	8.83				7.80	7.87	17.5	17.6	10.1	19800	4.4	3400	2990
WQ1-2	VA24D0009-005	2024-11-05	M	88.7	24239	33287	38000	7.69				7.76	7.83	20.8	23.9	10.8	25200	<2.0	4290	4110
WQ1-2	VA24D0813-013	2024-11-13	M	50.7	16218	23236	19500	9.08				7.73	7.73	14.0	11.9	9.2	12700	4.7	2290	2250
WQ1-2	VA24D1720-005	2024-11-21	M	91.9	22424	33190	38700	7.29				7.60	7.86	20.6	24.8	8.0	26800	<2.0	5240	4610
WQ1-2	L2758465-5	2024-12-17	M																	
WQ1-2	VA24D3769-005	2024-12-17	M	97.0	29252	42436	41700	7.41				7.62	7.80	27.1	26.9	8.7	29400	7.1	3890	4060
WQ1-2	L2758719-5	2025-01-21	M																	
WQ1-2	VA25A1408-005	2025-01-21	M	85.3	28546	42133	35300	7.77					7.78	26.8	22.8	8.1	24300	<2.0	4760	2580
WQ1-2	L2758994-5	2025-02-18	M																	
WQ1-2	VA25A3430-005	2025-02-18	M	92.0	20498	31318	38500	10.21				7.95	7.88	19.3	25.0	6.9	31100	<2.0	4930	4620
WQ1-2	VA25A6550-005	2025-03-25	M	92.3	22421	33593	38800	12.65				8.26	7.94	20.9	24.7	7.6	26400	3.0	6030	5100
WQ1-2	VA25A8962-005	2025-04-22	M	61.2	19848	27031	24700	12.23				8.40	8.03	16.6	15.2	11.1	18300	3.8	3060	2980
WQ1-2	VA25A9878-005	2025-04-30	M	27.9	12345	17331	9030	11.65				8.36	7.49	10.2	5.2	9.9	4880	2.6	953	1010
WQ1-2	VA25B0358-005	2025-05-06	M	92.2	27084	36600	37900	11.46				8.19	8.03	23.1	23.6	11.4	27200	<2.0	3930	4030
WQ1-2	VA25B1026-005	2025-05-13	M	63.6	9287	12106	25600	11.33				8.43	7.96	7.0	15.7	12.8	16500	3.5	3120	2930
WQ1-2	VA25B1711-005	2025-05-20	M	26.2	14467	19608	7900	10.69				8.48	7.56	11.7	4.5	11.3	5100	<2.0	802	826
WQ1-3	23L1905-06	2023-12-14	M	102	21732	33021	29300	8.03				7.69	7.27	20.5		7.1		16.8	3640	3710
WQ1-3	L2754366-9	2024-01-24	M																	
WQ1-3	VA24A1422-009	2024-01-24	M	58.5	14782	23615		10.66				7.50	7.66	14.1		5.4	17700	<2.0	2850	2800
WQ1-3	L2754594-6	2024-02-13	M																	
WQ1-3	VA24A2858-006	2024-02-13	M	64.8	16600	25931		10.45				7.68	7.76	15.7		6.2	16100	2.9	2980	2540
WQ1-3	L2755033-6	2024-03-20	M																	
WQ1-3	VA24A5955-006	2024-03-20	M	49.0	5299	8179	19000	12.80				7.99	7.78		11.4	6.6	13000	3.4	2250	2190
WQ1-3	L2755461-6	2024-04-23	M																	
WQ1-3	VA24A8736-006	2024-04-23	M	72.7	47178	65295	30600	11.09				8.56	8.06		19.0	10.5	20700	7.2	4040	3620
WQ1-3	L2755553-6	2024-04-30	M																	
WQ1-3	VA24A9418-006	2024-04-30	M	66.2	6467	9081	25800	12.70				8.24	8.21	5.1	16.3	9.9	16900	<2.0	3420	3400
WQ1-3	L2755641-6	2024-05-07	M																	
WQ1-3	VA24B0040-006	2024-05-07	M	49.6	11188	15489	20200	11.23				8.32	7.84	9.1	11.8	10.5	14900	4.5	2190	2030
WQ1-3	L2755769-6	2024-05-14	M																	
WQ1-3	VA24B0738-006	2024-05-14	M	14.2	1569	2249	4460	11.50				7.94	7.34	1.2	2.4	9.2	2460	5.6	457	460
WQ1-3	L2755874-6	2024-05-21	M																	
WQ1-3	VA24B1351-006	2024-05-21	M	15.4	1923	2621	4030	12.01				8.33	7.37	1.4	2.1	11.1	2310	7.2	392	385
WQ1-3	L2756277-6	2024-06-18	M																	
WQ1-3	VA24B4257-006	2024-06-18	M	17.1	1865	2497	2570	10.90				7.90	7.55	1.3	1.3	11.7	1480	7.0	286	282
WQ1-3	L2756678-6	2024-07-16	M																	
WQ1-3	VA24B7237-006	2024-07-16	M	16.0	1874	2323	5280	10.15				7.50	7.37	1.2	2.9	14.9	2980	22.6	529	523
WQ1-3	L2757095-6	2024-08-20	M																	
WQ1-3	VA24C1101-006	2024-08-20	M	28.3	8807	10767	10100	10.23				8.24	7.63	6.1	5.7	15.5	6510	6.0	1190	1130
WQ1-3	VA24C4483-006	2024-09-17	M	44.7	19023	23725	17600	10.38				8.23	7.71	14.4	10.3	14.6	12600	7.4	2070	2010
WQ1-3	VA24C8360-006	2024-10-22	M	24.4	3285	4837	8220	10.61				8.05	7.41	2.6	4.5	8.2	5140	11.8	911	874
WQ1-3	VA24C9197-006	2024-10-29	M	18.5	3059	4505	5750	10.98				8.00	7.35	2.4	3.1	8.2	3330	6.6	619	605
WQ1-3	VA24D0009-006	2024-11-05	M	49.2	19179	27480	19000	8.85				7.73	7.69	16.8	11.2	9.2	13200	<2.0	2090	1990
WQ1-3	VA24D0813-014	2024-11-13	M	31.6	9896	14699	10800	10.24				7.72	7.56	8.5	6.3	7.9	5920	5.7	1270	1200
WQ1-3	VA24D1720-006	2024-11-21	M	64.5	16729	25487	25600	9.24				7.57	7.79	15.4	15.7	7.0	17800	<2.0	3360	2860
WQ1-3	L2758465-6	2024-12-17	M																	
WQ1-3	VA24D3769-006	2024-12-17	M	92.2	29252	42436	39700	7.41				7.62	7.81	27.1	25.5	8.7	28200	<2.0	3710	3840
WQ1-3	L2758719-6	2025-01-21	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ1-3	VA25A1408-006	2025-01-21	M	78.0	19614	31906	31200	9.83					7.76	19.6	19.9	4.8	21700	<2.0	4220	2340
WQ1-3	L2758994-6	2025-02-18	M																	
WQ1-3	VA25A3430-006	2025-02-18	M	90.4	18947	29240	37400	10.51				7.96	7.88	17.9	24.2	6.6	30100	2.7	4900	4460
WQ1-3	VA25A6550-006	2025-03-25	M	59.5	11635	17932	23400	12.95				8.26	7.83	10.5	14.2	6.6	15300	<2.0	3120	2720
WQ1-3	VA25A8962-006	2025-04-22	M	38.3	9104	12673	13200	11.72				8.28	7.75	7.3	7.7	10.3	7660	3.3	1440	1420
WQ1-3	VA25A9878-006	2025-04-30	M	25.0	7788	11041	7510	11.35				7.99	7.40	6.3	4.3	9.6	4280	2.8	789	819
WQ1-3	VA25B0358-006	2025-05-06	M	32.0	9779	13337	11100	11.62				8.30	7.65	7.7	6.2	11.0	7580	3.2	985	1020
WQ1-3	VA25B1026-006	2025-05-13	M	37.4	7814	10453	13000	11.18				8.21	7.60	5.9	7.5	11.8	8170	2.2	1400	1330
WQ1-3	VA25B1711-006	2025-05-20	M	15.6	9583	13270	3200	10.97				8.14	7.36	7.7	1.7	10.5	1980	<2.0	306	303
WQ2-1	0051710-03	2020-05-20	M		31862			6.51	9.9			7.38	7.53	29.9		8.6		2.2	5870	
WQ2-1	0062209-03	2020-06-22	M		32118			6.19	9.3			7.38	7.69	29.8		9.0		<2.0	5770	
WQ2-1	0071996-03	2020-07-21	M		45788			6.42	9.6			7.59	7.65	29.5		9.4		2.8	5300	
WQ2-1	0082292-03	2020-08-24	M		32974			5.69	9.1			7.51	7.65	30.1		9.6		2.4	6180	
WQ2-1	0093017-03	2020-09-28	M		31957			7.03	9.6			7.40	7.57			10.1		4.5	5110	
WQ2-1	20J1961-03	2020-10-20	M		32181			5.05	9.6			7.53	7.62	29.2		9.8		2.8	6100	
WQ2-1	20J2778-03	2020-10-27	M		29684			7.47	10.0			7.73	7.59	26.4		10.2		2.8	5570	
WQ2-1	20K0360-03	2020-11-03	M		32385			4.88	9.8			7.52	7.69	29.6		9.6		2.4	5270	
WQ2-1	20K1261-03	2020-11-10	M		32865			4.80	9.8			7.43	7.47	30.1		9.6		3	5600	
WQ2-1	20K2100-03	2020-11-18	M						9.3				7.42					3.4	5890	
WQ2-1	20L1589-03	2020-12-14	M		32605			4.41	8.6				7.41	29.7		9.7		2.6	6240	
WQ2-1	21A2590-03	2021-01-27	M		31219			6.52	9.6			7.66	7.48	29.0		8.8		3.8	5470	
WQ2-1	21B2778-03	2021-02-25	M						10.1				7.54					<2.0	5970	
WQ2-1	21C3505-03	2021-03-25	M			45604		7.73	9.5			7.87	7.55			8.3		<2.0	6150	
WQ2-1	21D2478-03	2021-04-22	M		31144	45670		6.65	10.3			7.48	7.41	29.3		8.3		3.4	6020	
WQ2-1	21E1990-03	2021-05-18	M		31581	46051		6.32	9.6			7.33	7.69	29.6		8.5			6030	
WQ2-1	21E2917-03	2021-05-26	M		31756	46279		6.56	9.9			7.40	7.49	29.8		8.6		4	5420	
WQ2-1	21F0167-03	2021-06-01	M		31985	46624		5.33	10.8			7.38	7.38	30.0		8.6		3.2	5850	
WQ2-1	21F1056-03	2021-06-08	M		31924	46638		5.77	10.2			7.43	7.38	30.0		8.5		<2.0	6210	
WQ2-1	21F2014-03	2021-06-15	M		31694	46261		5.82	9.8			7.44	7.36	29.7		8.5		3.8	5760	
WQ2-1	21G2414-03	2021-07-20	M		30161	41254		7.08	9.8			7.59	7.47	26.3		10.9		<2.0	5400	
WQ2-1	21H3040-03	2021-08-25	M			45648			10.2			7.60	7.68			9.8		2.8	5690	
WQ2-1	21I3814-03	2021-09-28	M			33980		5.66	9.5				7.50	31.5		9.2		<2.0	5540	
WQ2-1	21J3514-03	2021-10-26	M		31763	43544		5.28	9.5			7.27	7.56	28.0		10.8		<2.0	4890	
WQ2-1	21K3046-03	2021-11-23	M		31627	44487		6.40	9.8			7.51	7.46	28.6		9.9		2.4	5940	
WQ2-1	21L2125-03	2021-12-14	M		32245	45599		7.41	11.1			7.56	7.47	29.4		9.7		2	5710	
WQ2-1	22A2312-03	2022-01-20	M		29799	44291		8.10	10.8			7.60	7.35	28.3		7.9		3	5250	
WQ2-1	22B2487-03	2022-02-17	M		29694	43492		7.60	10.6			7.70	7.48	27.8		8.4		3.8	5640	
WQ2-1	22C3145-03	2022-03-22	M		31109	45504		7.40	10.5			7.60	7.67	29.2		8.4		8.9	5720	
WQ2-1	22D2212-03	2022-04-19	M		29980	43948		6.60	11.6			7.50	7.50	28.1		8.3		5.3	6150	
WQ2-1	22E2480-05	2022-05-17	M		31269	45693		4.90	8.6				7.67	29.3		8.5		19	5570	
WQ2-1	22F3212-03	2022-06-21	M		30294	43836		6.20	10.2			7.45	7.76	28.1		8.8		77.5	5410	
WQ2-1	22G1763-03	2022-07-13	M		31161	44657		6.73	9.5			7.57	7.71	28.7		9.2		6.4	5530	5440
WQ2-1	22H2453-03	2022-08-16	M		31388	44723		6.04	9.7			7.60	7.65	28.7		9.4		4.7	4870	5160
WQ2-1	22I1926-03	2022-09-14	M		31587	44215		6.12	9.2			7.57	7.77	28.4		10.0		5.1	5180	5350
WQ2-1	22J1560-05	2022-10-12	M		31810	45637		5.70	8.0			7.49	7.65	29.3		9.1		15.6	5890	5230
WQ2-1	22K1453-03	2022-11-10	M		32520	46751		3.53	10.2			7.37	7.42	30.1		9.1		15.2	6330	6100
WQ2-1	22L0774-03	2022-12-07	M		32436	46347		2.69	9.6			7.39	7.60	29.9		9.3		13.0	5690	5990
WQ2-1	23A2847-03	2023-01-27	M					9.42	10.8			7.24	7.53			8.1		10.4	5670	6020
WQ2-1	23C0060-03	2023-02-28	M		28956	43686		7.98	10.7			7.67	7.67	27.8		7.3		26.4	6120	6110
WQ2-1	23C1797-03	2023-03-15	M		30667	46079		7.71	10.6			7.65	7.70	29.5		7.5		26.0	5340	5890
WQ2-1	23D2945-03	2023-04-26	M		31497	46745	43400	6.33				7.51	7.55	30.0		7.9		23.2	5490	5710
WQ2-1	23E2392-03	2023-05-17	M				41800						7.58					78.0	5970	6340
WQ2-1	23F3614-03	2023-06-27	M		31403	45729	43000	7.14				7.67	7.70	29.4		8.6		42.7	5620	5490

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Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ2-1	23G2415-03	2023-07-19	M		31457	45746	41900	6.85				7.65	7.72	29.4		8.6		12.0	5720	5780
WQ2-1	23H3309-05	2023-08-24	M		32088	44826	42300	6.56				7.54	7.80			10.1		11.4	5310	5480
WQ2-1	23I2271-05	2023-09-19	M		31825	45783	43600	6.39				7.55	7.73	29.4		9.0		14.8	5690	4850
WQ2-1	23J2236-05	2023-10-18	M		32087	46201	42100	5.64				7.57	7.54	29.7		9.0		20.0	4760	5800
WQ2-1	23K1909-03	2023-11-15	M	109	33331	47171	43800	5.48				7.47	7.59	30.5		9.6		4.2	6160	5930
WQ2-1	23L1905-07	2023-12-14	M	119	34121	48016	41000	5.79				7.63	7.50	31.1		9.8		17.2	5540	6020
WQ2-1	L2754383-1	2024-01-25	M																	
WQ2-1	VA24A1507-001	2024-01-25	M	105	31412	45796		7.57				7.49	7.73	29.4		8.6	32000	3.4	5720	5790
WQ2-1	L2754594-7	2024-02-13	M																	
WQ2-1	VA24A2858-007	2024-02-13	M	110	30982	45350		8.15				7.67	7.83	29.1		8.4	31200	5.1	4610	4610
WQ2-1	L2755033-7	2024-03-20	M																	
WQ2-1	VA24A5955-007	2024-03-20	M	107	32410	46976	46500	7.07				7.57	7.95		30.7	8.8	37300	<2.0	5830	5510
WQ2-1	L2755461-7	2024-04-23	M																	
WQ2-1	VA24A8736-007	2024-04-23	M	105	66241	96204	46200	4.97				7.51	7.93		29.9	8.7	31900	3.4	6260	5610
WQ2-1	L2755553-7	2024-04-30	M																	
WQ2-1	VA24A9418-007	2024-04-30	M	88.3	20526	29785	36200	9.90				7.62	8.34	18.4	23.7	8.7	23400	<2.0	4950	4850
WQ2-1	L2755641-7	2024-05-07	M																	
WQ2-1	VA24B0040-007	2024-05-07	M	101	21603	31413	46600	7.62				7.51	7.81	19.4	29.6	8.6	33700	<2.0	5110	4940
WQ2-1	L2755769-7	2024-05-14	M																	
WQ2-1	VA24B0738-007	2024-05-14	M	108	21525	31280	45800	7.80				7.40	8.01	19.4	29.8	8.7	35900	2.2	5560	5400
WQ2-1	L2755874-7	2024-05-21	M																	
WQ2-1	VA24B1351-007	2024-05-21	M	104	21742	31598	46100	6.81				7.40	7.88	19.6	29.2	8.7	34000	<2.0	5700	5720
WQ2-1	L2756277-7	2024-06-18	M																	
WQ2-1	VA24B4257-007	2024-06-18	M	105	31580	45937	45000	5.90				7.70	7.76	29.5	29.6	8.6	34300	<2.0	6150	6120
WQ2-1	L2756678-7	2024-07-16	M																	
WQ2-1	VA24B7237-007	2024-07-16	M	105	29509	42221	45800	5.56				7.63	7.91	26.9	30.1	9.2	32600	3.2	5630	5520
WQ2-1	L2757095-7	2024-08-20	M																	
WQ2-1	VA24C1101-007	2024-08-20	M	105	34581	49618	45900	5.29				7.48	7.88	32.2	29.8	9.1	32900	<2.0	5710	5740
WQ2-1	VA24C4483-007	2024-09-17	M	106	33071	47000	46200	6.21				7.55	7.93	30.3	29.8	9.5	41800	3.6	6000	5650
WQ2-1	VA24C8360-007	2024-10-22	M	106	28713	41202	46700	5.72				7.46	7.79	26.2	30.1	9.1	33800	<2.0	5910	5720
WQ2-1	VA24C9197-007	2024-10-29	M	106	29211	41918	46700	5.65				7.48	7.92	26.7	30.5	9.1	33400	4.4	5220	5200
WQ2-1	VA24D0009-007	2024-11-05	M	106	29169	41567	46900	6.46				7.56	7.77	26.5	30.2	9.4	32500	<2.0	5440	5340
WQ2-1	L2758095-4	2024-11-12	M																	
WQ2-1	VA24D0632-004	2024-11-12	M	110	28117	40153	46100	6.50				7.43	7.77	25.5	30.3	9.3	32300	<2.0	5890	5720
WQ2-1	VA24D1720-007	2024-11-21	M	108	32502	46384	45700	5.22				7.41	7.87	29.9	29.8	9.3	33000	<2.0	6180	5560
WQ2-1	L2758465-7	2024-12-17	M																	
WQ2-1	VA24D3769-007	2024-12-17	M	105	32918	46492	46100	5.94				7.51	7.77	30.0	30.1	9.7	32600	<2.0	4400	4780
WQ2-1	L2758719-7	2025-01-21	M																	
WQ2-1	VA25A1408-007	2025-01-21	M	105	31747	45425	44800	6.54					7.78	29.2	29.7	9.2	30900	<2.0	6380	3550
WQ2-1	L2758994-7	2025-02-18	M																	
WQ2-1	VA25A3430-007	2025-02-18	M	106	24577	36019	45500	8.36				7.77	7.81	22.6	30.1	8.4	36600	5.7	5890	5650
WQ2-1	VA25A6550-007	2025-03-25	M	105	29714	43167	45400	5.49				7.45	7.67	27.6	29.4	8.7	31600	<2.0	7130	5920
WQ2-1	VA25A8962-007	2025-04-22	M	106	29302	42842	45700	7.56				7.67	7.94	27.3	29.9	8.5	34900	5.9	6190	6180
WQ2-1	VA25A9878-007	2025-04-30	M	102	54831	80118	43100	6.04				7.66	7.79	55.1	28.8	8.5	34400	<2.0	5590	5990
WQ2-1	VA25B0358-007	2025-05-06	M	106	30174	43928	45500	6.99				7.68	7.97	28.1	28.9	8.6	33000	<2.0	5080	5450
WQ2-1	VA25B1026-007	2025-05-13	M	104	28729	41823	46600	6.79				7.59	7.92	26.6	30.5	8.6	30800	<2.0	6080	6140
WQ2-1	VA25B1711-007	2025-05-20	M	105	58271	84745	43300	6.31				7.68	7.86	58.8	28.5	8.6	30300	<2.0	6430	6620
WQ2-2	0051710-04	2020-05-20	M		2320			9.58	10.9			8.57	7.34	1.8		9.1		4	202	
WQ2-2	0062209-04	2020-06-22	M		6903			10.58	9.8			7.85	7.03	5.3		11.1		18.2	277	
WQ2-2	0071996-04	2020-07-21	M		4358			10.16	10.3			8.55	7.23	2.3		13.2		8.6	351	
WQ2-2	0082292-04	2020-08-24	M		23395			8.90	9.4			7.86	7.58	17.9		15.0		3.2	2540	
WQ2-2	0093017-04	2020-09-28	M		10618			10.23	9.3			7.70	7.52			12.2		11.6	1400	
WQ2-2	20J1961-04	2020-10-20	M		11029			10.09	9.5			7.91	7.60	9.0		10.0		2.6	1810	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ2-2	20J2778-04	2020-10-27	M		16888			9.81	10.8			7.92	7.61	15.4		7.4		<2.0	2440	
WQ2-2	20K0360-04	2020-11-03	M		20942			10.18	10.1			7.63	7.45	19.0		8.3		3.6	1870	
WQ2-2	20K1261-04	2020-11-10	M		12254			10.30	10.2			7.74	7.26	11.5		5.6		4.4	1940	
WQ2-2	20K2100-04	2020-11-18	M						9.7				7.25					9.4	1120	
WQ2-2	20L1589-04	2020-12-14	M		15627			10.21	10.5				7.53	14.9		5.7		<2.0	3090	
WQ2-2	21A2590-04	2021-01-27	M		28150			8.27	9.7			7.71	7.59	26.7		7.7		<2.0	5180	
WQ2-2	21B2778-04	2021-02-25	M						10.6				7.65					<2.0	4860	
WQ2-2	21C3505-04	2021-03-25	M			22345		13.05	11.1			8.58	8.05			7.8		<2.0	2130	
WQ2-2	21D2478-04	2021-04-22	M		13713	19336		14.13	11.5			8.55	8.04	11.5		9.8		4	1750	
WQ2-2	21E1990-04	2021-05-18	M		1183	1740		12.08	10.8			7.40	6.87	0.9		8.2		13.2	148	
WQ2-2	21E2917-04	2021-05-26	M		1482	2092		11.59	10.2			7.62	7.05	1.1		9.7		4.3	222	
WQ2-2	21F0167-04	2021-06-01	M		18618	25070		10.32	10.7			8.03	7.61	15.3		11.5		4	2270	
WQ2-2	21F1056-04	2021-06-08	M		2271	3164		11.56	11.0			7.80	7.08	1.7		10.2		4.2	206	
WQ2-2	21F2014-04	2021-06-15	M		5587	8002		11.34	10.6			7.52	7.11	4.4		9.2		11.5	698	
WQ2-2	21G2414-04	2021-07-20	M		24371	32138		7.24	9.9			7.72	7.38	20.1		12.5		5.6	522	
WQ2-2	21H3040-04	2021-08-25	M			35277			10.2			8.18	7.70			15.8		5	1120	
WQ2-2	21I3814-04	2021-09-28	M			15108		9.43	8.6				7.63	11.9		12.4		4	2700	
WQ2-2	21J3514-04	2021-10-26	M		3781	5628		11.25	10.3			7.39	7.24	3.1		7.8		10.2	615	
WQ2-2	21K3046-04	2021-11-23	M		23597	34785		8.57	10.4			7.65	7.48	21.7		8.2		<2.0	4310	
WQ2-2	21L2125-04	2021-12-14	M		15588	24796		9.68	11.0			7.64	7.47	14.9		5.6		<2.0	3150	
WQ2-2	22A2312-04	2022-01-20	M		26442	40752		9.50	11.0			7.70	7.34	25.7		6.6		4.2	4660	
WQ2-2	22B2487-04	2022-02-17	M		26467	39844		10.20	10.6			8.00	7.70	25.2		7.4		6.5	5080	
WQ2-2	22C3145-04	2022-03-22	M		26829	40225		12.00	12.7			8.20	8.06	25.4		7.6		9.3	4750	
WQ2-2	22D2212-11	2022-04-19	M		26234	38486		12.20	10.6			8.30	8.11	24.3		8.3		13.8	4980	
WQ2-2	22E2480-06	2022-05-17	M		21350	28440		10.40	9.4				7.62	17.5		11.9		6	1300	
WQ2-2	22F3212-04	2022-06-21	M		4192	5891		11.46	10.8			7.66	7.64	3.2		9.9		11.5	446	
WQ2-2	22G1763-04	2022-07-13	M		7668	9829		10.90	9.4			7.93	7.44	5.6		13.5		11.6	654	657
WQ2-2	22H2453-04	2022-08-16	M		4336	5402		9.82	9.8			8.17	7.50	2.9		14.7		9.8	448	468
WQ2-2	22I1926-04	2022-09-14	M		23184	29476		9.72	9.6			8.07	8.12	18.3		13.8		30.4	3260	3300
WQ2-2	22J1560-06	2022-10-12	M		29797	38652		10.38	9.0			8.09	7.96	24.6		13.0		8.8	4580	3620
WQ2-2	22K1453-04	2022-11-10	M		27334	41280		5.52	10.3			7.50	7.50	26.2		7.3		15.6	5300	5300
WQ2-2	22L0774-04	2022-12-07	M		27869	42225		6.59	9.2			7.55	7.64	26.8		7.2		7.7	5210	5330
WQ2-2	23A2847-04	2023-01-27	M					9.88	11.0			7.29	7.52			7.2		4.4	2920	2930
WQ2-2	23C0060-04	2023-02-28	M		25623	40332		9.38	11.0			7.76	7.66	25.4		5.9		30.0	5570	5520
WQ2-2	23C1797-04	2023-03-15	M		27479	42034		10.08	10.6			7.92	7.76	26.6		6.9		24.0	4790	5160
WQ2-2	23D2945-04	2023-04-26	M		27119	38850	25800	10.41				8.31	7.54	24.6		9.2		14.0	3060	3300
WQ2-2	23E2392-04	2023-05-17	M				3960						6.40					28.5	438	428
WQ2-2	23F3614-04	2023-06-27	M		4559	5564	4420	10.00				8.02	7.34	3.0		15.5		14.7	456	435
WQ2-2	23G2415-04	2023-07-19	M		8369	10105	7650	10.18				8.22	7.37	5.7		16.0		11.0	818	821
WQ2-2	23H3309-06	2023-08-24	M		31020	37879	16600	9.44				8.00	7.71			15.5		11.0	1850	1940
WQ2-2	23I2271-06	2023-09-19	M		24550	30151	18500	9.60				8.15	7.82	18.7		15.3		8.0	2260	2170
WQ2-2	23J2236-06	2023-10-18	M		26420	35066	6160	9.34				7.94	6.59	22.1		12.1		16.2	606	660
WQ2-2	23K1909-04	2023-11-15	M	70.8	27991	39677	22100	8.39				7.68	7.19	25.2		9.6		<2.0	2840	2710
WQ2-2	23L1905-08	2023-12-14	M	117	30356	44039	36800	6.81				7.73	7.50	28.2		8.7		24.8	4920	5420
WQ2-2	L2754383-2	2024-01-25	M																	
WQ2-2	VA24A1507-002	2024-01-25	M	97.8	28423	42471		8.30				7.53	7.73	27.0		7.7	25500	<2.0	5210	5460
WQ2-2	L2754594-8	2024-02-13	M																	
WQ2-2	VA24A2858-008	2024-02-13	M	79.9	22546	34114		9.22				7.72	7.80	21.2		7.2	21600	2.5	3880	3220
WQ2-2	L2755033-8	2024-03-20	M																	
WQ2-2	VA24A5955-008	2024-03-20	M	87.8	29709	43798	37300	10.99				8.02	8.04		24.0	8.2	29400	7.7	4330	4310
WQ2-2	L2755461-8	2024-04-23	M																	
WQ2-2	VA24A8736-008	2024-04-23	M	91.8	62247	87975	38500	9.37				8.28	8.13		24.4	9.7	27300	8.4	5210	4860
WQ2-2	L2755553-8	2024-04-30	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ2-2	VA24A9418-008	2024-04-30	M	38.4	17328	23898	12500	11.20				8.39	7.75	14.5	7.4	10.8	8450	<2.0	1630	1580
WQ2-2	L2755641-8	2024-05-07	M																	
WQ2-2	VA24B0040-008	2024-05-07	M	70.5	17650	23859	31300	10.66				8.29	7.99	14.5	19.0	11.4	20100	3.9	3240	3070
WQ2-2	L2755769-8	2024-05-14	M																	
WQ2-2	VA24B0738-008	2024-05-14	M	49.9	14345	19102	20000	9.35				8.18	7.80	11.4	12.0	12.0	14100	6.1	2280	2160
WQ2-2	L2755874-8	2024-05-21	M																	
WQ2-2	VA24B1351-008	2024-05-21	M	75.9	19361	25222	32400	7.65				8.19	8.02	15.4	19.7	12.8	23200	<2.0	3710	3880
WQ2-2	L2756277-8	2024-06-18	M																	
WQ2-2	VA24B4257-008	2024-06-18	M	52.0	7099	9096	19300	11.00				8.30	7.90	5.1	11.6	13.5	13200	6.1	2340	2410
WQ2-2	L2756678-8	2024-07-16	M																	
WQ2-2	VA24B7237-008	2024-07-16	M	48.0	12991	16236	20000	9.19				8.06	7.77	9.6	12.1	14.5	13100	17.1	2370	2290
WQ2-2	L2757095-8	2024-08-20	M																	
WQ2-2	VA24C1101-008	2024-08-20	M	81.0	25675	30553	34100	8.54				8.07	7.99	19.0	21.5	16.6	23800	<2.0	4040	4220
WQ2-2	VA24C4483-008	2024-09-17	M	59.4	13901	17649	24800	9.96				8.23	7.83	10.5	15.0	13.9	22100	7.2	2980	2730
WQ2-2	VA24C8360-008	2024-10-22	M	85.3	24831	33358	36400	6.67				7.73	7.86	20.9	22.8	11.6	25500	3.0	4340	4190
WQ2-2	VA24C9197-008	2024-10-29	M	60.9	19417	26904	24600	7.36				7.79	7.83	16.5	15.0	10.4	17000	4.3	2910	3030
WQ2-2	VA24D0009-008	2024-11-05	M	82.0	24144	33260	35000	7.36				7.74	7.82	20.8	21.8	10.7	25100	<2.0	4140	3800
WQ2-2	L2758095-5	2024-11-12	M																	
WQ2-2	VA24D0632-005	2024-11-12	M	62.7	17363	24765	25600	7.85				7.66	7.74	15.0	15.8	9.4	17500	4.1	2910	2880
WQ2-2	VA24D1720-008	2024-11-21	M	89.6	28149	40089	37700	6.37				7.54	7.85	25.5	24.1	9.4	26700	<2.0	5040	4640
WQ2-2	L2758465-8	2024-12-17	M																	
WQ2-2	VA24D3769-008	2024-12-17	M	94.0	29098	42233	40800	6.96				7.62	7.80	26.9	26.3	8.7	28600	<2.0	3760	4010
WQ2-2	L2758719-8	2025-01-21	M																	
WQ2-2	VA25A1408-008	2025-01-21	M	89.1	24387	37121	37200	8.17					7.79	23.3	24.1	7.0	26200	<2.0	5030	2690
WQ2-2	L2758994-8	2025-02-18	M																	
WQ2-2	VA25A3430-008	2025-02-18	M	91.9	19428	29658	38300	9.19				7.98	7.88	18.2	24.8	6.9	31300	2.9	5030	4690
WQ2-2	VA25A6550-008	2025-03-25	M	80.8	24124	36202	33800	10.25				8.12	7.89	22.7	21.2	7.5	22300	2.7	4830	4110
WQ2-2	VA25A8962-008	2025-04-22	M	60.9	21194	29145	25000	12.87				8.45	8.03	18.0	15.4	10.7	17000	3.5	3080	2980
WQ2-2	VA25A9878-008	2025-04-30	M	37.5	18734	25679	14100	11.45				8.46	7.64	15.7	8.4	10.8	6920	5.5	1550	1640
WQ2-2	VA25B0358-008	2025-05-06	M	85.3	26085	35032	35600	10.51				8.26	8.05	22.0	22.0	11.6	26000	<2.0	3650	3830
WQ2-2	VA25B1026-008	2025-05-13	M	41.9	13659	17951	15600	10.77				8.35	7.72	10.6	9.2	12.5	9490	<2.0	1680	1630
WQ2-2	VA25B1711-008	2025-05-20	M	35.5	16742	22696	12500	10.35				8.54	7.72	13.7	7.3	11.3	7700	<2.0	1380	1330
WQ2-3	23L1905-09	2023-12-14	M	113	25408	37406	36800	7.54				7.73	7.50	23.7		7.9		23.2	5140	5370
WQ2-3	L2754383-3	2024-01-25	M																	
WQ2-3	VA24A1507-003	2024-01-25	M	54.7	12568	20342		10.93				7.52	7.65	12.0		5.0	16800	3.1	2750	2700
WQ2-3	L2754594-9	2024-02-13	M																	
WQ2-3	VA24A2858-009	2024-02-13	M	62.9	20006	30572		9.86				7.71	7.74	18.8		6.9	16300	2.7	2870	2440
WQ2-3	L2755033-9	2024-03-20	M																	
WQ2-3	VA24A5955-009	2024-03-20	M	52.0	14379	21088	20100	12.78				8.29	7.90		12.2	8.3	15400	4.0	2400	2340
WQ2-3	L2755461-9	2024-04-23	M																	
WQ2-3	VA24A8736-009	2024-04-23	M	59.5	48398	66633	23900	10.94				8.62	8.00		14.5	10.7	16900	2.4	3490	3370
WQ2-3	L2755553-9	2024-04-30	M																	
WQ2-3	VA24A9418-009	2024-04-30	M	36.7	5533	7701	12000	12.00				8.15	7.66	4.3	7.1	10.3	7760	3.0	1510	1470
WQ2-3	L2755641-9	2024-05-07	M																	
WQ2-3	VA24B0040-009	2024-05-07	M	45.6	9157	12625	18600	11.21				8.28	7.82	7.3	10.8	10.6	12500	3.7	1880	1830
WQ2-3	L2755769-9	2024-05-14	M																	
WQ2-3	VA24B0738-009	2024-05-14	M	11.7	5780	8133	3040	11.08				7.88	7.27	4.5	1.6	9.8	1700	5.7	314	311
WQ2-3	L2755874-9	2024-05-21	M																	
WQ2-3	VA24B1351-009	2024-05-21	M	15.7	3200	4368	4470	11.25				7.69	7.38	2.3	2.3	11.0	2610	5.6	453	434
WQ2-3	L2756277-9	2024-06-18	M																	
WQ2-3	VA24B4257-010	2024-06-18	M	12.6	1012	1361	1260	11.20				8.10	7.41	0.7	<1.0	11.6	686	3.1	121	119
WQ2-3	L2756678-9	2024-07-16	M																	
WQ2-3	VA24B7237-009	2024-07-16	M	17.9	4582	5719	6430	9.94				7.69	7.39	3.1	3.6	14.6	3740	19.0	700	662

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ2-3	L2757095-9	2024-08-20	M																	
WQ2-3	VA24C1101-009	2024-08-20	M	33.8	11869	14256	11700	9.39				8.28	7.69	8.3	6.7	16.2	7680	10.0	1310	1310
WQ2-3	VA24C4483-009	2024-09-17	M	41.4	13280	16885	16000	10.29				8.24	7.68	10.0	9.3	13.8	11300	6.3	1950	1810
WQ2-3	VA24C8360-009	2024-10-22	M	24.5	6462	9331	8330	8.88				8.10	7.41	5.2	4.6	8.9	5010	9.6	920	891
WQ2-3	VA24C9197-009	2024-10-29	M	29.3	4183	6148	10000	9.45				8.20	7.52	3.4	5.6	8.3	6170	7.7	1090	1120
WQ2-3	VA24D0009-009	2024-11-05	M	48.9	11596	16885	18400	9.11				7.85	7.69	9.9	10.8	8.6	14700	<2.0	2030	2040
WQ2-3	L2758095-6	2024-11-12	M																	
WQ2-3	VA24D0632-006	2024-11-12	M	29.8	6864	10210	10300	9.77				7.86	7.50	5.8	5.9	7.8	6340	6.6	1120	1090
WQ2-3	VA24D1720-009	2024-11-21	M	72.6	21814	31680	29400	7.25				7.57	7.84	19.6	18.3	8.7	20400	<2.0	3800	3600
WQ2-3	L2758465-9	2024-12-17	M																	
WQ2-3	VA24D3769-009	2024-12-17	M	93.0	27745	40674	39500	7.42				7.63	7.79	25.8	25.4	8.4	27700	<2.0	3620	3950
WQ2-3	L2758719-9	2025-01-21	M																	
WQ2-3	VA25A1408-009	2025-01-21	M	79.1	20530	33018	32200	9.10					7.77	20.3	20.6	5.2	22500	7.3	4310	2370
WQ2-3	L2758994-9	2025-02-18	M																	
WQ2-3	VA25A3430-009	2025-02-18	M	89.6	18705	28871	37100	10.23				7.99	7.88	17.6	24.0	6.6	29600	3.0	4740	4480
WQ2-3	VA25A6550-009	2025-03-25	M	65.8	17844	26880	26300	11.68				8.24	7.98	16.4	16.6	7.4	17300	2.9	3560	3020
WQ2-3	VA25A8962-009	2025-04-22	M	39.0	10950	15418	13900	12.02				8.31	7.80	9.0	8.1	9.8	7480	<2.0	1540	1540
WQ2-3	VA25A9878-009	2025-04-30	M	24.3	12810	17860	7140	11.41				8.31	7.35	10.6	4.1	10.2	3960	2.6	736	772
WQ2-3	VA25B0358-009	2025-05-06	M	33.7	9020	12285	11700	11.47				8.30	7.66	7.1	6.6	11.1	8280	2.4	1060	1150
WQ2-3	VA25B1026-009	2025-05-13	M	29.7	8445	11301	10100	11.15				8.26	7.49	6.5	5.7	11.8	5930	<2.0	1050	994
WQ2-3	VA25B1711-009	2025-05-20	M	15.4	4514	6219	3360	10.88				8.72	7.36	3.4	1.8	10.6	2060	<2.0	327	322
WQ3-1	0051710-05	2020-05-20	M		31902			6.40	9.9			7.43	7.46	29.9		8.6		<2.0	5560	
WQ3-1	0062209-05	2020-06-22	M		32140			6.04	9.5			7.39	7.65	29.8		8.9		3.6	5680	
WQ3-1	0071996-05	2020-07-21	M		45977			6.43	9.7			7.49	7.62	29.6		9.3		2.4	5450	
WQ3-1	0082292-05	2020-08-24	M		32886			5.59	9.0			7.43	7.62	30.1		9.6		15.8	6190	
WQ3-1	0093017-05	2020-09-28	M		32121			6.88	9.4			7.46	7.56			10.1		3	4820	
WQ3-1	20J1961-05	2020-10-20	M		32121			6.88	9.6			7.46	7.64	29.3		9.7		3	6030	
WQ3-1	20J2778-05	2020-10-27	M		32031			5.60	9.7			7.64	7.60	29.3		9.5		2.2	5600	
WQ3-1	20K0360-05	2020-11-03	M		32436			5.63	9.4			7.53	7.63	29.6		9.6		2.4	5130	
WQ3-1	20K1261-05	2020-11-10	M		32888			4.80	9.8			7.46	7.47	30.1		9.6		2.2	5810	
WQ3-1	20K2100-05	2020-11-18	M						9.4				7.47					4	5990	
WQ3-1	20L1589-05	2020-12-14	M		32587			4.53	8.5				7.47	29.7		9.7		<2.0	5890	
WQ3-1	21A2590-05	2021-01-27	M		31225			7.12	9.6			7.63	7.50	29.0		8.7		4	5430	
WQ3-1	21B2778-05	2021-02-25	M						10.0				7.54					4	6130	
WQ3-1	21C3505-05	2021-03-25	M			45544		7.29	9.5			7.76	7.53			8.3		<2.0	5910	
WQ3-1	21D2478-05	2021-04-22	M		31071	45592		6.98	10.7			7.56	7.48	29.3		8.3		7.2	6060	
WQ3-1	21E1990-05	2021-05-18	M		31505	45929		6.24	11.0			7.40	7.68	29.5		8.6		6	4620	
WQ3-1	21E2917-05	2021-05-26	M		31733	46260		5.96	9.3			7.37	7.44	29.7		8.6		4.3	6320	
WQ3-1	21F0167-05	2021-06-01	M		31955	46596		5.45	9.8			7.42	7.40	30.0		8.5		2.4	5760	
WQ3-1	21F1056-05	2021-06-08	M		31941	46656		5.52	10.3			7.48	7.39	30.0		8.5		15	6320	
WQ3-1	21F2014-05	2021-06-15	M		31659	46180		5.80	10.0			7.46	7.38	29.7		8.5		<2.0	5840	
WQ3-1	21G2414-05	2021-07-20	M		26195	34906		8.45	9.8			7.60	7.69	21.9		11.9		6.5	5330	
WQ3-1	21H3040-05	2021-08-25	M			45559			10.2			7.60	7.67			9.8		<2.0	5650	
WQ3-1	21I3814-05	2021-09-28	M			33965		5.54	10.4				7.45	31.5		9.2		<2.0	5640	
WQ3-1	21J3514-05	2021-10-26	M		31795	43635		5.14	8.9			7.28	7.50	28.0		10.8		3.4	5620	
WQ3-1	21K3046-05	2021-11-23	M		31437	44234		6.41	9.5			7.51	7.55	28.4		9.9		5	5680	
WQ3-1	21L2125-05	2021-12-14	M		32194	45512		8.06	11.4			7.56	7.50	29.3		9.7		3	5190	
WQ3-1	22A2312-05	2022-01-20	M		31000	45234		7.60	10.5			7.60	7.29	29.0		8.5		3.6	5280	
WQ3-1	22B2487-05	2022-02-17	M		29753	43573		7.50	10.6			7.70	7.68	28.2		8.4		<2.5	5470	
WQ3-1	22C3145-05	2022-03-22	M		31264	45610		7.20	10.2			7.50	7.66	29.3		8.5		11.3	5550	
WQ3-1	22D2212-04	2022-04-19	M		30881	45337		6.20	10.9			7.50	7.49	29.1		8.3		4.7	6150	
WQ3-1	22E2480-07	2022-05-17	M		31308	45766		4.80	7.9				7.63	29.3		8.5		11.6	5580	
WQ3-1	22F3212-05	2022-06-21	M		30371	43964		6.09	10.7			7.40	7.73	28.1		8.8		61.5	5340	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ3-1	22G1763-05	2022-07-13	M		31107	44571		6.55	9.1			7.57	7.71	28.6		9.2		6.8	5550	5510
WQ3-1	22H2453-05	2022-08-16	M		31421	44664		6.30	9.6			7.62	7.68	28.7		9.5		3.2	4970	5200
WQ3-1	22I1926-05	2022-09-14	M		31584	44594		5.98	9.5			7.58	7.79	28.6		9.7		13.6	5090	5400
WQ3-1	22J1560-07	2022-10-12	M		31849	45695		5.69	8.9			7.51	7.66	29.4		9.1		6.0	1830	1650
WQ3-1	22K1453-05	2022-11-10	M		32521	46752		3.59	10.3			7.38	7.39	30.1		9.1		18.4	6600	6330
WQ3-1	22L0774-05	2022-12-07	M		32283	46236		3.19	9.3			7.41	7.61	29.8		9.2		7.7	5720	5930
WQ3-1	23A2847-05	2023-01-27	M					8.70	10.5			7.40	7.58			8.1		10.0	5880	6020
WQ3-1	23C0060-05	2023-02-28	M		28980	43717		8.03	10.8			7.68	7.69	27.9		7.4		18.8	5960	6230
WQ3-1	23C1797-05	2023-03-15	M		30780	46187		7.63	10.6			7.63	7.71	29.6		7.5		32.0	5500	5900
WQ3-1	23D2945-05	2023-04-26	M		31561	46792	43400	6.44				7.50	7.56	30.1		8.0		8.3	5500	5940
WQ3-1	23E2392-05	2023-05-17	M		31464	46437	41800	7.42				7.55	7.59	29.5		8.1		52.5	5930	5970
WQ3-1	23F3614-05	2023-06-27	M		31444	45773	43100	7.09				7.66	7.70	29.4		8.6		40.7	5410	5470
WQ3-1	23G2415-05	2023-07-19	M		31473	45720	41900	6.81				7.64	7.72	29.4		8.7		9.7	5710	6700
WQ3-1	23H3309-07	2023-08-24	M		32117	44826	41900	6.39				7.53	7.80			10.2		46.5	5240	5440
WQ3-1	23I2271-07	2023-09-19	M		31817	45781	43400	6.67				7.54	7.74	29.4		9.0		16.0	5700	5110
WQ3-1	23J2236-07	2023-10-18	M		32137	46161	41600	6.03				7.56	7.51	29.7		9.1		4.6	5080	5560
WQ3-1	23K1909-05	2023-11-15	M	113	33137	46827	43700	5.18				7.50	7.61	30.2		9.7		<2.0	5930	6000
WQ3-1	23L2091-01	2023-12-15	M	120	34010	47940	42000	4.97				7.64	7.55	31.0		9.8		8.8	6030	5650
WQ3-1	L2754366-1	2024-01-24	M																	
WQ3-1	VA24A1422-001	2024-01-24	M	110	31415	45788		7.44				7.32	7.77	29.4		8.6	35700	4.9	5840	5740
WQ3-1	L2754604-1	2024-02-14	M																	
WQ3-1	VA24A2995-001	2024-02-14	M	110	31246	45646		7.45				7.69	7.83	29.3		8.5	32000	<2.0	4570	4830
WQ3-1	L2755043-1	2024-03-21	M																	
WQ3-1	VA24A6026-001	2024-03-21	M	106	32641	47271	44000	7.22				7.55	7.96		31.4	8.8	36100	3.0	5500	5740
WQ3-1	L2755490-1	2024-04-24	M																	
WQ3-1	VA24A8916-001	2024-04-24	M	109	65947	95992	45700	5.61				7.56	7.87		30.9	8.6	31600	<2.0	6080	6180
WQ3-1	L2755567-1	2024-05-01	M																	
WQ3-1	VA24A9566-001	2024-05-01	M	106	20684	30094	46200	7.62				7.49	7.67	18.6	30.1	8.6	34700	<2.0	6270	5930
WQ3-1	L2755666-1	2024-05-08	M																	
WQ3-1	VA24B0201-001	2024-05-08	M	107	21757	31630	45700	7.86				7.46	8.01	19.6	30.7	8.7	30800	4.7	5470	5560
WQ3-1	L2755779-1	2024-05-15	M																	
WQ3-1	VA24B0901-001	2024-05-15	M	107	21566	31351	45900	7.79				7.44	8.01	19.4	29.9	8.7	33500	3.9	5610	5320
WQ3-1	L2755888-1	2024-05-22	M																	
WQ3-1	VA24B1500-001	2024-05-22	M	104	21563	31292	46000	6.60				7.37	7.87	19.4	29.1	8.7	32400	<2.0	5370	5580
WQ3-1	L2756312-1	2024-06-19	M																	
WQ3-1	VA24B4510-001	2024-06-19	M	105	31494	45762	44800	6.50				7.60	7.76	29.4	29.4	8.7	33400	3.5	5870	5640
WQ3-1	VA24B7397-001	2024-07-17	M	104	29623	42060	44900	6.64				7.62	7.93	26.8	29.4	9.5	32400	<2.0	5760	5830
WQ3-1	L2756689-1	2024-07-17	M																	
WQ3-1	L2757122-1	2024-08-21	M																	
WQ3-1	VA24C1337-001	2024-08-21	M	104	34855	49827	44900	5.72				7.54	7.85	32.4	29.3	9.3	33000	<2.0	5540	5640
WQ3-1	VA24C4683-001	2024-09-18	M	106	33078	46932	44900	6.35				7.45	7.83	30.3	29.3	9.5	32200	<2.0	5180	5130
WQ3-1	VA24C8569-001	2024-10-23	M	107	28862	41435	46300	6.52				7.52	7.90	26.4	30.3	9.1	33400	7.7	5840	6010
WQ3-1	L2757977-1	2024-10-30	M																	
WQ3-1	VA24C9414-001	2024-10-30	M	107	29430	42100	47000	4.99				7.44	7.76	26.9	30.6	9.2	36500	6.4	6040	5800
WQ3-1	VA24D0180-001	2024-11-06	M	106	29279	41952	46100	6.11				7.46	7.74	26.7	30.7	9.2	34100	<2.0	6000	5530
WQ3-1	VA24D0813-001	2024-11-13	M	106	28077	40007	45400	5.67				7.29	7.84	25.4	30.2	9.4	33600	<2.0	5920	5360
WQ3-1	L2758221-1	2024-11-22	M																	
WQ3-1	VA24D1791-001	2024-11-22	M	105	32513	46488	45900	5.26				7.17	7.84	30.0	30.0	9.3	31700	<2.0	6360	5730
WQ3-1	L2758486-1	2024-12-18	M																	
WQ3-1	VA24D3937-001	2024-12-18	M	108	33044	46697	47500	5.87				7.47	7.91	30.1	30.4	9.7	32100	<2.0	4980	4300
WQ3-1	L2758770-1	2025-01-22	M																	
WQ3-1	VA25A1525-001	2025-01-22	M	106	31664	45344	45100	7.19					7.90	29.1	30.6	9.2	31700	2.9	5900	4780
WQ3-1	L2759008-1	2025-02-19	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ3-1	VA25A3570-001	2025-02-19	M	107	24250	35853	46800	9.40				7.81	8.03	22.4	30.7	8.1	35500	10.6	7140	7170
WQ3-1	VA25A6679-001	2025-03-26	M	111	30099	43351	45300	5.49				7.47	7.81	27.7	29.8	9.0	31200	<2.0	8060	7400
WQ3-1	VA25A9109-001	2025-04-23	M	107	29232	42803	45500	6.96				7.57	7.89	27.3	29.4	8.4	30700	<2.0	5890	5720
WQ3-1	VA25A9941-001	2025-05-01	M	108	55380	80922	44500	6.09				7.80	7.92	55.7	29.2	8.5	34400	<2.0	5880	6280
WQ3-1	VA25B0496-001	2025-05-07	M	106	30183	43934	44800	6.54				7.54	7.93	28.1	29.6	8.6	35600	2.1	6660	6470
WQ3-1	VA25B1530-001	2025-05-16	M	107	28683	41712	46500	6.90				7.65	8.01	26.5	30.5	8.7	30600	<2.0	5860	5660
WQ3-1	VA25B1841-001	2025-05-21	M	106	58027	84388	44800	5.35				7.68	7.78	58.5	29.6	8.7	32700	<2.0	5980	6390
WQ3-2	0051710-06	2020-05-20	M		2759			9.22	11.0			8.49	7.40	2.0		10.7		5.2	481	
WQ3-2	0062209-06	2020-06-22	M		2054			11.20	10.2			8.15	6.85	1.5		10.1		12.8	250	
WQ3-2	0071996-06	2020-07-21	M		5472			10.14	10.3			8.52	7.12	2.0		13.2		5.4	425	
WQ3-2	0082292-06	2020-08-24	M		21300			9.15	9.4			7.90	7.93	16.0		15.3		6.4	3330	
WQ3-2	0093017-06	2020-09-28	M		8180			10.48	9.4			7.78	7.46			11.9		10	1060	
WQ3-2	20J1961-06	2020-10-20	M		11045			10.15	9.7			7.89	7.60	9.0		10.2		2.8	1830	
WQ3-2	20J2778-06	2020-10-27	M		14768			9.85	10.3			7.96	7.65	13.5		7.0		<2.0	2370	
WQ3-2	20K0360-06	2020-11-03	M		12108			10.90	9.2			7.82	7.40	10.5		8.1		2.4	1320	
WQ3-2	20K1261-06	2020-11-10	M		11437			10.70	10.2			7.62	7.43	10.7		5.4		<2.0	1780	
WQ3-2	20K2100-06	2020-11-18	M						9.5				7.25					6.6	1060	
WQ3-2	20L1589-06	2020-12-14	M		17695			9.60	10.6				7.60	16.9		6.0		<2.0	3460	
WQ3-2	21A2590-06	2021-01-27	M		26194			9.54	9.9			7.77	7.56	23.3		6.4		2.4	4450	
WQ3-2	21B2778-06	2021-02-25	M						10.8				7.69					2	4930	
WQ3-2	21C3505-06	2021-03-25	M			33386		12.97	11.6			8.48	8.25			8.3		3	3620	
WQ3-2	21D2478-06	2021-04-22	M		11494	16420		13.31	11.7			8.50	8.07	9.6		9.3		4.6	1630	
WQ3-2	21E1990-06	2021-05-18	M		1288	1920		11.96	10.9			7.29	7.33	1.0		8.4		10	205	
WQ3-2	21E2917-06	2021-05-26	M		1609	2287		11.84	10.2			7.65	7.12	1.2		9.5		3.7	239	
WQ3-2	21F0167-06	2021-06-01	M		17039	23075		10.35	10.3			8.04	7.28	14.0		11.3		3	886	
WQ3-2	21F1056-06	2021-06-08	M		1885	2628		11.55	10.6			8.16	7.09	1.4		10.2		6.6	265	
WQ3-2	21F2014-06	2021-06-15	M		5291	7574		11.34	10.6			7.70	7.20	4.2		9.2		20.5	740	
WQ3-2	21G2414-06	2021-07-20	M		25545	33558		7.38	9.9			7.78	7.30	21.0		12.5		6	384	
WQ3-2	21H3040-06	2021-08-25	M			32809			10.4			8.28	7.63			16.2		3.4	1090	
WQ3-2	21I3814-06	2021-09-28	M			16907		9.50	8.2				7.65	13.3		12.7		6.6	1750	
WQ3-2	21J3514-06	2021-10-26	M		3717	5518		11.31	10.6			7.58	7.02	3.0		7.9		10.6	529	
WQ3-2	21K3046-06	2021-11-23	M		23135	34262		9.04	9.9			7.64	7.45	21.4		8.0		2.6	4090	
WQ3-2	21L2125-06	2021-12-14	M		14777	23740		10.11	11.2			7.63	7.53	14.2		5.2		2	4230	
WQ3-2	22A2312-06	2022-01-20	M		26347	40617		9.50	10.8			7.70	7.34	25.6		6.6		4.2	4880	
WQ3-2	22B2487-06	2022-02-17	M		26423	39783		10.20	11.7			8.00	7.79	25.1		7.4		3.5	4700	
WQ3-2	22C3145-06	2022-03-22	M		26469	39622		12.30	12.2			8.30	8.09	25.0		7.6		12.4	4620	
WQ3-2	22D2212-05	2022-04-19	M		25614	37628		12.20	11.8			8.30	8.21	23.7		8.3		6	5130	
WQ3-2	22E2480-08	2022-05-17	M		10386	14893		11.40	9.8				7.67	8.7		9.2		6.4	1790	
WQ3-2	22F3212-06	2022-06-21	M		4014	5685		11.55	10.4			7.70	7.59	3.1		9.6		11	500	
WQ3-2	22G1763-06	2022-07-13	M		5827	7537		10.77	9.4			7.89	7.48	4.2		13.1		13.2	769	776
WQ3-2	22H2453-06	2022-08-16	M		3851	4783		9.99	9.9			7.97	7.46	2.6		14.8		6.5	433	455
WQ3-2	22I1926-06	2022-09-14	M		24348	30973		9.95	9.3			8.06	8.17	19.3		13.8		8.8	3210	3340
WQ3-2	22J1560-08	2022-10-12	M		31204	40759		10.30	9.4			8.05	7.92	26.1		12.7		10.8	4480	4610
WQ3-2	22K1453-06	2022-11-10	M		27834	42061		6.74	10.5			7.53	7.48	26.7		7.3		10.4	5660	5490
WQ3-2	22L0774-06	2022-12-07	M		28326	42653		6.39	9.9			7.55	7.66	27.1		7.4		5.3	5140	5570
WQ3-2	23A2847-06	2023-01-27	M					9.25	10.1			7.45	7.59			7.3		6.4	4760	4830
WQ3-2	23C0060-06	2023-02-28	M		24732	39233		9.62	10.5			7.78	7.69	24.6		5.6		23.2	5400	5300
WQ3-2	23C1797-06	2023-03-15	M		27567	42185		10.42	10.5			7.92	7.78	26.8		6.9		24.4	5010	5410
WQ3-2	23D2945-06	2023-04-26	M		25461	36120	27700	10.97				8.34	7.77	22.7		9.5		6.7	3300	3470
WQ3-2	23E2392-06	2023-05-17	M		2458	3528	3730	11.06				8.11	6.41	1.9		9.1		24.0	404	404
WQ3-2	23F3614-06	2023-06-27	M		4137	5120	5330	9.96				7.93	7.33	2.8		14.9		15.7	523	570
WQ3-2	23G2415-06	2023-07-19	M		11968	14306	7120	9.81				8.16	7.38	8.3		16.4		11.0	774	760
WQ3-2	23H3309-08	2023-08-24	M		31032	37915	32800	9.31				7.99	7.93			15.5		13.0	4050	4080

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ3-2	23I2271-08	2023-09-19	M		23975	29531	25000	9.85				8.16	7.92	18.3		15.1		6.4	3100	2870
WQ3-2	23J2236-08	2023-10-18	M		26505	35384	14200	8.99				7.93	6.83	22.3		11.9		9.8	1570	1600
WQ3-2	23K1909-06	2023-11-15	M	57.3	27966	39555	17100	8.34				7.71	6.94	25.1		9.7		2.6	2060	2040
WQ3-2	23L2091-02	2023-12-15	M	100	26162	38745	34000	7.18				7.77	7.50	24.4		8.0		8.0	4820	4490
WQ3-2	L2754366-2	2024-01-24	M																	
WQ3-2	VA24A1422-002	2024-01-24	M	100	29096	43407		8.36				7.41	7.79	27.7		7.7	34700	<2.0	5440	5570
WQ3-2	L2754604-2	2024-02-14	M																	
WQ3-2	VA24A2995-002	2024-02-14	M	81.1	23243	35803		8.13				7.75	7.80	22.3		6.6	23600	<2.0	3680	3520
WQ3-2	L2755043-2	2024-03-21	M																	
WQ3-2	VA24A6026-002	2024-03-21	M	64.1	21166	31241	25400	12.24				8.08	7.88		17.1	8.1	20500	2.7	3030	3080
WQ3-2	L2755490-2	2024-04-24	M																	
WQ3-2	VA24A8916-002	2024-04-24	M	87.8	52997	73419	35800	10.20				8.39	8.05		23.6	10.4	23800	4.2	4430	4490
WQ3-2	L2755567-2	2024-05-01	M																	
WQ3-2	VA24A9566-002	2024-05-01	M	81.9	18693	25503	35500	11.51				8.33	8.21	15.6	22.4	11.0	25500	<2.0	4590	4450
WQ3-2	L2755666-2	2024-05-08	M																	
WQ3-2	VA24B0201-002	2024-05-08	M	33.0	6290	8766	11500	11.39				8.10	7.68	4.9	6.8	10.2	7660	<2.0	1180	1170
WQ3-2	L2755779-2	2024-05-15	M																	
WQ3-2	VA24B0901-002	2024-05-15	M	48.0	14647	19892	19300	10.05				8.20	7.79	11.9	11.5	7.9	13800	6.1	2140	2100
WQ3-2	L2755888-2	2024-05-22	M																	
WQ3-2	VA24B1500-002	2024-05-22	M	26.4	4662	6378	8910	10.17				8.02	7.57	3.5	4.8	10.9	5510	4.1	924	948
WQ3-2	L2756312-2	2024-06-19	M																	
WQ3-2	VA24B4510-002	2024-06-19	M	42.2	1372	1829	11000	10.50				7.90	8.12	0.9	6.3	11.9	7100	5.5	1250	1240
WQ3-2	VA24B7397-002	2024-07-17	M	31.1	9921	12201	11500	9.06				8.16	7.55	7.0	6.6	15.2	7420	17.7	1310	1290
WQ3-2	L2756689-2	2024-07-17	M																	
WQ3-2	L2757122-2	2024-08-21	M																	
WQ3-2	VA24C1337-002	2024-08-21	M	30.7	12451	15087	10900	9.61				8.16	7.68	8.8	6.2	15.9	7320	6.8	1220	1250
WQ3-2	VA24C4683-002	2024-09-18	M	63.1	23996	29410	26200	9.85				8.20	7.95	18.2	16.2	15.4	17800	3.7	3320	3280
WQ3-2	VA24C8569-002	2024-10-23	M	69.8	24325	32836	28600	7.19				7.74	7.87	20.5	17.8	11.4	19100	10.7	3220	3430
WQ3-2	L2757977-2	2024-10-30	M																	
WQ3-2	VA24C9414-002	2024-10-30	M	80.7	22741	31218	33900	8.14				7.77	7.84	19.4	21.3	10.8	26000	2.6	4240	4080
WQ3-2	VA24D0180-002	2024-11-06	M	90.0	25274	34653	38100	7.01				7.67	7.79	21.8	24.8	10.8	29200	2.6	4760	4350
WQ3-2	VA24D0813-002	2024-11-13	M	51.7	16126	23165	20900	7.79				7.65	7.73	14.0	12.9	9.1	14600	4.7	2450	2390
WQ3-2	L2758221-2	2024-11-22	M																	
WQ3-2	VA24D1791-002	2024-11-22	M	85.5	22060	32696	33900	7.24				7.45	7.76	20.3	21.4	8.0	22900	<2.0	4540	4100
WQ3-2	L2758486-2	2024-12-18	M																	
WQ3-2	VA24D3937-002	2024-12-18	M	85.4	26067	38508	37200	6.63				7.57	7.89	24.3	23.1	8.1	24900	<2.0	3300	3360
WQ3-2	L2758770-2	2025-01-22	M																	
WQ3-2	VA25A1525-002	2025-01-22	M	85.5	22862	35996	35400	8.76					7.87	22.4	23.3	5.9	27300	2.8	3590	3310
WQ3-2	L2759008-2	2025-02-19	M																	
WQ3-2	VA25A3570-002	2025-02-19	M	91.8	19983	30609	38500	10.10				7.99	8.00	18.8	24.7	6.8	28600	4.6	5640	5210
WQ3-2	VA25A6679-002	2025-03-26	M	68.6	20145	30618	27500	10.94				8.10	7.96	18.8	17.2	7.1	18200	7.3	3860	4320
WQ3-2	VA25A9109-002	2025-04-23	M	89.9	25389	35208	37500	13.77				8.38	8.18	22.1	23.7	10.4	25400	<2.0	4460	4580
WQ3-2	VA25A9941-002	2025-05-01	M	29.5	12867	17772	9200	11.31				8.50	7.56	10.5	5.2	10.6	5300	2.7	969	947
WQ3-2	VA25B0496-002	2025-05-07	M	43.1	24501	32780	16000	10.15				8.11	7.73	20.5	9.6	11.8	7710	4.9	1960	1910
WQ3-2	VA25B1530-002	2025-05-16	M	32.8	15552	19960	11300	10.42				8.35	7.64	11.9	6.5	13.4	7090	<2.0	1090	1020
WQ3-2	VA25B1841-002	2025-05-21	M	29.6	27651	36795	9590	9.49				8.37	7.63	23.3	5.5	12.0	6240	<2.0	1030	1040
WQ3-3	23L2091-03	2023-12-15	M	90.8	24712	36913	32900	8.12				7.76	7.41	23.2		7.7		6.8	4570	4320
WQ3-3	L2754366-3	2024-01-24	M																	
WQ3-3	VA24A1422-003	2024-01-24	M	51.7	12738	20539		11.21				7.39	7.62	12.2		5.1	15100	<2.0	2460	2450
WQ3-3	L2754604-3	2024-02-14	M																	
WQ3-3	VA24A2995-003	2024-02-14	M	79.0	21100	33263		8.87				7.76	7.80	20.6		5.8	22000	<2.0	3410	3250
WQ3-3	L2755043-3	2024-03-21	M																	
WQ3-3	VA24A6026-003	2024-03-21	M	30.2	6054	9297	9260	13.00				7.83	7.60		5.7	6.3	5920	<2.0	1040	1020

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ3-3	L2755490-3	2024-04-24	M																	
WQ3-3	VA24A8916-003	2024-04-24	M	74.2	48775	66700	29500	11.24				8.52	8.01		19.0	10.9	19300	3.1	3810	3730
WQ3-3	L2755567-3	2024-05-01	M																	
WQ3-3	VA24A9566-003	2024-05-01	M	29.2	4620	6536	9190	12.48				8.23	7.53	3.6	5.2	9.7	5670	<2.0	1050	1040
WQ3-3	L2755666-3	2024-05-08	M																	
WQ3-3	VA24B0201-003	2024-05-08	M	31.5	5714	7973	10800	11.52				8.13	7.65	4.4	6.3	10.1	7090	3.6	1150	1150
WQ3-3	L2755779-3	2024-05-15	M																	
WQ3-3	VA24B0901-003	2024-05-15	M	35.0	6247	8524	13000	11.07				8.16	7.63	4.8	7.5	11.0	8600	6.4	1420	1360
WQ3-3	L2755888-3	2024-05-22	M																	
WQ3-3	VA24B1500-003	2024-05-22	M	24.7	2250	3133	8280	10.53				7.84	7.53	1.6	4.5	10.2	5120	2.4	848	776
WQ3-3	L2756312-3	2024-06-19	M																	
WQ3-3	VA24B4510-003	2024-06-19	M	11.9	1280	1703	1780	10.80				7.70	7.26	0.9	<1.0	12.0	1010	5.7	185	175
WQ3-3	VA24B7397-003	2024-07-17	M	10.1	2329	2782	2490	9.86				7.84	7.20	1.5	1.3	16.5	1430	10.9	255	258
WQ3-3	L2756689-3	2024-07-17	M																	
WQ3-3	L2757122-3	2024-08-21	M																	
WQ3-3	VA24C1337-003	2024-08-21	M	26.0	7662	9384	8510	10.04				8.19	7.58	5.3	4.8	15.4	5320	6.7	909	1160
WQ3-3	VA24C4683-003	2024-09-18	M	27.7	16471	20646	9320	10.42				8.23	7.56	12.4	5.3	14.4	5760	5.7	1080	1110
WQ3-3	VA24C8569-003	2024-10-23	M	58.9	11987	17040	23600	8.51				7.94	7.81	10.0	14.4	9.5	16200	12.5	2830	2780
WQ3-3	L2757977-3	2024-10-30	M																	
WQ3-3	VA24C9414-003	2024-10-30	M	26.0	5442	8033	7850	10.42				7.95	7.46	4.5	4.3	8.1	4780	4.6	817	799
WQ3-3	VA24D0180-003	2024-11-06	M	44.1	15809	22496	16100	9.37				7.60	7.61	13.5	9.7	9.4	12400	<2.0	1860	1700
WQ3-3	VA24D0813-003	2024-11-13	M	25.9	9988	14703	8990	9.29				7.68	7.45	8.5	5.2	8.2	4990	2.8	1020	973
WQ3-3	L2758221-3	2024-11-22	M																	
WQ3-3	VA24D1791-003	2024-11-22	M	75.1	21558	32057	31200	8.50				7.47	7.81	19.9	19.6	7.9	22100	<2.0	3900	3620
WQ3-3	L2758486-3	2024-12-18	M																	
WQ3-3	VA24D3937-003	2024-12-18	M	61.1	21244	32129	26100	7.80				7.62	7.80	19.9	15.7	7.3	17100	<2.0	2210	2630
WQ3-3	L2758770-3	2025-01-22	M																	
WQ3-3	VA25A1525-003	2025-01-22	M	84.5	22602	35703	34800	9.42					7.87	22.2	22.9	5.8	26000	2.3	3860	3130
WQ3-3	L2759008-3	2025-02-19	M																	
WQ3-3	VA25A3570-003	2025-02-19	M	88.1	18877	29111	36500	10.99				8.01	7.91	17.8	23.5	6.6	23500	5.2	5320	5950
WQ3-3	VA25A6679-003	2025-03-26	M	54.5	13980	21408	21300	11.90				8.11	7.88	12.8	13.0	6.8	13500	<2.0	2880	2800
WQ3-3	VA25A9109-003	2025-04-23	M	26.0	7108	10173	7530	13.06				8.40	7.50	5.8	4.1	9.2	4570	<2.0	741	759
WQ3-3	VA25A9941-003	2025-05-01	M	27.1	10888	15067	8310	11.26				8.34	7.51	8.8	4.7	10.5	4620	2.0	882	889
WQ3-3	VA25B0496-003	2025-05-07	M	28.4	8021	10813	9030	11.59				8.45	7.56	6.2	5.2	11.5	4890	<2.0	1010	1030
WQ3-3	VA25B1530-003	2025-05-16	M	22.1	3029	4226	6240	11.34				8.49	7.49	2.3	3.4	10.2	3620	<2.0	572	552
WQ3-3	VA25B1841-003	2025-05-21	M	13.7	3031	4338	2880	11.27				8.87	7.33	2.3	1.5	9.2	1770	<2.0	288	284
WQ4-1	0051710-07	2020-05-20	M		31821			7.15	9.9			7.51	7.60	29.8		8.6		2.2	6100	
WQ4-1	0062209-07	2020-06-22	M		32175			6.22	9.2			7.83	7.67	29.9		8.9		8	5900	
WQ4-1	0071996-07	2020-07-21	M		15675			5.57	9.3			7.48	7.65	29.4		9.4		<2.0	5340	
WQ4-1	0082292-07	2020-08-24	M		33025			5.80	9.2			7.54	7.69	30.2		9.6		4	5550	
WQ4-1	0093017-07	2020-09-28	M		31766			7.29	9.4			7.43	7.60			10.8		3.6	4640	
WQ4-1	20J1961-07	2020-10-20	M		32283			5.00	9.6			7.24	7.56	29.4		9.6		<2.0	5320	
WQ4-1	20J2778-07	2020-10-27	M		32079			5.52	9.9			7.60	7.61	29.2		9.6		2.2	5480	
WQ4-1	20K0360-07	2020-11-03	M		32442			5.30	9.8			7.51	7.71	29.6		9.6		2.6	5210	
WQ4-1	20K1261-07	2020-11-10	M		32903			4.80	9.8			7.44	7.51	30.1		9.6		3	5780	
WQ4-1	20K2100-07	2020-11-18	M						9.1				7.49					3.2	5720	
WQ4-1	20L1589-07	2020-12-14	M		32621			4.56	8.6				7.43	29.7		9.7		11.6	6240	
WQ4-1	21A2590-07	2021-01-27	M		31248			7.00	9.7			7.64	7.55	29.1		8.8		2.6	5630	
WQ4-1	21B2778-07	2021-02-25	M						10.2				7.54					2.4	6040	
WQ4-1	21C3505-07	2021-03-25	M			45576		7.47	9.4			7.82	7.50			8.3		2.8	6150	
WQ4-1	21D2478-07	2021-04-22	M		31149	45631		6.78	10.8			7.51	7.45	29.3		8.4		4.2	6350	
WQ4-1	21E1990-07	2021-05-18	M		31619	46125		6.05	9.9			7.39	6.85	29.6		8.5		8.4	5730	
WQ4-1	21E2917-07	2021-05-26	M		31673	46121			9.8			7.46	7.49	29.7		8.6		4.7	5670	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ4-1	21F0167-07	2021-06-01	M		31966	46536		5.74	10.6			7.31	7.40	29.9		8.6		2.4	5700	
WQ4-1	21F1056-07	2021-06-08	M		32042	46758		5.91	10.5			7.49	7.41	30.1		8.5		3	6140	
WQ4-1	21F2014-07	2021-06-15	M		31653	46144		5.95	9.9			7.49	7.40	29.7		8.6		4.4	5540	
WQ4-1	21G2414-07	2021-07-20	M		26701	34848		7.94	9.8			7.69	7.50	21.9		12.8		<2.0	5540	
WQ4-1	21H3040-07	2021-08-25	M			45651			10.3			7.61	7.67			9.7		<2.0	5550	
WQ4-1	21I3814-07	2021-09-28	M			34010		5.43	10.0				7.53	31.6		9.1		2.2	5490	
WQ4-1	21J3514-07	2021-10-26	M		31853	44390		5.11	8.4			7.27	7.50	28.5		10.2		2.4	5530	
WQ4-1	21K3046-07	2021-11-23	M		31487	44301		6.75	9.7			7.47	7.55	28.5		9.9		3.2	6110	
WQ4-1	21L2125-07	2021-12-14	M		32265	45609		7.52	11.2			7.59	7.51	29.4		9.7		4	5480	
WQ4-1	22A2312-07	2022-01-20	M		30917	45174		7.40	10.6			7.60	7.26	29.0		8.5		5.2	5250	
WQ4-1	22B2487-07	2022-02-17	M		29736	43536		7.30	10.5			7.70	7.71	27.8		8.4		<2.5	5480	
WQ4-1	22C3145-07	2022-03-22	M		31289	45632		7.00	10.9			7.50	7.63	29.3		8.5		10.1	5560	
WQ4-1	22D2212-12	2022-04-20	M		30656	45061		6.40	11.4			7.60	7.44	28.9		8.3		20.3	5760	
WQ4-1	22E2480-09	2022-05-17	M		31339	45813		4.80	7.8				7.64	29.4		8.5		13.2	5440	
WQ4-1	22F3212-07	2022-06-21	M		30466	44107		6.12	10.1			7.41	7.84	28.2		8.8		65.5	5460	
WQ4-1	22G1763-07	2022-07-13	M		31319	44904		7.27	9.3			7.56	7.73	28.8		9.2		10.4	5530	5610
WQ4-1	22H2453-07	2022-08-16	M		31480	44702		6.23	9.7			7.62	7.68	28.7		9.5		3.5	5350	5620
WQ4-1	22I1926-07	2022-09-14	M		31579	44334		6.10	9.5			7.58	7.82	28.3		9.9		6.8	4970	5270
WQ4-1	22J1560-09	2022-10-12	M		31829	45677		5.77	8.6			7.51	7.64	29.4		9.1		10.0	5570	5260
WQ4-1	22K1453-07	2022-11-10	M		32544	46769		4.05	10.2			7.39	7.43	30.1		9.1		14.4	6490	6360
WQ4-1	22L0774-07	2022-12-07	M		32531	46396		2.75	9.8			7.39	7.67	29.9		9.4		6.3	5590	6000
WQ4-1	23A2847-07	2023-01-27	M					9.37	10.1			7.45	7.56			7.8		14.0	5540	5830
WQ4-1	23C0060-07	2023-02-28	M		29083	43802		8.16	10.7			7.70	7.68	28.3		7.4		34.0	6200	6320
WQ4-1	23C1797-07	2023-03-15	M		30732	46153		7.54	10.4			7.67	7.69	29.6		7.5		25.6	5540	5800
WQ4-1	23D2945-07	2023-04-26	M		31589	46813	43700	6.24				7.49	7.52	30.1		8.0		6.7	5810	5880
WQ4-1	23E2392-07	2023-05-17	M		31500	46487	42000	7.11				7.54	7.62	29.9		8.1		73.3	5910	6140
WQ4-1	23F3614-07	2023-06-27	M		31416	45823	43000	7.15				7.66	7.69	29.4		8.5		44.3	5680	5530
WQ4-1	23G2415-07	2023-07-19	M		31489	45810	42000	6.93				7.66	7.72	29.4		8.6		12.0	5580	6660
WQ4-1	23H3309-09	2023-08-24	M		32181	44870	42200	6.43				7.54	7.83			10.2		57.0	5410	5360
WQ4-1	23I2271-09	2023-09-19	M		31875	45896	43600	6.50				7.52	7.74	29.5		9.0		12.8	5780	4830
WQ4-1	23J2236-09	2023-10-18	M		32048	46036	41800	5.78				7.57	7.53	29.6		9.1		3.6	4870	5650
WQ4-1	23K1909-07	2023-11-15	M	112	33149	46819	43300	4.90				7.50	7.54	30.2		29.8		3.4	5830	6010
WQ4-1	23L2091-04	2023-12-15	M	118	34017	47933	41800	5.18				7.64	7.51	31.0		9.8		<2.0	6460	5670
WQ4-1	L2754383-4	2024-01-25	M																	
WQ4-1	VA24A1507-004	2024-01-25	M	105	31563	45918		7.42				7.50	7.73	29.5		8.6	31300	<2.0	6140	5650
WQ4-1	L2754604-4	2024-02-14	M																	
WQ4-1	VA24A2995-004	2024-02-14	M	110	30943	45304		7.36				7.71	7.84	29.1		8.4	30900	<2.0	4960	4490
WQ4-1	L2755043-4	2024-03-21	M																	
WQ4-1	VA24A6026-004	2024-03-21	M	106	32662	47273	43500	7.42				7.56	7.96		31.0	8.8	33300	<2.0	5690	5560
WQ4-1	L2755490-4	2024-04-24	M																	
WQ4-1	VA24A8916-004	2024-04-24	M	108	66214	96376	45600	5.46				7.50	7.88		30.9	8.6	30900	<2.0	5810	5670
WQ4-1	L2755567-4	2024-05-01	M																	
WQ4-1	VA24A9566-004	2024-05-01	M	106	20716	30139	46200	7.91				7.47	7.69	18.6	30.1	8.6	34900	<2.0	6080	5980
WQ4-1	L2755666-4	2024-05-08	M																	
WQ4-1	VA24B0201-004	2024-05-08	M	106	21683	31522	45800	8.95				7.44	8.01	19.5	30.8	8.7	29300	2.9	5150	5280
WQ4-1	L2755779-4	2024-05-15	M																	
WQ4-1	VA24B0901-004	2024-05-15	M	107	21687	31516	46000	7.50				7.44	8.02	19.5	30.0	8.7	32600	2.2	5280	5130
WQ4-1	L2755888-4	2024-05-22	M																	
WQ4-1	VA24B1500-004	2024-05-22	M	103	21559	31255	45600	6.63				7.39	7.89	19.3	28.8	8.8	31800	2.7	5220	5610
WQ4-1	L2756312-4	2024-06-19	M																	
WQ4-1	VA24B4510-004	2024-06-19	M	106	31569	45826	45700	6.90				7.60	7.75	29.5	30.1	8.7	34600	4.9	5640	6150
WQ4-1	VA24B7397-004	2024-07-17	M	103	29638	42057	44700	6.39				7.62	7.91	26.8	29.3	9.5	32300	<2.0	5520	5690
WQ4-1	L2756689-4	2024-07-17	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ4-1	L2757122-4	2024-08-21	M																	
WQ4-1	VA24C1337-004	2024-08-21	M	104	34813	49950	45800	5.69				7.50	7.84	32.4	30.0	9.1	32200	3.0	5260	5890
WQ4-1	VA24C4683-004	2024-09-18	M	105	33098	46983	44200	6.28				7.46	7.82	30.3	28.8	9.5	32400	4.3	5170	5140
WQ4-1	VA24C8569-004	2024-10-23	M	107	28813	41378	46100	6.57				7.54	7.91	26.3	30.1	9.1	33500	8.2	5860	5900
WQ4-1	L2757977-4	2024-10-30	M																	
WQ4-1	VA24C9414-004	2024-10-30	M	107	29453	42100	47300	5.65				7.46	7.79	26.9	30.8	9.3	35200	5.3	6240	5620
WQ4-1	VA24D0180-004	2024-11-06	M	106	29230	41892	45900	6.44				7.54	7.77	26.7	30.6	9.2	34900	<2.0	5970	5190
WQ4-1	VA24D0813-004	2024-11-13	M	110	28092	40123	45200	5.97				7.34	7.84	25.5	30.1	9.3	35800	5.0	5920	5680
WQ4-1	L2758221-4	2024-11-22	M																	
WQ4-1	VA24D1791-004	2024-11-22	M	107	32529	46504	46200	5.37				7.42	7.82	30.0	30.3	9.3	33700	<2.0	6430	5980
WQ4-1	L2758486-4	2024-12-18	M																	
WQ4-1	VA24D3937-004	2024-12-18	M	105	33007	46637	47600	5.60				7.50	7.90	30.1	30.4	9.7	32600	5.8	4350	4880
WQ4-1	L2758770-4	2025-01-22	M																	
WQ4-1	VA25A1525-004	2025-01-22	M	105	31540	45206	44100	6.85					7.90	29.0	29.8	9.2	35200	4.9	4760	4080
WQ4-1	L2759008-4	2025-02-19	M																	
WQ4-1	VA25A3570-004	2025-02-19	M	106	24234	35836	45300	8.73				7.81	7.85	22.4	29.9	8.1	35400	4.9	6950	7110
WQ4-1	VA25A6679-004	2025-03-26	M	97.5	30025	43387	41400	6.35				7.55	7.85	27.7	27.0	8.9	28400	<2.0	3620	6180
WQ4-1	VA25A9109-004	2025-04-23	M	106	29239	42848	45700	7.12				7.62	7.87	27.3	29.5	8.4	30300	<2.0	5560	5680
WQ4-1	VA25A9941-004	2025-05-01	M	107	55204	80651	44900	6.54				7.73	7.91	55.5	29.5	8.5	33300	5.6	5720	6200
WQ4-1	VA25B0496-004	2025-05-07	M	106	30312	44081	45200	7.71				7.59	7.92	28.2	29.9	8.7	35100	<2.0	6490	6380
WQ4-1	VA25B1530-004	2025-05-16	M	107	28622	41548	46600	7.99				7.62	8.00	26.4	30.6	8.7	31400	<2.0	5780	5480
WQ4-1	VA25B1841-004	2025-05-21	M	106	58307	84838	45100	5.35				7.69	7.83	58.9	29.8	8.6	32400	<2.0	5880	6210
WQ4-2	0051710-08	2020-05-20	M		1645			10.27	11.1			8.82	7.56	1.2		9.4		4.4	387	
WQ4-2	0062209-08	2020-06-22	M		3892			10.72	9.8			8.02	6.92	2.9		10.5		28.6	280	
WQ4-2	0071996-08	2020-07-21	M		4367			9.70	10.2			8.42	7.15	2.3		1.2		11	456	
WQ4-2	0082292-08	2020-08-24	M		24894			8.13	9.4			7.72	7.90	19.1		15.2		7	3080	
WQ4-2	0093017-08	2020-09-28	M		12515			10.08	9.4			7.82	7.64			12.7		8.4	1690	
WQ4-2	20J1961-08	2020-10-20	M		5926			10.02	10.0			8.04	7.09	4.7		9.3		3.8	904	
WQ4-2	20J2778-08	2020-10-27	M		19835			10.31	10.3			7.86	7.52	18.1		8.0		<2.0	2090	
WQ4-2	20K0360-08	2020-11-03	M		24150			9.22	9.9			7.67	7.39	21.7		9.1		3	1180	
WQ4-2	20K1261-08	2020-11-10	M		14890			9.80	10.0			7.69	7.47	13.9		6.2		2.8	2560	
WQ4-2	20K2100-08	2020-11-18	M						9.7				7.18					6	976	
WQ4-2	20L1589-08	2020-12-14	M		14562			10.54	10.5				7.14	13.8		5.7		<2.0	3250	
WQ4-2	21A2590-08	2021-01-27	M		27754			8.33	9.8			7.74	7.60	26.7		7.7		2.6	4780	
WQ4-2	21B2778-08	2021-02-25	M						10.7				7.71					<2.0	4990	
WQ4-2	21C3505-08	2021-03-25	M			33095		13.04	11.5			8.49	8.21			8.2		<2.0	3240	
WQ4-2	21D2478-08	2021-04-22	M		14261	20033		14.03	11.8			8.57	8.20	11.9		9.9		8	2490	
WQ4-2	21E1990-08	2021-05-18	M		1356	1977		12.07	10.8			7.35	6.98	1.0		8.6		8	159	
WQ4-2	21E2917-08	2021-05-26	M		4290	5954		11.73	10.6			7.62	7.22	3.2		10.3		<3.3	540	
WQ4-2	21F0167-08	2021-06-01	M		16137	21761		10.50	10.7			8.05	7.41	13.1		11.5		3.4	1250	
WQ4-2	21F1056-08	2021-06-08	M		1571	2194		11.31	10.6			8.35	7.09	1.1		10.1		8.6	341	
WQ4-2	21F2014-08	2021-06-15	M		5223	7488		11.33	10.4			7.71	7.13	4.1		9.2		19.5	506	
WQ4-2	21G2414-08	2021-07-20	M		12175	16004		7.87	9.9			7.74	7.47	9.4		12.5		6.8	561	
WQ4-2	21H3040-08	2021-08-25	M			10624			10.4			8.25	7.63			14.7		5.4	1030	
WQ4-2	21I3814-08	2021-09-28	M			17763		9.40	9.1				7.83	14.0		12.8		4.6	2730	
WQ4-2	21J3514-08	2021-10-26	M		3473	5139		11.34	10.2			7.50	7.08	2.8		8.0		8.2	478	
WQ4-2	21K3046-08	2021-11-23	M		21718	32336		9.06	10.5			7.62	7.42	20.0		7.8		3.6	2120	
WQ4-2	21L2125-08	2021-12-14	M		31835	37343		8.63	11.3			7.66	7.50	23.5		7.9		3	2500	
WQ4-2	22A2312-08	2022-01-20	M		26287	40562		9.90	10.8			7.70	7.30	25.6		6.6		4.4	5200	
WQ4-2	22B2487-08	2022-02-17	M		26447	39820		9.70	12.3			8.10	7.91	25.1		7.4		5.2	4780	
WQ4-2	22C3145-08	2022-03-22	M		27142	40715		11.30	12.3			8.20	7.99	25.8		7.5		10.6	5020	
WQ4-2	22D2212-13	2022-04-20	M		25426	37346		12.30	11.7			8.30	8.18	23.5		8.3		13.1	4220	
WQ4-2	22E2480-10	2022-05-17	M		9761	13918		11.30	9.9				7.64	8.1		9.4		8.4	1120	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ4-2	22F3212-08	2022-06-21	M		4234	5966		11.46	10.8			7.88	7.52	3.3		9.8		8.5	369	
WQ4-2	22G1763-08	2022-07-13	M		4639	5868		10.94	9.6			7.69	7.35	3.2		14.0		14.0	458	458
WQ4-2	22H2453-08	2022-08-16	M		3903	4890		9.95	9.6			7.97	7.43	2.6		14.4		9.1	402	421
WQ4-2	22I1926-08	2022-09-14	M		26334	33642		9.13	9.5			8.02	8.16	21.1		13.6		11.2	3520	3630
WQ4-2	22J1560-10	2022-10-12	M		30617	39968		9.04	9.5			8.04	7.94	28.8		12.8		7.2	4510	4580
WQ4-2	22K1453-08	2022-11-10	M		28299	42643		7.98	10.5			7.55	7.50	27.1		7.4		10.8	5960	5660
WQ4-2	22L0774-08	2022-12-07	M		28412	42701		6.37	9.8			7.55	7.65	27.2		7.5		5.3	5630	5530
WQ4-2	23A2847-08	2023-01-27	M					9.29	11.1			7.50	7.26			7.2		6.8	4210	4380
WQ4-2	23C0060-08	2023-02-28	M		24546	39047		9.54	10.6			7.79	7.69	24.5		5.6		20.8	5420	5400
WQ4-2	23C1797-08	2023-03-15	M		26975	41154		10.92	10.4			7.96	7.76	26.0		7.0		18.8	4150	4270
WQ4-2	23D2945-08	2023-04-26	M		25533	36250	28200	11.03				8.33	7.86	22.8		9.5		11.3	3530	3710
WQ4-2	23E2392-08	2023-05-17	M		2818	4040	10000	11.19				8.09	6.61	2.2		9.2		50.7	1200	1180
WQ4-2	23F3614-08	2023-06-27	M		5098	6266	3660	9.69				8.07	7.33	3.4		15.2		15.7	363	368
WQ4-2	23G2415-08	2023-07-19	M		13891	21371	19800	8.58				8.10	7.75	12.9		16.8		12.3	2400	2350
WQ4-2	23H3309-10	2023-08-24	M		30689	37425	34200	9.57				8.01	7.93			15.6		12.5	4220	4440
WQ4-2	23I2271-11	2023-09-19	M		15894	20160	17000	10.31				8.20	7.76	12.1		14.0		7.6	1920	1830
WQ4-2	23J2236-11	2023-10-18	M		9164	12936	16400	10.59				7.84	7.00	7.5		9.7		26.4	1800	1810
WQ4-2	23K1909-08	2023-11-15	M	49.7	28328	39976	19800	8.17				7.70	6.96	25.4		9.7		3.0	2010	2050
WQ4-2	23L2091-05	2023-12-15	M	98.2	27008	39792	35700	6.87				7.76	7.33	25.2		8.2		6.8	5210	4770
WQ4-2	L2754383-5	2024-01-25	M																	
WQ4-2	VA24A1507-005	2024-01-25	M	65.0	29226	43679		8.12				7.55	7.69	27.9		7.7	18000	3.6	3450	3280
WQ4-2	L2754604-5	2024-02-14	M																	
WQ4-2	VA24A2995-005	2024-02-14	M	92.8	23222	35756		8.74				7.75	7.83	22.3		6.6	27000	5.0	4190	3900
WQ4-2	L2755043-5	2024-03-21	M																	
WQ4-2	VA24A6026-005	2024-03-21	M	38.1	12203	18471	13100	12.40				8.19	7.68		8.3	7.2	8950	<2.0	1500	1460
WQ4-2	L2755490-5	2024-04-24	M																	
WQ4-2	VA24A8916-005	2024-04-24	M	77.8	55815	77277	31900	10.55				8.43	8.00		20.8	10.5	21200	3.2	3970	3250
WQ4-2	L2755567-5	2024-05-01	M																	
WQ4-2	VA24A9566-005	2024-05-01	M	90.0	18713	25531	38600	12.35				8.37	8.24	15.6	24.6	11.0	27100	<2.0	5200	4960
WQ4-2	L2755666-5	2024-05-08	M																	
WQ4-2	VA24B0201-005	2024-05-08	M	34.8	5846	8121	12100	10.65				8.14	7.68	4.5	7.2	10.3	8010	4.0	1240	1270
WQ4-2	L2755779-5	2024-05-15	M																	
WQ4-2	VA24B0901-005	2024-05-15	M	50.7	11207	15027	20800	9.82				8.24	7.83	8.8	12.5	11.7	14800	5.4	2280	2130
WQ4-2	L2755888-5	2024-05-22	M																	
WQ4-2	VA24B1500-005	2024-05-22	M	53.9	14668	18808	22300	10.68				8.30	7.93	11.2	13.1	13.5	14900	<2.0	2530	2490
WQ4-2	L2756312-5	2024-06-19	M																	
WQ4-2	VA24B4510-005	2024-06-19	M	51.7	21256	26519	19700	9.30				8.30	7.94	16.3	11.9	14.6	12700	4.7	2220	2480
WQ4-2	VA24B7397-005	2024-07-17	M	57.3	20453	24963	24700	9.66				8.19	7.81	15.2	15.2	15.5	15900	8.9	3040	3200
WQ4-2	L2756689-5	2024-07-17	M																	
WQ4-2	L2757122-5	2024-08-21	M																	
WQ4-2	VA24C1337-005	2024-08-21	M	24.7	8281	10207	7640	9.88				8.19	7.57	5.8	4.2	15.1	5020	7.0	870	953
WQ4-2	VA24C4683-005	2024-09-18	M	29.9	11170	14389	10300	9.91				8.12	7.59	8.4	5.9	13.3	6160	6.7	1170	1180
WQ4-2	VA24C8569-005	2024-10-23	M	76.8	24059	32599	31900	7.48				7.78	7.89	20.3	20.0	11.3	21800	10.4	3940	3820
WQ4-2	L2757977-5	2024-10-30	M																	
WQ4-2	VA24C9414-005	2024-10-30	M	83.1	23685	32442	35600	7.84				7.78	7.85	20.2	22.5	10.9	26400	5.1	4560	3960
WQ4-2	VA24D0180-005	2024-11-06	M	88.5	24806	34113	37300	6.81				7.70	7.80	21.4	24.2	10.7	28400	<2.0	4640	4100
WQ4-2	VA24D0813-005	2024-11-13	M	41.6	18456	26291	17200	7.92				7.65	7.66	16.0	10.4	9.4	10800	3.7	2020	1840
WQ4-2	L2758221-5	2024-11-22	M																	
WQ4-2	VA24D1791-005	2024-11-22	M	74.4	24451	35683	31200	7.61				7.57	7.81	22.4	19.6	8.5	22000	<2.0	3970	3680
WQ4-2	L2758486-5	2024-12-18	M																	
WQ4-2	VA24D3937-005	2024-12-18	M	87.1	27013	39698	38900	6.76				7.62	7.90	25.1	24.3	8.3	26200	<2.0	3540	4080
WQ4-2	VA25A1525-005	2025-01-22	M	84.5	23865	37087	35000	8.20					7.88	23.2	23.0	6.3	26000	4.4	3510	3220
WQ4-2	L2758770-5	2025-01-22	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQ4-2	L2759008-5	2025-02-19	M																	
WQ4-2	VA25A3570-005	2025-02-19	M	87.5	19466	29963	36500	10.36				8.04	7.92	18.4	23.5	6.7	25500	6.0	4940	4960
WQ4-2	VA25A6679-005	2025-03-26	M	57.5	22703	34376	22700	9.70				8.03	7.89	21.4	13.9	7.2	14900	2.3	3120	3060
WQ4-2	VA25A9109-005	2025-04-23	M	86.4	25375	35071	36700	13.59				8.43	8.14	22.0	23.1	10.5	23800	2.6	4410	4840
WQ4-2	VA25A9941-005	2025-05-01	M	63.5	35267	47293	25000	11.07				8.47	7.95	30.7	15.4	11.7	19500	<2.0	2930	3170
WQ4-2	VA25B0496-005	2025-05-07	M	63.8	20978	27990	25600	10.39				8.17	7.91	17.2	16.0	11.9	19100	7.0	3040	3340
WQ4-2	VA25B1530-005	2025-05-16	M	40.2	11291	14802	14900	9.91				8.34	7.73	8.6	8.7	12.6	9370	2.0	1420	1550
WQ4-2	VA25B1841-005	2025-05-21	M	23.2	26185	34701	6490	9.85				8.18	7.52	21.8	3.6	12.2	4120	2.4	299	305
WQ4-3	23L2091-07	2023-12-15	M	87.5	22900	34489	31600	8.63				7.76	7.36	21.5		7.4		4.4	4280	4220
WQ4-3	L2754383-6	2024-01-25	M																	
WQ4-3	VA24A1507-006	2024-01-25	M	41.0	13784	22100		10.64				7.53	7.54	13.1		5.3	10700	2.7	1990	1930
WQ4-3	L2754604-6	2024-02-14	M																	
WQ4-3	VA24A2995-006	2024-02-14	M	78.7	21745	33901		9.63				7.78	7.81	21.0		6.2	22000	3.6	3440	3220
WQ4-3	L2755043-6	2024-03-21	M																	
WQ4-3	VA24A6026-006	2024-03-21	M	23.0	3321	5236	5600	12.70				7.89	7.49		3.3	5.8	3420	<2.0	604	596
WQ4-3	L2755490-6	2024-04-24	M																	
WQ4-3	VA24A8916-006	2024-04-24	M	36.9	42417	58437	12200	11.76				8.59	7.44		7.3	10.6	8180	<2.0	1420	1330
WQ4-3	L2755567-6	2024-05-01	M																	
WQ4-3	VA24A9566-006	2024-05-01	M	26.7	8035	11150	9370	13.34				8.41	7.58	6.4	5.3	10.4	5700	<2.0	1760	1710
WQ4-3	L2755666-6	2024-05-08	M																	
WQ4-3	VA24B0201-006	2024-05-08	M	31.4	5072	7014	10600	11.06				7.97	7.64	3.9	6.2	10.5	6830	<2.0	1060	1090
WQ4-3	L2755779-6	2024-05-15	M																	
WQ4-3	VA24B0901-006	2024-05-15	M	23.6	7062	9667	7900	10.76				8.17	7.51	5.5	4.4	10.9	4950	6.2	823	785
WQ4-3	L2755888-6	2024-05-22	M																	
WQ4-3	VA24B1500-006	2024-05-22	M	28.7	9151	12056	10300	10.67				8.28	7.61	6.9	5.7	12.4	6430	3.0	1080	1130
WQ4-3	L2756312-6	2024-06-19	M																	
WQ4-3	VA24B4510-006	2024-06-19	M	41.4	14693	18548	14800	10.10				8.20	7.86	11.0	8.7	14.2	9970	4.8	1590	847
WQ4-3	VA24B7397-006	2024-07-17	M	10.7	2257	2690	2550	10.39				7.83	7.23	1.4	1.3	16.6	1400	13.2	254	254
WQ4-3	L2756689-6	2024-07-17	M																	
WQ4-3	L2757122-6	2024-08-21	M																	
WQ4-3	VA24C1337-006	2024-08-21	M	24.3	7910	9779	7550	10.21				8.03	7.56	5.5	4.2	15.1	4770	6.9	816	884
WQ4-3	VA24C4683-006	2024-09-18	M	25.6	7286	9396	8280	10.27				8.27	7.50	5.3	4.6	13.2	5060	7.7	943	864
WQ4-3	VA24C8569-006	2024-10-23	M	33.9	15718	22043	12000	8.39				7.91	7.60	13.3	6.9	10.0	7500	12.3	1310	1330
WQ4-3	L2757977-6	2024-10-30	M																	
WQ4-3	VA24C9414-006	2024-10-30	M	27.3	5485	8053	8740	9.91				8.09	7.47	4.5	4.9	8.3	5380	4.0	920	876
WQ4-3	VA24D0180-006	2024-11-06	M	55.2	19383	27620	21500	7.83				7.81	7.70	16.9	13.2	9.4	14200	<2.0	2420	2250
WQ4-3	VA24D0813-006	2024-11-13	M		6879	10289		9.46				7.84		5.8		7.7			896	854
WQ4-3	L2758221-6	2024-11-22	M																	
WQ4-3	VA24D1791-006	2024-11-22	M	83.3	20403	29929	35100	8.26				7.62	7.84	18.5	22.3	8.3	25000	<2.0	4460	4260
WQ4-3	L2758486-6	2024-12-18	M																	
WQ4-3	VA24D3937-006	2024-12-18	M	70.8	19599	29626	31300	7.64				7.64	7.85	18.2	19.1	7.3	20900	<2.0	2490	2720
WQ4-3	L2758770-6	2025-01-22	M																	
WQ4-3	VA25A1525-006	2025-01-22	M	81.2	22018	35000	34000	9.93					7.88	21.7	22.3	5.6	26000	2.6	3290	3060
WQ4-3	L2759008-6	2025-02-19	M																	
WQ4-3	VA25A3570-006	2025-02-19	M	88.0	18745	28966	34000	11.21				8.05	7.91	17.7	21.8	6.5	25500	3.0	4870	4870
WQ4-3	VA25A6679-006	2025-03-26	M	50.2	16451	24981	20100	10.63				8.17	7.85	15.1	12.2	7.1	12600	2.1	2620	2560
WQ4-3	VA25A9109-006	2025-04-23	M	29.4	5510	7677	8420	12.86				8.57	7.56	4.3	4.7	10.2	5100	2.6	850	840
WQ4-3	VA25A9941-006	2025-05-01	M	25.5	11760	16274	7930	11.43				8.35	7.49	9.6	4.4	10.5	4560	<2.0	833	964
WQ4-3	VA25B0496-006	2025-05-07	M	46.2	12739	17076	17500	11.23				8.29	7.78	10.1	10.5	11.7	11700	5.1	2110	2170
WQ4-3	VA25B1530-006	2025-05-16	M	16.5	3485	4869	4480	10.90				8.47	7.43	2.6	2.4	10.1	2610	<2.0	395	387
WQ4-3	VA25B1841-006	2025-05-21	M	13.3	3294	4700	2800	11.39				8.68	7.31	2.5	1.5	9.3	1680	<2.0	362	373
WQR1-0.5	L2755545-7	2024-04-30	M																	
WQR1-0.5	VA24A9402-007	2024-04-30	M	47.5	9201			11.80		1.75	1.63	8.46	7.93	7.5		10.9	13300	<2.0	2230	1650

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Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA24A9802-011	2024-05-05	M										8.00					<2.0	1970	1910
WQR1-0.5	L2755648-10	2024-05-08	M																	
WQR1-0.5	VA24B0178-010	2024-05-08	M	51.6	13981			11.63		1.58	1.30	8.64	7.86	11.2		11.8	14000	3.7	2080	2070
WQR1-0.5	L2755934-1	2024-05-24	M																	
WQR1-0.5	VA24B1783-001	2024-05-24	M	28.1						2.07	1.69		7.61				5560	4.0	891	647
WQR1-0.5	L2755981-1	2024-05-28	M																	
WQR1-0.5	VA24B2063-001	2024-05-28	M	23.8	5628			12.22		1.52	1.40	7.80	7.45	2.9		9.3	4360	3.8	688	663
WQR1-0.5	VA24B2561-005	2024-06-01	M	18.0	4872			10.94		1.26	1.18	8.00	7.39	2.6		11.9	2690	<2.0	541	518
WQR1-0.5	L2756068-1	2024-06-04	M																	
WQR1-0.5	VA24B2772-001	2024-06-04	M	7.0	782			12.27		1.94	1.92	8.50	6.93	0.4		8.3	288	9.0	60.4	54.6
WQR1-0.5	VA24B3452-007	2024-06-10	M	11.2	4350			10.40		1.12	1.29	7.50	7.17	2.3		13.7	1150	17.9	244	264
WQR1-0.5	655-454600000-0	2024-06-17	M		3073			10.92				7.73		1.6		11.7				
WQR1-0.5	VA24B5880-003	2024-07-02	M										7.23				737	14.1	164	
WQR1-0.5	VA24B5882-007	2024-07-03	M		2767			11.50				7.50	7.33	1.9		13.6	1470	17.6	268	
WQR1-0.5	VA24B6465-001	2024-07-09	M	19.0	6753			11.00		0.85	1.03	7.60	7.21	4.6		15.4	4170	11.3	721	766
WQR1-0.5	VA24B7867-001	2024-07-20	M	16.4	2904			10.36		0.85	0.64	8.00	7.32	1.9		15.3	2820	14.1	586	597
WQR1-0.5	L2757210-1	2024-08-26	M																	
WQR1-0.5	VA24C2208-001	2024-08-26	M	24.2						0.86	0.81		7.48				4750	7.9	908	754
WQR1-0.5	L2757680-1	2024-10-06	M																	
WQR1-0.5	VA24C6685-001	2024-10-06	M	65.4	18236			9.96		1.44	1.35	7.70	7.92	14.8		11.8	16100	8.1	3020	2900
WQR1-0.5	VA24C7408-001	2024-10-13	M	72.7	29555			7.12		0.99	1.11	7.30	7.83	25.3		11.6	19400	<2.0	3660	3390
WQR1-0.5	L2757830-3	2024-10-19	M																	
WQR1-0.5	VA24C8041-003	2024-10-19	M	39.5	9056			10.93		1.81	2.23	7.59	7.53			9.1	10500	4.2	1740	1850
WQR1-0.5	VA24C8159-005	2024-10-20	M	23.4	6367			10.71		2.68	3.26	7.00	7.37	4.9		11.1	5040	14.6	865	866
WQR1-0.5	L2757872-1	2024-10-22	M																	
WQR1-0.5	VA24C8330-001	2024-10-22	M	27.0	10058			10.38		2.17	2.46	7.70	7.37	8.4		9.1	5730	11.6	1020	867
WQR1-0.5	L2757933-5	2024-10-28	M																	
WQR1-0.5	VA24C9041-005	2024-10-28	M	15.4	3692			11.43		3.15	3.04	7.30	7.24	3.0		8.1	2320	9.8	391	392
WQR1-0.5	L2758002-1	2024-11-01	M																	
WQR1-0.5	VA24C9683-001	2024-11-01	M	56.0	16328			9.85		1.85	1.81	7.50	7.62	14.1		9.3	14800	3.6	2900	2640
WQR1-0.5	L2758142-5	2024-11-14	M																	
WQR1-0.5	VA24D0945-005	2024-11-14	M	29.3	5060			11.40		2.88	2.84	7.30	7.41	4.2		7.3	6320	5.6	1030	707
WQR1-0.5	VA24D1069-005	2024-11-15	M	32.5	15057			10.44		2.44	2.52	7.40	7.44	13.3		8.1	6940	3.3	1250	1340
WQR1-0.5	L2758203-5	2024-11-19	M																	
WQR1-0.5	VA24D1567-005	2024-11-19	M	54.1	15558			10.02		1.51	1.56	7.50	7.67	14.0		7.6	15800	<2.0	2320	2300
WQR1-0.5	L2758353-1	2024-12-05	M																	
WQR1-0.5	VA24D2842-001	2024-12-05	M	63.1	14912			10.96		1.32	1.18	7.50	7.56	14.3		5.3	16200	<2.0	3170	2830
WQR1-0.5	L2758617-7	2025-01-08	M																	
WQR1-0.5	VA25A0392-007	2025-01-08	M	74.3	20807			10.08		0.85	1.12	7.50	7.66	19.8		6.6	19600	<2.0	3710	3740
WQR1-0.5	L2759040-7	2025-02-20	M																	
WQR1-0.5	VA25A3677-007	2025-02-20	M	77.5	21788			10.95		1.07	0.88	7.92	7.91	20.8		6.6	22100	<2.0	3670	3540
WQR1-0.5	L2759227-7	2025-03-13	M																	
WQR1-0.5	VA25A5556-007	2025-03-13	M	50.6	18499			11.34		1.74	1.78	8.24	7.91	17.4		6.7	11600	<2.0	2170	2420
WQR1-0.5	VA25A6528-013	2025-03-25	M	52.2	16482			12.41		1.52	2.10	8.25	7.93	15.2		7.0	12600	<2.0	2230	2660
WQR1-0.5	VA25A8147-001	2025-04-11	M	27.4	7075			11.66		2.00	2.05	8.01	7.42	6.0		7.3	4580	<2.0	779	774
WQR1-0.5	VA25A8148-001	2025-04-11	M																	
WQR1-0.5	VA25A8281-007	2025-04-14	M	42.1	11072			11.47		1.81	1.69	8.06	7.74	9.3		9.1	9840	<2.0	1620	1480
WQR1-0.5	VA25A8283-007	2025-04-14	M																	
WQR1-0.5	VA25A9123-008	2025-04-23	M	26.1	5399			11.92		1.26	1.40	7.79	7.52	4.3		9.4	3870	<2.0	714	642
WQR1-0.5	VA25A9125-008	2025-04-23	M																	
WQR1-0.5	VA25B0359-009	2025-05-06	M	25.8	6298			11.44		1.30	1.60	7.55	7.54	4.8		11.2	4360	2.6	914	712
WQR1-0.5	VA25B0360-009	2025-05-06	M																	
WQR1-0.5	VA25B0800-007	2025-05-09	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA25B0802-007	2025-05-09	M	30.7	6331			11.11		1.58	1.62	7.99	7.53	4.8		11.0	6440	4.4	1260	919
WQR1-0.5	VA25B2349-005	2025-05-27	M	26.3	10367	13094		10.72		1.36	1.54	8.13	7.57	7.6		14.1	4990	3.5	874	1090
WQR1-1	0051710-09	2020-05-20	M		31954			7.06	10.0			7.48	7.62	30.0		8.6		<2.0	6010	
WQR1-1	0062209-10	2020-06-22	M		32158			6.37	9.0			7.38	7.66	29.9		8.9		12.8	5820	
WQR1-1	0071996-09	2020-07-21	M		45595			6.69	9.5			7.39	7.64	29.3		9.5		4	5320	
WQR1-1	0082292-09	2020-08-24	M		32859			5.79	9.1			7.50	7.67	30.1		9.6		3.2	5540	
WQR1-1	0093017-09	2020-09-28	M		31810			6.59	9.2			6.90	7.46			9.9		3.8	5080	
WQR1-1	20J1961-09	2020-10-20	M		32242			5.01	9.0			7.33	7.55	29.3		9.7		3.6	6180	
WQR1-1	20J2778-09	2020-10-27	M		32122			5.21	9.2			7.29	7.45	29.3		9.6		3	5520	
WQR1-1	20K0360-09	2020-11-03	M		32523			4.66	10.0			7.40	7.62	29.7		9.6		2.6	5210	
WQR1-1	20K1261-09	2020-11-10	M		32958				9.6			7.30	7.49	30.2		9.5		2.4	5710	
WQR1-1	20K2100-09	2020-11-18	M						9.1				7.52					3.8	5850	
WQR1-1	20L1589-09	2020-12-14	M		32570			4.34	8.6				7.32	29.7		9.7		3.4	6820	
WQR1-1	21A2590-09	2021-01-27	M		31190			6.30	9.9			7.35	7.56	29.0		8.8		3.2	5500	
WQR1-1	21B2778-09	2021-02-25	M						10.2				7.59					4.2	5950	
WQR1-1	21C3505-10	2021-03-25	M			45634		6.82	9.5			7.22	7.61			8.3		2.2	6170	
WQR1-1	21D2478-09	2021-04-22	M		31401	45920		5.93	10.3			7.34	7.41	29.5		8.4		2.2	5880	
WQR1-1	21E1990-09	2021-05-18	M		31648	46173		5.93	10.9			7.21	7.69	29.7		8.5		<2.0	6030	
WQR1-1	21E2917-09	2021-05-26	M		31480	45739		6.28	9.2			7.43	7.47	29.4		8.7		8	6060	
WQR1-1	21F0167-09	2021-06-01	M		31926	46561		5.49	11.2			7.33	7.40	30.0		8.5		5.2	5880	
WQR1-1	21F1056-09	2021-06-08	M		32181	46892		5.13	10.2			7.37	7.37	30.2		8.6		3.6	5760	
WQR1-1	21F2014-09	2021-06-15	M		31601	46114		5.64	10.1			7.34	7.38	29.6		8.5		2.4	5750	
WQR1-1	21G2414-09	2021-07-20	M		22585	28848		8.66	10.0			7.45	7.47	17.8		13.6		2.4	5360	
WQR1-1	21H3040-09	2021-08-25	M			45603			10.3			7.58	7.69			10.1		<2.0	5450	
WQR1-1	21I3814-09	2021-09-28	M			33974		5.14	10.1			7.30	7.52	31.6		9.1		<2.0	5550	
WQR1-1	21J3514-09	2021-10-26	M		31844	44375		4.82	9.1			7.23	7.49			10.2		3.8	5440	
WQR1-1	21K3046-09	2021-11-23	M		31471	44273		6.54	9.6			7.47	7.40	28.4		9.9		3.4	5710	
WQR1-1	21L2125-09	2021-12-14	M		32163	45452		6.27	11.5			7.52	7.53	29.3		9.7		<2.0	5600	
WQR1-1	22A2312-09	2022-01-20	M		31010	45237		7.22	10.3			7.62	7.29	29.0		8.5		4.2	5540	
WQR1-1	22B2487-09	2022-02-17	M		29895	43636		7.18	10.7			7.69	7.55	27.9		8.5		<2.5	5370	
WQR1-1	22C3145-09	2022-03-22	M		31071	45492		7.68	10.2			7.58	7.71	29.2		8.4		9.7	5270	
WQR1-1	22D2212-06	2022-04-19	M		30887	45334		5.85	11.4			7.36	7.56	29.1		8.3		<5.0	6190	
WQR1-1	22E2480-01	2022-05-17	M		30304	41027		5.01	8.1				7.62	29.4		8.5		12.8	5700	
WQR1-1	22F3212-09	2022-06-21	M		30406	43924		6.14	11.0			7.51	7.59	28.1		8.9		47.2	5270	
WQR1-1	22G1763-09	2022-07-13	M		30926	44226		6.72	9.4			7.53	7.72	28.3		9.3		<4.0	5520	5470
WQR1-1	22H2453-09	2022-08-16	M		31375	44630		6.27	9.9			7.61	7.68	28.7		9.5		2.4	5380	5460
WQR1-1	22I1926-09	2022-09-14	M		31521	44515		5.89	9.4			7.47	7.82	28.6		9.7		11.6	5350	5370
WQR1-1	22J1560-01	2022-10-12	M		31796	45615		5.73	7.2			7.49	7.59	29.3		9.1		16.0	5810	5220
WQR1-1	22K1453-09	2022-11-10	M		32510	46756		3.61	10.3			7.19	7.48	30.1		9.0		11.2	6530	6640
WQR1-1	22L0774-09	2022-12-07	M		32412	46309		2.90	9.7			7.24	7.63	29.8		9.3		11.3	6060	6080
WQR1-1	23A2847-09	2023-01-27	M					8.91	10.9			7.29	7.52			8.0		8.0	5680	6000
WQR1-1	23C0060-09	2023-02-28	M		28971	43645		8.27	10.9			7.62	7.68	27.8		7.4		24.8	6260	6280
WQR1-1	23C1797-09	2023-03-15	M		30841	46239		8.07	10.8			7.59	7.70	29.7		7.6		24.8	5550	5600
WQR1-1	23D2945-09	2023-04-26	M		31521	46765	43500	6.31				7.48	7.60	30.1		7.9		13.0	5510	5940
WQR1-1	23E2392-09	2023-05-17	M		31485	46518	41700	7.40				7.58	7.68	29.9		8.1		84.0	6080	6460
WQR1-1	23F3614-09	2023-06-27	M		31649	46004	43000	6.98				7.68	7.70	29.6		8.7		41.0	5630	5640
WQR1-1	23G2415-09	2023-07-19	M		31383	45641	42100	6.84				7.66	7.75	29.3		8.6		12.3	5820	6330
WQR1-1	23H3309-01	2023-08-24	M		32076	44907	42500	6.43				7.53	7.71			10.0		10.8	5460	5400
WQR1-1	23I2271-01	2023-09-19	M		31936	46008	43800	6.57				7.55	7.67	29.6		9.0		11.6	5610	5070
WQR1-1	23J2236-01	2023-10-18	M		32112	46361	37600	5.52				7.54	7.54	29.8		8.9		9.2	4880	5560
WQR1-1	23K1909-09	2023-11-15	M	111	33391	47244	43800	5.26				7.10	7.63	30.5		9.6		2.0	6050	6060
WQR1-1	23L1905-01	2023-12-14	M	123	34063	47936	41100	5.00				7.62	7.28	31.0		9.8		8.4	5630	5470
WQR1-1	L2754366-4	2024-01-24	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR1-1	VA24A1422-004	2024-01-24	M	107	31403	45775		7.62				7.46	7.79	29.4		8.6	38300	<2.0	5900	5840
WQR1-1	L2754594-1	2024-02-13	M																	
WQR1-1	VA24A2858-001	2024-02-13	M	108	31028	45369		7.79				7.66	7.81	29.1		8.5	30800	<2.0	4790	4980
WQR1-1	L2755033-1	2024-03-20	M																	
WQR1-1	VA24A5955-001	2024-03-20	M	106	32456	47008	46400	7.33				7.52	7.96		30.6	8.8	36700	<2.0	5690	5820
WQR1-1	L2755461-1	2024-04-23	M																	
WQR1-1	VA24A8736-001	2024-04-23	M	105	66178	96345	46400	4.89				7.55	7.92		30.1	8.6	32200	2.1	5960	5730
WQR1-1	L2755553-1	2024-04-30	M																	
WQR1-1	VA24A9418-001	2024-04-30	M	106	20643	30019	44400	7.50				7.47	7.65	18.5	29.7	8.6	29900	<2.0	6030	5970
WQR1-1	L2755641-1	2024-05-07	M																	
WQR1-1	VA24B0040-001	2024-05-07	M	106	21789	31664	46700	6.47				7.49	7.80	19.6	29.7	8.7	33800	2.0	5540	5410
WQR1-1	L2755769-1	2024-05-14	M																	
WQR1-1	VA24B0738-001	2024-05-14	M	108	21618	31418	45600	6.51				7.27	8.01	19.5	29.7	8.7	34700	2.8	5590	5150
WQR1-1	L2755874-1	2024-05-21	M																	
WQR1-1	VA24B1351-001	2024-05-21	M	104	21702	31545	46500	7.17				7.35	7.87	19.5	29.5	8.7	34000	3.4	5600	5700
WQR1-1	L2756277-1	2024-06-18	M																	
WQR1-1	VA24B4257-001	2024-06-18	M	106	31503	45815	45900	6.10				7.60	7.73	29.4	30.2	8.6	34800	<2.3	6140	5860
WQR1-1	L2756678-1	2024-07-16	M																	
WQR1-1	VA24B7237-001	2024-07-16	M	105	29412	42262	44700	5.43				7.58	7.79	27.0	29.3	9.1	32900	<2.0	5790	5520
WQR1-1	L2757095-1	2024-08-20	M																	
WQR1-1	VA24C1101-001	2024-08-20	M	105	34585	49770	46200	5.18				7.50	7.86	32.3	30.1	9.0	32900	14.5	5760	5760
WQR1-1	VA24C4483-001	2024-09-17	M	105	33055	46986	46300	5.31				7.42	7.93	30.3	29.9	9.5	41500	8.5	6200	5870
WQR1-1	VA24C8360-001	2024-10-22	M	108	28697	41155	46700	5.46				7.42	7.77	26.2	30.1	9.2	33200	<2.0	5960	5900
WQR1-1	VA24C9197-001	2024-10-29	M	104	29260	41976	47000	5.10				7.41	7.92	26.8	30.7	9.1	33400	3.5	6240	6110
WQR1-1	VA24D0009-001	2024-11-05	M	105	29113	40833	45900	5.96				7.58	7.76	26.0	29.5	10.0	30200	<2.0	5640	5630
WQR1-1	L2758095-1	2024-11-12	M																	
WQR1-1	VA24D0632-001	2024-11-12	M	110	28108	40136	46000	5.58				7.36	7.77	25.5	30.2	9.3	32600	<2.0	5870	5840
WQR1-1	VA24D1720-001	2024-11-21	M	108	32455	46379	46200	4.77				7.16	7.81	29.9	30.2	9.3	33300	<2.0	6510	5730
WQR1-1	L2758465-1	2024-12-17	M																	
WQR1-1	VA24D3769-001	2024-12-17	M	109	32887	46438	45800	5.64				7.45	7.74	30.0	29.9	9.7	32200	<2.0	4990	5120
WQR1-1	L2758719-1	2025-01-21	M																	
WQR1-1	VA25A1408-001	2025-01-21	M	104	31814	45486	45000	6.47					7.76	29.2	29.8	9.3	31800	<2.0	6120	3660
WQR1-1	L2758994-1	2025-02-18	M																	
WQR1-1	VA25A3430-001	2025-02-18	M	106	24675	36064	45400	7.57				7.63	7.78	22.6	30.0	8.5	36400	4.4	6120	5660
WQR1-1	VA25A6550-001	2025-03-25	M	105	29648	43024	45200	6.07				7.47	7.66	27.5	29.3	8.7	31800	<2.0	6940	6620
WQR1-1	VA25A8962-001	2025-04-22	M	106	29300	42722	45400	7.63				7.52	7.94	27.2	29.7	8.6	30300	<2.0	6100	6360
WQR1-1	VA25A9878-001	2025-04-30	M	105	55236	80748	44400	5.76				7.67	7.78	55.6	29.8	8.5	36200	<2.0	5900	6410
WQR1-1	VA25B0358-001	2025-05-06	M	106	30089	43786	45200	7.53				7.46	7.97	28.0	28.7	8.6	33200	<2.0	4900	5800
WQR1-1	VA25B1026-001	2025-05-13	M	67.8	28436	41396	24300	6.66				7.37	7.93	26.3	14.8	8.6	15700	<2.0	3090	2970
WQR1-1	VA25B1711-001	2025-05-20	M	106	57279	83242	44800	6.37				7.41	7.81	57.6	29.6	8.7	32500	2.4	6540	6870
WQR1-2	0051710-10	2020-05-20	M		4594			9.35	10.7			8.35	7.32	3.5		10.2		6.2	515	
WQR1-2	0062209-09	2020-06-22	M		5317			10.49	10.0			7.86	6.95	4.0		11.0		17.4	305	
WQR1-2	0071996-10	2020-07-21	M		4654			9.54	10.0			8.22	7.15	2.5		13.6		11.6	1.72	
WQR1-2	0082292-10	2020-08-24	M		17731			9.31	9.3			7.90	7.89	13.4		14.6		5.2	2700	
WQR1-2	0093017-10	2020-09-28	M		5643			10.75	9.3			7.48	7.16			11.4		12.2	750	
WQR1-2	20J1961-10	2020-10-20	M		9639			10.34	9.2			6.43	7.60	7.9		9.8		3.4	2070	
WQR1-2	20J2778-10	2020-10-27	M		17278			9.47	10.1			7.78	7.64	15.8		7.4		<2.0	3010	
WQR1-2	20K0360-10	2020-11-03	M		17818			10.25	9.3			7.68	7.58	15.9		8.4		4.2	1580	
WQR1-2	20K1261-10	2020-11-10	M		12647			10.40	10.0			7.64	7.46	11.9		5.5		4.2	2030	
WQR1-2	20K2100-10	2020-11-18	M						9.4				7.29					13	1400	
WQR1-2	20L1589-10	2020-12-14	M		17996			9.95	10.4				6.32	17.2		6.0		2.8	3290	
WQR1-2	21A2590-10	2021-01-27	M		26910			8.86	10.1			7.64	7.58	26.1		7.5		<2.0	4630	
WQR1-2	21B2778-10	2021-02-25	M						10.9				7.71					2.6	4780	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR1-2	21C3505-11	2021-03-25	M			34711		13.42	11.1			8.39	8.03			8.2		<2.0	2060	
WQR1-2	21D2478-10	2021-04-22	M		9435	13676		12.87	11.7			8.29	8.16	7.9		8.8		3.8	1820	
WQR1-2	21E1990-10	2021-05-18	M		1096	1616		11.97	11.1			7.31	6.86	0.8		8.1		20	153	
WQR1-2	21E2917-10	2021-05-26	M		1410	1987		11.55	9.8			7.59	7.10	1.0		9.8		<3.3	218	
WQR1-2	21F0167-10	2021-06-01	M		15328	20855		10.56	11.0			8.05	7.46	12.5		11.1		2.8	1470	
WQR1-2	21F1056-10	2021-06-08	M		1051	1494		11.27	10.7			8.50	6.93	0.8		9.5		8.6	150	
WQR1-2	21F2014-10	2021-06-15	M		4406	6340		11.15	10.5			6.63	7.07	3.5		9.0		17.8	604	
WQR1-2	21G2414-10	2021-07-20	M		23775	31113		7.29	10.0			7.56	7.48	19.4		12.5		8.2	685	
WQR1-2	21H3040-10	2021-08-25	M			35651			10.4			8.23	7.81			16.5		3.8	1620	
WQR1-2	21I3814-10	2021-09-28	M			13333		9.43	9.2			7.64	7.80	10.5		11.9		8.4	1250	
WQR1-2	21J3514-10	2021-10-26	M		4270	6349		11.11	10.2			7.40	7.21	3.5		7.9		11.6	740	
WQR1-2	21K3046-10	2021-11-23	M		23161	136539		8.93	9.6			7.64	7.55	21.3		8.1		5	4380	
WQR1-2	21L2125-10	2021-12-14	M		17156	26032		9.19	11.3			7.64	7.32	15.8		7.2		<2.0	2550	
WQR1-2	22A2312-10	2022-01-20	M		26340	40621		9.51	10.9			7.77	7.36	25.6		6.6		4.4	4960	
WQR1-2	22B2487-10	2022-02-17	M		25851	38957		10.68	11.3			8.01	7.74	24.5		7.4		3.8	4810	
WQR1-2	22C3145-10	2022-03-22	M		26640	39941		11.53	12.2			8.21	7.98	25.2		7.6		10.8	4840	
WQR1-2	22D2212-07	2022-04-19	M		26556	38919		12.35	12.2			8.25	8.16	24.6		8.4		<3.3	5040	
WQR1-2	22E2480-02	2022-05-17	M		15948	21655		10.72	8.8				7.51	13.0		11.2		5.2	1400	
WQR1-2	22F3212-10	2022-06-21	M		4923	6893		11.23	11.1			7.79	7.58	3.8		10.0		11.2	540	
WQR1-2	22G1763-10	2022-07-13	M		6814	8746		10.65	9.4			7.75	7.56	4.9		13.4		26.4	1010	994
WQR1-2	22H2453-10	2022-08-16	M		13476	16323		9.93	9.8			8.22	7.56	9.6		15.9		7.3	1310	1350
WQR1-2	22I1926-10	2022-09-14	M		23884	30208		10.33	11.2			8.05	8.09	18.8		14.0		10.4	3440	3190
WQR1-2	22J1560-02	2022-10-12	M		30089	39100		10.21	8.3			8.08	7.92	24.8		12.9		18.3	4470	4170
WQR1-2	22K1453-10	2022-11-10	M		28638	42471		7.80	10.7			6.76	7.52	27.0		7.5		14.4	5340	5420
WQR1-2	22L0774-10	2022-12-07	M		28561	42932		6.17	9.6			7.47	7.63	27.3		7.5		5.0	5360	5450
WQR1-2	23A2847-10	2023-01-27	M					9.11	10.8			7.32	7.52			7.1		6.8	3260	3250
WQR1-2	23C0060-10	2023-02-28	M		26091	40931		9.21	10.6			7.71	7.68	25.8		6.0		20.8	5430	5680
WQR1-2	23C1797-10	2023-03-15	M		27480	42050		10.38	10.7			7.87	7.77	26.7		6.9		30.0	5130	5310
WQR1-2	23D2945-10	2023-04-26	M		26926	38546	22000	10.86				8.30	7.51	24.4		9.2		5.7	2610	2940
WQR1-2	23E2392-10	2023-05-17	M		4175	6037	4620	11.45				7.81	6.44	3.3		8.9		35.0	494	522
WQR1-2	23F3614-10	2023-06-27	M		5682	6881	5060	9.93				8.01	7.35	3.8		15.9		14.7	491	526
WQR1-2	23G2415-10	2023-07-19	M		4614	5822	7300	10.11				7.93	7.37	3.9		15.6		11.3	781	810
WQR1-2	23H3309-02	2023-08-24	M		29015	35921	32300	8.77				7.87	7.87			14.9		39.2	3880	4070
WQR1-2	23I2271-02	2023-09-19	M		25406	31133	29300	9.61				8.12	7.95	19.4		15.4		5.2	3590	3320
WQR1-2	23J2236-02	2023-10-18	M		27195	36165	32000	8.97				7.99	7.62	22.8		12.0		7.8	3600	3980
WQR1-2	23K1909-10	2023-11-15	M	106	29482	41452	36400	8.55				7.52	7.64	26.4		9.9		2.2	4800	4900
WQR1-2	23L1905-02	2023-12-14	M	117	29659	43214	38600	6.75				7.70	7.40	27.6		8.6		18.0	5430	5070
WQR1-2	L2754366-5	2024-01-24	M																	
WQR1-2	VA24A1422-005	2024-01-24	M	98.1	29743	44183		8.27				7.51	7.79	28.2		7.9	32400	4.6	5220	5360
WQR1-2	L2754594-2	2024-02-13	M																	
WQR1-2	VA24A2858-002	2024-02-13	M	87.5	28486	42052		8.55				7.71	7.81	26.8		8.1	25000	5.0	4500	3660
WQR1-2	L2755033-2	2024-03-20	M																	
WQR1-2	VA24A5955-002	2024-03-20	M	94.0	28913	42012	40400	10.93				8.10	7.95		26.2	8.7	32400	4.0	4690	4590
WQR1-2	L2755461-2	2024-04-23	M																	
WQR1-2	VA24A8736-002	2024-04-23	M	78.3	54342	75876	34000	10.39				8.41	8.10		21.3	10.2	23100	5.1	4440	4130
WQR1-2	L2755553-2	2024-04-30	M																	
WQR1-2	VA24A9418-002	2024-04-30	M	92.7	18176	24707	36300	12.60				8.35	8.36	15.0	23.7	11.2	25000	<2.0	4940	4790
WQR1-2	L2755641-2	2024-05-07	M																	
WQR1-2	VA24B0040-002	2024-05-07	M	65.0	17540	23862	27800	10.43				8.28	7.98	14.5	16.7	11.1	18600	3.3	2900	2800
WQR1-2	L2755769-2	2024-05-14	M																	
WQR1-2	VA24B0738-002	2024-05-14	M	31.9	8623	11524	11900	11.11				8.20	7.59	6.6	6.8	11.8	7240	7.0	1330	1290
WQR1-2	L2755874-2	2024-05-21	M																	
WQR1-2	VA24B1351-002	2024-05-21	M	31.1	4213	5597	11400	10.79				7.96	7.66	3.0	6.3	12.1	7380	3.2	1140	1170

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR1-2	L2756277-2	2024-06-18	M																	
WQR1-2	VA24B4257-002	2024-06-18	M	39.4	8649	11133	13700	10.50				8.20	7.86	6.4	8.0	13.3	9230	2.2	1620	1600
WQR1-2	L2756678-2	2024-07-16	M																	
WQR1-2	VA24B7237-002	2024-07-16	M	34.5	3982	5047	13300	9.50				7.62	7.64	2.7	7.8	14.0	8500	23.3	1520	1470
WQR1-2	L2757095-2	2024-08-20	M																	
WQR1-2	VA24C1101-002	2024-08-20	M	40.2	13031	15467	15400	9.33				8.33	7.79	9.1	9.0	16.7	11000	8.5	1760	1690
WQR1-2	VA24C4483-002	2024-09-17	M	43.7	28398	34152	17600	9.97				8.17	7.70	22.0	10.3	15.3	12400	5.5	2130	2010
WQR1-2	VA24C8360-002	2024-10-22	M	77.0	23484	31710	32400	7.95				7.80	7.84	19.7	20.1	11.4	22400	4.6	4080	3720
WQR1-2	VA24C9197-002	2024-10-29	M	78.0	22336	30687	33200	7.05				7.68	7.90	19.0	20.9	10.8	23100	2.3	4280	3320
WQR1-2	VA24D0009-002	2024-11-05	M	86.7	24188	33222	37000	7.17				7.72	7.83	20.8	23.2	10.8	24800	<2.0	4340	4150
WQR1-2	L2758095-2	2024-11-12	M																	
WQR1-2	VA24D0632-002	2024-11-12	M	59.3	12121	17699	24800	10.21				7.50	7.73	10.4	15.3	8.5	17100	3.1	2920	2890
WQR1-2	VA24D1720-002	2024-11-21	M	63.8	29332	41471	25700	5.85				7.38	7.78	26.4	15.8	9.7	17400	<2.0	3340	3060
WQR1-2	L2758465-2	2024-12-17	M																	
WQR1-2	VA24D3769-002	2024-12-17	M	92.2	28402	41576	38800	7.64				7.62	7.79	26.4	24.9	8.4	26800	<2.0	3990	3840
WQR1-2	L2758719-2	2025-01-21	M																	
WQR1-2	VA25A1408-002	2025-01-21	M	84.7	21524	34029	35600	7.99					7.77	21.1	23.0	5.8	23800	<2.0	4760	2600
WQR1-2	L2758994-2	2025-02-18	M																	
WQR1-2	VA25A3430-002	2025-02-18	M	89.0	20600	31561	37700	9.95				7.91	7.86	19.5	24.4	6.8	29400	2.3	4900	4610
WQR1-2	VA25A6550-002	2025-03-25	M	87.2	22151	33421	36400	12.23				8.24	7.98	20.8	23.0	7.3	24600	3.9	5230	4700
WQR1-2	VA25A8962-002	2025-04-22	M	53.8	17521	23757	21300	12.32				8.34	7.98	14.4	12.9	11.3	16100	3.2	2710	2560
WQR1-2	VA25A9878-002	2025-04-30	M	37.2	19190	26366	13300	11.12				8.43	7.60	16.1	7.9	10.8	7480	4.4	1440	1570
WQR1-2	VA25B0358-002	2025-05-06	M	65.1	25085	33321	25700	10.54				8.02	7.95	20.9	15.4	12.1	18400	<2.0	2680	2690
WQR1-2	VA25B1026-002	2025-05-13	M	44.4	17102	21878	16300	10.02				8.10	7.73	13.2	9.6	13.6	9560	3.1	1880	1750
WQR1-2	VA25B1711-002	2025-05-20	M	44.4	19683	26254	16800	10.01				8.24	7.87	16.1	10.1	11.9	10800	<2.0	2030	1970
WQR1-2m	L2755545-8	2024-04-30	M																	
WQR1-2m	VA24A9402-008	2024-04-30	M	51.9	12846			12.45		1.57	1.53	8.62	7.99	10.8		10.4	13100	<2.0	3410	3330
WQR1-2m	VA24A9802-012	2024-05-05	M										8.22					<2.0	4110	4210
WQR1-2m	L2755648-11	2024-05-08	M																	
WQR1-2m	VA24B0178-011	2024-05-08	M	56.7	16667			11.77		1.60	1.40	8.68	7.91	13.5		11.6	15000	3.3	2360	2160
WQR1-2m	L2755934-2	2024-05-24	M																	
WQR1-2m	VA24B1783-002	2024-05-24	M	34.9						1.58	1.51		7.72				8240	2.8	1260	1180
WQR1-2m	L2755981-2	2024-05-28	M																	
WQR1-2m	VA24B2063-002	2024-05-28	M	41.8	8271			12.67		1.63	1.31	8.30	7.81	4.5		10.0	9590	<2.0	2550	1610
WQR1-2m	VA24B2561-006	2024-06-01	M	33.6	31171			10.48		1.22	1.19	7.80	7.83	19.4		12.8	9010	2.3	1690	1520
WQR1-2m	L2756068-2	2024-06-04	M																	
WQR1-2m	VA24B2772-002	2024-06-04	M	8.2	1157			12.46		2.58	1.94	8.70	7.02	0.6		8.5	468	10.6	93.3	89.8
WQR1-2m	VA24B3452-008	2024-06-10	M	19.5	9870			10.76		3.03	1.31	7.90	7.41	5.4		13.8	3490	15.6	678	652
WQR1-2m	656-454600000-0	2024-06-17	M		18856			10.07				8.24		11.2		14.6				
WQR1-2m	VA24B5882-008	2024-07-03	M		2439			10.87				7.40	7.26	1.6		13.5	1640	16.3	321	
WQR1-2m	VA24B6465-002	2024-07-09	M	46.8	25304			11.23		0.68	1.02	7.90	7.68	20.1		13.8	12600	7.3	2290	680
WQR1-2m	VA24B7867-002	2024-07-20	M	30.5	9745			10.23		1.08	0.67	7.80	7.57	6.8		15.5	7090	14.1	1200	1280
WQR1-2m	L2757210-2	2024-08-26	M																	
WQR1-2m	VA24C2208-002	2024-08-26	M	70.2						1.43	1.15	8.10	7.96				20300	2.8	2500	3010
WQR1-2m	L2757680-2	2024-10-06	M																	
WQR1-2m	VA24C6685-002	2024-10-06	M	83.8	28482			8.95		1.11	1.12	7.70	7.90	23.5		12.7	22100	<3.0	4770	4490
WQR1-2m	VA24C7408-002	2024-10-13	M	90.0	32842			6.34		0.90	0.78	7.70	7.90	28.2		11.9	27000	<2.0	4680	4290
WQR1-2m	L2757830-6	2024-10-20	M																	
WQR1-2m	VA24C8041-006	2024-10-20	M	28.9						2.56	3.21		7.37				7590	20.9	1200	1200
WQR1-2m	L2757872-2	2024-10-22	M																	
WQR1-2m	VA24C8330-002	2024-10-22	M	27.0	22823			9.02		1.80	1.88	7.90	7.36	19.5		10.7	5310	10.6	1030	2630
WQR1-2m	L2757933-6	2024-10-28	M																	
WQR1-2m	VA24C9041-006	2024-10-28	M	23.1	20562			9.86		2.69	3.02	7.50	7.32	17.5		10.2	4060	10.6	733	1240

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR1-2m	L2758002-3	2024-11-01	M																	
WQR1-2m	VA24C9683-003	2024-11-01	M	65.1	26199			8.77		1.21	1.90	7.60	7.70	22.7		10.8	17700	<2.0	2870	3030
WQR1-2m	L2758353-2	2024-12-05	M																	
WQR1-2m	VA24D2842-002	2024-12-05	M	67.0	27927			8.97		1.35	1.05	7.50	7.60	26.2		8.1	16900	<2.0	3480	4400
WQR1-2m	L2758617-8	2025-01-08	M																	
WQR1-2m	VA25A0392-008	2025-01-08	M	70.8	28260			8.93		0.77	0.78	7.50	7.65	26.9		7.6	18300	<2.0	3440	4540
WQR1-2m	L2759040-8	2025-02-20	M																	
WQR1-2m	VA25A3677-008	2025-02-20	M	99.4	27798			10.91		0.98	1.06	7.93	8.00	26.8		7.1	30600	<2.0	5220	4170
WQR1-2m	L2759227-8	2025-03-13	M																	
WQR1-2m	VA25A5556-008	2025-03-13	M	62.1	26250			12.84		1.42	1.90	8.29	8.05	24.7		7.8	15800	5.7	2850	4660
WQR1-2m	VA25A6528-014	2025-03-25	M		27106			12.14				8.21		25.5		7.8				
WQR1-2m	VA25A8147-002	2025-04-11	M	59.3	15972			11.47		1.61	1.91	8.33	8.03	14.2		8.1	14300	<2.0	2360	2780
WQR1-2m	VA25A8148-002	2025-04-11	M																	
WQR1-2m	VA25A8281-008	2025-04-14	M	62.1	22700			12.11		1.94	1.66	8.28	7.98	20.2		9.2	16000	2.4	2900	3030
WQR1-2m	VA25A8283-008	2025-04-14	M																	
WQR1-2m	VA25A9123-009	2025-04-23	M	62.4	25958			12.24		1.19	1.42	8.33	8.01	22.2		11.1	16300	<2.0	1750	2960
WQR1-2m	VA25A9125-009	2025-04-23	M																	
WQR1-2m	VA25B0359-008	2025-05-06	M	29.0	29460			11.46		1.26	1.40	8.02	7.60	23.3		11.5	5420	2.3	1060	3000
WQR1-2m	VA25B0360-008	2025-05-06	M																	
WQR1-2m	VA25B0800-008	2025-05-09	M																	
WQR1-2m	VA25B0802-008	2025-05-09	M	65.3	21696			10.71		1.55	1.61	8.23	7.97	17.5		12.6	18800	2.0	3290	3230
WQR1-3	23L1905-03	2023-12-14	M	84.7	21119	32232	29000	8.25				7.71	7.14	19.9		6.9		14.8	3630	3630
WQR1-3	L2754366-6	2024-01-24	M																	
WQR1-3	VA24A1422-006	2024-01-24	M	59.0	13728	22066		10.97				7.48	7.68	13.1		5.2	18000	<2.0	2880	2890
WQR1-3	L2754594-3	2024-02-13	M																	
WQR1-3	VA24A2858-003	2024-02-13	M	59.1	16289	25689		10.40				7.68	7.74	15.5		5.8	16500	<2.0	2820	2580
WQR1-3	L2755033-3	2024-03-20	M																	
WQR1-3	VA24A5955-003	2024-03-20	M	42.7	12005	17744	15600	12.70				8.18	7.75		9.2	8.1	10500	3.3	1800	1760
WQR1-3	L2755461-3	2024-04-23	M																	
WQR1-3	VA24A8736-003	2024-04-23	M	68.3	45429	63383	29100	11.28				8.54	8.06		17.9	10.2	19200	6.0	3760	3510
WQR1-3	L2755553-3	2024-04-30	M																	
WQR1-3	VA24A9418-003	2024-04-30	M	37.3	6733	9459	12100	11.70				8.31	7.78	5.3	7.2	9.9	7940	<2.0	1500	1520
WQR1-3	L2755641-3	2024-05-07	M																	
WQR1-3	VA24B0040-003	2024-05-07	M	44.9	8120	11348	17800	11.15				8.28	7.77	6.5	10.3	10.1	11800	5.0	1850	1770
WQR1-3	L2755769-3	2024-05-14	M																	
WQR1-3	VA24B0738-003	2024-05-14	M	12.5	2577	3592	3120	11.30				8.18	7.28	1.9	1.6	10.2	1720	7.0	317	319
WQR1-3	L2755874-3	2024-05-21	M																	
WQR1-3	VA24B1351-003	2024-05-21	M	17.3	1861	2518	4890	11.23				7.57	7.41	1.3	2.6	11.3	2840	8.6	472	458
WQR1-3	L2756277-3	2024-06-18	M																	
WQR1-3	VA24B4257-003	2024-06-18	M	18.9	4378	5789	4990	10.90				7.60	7.41	3.2	2.7	12.3	2960	7.0	572	562
WQR1-3	L2756678-3	2024-07-16	M																	
WQR1-3	VA24B7237-003	2024-07-16	M	13.3	1794	2234	3820	9.91				7.61	7.27	1.2	2.0	14.7	2120	21.8	422	400
WQR1-3	L2757095-3	2024-08-20	M																	
WQR1-3	VA24C1101-003	2024-08-20	M	29.5	9684	11748	10400	9.80				8.31	7.64	6.7	5.9	15.8	6770	6.9	1120	1130
WQR1-3	VA24C4483-003	2024-09-17	M	41.8	12813	16371	16600	10.61				8.28	7.69	9.6	9.7	13.6	11600	7.1	2000	1860
WQR1-3	VA24C8360-003	2024-10-22	M	15.1	3152	4659	4860	10.20				8.13	7.27	2.5	2.6	8.1	2860	16.0	531	517
WQR1-3	VA24C9197-003	2024-10-29	M	16.9	3066	4537	5030	9.42				8.27	7.32	2.4	2.7	8.0	3020	5.6	561	521
WQR1-3	VA24D0009-003	2024-11-05	M	65.9	10134	14874	26600	8.64				7.93	7.77	8.6	16.1	8.3	16700	<2.0	2870	3030
WQR1-3	L2758095-3	2024-11-12	M																	
WQR1-3	VA24D0632-003	2024-11-12	M	36.1	3170	4819	13500	10.93				7.88	7.53	2.6	7.9	7.1	8500	4.9	1420	1440
WQR1-3	VA24D1720-003	2024-11-21	M	62.7	19584	29376	25100	7.24				7.54	7.79	18.0	15.4	7.6	16100	<2.0	3250	2850
WQR1-3	L2758465-3	2024-12-17	M																	
WQR1-3	VA24D3769-003	2024-12-17	M	93.7	27872	40968	40000	7.90				7.63	7.79	26.0	25.7	8.3	27800	6.4	3930	3930

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR1-3	L2758719-3	2025-01-21	M																	
WQR1-3	VA25A1408-003	2025-01-21	M	78.5	19518	31627	31800	9.66					7.76	19.4	20.3	5.0	21300	<2.0	4260	2410
WQR1-3	L2758994-3	2025-02-18	M																	
WQR1-3	VA25A3430-003	2025-02-18	M	88.3	18547	28803	36800	10.47				7.93	7.86	17.6	23.7	6.4	29800	2.7	4760	4400
WQR1-3	VA25A6550-003	2025-03-25	M	40.5	14742	22601	14200	13.21				8.28	7.55	13.5	8.2	6.8	8580	2.8	1730	1540
WQR1-3	VA25A8962-003	2025-04-22	M	36.7	19518	31627	12500	9.66				8.27	7.74	19.4	7.2	5.0	7030	2.2	1360	1340
WQR1-3	VA25A9878-003	2025-04-30	M	16.6	5264	7553	4000	11.76				8.50	7.23	4.2	2.2	9.1	2170	3.1	397	426
WQR1-3	VA25B0358-003	2025-05-06	M	19.3	16528	22159	5970	11.31				8.15	7.47	13.4	3.2	11.7	3670	2.5	504	537
WQR1-3	VA25B1026-003	2025-05-13	M	32.6	7373	9974	10800	11.08				8.03	7.54	5.6	6.2	11.4	6580	<2.0	1180	1100
WQR1-3	VA25B1711-003	2025-05-20	M	15.8	6448	8958	3450	10.97				8.32	7.37	5.0	1.8	10.3	2120	2.3	315	328
WQR1-SF	L2755545-9	2024-04-30	M																	
WQR1-SF	VA24A9402-009	2024-04-30	M	97.6	39991			7.18		1.05	1.32	7.78	7.95	28.9		8.7	28200	<2.0	5810	5600
WQR1-SF	VA24A9802-013	2024-05-05	M										7.84					<2.0	5350	5210
WQR1-SF	L2755648-12	2024-05-08	M																	
WQR1-SF	VA24B0178-012	2024-05-08	M	107	31594			6.27		0.71	0.98	7.81	8.01	30.0		8.6	32600	2.8	4930	5410
WQR1-SF	L2755934-3	2024-05-24	M																	
WQR1-SF	VA24B1783-003	2024-05-24	M	102						1.27	1.14		8.00				31100	<2.0	4770	5140
WQR1-SF	L2755981-3	2024-05-28	M																	
WQR1-SF	VA24B2063-003	2024-05-28	M	99.1	43672			10.05		1.34	1.10	7.80	7.92	28.0		10.2	31700	<2.6	5170	5110
WQR1-SF	L2756068-3	2024-06-04	M																	
WQR1-SF	VA24B2772-003	2024-06-04	M	104	45886			7.23		1.64	1.54	7.10	7.63	29.5		8.8	30600	3.1	6040	3520
WQR1-SF	VA24B3452-009	2024-06-10	M	98.7	23257			10.69		1.20	1.07	8.10	7.78	20.2		13.2	32800	<2.0	5710	5720
WQR1-SF	657-454600000-0	2024-06-17	M		46042			6.71				7.37		29.6		8.8				
WQR1-SF	VA24B5882-009	2024-07-03	M		26687			8.67				8.20	7.75	21.6		13.4	26100	4.6	4460	
WQR1-SF	VA24B6465-003	2024-07-09	M	87.5	31993			6.05		1.25	1.34	7.40	7.93	29.6		9.1	26700	2.9	5340	4480
WQR1-SF	VA24B7867-003	2024-07-20	M	94.6	31953			7.04		1.20	1.14	7.60	7.93	28.7		10.1	35600	2.1	5280	5430
WQR1-SF	L2757210-3	2024-08-26	M																	
WQR1-SF	VA24C2208-003	2024-08-26	M	105						1.34	1.13	7.50	7.80				33600	<2.0	5320	5390
WQR1-SF	L2757680-3	2024-10-06	M																	
WQR1-SF	VA24C6685-003	2024-10-06	M	105	32605			6.64		0.91	0.95	7.50	7.78	27.8		12.1	32500	5.5	5740	5340
WQR1-SF	VA24C7408-003	2024-10-13	M	105	32558			4.63		0.99	0.87	7.60	7.89	30.0		9.2	30900	<2.0	5800	5350
WQR1-SF	L2757872-3	2024-10-22	M																	
WQR1-SF	VA24C8330-003	2024-10-22	M	111	32766			5.01		1.07	1.05	7.60	7.67	29.8		9.8	31300	3.0	5520	5530
WQR1-SF	L2757933-7	2024-10-28	M																	
WQR1-SF	VA24C9041-007	2024-10-28	M	109	32739			5.35		1.52	1.20	7.30	7.70	30.0		9.6	32000	2.6	5550	3730
WQR1-SF	L2758002-4	2024-11-01	M																	
WQR1-SF	VA24C9683-004	2024-11-01	M		32778			5.08		1.21	1.11	7.30		29.6		10.0				5400
WQR1-SF	VA24D2498-001	2024-11-30	M	97.5						1.09	1.06		7.64				28400	<3.8	5210	
WQR1-SF	L2758353-3	2024-12-05	M																	
WQR1-SF	VA24D2842-003	2024-12-05	M	99.8	32742			6.25		1.13	0.97	7.40	7.61	30.0		9.5	30300	<2.0	5570	5780
WQR1-SF	L2758617-9	2025-01-08	M																	
WQR1-SF	VA25A0392-009	2025-01-08	M	105	32514			6.69		0.72	0.86	7.50	7.69	30.2		9.0	30000	<2.0	5550	5630
WQR1-SF	L2759040-9	2025-02-20	M																	
WQR1-SF	VA25A3677-009	2025-02-20	M	106	30758			8.52		1.02	0.73	7.66	7.83	29.4		7.8	32800	<2.0	5620	5220
WQR1-SF	L2759227-9	2025-03-13	M																	
WQR1-SF	VA25A5556-009	2025-03-13	M	96.8	29320			9.34		1.10	1.72	7.71	8.05	28.2		7.4	27700	5.9	5020	5320
WQR1-SF	VA25A6528-015	2025-03-25	M		31329			6.35				7.58		29.4		8.4				
WQR1-SF	VA25A8147-003	2025-04-11	M	95.1	31500			6.80		1.26	1.54	7.59	8.03	29.8		8.3	27800	2.9	4520	4410
WQR1-SF	VA25A8148-003	2025-04-11	M																	
WQR1-SF	VA25A8281-009	2025-04-14	M	106	32119			6.23		1.21	0.82	7.58	7.95	30.3		8.4	30200	<2.0	5600	5280
WQR1-SF	VA25A8283-009	2025-04-14	M																	
WQR1-SF	VA25A9123-010	2025-04-23	M	105	32490			7.28		0.80	1.03	7.66	7.90	30.5		8.6	31100	5.9	5660	5390
WQR1-SF	VA25A9125-010	2025-04-23	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR1-SF	VA25B0359-007	2025-05-06	M	94.7	32165			6.98		0.73	1.02	7.46	7.90	30.2		8.6	32100	<2.0	5330	5390
WQR1-SF	VA25B0360-007	2025-05-06	M																	
WQR1-SF	VA25B0800-009	2025-05-09	M																	
WQR1-SF	VA25B0802-009	2025-05-09	M	106	31838			7.01		1.00	0.92	7.61	7.83	29.9		8.6	34000	5.1	5750	5510
WQR2-0.5	L2755545-10	2024-04-30	M																	
WQR2-0.5	VA24A9402-010	2024-04-30	M	34.8	7391			11.65		1.70	1.70	8.24	7.70	6.0		9.3	7610	<2.0	1280	1240
WQR2-0.5	L2755648-1	2024-05-08	M																	
WQR2-0.5	VA24B0178-001	2024-05-08	M	32.7	7627			11.71		1.47	1.64	8.28	7.44	6.1		10.0	6900	2.4	1240	1150
WQR2-0.5	L2755934-10	2024-05-24	M																	
WQR2-0.5	VA24B1783-010	2024-05-24	M	25.1						1.45	1.40		7.51				4250	3.4	697	736
WQR2-0.5	VA24B3452-010	2024-06-10	M	14.8	2522			10.73		1.33	1.22	7.80	7.31	1.3		13.1	2270	10.2	515	487
WQR2-0.5	658-454600000-0	2024-06-17	M		1825			11.16				8.37		0.9		11.4				
WQR2-0.5	VA24B5882-010	2024-07-03	M		1336			10.84				7.00	7.27	0.9		14.6	845	15.9	173	
WQR2-0.5	VA24B6465-004	2024-07-09	M	19.5	8785			11.02		0.65	0.73	7.80	7.25	6.3		14.5	4370	13.4	782	763
WQR2-0.5	VA24B7867-004	2024-07-20	M	12.2	3037			10.33		1.02	0.72	7.30	7.13	2.0		15.4	1840	13.3	368	323
WQR2-0.5	L2757210-4	2024-08-26	M																	
WQR2-0.5	VA24C2208-004	2024-08-26	M	48.0						0.89	1.19		7.91				12600	3.4	2170	2060
WQR2-0.5	VA24C5557-001	2024-09-25	M	33.9	20732			9.51		0.79	0.77	6.30	7.67	16.6		12.8	7870	11.0	2570	2420
WQR2-0.5	L2757680-4	2024-10-06	M																	
WQR2-0.5	VA24C6685-004	2024-10-06	M	42.9	20198			9.75		1.46	1.70	7.80	7.73	16.3		12.4	10700	4.1	1870	1810
WQR2-0.5	VA24C7408-004	2024-10-13	M	64.5	18682			9.19		1.36	0.88	7.60	7.82	15.5		11.2	17500	2.3	3050	3070
WQR2-0.5	L2757830-2	2024-10-19	M																	
WQR2-0.5	VA24C8041-002	2024-10-19	M	33.9	11904			10.47		2.23	2.72	6.90	7.44			9.4	7880	47.4	1360	1350
WQR2-0.5	VA24C8159-004	2024-10-20	M	19.9	5852			10.95		2.69	2.87	7.30	7.34	4.5		10.9	4680	13.4	814	911
WQR2-0.5	L2757872-4	2024-10-22	M																	
WQR2-0.5	VA24C8330-004	2024-10-22	M	15.6	3405			11.19		2.65	2.58	7.40	7.18	2.7		8.4	2840	13.7	483	490
WQR2-0.5	L2757962-5	2024-10-29	M																	
WQR2-0.5	VA24C9185-005	2024-10-29	M	16.5	3611			10.63		2.73	7.91	7.30	7.25	2.9		8.3	2640	4.0	438	
WQR2-0.5	L2758003-1	2024-11-02	M																	
WQR2-0.5	VA24C9732-001	2024-11-02	M	44.6	11936			10.33		1.52	1.02	7.40	7.57	10.3		8.4	10900	2.2	1900	1940
WQR2-0.5	L2758142-6	2024-11-14	M																	
WQR2-0.5	VA24D0945-006	2024-11-14	M	23.3	4668			11.49		2.64	3.29	7.40	7.32	3.9		7.2	4100	7.1	706	636
WQR2-0.5	VA24D1069-006	2024-11-15	M	27.8	6666			11.22		2.54	2.56	6.80	7.45	5.7		7.2	5040	3.3	1010	907
WQR2-0.5	L2758203-6	2024-11-19	M																	
WQR2-0.5	VA24D1567-006	2024-11-19	M	40.8	11238			10.52		1.66	1.76	7.30	7.57	10.1		6.9	9730	<2.0	1660	1640
WQR2-0.5	L2758354-1	2024-12-06	M																	
WQR2-0.5	VA24D3008-001	2024-12-06	M	55.2	13471			11.10		1.00	1.11	7.50	7.84	12.6		5.9	12300	<2.0	2460	2350
WQR2-0.5	L2758634-7	2025-01-09	M																	
WQR2-0.5	VA25A0510-007	2025-01-09	M	85.2	24475			9.73		1.00	0.98	7.60	7.86	23.4		7.0	24700	<2.0	4680	4350
WQR2-0.5	L2759010-7	2025-02-18	M																	
WQR2-0.5	VA25A3415-007	2025-02-18	M	90.1	24844			10.61		0.71	0.97	7.88	7.88	23.9		6.8	29900	<2.0	4180	4420
WQR2-0.5	L2759209-7	2025-03-12	M																	
WQR2-0.5	VA25A5429-007	2025-03-12	M	30.6	8006			12.28		1.56	2.38	7.38	7.56	7.2		5.7	5040	<2.0	918	918
WQR2-0.5	VA25A6528-016	2025-03-25	M	55.1	15756			11.54		1.87	2.29	8.19	7.96	14.4		7.1	13500	2.0	2320	1960
WQR2-0.5	VA25A8147-004	2025-04-11	M	26.7	5810			11.68		1.88	2.11	7.76	7.47	4.9		7.1	4660	<2.0	973	740
WQR2-0.5	VA25A8148-004	2025-04-11	M																	
WQR2-0.5	VA25A8280-007	2025-04-13	M	23.1	5392			11.65		2.04	2.11	7.83	7.43	4.4		7.9	4120	<2.0	698	638
WQR2-0.5	VA25A8282-007	2025-04-13	M																	
WQR2-0.5	VA25A8854-007	2025-04-21	M	17.5	2269			12.30		1.64	1.82	8.07	7.36	1.8		7.7	2020	<2.0	324	343
WQR2-0.5	VA25A8855-007	2025-04-21	M																	
WQR2-0.5	VA25B0359-012	2025-05-06	M	36.7	9095			11.27		1.64	1.84	8.01	7.71	7.0		11.6	6120	3.0	1730	893
WQR2-0.5	VA25B0360-012	2025-05-06	M																	
WQR2-0.5	VA25B0499-007	2025-05-07	M	31.6	10579			11.44		1.34	1.38	8.10	7.55	8.5		10.7	5080	3.0	1240	911
WQR2-0.5	VA25B0502-007	2025-05-07	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR2-0.5	VA25B2349-006	2025-05-27	M	17.6	5830	7671		11.03		1.37	1.43	7.92	7.43	4.3		12.4	3010	5.7	622	644
WQR2-1	0051710-11	2020-05-20	M		31883			6.69	9.8			7.48	7.68	29.9		8.6		2.4	6130	
WQR2-1	0062209-12	2020-06-22	M		32174			6.47	9.0			7.38	7.64	29.9		8.9		<2.0	5760	
WQR2-1	0071996-11	2020-07-21	M		45807			6.62	10.0			7.42	7.61	29.5		9.4		2.4	5680	
WQR2-1	0082292-11	2020-08-24	M		33071			6.06	9.4			7.56	7.64	30.2		9.7		<2.0	5600	
WQR2-1	0093017-11	2020-09-28	M		31970			7.05	9.3			7.46	7.58			10.1		4	5080	
WQR2-1	20J1961-11	2020-10-20	M		32202			5.21	9.6			7.50	7.64	29.2		9.8		2.4	6030	
WQR2-1	20J2778-11	2020-10-27	M		32154			5.95	9.8			7.63	7.60	29.4		9.5		2	5560	
WQR2-1	20K0360-11	2020-11-03	M		32393			5.06	9.6			7.54	7.65	29.5		9.6		2.6	10200	
WQR2-1	20K1261-11	2020-11-10	M		32742			4.90	9.9			7.45	7.50	30.0		9.6		4.8	5600	
WQR2-1	20K2100-11	2020-11-18	M						9.0				7.52					2.2	5860	
WQR2-1	20L1589-11	2020-12-14	M		32406			4.88	8.5				7.44	29.5		9.7		2	6060	
WQR2-1	21A2590-11	2021-01-27	M		31223			6.65	9.9			7.68	7.55	29.1		8.8		3.2	5470	
WQR2-1	21B2778-11	2021-02-25	M						10.2				7.57					4	5360	
WQR2-1	21C3505-12	2021-03-25	M			45576		7.10	9.6			7.67	7.55			8.3		3.6	6190	
WQR2-1	21D2478-11	2021-04-22	M		31111	45607		6.70	10.5			7.53	7.54	29.3		8.4		8.6	5940	
WQR2-1	21E1990-11	2021-05-18	M		31573	46049		6.24	10.8			7.37	7.71	29.6		8.5		<2.0	5950	
WQR2-1	21E2917-11	2021-05-26	M		31630	46010		6.27	9.7			7.42	7.47	29.6		8.6		4.7	6170	
WQR2-1	21F0167-11	2021-06-01	M		31947	46591		5.58	10.7			7.44	7.47	30.0		8.5		2.2	5330	
WQR2-1	21F1056-11	2021-06-08	M		32045	46774		5.43	10.2			7.42	7.41	30.1		8.5		7.6	5750	
WQR2-1	21F2014-11	2021-06-15	M		31680	46209		5.65	10.0			7.49	7.40	29.7		8.5		<2.0	5800	
WQR2-1	21G2414-11	2021-07-20	M		26707	35162		7.89	9.6			7.68	7.51	22.1		12.4		3.4	5240	
WQR2-1	21H3040-11	2021-08-25	M			45303			10.3			7.63	7.65			10.0		<2.0	5320	
WQR2-1	21I3814-11	2021-09-28	M			33947		5.68	9.1				7.59	31.3		9.5		4	5660	
WQR2-1	21J3514-11	2021-10-26	M		31776	43564		5.37	9.0			7.29	7.54	28.0		10.8		3.8	5210	
WQR2-1	21K3046-11	2021-11-23	M		31753	44644		6.53	9.6			7.51	7.44	28.7		9.9		6.4	5840	
WQR2-1	21L2125-11	2021-12-14	M		32228	45556		7.67	11.0			7.58	7.47	29.3		9.7		<2.0	5640	
WQR2-1	22A2312-11	2022-01-20	M		31135	45367		7.30	10.6			7.60	7.25	29.1		8.6		4.2	5510	
WQR2-1	22B2487-11	2022-02-17	M		29699	43502		7.60	10.6			7.70	7.74	27.8		8.4		3	5610	
WQR2-1	22C3145-11	2022-03-22	M		31223	45583		7.30	10.1			7.50	7.63	29.3		8.5		18.1	5640	
WQR2-1	22D2212-14	2022-04-20	M		31018	45823		5.50	10.9			7.40	7.48	29.2		8.3		23.5	5860	
WQR2-1	22E2480-11	2022-05-17	M		29897	43311		7.40	7.8				7.63	27.7		8.8		11.6	5350	
WQR2-1	22F3212-11	2022-06-21	M		30613	44234		6.30	10.7			7.36	7.66	28.3		8.9		38	5200	
WQR2-1	22G1763-11	2022-07-13	M		31308	44954		6.41	9.4			7.60	7.73	28.9		9.1		13.6	5680	5600
WQR2-1	22H2453-11	2022-08-16	M		31398	44718		6.12	9.8			7.61	7.70	28.7		9.4		4.4	5280	5670
WQR2-1	22I1926-11	2022-09-14	M		31582	44464		5.98	10.6			7.58	7.79	28.6		9.8		14.0	5280	5290
WQR2-1	22J1560-11	2022-10-12	M		31825	45698		5.33	9.2			7.51	7.67	29.4		9.1		10.0	5900	5390
WQR2-1	22K1453-11	2022-11-10	M		32490	46739		4.09	10.3			7.41	7.35	30.1		9.0		18.8	6530	6290
WQR2-1	22K2628-03	2022-11-22	M						7.4				7.49					10.7	5260	5990
WQR2-1	22K2988-03	2022-11-24	M						8.9				7.46					9.2	6080	6700
WQR2-1	22K3123-03	2022-11-25	M						9.2				7.53					10.4	5320	6340
WQR2-1	22L0036-03	2022-11-30	M						9.4				7.39					17.8	5390	5750
WQR2-1	22L0263-03	2022-12-02	M						9.6				7.66					12.4	5160	5340
WQR2-1	22L0499-03	2022-12-05	M						8.4				7.49					5.2	6130	6200
WQR2-1	22L0633-03	2022-12-06	M						8.9				7.33					10.8	5420	5460
WQR2-1	22L0774-11	2022-12-07	M		32585	46399		2.44	9.2			7.37	7.63	29.9		9.4		7.0	5720	6110
WQR2-1	22L1436-03	2022-12-13	M						9.0				7.41					14.4	5760	6110
WQR2-1	23A2847-11	2023-01-27	M					8.59	10.7			7.33	7.56			7.9		11.6	5760	6020
WQR2-1	23C0060-11	2023-02-28	M		28952	43723		8.03	10.5			7.69	7.71	27.9		7.3		32.0	6180	6410
WQR2-1	23C1797-11	2023-03-15	M		30620	46056		7.47	10.6			7.63	7.70	29.5		7.5		25.6	5530	5850
WQR2-1	23D2945-11	2023-04-26	M		31500	46741	43400	6.36				7.48	7.59	30.0		7.9		8.3	5380	5910
WQR2-1	23E2392-11	2023-05-17	M		30011	42833	39500	9.05				7.86	7.72	27.4		9.3		100	5630	5700
WQR2-1	23F3614-11	2023-06-27	M		31354	45688	43000	7.02				7.65	7.72	29.3		8.6		43.0	5640	6300
WQR2-1	23G2415-11	2023-07-19	M		31466	45723	42100	6.77				7.65	7.73	29.4		8.7		9.3	5690	5650
WQR2-1	23H3309-11	2023-08-24	M		32237	44878	42300	6.55				7.55	7.81			10.3		38.0	5310	5450

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR2-1	23I2271-13	2023-09-19	M		31804	45893	43600	6.48				7.53	7.75	29.5		8.9		14.0	5730	4880
WQR2-1	23J2236-13	2023-10-18	M		32083	46059	41800	5.92				7.67	7.59	29.6		9.1		20.8	4880	5550
WQR2-1	23K1909-11	2023-11-15	M	111	33145	46824	43800	5.75				7.50	7.63	30.2		9.7		2.8	6080	6120
WQR2-1	23L2091-09	2023-12-15	M	117	33953	47768	42100	5.01				7.69	7.50	30.9		9.9		7.6	6120	5740
WQR2-1	L2754383-7	2024-01-25	M																	
WQR2-1	VA24A1507-009	2024-01-25	M	106	31555	45925		7.38				7.50	7.76	29.5		8.6	31300	<2.0	5920	5690
WQR2-1	L2754604-7	2024-02-14	M																	
WQR2-1	VA24A2995-009	2024-02-14	M	105	30912	45263		7.86				7.71	7.92	29.0		8.4	33900	<2.0	4810	4700
WQR2-1	L2755043-9	2024-03-21	M																	
WQR2-1	VA24A6026-009	2024-03-21	M	105	32802	47491	43500	7.12				7.55	7.97		31.0	8.8	37000	<2.0	5580	5650
WQR2-1	L2755490-7	2024-04-24	M																	
WQR2-1	VA24A8916-009	2024-04-24	M	108	65890	95880	45400	5.82				7.55	7.90		30.7	8.6	31700	2.3	6580	5660
WQR2-1	L2755567-7	2024-05-01	M																	
WQR2-1	VA24A9566-009	2024-05-01	M	105	20741	30180	45900	8.01				8.01	7.72	18.6	29.8	8.6	34300	<2.0	6010	6040
WQR2-1	L2755666-7	2024-05-08	M																	
WQR2-1	VA24B0201-009	2024-05-08	M	107	21730	31584	45500	8.86				7.47	8.01	19.6	30.5	8.7	31800	2.6	4870	4900
WQR2-1	L2755779-7	2024-05-15	M																	
WQR2-1	VA24B0901-009	2024-05-15	M	108	21661	31486	46100	7.60				7.43	8.02	19.5	30.1	8.7	33300	2.2	5360	5170
WQR2-1	L2755888-7	2024-05-22	M																	
WQR2-1	VA24B1500-009	2024-05-22	M	104	21540	31273	46200	6.24				7.43	7.89	19.4	29.3	8.7	32300	<2.0	5170	5640
WQR2-1	L2756312-7	2024-06-19	M																	
WQR2-1	VA24B4510-009	2024-06-19	M	105	31471	45785	45800	6.50				7.60	7.77	29.4	30.2	8.6	33900	2.5	5940	5700
WQR2-1	VA24B7397-009	2024-07-17	M	104	29552	42105	47100	6.24				7.64	7.92	26.9	31.0	9.4	32400	<2.0	5850	5500
WQR2-1	L2756689-7	2024-07-17	M																	
WQR2-1	L2757122-7	2024-08-21	M																	
WQR2-1	VA24C1337-009	2024-08-21	M	104	34788	49992	46000	5.45				7.49	7.84	32.4	30.1	9.1	33000	2.0	5360	5650
WQR2-1	VA24C4683-009	2024-09-18	M	105	33107	47087	44800	6.48				7.51	7.81	30.4	29.2	9.5	33100	6.9	5380	5060
WQR2-1	VA24C8569-009	2024-10-23	M	107	28844	41413	46400	7.09				7.57	7.91	26.4	30.3	9.1	33300	7.4	5500	5820
WQR2-1	L2757977-9	2024-10-30	M																	
WQR2-1	VA24C9414-009	2024-10-30	M	107	29461	42121	47200	5.30				7.47	7.79	26.9	30.7	9.3	36200	5.8	6000	5820
WQR2-1	VA24D0180-009	2024-11-06	M	106	29181	41839	45800	5.89				7.51	7.75	26.7	30.5	9.2	35600	<2.0	5990	5380
WQR2-1	VA24D0813-009	2024-11-13	M	110	28101	40129	45100	5.76				7.36	7.84	25.5	30.0	9.3	35900	3.9	5950	5860
WQR2-1	L2758221-7	2024-11-22	M																	
WQR2-1	VA24D1791-009	2024-11-22	M	105	32580	46548	45800	5.15				7.39	7.86	30.0	30.0	9.3	33500	<2.0	6230	5490
WQR2-1	L2758486-7	2024-12-18	M																	
WQR2-1	VA24D3937-009	2024-12-18	M	106	33000	46621	47400	5.80				7.53	7.90	30.1	30.3	9.7	32700	<2.0	4220	4480
WQR2-1	L2758770-7	2025-01-22	M																	
WQR2-1	VA25A1525-009	2025-01-22	M	106	31456	45123	45200	7.62					7.91	29.0	30.6	9.1	35400	16.5	5020	4400
WQR2-1	L2759008-7	2025-02-19	M																	
WQR2-1	VA25A3570-009	2025-02-19	M	106	24198	35817	45300	9.01				7.81	7.87	22.4	29.9	8.0	35700	<2.0	5660	6780
WQR2-1	VA25A6679-009	2025-03-26	M	110	30263	43625	45100	5.62				7.50	7.85	27.9	29.7	9.0	31500	<2.0	7200	7060
WQR2-1	VA25A9109-009	2025-04-23	M	105	29306	42892	45400	7.47				7.65	7.89	27.4	29.3	8.4	29800	4.2	5780	5450
WQR2-1	VA25A9941-009	2025-05-01	M	108	55278	80755	44200	6.01				7.72	7.92	55.6	29.0	8.5	33500	9.0	5670	6060
WQR2-1	VA25B0496-009	2025-05-07	M	106	30268	44041	45100	7.72				7.71	7.92	28.2	29.8	8.6	36600	<2.0	6550	6570
WQR2-1	VA25B1530-009	2025-05-16	M	107	28434	41331	46400	7.30				7.55	8.00	26.3	30.4	8.7	31500	<2.0	5680	5700
WQR2-1	VA25B1841-009	2025-05-21	M	106	58567	85215	45700	5.77				7.64	7.78	59.2	30.3	8.6	32500	<2.0	5930	6610
WQR2-2	0051710-12	2020-05-20	M		5435			9.25	10.8			8.18	7.88	4.2		10.1		4.2	1780	
WQR2-2	0062209-11	2020-06-22	M		9504			10.28	9.3			7.75	7.06	7.5		11.1		14.6	569	
WQR2-2	0071996-12	2020-07-21	M		4495			9.48	10.0			8.40	7.15	2.4		13.6		13.8	407	
WQR2-2	0082292-12	2020-08-24	M		25267			8.47	9.7			7.75	7.90	19.7		14.5		4.6	2990	
WQR2-2	0093017-12	2020-09-28	M		5725			10.62	9.5			7.89	7.39			12.3		8	710	
WQR2-2	20J1961-12	2020-10-20	M		5872			10.94	9.7			7.91	7.35	4.6		9.8		<2.0	923	
WQR2-2	20J2778-12	2020-10-27	M		19340			9.65	10.4			7.89	7.68	17.6		7.9		<2.0	2850	
WQR2-2	20K0360-12	2020-11-03	M		14322			10.63	9.8			7.67	7.50	12.6		8.1		2.6	1330	
WQR2-2	20K1261-12	2020-11-10	M		15247			9.60	10.0			7.70	7.53	14.3		6.2		3.2	3060	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR2-2	20K2100-12	2020-11-18	M						9.7				7.13					11	1320	
WQR2-2	20L1589-12	2020-12-14	M		21438			9.20	10.7				7.57	20.4		6.7		2.2	3300	
WQR2-2	21A2590-12	2021-01-27	M		26325			8.97	9.9			7.76	7.56	25.3		7.0		4	4930	
WQR2-2	21B2778-12	2021-02-25	M						10.7				7.59					3.8	4590	
WQR2-2	21C3505-13	2021-03-25	M			31828		13.27	11.4			8.56	8.27			8.3		2.6	3700	
WQR2-2	21D2478-12	2021-04-22	M		8309	11954		13.76	11.3			8.57	7.75	6.8		9.0		4.2	1120	
WQR2-2	21E1990-12	2021-05-18	M		2014	2895		11.88	10.9			7.31	7.34	1.5		9.1		10.8	225	
WQR2-2	21E2917-12	2021-05-26	M		4993	6825		8.19	9.9			7.94	7.50	3.8		10.9		5.3	724	
WQR2-2	21F0167-12	2021-06-01	M		13214	18116		10.53	10.9			8.03	7.32	10.7		10.8		4.2	975	
WQR2-2	21F1056-12	2021-06-08	M		1282	1805		11.58	10.6			6.43	7.08	0.9		9.9		4.6	294	
WQR2-2	21F2014-12	2021-06-15	M		2623	3766		11.48	10.4			8.20	7.10	2.0		9.1		21.5	392	
WQR2-2	21G2414-12	2021-07-20	M		6679	8187		8.72	9.8			7.96	7.33	4.6		15.4		7.8	446	
WQR2-2	21H3040-12	2021-08-25	M			10844			10.3			8.26	7.56			14.8		6.4	1080	
WQR2-2	21I3814-12	2021-09-28	M			15908		9.27	9.5				7.70	12.6		12.3		10.4	1630	
WQR2-2	21J3514-12	2021-10-26	M		8063	11826		10.46	9.8			7.35	7.37	6.7		8.3		9.2	1440	
WQR2-2	21K3046-12	2021-11-23	M		19246	28928		9.62	9.6			7.62	7.44	17.7		7.5		4	2470	
WQR2-2	21L2125-12	2021-12-14	M		24711	37114		8.57	11.3			7.71	7.52	23.3		7.5		2	4250	
WQR2-2	22A2312-12	2022-01-20	M		26303	40581		9.60	10.6			7.74	7.33	25.6		6.6		4.8	4880	
WQR2-2	22B2487-12	2022-02-17	M		25824	38901		10.90	10.9			8.10	7.83	24.5		7.4		5.2	4810	
WQR2-2	22C3145-12	2022-03-22	M		26727	40022		13.30	12.8			8.30	8.04	25.3		7.6		9.7	4800	
WQR2-2	22D2212-15	2022-04-20	M		23865	34995		11.70	12.0			8.30	8.18	21.9		8.3		14.1	3960	
WQR2-2	22E2480-12	2022-05-17	M		7447	10704		11.50	9.9				7.65	6.1		9.1		7.2	1180	
WQR2-2	22F3212-12	2022-06-21	M		4519	6331		10.69	10.3			8.14	7.54	3.5		10.0		6.8	343	
WQR2-2	22G1763-12	2022-07-13	M		4660	6031		10.76	9.2			7.73	7.39	3.3		13.1		16.4	507	514
WQR2-2	22H2453-12	2022-08-16	M		4638	5696		10.10	10.2			7.89	7.44	3.1		15.3		9.1	432	472
WQR2-2	22I1926-12	2022-09-14	M		26090	33378		9.46	11.3			8.03	8.14	20.9		13.6		8.8	3480	3490
WQR2-2	22J1560-12	2022-10-12	M		30717	40220		9.68	9.8			8.03	7.96	25.7		12.6		6.0	3050	3230
WQR2-2	22K1453-12	2022-11-10	M		29269	30591		7.32	10.5			7.56	7.49	27.9		7.7		16.0	5760	5410
WQR2-2	22K2628-04	2022-11-22	M						8.6				7.58					14.0	5050	5620
WQR2-2	22K2988-04	2022-11-24	M						9.4				7.47					4.0	4380	4850
WQR2-2	22K3123-04	2022-11-25	M						9.6				7.62					7.6	5130	5880
WQR2-2	22L0036-04	2022-11-30	M						9.5				7.53					10.0	4560	5000
WQR2-2	22L0263-04	2022-12-02	M						9.9				7.68					11.6	5800	5350
WQR2-2	22L0499-04	2022-12-05	M						9.2				7.50					9.6	4770	5380
WQR2-2	22L0633-04	2022-12-06	M						9.1				7.39					11.6	4320	4410
WQR2-2	22L0774-12	2022-12-07	M		28389	42624		6.19	9.2			7.54	7.66	27.1		7.5		7.0	5240	5180
WQR2-2	22L1436-04	2022-12-13	M						10.0				7.43					20.0	5030	5260
WQR2-2	23A2847-12	2023-01-27	M					9.05	10.9			7.37	7.54			6.4		7.6	4200	4310
WQR2-2	23C0060-12	2023-02-28	M		24275	38679		9.79	10.5			7.79	7.70	24.2		5.5		18.8	5330	5550
WQR2-2	23C1797-12	2023-03-15	M		27553	42052		10.43	10.4			7.94	7.78	26.7		6.9		22.8	4900	5130
WQR2-2	23D2945-12	2023-04-26	M		22872	31942	25300	10.59				8.34	7.64	19.9		10.1		12.7	3140	3520
WQR2-2	23E2392-12	2023-05-17	M		5983	8644	6470	11.36				7.90	6.48	4.8		8.9		43.0	729	762
WQR2-2	23F3614-12	2023-06-27	M		5259	6463	6280	9.79				8.03	7.36	3.6		15.2		15.0	623	683
WQR2-2	23G2415-12	2023-07-19	M		21797	25329	23600	9.25				8.19	7.83	15.5		17.7		10.0	3190	2960
WQR2-2	23H3309-12	2023-08-24	M		30463	37368	34200	9.55				7.97	7.78			15.3		<5.0	4230	4460
WQR2-2	23I2271-14	2023-09-19	M		23921	29379	22700	10.23				8.18	7.94	18.2		15.3		8.8	2720	2500
WQR2-2	23J2236-14	2023-10-18	M		13061	18242	11600	10.19				7.96	6.79	10.8		10.1		28.8	1250	1280
WQR2-2	23K1909-12	2023-11-15	M	85.9	26748	38241	33800	7.93				7.71	7.59	24.2		9.3		<2.0	4450	4520
WQR2-2	23L2091-10	2023-12-15	M	104	28069	41128	36600	6.68				7.78	7.51	26.1		8.4		2.6	5250	4830
WQR2-2	L2754383-8	2024-01-25	M																	
WQR2-2	VA24A1507-010	2024-01-25	M	98.4	28303	42577		8.39				7.54	7.77	27.1		7.4	29800	<2.0	5440	5250
WQR2-2	L2754604-8	2024-02-14	M																	
WQR2-2	VA24A2995-010	2024-02-14	M	91.4	26474	39976		8.45				7.77	7.91	25.3		7.3	27800	2.8	4160	4030
WQR2-2	L2755043-10	2024-03-21	M																	
WQR2-2	VA24A6026-010	2024-03-21	M	71.6	27325	39625	29300	12.90				8.39	7.93		20.0	8.8	22800	5.7	3560	3600

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR2-2	L2755490-8	2024-04-24	M																	
WQR2-2	VA24A8916-010	2024-04-24	M	83.2	52689	71742	33600	10.81				8.55	8.08		22.0	11.1	22500	4.5	4280	4080
WQR2-2	L2755567-8	2024-05-01	M																	
WQR2-2	VA24A9566-010	2024-05-01	M	80.2	17249	23317	34600	12.16				8.40	8.23	14.1	21.8	11.4	24800	<2.0	4350	4310
WQR2-2	L2755666-8	2024-05-08	M																	
WQR2-2	VA24B0201-010	2024-05-08	M	54.2	10234	14033	20600	10.56				8.29	7.89	8.1	12.7	10.8	13500	3.2	2060	2110
WQR2-2	L2755779-8	2024-05-15	M																	
WQR2-2	VA24B0901-010	2024-05-15	M	71.8	13209	25384	29900	10.71				8.18	7.96	15.5	18.6	11.6	20000	4.6	3220	3040
WQR2-2	L2755888-8	2024-05-22	M																	
WQR2-2	VA24B1500-010	2024-05-22	M	45.1	7185	9555	18200	10.08				8.28	7.86	5.4	10.5	12.0	11900	4.2	1950	2030
WQR2-2	L2756312-8	2024-06-19	M																	
WQR2-2	VA24B4510-010	2024-06-19	M	72.3	22550	28362	29400	9.60				8.30	7.98	17.5	18.6	14.5	21000	4.4	3350	3690
WQR2-2	VA24B7397-010	2024-07-17	M	33.2	11629	14206	13700	9.40				8.22	7.61	8.3	8.0	15.5	8240	11.8	1480	1340
WQR2-2	L2756689-8	2024-07-17	M																	
WQR2-2	L2757122-8	2024-08-21	M																	
WQR2-2	VA24C1337-010	2024-08-21	M	31.4	9276	11257	10900	9.52				8.29	7.68	6.4	6.2	15.8	7320	8.5	1230	1290
WQR2-2	VA24C4683-010	2024-09-18	M	36.8	9728	12582	13400	9.73				8.11	7.69	7.3	7.8	13.1	8760	7.1	1630	1550
WQR2-2	VA24C8569-010	2024-10-23	M	57.7	22156	30243	23400	8.07				7.82	7.82	18.7	14.2	11.0	16000	10.3	2650	2770
WQR2-2	L2757977-10	2024-10-30	M																	
WQR2-2	VA24C9414-010	2024-10-30	M	64.8	22756	31239	26600	7.54				7.77	7.79	19.4	16.3	10.8	19200	4.4	3230	3050
WQR2-2	VA24D0180-010	2024-11-06	M	63.2	25944	35507	25300	6.74				7.70	7.74	22.3	15.8	10.9	17600	2.3	2990	2820
WQR2-2	VA24D0813-010	2024-11-13	M	51.8	18495	26361	20100	8.59				7.65	7.74	16.1	12.3	9.4	13900	3.1	2430	2320
WQR2-2	L2758221-8	2024-11-22	M																	
WQR2-2	VA24D1791-010	2024-11-22	M	87.8	23248	34195	37000	7.70				7.58	7.86	21.3	23.6	8.2	26800	<2.0	4940	4600
WQR2-2	L2758486-8	2024-12-18	M																	
WQR2-2	VA24D3937-010	2024-12-18	M	75.8	31124	44405	32900	5.66				7.54	7.87	28.5	20.2	9.3	21900	<2.0	2890	3280
WQR2-2	L2758770-8	2025-01-22	M																	
WQR2-2	VA25A1525-010	2025-01-22	M	90.1	24613	38251	37700	8.72					7.89	24.0	25.0	6.3	26700	<2.0	3880	3350
WQR2-2	L2759008-8	2025-02-19	M																	
WQR2-2	VA25A3570-010	2025-02-19	M	85.1	18339	28399	34900	10.60				8.06	7.92	17.3	22.4	6.5	22700	4.9	4200	4910
WQR2-2	VA25A6679-010	2025-03-26	M	86.4	22713	34410	35000	10.03				8.07	8.00	21.4	22.4	7.2	23400	3.3	5080	5000
WQR2-2	VA25A9109-010	2025-04-23	M	88.5	26146	36206	37100	13.80				8.44	8.17	22.8	23.4	10.5	24800	<2.0	4420	4280
WQR2-2	VA25A9941-010	2025-05-01	M	44.7	29376	39478	17000	10.98				8.45	7.77	25.1	10.1	11.6	8830	4.4	1860	2010
WQR2-2	VA25B0496-010	2025-05-07	M	79.1	18775	25068	32300	10.02				8.32	7.99	15.3	20.6	11.9	25000	<2.0	4350	4360
WQR2-2	VA25B1530-010	2025-05-16	M	30.8	12986	16702	10100	10.30				8.20	7.63	9.9	5.7	13.4	6130	<2.0	996	957
WQR2-2	VA25B1841-010	2025-05-21	M	58.4	19083	25294	23400	10.25				8.41	7.97	15.5	14.0	12.1	15100	<2.0	2980	3010
WQR2-2m	L2755545-11	2024-04-30	M																	
WQR2-2m	VA24A9402-011	2024-04-30	M	63.3	8240			13.10		1.57	1.46	8.62	8.09	7.2		9.1	16900	<2.0	3300	4710
WQR2-2m	L2755648-2	2024-05-08	M																	
WQR2-2m	VA24B0178-002	2024-05-08	M	32.1	7622			12.32		1.74	1.40	8.43	7.46	6.3		10.2	6800	2.1	1060	1130
WQR2-2m	L2755934-11	2024-05-24	M																	
WQR2-2m	VA24B1783-011	2024-05-24	M	28.5						1.78	1.39		7.60				5390	2.9	941	949
WQR2-2m	VA24B3452-011	2024-06-10	M	30.6	7740			10.75		1.22	1.30	7.70	7.71	4.3		13.6	5640	9.0	1340	1280
WQR2-2m	659-454600000-0	2024-06-17	M		17246			10.42				8.10		10.2		13.2				
WQR2-2m	VA24B5882-011	2024-07-03	M		1280			10.62				7.10	7.24	0.8		14.0	665	19.7	168	
WQR2-2m	VA24B6465-005	2024-07-09	M	38.8	15886			11.05		0.69	0.85	8.00	7.55	12.0		14.2	10100	10.8	1800	1040
WQR2-2m	VA24B7867-005	2024-07-20	M	12.3	16466			10.24		0.56	0.57	7.70	7.18	12.5		15.6	1710	17.1	347	295
WQR2-2m	L2757210-5	2024-08-26	M																	
WQR2-2m	VA24C2208-005	2024-08-26	M	17.0						0.99	0.87	6.70	7.39				3140	4.3	489	529
WQR2-2m	VA24C5557-002	2024-09-25	M	93.0	28854			9.01		1.08	1.07	7.70	7.91	23.6		13.2	27300	5.7	4790	4470
WQR2-2m	L2757680-5	2024-10-06	M																	
WQR2-2m	VA24C6685-005	2024-10-06	M	86.5	31962			8.03		1.39	1.16	7.60	7.94	26.8		12.7	25900	5.3	4380	2360
WQR2-2m	VA24C7408-005	2024-10-13	M	75.4	31822			6.66		1.03	0.96	7.60	7.88	27.5		11.6	22000	<2.0	3740	3520
WQR2-2m	L2757872-5	2024-10-22	M																	
WQR2-2m	VA24C8330-005	2024-10-22	M	27.2	27343			8.50		2.74	2.30	7.80	7.34	23.3		11.5	5640	12.0	1060	1340
WQR2-2m	VA24C9185-006	2024-10-29	M	59.9	19794			9.40		1.88	2.06	7.50	7.73	17.0		10.1	16700	6.2	1370	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR2-2m	L2757962-6	2024-10-29	M																	
WQR2-2m	L2758003-2	2024-11-02	M																	
WQR2-2m	VA24C9732-002	2024-11-02	M	51.5	21112			9.28		1.55	1.68	7.50	7.64	18.3		9.9	13400	<2.0	2290	2560
WQR2-2m	L2758354-2	2024-12-06	M																	
WQR2-2m	VA24D3008-002	2024-12-06	M	71.5	28818			8.24		0.82	1.22	7.50	7.93	27.0		8.2	18800	<2.0	3100	4950
WQR2-2m	L2758634-8	2025-01-09	M																	
WQR2-2m	VA25A0510-008	2025-01-09	M	88.7	27135			9.10		0.98	0.95	7.60	7.86	25.9		7.4	26100	<2.0	4870	4520
WQR2-2m	L2759010-8	2025-02-18	M																	
WQR2-2m	VA25A3415-008	2025-02-18	M	100	27848			10.50		0.76	0.95	7.90	7.91	26.9		7.1	34000	3.5	4990	5170
WQR2-2m	L2759209-8	2025-03-12	M																	
WQR2-2m	VA25A5429-008	2025-03-12	M	90.6	25334			11.74		1.41	1.93	7.78	8.15	24.0		7.4	25900	7.4	4490	3480
WQR2-2m	VA25A6528-017	2025-03-25	M		26035			12.45				8.19	8.10	24.5		7.7	25200	3.5		
WQR2-2m	VA25A8147-005	2025-04-11	M	43.9	16309			11.29		1.94	1.94	8.19	7.83	14.3		8.4	9820	<2.0	1700	1170
WQR2-2m	VA25A8148-005	2025-04-11	M																	
WQR2-2m	VA25A8280-008	2025-04-13	M	30.3	7981			11.71		1.88	1.97	7.84	7.56	6.7		8.2	5780	<2.0	1030	908
WQR2-2m	VA25A8282-008	2025-04-13	M																	
WQR2-2m	VA25A8854-008	2025-04-21	M	40.1	20789			11.39		1.66	1.81	8.29	7.91	17.4		11.2	8540	2.3	1410	309
WQR2-2m	VA25A8855-008	2025-04-21	M																	
WQR2-2m	VA25B0359-011	2025-05-06	M	53.1	26382			10.79		1.65	1.80	8.13	7.91	22.2		11.8	15300	6.0	2630	3400
WQR2-2m	VA25B0360-011	2025-05-06	M																	
WQR2-2m	VA25B0499-008	2025-05-07	M	53.2	12582			11.48		1.45	1.56	8.14	7.80	10.1		11.0	14100	<2.0	2610	2280
WQR2-2m	VA25B0502-008	2025-05-07	M																	
WQR2-3	23L2091-11	2023-12-15	M	87.7	23151	34942	31500	8.42				7.79	7.41	21.8		7.3		11.0	4320	4200
WQR2-3	L2754383-9	2024-01-25	M																	
WQR2-3	VA24A1507-011	2024-01-25	M	96.6	14040	22455		10.89				7.52	7.77	13.4		5.4	28800	<2.0	5240	5200
WQR2-3	L2754604-9	2024-02-14	M																	
WQR2-3	VA24A2995-011	2024-02-14	M	82.3	23450	36006		9.41				7.79	7.87	22.5		6.7	24900	<2.0	3640	3510
WQR2-3	L2755043-11	2024-03-21	M																	
WQR2-3	VA24A6026-011	2024-03-21	M	37.6	8344	12640	12900	12.88				8.14	7.72		8.2	7.2	8360	2.4	1450	1410
WQR2-3	L2755490-9	2024-04-24	M																	
WQR2-3	VA24A8916-011	2024-04-24	M	45.3	25410	35543	15400	11.52				8.55	7.61		9.4	10.1	9320	<2.0	1800	1660
WQR2-3	L2755567-9	2024-05-01	M																	
WQR2-3	VA24A9566-011	2024-05-01	M	32.8	5813	7945	11500	12.94				8.41	7.68	4.4	6.6	11.0	7240	<2.0	1330	1320
WQR2-3	L2755666-9	2024-05-08	M																	
WQR2-3	VA24B0201-011	2024-05-08	M	45.5	7134	9808	17200	11.02				8.26	7.82	5.5	10.5	10.7	11600	3.0	1700	1690
WQR2-3	L2755779-9	2024-05-15	M																	
WQR2-3	VA24B0901-011	2024-05-15	M	17.9	6905	9419	5420	11.66				8.19	7.45	5.3	2.9	11.0	3260	5.4	548	519
WQR2-3	L2755888-9	2024-05-22	M																	
WQR2-3	VA24B1500-011	2024-05-22	M	28.3	5381	7225	8880	10.49				8.13	7.57	4.0	5.0	11.6	5340	4.0	869	942
WQR2-3	L2756312-9	2024-06-19	M																	
WQR2-3	VA24B4510-011	2024-06-19	M	18.1	5175	6417	4710	10.80				8.00	7.36	3.7	2.6	12.8	2830	6.7	507	554
WQR2-3	VA24B7397-011	2024-07-17	M	15.9	2024	2379	5190	10.13				7.93	7.37	1.2	2.8	17.2	3160	14.1	542	566
WQR2-3	L2756689-9	2024-07-17	M																	
WQR2-3	L2757122-9	2024-08-21	M																	
WQR2-3	VA24C1337-011	2024-08-21	M	26.6	7169	8864	8670	10.14				8.11	7.61	5.0	4.9	15.0	5580	7.9	947	982
WQR2-3	VA24C4683-011	2024-09-18	M	30.5	8444	10934	10700	10.58				8.02	7.58	6.2	6.1	13.1	6390	9.4	1260	1240
WQR2-3	VA24C8569-011	2024-10-23	M	31.1	13370	18975	10600	8.99				7.95	7.56	11.3	6.0	9.5	6660	13.5	1120	1180
WQR2-3	VA24C9414-011	2024-10-30	M	29.5	6565	9566	9560	9.69				7.98	7.51	5.4	5.4	8.6	6040	4.8	1040	1030
WQR2-3	L2757977-11	2024-10-30	M																	
WQR2-3	VA24D0180-011	2024-11-06	M	51.2	11680	17149	19500	9.20				7.90	7.68	10.1	11.9	8.3	12800	<2.0	2210	2040
WQR2-3	L2758221-9	2024-11-22	M																	
WQR2-3	VA24D1791-011	2024-11-22	M	80.5	22905	33801	34700	8.59				7.60	7.85	21.1	22.0	8.1	23900	<2.0	4570	4160
WQR2-3	L2758486-9	2024-12-18	M																	
WQR2-3	VA24D3937-011	2024-12-18	M	71.7	17146	26216	30600	7.64				7.67	7.84	15.9	18.6	6.9	20300	<2.0	2000	3200
WQR2-3	L2758770-9	2025-01-22	M																	
WQR2-3	VA25A1525-011	2025-01-22	M	90.0	23821	37329	37500	9.23					7.88	23.3	24.9	6.1	29400	5.4	3780	3370
WQR2-3	L2759008-9	2025-02-19	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Alkalinity	Conductivity-Field	Specific Conductance (SPC)-Field	Conductivity-Lab	Dissolved Oxygen (DO)-Field	Dissolved Oxygen (DO)-Lab	Dissolved Organic Carbon (DOC)	Total Organic Carbon (TOC)	pH-Field	pH-Lab	Salinity-Field	Salinity-Lab	Temperature-Field	Total Dissolved Solids (TDS)	Total Suspended Solids (TSS)	Total Hardness	Dissolved Hardness
				mg/L	uS/cm	uS/cm	µS/cm	mg/L	mg/L	mg/L	mg/L	pH units	pH units	ppt	ppt	°C	mg/L	mg/L	mg/L	mg/L
WQR2-3	VA25A3570-011	2025-02-19	M	86.4	17965	27899	35700	11.16				8.05	7.93	17.0	23.0	6.4	27200	4.7	4380	4880
WQR2-3	VA25A6679-011	2025-03-26	M	55.1	15059	23052	21800	11.47				8.10	7.87	13.8	13.3	6.9	14000	3.0	2900	2720
WQR2-3	VA25A9109-011	2025-04-23	M	32.9	7894	10869	10300	13.19				8.48	7.64	6.2	5.8	10.7	6330	<2.0	1040	1050
WQR2-3	VA25A9941-011	2025-05-01	M	26.7	10950	15343	8420	11.39				8.29	7.54	9.0	4.8	10.0	4890	<2.0	882	878
WQR2-3	VA25B0496-011	2025-05-07	M	34.2	12616	17030	11600	11.13				8.31	7.65	10.0	6.7	11.4	5770	2.2	1350	1330
WQR2-3	VA25B1530-011	2025-05-16	M	17.4	3818	5254	4760	11.10				8.41	7.44	2.8	2.6	10.7	2750	<2.0	424	423
WQR2-3	VA25B1841-011	2025-05-21	M	14.5	4960	6952	3000	11.29				8.51	7.32	3.8	1.5	10.0	1750	2.1	290	375
WQR2-SF	L2755545-12	2024-04-30	M																	
WQR2-SF	VA24A9402-012	2024-04-30	M	104	30966			7.31		1.18	1.07	7.81	7.91	21.7		8.8	29700	<2.0	5720	5820
WQR2-SF	L2755648-3	2024-05-08	M																	
WQR2-SF	VA24B0178-003	2024-05-08	M	101	30851			8.47		1.31	1.04	8.00	7.86	28.3		9.2	26800	<2.0	5530	5130
WQR2-SF	L2755934-12	2024-05-24	M																	
WQR2-SF	VA24B1783-012	2024-05-24	M	96.2						1.26	1.25		8.05				29800	4.4	4440	4900
WQR2-SF	VA24B3452-012	2024-06-10	M	83.8	46100			6.44		1.42	1.28	7.40	8.07	29.6		8.8	25600	4.9	4750	4750
WQR2-SF	660-454600000-0	2024-06-17	M		44103			9.01				7.47		28.3		10.2				
WQR2-SF	VA24B5882-012	2024-07-03	M		28112			8.54				8.00	7.89	22.8		13.4	25900	<2.1	4430	
WQR2-SF	VA24B6465-006	2024-07-09	M	96.0	31339			8.90		1.17	1.25	7.70	7.91	27.3		11.2	30400	2.6	5320	5840
WQR2-SF	VA24B7867-006	2024-07-20	M	64.2	31899			9.25		1.28	1.17	7.70	7.89	27.3		11.9	19500	4.7	5290	4990
WQR2-SF	L2757210-6	2024-08-26	M																	
WQR2-SF	VA24C2208-006	2024-08-26	M	98.2						1.68	1.13	7.70	7.87				28200	<2.0	5180	4670
WQR2-SF	VA24C5557-003	2024-09-25	M	104	32015			5.24		1.25	0.90	7.40	7.73	28.6		10.3	31600	7.0	5480	4980
WQR2-SF	L2757680-6	2024-10-06	M																	
WQR2-SF	VA24C6685-006	2024-10-06	M	105	31950			4.83		1.06	1.01	7.30	7.81	29.2		9.5	32400	<3.0	5590	5540
WQR2-SF	VA24C7408-006	2024-10-13	M	105	32573			4.59		0.88	0.81	7.40	7.89	30.1		9.1	31500	<2.0	5790	5310
WQR2-SF	L2757872-6	2024-10-22	M																	
WQR2-SF	VA24C8330-006	2024-10-22	M	87.2	32864			5.22		1.30	1.45	7.60	7.73	29.8		9.9	25600	5.0	4620	4700
WQR2-SF	VA24C9185-007	2024-10-29	M	85.4	32471			5.80		1.18	1.42	7.40	7.77	28.8		10.6	25700	3.6	4060	
WQR2-SF	L2757962-7	2024-10-29	M																	
WQR2-SF	L2758003-3	2024-11-02	M																	
WQR2-SF	VA24C9732-003	2024-11-02	M	75.4	30666			7.00		1.49	1.24	7.40	7.70	26.8		10.9	21100	<2.0	4390	4820
WQR2-SF	L2758354-3	2024-12-06	M																	
WQR2-SF	VA24D3008-003	2024-12-06	M	104	33667			5.33		0.85	0.91	7.40	8.01	30.8		9.7	31000	<2.0	5560	5580
WQR2-SF	L2758634-9	2025-01-09	M																	
WQR2-SF	VA25A0510-009	2025-01-09	M	104	31879			7.48		0.92	0.82	7.50	7.86	29.8		8.7	30500	<2.0	5480	5140
WQR2-SF	L2759010-9	2025-02-18	M																	
WQR2-SF	VA25A3415-009	2025-02-18	M	106	31389			7.69		0.51	1.25	7.66	7.81	29.8		8.1	35800	2.8	5470	5400
WQR2-SF	L2759209-9	2025-03-12	M																	
WQR2-SF	VA25A5429-009	2025-03-12	M	104	29076			10.27		1.08	1.50	7.59	7.82	28.0		7.6	31600	<2.0	5370	5480
WQR2-SF	VA25A6528-018	2025-03-25	M		31057			6.69				7.59	7.77	29.3		8.2	28500	2.6		
WQR2-SF	VA25A8147-006	2025-04-11	M	91.2	29930			10.19		1.41	1.57	7.93	8.08	28.0		8.5	26200	2.3	4300	4250
WQR2-SF	VA25A8148-006	2025-04-11	M																	
WQR2-SF	VA25A8280-009	2025-04-13	M	104	31604			6.54		1.13	1.07	7.55	7.84	29.9		8.3	30300	<2.0	5490	5060
WQR2-SF	VA25A8282-009	2025-04-13	M																	
WQR2-SF	VA25A8854-009	2025-04-21	M	105	31014			12.11		1.22	2.08	8.05	7.90	28.7		9.0	29600	3.2	4830	5120
WQR2-SF	VA25A8855-009	2025-04-21	M																	
WQR2-SF	VA25B0359-010	2025-05-06	M	97.0	32152			6.94		0.81	0.84	7.53	8.02	30.2		8.6	32100	<2.0	5870	5450
WQR2-SF	VA25B0360-010	2025-05-06	M																	
WQR2-SF	VA25B0499-009	2025-05-07	M	99.8	31102			9.82		1.30	1.24	7.72	7.96	28.6		9.2	27400	7.5	5450	4420
WQR2-SF	VA25B0502-009	2025-05-07	M																	

Notes:
Sample Class 'M' = monitoring sample.
'<' = result is below the indicated detection limit.

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	0051710-01	2020-05-20	M	0.32		<1.8	<0.050				<5.00			0.0115	<0.00040	0.00155	0.0102	<0.00020	<0.00020	3.47	0.000086	392	<0.00100	
WQ1-1	0062209-01	2020-06-22	M	0.60		1	<0.050				<1.00			0.0269	0.00046	0.0019	0.0106	<0.00020	<0.00020	4.42	0.000091	405	<0.00100	
WQ1-1	0071996-01	2020-07-21	M	0.66		<1	<0.050				<1.00			0.0368	<0.00040	0.00285	0.0118	<0.00020	<0.00020	4.08	0.000079	289	<0.00100	
WQ1-1	0082292-01	2020-08-24	M	0.49		5	<0.050				<1.00			0.0533	<0.00040	0.00203	0.011	<0.00020	<0.00020	3.87	0.000079	364	<0.00100	
WQ1-1	0093017-01	2020-09-28	M	0.77		11	<0.050				<1.00			1.1	<0.00040	0.00174	0.0115	<0.00020	<0.00020	4.25	0.000066	392	0.00226	
WQ1-1	20J1961-01	2020-10-20	M	0.51		<1.8	<0.050				<10.0			0.0637	<0.00040	0.00188	0.0127	<0.00020	<0.00020	4.18	0.000075	371	<0.00100	
WQ1-1	20J2778-01	2020-10-27	M	0.37		<1	<0.050				<1.00			0.0194	<0.00040	0.00183	0.012	<0.00020	<0.00020	3.76	0.000083	375	<0.00100	
WQ1-1	20K0360-01	2020-11-03	M	0.47		44	<0.050				<1.00			0.0403	<0.00040	0.00163	0.0118	<0.00020	0.00024	3.82	0.000103	340	<0.00100	
WQ1-1	20K1261-01	2020-11-10	M	0.10		<1	<0.050				<1.00			0.0259	<0.00040	0.00215	0.0132	<0.00020	<0.00020	4.1	0.000074	438	<0.00100	
WQ1-1	20K2100-01	2020-11-18	M			<1.8	<0.050				<1.00			0.0235	<0.00040	0.00257	0.0128	<0.00020	<0.00020	3.71	0.000051	398	<0.00100	
WQ1-1	20L1589-01	2020-12-14	M	-0.04		2	<0.050				<1.00			0.0447	<0.00040	0.0025	0.0128	<0.00020	<0.00020	3.9	0.000083	423	<0.00100	
WQ1-1	21A2590-01	2021-01-27	M	0.24		4	<0.050				<1.00			0.0187	<0.00040	0.00171	<0.0100	<0.00020	<0.00020	3.72	0.000081	371	<0.00100	
WQ1-1	21B2778-01	2021-02-25	M			<1.8	<0.050				<1.00			0.016	0.00045	0.0017	0.0114	<0.00020	<0.00020	4.29	0.000062	406	<0.00100	
WQ1-1	21C3505-01	2021-03-25	M	0.38		<1	<0.050				<1.00			0.0201	0.000554	0.00171	0.0122	<0.000100	<0.000100	4.58	0.0000995	370	<0.00100	
WQ1-1	21D2478-01	2021-04-22	M	0.11		<1	<0.050				<1.00			0.0173	<0.000500	0.00188	0.0115	<0.000100	<0.000100	4.48	0.000101	402	<0.00100	
WQ1-1	21E1990-01	2021-05-18	M	0.23		1	<0.050				<1.00			<0.0100	<0.00040	0.00177	0.0104	<0.00020	<0.00020	5.41	0.000066	406	<0.00100	
WQ1-1	21E2917-01	2021-05-26	M	0.17		1	<0.050				<1.00			0.0444	<0.000500	0.0014	0.00881	<0.000100	<0.000100	3.22	0.0000643	315	<0.00100	
WQ1-1	21F0167-01	2021-06-01	M	0.53		10	0.165				<1.00			0.0728	<0.000500	0.000873	0.0104	<0.000100	<0.000100	2.48	0.0000421	229	<0.00100	
WQ1-1	21F1056-01	2021-06-08	M	0.89		<1	0.094				<1.00			0.0342	<0.000500	0.00191	0.0163	<0.000100	<0.000100	4.85	0.0000828	418	<0.00100	
WQ1-1	21F2014-01	2021-06-15	M	1.89		<1	<0.050				<1.00			0.0285	<0.000500	0.00196	0.00991	<0.000100	<0.000100	4.01	0.0000845	362	<0.00100	
WQ1-1	21G2414-01	2021-07-20	M	0.96		2	<0.050				<1.00			0.0393	<0.000500	0.00171	0.0114	<0.000100	<0.000100	3.84	0.000086	337	<0.00100	
WQ1-1	21H3040-01	2021-08-25	M			1	<0.050				<1.00			0.0299	<0.000500	0.00151	0.0105	<0.000100	<0.000100	4	0.0000722	395	<0.00100	
WQ1-1	21I3814-01	2021-09-28	M	0.58		4	0.055				<1.00			0.0463	<0.000500	0.00146	0.0114	<0.000100	<0.000100	3.32	0.0000918	327	<0.00100	
WQ1-1	21J3514-01	2021-10-26	M	-0.46		<1	<0.050				<1.00			0.0422	0.00025	0.00131	0.0118	<0.00010	<0.00010	3.72	0.000088	329	<0.00050	
WQ1-1	21K3046-01	2021-11-23	M	0.73		2	<0.050				<1.00			<0.0100	<0.00040	0.00146	0.0104	<0.00020	<0.00020	3.5	0.000087	340	<0.00100	
WQ1-1	21L2125-01	2021-12-14	M	0.29		6	<0.050				<1.00			<0.0100	<0.00040	<0.00100	0.0118	<0.00020	<0.00020	1.99	0.000043	155	<0.00100	
WQ1-1	22A2312-01	2022-01-20	M	0.03		4.5	<0.050				<1.00			0.0147	0.00047	0.00247	<0.0100	<0.00020	<0.00020	4.62	0.000102	339	<0.00100	
WQ1-1	22B2487-01	2022-02-17	M	0.50		<1	<0.050	<25.0	14300	<25.0	<2.50	<2.50	2520	0.0247	<0.00040	0.00144	<0.0100	<0.00020	<0.00020	3.73	0.000087	334	<0.00100	
WQ1-1	22C3145-01	2022-03-22	M	0.31		<1	<0.050	60.5	15600	<25.0	<2.50	<2.50	2300	0.0156	<0.00040	0.00186	0.0116	<0.00020	<0.00020	3.81	0.000087	363	0.00304	
WQ1-1	22D2212-01	2022-04-19	M	0.79		<1	<0.050	64	15700	<50.0	<5.00	<5.00	2170	0.0181	<0.00040	0.00189	0.0134	<0.00020	<0.00020	5.27	0.000252	348	<0.00100	
WQ1-1	22E2480-03	2022-05-17	M	3.84		<1	<0.050	65.4	16600	<50.0	<5.00	<5.00	2270	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.7	<0.000100	354	<0.00500	
WQ1-1	22F3212-01	2022-06-21	M	-0.16		<1	<0.050	53	15700	<50.0	<5.00	<5.00	2150	0.0214	<0.000500	0.00186	0.0107	<0.000100	<0.000100	4.34	0.0000691	358	<0.00100	
WQ1-1	22G1763-01	2022-07-13	M	0.15		<1	<0.050	<50.0	11000	<50.0	<5.00	<5.00	1430	<0.0200	<0.000500	0.00170	0.00994	<0.000100	<0.000100	4.23	0.0000731	336	<0.00100	
WQ1-1	22H2453-01	2022-08-16	M	-0.13		<1	<0.050	72.5	19500	<50.0	8.65	<5.00	2950	0.0302	<0.000500	0.00153	0.0109	<0.000100	<0.000100	3.91	0.0000624	351	<0.00100	
WQ1-1	22I1926-01	2022-09-14	M	0.75		1	<0.050	51.5	15800	<10.0	<1.00	<1.00	2460	0.0221	<0.000500	0.00142	0.00949	<0.000100	<0.000100	3.80	0.0000706	303	<0.00100	
WQ1-1	22J1560-03	2022-10-12	M	0.20		1	<0.050	<100	17700	<100	<10.0	<10.0	2630	0.0209	<0.000500	0.00158	0.0108	<0.000100	<0.000100	4.03	0.0000759	336	<0.00100	
WQ1-1	22K1453-01	2022-11-10	M	0.34		<1	<0.050	37.1	16700	<25.0	0.412	<0.0050	2330	0.0266	<0.000500	0.00179	0.0125	<0.000100	<0.000100	4.69	0.0000824	354	<0.00100	
WQ1-1	22L0774-01	2022-12-07	M	0.25		<1	<0.050	<25.0	16500	<25.0	<2.50	<2.50	2330	0.0210	<0.000500	0.00197	0.0139	<0.000100	<0.000100	4.51	0.000105	377	<0.00100	
WQ1-1	23A2847-01	2023-01-27	M			1	<0.050	<100	16600	<100	0.374	<0.0050	2220	0.0215	<0.000500	0.00169	0.0101	0.000116	<0.000100	4.13	0.0000816	374	<0.00100	
WQ1-1	23C0060-01	2023-02-28	M	0.09		<1	<0.050	<100	16600	<100	<10.0	<10.0	2140	<0.0200	<0.000500	0.00169	0.00846	<0.000100	<0.000100	3.81	0.0000898	369	<0.00100	
WQ1-1	23C1797-01	2023-03-15	M	-0.53		<1	<0.050	<100	15000	<100	<10.0	<10.0	2160	0.0409	<0.000500	0.00176	0.00939	<0.000100	<0.000100	3.52	0.0000857	335	<0.00100	
WQ1-1	23D2945-01	2023-04-26	M	0.14	0.38	<1	<0.050	<100	15600	1.09	0.472	<0.0500	2090	<0.0200	<0.000500	0.00177	0.00959	<0.000100	<0.000100	3.65	0.0000839	349	<0.00100	
WQ1-1	23E2392-01	2023-05-17	M	5.76	0.74	<1	0.111	<100	15800	0.802	0.367	0.0980	2270	0.0288	<0.000500	0.00171	0.0110	<0.000100	<0.000100	3.65	0.0000761	384	<0.00100	
WQ1-1	23F3614-01	2023-06-27	M	0.81	0.66	<1	<0.050	<100	15600	1.14	0.505	<0.0500	2120	<0.0600	<0.000500	0.00197	0.00968	<0.000100	<0.000100	4.43	0.0000933	392	<0.00100	
WQ1-1	23G2415-01	2023-07-19	M	0.32	0.53	2	<0.050	<100	15600	1.12	<1.00	<0.500	2100	0.0292	<0.000500	0.00181	0.0105	<0.000100	<0.000100	4.14	0.0000985	377	<0.00100	
WQ1-1	23H3309-03	2023-08-24	M	0.22	0.53	1	<0.050	<100	14400	1.11	0.386	0.0084	1940	0.0233	<0.000500	0.00185	0.0104	<0.000100	<0.000100	4.14	0.0000725	368	<0.00100	
WQ1-1	23I2271-03	2023-09-19	M	0.48	0.80	<1	<0.050	<100	17500	1.12	0.445	<0.0500	2740	0.0465	<0.000500	0.00189	0.0108	<0.000100	<0.000100	4.51	0.0000895	372	<0.00100	
WQ1-1	23J2236-03	2023-10-18	M	0.24	0.55	<1	<0.050	<100	16600	1.11	0.418	<0.0500	2360	0.0363	<0.000500	0.00194	0.00988	<0.000100	<0.000100	3.76	0.0000927	388	<0.00100	
WQ1-1	23K1909-01	2023-11-15	M	0.01	1.17	<1.8	<0.050	<100	17500	1.33	0.430	<0.0500	2280	0.0343	<0.000500	0.00180	0.00932	<0.000100	<0.000100	4.54	0.000108	407	<0.00100	
WQ1-1	23L1905-04	2023-12-14	M	1.12	56.5	<1.8	<0.050	<100	15200	1.20	0.505	<0.0500	1940	2.85	<0.000500	0.00296	0.0380	<0.000100	<0.000100	3.9	0.000133	374	0.00254	
WQ1-1	L2754366-7	2024-01-24	M																					
WQ1-1	VA24A1422-007	2024-01-24	M	0.65	0.14	<10	<0.0050	58.3	16900	<1.0	<0.50	<0.10	2310	0.0188	<0.0010	0.00199	0.0088	<0.00050	<0.00050	3.75	0.000073	401	<0.00050	<0.0250
WQ1-1	L2754594-4	2024-02-13	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	VA24A2858-004	2024-02-13	M	0.00	0.91	<10	0.0112	34.1	9990	<1.0	<0.50	<0.10	1410	0.0568	<0.0010	0.00110	0.0105	<0.00050	<0.00050	2.11	0.000046	218	<0.00050	<0.00150
WQ1-1	L2755033-4	2024-03-20	M																					
WQ1-1	VA24A5955-004	2024-03-20	M	0.64	0.23	<10	<0.0050	57.4	16800	<1.0	<0.50	<0.10	2320	0.0275	<0.0010	0.00253	0.0098	<0.00050	<0.00050	3.85	0.000084	401	<0.00050	<0.00150
WQ1-1	L2755461-4	2024-04-23	M																					
WQ1-1	VA24A8736-004	2024-04-23	M	0.48	0.36	<10	0.0056	52.1	15200	<1.0	<0.50	<0.10	2100	0.0179	<0.0010	0.00272	0.0104	<0.00050	<0.00050	4.50	0.000081	414	<0.00050	<0.00150
WQ1-1	L2755553-4	2024-04-30	M																					
WQ1-1	VA24A9418-004	2024-04-30	M	0.16	0.47	<10	0.0135	56.9	16700	<1.0	<0.50	<0.10	2320	0.0100	<0.0010	0.00370	0.0106	<0.00050	<0.00050	4.03	0.000082	388	<0.00050	<0.00150
WQ1-1	L2755641-4	2024-05-07	M																					
WQ1-1	VA24B0040-004	2024-05-07	M	0.29	0.34	<10	<0.0050	58.9	17200	<1.0	<0.50	<0.10	3000	0.0148	<0.0010	0.00324	0.0095	<0.00050	<0.00050	4.24	0.000079	389	<0.00050	<0.00150
WQ1-1	L2755769-4	2024-05-14	M																					
WQ1-1	VA24B0738-004	2024-05-14	M	-0.01	0.12	<10	0.0072	56.6	17200	<1.0	<0.50	<0.10	2310	0.0121	<0.0010	0.00244	0.0095	<0.00050	<0.00050	3.72	0.000082	378	<0.00050	<0.00150
WQ1-1	L2755874-4	2024-05-21	M																					
WQ1-1	VA24B1351-004	2024-05-21	M	0.11	0.41	<10	<0.0050	55.7	16600	<1.0	<0.50	<0.10	2300	0.0231	<0.0010	0.00252	0.0105	<0.00050	<0.00050	3.80	0.000077	368	<0.00050	<0.00150
WQ1-1	L2756277-4	2024-06-18	M																					
WQ1-1	VA24B4257-004	2024-06-18	M	1.80	0.25	<10	<0.0050	59.8	16900	<1.0	0.53	<0.10	2250	0.0142	<0.0010	0.00376	0.0107	<0.00050	<0.00050	4.38	0.000080	383	<0.00050	<0.00150
WQ1-1	L2756678-4	2024-07-16	M																					
WQ1-1	VA24B7237-004	2024-07-16	M	0.10	0.39	<10	<0.0050	61.2	18100	<1.0	<0.50	<0.10	2540	0.0229	<0.0010	0.00386	0.0112	<0.00050	<0.00050	3.52	0.000085	420	<0.00050	<0.00150
WQ1-1	L2757095-4	2024-08-20	M																					
WQ1-1	VA24C1101-004	2024-08-20	M	0.39	0.40	<10	<0.0050	59.5	17600	<1.0	0.57	<0.10	2450	0.0154	<0.0010	0.00394	0.0118	<0.00050	<0.00050	3.89	0.000071	398	<0.00050	<0.00150
WQ1-1	VA24C4483-004	2024-09-17	M	1.82	1.01	<10	<0.0050	55.0	16700	<1.0	<0.50	<0.10	2340	0.0508	<0.0010	0.00400	0.0115	<0.00050	<0.00050	3.26	0.000084	403	<0.00050	<0.00150
WQ1-1	VA24C8360-004	2024-10-22	M	1.12	0.66	<10	<0.0050	58.1	17000	<1.0	1.21	<0.10	2330	0.0389	<0.0010	0.00586	0.0116	<0.00050	<0.00050	3.55	0.000084	367	<0.00050	<0.00150
WQ1-1	VA24C9197-004	2024-10-29	M	1.27	0.38	<10	<0.0050	59.1	17500	<1.0	0.52	<0.10	2350	0.0166	<0.0010	0.00162	0.0102	<0.00050	<0.00050	4.09	0.000079	401	<0.00050	<0.00150
WQ1-1	VA24D0009-004	2024-11-05	M	2.21	0.22	<10	<0.0050	56.9	16700	<1.0	<0.50	<0.10	2320	0.0244	<0.0010	0.00161	0.0114	<0.00050	<0.00050	3.09	0.000081	364	<0.00050	<0.00150
WQ1-1	VA24D0813-011	2024-11-13	M	1.66	0.26	<10	<0.0050	53.0	16700	<1.0	<0.50	<0.10	2340	0.0241	<0.0010	0.00182	0.0120	<0.00050	<0.00050	3.52	0.000085	388	<0.00050	<0.00150
WQ1-1	VA24D1720-004	2024-11-21	M	-0.90	0.47	<10	<0.0050	51.3	15800	<1.0	<0.50	<0.10	2200	0.0264	<0.0010	0.00169	0.0125	<0.00050	<0.00050	4.90	0.000086	403	<0.00050	<0.00150
WQ1-1	L2758465-4	2024-12-17	M																					
WQ1-1	VA24D3769-004	2024-12-17	M	-0.04	0.27	10	<0.0050	55.0	16800	<1.0	<0.50	<0.10	2330	0.0137	<0.0010	0.00167	0.0097	<0.00050	<0.00050	3.75	0.000084	343	<0.00050	<0.00150
WQ1-1	L2758719-4	2025-01-21	M																					
WQ1-1	VA25A1408-004	2025-01-21	M	-1.77	0.31	<10	<0.0050	53.5	16000	<1.0	<0.50	<0.10	2240	0.0192	<0.0010	0.00157	0.0087	<0.00050	<0.00050	4.43	0.000080	415	<0.00050	<0.00150
WQ1-1	L2758994-4	2025-02-18	M																					
WQ1-1	VA25A3430-004	2025-02-18	M	-2.14	0.38	<10	<0.0050	55.7	17000	<1.0	<0.50	<0.10	2360	0.0192	<0.0010	0.00174	0.0097	<0.00050	<0.00050	3.71	0.000091	404	<0.00050	<0.00150
WQ1-1	VA25A6550-004	2025-03-25	M	-0.14	1.25	<10	0.0084	56.7	16600	<1.0	<0.50	<0.10	2330	0.105	<0.0010	0.00166	0.0101	<0.00050	<0.00050	3.27	0.000082	418	<0.00050	<0.00150
WQ1-1	VA25A8962-004	2025-04-22	M	-3.27	0.27	30	0.0214	57.5	16100	<1.0	<0.50	<0.10	2160	0.0129	<0.0010	0.00161	0.0090	<0.00050	<0.00050	3.55	0.000081	357	<0.00050	<0.00150
WQ1-1	VA25A9878-004	2025-04-30	M	-3.09	0.16	<10	0.0475	62.1	17300	1.2	<0.50	<0.10	2410	<0.0050	<0.0010	0.00145	0.0086	<0.00050	<0.00050	3.58	0.000068	387	<0.00050	<0.00150
WQ1-1	VA25B0358-004	2025-05-06	M	0.34	0.27	<10	<0.0050	66.5	17500	<1.0	<0.50	<0.10	2420	0.0085	<0.0010	0.00154	0.0090	<0.00050	<0.00050	2.66	0.000071	338	<0.00050	<0.00150
WQ1-1	VA25B1026-004	2025-05-13	M	28.53	0.33	<10	0.0192	56.1	17200	<1.0	<0.50	<0.10	2380	0.0160	<0.0010	0.00163	0.0098	<0.00050	<0.00050	4.07	0.000092	387	<0.00050	<0.00150
WQ1-1	VA25B1711-004	2025-05-20	M	-0.93	0.37	<10	<0.0050	62.2	17700	<1.0	<0.50	<0.10	2340	0.0090	<0.0010	0.00144	0.0091	<0.00050	<0.00050	4.36	0.000077	376	<0.00050	<0.00150
WQ1-2	0051710-02	2020-05-20	M	2.07		7.8	<0.050				<1.00			0.298	<0.00040	<0.00100	0.0106	<0.00020	<0.00020	0.432	<0.000020	33.8	<0.00100	
WQ1-2	0062209-02	2020-06-22	M	11.24		2	<0.050				<0.010			1.09	<0.00040	<0.00100	0.0247	<0.00020	<0.00020	0.247	<0.000020	21.4	<0.00100	
WQ1-2	0071996-02	2020-07-21	M	12.90		6	<0.050				<0.010			0.858	<0.00040	<0.00100	0.0183	<0.00020	<0.00020	0.366	<0.000020	20.4	<0.00100	
WQ1-2	0082292-02	2020-08-24	M	1.07		1	<0.050				<1.00			0.0845	<0.00040	0.00128	0.0294	<0.00020	<0.00020	2.33	0.000049	216	<0.00100	
WQ1-2	0093017-02	2020-09-28	M	11.06		21	<0.050				<1.00			0.582	<0.00040	<0.00100	0.0187	<0.00020	<0.00020	0.847	0.000036	75.9	<0.00100	
WQ1-2	20J1961-02	2020-10-20	M	2.27		2	<0.050				<10.0			0.158	<0.00040	<0.00100	0.0134	<0.00020	<0.00020	1.35	0.000036	120	<0.00100	
WQ1-2	20J2778-02	2020-10-27	M	11.06		4	<0.050				<1.00			0.0493	<0.00040	<0.00100	0.013	<0.00020	<0.00020	1.87	0.000051	179	<0.00100	
WQ1-2	20K0360-02	2020-11-03	M	1.10		72	<0.050				<1.00			0.158	<0.00040	<0.00100	0.0125	<0.00020	<0.00020	1.81	0.000044	164	<0.00100	
WQ1-2	20K1261-02	2020-11-10	M	2.10		5	<0.050				<1.00			0.136	<0.00040	<0.00100	0.0145	<0.00020	<0.00020	1.37	0.00003	128	<0.00100	
WQ1-2	20K2100-02	2020-11-18	M			14	<0.050				<1.00			0.396	<0.00040	0.00119	0.0144	<0.00020	<0.00020	0.845	<0.000020	88.6	<0.00100	
WQ1-2	20L1589-02	2020-12-14	M	0.30		1	<0.050				<1.00			0.0459	<0.00040	0.00153	0.0134	<0.00020	<0.00020	2.12	0.000062	219	<0.00100	
WQ1-2	21A2590-02	2021-01-27	M	0.24		3	<0.050				<1.00			0.0181	<0.00040	0.00175	0.0102	<0.00020	<0.00020	3.45	0.000078	326	<0.00100	
WQ1-2	21B2778-02	2021-02-25	M			<1.8	<0.050				<1.00			0.0224	<0.00040	0.0015	0.0123	<0.00020	<0.00020	3.43	0.000399	316	<0.00100	
WQ1-2	21C3505-02	2021-03-25	M	0.71		<1	<0.050				<1.00			<0.0020	0.000062	<0.000050	<0.00010	<0.000010	<0.000010	0.0024	<0.0000020	<0.04	0.00013	
WQ1-2	21D2478-02	2021-04-22	M	1.94		<1	<0.050				14.8			0.174	0.000087	0.000449	0.0103	<0.000010	<0.000010	1.01	0.0000156	98.3	0.00038	
WQ1-2	21E1990-02	2021-05-18	M	11.75		17	<0.050				<1.00			0.699	<0.00020	<0.00050	0.0143	<0.00010	<0.00010	0.102	0.000014	12.3	0.00057	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	21E2917-02	2021-05-26	M	4.34		12	<0.050				<1.00			0.322	<0.000050	0.000184	0.00986	<0.000010	<0.000010	0.213	0.0000077	21	0.00037	
WQ1-2	21F0167-02	2021-06-01	M	1.69		3	0.092				<1.00			0.228	0.000134	0.000318	0.00992	<0.000010	<0.000010	0.89	0.0000136	75.5	0.00033	
WQ1-2	21F1056-02	2021-06-08	M	12.26		4	0.069				<1.00			0.822	<0.000050	0.000237	0.0189	0.00001	<0.000010	0.15	0.000008	16.3	0.00055	
WQ1-2	21F2014-02	2021-06-15	M	16.29		14	0.078				<1.00			1.14	0.000053	0.000415	0.024	0.000015	<0.000010	0.509	0.000018	50.1	0.00073	
WQ1-2	21G2414-02	2021-07-20	M	3.80		58	<0.050				<1.00			0.31	<0.000500	<0.000500	0.0126	<0.000100	<0.000100	0.449	<0.0000200	35.2	<0.00100	
WQ1-2	21H3040-02	2021-08-25	M			2	0.092				<1.00			0.152	<0.000500	0.000666	0.0168	<0.000100	<0.000100	1.62	0.0000261	157	<0.00100	
WQ1-2	21I3814-02	2021-09-28	M	6.37		2	0.064				<1.00			0.347	<0.000500	0.000524	0.0203	<0.000100	<0.000100	1.38	0.0000383	129	<0.00100	
WQ1-2	21J3514-02	2021-10-26	M	7.94		613	<0.050				<1.00			0.536	<0.00020	<0.00050	0.0118	<0.00010	<0.00010	0.473	0.000018	37.7	<0.00050	
WQ1-2	21K3046-02	2021-11-23	M	0.89		5	<0.050				<1.00			0.0425	<0.00040	0.00137	0.0135	<0.00020	<0.00020	2.88	0.000068	270	<0.00100	
WQ1-2	21L2125-02	2021-12-14	M	0.51		6	<0.050				<1.00			<0.0100	<0.00040	<0.00100	0.0125	<0.00020	<0.00020	2.26	0.000171	171	<0.00100	
WQ1-2	22A2312-02	2022-01-20	M	0.00		<1.8	<0.050				<1.00			0.0224	<0.00040	0.00262	0.0109	<0.00020	<0.00020	4.28	0.000067	305	<0.00100	
WQ1-2	22B2487-02	2022-02-17	M	0.70		<1	<0.050	<25.0	12600	<25.0	<2.50	<2.50	2010	0.0183	<0.00040	0.0013	<0.0100	<0.00020	<0.00020	3.33	0.000079	293	<0.00100	
WQ1-2	22C3145-02	2022-03-22	M	0.30		<1	0.062	53.8	13700	<25.0	<2.50	<2.50	1910	0.0176	<0.00040	0.00184	<0.0100	<0.00020	<0.00020	3.4	0.000064	324	<0.00100	
WQ1-2	22D2212-02	2022-04-19	M	0.70		<1	<0.050	52.5	13600	<50.0	6.3	<5.00	1910	0.0213	<0.00040	0.00147	<0.0100	<0.00020	<0.00020	4.98	0.000119	298	<0.00100	
WQ1-2	22E2480-04	2022-05-17	M	1.80		4	<0.050	<50.0	2070	<50.0	<5.00	<5.00	<500	0.186	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	0.526	<0.000100	45.9	<0.00500	
WQ1-2	22F3212-02	2022-06-21	M	4.33		4	<0.050	<50.0	1390	<50.0	<5.00	<5.00	<500	0.241	<0.000500	<0.000500	0.0102	<0.000100	<0.000100	0.481	<0.0000200	34.3	<0.00100	
WQ1-2	22G1763-02	2022-07-13	M	7.52		<1	<0.050	<50.0	2800	<50.0	<5.00	<5.00	<500	0.364	<0.000500	<0.000500	0.0133	<0.000100	<0.000100	0.873	0.0000301	67.1	<0.00100	
WQ1-2	22H2453-02	2022-08-16	M	6.16		2	<0.050	<50.0	1220	<50.0	<5.00	<5.00	<500	0.354	<0.000500	<0.000500	0.0140	<0.000100	<0.000100	0.336	<0.0000200	30.9	<0.00100	
WQ1-2	22I1926-02	2022-09-14	M	1.42		1	<0.050	30.4	9270	<10.0	<1.00	<1.00	1520	0.0721	<0.000500	0.00117	0.0120	<0.000100	<0.000100	2.63	0.0000461	207	<0.00100	
WQ1-2	22J1560-04	2022-10-12	M	0.45		<1	<0.050	<100	9860	<100	<10.0	<10.0	1640	0.0486	<0.000500	0.00120	0.00967	<0.000100	<0.000100	3.02	0.0000469	238	<0.00100	
WQ1-2	22K1453-02	2022-11-10	M	0.53		<1	<0.050	33.3	14100	<25.0	0.400	<0.0050	1910	0.0374	<0.000500	0.00161	0.0128	<0.000100	<0.000100	4.19	0.0000940	313	<0.00100	
WQ1-2	22L0774-02	2022-12-07	M	0.37		4	<0.050	<25.0	14800	<25.0	<2.50	<2.50	2030	<0.0200	<0.000500	0.00179	0.0123	<0.000100	<0.000100	4.03	0.0000696	316	<0.00100	
WQ1-2	23A2847-02	2023-01-27	M	0.00		1	<0.050	<100	8710	<100	0.243	<0.0050	1240	0.0306	<0.000500	0.00115	0.0114	0.000104	<0.000100	2.19	0.0000559	206	<0.00100	
WQ1-2	23C0060-02	2023-02-28	M	0.03		<1	<0.050	<100	15300	<100	<10.0	<10.0	2020	<0.0200	<0.000500	0.00169	0.00928	<0.000100	<0.000100	3.58	0.0000855	348	<0.00100	
WQ1-2	23C1797-02	2023-03-15	M	-0.33		1	<0.050	<100	14000	<100	<10.0	<10.0	1870	<0.0200	<0.000500	0.00165	0.0102	<0.000100	<0.000100	3.44	0.0000798	310	<0.00100	
WQ1-2	23D2945-02	2023-04-26	M	0.23	0.63	<1	<0.050	<100	8450	0.596	<0.100	<0.0500	1090	0.0376	<0.000500	0.000999	0.00844	<0.000100	<0.000100	1.96	0.0000231	176	<0.00100	
WQ1-2	23E2392-02	2023-05-17	M	16.00	23.4	12	0.065	<100	1010	0.092	0.161	0.0710	<1000	1.04	<0.000100	0.000310	0.0199	<0.000020	<0.000020	0.201	0.0000133	26.7	<0.00100	
WQ1-2	23F3614-02	2023-06-27	M	8.10	9.68	4	<0.050	<100	1790	0.132	0.209	<0.0500	<1000	0.361	<0.000500	<0.000500	0.0135	<0.000100	<0.000100	0.445	<0.0000200	39.3	<0.00100	
WQ1-2	23G2415-02	2023-07-19	M	8.50	6.42	3	<0.050	<100	2340	0.187	<1.00	<0.500	<1000	0.259	<0.000500	0.000556	0.0167	<0.000100	<0.000100	0.685	<0.0000200	59.7	<0.00100	
WQ1-2	23H3309-04	2023-08-24	M	0.08	0.26	<1	<0.050	<100	12300	0.943	0.0677	0.0083	1720	0.0422	<0.000500	0.00154	0.0117	0.000103	<0.000100	3.15	0.0000519	289	<0.00100	
WQ1-2	23I2271-04	2023-09-19	M	0.59	1.31	<1	<0.050	<100	10000	0.734	<0.100	<0.0500	1780	0.0592	<0.000500	0.000976	0.0119	<0.000100	<0.000100	2.67	0.0000373	234	<0.00100	
WQ1-2	23J2236-04	2023-10-18	M	7.80	12.1	91	<0.050	<100	3820	0.251	<0.100	<0.0500	<1000	0.659	<0.000500	0.000579	0.0192	<0.000100	<0.000100	0.855	0.0000484	86.2	<0.00100	
WQ1-2	23K1909-02	2023-11-15	M	0.00	0.84	2.0	<0.050	<100	12900	0.984	0.287	<0.0500	1750	0.0580	<0.000500	0.00152	0.0107	<0.000100	<0.000100	3.45	0.0000858	307	<0.00100	
WQ1-2	23L1905-05	2023-12-14	M	0.16	0.40	<1.8	<0.050	<100	15100	1.09	0.396	<0.0500	1900	0.0303	<0.000500	0.00184	0.0108	<0.000100	<0.000100	3.88	0.0000888	359	<0.00100	
WQ1-2	L2754366-8	2024-01-24	M																					
WQ1-2	VA24A1422-008	2024-01-24	M	0.13	0.19	<10	<0.0050	53.4	15500	<1.0	<0.50	<0.10	2090	0.0185	<0.0010	0.00198	0.0090	<0.00050	<0.00050	3.54	0.000072	376	<0.00050	<0.0250
WQ1-2	L2754594-5	2024-02-13	M																					
WQ1-2	VA24A2858-005	2024-02-13	M	0.61	0.65	<10	0.0079	39.6	11600	<1.0	<0.50	<0.10	1630	0.0439	<0.0010	0.00124	0.0100	<0.00050	<0.00050	2.80	0.000061	258	<0.00050	<0.00150
WQ1-2	L2755033-5	2024-03-20	M																					
WQ1-2	VA24A5955-005	2024-03-20	M	1.98	2.01	<10	<0.0050	35.6	10700	<1.0	<0.50	<0.10	1450	0.0578	<0.0010	0.00184	0.0092	<0.00050	<0.00050	2.52	0.000055	248	<0.00050	<0.00150
WQ1-2	L2755461-5	2024-04-23	M																					
WQ1-2	VA24A8736-005	2024-04-23	M	1.23	2.05	<10	<0.0050	38.9	11400	<1.0	<0.50	<0.10	1590	0.0355	<0.0010	0.00197	0.0092	<0.00050	<0.00050	3.29	0.000060	288	<0.00050	<0.00150
WQ1-2	L2755553-5	2024-04-30	M																					
WQ1-2	VA24A9418-005	2024-04-30	M	-0.23	1.49	<10	0.0071	18.0	5360	<1.0	<0.50	<0.10	717	0.0801	<0.0010	0.00121	0.0070	<0.00050	<0.00050	1.45	0.000034	124	<0.00050	<0.00150
WQ1-2	L2755641-5	2024-05-07	M																					
WQ1-2	VA24B0040-005	2024-05-07	M	0.35	0.58	<10	<0.0050	37.9	11100	<1.0	<0.50	<0.10	1610	0.0337	<0.0010	0.00248	0.0064	<0.00050	<0.00050	2.93	0.000041	260	<0.00050	<0.00150
WQ1-2	L2755769-5	2024-05-14	M																					
WQ1-2	VA24B0738-005	2024-05-14	M	1.91	4.86	<10	0.0091	13.2	4110	<1.0	<0.50	<0.10	472	0.414	<0.0010	0.00079	0.0109	<0.00050	<0.00050	0.86	0.000022	92.3	<0.00050	<0.00150
WQ1-2	L2755874-5	2024-05-21	M																					
WQ1-2	VA24B1351-005	2024-05-21	M	2.44	1.04	<10	0.0166	38.2	11500	<1.0	<0.50	<0.10	1570	0.0755	<0.0010	0.00179	0.0076	<0.00050	<0.00050	2.55	0.000047	250	<0.00050	<0.00150
WQ1-2	L2756277-5	2024-06-18	M																					
WQ1-2	VA24B4257-005	2024-06-18	M	4.40	0.74	<10	0.0200	28.0	7960	<1.0	<0.50	<0.10	1030	0.0637	<0.0010	0.00225	0.0064	<0.00050	<0.00050	2.22	0.000032	191	<0.00050	<0.00150
WQ1-2	L2756678-5	2024-07-16	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	VA24B7237-005	2024-07-16	M	16.43	15.6	41	0.0060	16.5	5220	<1.0	<0.50	<0.10	701	0.812	<0.0010	0.00175	0.0204	<0.00050	<0.00050	1.14	0.000032	114	<0.00050	<0.00150
WQ1-2	L2757095-5	2024-08-20	M																					
WQ1-2	VA24C1101-005	2024-08-20	M	8.22	6.55	20	<0.0050	14.4	4300	<1.0	<0.50	<0.10	583	0.336	<0.0010	0.00135	0.0187	<0.00050	<0.00050	1.09	0.000021	101	<0.00050	<0.00150
WQ1-2	VA24C4483-005	2024-09-17	M	1.33	3.72	<10	0.0085	22.9	7240	<1.0	<0.50	<0.10	1010	0.167	<0.0010	0.00212	0.0135	<0.00050	<0.00050	1.57	0.000030	175	<0.00050	<0.00150
WQ1-2	VA24C8360-005	2024-10-22	M	2.14	1.93	<10	0.0166	43.6	12800	<1.0	0.52	<0.10	1760	0.0780	<0.0010	0.00534	0.0138	<0.00050	<0.00050	2.74	0.000076	278	<0.00050	<0.00150
WQ1-2	VA24C9197-005	2024-10-29	M	3.23	2.04	<10	0.0156	34.6	10200	<1.0	<0.50	<0.10	1340	0.0918	<0.0010	0.00102	0.0114	<0.00050	<0.00050	2.55	0.000037	231	<0.00050	<0.00150
WQ1-2	VA24D0009-005	2024-11-05	M	2.02	0.37	<10	0.0146	45.5	13200	<1.0	<0.50	<0.10	1840	0.0231	<0.0010	0.00140	0.0113	<0.00050	<0.00050	2.44	0.000064	290	<0.00050	<0.00150
WQ1-2	VA24D0813-013	2024-11-13	M	3.78	2.67	10	0.0074	20.7	6630	<1.0	<0.50	<0.10	902	0.140	<0.0010	0.00083	0.0112	<0.00050	<0.00050	1.45	0.000040	151	<0.00050	<0.00150
WQ1-2	VA24D1720-005	2024-11-21	M	-0.48	0.49	<10	0.0082	37.7	11600	<1.0	<0.50	<0.10	1610	0.0260	<0.0010	0.00139	0.0118	<0.00050	<0.00050	3.68	0.000066	336	<0.00050	<0.00150
WQ1-2	L2758465-5	2024-12-17	M																					
WQ1-2	VA24D3769-005	2024-12-17	M	-0.20	0.31	<10	<0.0050	47.8	14800	<1.0	<0.50	<0.10	2040	0.0144	<0.0010	0.00138	0.0090	<0.00050	<0.00050	3.36	0.000071	293	<0.00050	<0.00150
WQ1-2	L2758719-5	2025-01-21	M																					
WQ1-2	VA25A1408-005	2025-01-21	M	-1.90	0.55	<10	0.0085	37.8	11700	<1.0	<0.50	<0.10	1600	0.0182	<0.0010	0.00130	0.0094	<0.00050	<0.00050	3.40	0.000062	313	<0.00050	<0.00150
WQ1-2	L2758994-5	2025-02-18	M																					
WQ1-2	VA25A3430-005	2025-02-18	M	-2.04	0.57	<10	<0.0050	44.8	13800	<1.0	<0.50	<0.10	1890	0.0158	<0.0010	0.00143	0.0107	<0.00050	<0.00050	3.07	0.000068	324	<0.00050	<0.00150
WQ1-2	VA25A6550-005	2025-03-25	M	0.09	0.77	<10	0.0078	47.2	13900	<1.0	<0.50	<0.10	1930	0.0168	<0.0010	0.00140	0.0082	<0.00050	<0.00050	2.87	0.000067	371	<0.00050	<0.00150
WQ1-2	VA25A8962-005	2025-04-22	M	-2.86	0.88	<10	0.0053	29.3	8460	<1.0	<0.50	<0.10	1130	0.0388	<0.0010	0.00084	0.0086	<0.00050	<0.00050	2.07	0.000031	190	<0.00050	<0.00150
WQ1-2	VA25A9878-005	2025-04-30	M	-0.40	1.64	<10	<0.0050	9.4	2890	<1.0	<0.50	<0.10	348	0.162	<0.0010	<0.00040	0.0082	<0.00050	<0.00050	0.73	<0.000020	68.2	<0.00050	<0.00150
WQ1-2	VA25B0358-005	2025-05-06	M	0.23	0.43	<10	0.0355	54.7	14200	<1.0	<0.50	<0.10	1950	0.0110	<0.0010	0.00118	0.0089	<0.00050	<0.00050	2.25	0.000040	282	<0.00050	<0.00150
WQ1-2	VA25B1026-005	2025-05-13	M	-0.09	0.47	10	0.0059	30.2	8740	<1.0	<0.50	<0.10	1190	0.0407	<0.0010	0.00086	0.0090	<0.00050	<0.00050	2.28	0.000032	202	<0.00050	<0.00150
WQ1-2	VA25B1711-005	2025-05-20	M	0.70	1.95	10	<0.0050	8.7	2490	<1.0	<0.50	<0.10	316	0.0860	<0.0010	<0.00040	0.0076	<0.00050	<0.00050	0.74	<0.000020	54.2	<0.00050	<0.00150
WQ1-3	23L1905-06	2023-12-14	M	0.95	1.25	2.0	<0.050	<100	10800	0.732	0.310	<0.0500	1260	0.0560	<0.000500	0.00125	0.0115	<0.000100	<0.000100	2.53	0.0000731	236	<0.00100	
WQ1-3	L2754366-9	2024-01-24	M																					
WQ1-3	VA24A1422-009	2024-01-24	M	0.76	0.92	10	0.0136	27.6	8090	<1.0	<0.50	<0.10	1080	0.0603	<0.0010	0.00112	0.0091	<0.00050	<0.00050	1.75	0.000042	196	<0.00050	<0.0250
WQ1-3	L2754594-6	2024-02-13	M																					
WQ1-3	VA24A2858-006	2024-02-13	M	1.05	0.78	<10	0.0119	30.8	8990	<1.0	<0.50	<0.10	1260	0.0578	<0.0010	0.00102	0.0103	<0.00050	<0.00050	2.05	0.000048	198	<0.00050	<0.00150
WQ1-3	L2755033-6	2024-03-20	M																					
WQ1-3	VA24A5955-006	2024-03-20	M	1.66	2.13	<10	<0.0050	20.5	6300	<1.0	<0.50	<0.10	841	0.0960	<0.0010	0.00120	0.0094	<0.00050	<0.00050	1.59	0.000035	154	<0.00050	<0.00150
WQ1-3	L2755461-6	2024-04-23	M																					
WQ1-3	VA24A8736-006	2024-04-23	M	1.35	1.84	<10	<0.0050	34.6	9980	<1.0	<0.50	<0.10	1360	0.0386	<0.0010	0.00168	0.0093	<0.00050	<0.00050	2.88	0.000040	260	<0.00050	<0.00150
WQ1-3	L2755553-6	2024-04-30	M																					
WQ1-3	VA24A9418-006	2024-04-30	M	1.20	0.84	<10	0.0111	31.4	9290	<1.0	<0.50	<0.10	1240	0.0425	<0.0010	0.00187	0.0057	<0.00050	<0.00050	2.38	0.000038	218	<0.00050	<0.00150
WQ1-3	L2755641-6	2024-05-07	M																					
WQ1-3	VA24B0040-006	2024-05-07	M	1.85	1.55	<10	<0.0050	22.0	6420	<1.0	<0.50	<0.10	1020	0.116	<0.0010	0.00167	0.0081	<0.00050	<0.00050	1.78	0.000034	157	<0.00050	<0.00150
WQ1-3	L2755769-6	2024-05-14	M																					
WQ1-3	VA24B0738-006	2024-05-14	M	4.83	6.30	<10	0.0064	<5.0	1240	<1.0	<0.50	<0.10	122	0.416	<0.0010	0.00052	0.0097	<0.00050	<0.00050	0.31	<0.000020	30.8	<0.00050	<0.00150
WQ1-3	L2755874-6	2024-05-21	M																					
WQ1-3	VA24B1351-006	2024-05-21	M	7.72	6.68	20	0.0096	<5.0	1180	<1.0	<0.50	<0.10	139	0.366	<0.0010	0.00044	0.0124	<0.00050	<0.00050	0.34	<0.000020	29.0	<0.00050	<0.00150
WQ1-3	L2756277-6	2024-06-18	M																					
WQ1-3	VA24B4257-006	2024-06-18	M	10.00	4.46	20	0.0061	<5.0	734	<1.0	<0.50	<0.10	81	0.434	<0.0010	<0.00040	0.0128	<0.00050	<0.00050	0.33	<0.000020	20.7	<0.00050	<0.00150
WQ1-3	L2756678-6	2024-07-16	M																					
WQ1-3	VA24B7237-006	2024-07-16	M	18.28	16.7	30	<0.0050	<5.0	1660	<1.0	<0.50	<0.10	209	0.949	<0.0010	0.00045	0.0205	<0.00050	<0.00050	0.36	<0.000020	37.1	<0.00050	<0.00150
WQ1-3	L2757095-6	2024-08-20	M																					
WQ1-3	VA24C1101-006	2024-08-20	M	8.77	7.95	110	0.0110	10.6	3180	<1.0	<0.50	<0.10	420	0.282	<0.0010	0.00092	0.0175	<0.00050	<0.00050	0.74	<0.000020	77.1	<0.00050	<0.00150
WQ1-3	VA24C4483-006	2024-09-17	M	4.41	4.29	<10	0.0095	18.2	5670	<1.0	<0.50	<0.10	786	0.195	<0.0010	0.00149	0.0145	<0.00050	<0.00050	1.24	0.000030	136	<0.00050	<0.00150
WQ1-3	VA24C8360-006	2024-10-22	M	21.58	23.2	10	0.0086	8.6	2680	<1.0	<0.50	<0.10	344	0.897	<0.0010	0.00157	0.0258	<0.00050	<0.00050	0.63	<0.000020	58.1	<0.00050	<0.00150
WQ1-3	VA24C9197-006	2024-10-29	M	7.09	7.28	20	0.0112	5.7	1780	<1.0	<0.50	<0.10	190	0.334	<0.0010	<0.00040	0.0110	<0.00050	<0.00050	0.51	<0.000020	43.3	<0.00050	<0.00150
WQ1-3	VA24D0009-006	2024-11-05	M	2.74	1.32	<10	0.0173	20.8	6150	<1.0	<0.50	<0.10	840	0.0861	<0.0010	0.00072	0.0107	<0.00050	<0.00050	1.20	0.000032	137	<0.00050	<0.00150
WQ1-3	VA24D0813-014	2024-11-13	M	6.77	4.30	30	0.0091	11.2	3540	<1.0	<0.50	<0.10	470	0.268	<0.0010	0.00059	0.0103	<0.00050	<0.00050	0.80	0.000021	83.0	<0.00050	<0.00150
WQ1-3	VA24D1720-006	2024-11-21	M	-0.26	1.08	<10	0.0156	28.3	8750	<1.0	<0.50	<0.10	1200	0.0504	<0.0010	0.00096	0.0122	<0.00050	<0.00050	2.46	0.000038	209	<0.00050	<0.00150
WQ1-3	L2758465-6	2024-12-17	M																					
WQ1-3	VA24D3769-006	2024-12-17	M	-0.20	0.47	<10	<0.0050	45.3	14000	<1.0	<0.50	<0.10	1930	0.0231	<0.0010	0.00146	0.0095	<0.00050	<0.00050	3.16	0.000073	273	<0.00050	<0.00150
WQ1-3	L2758719-6	2025-01-21	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-3	VA25A1408-006	2025-01-21	M	-1.45	0.59	<10	0.0108	34.8	10800	<1.0	<0.50	<0.10	1460	0.0197	<0.0010	0.00108	0.0096	<0.00050	<0.00050	3.13	0.000056	282	<0.00050	<0.00150
WQ1-3	L2758994-6	2025-02-18	M																					
WQ1-3	VA25A3430-006	2025-02-18	M	-2.03	0.56	<10	0.0096	41.0	12500	<1.0	<0.50	<0.10	1710	0.0132	<0.0010	0.00135	0.0108	<0.00050	<0.00050	3.11	0.000065	321	<0.00050	<0.00150
WQ1-3	VA25A6550-006	2025-03-25	M	0.28	0.98	10	0.0099	27.4	8050	<1.0	<0.50	<0.10	1100	0.0464	<0.0010	0.00078	0.0082	<0.00050	<0.00050	1.83	0.000035	201	<0.00050	<0.00150
WQ1-3	VA25A8962-006	2025-04-22	M	-2.00	1.07	<10	0.0066	14.5	4220	<1.0	<0.50	<0.10	525	0.0627	<0.0010	0.00045	0.0081	<0.00050	<0.00050	0.99	<0.000020	93.5	<0.00050	<0.00150
WQ1-3	VA25A9878-006	2025-04-30	M	-0.05	2.08	10	0.0064	8.0	2380	<1.0	<0.50	<0.10	293	0.172	<0.0010	<0.00040	0.0084	<0.00050	<0.00050	0.60	<0.000020	57.1	<0.00050	<0.00150
WQ1-3	VA25B0358-006	2025-05-06	M	2.88	3.10	<10	0.0125	12.8	3720	<1.0	<0.50	<0.10	472	0.120	<0.0010	0.00041	0.0093	<0.00050	<0.00050	0.77	<0.000020	74.7	<0.00050	<0.00150
WQ1-3	VA25B1026-006	2025-05-13	M	0.58	1.24	<10	<0.0050	13.1	4140	<1.0	<0.50	<0.10	546	0.0925	<0.0010	0.00046	0.0090	<0.00050	<0.00050	1.12	0.000024	94.7	<0.00050	<0.00150
WQ1-3	VA25B1711-006	2025-05-20	M	1.00	2.71	<10	0.0067	<5.0	946	<1.0	<0.50	<0.10	109	0.115	<0.0010	<0.00040	0.0084	<0.00050	<0.00050	0.31	<0.000020	23.5	<0.00050	<0.00150
WQ2-1	0051710-03	2020-05-20	M	0.40		<1.8	<0.050				6.3			0.014	<0.00040	0.00174	0.0104	<0.00020	<0.00020	4.02	0.000078	432	<0.00100	
WQ2-1	0062209-03	2020-06-22	M	1.15		<1	<0.050				<1.00			0.0253	0.00048	0.00182	0.0104	<0.00020	<0.00020	4.34	0.000082	399	<0.00100	
WQ2-1	0071996-03	2020-07-21	M	0.60		<1	<0.050				<1.00			0.0266	<0.00040	0.00268	0.0126	<0.00020	<0.00020	4.06	0.000072	285	<0.00100	
WQ2-1	0082292-03	2020-08-24	M	0.64		4	<0.050				<1.00			0.0516	<0.00040	0.00201	0.012	<0.00020	<0.00020	4.21	0.000086	384	<0.00100	
WQ2-1	0093017-03	2020-09-28	M	0.83		1	<0.050				<1.00			0.0771	<0.00040	0.00184	0.0143	<0.00020	<0.00020	4.41	0.000092	396	<0.00100	
WQ2-1	20J1961-03	2020-10-20	M	0.66		<1.8	<0.050				<10.0			0.0546	<0.00040	0.00191	0.0137	<0.00020	<0.00020	4.41	0.000096	406	<0.00100	
WQ2-1	20J2778-03	2020-10-27	M	545.13		18	<0.050				<1.00			0.0255	<0.00040	0.00183	0.0125	<0.00020	<0.00020	3.93	0.000087	382	<0.00100	
WQ2-1	20K0360-03	2020-11-03	M	0.39		4	<0.050				<1.00			0.0298	<0.00040	0.00155	0.0114	<0.00020	<0.00020	4.24	0.000082	383	<0.00100	
WQ2-1	20K1261-03	2020-11-10	M	0.20		<1	<0.050				<1.00			0.0277	0.00041	0.00154	0.0133	<0.00020	<0.00020	4.15	0.000084	439	<0.00100	
WQ2-1	20K2100-03	2020-11-18	M			<1.8	<0.050				<1.00			0.0297	<0.00040	0.00225	0.0129	<0.00020	<0.00020	3.83	0.000033	406	<0.00100	
WQ2-1	20L1589-03	2020-12-14	M	-0.11		<1	0.081				<1.00			0.0156	<0.00040	0.00213	0.0114	<0.00020	<0.00020	3.84	0.000089	430	<0.00100	
WQ2-1	21A2590-03	2021-01-27	M	0.30		2	<0.050				<1.00			0.0222	<0.00040	0.00137	0.0109	<0.00020	<0.00020	3.99	0.000058	376	<0.00100	
WQ2-1	21B2778-03	2021-02-25	M			2	<0.050				<1.00			0.0184	<0.00040	0.00177	0.0117	<0.00020	<0.00020	4.32	0.000091	409	<0.00100	
WQ2-1	21C3505-03	2021-03-25	M	0.47		<1	0.061				<1.00			0.035	0.000606	0.00176	0.011	<0.000100	<0.000100	4.91	0.000105	398	<0.00100	
WQ2-1	21D2478-03	2021-04-22	M	0.18		<1	<0.050				<1.00			0.021	<0.000500	0.00163	0.0111	<0.000100	<0.000100	4.42	0.0000885	381	<0.00100	
WQ2-1	21E1990-03	2021-05-18	M	0.31		<1	<0.050				<1.00			0.0381	<0.00040	0.00182	0.0127	<0.00020	<0.00020	5.37	0.000075	408	<0.00100	
WQ2-1	21E2917-03	2021-05-26	M	0.22		6	<0.050				<1.00			0.0561	<0.000500	0.00159	0.0105	<0.000100	<0.000100	3.67	0.0000577	358	<0.00100	
WQ2-1	21F0167-03	2021-06-01	M	0.44		2	0.065				<1.00			0.0345	<0.000500	0.00144	0.0114	<0.000100	<0.000100	3.94	0.0000612	356	<0.00100	
WQ2-1	21F1056-03	2021-06-08	M	1.92		<1	0.114				<1.00			0.0174	<0.000500	0.00161	0.0108	<0.000100	<0.000100	4.6	0.0000714	397	<0.00100	
WQ2-1	21F2014-03	2021-06-15	M	1.81		<1	0.158				<1.00			0.0178	<0.000500	0.00184	0.0112	<0.000100	<0.000100	4.1	0.0000916	372	<0.00100	
WQ2-1	21G2414-03	2021-07-20	M	1.18		<1	<0.050				<1.00			0.0395	<0.000500	0.00155	0.011	<0.000100	<0.000100	3.89	0.0000875	337	<0.00100	
WQ2-1	21H3040-03	2021-08-25	M			<1	<0.050				<1.00			0.0169	<0.000500	0.00165	0.0104	<0.000100	<0.000100	4.16	0.00007	407	<0.00100	
WQ2-1	21I3814-03	2021-09-28	M	0.87		2	<0.050				<1.00			0.0446	<0.000500	0.00145	0.0121	<0.000100	<0.000100	3.58	0.0000798	353	<0.00100	
WQ2-1	21J3514-03	2021-10-26	M	-0.58		68	<0.050				<1.00			0.0397	<0.00020	0.00149	0.011	<0.00010	<0.00010	3.35	0.000075	301	<0.00050	
WQ2-1	21K3046-03	2021-11-23	M	0.70		2	<0.050				<1.00			0.0106	<0.00040	0.00159	0.0129	<0.00020	<0.00020	3.64	0.000078	351	<0.00100	
WQ2-1	21L2125-03	2021-12-14	M	0.28		<1	<0.050				<1.00			<0.0100	<0.00040	0.00205	0.0112	<0.00020	<0.00020	4.7	0.00009	340	<0.00100	
WQ2-1	22A2312-03	2022-01-20	M	0.00		<1.8	<0.050				<1.00			0.0129	<0.00040	0.00279	0.0108	<0.00020	<0.00020	4.36	0.000116	340	<0.00100	
WQ2-1	22B2487-03	2022-02-17	M	0.50		<1	<0.050	<25.0	14700	<25.0	<2.50	<2.50	2370	0.0286	<0.00040	0.00152	0.0102	<0.00020	<0.00020	3.77	0.000087	330	<0.00100	
WQ2-1	22C3145-03	2022-03-22	M	0.30		<1	<0.050	62.7	15100	<25.0	<2.50	<2.50	2220	0.107	<0.00040	0.00185	<0.0100	<0.00020	<0.00020	3.1	0.000091	293	0.00105	
WQ2-1	22D2212-03	2022-04-19	M			<1	<0.050	59.4	15400	<50.0	<5.00	<5.00	2090	0.0401	<0.00040	0.0018	0.0148	<0.00020	<0.00020	6.07	0.000118	345	<0.00100	
WQ2-1	22E2480-05	2022-05-17	M	0.10		<1	<0.050	67.2	16900	<50.0	<5.00	<5.00	2350	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.46	<0.000100	344	<0.00500	
WQ2-1	22F3212-03	2022-06-21	M	-0.13		<1	<0.050	<50.0	12400	<50.0	<5.00	<5.00	1630	0.0228	<0.000500	0.00174	0.0106	<0.000100	<0.000100	4.12	0.000075	344	<0.00100	
WQ2-1	22G1763-03	2022-07-13	M	0.05		<1	<0.050	<50.0	14900	<50.0	<5.00	<5.00	1970	0.0225	<0.000500	0.00172	0.0111	<0.000100	<0.000100	4.34	0.0000927	335	<0.00100	
WQ2-1	22H2453-03	2022-08-16	M	-0.06		1	<0.050	<50.0	13300	<50.0	<5.00	<5.00	1890	0.0377	<0.000500	0.00155	0.0111	<0.000100	<0.000100	3.84	0.0000647	345	<0.00100	
WQ2-1	22I1926-03	2022-09-14	M	3.05		<1	<0.050	50.0	15100	<10.0	<1.00	<1.00	2540	0.0212	<0.000500	0.00145	0.00950	<0.000100	<0.000100	3.90	0.0000660	307	<0.00100	
WQ2-1	22J1560-05	2022-10-12	M	0.21		<1	<0.050	<100	17000	<100	<10.0	<10.0	2610	0.0272	<0.000500	0.00170	0.0117	<0.000100	<0.000100	4.21	0.0000912	346	<0.00100	
WQ2-1	22K1453-03	2022-11-10	M	0.25		<1	<0.050	36.8	15800	<25.0	0.442	<0.0050	2200	0.0267	<0.000500	0.00225	0.0122	<0.000100	<0.000100	5.02	0.0000775	375	<0.00100	
WQ2-1	22L0774-03	2022-12-07	M	0.25		1	0.070	<25.0	16200	<25.0	<2.50	<2.50	2270	<0.0200	<0.000500	0.00186	0.0124	<0.000100	<0.000100	4.38	0.0000748	339	<0.00100	
WQ2-1	23A2847-03	2023-01-27	M	21.30		<1	<0.050	<100	16900	<100	0.376	<0.0050	2270	0.0607	<0.000500	0.00184	0.00981	0.000105	<0.000100	4.19	0.0000955	381	<0.00100	
WQ2-1	23C0060-03	2023-02-28	M	0.03		1	<0.050	<100	16900	<100	<10.0	<10.0	2140	<0.0200	<0.000500	0.00173	0.0103	<0.000100	<0.000100	3.87	0.0000733	392	<0.00100	
WQ2-1	23C1797-03	2023-03-15	M	-0.49		<1	<0.050	<100	14700	<100	<10.0	<10.0	1970	<0.0200	<0.000500	0.00183	0.00942	<0.000100	<0.000100	3.72	0.0000816	329	<0.00100	
WQ2-1	23D2945-03	2023-04-26	M	0.18	0.30	<1	<0.050	<100	16600	1.08	0.491	<0.0500	2110	<0.0200	<0.000500	0.00181	0.00942	<0.000100	<0.000100	3.84	0.0000939	343	<0.00100	
WQ2-1	23E2392-03	2023-05-17	M		0.40	<1	0.073	<100	16000	0.811	0.458	0.0660	2190	0.0271	<0.000500	0.00204	0.00997	<0.000100	<0.000100	3.64	0.0000913	397	<0.00100	
WQ2-1	23F3614-03	2023-06-27	M	0.48	0.66	<1	<0.050	<100	17000	1.12	0.593	<0.0500	2340	0.0254	<0.000500	0.00184	0.0109	<0.000100	<0.000100	4.35	0.0000963	401	<0.00100	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-1	23G2415-03	2023-07-19	M	0.24	0.56	<1	<0.050	<100	15700	1.16	<1.00	<0.500	2150	0.0279	<0.000500	0.00194	0.00989	<0.000100	<0.000100	4.3	0.000103	388	<0.00100	
WQ2-1	23H3309-05	2023-08-24	M	0.40	0.56	<1	<0.050	<100	15400	1.12	0.312	0.0081	2160	0.0218	<0.000500	0.00219	0.0106	<0.000100	<0.000100	4	0.0000822	356	<0.00100	
WQ2-1	23I2271-05	2023-09-19	M	0.57	1.05	<1	<0.050	<100	16700	1.12	0.442	<0.0500	2240	0.0368	<0.000500	0.00169	0.0114	<0.000100	<0.000100	4.33	0.000106	374	<0.00100	
WQ2-1	23J2236-05	2023-10-18	M	37.91	7.37	<1	<0.050	<100	16600	1.18	0.442	<0.0500	2550	0.318	<0.000500	0.00174	0.0139	<0.000100	<0.000100	3.69	0.0000857	383	<0.00100	
WQ2-1	23K1909-03	2023-11-15	M	0.32	1.02	<1.8	<0.050	<100	18000	1.25	0.381	0.0570	2520	0.0428	<0.000500	0.00183	0.0106	<0.000100	<0.000100	7.92	0.000121	450	<0.00100	
WQ2-1	23L1905-07	2023-12-14	M	0.28	0.37	<1.8	<0.050	<100	16500	1.20	0.448	<0.0500	2020	0.0283	<0.000500	0.00198	0.00968	<0.000100	<0.000100	3.66	0.000108	348	<0.00100	
WQ2-1	L2754383-1	2024-01-25	M																					
WQ2-1	VA24A1507-001	2024-01-25	M	0.75	0.33	10	<0.0050	54.2	16200	<1.0	0.57	<0.10	2240	0.0186	<0.0010	0.00190	0.0083	<0.00050	<0.00050	3.89	0.000079	379	<0.00050	<0.00150
WQ2-1	L2754594-7	2024-02-13	M																					
WQ2-1	VA24A2858-007	2024-02-13	M	0.32	0.20	30	<0.0050	57.5	16700	<1.0	<0.50	<0.10	2370	0.0197	<0.0010	0.00160	0.0095	<0.00050	<0.00050	4.14	0.000075	346	<0.00050	<0.00150
WQ2-1	L2755033-7	2024-03-20	M																					
WQ2-1	VA24A5955-007	2024-03-20	M	0.55	0.28	<10	<0.0050	57.5	17000	<1.0	0.55	<0.10	2350	0.0269	<0.0010	0.00267	0.0100	<0.00050	<0.00050	3.84	0.000079	405	<0.00050	<0.00150
WQ2-1	L2755461-7	2024-04-23	M																					
WQ2-1	VA24A8736-007	2024-04-23	M	0.60	0.64	<10	0.0062	52.5	15400	<1.0	<0.50	<0.10	2140	0.0439	<0.0010	0.00302	0.0108	<0.00050	<0.00050	4.50	0.000086	414	<0.00050	<0.00150
WQ2-1	L2755553-7	2024-04-30	M																					
WQ2-1	VA24A9418-007	2024-04-30	M	0.01	0.28	<10	0.0110	45.2	13200	<1.0	<0.50	<0.10	1800	0.0093	<0.0010	0.00257	0.0047	<0.00050	<0.00050	3.27	0.000060	316	<0.00050	<0.00150
WQ2-1	L2755641-7	2024-05-07	M																					
WQ2-1	VA24B0040-007	2024-05-07	M	0.35	0.15	<10	0.0183	57.6	16700	<1.0	<0.50	<0.10	2350	0.0122	<0.0010	0.00334	0.0103	<0.00050	<0.00050	4.11	0.000090	382	<0.00050	<0.00150
WQ2-1	L2755769-7	2024-05-14	M																					
WQ2-1	VA24B0738-007	2024-05-14	M	-0.06	<0.10	<10	<0.0050	58.1	17400	<1.0	<0.50	<0.10	2310	0.0105	<0.0010	0.00240	0.0092	<0.00050	<0.00050	3.62	0.000078	381	<0.00050	<0.00150
WQ2-1	L2755874-7	2024-05-21	M																					
WQ2-1	VA24B1351-007	2024-05-21	M	0.17	0.27	<10	<0.0050	55.3	16600	<1.0	<0.50	<0.10	2260	0.0222	<0.0010	0.00255	0.0103	<0.00050	<0.00050	3.75	0.000070	369	<0.00050	<0.00150
WQ2-1	L2756277-7	2024-06-18	M																					
WQ2-1	VA24B4257-007	2024-06-18	M	2.00	0.31	<10	<0.0050	52.5	15000	<1.0	0.70	<0.10	1990	0.0172	<0.0010	0.00364	0.0105	<0.00050	<0.00050	4.30	0.000072	385	<0.00050	<0.00150
WQ2-1	L2756678-7	2024-07-16	M																					
WQ2-1	VA24B7237-007	2024-07-16	M	5.15	0.49	10	<0.0050	58.7	17500	<1.0	<0.50	<0.10	2390	0.0274	<0.0010	0.00369	0.0106	<0.00050	<0.00050	3.36	0.000077	390	<0.00050	<0.00150
WQ2-1	L2757095-7	2024-08-20	M																					
WQ2-1	VA24C1101-007	2024-08-20	M	0.38	0.34	<10	<0.0050	57.5	17000	<1.0	<0.50	<0.10	2360	0.0153	<0.0010	0.00376	0.0105	<0.00050	<0.00050	3.69	0.000075	373	<0.00050	<0.00150
WQ2-1	VA24C4483-007	2024-09-17	M	0.08	0.37	<10	<0.0050	54.5	16500	<1.0	<0.50	<0.10	2310	0.0222	<0.0010	0.00548	0.0115	<0.00050	<0.00050	4.00	0.000081	426	<0.00050	<0.00150
WQ2-1	VA24C8360-007	2024-10-22	M	1.96	0.60	<10	<0.0050	59.0	17200	<1.0	<0.50	<0.10	2380	0.0346	<0.0010	0.00625	0.0109	<0.00050	<0.00050	3.54	0.000086	371	<0.00050	<0.00150
WQ2-1	VA24C9197-007	2024-10-29	M	1.83	1.42	<10	<0.0050	59.2	17400	<1.0	<0.50	<0.10	2330	0.0528	<0.0010	0.00169	0.0108	<0.00050	<0.00050	4.22	0.000092	393	<0.00050	<0.00150
WQ2-1	VA24D0009-007	2024-11-05	M	1.74	0.47	<10	<0.0050	57.3	16800	<1.0	0.51	<0.10	2320	0.0392	<0.0010	0.00152	0.0118	<0.00050	<0.00050	2.93	0.000076	364	<0.00050	<0.00150
WQ2-1	L2758095-4	2024-11-12	M																					
WQ2-1	VA24D0632-004	2024-11-12	M	1.85	0.34	<10	<0.0050	53.9	17000	<1.0	<0.50	<0.10	2360	0.0200	<0.0010	0.00173	0.0118	<0.00050	<0.00050	3.48	0.000084	397	<0.00050	<0.00150
WQ2-1	VA24D1720-007	2024-11-21	M	492.93	1.75	20	<0.0050	55.6	16900	<1.0	<0.50	<0.10	2350	0.0515	<0.0010	0.00170	0.0132	<0.00050	<0.00050	4.55	0.000101	397	<0.00050	<0.00150
WQ2-1	L2758465-7	2024-12-17	M																					
WQ2-1	VA24D3769-007	2024-12-17	M	0.02	0.28	<10	<0.0050	54.9	16800	<1.0	<0.50	<0.10	2330	0.0094	<0.0010	0.00172	0.0094	<0.00050	<0.00050	3.69	0.000079	324	<0.00050	<0.00150
WQ2-1	L2758719-7	2025-01-21	M																					
WQ2-1	VA25A1408-007	2025-01-21	M	-2.00	0.23	<10	<0.0050	49.6	15000	<1.0	<0.50	<0.10	2050	0.0208	<0.0010	0.00156	0.0087	<0.00050	<0.00050	4.30	0.000081	443	<0.00050	<0.00150
WQ2-1	L2758994-7	2025-02-18	M																					
WQ2-1	VA25A3430-007	2025-02-18	M	-2.96	1.38	<10	<0.0050	56.6	17000	<1.0	0.63	<0.10	2340	0.0746	<0.0010	0.00167	0.0103	<0.00050	<0.00050	3.59	0.000091	395	<0.00050	<0.00150
WQ2-1	VA25A6550-007	2025-03-25	M	278.71	0.57	<10	<0.0050	56.8	16600	<1.0	<0.50	<0.10	2310	0.0146	<0.0010	0.00168	0.0102	<0.00050	<0.00050	3.44	0.000073	430	<0.00050	<0.00150
WQ2-1	VA25A8962-007	2025-04-22	M	-3.17	0.30	<10	0.0198	59.4	16700	<1.0	<0.50	<0.10	2260	0.0086	<0.0010	0.00163	0.0092	<0.00050	<0.00050	3.64	0.000075	367	<0.00050	<0.00150
WQ2-1	VA25A9878-007	2025-04-30	M	-2.99	0.15	<10	0.0462	58.1	16600	1.3	<0.50	<0.10	2310	0.0080	<0.0010	0.00158	0.0087	<0.00050	<0.00050	3.59	0.000083	377	<0.00050	<0.00150
WQ2-1	VA25B0358-007	2025-05-06	M	0.35	0.34	<10	<0.0050	67.5	17900	1.4	<0.50	<0.10	2480	0.0089	<0.0010	0.00160	0.0092	<0.00050	<0.00050	2.68	0.000077	352	<0.00050	<0.00150
WQ2-1	VA25B1026-007	2025-05-13	M	-0.87	0.30	<10	0.0179	56.2	17200	<1.0	<0.50	<0.10	2380	0.0146	<0.0010	0.00155	0.0092	<0.00050	<0.00050	3.92	0.000067	373	<0.00050	<0.00150
WQ2-1	VA25B1711-007	2025-05-20	M	-0.92	0.24	<10	0.0379	56.8	16200	<1.0	<0.50	<0.10	2150	0.0094	<0.0010	0.00143	0.0091	<0.00050	<0.00050	4.02	0.000079	349	<0.00050	<0.00150
WQ2-2	0051710-04	2020-05-20	M	1.29		2	<0.050				<1.00			0.336	<0.00040	<0.00100	<0.0100	<0.00020	<0.00020	0.258	<0.000020	17.7	<0.00100	
WQ2-2	0062209-04	2020-06-22	M	12.25		6	0.092				<0.010			0.934	<0.00040	<0.00100	0.023	<0.00020	<0.00020	0.249	<0.000020	22.4	<0.00100	
WQ2-2	0071996-04	2020-07-21	M	12.28		6	<0.050				<0.010			0.638	<0.00040	<0.00100	0.0167	<0.00020	<0.00020	0.371	<0.000020	20.4	<0.00100	
WQ2-2	0082292-04	2020-08-24	M	0.66		2	<0.050				<1.00			0.209	<0.00040	0.00109	0.0319	<0.00020	<0.00020	1.92	0.000052	169	<0.00100	
WQ2-2	0093017-04	2020-09-28	M	7.70		12	<0.050				<1.00			0.386	<0.00040	<0.00100	0.0161	<0.00020	<0.00020	1.2	0.000024	110	<0.00100	
WQ2-2	20J1961-04	2020-10-20	M	2.34		<1.8	<0.050				<10.0			0.15	<0.00040	<0.00100	0.0134	<0.00020	<0.00020	1.41	0.000032	126	<0.00100	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	20J2778-04	2020-10-27	M	11.11		4	<0.050				<1.00			0.0557	<0.00040	<0.00100	0.013	<0.00020	<0.00020	1.84	0.000049	175	<0.00100	
WQ2-2	20K0360-04	2020-11-03	M	2.10		20	<0.050				<1.00			0.192	<0.00040	<0.00100	0.0123	<0.00020	<0.00020	1.48	0.000038	131	<0.00100	
WQ2-2	20K1261-04	2020-11-10	M	2.50		7	0.05				<1.00			0.147	<0.00040	<0.00100	0.0146	<0.00020	<0.00020	1.54	0.000034	144	<0.00100	
WQ2-2	20K2100-04	2020-11-18	M			7.8	<0.050				<1.00			0.419	<0.00040	0.0012	0.0148	<0.00020	<0.00020	0.78	<0.000020	81.1	<0.00100	
WQ2-2	20L1589-04	2020-12-14	M	0.39		<1	<0.050				<1.00			0.045	<0.00040	0.00127	0.014	<0.00020	<0.00020	2.11	0.000058	220	<0.00100	
WQ2-2	21A2590-04	2021-01-27	M	0.21		2	<0.050				<1.00			0.0216	<0.00040	0.00161	<0.0100	<0.00020	<0.00020	3.8	0.000083	357	<0.00100	
WQ2-2	21B2778-04	2021-02-25	M			<1.8	<0.050				<1.00			0.0215	<0.00040	0.00161	0.01	<0.00020	<0.00020	3.6	0.000057	330	<0.00100	
WQ2-2	21C3505-04	2021-03-25	M	0.82		<1	<0.050				<1.00			0.0397	<0.000500	0.000657	0.00959	<0.000100	<0.000100	1.85	0.0000434	144	<0.00100	
WQ2-2	21D2478-04	2021-04-22	M	1.76		<1	<0.050				<1.00			0.191	0.0001	0.000497	0.0104	<0.000010	0.000013	1.39	0.0000237	131	0.00031	
WQ2-2	21E1990-04	2021-05-18	M	11.68		39	<0.050				<1.00			0.657	<0.00020	<0.00050	0.0135	<0.00010	<0.00010	0.0893	<0.000010	11.2	<0.00050	
WQ2-2	21E2917-04	2021-05-26	M	4.10		10	<0.050				<1.00			0.311	<0.000050	0.000181	0.00978	<0.000010	<0.000010	0.182	0.0000082	18.1	0.00036	
WQ2-2	21F0167-04	2021-06-01	M	1.05		<1	0.13				<1.00			0.184	0.000111	0.000599	0.0116	<0.000010	<0.000010	1.69	0.0000224	146	0.00038	
WQ2-2	21F1056-04	2021-06-08	M	12.69		4	0.119				<1.00			0.701	0.000199	0.000214	0.0154	<0.000010	<0.000010	0.16	0.0000084	15.4	0.00052	
WQ2-2	21F2014-04	2021-06-15	M	14.77		10	<0.050				<1.00			0.875	0.000134	0.000371	0.0197	<0.000010	<0.000010	0.471	0.0000192	46.4	0.0006	
WQ2-2	21G2414-04	2021-07-20	M	2.83		3	<0.050				<1.00			0.263	<0.000500	<0.000500	0.0122	<0.000100	<0.000100	0.4	<0.0000200	33.3	<0.00100	
WQ2-2	21H3040-04	2021-08-25	M			6	<0.050				<1.00			0.316	<0.000500	0.000553	0.0185	<0.000100	<0.000100	0.881	<0.0000200	80.9	<0.00100	
WQ2-2	21I3814-04	2021-09-28	M	6.41		9.3	0.055				<1.00			0.123	<0.000500	0.00069	0.0186	<0.000100	<0.000100	1.85	0.0000405	175	<0.00100	
WQ2-2	21J3514-04	2021-10-26	M	6.86		727	<0.050				<1.00			0.474	<0.00020	<0.00050	0.012	<0.00010	<0.00010	0.513	0.00003	42.6	<0.00050	
WQ2-2	21K3046-04	2021-11-23	M	0.82		2	<0.050				<1.00			0.0227	<0.00040	0.00114	0.0114	<0.00020	<0.00020	2.82	0.00006	256	<0.00100	
WQ2-2	21L2125-04	2021-12-14	M	0.63		15	<0.050				<1.00			<0.0100	<0.00040	0.00115	0.0123	<0.00020	<0.00020	2.7	0.000058	193	<0.00100	
WQ2-2	22A2312-04	2022-01-20	M	0.00		<1.8	<0.050				<1.00			0.0358	<0.00040	0.00228	0.0103	<0.00020	<0.00020	4.27	0.000088	294	<0.00100	
WQ2-2	22B2487-04	2022-02-17	M	0.70		<1	<0.050	<25.0	14000	<25.0	<2.50	<2.50	2210	0.0191	<0.00040	0.00146	<0.0100	<0.00020	<0.00020	3.42	0.000078	297	<0.00100	
WQ2-2	22C3145-04	2022-03-22	M	0.30		<1	<0.050	51.4	12100	<25.0	<2.50	<2.50	1830	0.07	<0.00040	0.00163	<0.0100	<0.00020	<0.00020	2.82	0.000066	267	<0.00100	
WQ2-2	22D2212-11	2022-04-19	M	0.70		<1	<0.050	54.4	13600	<50.0	<5.00	<5.00	1860	0.0238	<0.00040	0.00151	<0.0100	<0.00020	<0.00020	4.87	0.000056	303	<0.00100	
WQ2-2	22E2480-06	2022-05-17	M	0.20		3	<0.050	<50.0	3490	<50.0	<5.00	<5.00	<500	0.126	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	0.736	<0.000100	67.3	<0.00500	
WQ2-2	22F3212-04	2022-06-21	M	3.78		9	0.052	<50.0	1280	<50.0	<5.00	<5.00	<500	0.23	<0.000500	<0.000500	0.00882	<0.000100	<0.000100	0.448	<0.0000200	31.2	<0.00100	
WQ2-2	22G1763-04	2022-07-13	M	5.57		3	<0.050	<50.0	1900	<50.0	<5.00	<5.00	<500	0.296	<0.000500	<0.000500	0.0130	<0.000100	<0.000100	0.569	0.0000258	41.8	<0.00100	
WQ2-2	22H2453-04	2022-08-16	M	8.86		2	<0.050	<50.0	1120	<50.0	<5.00	<5.00	<500	0.343	<0.000500	<0.000500	0.0134	<0.000100	<0.000100	0.350	<0.0000200	31.9	<0.00100	
WQ2-2	22I1926-04	2022-09-14	M	3.51		1	<0.050	32.5	9830	<10.0	<1.00	<1.00	1630	0.0688	<0.000500	0.000985	0.0116	<0.000100	<0.000100	2.54	0.0000509	192	<0.00100	
WQ2-2	22J1560-06	2022-10-12	M	0.51		<1	<0.050	<100	10100	<100	<10.0	<10.0	1800	0.0860	<0.000500	0.00155	0.0126	<0.000100	<0.000100	3.34	0.0000456	263	<0.00100	
WQ2-2	22K1453-04	2022-11-10	M	0.64		1	<0.050	32.3	13900	<25.0	0.382	<0.0050	1880	0.0372	<0.000500	0.00171	0.0123	<0.000100	<0.000100	4.27	0.0000831	309	<0.00100	
WQ2-2	22L0774-04	2022-12-07	M	0.35		1	<0.050	<25.0	15500	<25.0	<2.50	<2.50	2130	<0.0200	<0.000500	0.00157	0.0116	<0.000100	<0.000100	4.02	0.0000844	301	<0.00100	
WQ2-2	23A2847-04	2023-01-27	M	0.00		<1	<0.050	<100	7510	<100	0.238	<0.0050	1070	0.0312	<0.000500	0.00108	0.0105	<0.000100	<0.000100	2.2	0.0000636	196	<0.00100	
WQ2-2	23C0060-04	2023-02-28	M	-0.01		<1	<0.050	<100	14800	<100	<10.0	<10.0	1890	<0.0200	<0.000500	0.00172	0.00938	<0.000100	<0.000100	3.65	0.0000958	355	<0.00100	
WQ2-2	23C1797-04	2023-03-15	M	-0.31		<1	<0.050	<100	13100	<100	<10.0	<10.0	1880	0.0204	<0.000500	0.00164	0.0107	<0.000100	<0.000100	3.3	0.0000549	289	<0.00100	
WQ2-2	23D2945-04	2023-04-26	M	0.23	0.63	<1	<0.050	<100	9080	0.633	<0.100	<0.0500	1190	0.0354	<0.000500	0.00114	0.00934	<0.000100	<0.000100	2.13	0.0000477	201	<0.00100	
WQ2-2	23E2392-04	2023-05-17	M		21.4	10	0.072	<100	1210	0.099	0.112	0.0700	<1000	0.965	<0.000100	0.000302	0.0175	<0.000020	<0.000020	0.248	0.0000166	31.1	<0.00100	
WQ2-2	23F3614-04	2023-06-27	M	8.06	9.97	4	<0.050	<100	1230	0.116	<0.100	<0.0500	<1000	0.41	<0.000500	<0.000500	0.0146	<0.000100	<0.000100	0.367	<0.0000200	31.9	<0.00100	
WQ2-2	23G2415-04	2023-07-19	M	7.00	7.01	1	<0.050	<100	2110	0.177	<1.00	<0.500	<1000	0.272	<0.000500	<0.000500	0.0159	<0.000100	<0.000100	0.648	0.0000338	55.8	<0.00100	
WQ2-2	23H3309-06	2023-08-24	M	0.03	5.71	<1	<0.050	<100	5100	0.397	<0.0550	<0.0050	<1000	0.241	<0.000500	0.000748	0.0167	<0.000100	<0.000100	1.42	0.0000511	125	<0.00100	
WQ2-2	23I2271-06	2023-09-19	M	0.61	3.05	1	<0.050	<100	6000	0.429	<0.100	<0.0500	<1000	0.113	<0.000500	0.000659	0.0150	<0.000100	<0.000100	1.73	0.0000315	151	<0.00100	
WQ2-2	23J2236-06	2023-10-18	M	1.48	21.0	46	<0.050	<100	1690	0.142	0.122	<0.0500	<1000	0.897	<0.000500	<0.000500	0.0257	<0.000100	<0.000100	0.422	0.0000292	46	<0.00100	
WQ2-2	23K1909-04	2023-11-15	M	-0.02	1.61	2.0	<0.050	<100	7920	0.580	0.199	<0.0500	1210	0.0942	<0.000500	0.000948	0.0119	<0.000100	<0.000100	4.53	0.0000283	215	<0.00100	
WQ2-2	23L1905-08	2023-12-14	M	0.21	0.62	<1.8	<0.050	<100	13700	1.07	0.395	<0.0500	1740	0.0405	<0.000500	0.00152	0.0107	<0.000100	<0.000100	3.44	0.0000892	319	<0.00100	
WQ2-2	L2754383-2	2024-01-25	M																					
WQ2-2	VA24A1507-002	2024-01-25	M	1.03	0.39	20	<0.0050	50.8	15200	<1.0	<0.50	<0.10	2080	0.0259	<0.0010	0.00199	0.0089	<0.00050	<0.00050	3.82	0.000073	371	<0.00050	<0.00150
WQ2-2	L2754594-8	2024-02-13	M																					
WQ2-2	VA24A2858-008	2024-02-13	M	0.72	0.84	<10	0.0066	39.7	11700	<1.0	<0.50	<0.10	1640	0.0457	<0.0010	0.00140	0.0102	<0.00050	<0.00050	3.00	0.000068	260	<0.00050	<0.00150
WQ2-2	L2755033-8	2024-03-20	M																					
WQ2-2	VA24A5955-008	2024-03-20	M	1.14	2.05	<10	<0.0050	44.3	13200	<1.0	<0.50	<0.10	1800	0.0312	<0.0010	0.00226	0.0094	<0.00050	<0.00050	3.07	0.000060	311	<0.00050	<0.00150
WQ2-2	L2755461-8	2024-04-23	M																					
WQ2-2	VA24A8736-008	2024-04-23	M	1.37	1.94	<10	<0.0050	44.1	13000	<1.0	<0.50	<0.10	1810	0.0248	<0.0010	0.00242	0.0097	<0.00050	<0.00050	3.67	0.000056	340	0.00052	<0.00150
WQ2-2	L2755553-8	2024-04-30	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	VA24A9418-008	2024-04-30	M	0.37	1.68	<10	0.0093	14.0	4170	<1.0	<0.50	<0.10	550	0.0864	<0.0010	0.00106	0.0077	<0.00050	<0.00050	1.20	<0.000020	105	<0.00050	<0.00150
WQ2-2	L2755641-8	2024-05-07	M																					
WQ2-2	VA24B0040-008	2024-05-07	M	0.31	1.44	<10	0.0086	35.4	10300	<1.0	<0.50	<0.10	1530	0.0768	<0.0010	0.00235	0.0071	<0.00050	<0.00050	2.69	0.000035	238	<0.00050	<0.00150
WQ2-2	L2755769-8	2024-05-14	M																					
WQ2-2	VA24B0738-008	2024-05-14	M	2.36	2.32	<10	0.0102	21.1	6570	<1.0	<0.50	<0.10	819	0.209	<0.0010	0.00133	0.0090	<0.00050	<0.00050	1.58	0.000031	153	<0.00050	<0.00150
WQ2-2	L2755874-8	2024-05-21	M																					
WQ2-2	VA24B1351-008	2024-05-21	M	0.39	1.39	<10	0.0194	37.3	11200	<1.0	<0.50	<0.10	1530	0.0768	<0.0010	0.00172	0.0082	<0.00050	<0.00050	2.60	0.000042	242	<0.00050	<0.00150
WQ2-2	L2756277-8	2024-06-18	M																					
WQ2-2	VA24B4257-008	2024-06-18	M	6.80	1.82	20	0.0212	22.8	6590	<1.0	<0.50	<0.10	858	0.132	<0.0010	0.00161	0.0089	<0.00050	<0.00050	1.55	0.000022	149	0.00286	<0.00150
WQ2-2	L2756678-8	2024-07-16	M																					
WQ2-2	VA24B7237-008	2024-07-16	M	10.26	9.07	10	0.0067	23.3	7280	<1.0	<0.50	<0.10	980	0.402	<0.0010	0.00212	0.0171	<0.00050	<0.00050	1.50	0.000036	161	<0.00050	<0.00150
WQ2-2	L2757095-8	2024-08-20	M																					
WQ2-2	VA24C1101-008	2024-08-20	M	2.78	0.95	<10	0.0168	42.8	12700	<1.0	<0.50	<0.10	1760	0.0556	<0.0010	0.00267	0.0121	<0.00050	<0.00050	2.73	0.000055	269	<0.00050	<0.00150
WQ2-2	VA24C4483-008	2024-09-17	M	6.10	4.16	<10	0.0109	26.8	8360	<1.0	<0.50	<0.10	1160	0.135	<0.0010	0.00223	0.0137	<0.00050	<0.00050	1.72	0.000049	191	<0.00050	<0.00150
WQ2-2	VA24C8360-008	2024-10-22	M	3.03	2.80	<10	0.0163	43.2	12800	<1.0	<0.50	<0.10	1770	0.112	<0.0010	0.00502	0.0145	<0.00050	<0.00050	2.66	0.000053	279	<0.00050	<0.00150
WQ2-2	VA24C9197-008	2024-10-29	M	3.09	3.44	10	0.0146	30.7	9020	<1.0	<0.50	<0.10	1170	0.146	<0.0010	0.00094	0.0118	<0.00050	<0.00050	2.18	0.000056	197	<0.00050	<0.00150
WQ2-2	VA24D0009-008	2024-11-05	M	1.59	0.45	<10	0.0130	41.6	12100	<1.0	<0.50	<0.10	1680	0.0366	<0.0010	0.00112	0.0112	<0.00050	<0.00050	2.33	0.000056	265	<0.00050	<0.00150
WQ2-2	L2758095-5	2024-11-12	M																					
WQ2-2	VA24D0632-005	2024-11-12	M	3.90	3.03	10	0.0092	27.1	8780	<1.0	<0.50	<0.10	1220	0.161	<0.0010	0.00100	0.0114	<0.00050	<0.00050	1.78	0.000049	198	<0.00050	<0.00150
WQ2-2	VA24D1720-008	2024-11-21	M	-1.00	0.81	20	0.0053	22.0	6900	<1.0	<0.50	<0.10	931	0.0407	<0.0010	0.00134	0.0121	<0.00050	<0.00050	3.74	0.000059	322	<0.00050	<0.00150
WQ2-2	L2758465-8	2024-12-17	M																					
WQ2-2	VA24D3769-008	2024-12-17	M	-0.07	0.31	41	<0.0050	49.0	15100	<1.0	<0.50	<0.10	2120	0.0137	<0.0010	0.00148	0.0096	<0.00050	<0.00050	3.28	0.000072	276	<0.00050	<0.00150
WQ2-2	L2758719-8	2025-01-21	M																					
WQ2-2	VA25A1408-008	2025-01-21	M	-1.90	0.56	<10	0.0072	41.6	12900	<1.0	<0.50	<0.10	1760	0.0190	<0.0010	0.00119	0.0095	<0.00050	<0.00050	3.54	0.000068	331	<0.00050	<0.00150
WQ2-2	L2758994-8	2025-02-18	M																					
WQ2-2	VA25A3430-008	2025-02-18	M	-2.97	0.71	<10	<0.0050	44.8	13600	<1.0	<0.50	<0.10	1880	0.0211	<0.0010	0.00139	0.0107	<0.00050	<0.00050	3.18	0.000075	331	<0.00050	<0.00150
WQ2-2	VA25A6550-008	2025-03-25	M	0.05	1.04	<10	0.0230	41.6	12000	<1.0	<0.50	<0.10	1660	0.0229	<0.0010	0.00121	0.0088	<0.00050	<0.00050	2.63	0.000055	302	<0.00050	<0.00150
WQ2-2	VA25A8962-008	2025-04-22	M	-2.84	0.80	<10	0.0067	29.9	8410	<1.0	<0.50	<0.10	1110	0.0338	<0.0010	0.00081	0.0085	<0.00050	<0.00050	2.08	0.000048	191	<0.00050	<0.00150
WQ2-2	VA25A9878-008	2025-04-30	M	-1.37	1.51	<10	<0.0050	16.2	4690	<1.0	<0.50	<0.10	614	0.118	<0.0010	0.00049	0.0081	<0.00050	<0.00050	1.17	0.000020	109	<0.00050	<0.00150
WQ2-2	VA25B0358-008	2025-05-06	M	0.36	0.26	<10	0.0338	52.2	13600	<1.0	<0.50	<0.10	1860	0.0121	<0.0010	0.00109	0.0089	<0.00050	<0.00050	2.19	0.000043	263	<0.00050	<0.00150
WQ2-2	VA25B1026-008	2025-05-13	M	0.10	1.20	<10	0.0058	16.1	5160	<1.0	<0.50	<0.10	689	0.0848	<0.0010	0.00054	0.0088	<0.00050	<0.00050	1.37	0.000022	115	<0.00050	<0.00150
WQ2-2	VA25B1711-008	2025-05-20	M	0.09	1.59	10	0.0081	14.4	4090	<1.0	<0.50	<0.10	535	0.0728	<0.0010	0.00052	0.0079	<0.00050	<0.00050	1.09	0.000021	88.2	<0.00050	<0.00150
WQ2-3	23L1905-09	2023-12-14	M	1.11	1.00	<1.8	<0.050	<100	14100	1.05	0.404	<0.0500	1760	0.0689	<0.000500	0.00179	0.0113	<0.000100	<0.000100	3.67	0.0000727	338	<0.00100	
WQ2-3	L2754383-3	2024-01-25	M																					
WQ2-3	VA24A1507-003	2024-01-25	M	1.60	1.28	74	0.0101	21.8	6930	<1.0	<0.50	<0.10	903	0.0850	<0.0010	0.00103	0.0081	<0.00050	<0.00050	2.00	0.000041	182	<0.00050	<0.00150
WQ2-3	L2754594-9	2024-02-13	M																					
WQ2-3	VA24A2858-009	2024-02-13	M	1.13	1.16	<10	0.0110	29.0	8580	<1.0	<0.50	<0.10	1200	0.0703	<0.0010	0.00097	0.0104	<0.00050	<0.00050	1.95	0.000047	191	<0.00050	<0.00150
WQ2-3	L2755033-9	2024-03-20	M																					
WQ2-3	VA24A5955-009	2024-03-20	M	1.81	2.16	<10	<0.0050	22.6	6760	<1.0	<0.50	<0.10	907	0.0770	<0.0010	0.00144	0.0093	<0.00050	<0.00050	1.71	0.000026	169	<0.00050	<0.00150
WQ2-3	L2755461-9	2024-04-23	M																					
WQ2-3	VA24A8736-009	2024-04-23	M	1.27	1.37	<10	<0.0050	25.5	7650	<1.0	<0.50	<0.10	1040	0.0370	<0.0010	0.00140	0.0088	<0.00050	<0.00050	2.52	0.000035	225	<0.00050	<0.00150
WQ2-3	L2755553-9	2024-04-30	M																					
WQ2-3	VA24A9418-009	2024-04-30	M	1.19	1.63	<10	0.0088	12.8	3870	<1.0	<0.50	<0.10	494	0.0831	<0.0010	0.00097	0.0072	<0.00050	<0.00050	1.08	<0.000020	96.9	<0.00050	<0.00150
WQ2-3	L2755641-9	2024-05-07	M																					
WQ2-3	VA24B0040-009	2024-05-07	M	2.50	2.20	<10	<0.0050	21.9	6320	<1.0	<0.50	<0.10	839	0.125	<0.0010	0.00161	0.0082	<0.00050	<0.00050	1.56	0.000032	135	<0.00050	<0.00150
WQ2-3	L2755769-9	2024-05-14	M																					
WQ2-3	VA24B0738-009	2024-05-14	M	6.32	6.88	<10	0.0053	<5.0	885	<1.0	<0.50	<0.10	70	0.568	<0.0010	0.00063	0.0121	<0.00050	<0.00050	<0.30	<0.000020	21.7	<0.00050	<0.00150
WQ2-3	L2755874-9	2024-05-21	M																					
WQ2-3	VA24B1351-009	2024-05-21	M	7.20	6.20	<10	0.0114	<5.0	1340	<1.0	<0.50	<0.10	154	0.413	<0.0010	0.00044	0.0126	<0.00050	<0.00050	0.31	<0.000020	31.2	<0.00050	<0.00150
WQ2-3	L2756277-9	2024-06-18	M																					
WQ2-3	VA24B4257-010	2024-06-18	M	9.50	3.33	10	<0.0050	<5.0	342	<1.0	<0.50	<0.10	41	0.295	<0.0010	<0.00040	0.0085	<0.00050	<0.00050	<0.30	<0.000020	10.4	<0.00050	<0.00150
WQ2-3	L2756678-9	2024-07-16	M																					
WQ2-3	VA24B7237-009	2024-07-16	M	16.73	17.5	41	<0.0050	6.6	2250	<1.0	<0.50	<0.10	278	0.819	<0.0010	0.00108	0.0194	<0.00050	<0.00050	0.49	<0.000020	47.9	0.00061	<0.00150

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-3	L2757095-9	2024-08-20	M																					
WQ2-3	VA24C1101-009	2024-08-20	M	6.11	7.95	52	<0.0050	12.5	3750	<1.0	<0.50	<0.10	503	0.419	<0.0010	0.00129	0.0200	<0.00050	<0.00050	0.92	<0.000020	86.4	<0.00050	<0.00150
WQ2-3	VA24C4483-009	2024-09-17	M	6.05	4.13	<10	0.0107	16.8	5230	<1.0	<0.50	<0.10	730	0.160	<0.0010	0.00167	0.0145	<0.00050	<0.00050	1.16	0.000025	126	<0.00050	<0.00150
WQ2-3	VA24C8360-009	2024-10-22	M	12.69	20.0	<10	0.0083	8.8	2720	<1.0	<0.50	<0.10	344	0.708	<0.0010	0.00149	0.0235	<0.00050	<0.00050	0.63	0.000024	60.1	<0.00050	<0.00150
WQ2-3	VA24C9197-009	2024-10-29	M	6.20	7.62	20	0.0144	10.9	3260	<1.0	<0.50	<0.10	402	0.346	<0.0010	0.00053	0.0110	<0.00050	<0.00050	0.86	0.000024	75.2	<0.00050	<0.00150
WQ2-3	VA24D0009-009	2024-11-05	M	2.69	1.61	10	0.0339	20.6	6020	<1.0	<0.50	<0.10	825	0.0868	<0.0010	0.00063	0.0112	<0.00050	<0.00050	1.18	0.000027	134	<0.00050	<0.00150
WQ2-3	L2758095-6	2024-11-12	M																					
WQ2-3	VA24D0632-006	2024-11-12	M	6.38	5.13	20	0.0168	10.0	3270	<1.0	<0.50	<0.10	426	0.268	<0.0010	0.00045	0.0109	<0.00050	<0.00050	0.72	<0.000020	75.0	<0.00050	<0.00150
WQ2-3	VA24D1720-009	2024-11-21	M	0.25	1.52	<10	0.0127	27.3	8420	<1.0	<0.50	<0.10	1150	0.0958	<0.0010	0.00110	0.0135	<0.00050	<0.00050	2.66	0.000051	248	<0.00050	<0.00150
WQ2-3	L2758465-9	2024-12-17	M																					
WQ2-3	VA24D3769-009	2024-12-17	M	-0.13	0.33	10	<0.0050	47.1	14600	<1.0	<0.50	<0.10	2020	0.0151	<0.0010	0.00143	0.0103	<0.00050	<0.00050	3.13	0.000073	269	<0.00050	<0.00150
WQ2-3	L2758719-9	2025-01-21	M																					
WQ2-3	VA25A1408-009	2025-01-21	M	-1.76	0.69	<10	0.0118	36.9	11400	<1.0	<0.50	<0.10	1580	0.0228	<0.0010	0.00104	0.0098	<0.00050	<0.00050	3.10	0.000058	288	<0.00050	<0.00150
WQ2-3	L2758994-9	2025-02-18	M																					
WQ2-3	VA25A3430-009	2025-02-18	M	-2.86	0.61	<10	0.0060	43.8	13500	<1.0	<0.50	<0.10	1860	0.0161	<0.0010	0.00131	0.0111	<0.00050	<0.00050	3.00	0.000072	313	<0.00050	<0.00150
WQ2-3	VA25A6550-009	2025-03-25	M	0.14	1.08	10	0.0095	29.9	9100	<1.0	<0.50	<0.10	1230	0.0394	<0.0010	0.00089	0.0086	<0.00050	<0.00050	2.08	0.000039	231	<0.00050	<0.00150
WQ2-3	VA25A8962-009	2025-04-22	M	-2.13	1.09	<10	0.0057	15.7	4570	<1.0	<0.50	<0.10	546	0.0577	<0.0010	0.00049	0.0078	<0.00050	<0.00050	1.06	0.000033	98.8	<0.00050	<0.00150
WQ2-3	VA25A9878-009	2025-04-30	M	-0.63	1.55	10	0.0064	7.2	2200	<1.0	<0.50	<0.10	268	0.153	<0.0010	<0.00040	0.0077	<0.00050	<0.00050	0.58	<0.000020	53.9	<0.00050	<0.00150
WQ2-3	VA25B0358-009	2025-05-06	M	3.02	3.01	<10	0.0151	14.3	4050	<1.0	<0.50	<0.10	517	0.131	<0.0010	0.00045	0.0094	<0.00050	<0.00050	0.82	<0.000020	79.3	<0.00050	<0.00150
WQ2-3	VA25B1026-009	2025-05-13	M	0.44	1.26	<10	<0.0050	9.8	3260	<1.0	<0.50	<0.10	422	0.0924	<0.0010	<0.00040	0.0075	<0.00050	<0.00050	0.88	<0.000020	74.0	<0.00050	<0.00150
WQ2-3	VA25B1711-009	2025-05-20	M	0.97	2.62	<10	0.0067	<5.0	1020	<1.0	<0.50	<0.10	118	0.110	<0.0010	<0.00040	0.0084	<0.00050	<0.00050	0.33	<0.000020	24.5	<0.00050	<0.00150
WQ3-1	0051710-05	2020-05-20	M	0.91		<1.8	<0.050				<5.00			0.0292	<0.00040	0.00169	<0.0100	<0.00020	<0.00020	3.96	0.000075	413	<0.00100	
WQ3-1	0062209-05	2020-06-22	M	0.66		<1	<0.050				<1.00			0.0184	0.00043	0.00178	0.0103	<0.00020	<0.00020	4.29	0.000078	401	<0.00100	
WQ3-1	0071996-05	2020-07-21	M	1.05		3	<0.050				<1.00			0.0324	<0.00040	0.00264	0.0131	<0.00200	<0.00020	4.13	0.000087	292	<0.00100	
WQ3-1	0082292-05	2020-08-24	M	0.39		2	<0.050				<1.00			0.0353	<0.00040	0.00193	0.0119	<0.00020	<0.00020	4.26	0.000107	384	<0.00100	
WQ3-1	0093017-05	2020-09-28	M	0.62		3	<0.050				<1.00			0.0689	<0.00040	0.00155	0.0105	<0.00020	<0.00020	4.21	0.000094	374	<0.00100	
WQ3-1	20J1961-05	2020-10-20	M	0.62		2	<0.050				<10.0			0.031	<0.00040	0.00183	0.0124	<0.00020	<0.00020	4.31	0.000079	401	<0.00100	
WQ3-1	20J2778-05	2020-10-27	M	15.26		<1	<0.050				<1.00			0.0337	<0.00040	0.00188	0.013	<0.00020	<0.00020	3.99	0.000084	397	<0.00100	
WQ3-1	20K0360-05	2020-11-03	M	0.26		<1	<0.050				<1.00			0.0242	<0.00040	0.00183	0.0108	<0.00020	<0.00020	4.09	0.000075	369	<0.00100	
WQ3-1	20K1261-05	2020-11-10	M	0.20		<1	<0.050				<1.00			0.0242	<0.00040	0.00181	0.012	<0.00020	<0.00020	4.19	0.000074	444	<0.00100	
WQ3-1	20K2100-05	2020-11-18	M			<1.8	<0.050				<1.00			0.0361	<0.00040	0.00217	0.0119	<0.00020	<0.00020	3.91	0.000038	414	<0.00100	
WQ3-1	20L1589-05	2020-12-14	M	-0.04		<1	0.073				<1.00			0.0132	<0.00040	0.00228	0.0118	<0.00020	<0.00020	3.71	0.000078	419	<0.00100	
WQ3-1	21A2590-05	2021-01-27	M	1.60		2	<0.050				<1.00			0.0233	<0.00040	0.00189	0.0105	<0.00020	<0.00020	3.9	0.000064	370	<0.00100	
WQ3-1	21B2778-05	2021-02-25	M			<1.8	<0.050				<1.00			0.0125	<0.00040	0.00152	0.0109	<0.00020	<0.00020	4.33	0.000077	415	<0.00100	
WQ3-1	21C3505-05	2021-03-25	M	0.41		<1	<0.050				<1.00			0.0162	<0.000500	0.00158	0.0102	<0.000100	<0.000100	4.78	0.0000976	388	<0.00100	
WQ3-1	21D2478-05	2021-04-22	M	0.24		<1	<0.050				<1.00			0.0132	<0.000500	0.00168	0.0105	<0.000100	<0.000100	4.34	0.0000862	374	<0.00100	
WQ3-1	21E1990-05	2021-05-18	M	0.23		3	<0.050				<1.00			0.0092	0.00027	0.00245	0.0103	<0.00010	<0.00010	3.44	0.000075	312	<0.00050	
WQ3-1	21E2917-05	2021-05-26	M	0.50		<1	<0.050				<1.00			0.0197	<0.000500	0.00154	0.0101	<0.000100	<0.000100	4.25	0.0000781	427	<0.00100	
WQ3-1	21F0167-05	2021-06-01	M	0.55		1	0.066				<1.00			0.0276	<0.000500	0.0013	0.0102	<0.000100	<0.000100	3.96	0.0000837	355	<0.00100	
WQ3-1	21F1056-05	2021-06-08	M	2.02		<1	0.08				<1.00			0.026	<0.000500	0.00154	0.0109	<0.000100	<0.000100	4.52	0.0000915	408	<0.00100	
WQ3-1	21F2014-05	2021-06-15	M	1.99		1	0.117				<1.00			0.027	<0.000500	0.00204	0.0108	<0.000100	<0.000100	4.08	0.0000851	367	<0.00100	
WQ3-1	21G2414-05	2021-07-20	M	2.77		<1	<0.050				<1.00			0.0235	<0.000500	0.00146	0.0113	<0.000100	<0.000100	3.86	0.0000734	330	<0.00100	
WQ3-1	21H3040-05	2021-08-25	M			<1	<0.050				<1.00			0.018	<0.000500	0.00154	0.0107	<0.000100	<0.000100	4.12	0.0000676	407	<0.00100	
WQ3-1	21I3814-05	2021-09-28	M	0.75		<1.8	<0.050				<1.00			0.115	<0.000500	0.00129	0.0125	<0.000100	<0.000100	3.78	0.0000903	365	<0.00100	
WQ3-1	21J3514-05	2021-10-26	M	-0.29		10	<0.050				<1.00			0.043	<0.00020	0.00153	0.0118	<0.00010	<0.00010	3.85	0.000076	352	<0.00050	
WQ3-1	21K3046-05	2021-11-23	M	0.72		<1	<0.050				<1.00			<0.0100	<0.00040	0.0015	0.0112	<0.00020	<0.00020	3.72	0.000063	347	<0.00100	
WQ3-1	21L2125-05	2021-12-14	M	0.37		1	<0.050				<1.00			0.08	<0.00040	0.00191	0.0109	<0.00020	<0.00020	4.44	0.000082	317	<0.00100	
WQ3-1	22A2312-05	2022-01-20	M	0.00		<1.8	<0.050				<1.00			0.0174	<0.00040	0.00251	0.01	<0.00020	<0.00020	4.54	0.000086	332	<0.00100	
WQ3-1	22B2487-05	2022-02-17	M	0.30		<1	<0.050	<25.0	15600	<25.0	<2.50	<2.50	2400	0.0165	<0.00040	0.00124	<0.0100	<0.00020	<0.00020	3.88	0.000092	332	<0.00100	
WQ3-1	22C3145-05	2022-03-22	M	0.50		<1	<0.050	63.3	15200	<25.0	<2.50	<2.50	2230	0.0579	<0.00040	0.00192	0.0103	<0.00020	<0.00020	3.23	0.000083	316	<0.00100	
WQ3-1	22D2212-04	2022-04-19	M	0.60		<1	<0.050	66.4	16000	<50.0	<5.00	<5.00	2220	0.0293	<0.00040	0.00197	0.0145	<0.00020	<0.00020	6.64	0.000132	363	<0.00100	
WQ3-1	22E2480-07	2022-05-17	M	0.10		<1	<0.050	70	17300	<50.0	<5.00	<5.00	2390	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.26	<0.000100	319	<0.00500	
WQ3-1	22F3212-05	2022-06-21	M	0.40		<1	<0.050	58.1	15900	<50.0	<5.00	<5.00	2110	0.0208	<0.000500	0.00175	0.0117	<0.000100	<0.000100	4.28	0.0000968	360	<0.00100	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	22G1763-05	2022-07-13	M	0.19		<1	<0.050	52.4	15400	<50.0	<5.00	<5.00	2030	<0.0200	<0.000500	0.00187	0.0107	<0.000100	<0.000100	4.43	0.0000677	337	<0.00100	
WQ3-1	22H2453-05	2022-08-16	M	0.10		<1	<0.050	<50.0	14100	<50.0	<5.00	<5.00	2010	0.0428	<0.000500	0.00142	0.0104	<0.000100	<0.000100	3.92	0.0000913	354	<0.00100	
WQ3-1	22I1926-05	2022-09-14	M	1.65		<1	<0.050	51.0	15700	<10.0	<1.00	<1.00	2580	0.0326	<0.000500	0.00162	0.00946	<0.000100	<0.000100	3.70	0.0000680	323	<0.00100	
WQ3-1	22J1560-07	2022-10-12	M	0.17		1	<0.050	<100	5290	<100	<10.0	<10.0	1270	0.186	<0.000500	0.000598	0.0132	<0.000100	<0.000100	1.47	0.0000273	109	<0.00100	
WQ3-1	22K1453-05	2022-11-10	M	0.57		<1	<0.050	36.6	17000	<25.0	0.446	<0.0050	2340	0.0291	<0.000500	0.00223	0.0123	<0.000100	<0.000100	5.3	0.000101	385	<0.00100	
WQ3-1	22L0774-05	2022-12-07	M	0.56		<1	<0.050	<25.0	16300	<25.0	<2.50	<2.50	2260	0.0259	<0.000500	0.00192	0.0115	<0.000100	<0.000100	4.48	0.0000828	330	<0.00100	
WQ3-1	23A2847-05	2023-01-27	M	0.50		1	<0.050	<100	17000	<100	0.380	<0.0050	2360	0.0293	<0.000500	0.00204	0.00944	<0.000100	<0.000100	4.42	0.0000802	385	<0.00100	
WQ3-1	23C0060-05	2023-02-28	M	-0.08		<1	<0.050	<100	16600	<100	<10.0	<10.0	2120	<0.0200	<0.000500	0.00176	0.00883	<0.000100	<0.000100	3.73	0.0000930	375	<0.00100	
WQ3-1	23C1797-05	2023-03-15	M	-0.44		<1	<0.050	<100	14700	<100	<10.0	<10.0	1980	<0.0200	<0.000500	0.00192	0.00979	<0.000100	<0.000100	3.83	0.0000700	331	<0.00100	
WQ3-1	23D2945-05	2023-04-26	M	0.23	0.42	<1	<0.050	<100	16400	1.09	0.542	<0.0500	2090	0.0254	<0.000500	0.00194	0.00995	<0.000100	<0.000100	3.91	0.0000901	366	<0.00100	
WQ3-1	23E2392-05	2023-05-17	M	0.38	0.37	<1	0.109	<100	15900	0.805	0.425	0.0630	2140	0.0293	<0.000500	0.00192	0.00970	<0.000100	<0.000100	3.69	0.000101	397	<0.00100	
WQ3-1	23F3614-05	2023-06-27	M	0.99	0.71	<1	<0.050	<100	17200	1.12	0.508	<0.0500	2530	<0.0500	<0.000500	0.00171	0.00997	<0.000100	<0.000100	4.46	0.000112	373	<0.00100	
WQ3-1	23G2415-05	2023-07-19	M	0.22	0.67	1	<0.050	<100	15700	1.14	<1.00	<0.500	2200	0.0294	<0.000500	0.00185	0.0103	<0.000100	<0.000100	4.33	0.0000719	390	<0.00100	
WQ3-1	23H3309-07	2023-08-24	M	0.23	0.62	<1	<0.050	<100	15400	1.11	0.292	0.0090	2330	0.0229	<0.000500	0.00191	0.0107	<0.000100	<0.000100	3.88	0.000103	345	<0.00100	
WQ3-1	23I2271-07	2023-09-19	M	0.49	1.05	<1	<0.050	<100	16300	1.12	0.375	<0.0500	2330	0.0650	<0.000500	0.00167	0.0116	<0.000100	<0.000100	4.2	0.0000824	368	<0.00100	
WQ3-1	23J2236-07	2023-10-18	M	0.62	1.00	1	<0.050	<100	17100	1.19	0.435	<0.0500	2930	0.0668	<0.000500	0.00166	0.0107	<0.000100	<0.000100	4.13	0.000106	331	<0.00100	
WQ3-1	23K1909-05	2023-11-15	M	0.29	0.94	<1.8	<0.050	<100	18500	1.26	0.439	<0.0500	2770	0.0315	<0.000500	0.00168	0.00850	<0.000100	<0.000100	7.42	0.000105	426	<0.00100	
WQ3-1	23L2091-01	2023-12-15	M	1.01	0.76	<1.8	<0.050	<100	16800	1.22	0.433	<0.0050	2090	0.0407	<0.000500	0.00186	0.0103	<0.000100	<0.000100	4.49	0.0000878	378	<0.00100	
WQ3-1	L2754366-1	2024-01-24	M																					
WQ3-1	VA24A1422-001	2024-01-24	M	2.35	0.10	<10	<0.0050	58.4	16800	<1.0	<0.50	<0.10	2340	0.0259	<0.0010	0.00195	0.0091	<0.00050	<0.00050	3.68	0.000077	393	<0.00050	<0.00150
WQ3-1	L2754604-1	2024-02-14	M																					
WQ3-1	VA24A2995-001	2024-02-14	M	5.02	0.17	31	<0.0050	55.6	16400	<1.0	<0.50	<0.10	2310	0.0164	<0.0010	0.00164	0.0093	<0.00050	<0.00050	4.23	0.000086	335	<0.00050	<0.00150
WQ3-1	L2755043-1	2024-03-21	M																					
WQ3-1	VA24A6026-001	2024-03-21	M	0.73	0.53	<10	<0.0050	57.3	16700	<1.0	<0.50	<0.10	2250	0.0380	<0.0010	0.00270	0.0096	<0.00050	<0.00050	3.42	0.000067	387	<0.00050	<0.00150
WQ3-1	L2755490-1	2024-04-24	M																					
WQ3-1	VA24A8916-001	2024-04-24	M	0.47	0.44	<10	<0.0050	58.0	16900	<1.0	<0.50	<0.10	2350	0.0124	<0.0010	0.00338	0.0111	<0.00050	<0.00050	3.86	0.000066	391	<0.00050	<0.00150
WQ3-1	L2755567-1	2024-05-01	M																					
WQ3-1	VA24A9566-001	2024-05-01	M	-0.12	0.19	<10	0.0156	58.6	16800	1.0	<0.50	<0.10	2380	0.0126	<0.0010	0.00320	0.0107	<0.00050	<0.00050	3.96	0.000069	400	<0.00050	<0.00150
WQ3-1	L2755666-1	2024-05-08	M																					
WQ3-1	VA24B0201-001	2024-05-08	M	0.06	0.35	<10	0.0079	60.2	17500	<1.0	<0.50	<0.10	2410	0.0142	<0.0010	0.00353	0.0095	<0.00050	<0.00050	3.68	0.000076	378	<0.00050	<0.00150
WQ3-1	L2755779-1	2024-05-15	M																					
WQ3-1	VA24B0901-001	2024-05-15	M	0.04	0.36	<10	<0.0050	56.6	17300	<1.0	<0.50	<0.10	2320	0.0198	<0.0010	0.00370	0.0101	<0.00050	<0.00050	3.78	0.000083	384	<0.00050	<0.00150
WQ3-1	L2755888-1	2024-05-22	M																					
WQ3-1	VA24B1500-001	2024-05-22	M	0.15	0.49	<10	<0.0050	53.9	16100	<1.0	<0.50	<0.10	2210	0.0216	<0.0010	0.00318	0.0102	<0.00050	<0.00050	4.10	0.000083	352	<0.00050	<0.00150
WQ3-1	L2756312-1	2024-06-19	M																					
WQ3-1	VA24B4510-001	2024-06-19	M	1.90	0.48	<10	<0.0050	57.6	16300	<1.0	<0.50	<0.10	2180	0.0253	<0.0010	0.00562	0.0109	<0.00050	<0.00050	3.51	0.000088	406	<0.00050	<0.00150
WQ3-1	VA24B7397-001	2024-07-17	M	-0.36	0.34	<10	<0.0050	40.1	12300	1.1	<0.50	<0.10	1690	0.0200	<0.0010	0.00380	0.0112	<0.00050	<0.00050	3.24	0.000079	396	<0.00050	<0.00150
WQ3-1	L2756689-1	2024-07-17	M																					
WQ3-1	L2757122-1	2024-08-21	M																					
WQ3-1	VA24C1337-001	2024-08-21	M	0.19	0.37	<10	<0.0050	59.1	17400	<1.0	<0.50	<0.10	2420	0.0156	<0.0010	0.00340	0.0105	<0.00050	<0.00050	3.48	0.000078	355	<0.00050	<0.00150
WQ3-1	VA24C4683-001	2024-09-18	M	1.38	0.43	<10	<0.0050	56.8	16200	<1.0	<0.50	<0.10	2270	0.0193	<0.0010	0.00541	0.0112	<0.00050	<0.00050	4.26	0.000090	393	<0.00050	<0.00150
WQ3-1	VA24C8569-001	2024-10-23	M	1.88	0.47	<10	<0.0050	53.8	16300	<1.0	<0.50	<0.10	2230	0.0256	<0.0010	0.00550	0.0103	<0.00050	<0.00050	3.58	0.000080	362	<0.00050	<0.00150
WQ3-1	L2757977-1	2024-10-30	M																					
WQ3-1	VA24C9414-001	2024-10-30	M	0.81	0.41	<10	0.0056	60.0	18500	<1.0	0.53	<0.10	2620	0.0259	<0.0010	0.00162	0.0107	<0.00050	<0.00050	3.90	0.000094	408	<0.00050	<0.00150
WQ3-1	VA24D0180-001	2024-11-06	M	1.49	0.34	<10	<0.0050	56.2	16900	<1.0	0.56	<0.10	2350	0.0318	<0.0010	0.00156	0.0110	<0.00050	<0.00050	3.64	0.000082	376	<0.00050	<0.00150
WQ3-1	VA24D0813-001	2024-11-13	M	0.79	0.57	<10	<0.0050	53.7	17000	<1.0	0.51	<0.10	2400	0.0349	<0.0010	0.00164	0.0123	<0.00050	<0.00050	3.51	0.000077	390	<0.00050	<0.00150
WQ3-1	L2758221-1	2024-11-22	M																					
WQ3-1	VA24D1791-001	2024-11-22	M	-1.79	0.40	<10	<0.0050	52.1	16600	<1.0	0.54	<0.10	2360	0.0228	<0.0010	0.00166	0.0120	<0.00050	<0.00050	4.80	0.000086	421	<0.00050	<0.00150
WQ3-1	L2758486-1	2024-12-18	M																					
WQ3-1	VA24D3937-001	2024-12-18	M	0.04	0.24	20	<0.0050	54.0	15900	<1.0	<0.50	<0.10	2200	0.0145	<0.0010	0.00174	0.0092	<0.00050	<0.00050	3.52	0.000075	361	<0.00050	<0.00150
WQ3-1	L2758770-1	2025-01-22	M																					
WQ3-1	VA25A1525-001	2025-01-22	M	-1.49	0.44	<10	<0.0050	60.4	17200	<1.0	<0.50	<0.10	2420	0.0168	<0.0010	0.00169	0.0085	<0.00050	<0.00050	3.62	0.000083	386	<0.00050	<0.00150
WQ3-1	L2759008-1	2025-02-19	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	VA25A3570-001	2025-02-19	M	-3.08	0.45	<10	<0.0050	51.1	16100	<1.0	<0.50	<0.10	2240	0.0141	<0.0010	0.00164	0.0095	<0.00050	<0.00050	3.54	0.000070	387	<0.00050	<0.00150
WQ3-1	VA25A6679-001	2025-03-26	M	0.53	0.81	<10	0.0093	58.4	16600	<1.0	<0.50	<0.10	2320	0.0248	<0.0010	0.00173	0.0104	<0.00050	<0.00050	4.83	0.000073	442	<0.00050	<0.00150
WQ3-1	VA25A9109-001	2025-04-23	M	-2.90	0.34	<10	0.0265	61.4	17200	<1.0	<0.50	<0.10	2430	0.0160	<0.0010	0.00165	0.0091	<0.00050	<0.00050	3.26	0.000074	380	<0.00050	<0.00150
WQ3-1	VA25A9941-001	2025-05-01	M	-3.16	0.29	<10	0.0298	60.7	17200	1.6	0.53	<0.10	2440	0.0060	<0.0010	0.00157	0.0085	<0.00050	<0.00050	3.96	0.000083	394	<0.00050	<0.00150
WQ3-1	VA25B0496-001	2025-05-07	M	0.28	0.18	<10	<0.0050	60.1	17500	<1.0	0.58	<0.10	2340	0.0110	<0.0010	0.00164	0.0093	<0.00050	<0.00050	4.05	0.000073	392	<0.00050	<0.00150
WQ3-1	VA25B1530-001	2025-05-16	M	-0.88	0.34	<10	0.0077	57.9	17100	<1.0	<0.50	<0.10	2400	0.0233	<0.0010	0.00157	0.0094	<0.00050	<0.00050	3.68	0.000080	368	<0.00050	<0.00150
WQ3-1	VA25B1841-001	2025-05-21	M	-0.89	0.46	10	<0.0050	63.1	17800	<1.0	<0.50	<0.10	2350	0.0174	<0.0010	0.00133	0.0090	<0.00050	<0.00050	3.86	0.000096	366	<0.00050	<0.00150
WQ3-2	0051710-06	2020-05-20	M	1.17		2	<0.050				<1.00			0.301	<0.00040	<0.00100	<0.0100	<0.00020	<0.00020	0.438	0.000025	37.2	<0.00100	
WQ3-2	0062209-06	2020-06-22	M	18.95		10	<0.050				<0.010			0.897	<0.00040	<0.00100	0.0205	<0.00020	<0.00020	0.215	<0.000020	18.9	<0.00100	
WQ3-2	0071996-06	2020-07-21	M	11.92		10	<0.050				<0.010			0.644	<0.00040	<0.00100	0.0168	<0.00020	<0.00020	0.439	<0.000020	24.5	<0.00100	
WQ3-2	0082292-06	2020-08-24	M	1.79		1	<0.050				<1.00			0.232	<0.00040	0.00135	0.0315	<0.00020	<0.00020	2.34	0.000051	210	<0.00100	
WQ3-2	0093017-06	2020-09-28	M	9.18		24	<0.050				<1.00			0.422	<0.00040	<0.00100	0.0165	<0.00020	<0.00020	0.954	0.000024	84.6	<0.00100	
WQ3-2	20J1961-06	2020-10-20	M	2.26		<1.8	<0.050				<10.0			0.143	<0.00040	<0.00100	0.0137	<0.00020	<0.00020	1.41	0.000035	124	<0.00100	
WQ3-2	20J2778-06	2020-10-27	M	1.11		1	<0.050				<1.00			0.0538	<0.00040	0.00103	0.0126	<0.00020	<0.00020	1.8	0.000041	173	<0.00100	
WQ3-2	20K0360-06	2020-11-03	M	2.32		22	<0.050				<1.00			0.221	<0.00040	<0.00100	<0.0100	<0.00020	<0.00020	1.07	<0.000020	93.8	<0.00100	
WQ3-2	20K1261-06	2020-11-10	M	2.30		5	0.053				<1.00			0.174	<0.00040	<0.00100	0.0151	<0.00020	<0.00020	1.46	0.00003	136	<0.00100	
WQ3-2	20K2100-06	2020-11-18	M			6.8	<0.050				<1.00			0.329	<0.00040	0.00107	0.0108	<0.00020	<0.00020	0.729	<0.000020	75.6	<0.00100	
WQ3-2	20L1589-06	2020-12-14	M	0.30		2	<0.050				<1.00			0.0458	<0.00040	0.0014	0.0151	<0.00020	<0.00020	2.34	0.000049	246	<0.00100	
WQ3-2	21A2590-06	2021-01-27	M	0.29		3	<0.050				<1.00			0.0215	<0.00040	0.00144	0.0106	<0.00020	<0.00020	3.43	0.000049	320	<0.00100	
WQ3-2	21B2778-06	2021-02-25	M			2	<0.050				<1.00			0.0168	<0.00040	0.00141	0.0101	<0.00020	<0.00020	3.58	0.000066	333	<0.00100	
WQ3-2	21C3505-06	2021-03-25	M	0.75		2	<0.050				<1.00			0.022	<0.000500	0.000751	0.0092	<0.000100	<0.000100	3	0.000053	236	<0.00100	
WQ3-2	21D2478-06	2021-04-22	M	2.09		<1	<0.050				<1.00			0.197	0.000148	0.000522	0.0104	<0.000010	0.000026	1.47	0.0000214	131	0.00031	
WQ3-2	21E1990-06	2021-05-18	M	10.82		16	<0.050				<1.00			0.703	<0.00040	<0.00100	0.014	<0.00020	<0.00020	0.371	<0.000020	15.8	<0.00100	
WQ3-2	21E2917-06	2021-05-26	M	3.52		5	<0.050				<1.00			0.246	<0.000050	0.000164	0.00815	<0.000010	<0.000010	0.209	0.0000062	19.9	0.00029	
WQ3-2	21F0167-06	2021-06-01	M	1.35		3	0.065				<1.00			0.233	0.000056	0.000286	0.0105	<0.000010	<0.000010	0.776	0.0000201	62.4	0.00034	
WQ3-2	21F1056-06	2021-06-08	M	14.76		3	0.425				<1.00			0.925	0.000066	0.000259	0.021	0.000014	<0.000010	0.209	0.0000105	20.1	0.0006	
WQ3-2	21F2014-06	2021-06-15	M	16.07		18	<0.050				<1.00			1.19	0.000081	0.000398	0.0253	0.000016	<0.000010	0.505	0.0000172	50	0.00079	
WQ3-2	21G2414-06	2021-07-20	M	2.09		1	<0.050				<1.00			0.394	<0.000500	<0.000500	0.0135	<0.000100	<0.000100	0.341	<0.0000200	24.9	<0.00100	
WQ3-2	21H3040-06	2021-08-25	M			4	<0.050				<1.00			0.259	<0.000500	<0.000500	0.0178	<0.000100	<0.000100	0.854	0.0000201	77.9	<0.00100	
WQ3-2	21I3814-06	2021-09-28	M	4.85		11	0.051				<1.00			0.335	<0.000500	<0.000500	0.0161	<0.000100	<0.000100	1.33	0.0000248	126	<0.00100	
WQ3-2	21J3514-06	2021-10-26	M	6.40		411	<0.050				<1.00			0.493	<0.00020	<0.00050	0.012	<0.00010	<0.00010	0.443	0.00002	37.2	<0.00050	
WQ3-2	21K3046-06	2021-11-23	M	0.96		2	<0.050				<1.00			0.0396	<0.00040	0.00118	0.0123	<0.00020	<0.00020	2.73	0.000048	241	<0.00100	
WQ3-2	21L2125-06	2021-12-14	M	0.60		6	<0.050				<1.00			<0.0100	<0.00040	0.00153	0.0119	<0.00020	<0.00020	3.62	0.000057	257	<0.00100	
WQ3-2	22A2312-06	2022-01-20	M	0.00		<1.8	<0.050				<1.00			0.0281	0.00041	0.00257	0.0114	<0.00020	<0.00020	4.18	0.000078	317	<0.00100	
WQ3-2	22B2487-06	2022-02-17	M	0.70		<1	<0.050	<25.0	13400	<25.0	<2.50	<2.50	2060	0.0273	<0.00040	0.00107	<0.0100	<0.00020	<0.00020	3.34	0.000072	288	<0.00100	
WQ3-2	22C3145-06	2022-03-22	M	0.30		<1	<0.050	54.1	13500	<25.0	<2.50	<2.50	1890	0.0247	<0.00040	0.00151	<0.0100	<0.00020	<0.00020	2.9	0.000073	283	<0.00100	
WQ3-2	22D2212-05	2022-04-19	M	0.70		<1	<0.050	<50.0	11900	<50.0	<5.00	<5.00	1650	0.0225	<0.00040	0.00139	<0.0100	<0.00020	<0.00020	4.94	0.000078	292	<0.00100	
WQ3-2	22E2480-08	2022-05-17	M	2.80		10	<0.050	<50.0	4750	<50.0	<5.00	<5.00	682	0.15	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	1.01	<0.000100	93.8	<0.00500	
WQ3-2	22F3212-06	2022-06-21	M	3.27		12	<0.050	<50.0	1490	<50.0	<5.00	<5.00	<500	0.223	<0.000500	<0.000500	0.00796	<0.000100	<0.000100	0.481	<0.0000200	33.7	<0.00100	
WQ3-2	22G1763-06	2022-07-13	M	6.31		2	<0.050	<50.0	3010	<50.0	<5.00	<5.00	<500	0.258	<0.000500	<0.000500	0.00998	<0.000100	<0.000100	0.666	<0.0000200	49	<0.00100	
WQ3-2	22H2453-06	2022-08-16	M	7.87		6	<0.050	<50.0	1120	<50.0	<5.00	<5.00	<500	0.312	<0.000500	<0.000500	0.0133	<0.000100	<0.000100	0.341	<0.0000200	30.4	<0.00100	
WQ3-2	22I1926-06	2022-09-14	M	1.12		1	<0.050	32.7	9730	<10.0	<1.00	<1.00	1570	0.0487	<0.000500	0.000861	0.0111	<0.000100	<0.000100	2.41	0.0000470	201	<0.00100	
WQ3-2	22J1560-08	2022-10-12	M	0.38		8	<0.050	<100	14300	<100	<10.0	<10.0	2520	0.0341	<0.000500	0.00121	0.0100	<0.000100	<0.000100	3.34	0.0000608	273	<0.00100	
WQ3-2	22K1453-06	2022-11-10	M	0.50		2	<0.050	34.0	15000	<25.0	0.403	<0.0050	2040	0.0349	<0.000500	0.00183	0.0123	<0.000100	<0.000100	4.52	0.0000814	327	<0.00100	
WQ3-2	22L0774-06	2022-12-07	M	0.97		1	<0.050	<25.0	15100	<25.0	<2.50	<2.50	2100	0.0324	<0.000500	0.00162	0.0135	<0.000100	<0.000100	4.11	0.0000705	301	<0.00100	
WQ3-2	23A2847-06	2023-01-27	M	0.00		<1	<0.050	<100	13000	<100	0.334	<0.0050	1820	0.0234	<0.000500	0.00168	0.0102	<0.000100	<0.000100	3.68	0.0000665	323	<0.00100	
WQ3-2	23C0060-06	2023-02-28	M	0.10		1	<0.050	<100	14100	<100	<10.0	<10.0	1820	<0.0200	<0.000500	0.00159	0.00918	<0.000100	<0.000100	3.5	0.0000707	349	<0.00100	
WQ3-2	23C1797-06	2023-03-15	M	-0.29		<1	<0.050	<100	13300	<100	<10.0	<10.0	1770	<0.0200	<0.000500	0.00161	0.00983	<0.000100	<0.000100	3.48	0.000101	299	<0.00100	
WQ3-2	23D2945-06	2023-04-26	M	0.21	0.61	<1	<0.050	<100	10700	0.682	<0.100	<0.0500	1390	0.0316	<0.000500	0.00112	0.00880	<0.000100	<0.000100	2.38	0.0000410	213	<0.00100	
WQ3-2	23E2392-06	2023-05-17	M	14.04	20.1	10	0.067	<100	1070	0.094	0.116	0.0670	<1000	0.943	<0.000100	0.000309	0.0172	0.000020	<0.000020	0.236	0.0000129	28.2	<0.00100	
WQ3-2	23F3614-06	2023-06-27	M	8.45	11.0	5	<0.050	<100	1540	0.114	<0.100	<0.0500	<1000	0.409	<0.000500	<0.000500	0.0135	<0.000100	<0.000100	0.432	<0.0000200	36.5	<0.00100	
WQ3-2	23G2415-06	2023-07-19	M	6.14	6.26	1	<0.050	<100	1990	0.165	<1.00	<0.500	<1000	0.387	<0.000500	<0.000500	0.0168	<0.000100	<0.000100	0.612	0.0000303	52.3	<0.00100	
WQ3-2	23H3309-08	2023-08-24	M	0.07	0.97	<1	<0.050	<100	11300	0.865	0.0613	0.0077	1740	0.0472	<0.000500	0.00153	0.0130	<0.000100	<0.000100	3.08	0.0000605	273	<0.00100	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-2	23I2271-08	2023-09-19	M	0.67	1.59	8	<0.050	<100	8470	0.580	<0.100	<0.0500	1630	0.0755	<0.000500	0.000807	0.0134	<0.000100	<0.000100	2.34	0.0000398	200	<0.00100	
WQ3-2	23J2236-08	2023-10-18	M	1.78	6.22	38	<0.050	<100	4360	0.310	0.110	<0.0500	<1000	0.445	<0.000500	0.000629	0.0138	<0.000100	<0.000100	1.07	0.0000229	113	<0.00100	
WQ3-2	23K1909-06	2023-11-15	M	-0.04	1.75	4.5	<0.050	<100	6180	0.442	0.170	<0.0500	1250	0.0973	<0.000500	0.000725	0.0109	<0.000100	<0.000100	2.97	0.0000503	153	<0.00100	
WQ3-2	23L2091-02	2023-12-15	M	0.63	0.87	<1.8	<0.050	<100	13600	0.950	0.343	<0.0050	1670	0.0519	<0.000500	0.00147	0.0106	<0.000100	<0.000100	3.47	0.0000588	305	<0.00100	
WQ3-2	L2754366-2	2024-01-24	M																					
WQ3-2	VA24A1422-002	2024-01-24	M	1.41	0.16	<10	<0.0050	55.0	15900	<1.0	<0.50	<0.10	2190	0.0173	<0.0010	0.00196	0.0089	<0.00050	<0.00050	3.61	0.000067	382	<0.00050	<0.00150
WQ3-2	L2754604-2	2024-02-14	M																					
WQ3-2	VA24A2995-002	2024-02-14	M	5.05	0.56	<10	0.0095	40.3	11800	<1.0	<0.50	<0.10	1650	0.0358	<0.0010	0.00115	0.0102	<0.00050	<0.00050	3.58	0.000060	262	<0.00050	<0.00150
WQ3-2	L2755043-2	2024-03-21	M																					
WQ3-2	VA24A6026-002	2024-03-21	M	1.49	1.76	<10	0.0056	30.3	8980	<1.0	<0.50	<0.10	1180	0.0561	<0.0010	0.00148	0.0086	<0.00050	<0.00050	2.03	0.000049	210	<0.00050	<0.00150
WQ3-2	L2755490-2	2024-04-24	M																					
WQ3-2	VA24A8916-002	2024-04-24	M	1.38	2.00	<10	0.0052	42.8	12500	<1.0	<0.50	<0.10	1710	0.0205	<0.0010	0.00283	0.0084	<0.00050	<0.00050	3.03	0.000061	286	<0.00050	<0.00150
WQ3-2	L2755567-2	2024-05-01	M																					
WQ3-2	VA24A9566-002	2024-05-01	M	-0.22	0.29	<10	0.0199	43.1	12600	<1.0	<0.50	<0.10	1760	0.0198	<0.0010	0.00276	0.0055	<0.00050	<0.00050	2.88	0.000055	295	<0.00050	<0.00150
WQ3-2	L2755666-2	2024-05-08	M																					
WQ3-2	VA24B0201-002	2024-05-08	M	1.35	1.62	10	<0.0050	13.1	3970	<1.0	<0.50	<0.10	513	0.102	<0.0010	0.00120	0.0073	<0.00050	<0.00050	0.90	<0.000020	88.4	<0.00050	<0.00150
WQ3-2	L2755779-2	2024-05-15	M																					
WQ3-2	VA24B0901-002	2024-05-15	M	3.50	4.44	<10	0.0115	19.5	6480	<1.0	<0.50	<0.10	840	0.186	<0.0010	0.00179	0.0098	<0.00050	<0.00050	1.50	0.000023	146	<0.00050	<0.00150
WQ3-2	L2755888-2	2024-05-22	M																					
WQ3-2	VA24B1500-002	2024-05-22	M	4.27	5.62	10	0.0089	8.9	2760	<1.0	<0.50	<0.10	348	0.237	<0.0010	0.00088	0.0102	<0.00050	<0.00050	0.82	<0.000020	59.8	<0.00050	<0.00150
WQ3-2	L2756312-2	2024-06-19	M																					
WQ3-2	VA24B4510-002	2024-06-19	M	10.20	4.63	<10	0.0142	12.0	3520	<1.0	<0.50	<0.10	443	0.256	<0.0010	0.00214	0.0112	<0.00050	<0.00050	0.83	<0.000020	88.1	<0.00050	<0.00150
WQ3-2	VA24B7397-002	2024-07-17	M	9.58	7.49	<10	<0.0050	9.4	3280	<1.0	<0.50	<0.10	440	0.430	<0.0010	0.00111	0.0160	<0.00050	<0.00050	0.84	<0.000020	88.2	<0.00050	<0.00150
WQ3-2	L2756689-2	2024-07-17	M																					
WQ3-2	L2757122-2	2024-08-21	M																					
WQ3-2	VA24C1337-002	2024-08-21	M	6.28	6.19	52	0.0128	11.9	3680	<1.0	<0.50	<0.10	494	0.277	<0.0010	0.00081	0.0156	<0.00050	<0.00050	0.81	0.000024	78.9	<0.00050	<0.00150
WQ3-2	VA24C4683-002	2024-09-18	M	1.95	2.07	<10	<0.0050	31.2	8940	<1.0	<0.50	<0.10	1240	0.0957	<0.0010	0.00240	0.0113	<0.00050	<0.00050	1.93	0.000047	213	<0.00050	<0.00150
WQ3-2	VA24C8569-002	2024-10-23	M	4.05	5.97	<10	0.0179	34.1	10200	<1.0	<0.50	<0.10	1380	0.261	<0.0010	0.00402	0.0168	<0.00050	<0.00050	2.00	0.000063	212	<0.00050	<0.00150
WQ3-2	L2757977-2	2024-10-30	M																					
WQ3-2	VA24C9414-002	2024-10-30	M	2.19	0.61	10	0.0150	39.1	12000	<1.0	<0.50	<0.10	1680	0.0488	<0.0010	0.00129	0.0123	<0.00050	<0.00050	2.73	0.000066	290	<0.00050	<0.00150
WQ3-2	VA24D0180-002	2024-11-06	M	1.28	0.29	<10	0.0072	47.1	13400	<1.0	<0.50	<0.10	1860	0.0226	<0.0010	0.00144	0.0113	<0.00050	<0.00050	3.06	0.000072	310	<0.00050	<0.00150
WQ3-2	VA24D0813-002	2024-11-13	M	1.90	1.73	<10	0.0065	22.0	7100	<1.0	<0.50	<0.10	977	0.128	<0.0010	0.00077	0.0099	<0.00050	<0.00050	1.59	0.000039	161	<0.00050	<0.00150
WQ3-2	L2758221-2	2024-11-22	M																					
WQ3-2	VA24D1791-002	2024-11-22	M	-1.59	0.81	<10	0.0116	37.0	12100	<1.0	<0.50	<0.10	1670	0.0445	<0.0010	0.00129	0.0119	<0.00050	<0.00050	3.45	0.000078	301	<0.00050	<0.00150
WQ3-2	L2758486-2	2024-12-18	M																					
WQ3-2	VA24D3937-002	2024-12-18	M	-0.05	0.59	<10	0.0061	41.7	12400	<1.0	<0.50	<0.10	1680	0.0263	<0.0010	0.00127	0.0093	<0.00050	<0.00050	2.78	0.000060	252	<0.00050	<0.00150
WQ3-2	L2758770-2	2025-01-22	M																					
WQ3-2	VA25A1525-002	2025-01-22	M	-1.23	0.53	10	0.0063	46.8	13300	<1.0	<0.50	<0.10	1870	0.0139	<0.0010	0.00128	0.0095	<0.00050	<0.00050	2.98	0.000066	282	<0.00050	<0.00150
WQ3-2	L2759008-2	2025-02-19	M																					
WQ3-2	VA25A3570-002	2025-02-19	M	-2.91	0.89	20	<0.0050	38.0	12100	<1.0	<0.50	<0.10	1690	0.0124	<0.0010	0.00142	0.0106	<0.00050	<0.00050	3.01	0.000063	314	<0.00050	<0.00150
WQ3-2	VA25A6679-002	2025-03-26	M	0.68	1.61	<10	0.0160	32.1	9600	<1.0	<0.50	<0.10	1320	0.0418	<0.0010	0.00102	0.0086	<0.00050	<0.00050	2.64	0.000044	240	<0.00050	<0.00150
WQ3-2	VA25A9109-002	2025-04-23	M	-2.97	0.30	<10	<0.0050	49.0	13800	<1.0	<0.50	<0.10	1950	0.0092	<0.0010	0.00120	0.0081	<0.00050	<0.00050	2.64	0.000062	294	<0.00050	<0.00150
WQ3-2	VA25A9941-002	2025-05-01	M	-0.72	2.62	<10	<0.0050	10.1	3040	<1.0	<0.50	<0.10	432	0.143	<0.0010	<0.00040	0.0078	<0.00050	<0.00050	0.75	<0.000020	71.5	<0.00050	<0.00150
WQ3-2	VA25B0496-002	2025-05-07	M	0.69	1.32	<10	0.0174	18.4	5230	<1.0	<0.50	<0.10	720	0.101	<0.0010	0.00053	0.0090	<0.00050	<0.00050	1.30	0.000023	128	<0.00050	<0.00150
WQ3-2	VA25B1530-002	2025-05-16	M	-0.56	1.45	<10	0.0071	12.7	3730	<1.0	<0.50	<0.10	492	0.135	<0.0010	<0.00040	0.0082	<0.00050	<0.00050	0.88	0.000020	80.7	<0.00050	<0.00150
WQ3-2	VA25B1841-002	2025-05-21	M	0.84	1.67	<10	0.0107	10.9	3100	<1.0	<0.50	<0.10	391	0.107	<0.0010	<0.00040	0.0077	<0.00050	<0.00050	0.74	0.000023	68.4	<0.00050	<0.00150
WQ3-3	23L2091-03	2023-12-15	M	0.88	1.05	<1.8	<0.050	<100	12700	0.928	0.333	<0.0050	1570	0.0571	<0.000500	0.00157	0.0111	<0.000100	<0.000100	3.36	0.0000645	295	<0.00100	
WQ3-3	L2754366-3	2024-01-24	M																					
WQ3-3	VA24A1422-003	2024-01-24	M	2.56	0.83	<10	0.0134	23.4	6900	<1.0	<0.50	<0.10	921	0.0764	<0.0010	0.00094	0.0083	<0.00050	<0.00050	1.64	0.000041	167	<0.00050	<0.0250
WQ3-3	L2754604-3	2024-02-14	M																					
WQ3-3	VA24A2995-003	2024-02-14	M	5.18	0.49	<10	0.0084	39.5	11500	<1.0	<0.50	<0.10	1620	0.0375	<0.0010	0.00109	0.0096	<0.00050	<0.00050	3.38	0.000060	243	<0.00050	<0.00150
WQ3-3	L2755043-3	2024-03-21	M																					
WQ3-3	VA24A6026-003	2024-03-21	M	1.58	1.50	20	0.0097	9.6	2890	<1.0	<0.50	<0.10	358	0.107	<0.0010	0.00076	0.0089	<0.00050	<0.00050	0.79	0.000020	70.5	<0.00050	<0.00150

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-3	L2755490-3	2024-04-24	M																					
WQ3-3	VA24A8916-003	2024-04-24	M	1.26	1.56	<10	<0.0050	35.1	10300	<1.0	<0.50	<0.10	1420	0.0301	<0.0010	0.00220	0.0081	<0.00050	<0.00050	2.54	0.000054	240	<0.00050	<0.00150
WQ3-3	L2755567-3	2024-05-01	M																					
WQ3-3	VA24A9566-003	2024-05-01	M	1.10	1.14	<10	0.0106	9.5	2870	<1.0	<0.50	<0.10	387	0.0795	<0.0010	0.00074	0.0077	<0.00050	<0.00050	0.81	<0.000020	69.4	<0.00050	<0.00150
WQ3-3	L2755666-3	2024-05-08	M																					
WQ3-3	VA24B0201-003	2024-05-08	M	1.59	1.74	<10	<0.0050	11.5	3500	<1.0	<0.50	<0.10	438	0.107	<0.0010	0.00115	0.0071	<0.00050	<0.00050	0.90	0.000023	81.5	<0.00050	<0.00150
WQ3-3	L2755779-3	2024-05-15	M																					
WQ3-3	VA24B0901-003	2024-05-15	M	5.38	6.50	<10	0.0095	12.7	4410	<1.0	<0.50	<0.10	538	0.237	<0.0010	0.00148	0.0103	<0.00050	<0.00050	1.07	0.000023	96.1	<0.00050	<0.00150
WQ3-3	L2755888-3	2024-05-22	M																					
WQ3-3	VA24B1500-003	2024-05-22	M	5.24	4.45	10	0.0063	7.9	2540	<1.0	<0.50	<0.10	312	0.232	<0.0010	0.00075	0.0098	<0.00050	<0.00050	0.80	<0.000020	56.0	<0.00050	<0.00150
WQ3-3	L2756312-3	2024-06-19	M																					
WQ3-3	VA24B4510-003	2024-06-19	M	10.30	5.55	20	<0.0050	<5.0	495	<1.0	<0.50	<0.10	47	0.344	<0.0010	0.00112	0.0118	<0.00050	<0.00050	<0.30	<0.000020	15.9	<0.00050	<0.00150
WQ3-3	VA24B7397-003	2024-07-17	M	14.59	9.74	<10	<0.0050	<5.0	731	<1.0	<0.50	<0.10	93	0.637	<0.0010	<0.00040	0.0161	<0.00050	<0.00050	<0.30	<0.000020	18.4	<0.00050	<0.00150
WQ3-3	L2756689-3	2024-07-17	M																					
WQ3-3	L2757122-3	2024-08-21	M																					
WQ3-3	VA24C1337-003	2024-08-21	M	7.29	7.41	41	<0.0050	9.8	3030	<1.0	<0.50	<0.10	413	0.282	<0.0010	0.00065	0.0163	<0.00050	<0.00050	0.69	<0.000020	60.5	<0.00050	<0.00150
WQ3-3	VA24C4683-003	2024-09-18	M	4.13	6.81	<10	0.0154	10.0	2900	<1.0	<0.50	<0.10	394	0.269	<0.0010	0.00112	0.0155	<0.00050	<0.00050	0.71	0.000027	69.8	<0.00050	<0.00150
WQ3-3	VA24C8569-003	2024-10-23	M	8.55	8.85	<10	0.0144	27.3	8180	<1.0	<0.50	<0.10	1100	0.352	<0.0010	0.00355	0.0182	<0.00050	<0.00050	1.74	0.000053	178	<0.00050	<0.00150
WQ3-3	L2757977-3	2024-10-30	M																					
WQ3-3	VA24C9414-003	2024-10-30	M	5.78	4.20	10	0.0125	9.4	2450	<1.0	<0.50	<0.10	327	0.245	<0.0010	<0.00040	0.0104	<0.00050	<0.00050	0.60	<0.000020	56.8	<0.00050	<0.00150
WQ3-3	VA24D0180-003	2024-11-06	M	2.12	1.26	<10	0.0171	19.7	5280	<1.0	<0.50	<0.10	721	0.0814	<0.0010	0.00059	0.0109	<0.00050	<0.00050	1.26	0.000028	122	<0.00050	<0.00150
WQ3-3	VA24D0813-003	2024-11-13	M	2.45	2.55	<10	0.0066	9.1	2850	<1.0	<0.50	<0.10	374	0.200	<0.0010	<0.00040	0.0082	<0.00050	<0.00050	0.68	0.000030	66.6	<0.00050	<0.00150
WQ3-3	L2758221-3	2024-11-22	M																					
WQ3-3	VA24D1791-003	2024-11-22	M	-1.68	0.84	<10	0.0077	33.2	11000	<1.0	0.57	0.35	1540	0.0484	<0.0010	0.00109	0.0115	<0.00050	<0.00050	3.16	0.000062	259	<0.00050	<0.00150
WQ3-3	L2758486-3	2024-12-18	M																					
WQ3-3	VA24D3937-003	2024-12-18	M	0.29	1.00	<10	<0.0050	27.7	8330	<1.0	<0.50	<0.10	1120	0.0775	<0.0010	0.00091	0.0077	<0.00050	<0.00050	1.93	0.000042	172	<0.00050	<0.00150
WQ3-3	L2758770-3	2025-01-22	M																					
WQ3-3	VA25A1525-003	2025-01-22	M	-1.24	0.63	<10	0.0065	46.1	13200	<1.0	<0.50	<0.10	1860	0.0180	<0.0010	0.00129	0.0095	<0.00050	<0.00050	2.74	0.000060	287	<0.00050	<0.00150
WQ3-3	L2759008-3	2025-02-19	M																					
WQ3-3	VA25A3570-003	2025-02-19	M	-2.73	0.84	10	0.0055	43.4	13000	<1.0	<0.50	<0.10	1750	0.0123	<0.0010	0.00136	0.0103	<0.00050	<0.00050	2.94	0.000060	299	<0.00050	<0.00150
WQ3-3	VA25A6679-003	2025-03-26	M	0.63	1.24	<10	0.0124	23.6	7120	<1.0	<0.50	<0.10	956	0.0509	<0.0010	0.00072	0.0073	<0.00050	<0.00050	2.14	0.000034	173	<0.00050	<0.00150
WQ3-3	VA25A9109-003	2025-04-23	M	11.46	0.72	<10	<0.0050	7.7	2420	<1.0	<0.50	<0.10	338	0.0695	<0.0010	<0.00040	0.0068	<0.00050	<0.00050	0.57	<0.000020	54.4	<0.00050	<0.00150
WQ3-3	VA25A9941-003	2025-05-01	M	-1.23	2.24	<10	<0.0050	9.1	2730	<1.0	<0.50	<0.10	388	0.132	<0.0010	<0.00040	0.0074	<0.00050	<0.00050	0.78	<0.000020	64.6	<0.00050	<0.00150
WQ3-3	VA25B0496-003	2025-05-07	M	1.40	1.89	20	0.0121	9.7	2840	<1.0	<0.50	<0.10	376	0.124	<0.0010	<0.00040	0.0080	<0.00050	<0.00050	0.83	<0.000020	66.1	<0.00050	<0.00150
WQ3-3	VA25B1530-003	2025-05-16	M	1.58	2.21	<10	0.0062	6.1	1940	<1.0	<0.50	<0.10	255	0.168	<0.0010	<0.00040	0.0078	<0.00050	<0.00050	0.54	<0.000020	44.3	<0.00050	<0.00150
WQ3-3	VA25B1841-003	2025-05-21	M	1.40	2.19	<10	0.0077	<5.0	812	<1.0	<0.50	<0.10	88	0.147	<0.0010	<0.00040	0.0073	<0.00050	<0.00050	0.31	<0.000020	21.3	<0.00050	<0.00150
WQ4-1	0051710-07	2020-05-20	M	1.41		<1.8	<0.050				<5.00			0.0262	<0.00040	0.00177	0.0106	<0.00020	<0.00020	4.3	0.000076	457	<0.00100	
WQ4-1	0062209-07	2020-06-22	M	0.31		<1	<0.050				<1.00			0.0181	<0.00040	0.00181	0.0103	<0.00020	<0.00020	4.44	0.00009	405	<0.00100	
WQ4-1	0071996-07	2020-07-21	M	0.52		<1	<0.050				<1.00			0.0255	<0.00040	0.00242	0.012	<0.00020	<0.00020	4.17	0.000076	289	<0.00100	
WQ4-1	0082292-07	2020-08-24	M	0.65		<1	<0.050				<1.00			0.0527	<0.00040	0.00159	0.0103	<0.00020	<0.00020	3.89	0.000076	352	<0.00100	
WQ4-1	0093017-07	2020-09-28	M	0.68		5	<0.050				<1.00			0.128	<0.00040	0.00166	0.0126	<0.00020	<0.00020	4.07	0.000083	362	0.0011	
WQ4-1	20J1961-07	2020-10-20	M	0.00		<1.8	<0.050				<10.0			0.0482	<0.00040	0.00156	0.0135	<0.00020	<0.00020	3.94	0.000086	359	<0.00100	
WQ4-1	20J2778-07	2020-10-27	M	0.36		<1	<0.050				<1.00			0.027	<0.00040	0.00178	0.0119	<0.00020	<0.00020	3.89	0.000082	384	<0.00100	
WQ4-1	20K0360-07	2020-11-03	M	0.37		1	<0.050				<1.00			0.0244	<0.00040	0.00175	0.0115	<0.00020	<0.00020	4.13	0.000082	362	<0.00100	
WQ4-1	20K1261-07	2020-11-10	M	0.10		<1	<0.050				<1.00			0.0216	<0.00040	0.00177	0.0125	<0.00020	<0.00020	4.12	0.000064	434	<0.00100	
WQ4-1	20K2100-07	2020-11-18	M			2	<0.050				<1.00			0.0321	<0.00040	0.0023	0.0117	<0.00020	<0.00020	3.87	0.000047	406	<0.00100	
WQ4-1	20L1589-07	2020-12-14	M	0.02		<1	<0.050				<1.00			0.221	<0.00040	0.00222	0.0158	<0.00020	<0.00020	4.05	0.000097	460	<0.00100	
WQ4-1	21A2590-07	2021-01-27	M	0.34		3	<0.050				<1.00			0.0201	<0.00040	0.00169	<0.0100	<0.00020	<0.00020	4.24	0.000077	411	<0.00100	
WQ4-1	21B2778-07	2021-02-25	M			<1.8	<0.050				<1.00			0.0291	0.00493	0.00193	0.0141	<0.00020	<0.00020	4.36	0.00011	414	0.00214	
WQ4-1	21C3505-07	2021-03-25	M	0.59		<1	<0.050				<1.00			0.041	0.000549	0.00134	0.0117	<0.000100	<0.000100	4.93	0.000112	398	0.00102	
WQ4-1	21D2478-07	2021-04-22	M	0.39		<1	<0.050				<1.00			0.04	<0.000500	0.00168	0.0112	<0.000100	<0.000100	4.59	0.0000887	402	<0.00100	
WQ4-1	21E1990-07	2021-05-18	M	0.30		3	<0.050				<1.00			0.0218	<0.00040	0.0016	0.0117	<0.00020	<0.00020	5.38	0.000054	391	<0.00100	
WQ4-1	21E2917-07	2021-05-26	M	0.47		2	<0.050				<1.00			0.052	<0.000500	0.00161	0.011	<0.000100	<0.000100	3.81	0.0000749	386	<0.00100	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	21F0167-07	2021-06-01	M	47.71		<1	<0.050				<1.00			0.029	<0.000500	0.00143	0.0109	<0.000100	<0.000100	3.88	0.0000774	354	<0.00100	
WQ4-1	21F1056-07	2021-06-08	M	2.26		<1	0.062				<1.00			0.0206	<0.000500	0.00168	0.0105	<0.000100	<0.000100	4.24	0.0000884	401	<0.00100	
WQ4-1	21F2014-07	2021-06-15	M	1.98		<1	<0.050				<1.00			0.0308	<0.000500	0.00168	0.011	<0.000100	<0.000100	3.98	0.0000972	359	<0.00100	
WQ4-1	21G2414-07	2021-07-20	M	2.12		1	<0.050				<1.00			0.0221	<0.000500	0.00157	0.00972	<0.000100	<0.000100	4	0.0000827	335	<0.00100	
WQ4-1	21H3040-07	2021-08-25	M			2	<0.050				<1.00			0.0274	<0.000500	0.0016	0.0114	<0.000100	<0.000100	4.12	0.0000972	400	<0.00100	
WQ4-1	21I3814-07	2021-09-28	M	0.83		2	<0.050				<1.00			0.0516	<0.000500	0.00123	0.0114	<0.000100	<0.000100	3.72	0.0000739	365	<0.00100	
WQ4-1	21J3514-07	2021-10-26	M	-0.13		9	<0.050				<1.00			0.0226	<0.00020	0.00163	0.0113	<0.00010	<0.00010	3.68	0.00008	351	<0.00050	
WQ4-1	21K3046-07	2021-11-23	M	193.25		1	<0.050				<1.00			0.0141	<0.00040	0.00161	0.0129	<0.00020	<0.00020	3.88	0.000064	349	<0.00100	
WQ4-1	21L2125-07	2021-12-14	M	0.30		4	<0.050				<1.00			<0.0100	<0.00040	0.00205	0.0108	<0.00020	<0.00020	4.68	0.000072	328	<0.00100	
WQ4-1	22A2312-07	2022-01-20	M	0.10		<1.8	<0.050				<1.00			0.0169	<0.00040	0.00247	0.0101	<0.00020	<0.00020	4.65	0.000084	339	<0.00100	
WQ4-1	22B2487-07	2022-02-17	M	0.40		<1	<0.050	<25.0	14700	<25.0	<2.50	<2.50	2390	0.0238	<0.00040	0.00122	<0.0100	<0.00020	<0.00020	4.02	0.000088	338	<0.00100	
WQ4-1	22C3145-07	2022-03-22	M	0.30		<1	<0.050	61.9	15400	<25.0	<2.50	<2.50	2220	0.0203	<0.00040	0.00204	0.0106	<0.00020	<0.00020	3.16	0.000084	315	<0.00100	
WQ4-1	22D2212-12	2022-04-20	M	0.60		<1	<0.050	63.5	16400	<50.0	<5.00	<5.00	2220	0.0188	<0.00040	0.00182	0.0134	<0.00020	<0.00020	5.64	0.000099	356	<0.00100	
WQ4-1	22E2480-09	2022-05-17	M	0.00		1	<0.050	66	16300	<50.0	<5.00	<5.00	2260	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.22	<0.000100	321	<0.00500	
WQ4-1	22F3212-07	2022-06-21	M	0.08		<1	<0.050	55	15300	<50.0	<5.00	<5.00	2050	0.0267	<0.000500	0.00154	0.0115	<0.000100	<0.000100	4.42	0.0000675	359	<0.00100	
WQ4-1	22G1763-07	2022-07-13	M	0.20		<1	<0.050	53.2	15900	<50.0	<5.00	<5.00	2080	0.0251	<0.000500	0.00182	0.0106	<0.000100	<0.000100	4.29	0.0000917	329	<0.00100	
WQ4-1	22H2453-07	2022-08-16	M	0.33		8	<0.050	<50.0	13900	<50.0	<5.00	<5.00	2170	0.0500	<0.000500	0.00155	0.0104	<0.000100	<0.000100	4.17	0.0000951	372	<0.00100	
WQ4-1	22I1926-07	2022-09-14	M	0.71		2	<0.050	49.7	15500	<10.0	<1.00	<1.00	2480	0.0207	<0.000500	0.00147	0.00947	<0.000100	<0.000100	3.72	0.0000770	305	<0.00100	
WQ4-1	22J1560-09	2022-10-12	M	0.44		1	<0.050	<100	17100	<100	<10.0	<10.0	2810	0.0289	<0.000500	0.00169	0.0114	<0.000100	<0.000100	4.09	0.0000728	336	<0.00100	
WQ4-1	22K1453-07	2022-11-10	M	0.53		<1	<0.050	35.4	16000	<25.0	0.454	<0.0050	2210	0.0341	<0.000500	0.00201	0.0120	<0.000100	<0.000100	4.92	0.0000791	379	<0.00100	
WQ4-1	22L0774-07	2022-12-07	M	0.28		<1	<0.050	<25.0	16200	<25.0	<2.50	<2.50	2250	<0.0200	<0.000500	0.00183	0.0124	<0.000100	<0.000100	4.41	0.0000805	324	<0.00100	
WQ4-1	23A2847-07	2023-01-27	M	0.10			<0.050	<100	16900	<100	0.376	<0.0050	2660	<0.0200	<0.000500	0.00206	0.00959	0.000108	<0.000100	3.91	0.0000979	368	<0.00100	
WQ4-1	23C0060-07	2023-02-28	M	0.01		1	<0.050	<100	16800	<100	<10.0	<10.0	2120	0.0203	<0.000500	0.00187	0.00955	<0.000100	<0.000100	3.84	0.0000671	396	<0.00100	
WQ4-1	23C1797-07	2023-03-15	M	-0.55		<1	<0.050	<100	15600	<100	<10.0	<10.0	2050	<0.0200	<0.000500	0.00188	0.00956	<0.000100	<0.000100	3.94	0.0000873	340	<0.00100	
WQ4-1	23D2945-07	2023-04-26	M	0.54	0.41	<1	0.051	<100	16400	1.09	0.573	<0.0500	2090	<0.0200	<0.000500	0.00212	0.0104	<0.000100	<0.000100	3.96	0.000120	367	<0.00100	
WQ4-1	23E2392-07	2023-05-17	M	0.30	0.54	<1	0.073	<100	15900	0.808	0.556	0.0600	2140	0.0312	<0.000500	0.00184	0.00937	<0.000100	<0.000100	3.67	0.0000985	391	<0.00100	
WQ4-1	23F3614-07	2023-06-27	M	0.80	1.25	<1	<0.050	<100	16600	1.12	0.477	<0.0500	2570	<0.0600	<0.000500	0.00183	0.0109	<0.000100	<0.000100	4.4	0.0000778	379	<0.00100	
WQ4-1	23G2415-07	2023-07-19	M	0.00	0.72	<1	0.052	<100	15700	1.14	<1.00	<0.500	2270	0.0315	<0.000500	0.00197	0.00979	<0.000100	<0.000100	4.18	0.000103	382	<0.00100	
WQ4-1	23H3309-09	2023-08-24	M	0.33	0.76	<1	<0.050	<100	15100	1.13	0.326	0.0093	2270	0.0343	<0.000500	0.00190	0.00960	<0.000100	<0.000100	4.05	0.0000649	363	<0.00100	
WQ4-1	23I2271-09	2023-09-19	M	0.67	1.06	<1	<0.050	<100	16700	1.13	0.419	<0.0500	2660	0.0305	<0.000500	0.00179	0.0114	<0.000100	<0.000100	4.25	0.0000750	368	<0.00100	
WQ4-1	23J2236-09	2023-10-18	M	0.10	0.56	<1	<0.050	<100	16300	1.18	0.434	<0.0500	3010	0.0464	<0.000500	0.00160	0.0112	<0.000100	<0.000100	3.74	0.0000990	372	<0.00100	
WQ4-1	23K1909-07	2023-11-15	M	0.11	1.47	<1.8	<0.050	<100	17300	1.24	0.441	<0.0500	3140	0.0313	<0.000500	0.00184	0.0102	<0.000100	<0.000100	4.63	0.0000778	371	<0.00100	
WQ4-1	23L2091-04	2023-12-15	M	0.85	0.82	<1.8	<0.050	<100	17300	1.14	0.438	<0.0050	2170	0.0496	<0.000500	0.00214	0.00936	<0.000100	<0.000100	4.94	0.0000903	404	<0.00100	
WQ4-1	L2754383-4	2024-01-25	M																					
WQ4-1	VA24A1507-004	2024-01-25	M	3.19	0.25	10	<0.0050	50.2	15000	<1.0	<0.50	<0.10	2040	0.0098	<0.0010	0.00212	0.0088	<0.00050	<0.00050	4.36	0.000076	412	<0.00050	<0.00150
WQ4-1	L2754604-4	2024-02-14	M																					
WQ4-1	VA24A2995-004	2024-02-14	M	3.76	0.16	10	<0.0050	56.8	16500	<1.0	<0.50	<0.10	2320	0.0168	<0.0010	0.00159	0.0094	<0.00050	<0.00050	5.01	0.000085	359	<0.00050	<0.00150
WQ4-1	L2755043-4	2024-03-21	M																					
WQ4-1	VA24A6026-004	2024-03-21	M	0.57	0.35	<10	<0.0050	57.6	17000	<1.0	<0.50	<0.10	2290	0.0252	<0.0010	0.00259	0.0094	<0.00050	<0.00050	3.82	0.000076	400	<0.00050	<0.00150
WQ4-1	L2755490-4	2024-04-24	M																					
WQ4-1	VA24A8916-004	2024-04-24	M	0.47	0.47	<10	<0.0050	57.1	16700	<1.0	<0.50	<0.10	2320	0.0120	<0.0010	0.00348	0.0099	<0.00050	<0.00050	3.90	0.000079	382	<0.00050	<0.00150
WQ4-1	L2755567-4	2024-05-01	M																					
WQ4-1	VA24A9566-004	2024-05-01	M	0.10	0.35	<10	0.0106	58.0	17000	<1.0	<0.50	<0.10	2410	0.0164	<0.0010	0.00355	0.0104	<0.00050	<0.00050	3.94	0.000080	392	<0.00050	<0.00150
WQ4-1	L2755666-4	2024-05-08	M																					
WQ4-1	VA24B0201-004	2024-05-08	M	0.18	0.97	<10	<0.0050	61.0	17700	<1.0	0.54	<0.10	2430	0.0391	<0.0010	0.00341	0.0102	<0.00050	<0.00050	3.68	0.000086	379	<0.00050	<0.00150
WQ4-1	L2755779-4	2024-05-15	M																					
WQ4-1	VA24B0901-004	2024-05-15	M	0.16	0.34	<10	<0.0050	58.4	17400	<1.0	<0.50	<0.10	2350	0.0125	<0.0010	0.00383	0.0100	<0.00050	<0.00050	3.91	0.000076	381	<0.00050	<0.00150
WQ4-1	L2755888-4	2024-05-22	M																					
WQ4-1	VA24B1500-004	2024-05-22	M	0.63	0.73	<10	0.0091	54.5	16200	<1.0	<0.50	<0.10	2210	0.0316	<0.0010	0.00289	0.0102	<0.00050	<0.00050	4.29	0.000088	342	<0.00050	<0.00150
WQ4-1	L2756312-4	2024-06-19	M																					
WQ4-1	VA24B4510-004	2024-06-19	M	3.20	0.49	<10	<0.0050	60.8	17100	<1.0	<0.50	<0.10	2330	0.0223	<0.0010	0.00574	0.0106	<0.00050	<0.00050	3.58	0.000084	411	<0.00050	<0.00150
WQ4-1	VA24B7397-004	2024-07-17	M	-0.47	0.51	<10	<0.0050	36.1	11100	<1.0	0.68	0.21	1500	0.0239	<0.0010	0.00364	0.0108	<0.00050	<0.00050	3.22	0.000080	382	<0.00050	<0.00150
WQ4-1	L2756689-4	2024-07-17	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	L2757122-4	2024-08-21	M																					
WQ4-1	VA24C1337-004	2024-08-21	M	0.15	0.28	<10	<0.0050	61.0	17700	<1.0	0.53	<0.10	2480	0.0154	<0.0010	0.00356	0.0106	<0.00050	<0.00050	3.70	0.000069	357	<0.00050	<0.00150
WQ4-1	VA24C4683-004	2024-09-18	M	1.29	0.49	<10	<0.0050	56.9	16400	<1.0	<0.50	<0.10	2320	0.0199	<0.0010	0.00540	0.0108	<0.00050	<0.00050	4.31	0.000081	388	<0.00050	<0.00150
WQ4-1	VA24C8569-004	2024-10-23	M	0.63	0.49	<10	<0.0050	57.9	17300	<1.0	0.51	<0.10	2370	0.0176	<0.0010	0.00622	0.0106	<0.00050	<0.00050	3.59	0.000095	368	<0.00050	<0.00150
WQ4-1	L2757977-4	2024-10-30	M																					
WQ4-1	VA24C9414-004	2024-10-30	M	1.79	0.31	<10	<0.0050	54.5	16800	<1.0	<0.50	<0.10	2350	0.0138	<0.0010	0.00154	0.0108	<0.00050	<0.00050	4.22	0.000080	422	<0.00050	<0.00150
WQ4-1	VA24D0180-004	2024-11-06	M	1.08	0.46	<10	0.0066	57.8	16700	<1.0	0.63	<0.10	2310	0.0254	<0.0010	0.00175	0.0117	<0.00050	<0.00050	3.68	0.000091	380	<0.00050	<0.00150
WQ4-1	VA24D0813-004	2024-11-13	M	1.65	0.22	<10	<0.0050	53.6	17000	<1.0	<0.50	<0.10	2380	0.0238	<0.0010	0.00164	0.0119	<0.00050	<0.00050	3.59	0.000068	392	<0.00050	<0.00150
WQ4-1	L2758221-4	2024-11-22	M																					
WQ4-1	VA24D1791-004	2024-11-22	M	-1.27	0.70	<10	0.0051	53.4	16900	<1.0	<0.50	0.14	2370	0.0361	<0.0010	0.00169	0.0123	<0.00050	<0.00050	5.24	0.000076	433	<0.00050	<0.00150
WQ4-1	L2758486-4	2024-12-18	M																					
WQ4-1	VA24D3937-004	2024-12-18	M	0.51	0.68	<10	<0.0050	52.7	15600	<1.0	<0.50	<0.10	2130	0.0237	<0.0010	0.00172	0.0092	<0.00050	<0.00050	3.58	0.000082	329	<0.00050	<0.00150
WQ4-1	L2758770-4	2025-01-22	M																					
WQ4-1	VA25A1525-004	2025-01-22	M	-2.55	0.33	<10	<0.0050	60.8	17100	<1.0	<0.50	<0.10	2410	0.0188	<0.0010	0.00153	0.0091	<0.00050	<0.00050	3.39	0.000075	389	<0.00050	<0.00150
WQ4-1	L2759008-4	2025-02-19	M																					
WQ4-1	VA25A3570-004	2025-02-19	M	-3.29	0.41	<10	0.0194	57.0	17000	<1.0	<0.50	<0.10	2310	0.0147	<0.0010	0.00170	0.0097	<0.00050	<0.00050	3.64	0.000077	375	<0.00050	<0.00150
WQ4-1	VA25A6679-004	2025-03-26	M	-0.30	0.42	<10	0.0146	51.9	15000	<1.0	<0.50	<0.10	2070	0.0818	<0.0010	0.00117	0.0087	<0.00050	<0.00050	2.20	0.000042	225	<0.00050	<0.00150
WQ4-1	VA25A9109-004	2025-04-23	M	-3.20	0.24	<10	0.0161	62.1	17400	<1.0	0.55	<0.10	2430	0.0052	<0.0010	0.00170	0.0088	<0.00050	<0.00050	3.11	0.000075	364	<0.00050	<0.00150
WQ4-1	VA25A9941-004	2025-05-01	M	-3.14	0.18	<10	0.0305	60.3	17000	1.4	<0.50	<0.10	2420	0.0060	<0.0010	0.00152	0.0085	<0.00050	<0.00050	3.93	0.000075	396	<0.00050	<0.00150
WQ4-1	VA25B0496-004	2025-05-07	M	0.23	0.10	<10	0.0064	59.0	17300	1.0	<0.50	<0.10	2300	0.0094	<0.0010	0.00170	0.0092	<0.00050	<0.00050	3.96	0.000078	388	<0.00050	<0.00150
WQ4-1	VA25B1530-004	2025-05-16	M	-1.06	0.28	<10	<0.0050	58.3	17100	<1.0	<0.50	<0.10	2390	0.0138	<0.0010	0.00172	0.0096	<0.00050	<0.00050	3.59	0.000078	369	<0.00050	<0.00150
WQ4-1	VA25B1841-004	2025-05-21	M	-0.86	0.25	<10	<0.0050	57.1	16200	<1.0	<0.50	<0.10	2110	0.0161	<0.0010	0.00137	0.0087	<0.00050	<0.00050	3.86	0.000099	358	<0.00050	<0.00150
WQ4-2	0051710-08	2020-05-20	M	1.79		2	<0.050				<1.00			0.261	<0.00040	<0.00100	<0.0100	<0.00020	<0.00020	0.363	<0.000020	30	<0.00100	
WQ4-2	0062209-08	2020-06-22	M	18.88		8	0.064				<0.010			1.21	<0.00040	<0.00100	0.0265	<0.00020	<0.00020	0.265	<0.000020	20.9	<0.00100	
WQ4-2	0071996-08	2020-07-21	M	13.12		10	<0.050				<0.010			0.647	<0.00040	<0.00100	0.0191	<0.00020	<0.00020	0.456	<0.000020	25.4	<0.00100	
WQ4-2	0082292-08	2020-08-24	M	0.63		1	<0.050				<1.00			0.189	<0.00040	0.00131	0.0285	<0.00020	<0.00020	2.3	0.000052	204	<0.00100	
WQ4-2	0093017-08	2020-09-28	M	7.35		16	<0.050				<1.00			0.322	<0.00040	<0.00100	0.0173	<0.00020	<0.00020	1.49	0.000031	134	<0.00100	
WQ4-2	20J1961-08	2020-10-20	M	3.91		<1.8	<0.050				<10.0			0.205	<0.00040	<0.00100	0.0152	<0.00020	<0.00020	0.717	0.000043	61.4	<0.00100	
WQ4-2	20J2778-08	2020-10-27	M	0.82		1	<0.050				<1.00			0.0631	<0.00040	<0.00100	0.012	<0.00020	<0.00020	1.61	0.00005	151	<0.00100	
WQ4-2	20K0360-08	2020-11-03	M	1.01		49	<0.050				<1.00			0.241	<0.00040	<0.00100	0.0105	<0.00020	<0.00020	0.966	0.000029	84.8	<0.00100	
WQ4-2	20K1261-08	2020-11-10	M	2.30		5	<0.050				1.14			0.14	<0.00040	0.00123	0.0156	<0.00020	<0.00020	2.02	0.000033	194	<0.00100	
WQ4-2	20K2100-08	2020-11-18	M			11	<0.050				<1.00			0.302	<0.00040	<0.00100	0.011	<0.00020	<0.00020	0.695	<0.000020	71.2	<0.00100	
WQ4-2	20L1589-08	2020-12-14	M	0.37		<1	<0.050				<1.00			0.0488	<0.00040	0.00152	0.0141	<0.00020	<0.00020	2.22	0.00006	232	<0.00100	
WQ4-2	21A2590-08	2021-01-27	M	0.18		1	<0.050				<1.00			0.0215	<0.00040	0.00141	0.0104	<0.00020	<0.00020	3.48	0.000064	323	<0.00100	
WQ4-2	21B2778-08	2021-02-25	M			<1.8	<0.050				<1.00			0.0173	<0.00040	0.00146	0.0107	<0.00020	<0.00020	3.64	0.000055	338	<0.00100	
WQ4-2	21C3505-08	2021-03-25	M	0.60		<1	<0.050				<1.00			0.0291	<0.000500	0.000882	0.00945	<0.000100	<0.000100	2.74	0.0000484	214	<0.00100	
WQ4-2	21D2478-08	2021-04-22	M	1.91		<1	<0.050				<1.00			0.157	0.000168	0.000659	0.0106	<0.000010	0.00003	2.1	0.0000275	195	0.00038	
WQ4-2	21E1990-08	2021-05-18	M	3.94		12	<0.050				<1.00			0.577	<0.00020	<0.00050	0.0116	<0.00010	<0.00010	0.147	0.000018	12.1	<0.00050	
WQ4-2	21E2917-08	2021-05-26	M	3.35		10	<0.050				<1.00			0.282	0.000062	0.000242	0.00917	<0.000010	<0.000010	0.443	0.000012	41	0.00052	
WQ4-2	21F0167-08	2021-06-01	M	1.45		<1	0.297				<1.00			0.243	0.000084	0.00038	0.0102	<0.000010	<0.000010	1.06	0.0000149	85.6	0.00033	
WQ4-2	21F1056-08	2021-06-08	M	12.75		8	0.086				<1.00			0.851	0.000053	0.000281	0.0187	0.000014	<0.000010	0.265	0.000013	24.6	0.00057	
WQ4-2	21F2014-08	2021-06-15	M	16.12		12	<0.050				<1.00			1.21	0.000077	0.000322	0.0244	0.000016	<0.000010	0.352	0.0000136	35.1	0.0008	
WQ4-2	21G2414-08	2021-07-20	M	2.67		1	<0.050				<1.00			0.288	<0.000500	<0.000500	0.0127	<0.000100	<0.000100	0.481	<0.0000200	37.3	<0.00100	
WQ4-2	21H3040-08	2021-08-25	M			<1	<0.050				<1.00			0.289	<0.000500	<0.000500	0.0182	<0.000100	<0.000100	0.821	<0.0000200	74.5	<0.00100	
WQ4-2	21I3814-08	2021-09-28	M	4.38		2	0.052				<1.00			0.171	<0.000500	0.000725	0.0173	<0.000100	<0.000100	1.95	0.0000474	185	<0.00100	
WQ4-2	21J3514-08	2021-10-26	M	3.94		517	<0.050				<1.00			0.391	<0.00020	<0.00050	0.0093	<0.00010	<0.00010	0.408	0.000021	34.3	<0.00050	
WQ4-2	21K3046-08	2021-11-23	M	1.09		2	<0.050				<1.00			0.0484	<0.00040	<0.00100	0.0118	<0.00020	<0.00020	1.64	0.000028	135	<0.00100	
WQ4-2	21L2125-08	2021-12-14	M	0.35		7	<0.050				<1.00			<0.0100	0.00333	<0.00100	0.0117	<0.00020	<0.00020	2.17	0.000034	153	<0.00100	
WQ4-2	22A2312-08	2022-01-20	M	0.10		<1.8	<0.050				<1.00			0.0272	<0.00040	0.00262	0.0111	<0.00020	<0.00020	4.57	0.000074	327	<0.00100	
WQ4-2	22B2487-08	2022-02-17	M	0.70		<1	<0.050	<25.0	13600	<25.0	<2.50	<2.50	2050	0.024	<0.00040	0.00121	0.011	<0.00020	<0.00020	3.43	0.000076	285	<0.00100	
WQ4-2	22C3145-08	2022-03-22	M	0.30		<1	0.104	52	13600	<25.0	<2.50	<2.50	1840	0.0142	<0.00040	0.00184	<0.0100	<0.00020	<0.00020	2.76	0.000055	269	<0.00100	
WQ4-2	22D2212-13	2022-04-20	M	0.80		2	<0.050	<50.0	10700	<50.0	<5.00	<5.00	1540	0.0224	<0.00040	0.00104	<0.0100	<0.00020	<0.00020	3.85	0.000055	252	<0.00100	
WQ4-2	22E2480-10	2022-05-17	M	2.80		5	<0.050	<50.0	3470	<50.0	<5.00	<5.00	<500	0.189	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	0.753	<0.000100	70.2	<0.00500	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	22F3212-08	2022-06-21	M	3.82		16	<0.050	<50.0	1070	<50.0	<5.00	<5.00	<500	0.222	<0.000500	<0.000500	0.00733	<0.000100	<0.000100	0.399	<0.0000200	25.7	<0.00100	
WQ4-2	22G1763-08	2022-07-13	M	7.66		1	<0.050	<50.0	1250	<50.0	<5.00	<5.00	<500	0.461	<0.000500	<0.000500	0.0127	<0.000100	<0.000100	0.426	<0.0000200	29.6	<0.00100	
WQ4-2	22H2453-08	2022-08-16	M	9.44		1	<0.050	<50.0	1090	<50.0	<5.00	<5.00	<500	0.379	<0.000500	<0.000500	0.0151	<0.000100	<0.000100	0.325	<0.0000200	28.7	<0.00100	
WQ4-2	22I1926-08	2022-09-14	M	1.10		<1	<0.050	35.1	10400	<10.0	<1.00	<1.00	1740	0.0369	<0.000500	0.00115	0.0102	<0.000100	<0.000100	2.64	0.0000519	211	<0.00100	
WQ4-2	22J1560-10	2022-10-12	M	0.38		1	<0.050	<100	13600	<100	<10.0	<10.0	2460	0.0280	<0.000500	0.00136	0.00961	<0.000100	<0.000100	3.32	0.0000666	262	<0.00100	
WQ4-2	22K1453-08	2022-11-10	M	0.47		4	<0.050	33.8	15500	<25.0	0.409	<0.0050	2130	0.0374	<0.000500	0.00172	0.0118	<0.000100	<0.000100	4.59	0.0000804	350	0.00223	
WQ4-2	22L0774-08	2022-12-07	M	0.32		1	0.070	<25.0	15500	<25.0	<2.50	<2.50	2070	<0.0200	<0.000500	0.00176	0.0121	<0.000100	<0.000100	3.94	0.0000758	362	<0.00100	
WQ4-2	23A2847-08	2023-01-27	M	0.00		2	<0.050	<100	12100	<100	0.312	<0.0050	1700	0.0269	<0.000500	0.00154	0.0106	0.000105	<0.000100	3	0.0000738	288	<0.00100	
WQ4-2	23C0060-08	2023-02-28	M	0.06		<1	0.072	<100	14600	<100	<10.0	<10.0	1850	0.0203	<0.000500	0.00163	0.00957	<0.000100	<0.000100	3.39	0.0000784	346	<0.00100	
WQ4-2	23C1797-08	2023-03-15	M	-0.41		<1	<0.050	<100	11500	<100	<10.0	<10.0	1610	0.0237	<0.000500	0.00125	0.00970	<0.000100	<0.000100	2.58	0.0000708	257	<0.00100	
WQ4-2	23D2945-08	2023-04-26	M	0.22	0.53	<1	0.059	<100	9040	0.688	0.139	<0.0500	1200	0.0267	<0.000500	0.00121	0.00777	<0.000100	<0.000100	2.56	0.0000346	228	<0.00100	
WQ4-2	23E2392-08	2023-05-17	M	21.38	23.4	8	0.086	<100	3180	0.222	<0.100	0.0680	<1000	1.07	<0.000250	0.000520	0.0226	<0.000050	<0.000050	0.774	0.0000132	80.6	<0.00100	
WQ4-2	23F3614-08	2023-06-27	M	8.21	11.9	6	<0.050	<100	1030	0.088	<0.100	0.0770	<1000	0.447	<0.000500	<0.000500	0.0142	<0.000100	<0.000100	0.305	<0.0000200	25.5	<0.00100	
WQ4-2	23G2415-08	2023-07-19	M	5.70	5.74	<1	<0.050	<100	6340	0.481	<1.00	<0.500	<1000	0.233	<0.000500	0.00101	0.0165	<0.000100	<0.000100	1.73	0.0000285	158	<0.00100	
WQ4-2	23H3309-10	2023-08-24	M	0.11	0.48	<1	<0.050	<100	12200	0.907	0.0859	0.0081	1920	0.0239	<0.000500	0.00160	0.0120	<0.000100	<0.000100	3.18	0.0000660	283	<0.00100	
WQ4-2	23I2271-11	2023-09-19	M	1.29	2.62	4	<0.050	<100	5800	0.395	<0.100	<0.0500	1070	0.129	<0.000500	0.000675	0.0140	<0.000100	<0.000100	1.46	0.0000278	128	<0.00100	
WQ4-2	23J2236-11	2023-10-18	M	16.39	20.5	31	<0.050	<100	5160	0.383	0.130	<0.0500	1110	0.818	<0.000500	0.000841	0.0216	<0.000100	<0.000100	1.3	0.0000329	110	<0.00100	
WQ4-2	23K1909-08	2023-11-15	M	0.04	1.91	2.0	<0.050	<100	5800	0.449	0.181	<0.0500	1760	0.102	<0.000500	0.000639	0.0113	<0.000100	<0.000100	1.44	0.0000408	123	<0.00100	
WQ4-2	23L2091-05	2023-12-15	M	0.58	0.63	<1.8	<0.050	<100	14200	0.965	0.357	<0.0050	1690	0.0419	<0.000500	0.00162	0.0106	<0.000100	<0.000100	4.08	0.0000880	332	<0.00100	
WQ4-2	L2754383-5	2024-01-25	M																					
WQ4-2	VA24A1507-005	2024-01-25	M	2.84	1.01	10	0.0064	30.3	9330	<1.0	<0.50	<0.10	1240	0.0681	<0.0010	0.00132	0.0080	<0.00050	<0.00050	2.59	0.000042	226	<0.00050	<0.00150
WQ4-2	L2754604-5	2024-02-14	M																					
WQ4-2	VA24A2995-005	2024-02-14	M	4.07	0.35	<10	0.0050	48.8	14300	<1.0	<0.50	<0.10	2020	0.0234	<0.0010	0.00139	0.0098	<0.00050	<0.00050	4.36	0.000063	301	<0.00050	<0.00150
WQ4-2	L2755043-5	2024-03-21	M																					
WQ4-2	VA24A6026-005	2024-03-21	M	1.37	1.46	<10	0.0115	13.8	4220	<1.0	<0.50	<0.10	535	0.100	<0.0010	0.00094	0.0088	<0.00050	<0.00050	1.10	<0.000020	103	<0.00050	<0.00150
WQ4-2	L2755490-5	2024-04-24	M																					
WQ4-2	VA24A8916-005	2024-04-24	M	1.45	1.62	<10	<0.0050	35.7	10500	<1.0	<0.50	<0.10	1430	0.0263	<0.0010	0.00239	0.0077	<0.00050	<0.00050	2.70	0.000047	254	<0.00050	<0.00150
WQ4-2	L2755567-5	2024-05-01	M																					
WQ4-2	VA24A9566-005	2024-05-01	M	-0.22	0.10	<10	0.0102	45.0	13300	<1.0	<0.50	<0.10	1850	0.0071	<0.0010	0.00290	0.0046	<0.00050	<0.00050	3.41	0.000058	336	<0.00050	<0.00150
WQ4-2	L2755666-5	2024-05-08	M																					
WQ4-2	VA24B0201-005	2024-05-08	M	1.74	1.99	<10	0.0064	13.2	4060	<1.0	<0.50	<0.10	512	0.111	<0.0010	0.00120	0.0078	<0.00050	<0.00050	0.96	<0.000020	91.8	<0.00050	<0.00150
WQ4-2	L2755779-5	2024-05-15	M																					
WQ4-2	VA24B0901-005	2024-05-15	M	3.48	4.41	<10	0.0143	23.6	7390	<1.0	<0.50	<0.10	951	0.187	<0.0010	0.00204	0.0106	<0.00050	<0.00050	1.74	0.000032	158	<0.00050	<0.00150
WQ4-2	L2755888-5	2024-05-22	M																					
WQ4-2	VA24B1500-005	2024-05-22	M	1.23	2.68	20	0.0106	23.8	7320	<1.0	<0.50	<0.10	984	0.111	<0.0010	0.00153	0.0078	<0.00050	<0.00050	2.27	0.000036	162	<0.00050	<0.00150
WQ4-2	L2756312-5	2024-06-19	M																					
WQ4-2	VA24B4510-005	2024-06-19	M	3.00	2.12	<10	0.0111	22.4	6490	<1.0	<0.50	<0.10	836	0.105	<0.0010	0.00312	0.0076	<0.00050	<0.00050	1.51	0.000037	166	<0.00050	<0.00150
WQ4-2	VA24B7397-005	2024-07-17	M	4.92	6.11	10	0.0079	20.2	6520	<1.0	<0.50	<0.10	892	0.232	<0.0010	0.00230	0.0137	<0.00050	<0.00050	1.88	0.000038	204	<0.00050	<0.00150
WQ4-2	L2756689-5	2024-07-17	M																					
WQ4-2	L2757122-5	2024-08-21	M																					
WQ4-2	VA24C1337-005	2024-08-21	M	8.23	7.92	63	<0.0050	8.0	2520	<1.0	<0.50	<0.10	340	0.278	<0.0010	0.00069	0.0165	<0.00050	<0.00050	0.67	<0.000020	59.8	<0.00050	<0.00150
WQ4-2	VA24C4683-005	2024-09-18	M	8.48	7.62	<10	0.0158	11.0	3240	<1.0	<0.50	<0.10	444	0.285	<0.0010	0.00120	0.0160	<0.00050	<0.00050	0.76	<0.000020	75.4	<0.00050	<0.00150
WQ4-2	VA24C8569-005	2024-10-23	M	2.79	5.24	10	0.0151	38.6	11600	<1.0	<0.50	<0.10	1560	0.195	<0.0010	0.00485	0.0162	<0.00050	<0.00050	2.43	0.000061	253	<0.00050	<0.00150
WQ4-2	L2757977-5	2024-10-30	M																					
WQ4-2	VA24C9414-005	2024-10-30	M	1.99	0.52	<10	0.0167	42.9	13100	<1.0	<0.50	<0.10	1840	0.0357	<0.0010	0.00119	0.0124	<0.00050	<0.00050	3.15	0.000069	312	<0.00050	<0.00150
WQ4-2	VA24D0180-005	2024-11-06	M	0.99	0.25	<10	0.0104	46.5	13100	<1.0	0.56	<0.10	1820	0.0274	<0.0010	0.00144	0.0115	<0.00050	<0.00050	2.77	0.000084	299	<0.00050	<0.00150
WQ4-2	VA24D0813-005	2024-11-13	M	2.62	1.41	<10	0.0150	18.6	5900	<1.0	<0.50	<0.10	805	0.170	<0.0010	0.00077	0.0079	<0.00050	<0.00050	1.29	0.000036	134	<0.00050	<0.00150
WQ4-2	L2758221-5	2024-11-22	M																					
WQ4-2	VA24D1791-005	2024-11-22	M	-1.43	0.78	<10	0.0083	34.1	11000	<1.0	<0.50	<0.10	1540	0.0529	<0.0010	0.00115	0.0105	<0.00050	<0.00050	3.08	0.000062	266	<0.00050	<0.00150
WQ4-2	L2758486-5	2024-12-18	M																					
WQ4-2	VA24D3937-005	2024-12-18	M	-0.02	0.54	<10	<0.0050	43.8	13100	<1.0	<0.50	<0.10	1800	0.0223	<0.0010	0.00134	0.0093	<0.00050	<0.00050	3.00	0.000059	271	<0.00050	<0.00150
WQ4-2	VA25A1525-005	2025-01-22	M	-2.41	0.59	<10	0.0069	45.7	13100	<1.0	<0.50	<0.10	1820	0.0163	<0.0010	0.00123	0.0096	<0.00050	<0.00050	2.83	0.000060	282	<0.00050	<0.00150
WQ4-2	L2758770-5	2025-01-22	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	L2759008-5	2025-02-19	M																					
WQ4-2	VA25A3570-005	2025-02-19	M	-3.11	0.89	<10	0.0080	43.5	13100	<1.0	<0.50	<0.10	1790	0.0154	<0.0010	0.00128	0.0102	<0.00050	<0.00050	2.90	0.000059	278	<0.00050	<0.00150
WQ4-2	VA25A6679-005	2025-03-26	M	0.34	1.33	<10	0.0125	25.5	7740	<1.0	<0.50	<0.10	1060	0.0547	<0.0010	0.00084	0.0075	<0.00050	<0.00050	2.27	0.000038	191	<0.00050	<0.00150
WQ4-2	VA25A9109-005	2025-04-23	M	-3.06	0.45	<10	<0.0050	46.3	13200	<1.0	<0.50	<0.10	1850	0.0135	<0.0010	0.00114	0.0082	<0.00050	<0.00050	2.49	0.000058	281	<0.00050	<0.00150
WQ4-2	VA25A9941-005	2025-05-01	M	-2.68	0.82	<10	0.0105	30.1	8790	<1.0	<0.50	<0.10	1240	0.0400	<0.0010	0.00085	0.0079	<0.00050	<0.00050	2.17	0.000039	208	<0.00050	<0.00150
WQ4-2	VA25B0496-005	2025-05-07	M	0.84	0.99	<10	0.0203	31.0	8760	<1.0	<0.50	<0.10	1210	0.0702	<0.0010	0.00073	0.0089	<0.00050	<0.00050	2.03	0.000036	191	<0.00050	<0.00150
WQ4-2	VA25B1530-005	2025-05-16	M	0.11	1.53	<10	<0.0050	16.6	4920	<1.0	<0.50	<0.10	651	0.116	<0.0010	0.00048	0.0083	<0.00050	<0.00050	1.15	0.000021	102	<0.00050	<0.00150
WQ4-2	VA25B1841-005	2025-05-21	M	0.89	2.34	<10	<0.0050	7.3	2040	<1.0	<0.50	<0.10	255	0.149	<0.0010	<0.00040	0.0066	<0.00050	<0.00050	0.32	<0.000020	22.1	<0.00050	<0.00150
WQ4-3	23L2091-07	2023-12-15	M	0.89	1.29	<1.8	<0.050	<100	11600	0.806	0.309	<0.0050	1460	0.0545	<0.000500	0.00146	0.00976	<0.000100	<0.000100	3.21	0.0000707	268	<0.00100	
WQ4-3	L2754383-6	2024-01-25	M																					
WQ4-3	VA24A1507-006	2024-01-25	M	3.80	1.03	20	0.0090	16.1	5130	<1.0	<0.50	<0.10	656	0.103	<0.0010	0.00072	0.0069	<0.00050	<0.00050	1.53	0.000032	131	<0.00050	<0.00150
WQ4-3	L2754604-6	2024-02-14	M																					
WQ4-3	VA24A2995-006	2024-02-14	M	2.89	0.98	<10	0.0128	39.2	11600	<1.0	<0.50	<0.10	1630	0.0644	<0.0010	0.00113	0.0097	<0.00050	<0.00050	3.66	0.000061	243	<0.00050	<0.00150
WQ4-3	L2755043-6	2024-03-21	M																					
WQ4-3	VA24A6026-006	2024-03-21	M	1.37	1.38	<10	0.0119	5.4	1600	<1.0	<0.50	<0.10	161	0.107	<0.0010	0.00059	0.0083	<0.00050	<0.00050	0.47	<0.000020	42.5	<0.00050	<0.00150
WQ4-3	L2755490-6	2024-04-24	M																					
WQ4-3	VA24A8916-006	2024-04-24	M	1.07	1.03	<10	0.0130	12.7	3880	<1.0	<0.50	<0.10	512	0.0659	<0.0010	0.00046	0.0083	<0.00050	<0.00050	0.89	0.000021	92.8	<0.00050	<0.00150
WQ4-3	L2755567-6	2024-05-01	M																					
WQ4-3	VA24A9566-006	2024-05-01	M	0.70	0.74	<10	0.0126	9.5	2920	<1.0	<0.50	<0.10	391	0.0635	<0.0010	0.00131	0.0074	<0.00050	<0.00050	1.30	<0.000020	114	<0.00050	<0.00150
WQ4-3	L2755666-6	2024-05-08	M																					
WQ4-3	VA24B0201-006	2024-05-08	M	1.62	1.77	10	0.0057	11.4	3490	<1.0	<0.50	<0.10	410	0.106	<0.0010	0.00107	0.0073	<0.00050	<0.00050	0.82	<0.000020	75.8	<0.00050	<0.00150
WQ4-3	L2755779-6	2024-05-15	M																					
WQ4-3	VA24B0901-006	2024-05-15	M	4.96	7.70	<10	0.0085	6.4	2570	<1.0	<0.50	<0.10	273	0.357	<0.0010	0.00113	0.0115	<0.00050	<0.00050	0.68	<0.000020	56.0	<0.00050	<0.00150
WQ4-3	L2755888-6	2024-05-22	M																					
WQ4-3	VA24B1500-006	2024-05-22	M	3.06	3.76	<10	<0.0050	10.2	3200	<1.0	<0.50	<0.10	402	0.184	<0.0010	0.00095	0.0093	<0.00050	<0.00050	0.97	<0.000020	69.8	<0.00050	<0.00150
WQ4-3	L2756312-6	2024-06-19	M																					
WQ4-3	VA24B4510-006	2024-06-19	M	6.40	3.65	<10	0.0057	17.2	4970	<1.0	<0.50	<0.10	626	0.197	<0.0010	0.00270	0.0095	<0.00050	<0.00050	1.11	0.000027	117	<0.00050	<0.00150
WQ4-3	VA24B7397-006	2024-07-17	M	13.64	9.22	<10	<0.0050	<5.0	794	<1.0	<0.50	<0.10	102	0.595	<0.0010	0.00055	0.0170	<0.00050	<0.00050	<0.30	<0.000020	18.4	<0.00050	<0.00150
WQ4-3	L2756689-6	2024-07-17	M																					
WQ4-3	L2757122-6	2024-08-21	M																					
WQ4-3	VA24C1337-006	2024-08-21	M	8.29	5.63	31	<0.0050	8.1	2540	<1.0	<0.50	<0.10	344	0.270	<0.0010	0.00060	0.0174	<0.00050	<0.00050	0.60	<0.000020	56.4	<0.00050	<0.00150
WQ4-3	VA24C4683-006	2024-09-18	M	8.55	7.96	31	0.0158	8.7	2570	<1.0	<0.50	<0.10	349	0.339	<0.0010	0.00113	0.0161	<0.00050	<0.00050	0.57	<0.000020	61.0	<0.00050	<0.00150
WQ4-3	VA24C8569-006	2024-10-23	M	5.04	11.4	20	0.0113	13.4	4070	<1.0	<0.50	<0.10	529	0.451	<0.0010	0.00178	0.0201	<0.00050	<0.00050	0.87	0.000032	84.6	<0.00050	<0.00150
WQ4-3	L2757977-6	2024-10-30	M																					
WQ4-3	VA24C9414-006	2024-10-30	M	5.98	3.75	<10	0.0116	10.2	2770	<1.0	<0.50	<0.10	362	0.234	<0.0010	<0.00040	0.0097	<0.00050	<0.00050	0.68	<0.000020	63.2	<0.00050	<0.00150
WQ4-3	VA24D0180-006	2024-11-06	M	1.17	1.24	10	0.0200	25.8	7210	<1.0	<0.50	<0.10	986	0.0764	<0.0010	0.00076	0.0117	<0.00050	<0.00050	1.53	0.000037	157	<0.00050	<0.00150
WQ4-3	VA24D0813-006	2024-11-13	M	4.18		20	0.0096	6.8	2500	<1.0	<0.50	<0.10	308	0.196	<0.0010	<0.00040	0.0088	<0.00050	<0.00050	0.60	0.000026	60.2	<0.00050	<0.00150
WQ4-3	L2758221-6	2024-11-22	M																					
WQ4-3	VA24D1791-006	2024-11-22	M	-1.39	0.87	10	0.0051	38.9	12600	<1.0	<0.50	<0.10	1770	0.0364	<0.0010	0.00134	0.0113	<0.00050	<0.00050	3.69	0.000058	298	<0.00050	<0.00150
WQ4-3	L2758486-6	2024-12-18	M																					
WQ4-3	VA24D3937-006	2024-12-18	M	0.10	0.53	<10	<0.0050	33.9	10300	<1.0	<0.50	<0.10	1420	0.0382	<0.0010	0.00102	0.0083	<0.00050	<0.00050	2.26	0.000060	195	<0.00050	<0.00150
WQ4-3	L2758770-6	2025-01-22	M																					
WQ4-3	VA25A1525-006	2025-01-22	M	-2.31	0.54	<10	0.0066	47.1	13300	<1.0	<0.50	<0.10	1880	0.0184	<0.0010	0.00115	0.0092	<0.00050	<0.00050	2.70	0.000062	274	<0.00050	<0.00150
WQ4-3	L2759008-6	2025-02-19	M																					
WQ4-3	VA25A3570-006	2025-02-19	M	-3.05	0.92	<10	0.0079	40.7	12300	<1.0	<0.50	<0.10	1680	0.0135	<0.0010	0.00123	0.0107	<0.00050	<0.00050	2.73	0.000053	268	<0.00050	<0.00150
WQ4-3	VA25A6679-006	2025-03-26	M	0.43	1.36	<10	0.0112	22.4	6720	<1.0	<0.50	<0.10	918	0.0672	<0.0010	0.00076	0.0067	<0.00050	<0.00050	1.89	0.000038	161	<0.00050	<0.00150
WQ4-3	VA25A9109-006	2025-04-23	M	-2.36	0.96	<10	<0.0050	8.7	2690	<1.0	<0.50	<0.10	377	0.0720	<0.0010	<0.00040	0.0077	<0.00050	<0.00050	0.62	<0.000020	60.2	<0.00050	<0.00150
WQ4-3	VA25A9941-006	2025-05-01	M	-0.95	1.76	<10	<0.0050	8.7	2650	<1.0	<0.50	<0.10	377	0.119	<0.0010	<0.00040	0.0068	<0.00050	<0.00050	0.71	<0.000020	61.5	<0.00050	<0.00150
WQ4-3	VA25B0496-006	2025-05-07	M	2.07	1.45	<10	0.0108	20.4	5830	<1.0	<0.50	<0.10	798	0.104	<0.0010	0.00056	0.0086	<0.00050	<0.00050	1.41	0.000022	136	<0.00050	<0.00150
WQ4-3	VA25B1530-006	2025-05-16	M	1.00	2.39	10	<0.0050	<5.0	1360	<1.0	<0.50	<0.10	168	0.184	<0.0010	<0.00040	0.0078	<0.00050	<0.00050	0.38	<0.000020	31.8	<0.00050	<0.00150
WQ4-3	VA25B1841-006	2025-05-21	M	1.49	1.99	<10	0.0071	<5.0	820	<1.0	<0.50	<0.10	88	0.151	<0.0010	<0.00040	0.0076	<0.00050	<0.00050	<0.30	<0.000020	26.4	<0.00050	<0.00150
WQR1-0.5	L2755545-7	2024-04-30	M																					
WQR1-0.5	VA24A9402-007	2024-04-30	M	1.18	1.27		0.0093	19.8	6280	<1.0	<0.50	<0.10	825	0.0805	<0.0010	0.00137	0.0067	<0.00050	<0.00050	1.62	0.000037	142	<0.00050	<0.00150

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA24A9802-011	2024-05-05	M		0.97									0.0670	<0.0010	0.00084	0.0076	<0.00050	<0.00050	1.37	0.000026	125	<0.00050	<0.00150
WQR1-0.5	L2755648-10	2024-05-08	M																					
WQR1-0.5	VA24B0178-010	2024-05-08	M	1.17	1.75		<0.0050	24.2	7170	<1.0	<0.50	<0.10	946	0.0782	<0.0010	0.00174	0.0074	<0.00050	<0.00050	1.66	0.000025	154	<0.00050	<0.00150
WQR1-0.5	L2755934-1	2024-05-24	M																					
WQR1-0.5	VA24B1783-001	2024-05-24	M		3.19		<0.0050	9.8	2900	<1.0	<0.50	<0.10	383	0.166	<0.0010	0.00098	0.0095	<0.00050	<0.00050	0.86	<0.000020	68.3	<0.00050	<0.00150
WQR1-0.5	L2755981-1	2024-05-28	M																					
WQR1-0.5	VA24B2063-001	2024-05-28	M	2.74	3.12		0.0122	8.2	2310	<1.0	<0.50	<0.10	269	0.227	<0.0010	<0.00040	0.0090	<0.00050	<0.00050	0.58	<0.000020	46.2	<0.00050	<0.00150
WQR1-0.5	VA24B2561-005	2024-06-01	M	2.71			<0.0050	<5.0	1500	<1.0	<0.50	<0.10	201	0.171	<0.0010	<0.00040	0.0088	<0.00050	<0.00050	0.39	<0.000020	35.3	<0.00050	
WQR1-0.5	L2756068-1	2024-06-04	M																					
WQR1-0.5	VA24B2772-001	2024-06-04	M	9.18	12.5		0.0103	<5.0	156	<1.0	<0.50	<0.10	<30	0.627	<0.0010	0.00048	0.0134	<0.00050	<0.00050	<0.30	<0.000020	6.2	<0.00050	0.00152
WQR1-0.5	VA24B3452-007	2024-06-10	M	6.47	11.0		<0.0050	<5.0	629	<1.0	<0.50	<0.10	67	0.612	<0.0010	<0.00040	0.0140	<0.00050	<0.00050	<0.30	<0.000020	17.1	<0.00050	<0.00150
WQR1-0.5	655-454600000-0	2024-06-17	M	7.82																				
WQR1-0.5	VA24B5880-003	2024-07-02	M		17.8									0.929	<0.0010	<0.00040	0.0193	<0.00050	<0.00050	<0.30	<0.000020	12.6	<0.00050	
WQR1-0.5	VA24B5882-007	2024-07-03	M	23.70	17.0									0.370	<0.0010	<0.00040	0.0138	<0.00050	<0.00050	0.30	<0.000020	19.0	<0.00050	
WQR1-0.5	VA24B6465-001	2024-07-09	M	9.18	9.05		<0.0050	6.5	2180	<1.0	<0.50	<0.10	278	0.499	<0.0010	0.00073	0.0166	<0.00050	<0.00050	0.48	<0.000020	47.9	<0.00050	<0.00150
WQR1-0.5	VA24B7867-001	2024-07-20	M	15.41	14.2		0.0054	5.6	1810	<1.0	<0.50	<0.10	233	0.381	<0.0010	0.00046	0.0172	<0.00050	<0.00050	0.38	<0.000020	39.9	<0.00050	<0.00150
WQR1-0.5	L2757210-1	2024-08-26	M																					
WQR1-0.5	VA24C2208-001	2024-08-26	M		16.1		<0.0050	7.7	2450	<1.0	<0.50	<0.10	315	0.664	<0.0010	0.00058	0.0216	<0.00050	<0.00050	0.62	<0.000020	63.4	0.00088	<0.00150
WQR1-0.5	L2757680-1	2024-10-06	M																					
WQR1-0.5	VA24C6685-001	2024-10-06	M	7.70	2.14		0.0051	30.3	8910	<2.00	<0.500	<0.100	1220	0.127	<0.00200	<0.00200	0.0124	<0.000400	<0.00100	2.20	<0.000100	197	<0.0100	<0.00150
WQR1-0.5	VA24C7408-001	2024-10-13	M	2.19	3.08		0.0115	38.6	11200	<1.0	<0.50	<0.10	1550	0.128	<0.0010	0.00465	0.0143	<0.00050	<0.00050	2.14	0.000060	231	<0.00050	<0.00150
WQR1-0.5	L2757830-3	2024-10-19	M																					
WQR1-0.5	VA24C8041-003	2024-10-19	M	15.38	5.02		0.0149	19.0	5880	<1.0	<0.50	<0.10	812	0.259	<0.0010	0.00217	0.0149	<0.00050	<0.00050	1.30	0.000038	124	<0.00050	<0.00150
WQR1-0.5	VA24C8159-005	2024-10-20	M	22.25	23.4		0.0081	8.6	2710	<1.0	<0.50	<0.10	367	1.01	<0.0010	<0.00200	0.0310	<0.00050	<0.00050	0.66	0.000023	63.0	0.00056	<0.00150
WQR1-0.5	L2757872-1	2024-10-22	M																					
WQR1-0.5	VA24C8330-001	2024-10-22	M		20.8		0.0110	10.1	3160	<1.0	<0.50	<0.10	409	1.02	<0.0010	0.00154	0.0290	<0.00050	<0.00050	0.68	0.000021	68.0	0.00053	<0.00150
WQR1-0.5	L2757933-5	2024-10-28	M																					
WQR1-0.5	VA24C9041-005	2024-10-28	M	11.20	11.6		0.0091	<5.0	1210	<1.0	<0.50	<0.10	164	0.622	<0.0010	<0.00080	0.0134	<0.00050	<0.00050	<0.30	<0.000020	28.8	<0.00050	<0.00150
WQR1-0.5	L2758002-1	2024-11-01	M																					
WQR1-0.5	VA24C9683-001	2024-11-01	M	1.39	1.54		0.0210	25.1	7440	<1.0	<0.50	<0.10	958	0.0881	<0.0010	0.00084	0.0119	<0.00050	<0.00050	1.76	0.000051	195	<0.00050	<0.00150
WQR1-0.5	L2758142-5	2024-11-14	M																					
WQR1-0.5	VA24D0945-005	2024-11-14	M	5.14	5.52		0.0100	10.2	3650	<1.0	<0.50	<0.10	503	0.285	<0.0010	0.00046	0.0096	<0.00050	<0.00050	0.70	0.000025	70.4	<0.00050	<0.00150
WQR1-0.5	VA24D1069-005	2024-11-15	M	3.02	3.30		0.0105	11.5	3610	<1.0	<0.50	<0.10	476	0.208	<0.0010	0.00042	0.0100	<0.00050	<0.00050	0.83	0.000023	80.8	<0.00050	<0.00150
WQR1-0.5	L2758203-5	2024-11-19	M																					
WQR1-0.5	VA24D1567-005	2024-11-19	M	1.74	1.24		0.0129	22.6	7140	<1.0	<0.50	<0.10	987	0.0843	<0.0010	0.00079	0.0116	<0.00050	<0.00050	1.70	0.000041	154	<0.00050	<0.00150
WQR1-0.5	L2758353-1	2024-12-05	M																					
WQR1-0.5	VA24D2842-001	2024-12-05	M	2.03	0.94		0.0165	28.4	8550	<1.0	<0.50	<0.10	1180	0.0323	<0.0010	0.00090	0.0112	<0.00050	<0.00050	1.84	0.000052	199	<0.00050	<0.00150
WQR1-0.5	L2758617-7	2025-01-08	M																					
WQR1-0.5	VA25A0392-007	2025-01-08	M	1.39	0.72		0.0144	34.9	10600	<1.0	<0.50	<0.10	1490	0.0224	<0.0010	0.00108	0.0110	<0.00050	<0.00050	2.16	0.000059	230	<0.00050	<0.00150
WQR1-0.5	L2759040-7	2025-02-20	M																					
WQR1-0.5	VA25A3677-007	2025-02-20	M	1.25	0.94		0.0081	35.2	10600	<1.0	<0.50	<0.10	1460	0.0164	<0.0010	0.00111	0.0108	<0.00050	<0.00050	2.88	0.000056	241	<0.00050	<0.00150
WQR1-0.5	L2759227-7	2025-03-13	M																					
WQR1-0.5	VA25A5556-007	2025-03-13	M	1.23	0.89		0.0077	23.5	6560	<1.0	<0.50	<0.10	871	0.0408	<0.0010	0.00073	0.0076	<0.00050	<0.00050	1.78	0.000031	149	<0.00050	<0.00150
WQR1-0.5	VA25A6528-013	2025-03-25	M	1.46	0.87		0.0071	17.6	6840	<1.0	<0.50	<0.10	894	0.0590	<0.0010	0.00071	0.0075	<0.00050	<0.00050	1.73	0.000030	155	<0.00050	
WQR1-0.5	VA25A8147-001	2025-04-11	M	2.34	1.81		0.0081	8.3	2520	<1.0	<0.50	<0.10	294	0.134	<0.0010	<0.00040	0.0076	<0.00050	<0.00050	0.66	<0.000020	56.0	<0.00050	<0.00150
WQR1-0.5	VA25A8148-001	2025-04-11	M																					
WQR1-0.5	VA25A8281-007	2025-04-14	M	1.46	0.70		0.0089	17.0	4950	<1.0	<0.50	<0.10	697	0.0547	<0.0010	0.00050	0.0080	<0.00050	<0.00050	1.22	0.000029	108	<0.00050	<0.00150
WQR1-0.5	VA25A8283-007	2025-04-14	M																					
WQR1-0.5	VA25A9123-008	2025-04-23	M	1.36	1.04		0.0086	6.3	2020	<1.0	<0.50	<0.10	287	0.0655	<0.0010	<0.00040	0.0081	<0.00050	<0.00050	0.54	<0.000020	46.0	<0.00050	<0.00150
WQR1-0.5	VA25A9125-008	2025-04-23	M																					
WQR1-0.5	VA25B0359-009	2025-05-06	M	3.85	2.29		0.0104	8.4	2660	<1.0	<0.50	<0.10	338	0.156	<0.0010	<0.00040	0.0088	<0.00050	<0.00050	0.55	<0.000020	57.9	<0.00050	<0.00150
WQR1-0.5	VA25B0360-009	2025-05-06	M																					
WQR1-0.5	VA25B0800-007	2025-05-09	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA25B0802-007	2025-05-09	M	3.34	2.96		0.0094	11.7	3310	<1.0	<0.50	<0.10	407	0.179	<0.0010	<0.00040	0.0084	<0.00050	<0.00050	0.99	<0.000020	81.5	<0.00050	<0.00150
WQR1-0.5	VA25B2349-005	2025-05-27	M	2.67	2.60		<0.0050	8.4	2630	<1.0	<0.50	<0.10	362	0.128	<0.0010	<0.00040	0.0080	<0.00050	<0.00050	0.62	<0.000020	59.8	<0.00050	<0.00150
WQR1-1	0051710-09	2020-05-20	M	0.27		<1.8	<0.050				<5.00			0.0115	<0.00040	0.00173	<0.0100	<0.00020	<0.00020	4.36	0.000078	451	<0.00100	
WQR1-1	0062209-10	2020-06-22	M	0.30		<1	<0.050				<1.00			0.0551	<0.00040	0.00177	0.0104	<0.00020	<0.00020	4.33	0.000089	405	<0.00100	
WQR1-1	0071996-09	2020-07-21	M	0.80		<1	<0.050				<1.00			0.0525	<0.00040	0.00238	0.0122	<0.00020	<0.00020	4.08	0.000063	284	<0.00100	
WQR1-1	0082292-09	2020-08-24	M	0.40		9	<0.050				<1.00			0.0361	<0.00040	0.00197	0.011	<0.00020	<0.00020	3.85	0.000088	350	<0.00100	
WQR1-1	0093017-09	2020-09-28	M	0.77		1	<0.050				<1.00			0.0635	<0.00040	0.00146	0.0123	<0.00020	<0.00020	4.41	0.000103	390	<0.00100	
WQR1-1	20J1961-09	2020-10-20	M	0.50		<1.8	<0.050				<10.0			0.0602	<0.00040	0.00183	0.0126	<0.00020	<0.00020	4.35	0.000126	405	<0.00100	
WQR1-1	20J2778-09	2020-10-27	M	0.31		<1	<0.050				<1.00			0.0227	<0.00040	0.00171	0.0121	<0.00020	<0.00020	3.91	0.000139	381	<0.00100	
WQR1-1	20K0360-09	2020-11-03	M	0.25		<1	<0.050				<1.00			0.0281	<0.00040	0.00164	0.0109	<0.00020	<0.00020	4.2	0.000075	365	<0.00100	
WQR1-1	20K1261-09	2020-11-10	M	0.10		<1	<0.050				1.04			0.0246	<0.00040	0.00185	0.0139	<0.00020	<0.00020	4.21	0.000077	433	<0.00100	
WQR1-1	20K2100-09	2020-11-18	M			<1.8	<0.050				<1.00			0.0301	<0.00040	0.00236	0.0141	<0.00020	<0.00020	3.94	0.000048	411	<0.00100	
WQR1-1	20L1589-09	2020-12-14	M	-0.01		<1	<0.050				<1.00			0.0189	<0.00040	0.00232	0.0128	<0.00020	<0.00020	4.13	0.000101	472	<0.00100	
WQR1-1	21A2590-09	2021-01-27	M	0.18		4	<0.050				<1.00			0.0148	<0.00040	0.00165	<0.0100	<0.00020	<0.00020	4.07	0.000078	388	<0.00100	
WQR1-1	21B2778-09	2021-02-25	M			<1.8	<0.050				<1.00			0.0111	<0.00040	0.00162	0.0112	<0.00020	<0.00020	4.36	0.000089	414	<0.00100	
WQR1-1	21C3505-10	2021-03-25	M	0.56		<1	0.094				<1.00			0.0214	<0.000500	0.00184	0.0127	<0.000100	<0.000100	4.88	0.0000979	397	<0.00100	
WQR1-1	21D2478-09	2021-04-22	M	0.21		<1	<0.050				<1.00			0.0182	<0.000500	0.00162	0.011	<0.000100	<0.000100	4.44	0.0000757	384	<0.00100	
WQR1-1	21E1990-09	2021-05-18	M	0.12		1	<0.050				<1.00			<0.0100	0.00056	0.00168	0.0114	<0.00020	<0.00020	5.65	0.00009	406	<0.00100	
WQR1-1	21E2917-09	2021-05-26	M	0.20		1	<0.050				<1.00			0.0152	<0.000500	0.00146	0.00967	<0.000100	<0.000100	4.09	0.0000895	413	<0.00100	
WQR1-1	21F0167-09	2021-06-01	M	0.31		<1	0.081				<1.00			0.029	<0.000500	0.00156	0.0159	<0.000100	<0.000100	3.91	0.0000886	366	<0.00100	
WQR1-1	21F1056-09	2021-06-08	M	0.79		<1	0.095				<1.00			0.0223	<0.000500	0.00152	0.012	<0.000100	<0.000100	3.95	0.0000724	386	<0.00100	
WQR1-1	21F2014-09	2021-06-15	M	2.21		<1	<0.050				<1.00			0.0377	<0.000500	0.0015	0.0104	<0.000100	<0.000100	4.02	0.0001	362	<0.00100	
WQR1-1	21G2414-09	2021-07-20	M	3.07		<1	<0.050				<1.00			0.0338	<0.000500	0.00149	0.0113	<0.000100	<0.000100	3.82	0.000072	323	<0.00100	
WQR1-1	21H3040-09	2021-08-25	M			2	0.051				<1.00			0.0148	<0.000500	0.00161	0.0102	<0.000100	<0.000100	4.01	0.0000851	393	<0.00100	
WQR1-1	21I3814-09	2021-09-28	M	0.66		<1.8	<0.050				<1.00			0.0478	<0.000500	0.00146	0.0112	<0.000100	<0.000100	3.74	0.0000757	350	<0.00100	
WQR1-1	21J3514-09	2021-10-26	M	-0.60		10	<0.050				<1.00			0.0263	<0.00020	0.00157	0.0117	<0.00010	<0.00010	3.74	0.000082	328	<0.00050	
WQR1-1	21K3046-09	2021-11-23	M	0.67		2	<0.050				<1.00			1.1	<0.00040	0.00137	0.0314	<0.00020	<0.00020	3.81	0.00008	343	0.0013	
WQR1-1	21L2125-09	2021-12-14	M	0.31		1	<0.050				<1.00			<0.0100	<0.00040	0.00204	0.0113	<0.00020	<0.00020	4.75	0.000072	336	<0.00100	
WQR1-1	22A2312-09	2022-01-20	M	-0.06		<1.8	<0.050				<1.00			0.0127	<0.00040	0.00305	0.0103	<0.00020	<0.00020	4.9	0.000082	361	<0.00100	
WQR1-1	22B2487-09	2022-02-17	M	0.40		<1	<0.050	<25.0	14400	<25.0	<2.50	<2.50	2630	0.0236	<0.00040	0.00129	<0.0100	<0.00020	<0.00020	3.91	0.000077	331	<0.00100	
WQR1-1	22C3145-09	2022-03-22	M	0.30		<1	0.063	61.8	13500	<25.0	<2.50	<2.50	2170	0.0248	<0.00040	0.00168	<0.0100	<0.00020	<0.00020	3.03	0.000082	292	<0.00100	
WQR1-1	22D2212-06	2022-04-19	M	0.52		<1	0.103	67.5	16300	<50.0	<5.00	<5.00	2300	0.0314	<0.00040	0.00196	0.0138	<0.00020	<0.00020	5.97	0.00008	356	<0.00100	
WQR1-1	22E2480-01	2022-05-17	M	0.07		<1	<0.050	63.6	16700	<50.0	<5.00	<5.00	2300	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.91	<0.000100	356	<0.00500	
WQR1-1	22F3212-09	2022-06-21	M	-0.20		<1	<0.050	64.6	15800	<50.0	<5.00	<5.00	2120	<0.0200	<0.000500	0.00163	0.00997	<0.000100	<0.000100	4.38	0.0000812	362	<0.00100	
WQR1-1	22G1763-09	2022-07-13	M	0.01		<1	<0.050	<50.0	14200	<50.0	<5.00	<5.00	1840	0.0235	<0.000500	0.00169	0.0111	<0.000100	<0.000100	4.45	0.0000914	338	<0.00100	
WQR1-1	22H2453-09	2022-08-16	M	-0.05		<1	<0.050	<50.0	13300	<50.0	<5.00	<5.00	1940	0.0401	<0.000500	0.00169	0.0119	<0.000100	<0.000100	4.17	0.000108	379	<0.00100	
WQR1-1	22I1926-09	2022-09-14	M	6.07		4	<0.050	52.2	15900	<10.0	<1.00	<1.00	2610	0.0210	<0.000500	0.00159	0.0100	<0.000100	<0.000100	3.87	0.0000698	313	0.00108	
WQR1-1	22J1560-01	2022-10-12	M	0.26		<1	<0.050	<100	15900	<100	<10.0	<10.0	2320	0.0206	<0.000500	0.00180	0.0118	<0.000100	<0.000100	4.27	0.0000830	369	<0.00100	
WQR1-1	22K1453-09	2022-11-10	M	0.30		<1	<0.050	36.4	15700	<25.0	0.439	<0.0050	2170	0.0281	<0.000500	0.00221	0.0125	<0.000100	<0.000100	5.11	0.000109	379	<0.00100	
WQR1-1	22L0774-09	2022-12-07	M	0.27		<1	<0.050	<25.0	16700	<25.0	<2.50	<2.50	2230	<0.0200	<0.000500	0.00173	0.0140	<0.000100	<0.000100	4.4	0.0000822	367	<0.00100	
WQR1-1	23A2847-09	2023-01-27	M	0.00		<1	<0.050	<100	16100	<100	0.381	<0.0050	2340	0.0201	<0.000500	0.00204	0.00924	<0.000100	<0.000100	4.19	0.0000943	378	<0.00100	
WQR1-1	23C0060-09	2023-02-28	M	0.10		<1	<0.050	<100	16600	<100	<10.0	<10.0	2110	<0.0200	<0.000500	0.00184	0.00961	<0.000100	<0.000100	3.76	0.0000855	390	<0.00100	
WQR1-1	23C1797-09	2023-03-15	M	-0.45		<1	<0.050	<100	15400	<100	<10.0	<10.0	2060	0.0345	<0.000500	0.00184	0.00979	<0.000100	<0.000100	3.71	0.0000916	355	<0.00100	
WQR1-1	23D2945-09	2023-04-26	M	0.23	0.35	<1	<0.050	<100	16000	1.09	0.642	<0.0500	2060	0.0201	<0.000500	0.00201	0.0101	<0.000100	<0.000100	4.11	0.0000646	354	0.00189	
WQR1-1	23E2392-09	2023-05-17	M	0.35	0.32	<1	0.081	<100	15900	0.808	0.420	0.0620	2150	0.0312	<0.000500	0.00186	0.0107	<0.000100	<0.000100	3.85	0.0000890	400	<0.00100	
WQR1-1	23F3614-09	2023-06-27	M	0.59	0.46	<1	<0.050	<100	16600	1.12	0.436	<0.0500	2710	<0.0900	<0.000500	0.00196	0.00964	<0.000100	<0.000100	4.48	0.0000894	380	<0.00100	
WQR1-1	23G2415-09	2023-07-19	M	0.11	0.90	1	<0.050	<100	15600	1.14	0.434	<0.0500	2190	0.0292	<0.000500	0.00206	0.0118	<0.000100	<0.000100	4.35	0.0000825	392	<0.00100	
WQR1-1	23H3309-01	2023-08-24	M	0.22	0.62	<1	<0.050	<100	14800	1.08	0.387	0.0086	1980	0.0360	<0.000500	0.00196	0.0111	<0.000100	<0.000100	4.07	0.000112	364	<0.00100	
WQR1-1	23I2271-01	2023-09-19	M	0.41	0.66	<1	<0.050	<100	17500	1.13	0.445	<0.0500	2550	0.0220	<0.000500	0.00172	0.0102	<0.000100	<0.000100	4.31	0.000128	361	<0.00100	
WQR1-1	23J2236-01	2023-10-18	M	0.32	0.54	<1	<0.050	<100	16800	1.12	0.439	<0.0500	2370	0.0351	<0.000500	0.00164	0.0111	<0.000100	<0.000100	3.79	0.0000956	390	<0.00100	
WQR1-1	23K1909-09	2023-11-15	M	0.10	0.61	4.5	<0.050	<100	18000	1.26	0.426	<0.0500	3810	0.0345	<0.000500	0.00168	0.00979	<0.000100	<0.000100	4.77	0.000102	410	<0.00100	
WQR1-1	23L1905-01	2023-12-14	M	0.23	0.21	<1.8	<0.050	<100	16200	1.27	0.450	<0.0500	2000	0.0421	<0.000500	0.00186	0.0101	<0.000100	<0.000100	3.79	0.0000885	365	<0.00100	
WQR1-1	L2754366-4	2024-01-24	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-1	VA24A1422-004	2024-01-24	M	0.41	0.16	10	<0.0050	57.8	16800	<1.0	<0.50	<0.10	2310	0.0221	<0.0010	0.00195	0.0087	<0.00050	<0.00050	3.88	0.000080	401	<0.00050	<0.0250
WQR1-1	L2754594-1	2024-02-13	M																					
WQR1-1	VA24A2858-001	2024-02-13	M	0.27	0.28	20	<0.0050	56.8	16500	<1.0	<0.50	<0.10	2310	0.0212	<0.0010	0.00162	0.0093	<0.00050	<0.00050	4.31	0.000072	357	<0.00050	<0.00150
WQR1-1	L2755033-1	2024-03-20	M																					
WQR1-1	VA24A5955-001	2024-03-20	M	0.53	0.43	<10	<0.0050	57.2	16900	<1.0	<0.50	<0.10	2360	0.0213	<0.0010	0.00253	0.0095	<0.00050	<0.00050	3.59	0.000068	399	<0.00050	<0.00150
WQR1-1	L2755461-1	2024-04-23	M																					
WQR1-1	VA24A8736-001	2024-04-23	M	0.25	0.48	<10	0.0100	52.4	15200	<1.0	<0.50	<0.10	2100	0.0406	<0.0010	0.00252	0.0097	<0.00050	<0.00050	3.98	0.000095	393	<0.00050	<0.00150
WQR1-1	L2755553-1	2024-04-30	M																					
WQR1-1	VA24A9418-001	2024-04-30	M	0.05	0.47	<10	0.0147	50.3	15400	<1.0	0.55	<0.10	2120	0.0212	<0.0010	0.00366	0.0111	<0.00050	<0.00050	3.89	0.000068	388	<0.00050	<0.00150
WQR1-1	L2755641-1	2024-05-07	M																					
WQR1-1	VA24B0040-001	2024-05-07	M	0.14	0.19	<10	<0.0050	53.2	15500	<1.0	<0.50	<0.10	2310	0.0109	<0.0010	0.00332	0.0097	<0.00050	<0.00050	3.95	0.000075	388	<0.00050	<0.00150
WQR1-1	L2755769-1	2024-05-14	M																					
WQR1-1	VA24B0738-001	2024-05-14	M	-0.12	0.30	<10	<0.0050	56.0	16500	<1.0	<0.50	<0.10	2220	0.0143	<0.0010	0.00239	0.0096	<0.00050	<0.00050	3.52	0.000079	375	<0.00050	<0.00150
WQR1-1	L2755874-1	2024-05-21	M																					
WQR1-1	VA24B1351-001	2024-05-21	M	-0.05	0.20	<10	<0.0050	56.5	16800	<1.0	<0.50	<0.10	2320	0.0143	<0.0010	0.00239	0.0099	<0.00050	<0.00050	3.50	0.000070	361	<0.00050	<0.00150
WQR1-1	L2756277-1	2024-06-18	M																					
WQR1-1	VA24B4257-001	2024-06-18	M	2.00	0.65	<10	<0.0050	59.8	17000	<1.0	0.51	<0.10	2260	0.0312	<0.0010	0.00418	0.0111	<0.00050	<0.00050	3.79	0.000083	382	0.00063	<0.00150
WQR1-1	L2756678-1	2024-07-16	M																					
WQR1-1	VA24B7237-001	2024-07-16	M	-0.49	0.54	<10	0.0059	57.6	17100	<1.0	<0.50	<0.10	2370	0.0334	<0.0010	0.00370	0.0111	<0.00050	<0.00050	3.39	0.000086	389	<0.00050	<0.00150
WQR1-1	L2757095-1	2024-08-20	M																					
WQR1-1	VA24C1101-001	2024-08-20	M	0.11	0.33	<10	0.0051	57.2	17000	<1.0	<0.50	<0.10	2360	0.0216	<0.0010	0.00390	0.0110	<0.00050	<0.00050	3.52	0.000069	377	<0.00050	<0.00150
WQR1-1	VA24C4483-001	2024-09-17	M	1.44	0.31	<10	<0.0050	53.8	16400	<1.0	<0.50	<0.10	2310	0.0178	<0.0010	0.00355	0.0110	<0.00050	<0.00050	3.36	0.000060	388	<0.00050	<0.00150
WQR1-1	VA24C8360-001	2024-10-22	M	2.37	0.83	<10	<0.0050	58.7	17200	<1.0	0.50	<0.10	2380	0.0368	<0.0010	0.00630	0.0110	<0.00050	<0.00050	3.60	0.000070	373	<0.00050	<0.00150
WQR1-1	VA24C9197-001	2024-10-29	M	1.00	0.77	10	<0.0050	55.6	16300	<1.0	0.54	<0.10	2200	0.0349	<0.0010	0.00176	0.0105	<0.00050	<0.00050	4.22	0.000066	390	<0.00050	<0.00150
WQR1-1	VA24D0009-001	2024-11-05	M	1.00	0.26	<10	<0.0050	56.6	16400	<1.0	<0.50	<0.10	2270	0.0242	<0.0010	0.00151	0.0119	<0.00050	<0.00050	3.24	0.000071	362	<0.00050	<0.00150
WQR1-1	L2758095-1	2024-11-12	M																					
WQR1-1	VA24D0632-001	2024-11-12	M	2.09	0.50	<10	0.0086	54.3	17000	1.0	<0.50	0.11	2340	0.0299	<0.0010	0.00163	0.0120	<0.00050	<0.00050	3.41	0.000077	388	<0.00050	<0.00150
WQR1-1	VA24D1720-001	2024-11-21	M	-0.55	0.56	<10	<0.0050	54.1	16500	<1.0	0.86	<0.10	2280	0.0279	<0.0010	0.00154	0.0130	<0.00050	<0.00050	4.93	0.000077	415	<0.00050	<0.00150
WQR1-1	L2758465-1	2024-12-17	M																					
WQR1-1	VA24D3769-001	2024-12-17	M	-0.05	0.26	<10	<0.0050	52.5	16200	<1.0	<0.50	<0.10	2240	0.0152	<0.0010	0.00162	0.0092	<0.00050	<0.00050	3.55	0.000082	351	<0.00050	<0.00150
WQR1-1	L2758719-1	2025-01-21	M																					
WQR1-1	VA25A1408-001	2025-01-21	M	-1.44	0.24	<10	<0.0050	55.5	16800	<1.0	<0.50	<0.10	2340	0.0188	<0.0010	0.00155	0.0086	<0.00050	<0.00050	4.09	0.000081	406	<0.00050	<0.00150
WQR1-1	L2758994-1	2025-02-18	M																					
WQR1-1	VA25A3430-001	2025-02-18	M	-2.85	0.43	<10	<0.0050	48.6	14900	<1.0	<0.50	<0.10	2050	0.0185	<0.0010	0.00171	0.0097	<0.00050	<0.00050	3.80	0.000091	405	<0.00050	<0.00150
WQR1-1	VA25A6550-001	2025-03-25	M	-0.22	0.50	<10	0.0072	56.4	16500	<1.0	<0.50	<0.10	2300	0.0092	<0.0010	0.00157	0.0098	<0.00050	<0.00050	3.40	0.000087	422	<0.00050	<0.00150
WQR1-1	VA25A8962-001	2025-04-22	M	-3.25	0.18	10	0.0236	60.3	16800	<1.0	<0.50	<0.10	2310	<0.0050	<0.0010	0.00160	0.0085	<0.00050	<0.00050	3.64	0.000087	363	<0.00050	<0.00150
WQR1-1	VA25A9878-001	2025-04-30	M	-2.97	0.14	<10	0.0344	60.3	17100	1.3	<0.50	<0.10	2370	0.0116	<0.0010	0.00162	0.0090	<0.00050	<0.00050	3.62	0.000089	399	<0.00050	<0.00150
WQR1-1	VA25B0358-001	2025-05-06	M	0.28	0.35	<10	0.0194	64.7	17300	1.3	<0.50	<0.10	2370	0.0084	<0.0010	0.00157	0.0094	<0.00050	<0.00050	2.65	0.000090	346	<0.00050	<0.00150
WQR1-1	VA25B1026-001	2025-05-13	M	-0.68	1.01	<10	0.0141	25.5	7860	<1.0	<0.50	<0.10	1080	0.0605	<0.0010	0.00077	0.0093	<0.00050	<0.00050	1.90	0.000046	188	<0.00050	<0.00150
WQR1-1	VA25B1711-001	2025-05-20	M	-0.98	0.40	<10	0.0098	61.2	17400	<1.0	<0.50	<0.10	2300	0.0182	<0.0010	0.00151	0.0088	<0.00050	<0.00050	4.32	0.000067	362	<0.00050	<0.00150
WQR1-2	0051710-10	2020-05-20	M	1.41		2	<0.050				<1.00			0.298	<0.00040	<0.00100	0.0105	<0.00020	<0.00020	0.443	<0.000020	39.4	<0.00100	
WQR1-2	0062209-09	2020-06-22	M	12.78		10	<0.050				<0.010			1.17	<0.00040	<0.00100	0.0253	<0.00020	<0.00020	0.256	<0.000020	21.8	<0.00100	
WQR1-2	0071996-10	2020-07-21	M	11.52		4	<0.050				<0.010			<0.0100	<0.00040	<0.00100	<0.0100	<0.00200	<0.00020	0.14	<0.000020	0.65	<0.00100	
WQR1-2	0082292-10	2020-08-24	M	4.27		<1	<0.050				<1.00			0.197	<0.00040	0.00132	0.0289	<0.00020	<0.00020	1.94	0.000045	171	<0.00100	
WQR1-2	0093017-10	2020-09-28	M	10.44		36	<0.050				<1.00			0.375	<0.00040	<0.00100	0.0182	<0.00020	<0.00020	0.693	<0.000020	59.6	<0.00100	
WQR1-2	20J1961-10	2020-10-20	M	2.79			<0.050				<10.0			0.159	<0.00040	<0.00100	0.0149	<0.00020	<0.00020	1.66	0.000042	151	<0.00100	
WQR1-2	20J2778-10	2020-10-27	M	4.43		1	<0.050				<1.00			0.0493	<0.00040	0.00115	0.0145	<0.00020	<0.00020	2.21	0.000051	210	<0.00100	
WQR1-2	20K0360-10	2020-11-03	M	2.87		20	<0.050				<1.00			0.234	<0.00040	<0.00100	0.0123	<0.00020	<0.00020	1.29	0.000021	112	<0.00100	
WQR1-2	20K1261-10	2020-11-10	M	2.50		12	<0.050				<1.00			0.165	<0.00040	<0.00100	0.0184	<0.00020	<0.00020	1.63	0.000049	152	<0.00100	
WQR1-2	20K2100-10	2020-11-18	M			6.8	<0.050				<1.00			0.398	<0.00040	0.00106	0.0148	<0.00020	<0.00020	0.987	<0.000020	101	<0.00100	
WQR1-2	20L1589-10	2020-12-14	M	0.32		4	<0.050				<1.00			0.0327	<0.00040	0.00148	0.0138	<0.00020	<0.00020	2.32	0.000051	239	<0.00100	
WQR1-2	21A2590-10	2021-01-27	M	0.25		2	<0.050				<1.00			0.0219	<0.00040	0.00146	0.0108	<0.00020	<0.00020	3.45	0.000067	328	<0.00100	
WQR1-2	21B2778-10	2021-02-25	M			<1.8	<0.050				<1.00			0.0187	<0.00040	0.00166	0.0103	<0.00020	<0.00020	3.48	0.000061	329	<0.00100	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	21C3505-11	2021-03-25	M	0.56		<1	<0.050				<1.00			0.0418	<0.000500	<0.000500	0.00833	<0.000100	<0.000100	1.83	0.0000239	136	<0.00100	
WQR1-2	21D2478-10	2021-04-22	M	1.98		3	<0.050				<1.00			0.206	0.000122	0.000547	0.0102	<0.000010	0.000011	1.72	0.0000231	145	0.00039	
WQR1-2	21E1990-10	2021-05-18	M	12.90		23	0.143				<1.00			0.829	<0.00020	<0.00050	0.0157	<0.00010	<0.00010	0.126	0.000021	12.1	0.0012	
WQR1-2	21E2917-10	2021-05-26	M	4.44		8	<0.050				<1.00			0.301	<0.000050	0.000191	0.00983	<0.000010	<0.000010	0.184	0.0000055	17.5	0.00031	
WQR1-2	21F0167-10	2021-06-01	M	1.78		1	0.099				<1.00			0.219	0.000089	0.000409	0.0107	<0.000010	<0.000010	1.18	0.0000205	97	0.00035	
WQR1-2	21F1056-10	2021-06-08	M	12.95		3	0.157				<1.00			0.876	<0.000050	0.000227	0.019	0.00001	<0.000010	0.114	0.0000081	12.5	0.00059	
WQR1-2	21F2014-10	2021-06-15	M	18.66		17	0.057				<1.00			1	0.000055	0.000347	0.0214	<0.000010	<0.000010	0.41	0.0000145	40.9	0.00076	
WQR1-2	21G2414-10	2021-07-20	M	2.66		1	<0.050				<1.00			0.278	<0.000500	<0.000500	0.0125	<0.000100	<0.000100	0.574	<0.0000200	44.9	<0.00100	
WQR1-2	21H3040-10	2021-08-25	M			3	0.089				<1.00			0.225	<0.000500	0.000639	0.0167	<0.000100	<0.000100	1.23	<0.0000200	116	<0.00100	
WQR1-2	21I3814-10	2021-09-28	M	7.54		7.8	0.055				<1.00			0.421	<0.000500	<0.000500	0.0222	<0.000100	<0.000100	0.952	0.0000241	86.9	<0.00100	
WQR1-2	21J3514-10	2021-10-26	M	6.35		461	<0.050				<1.00			0.472	<0.00020	<0.00050	0.013	<0.00010	<0.00010	0.596	0.000022	53.9	<0.00050	
WQR1-2	21K3046-10	2021-11-23	M	0.81		9	<0.050				<1.00			0.0151	<0.00040	0.00137	0.0116	<0.00020	<0.00020	3	0.000067	262	<0.00100	
WQR1-2	21L2125-10	2021-12-14	M	0.35		7	<0.050				<1.00			<0.0100	<0.00040	0.00104	0.0113	<0.00020	<0.00020	2.31	0.000046	161	<0.00100	
WQR1-2	22A2312-10	2022-01-20	M	-0.02		<1.8	<0.050				<1.00			0.0267	<0.00040	0.00242	0.0109	<0.00020	<0.00020	4.39	0.000068	321	<0.00100	
WQR1-2	22B2487-10	2022-02-17	M	0.72		<1	<0.050	<25.0	13100	<25.0	<2.50	<2.50	2620	0.0151	<0.00040	0.0012	<0.0100	<0.00020	<0.00020	3.48	0.000081	290	<0.00100	
WQR1-2	22C3145-10	2022-03-22	M	0.31		<1	0.064	53.2	13200	<25.0	<2.50	<2.50	1890	0.0261	<0.00040	0.00161	<0.0100	<0.00020	<0.00020	2.89	0.000083	282	<0.00100	
WQR1-2	22D2212-07	2022-04-19	M	0.78		<1	<0.050	55.8	12900	<50.0	<5.00	<5.00	1760	0.027	<0.00040	0.00131	<0.0100	<0.00020	<0.00020	4.76	0.000052	285	<0.00100	
WQR1-2	22E2480-02	2022-05-17	M	1.01		4	0.051	<50.0	3480	<50.0	<5.00	<5.00	520	0.212	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	0.857	0.00016	78	<0.00500	
WQR1-2	22F3212-10	2022-06-21	M	6.24		21	<0.050	<50.0	1570	<50.0	<5.00	<5.00	<500	0.262	<0.000500	<0.000500	0.00999	<0.000100	<0.000100	0.514	<0.0000200	35.9	<0.00100	
WQR1-2	22G1763-10	2022-07-13	M	6.45		1	<0.050	<50.0	2560	<50.0	<5.00	<5.00	<500	0.298	<0.000500	<0.000500	0.0118	<0.000100	<0.000100	0.969	<0.0000200	70.7	<0.00100	
WQR1-2	22H2453-10	2022-08-16	M	3.68		2	<0.050	<50.0	3820	<50.0	<5.00	<5.00	591	0.0247	<0.000500	<0.000500	0.0101	<0.000100	<0.000100	1.02	<0.0000200	91.1	<0.00100	
WQR1-2	22I1926-10	2022-09-14	M	2.28		1	<0.050	30.6	9260	<10.0	<1.00	<1.00	1500	0.0972	<0.000500	0.00106	0.0129	<0.000100	<0.000100	2.53	0.0000368	203	<0.00100	
WQR1-2	22J1560-02	2022-10-12	M	0.58		2	<0.050	<100	12300	<100	11.0	<10.0	1890	0.0283	<0.000500	0.00134	0.0101	<0.000100	<0.000100	3.37	0.0000697	275	<0.00100	
WQR1-2	22K1453-10	2022-11-10	M	0.52		1	<0.050	33.0	14500	<25.0	0.396	<0.0050	1980	0.0350	<0.000500	0.00158	0.0123	<0.000100	<0.000100	4.29	0.0000816	319	<0.00100	
WQR1-2	22L0774-10	2022-12-07	M	0.31		1	<0.050	<25.0	15300	<25.0	<2.50	<2.50	2090	0.0230	<0.000500	0.00155	0.0127	<0.000100	<0.000100	3.98	0.0000575	310	<0.00100	
WQR1-2	23A2847-10	2023-01-27	M	0.00		4	<0.050	<100	10300	<100	0.358	<0.0050	1480	0.0250	<0.000500	0.00119	0.0112	<0.000100	<0.000100	2.37	0.0000478	226	<0.00100	
WQR1-2	23C0060-10	2023-02-28	M	0.01		<1	<0.050	<100	14900	<100	<10.0	<10.0	1900	<0.0200	<0.000500	0.00151	0.00983	<0.000100	<0.000100	3.29	0.0000953	351	<0.00100	
WQR1-2	23C1797-10	2023-03-15	M	-0.42		<1	<0.050	<100	14200	<100	<10.0	<10.0	1880	0.0280	<0.000500	0.00163	0.00935	<0.000100	<0.000100	3.46	0.0000791	309	<0.00100	
WQR1-2	23D2945-10	2023-04-26	M	0.25	0.62	1	0.053	<100	7600	0.587	0.257	<0.0500	1020	0.0427	<0.000500	0.000909	0.00852	<0.000100	<0.000100	1.87	0.0000429	179	<0.00100	
WQR1-2	23E2392-10	2023-05-17	M	20.88	22.0	8	0.062	<100	1330	0.111	0.295	0.0700	<1000	0.961	<0.000100	0.000293	0.0189	<0.000020	<0.000020	0.305	0.0000169	34.7	<0.00100	
WQR1-2	23F3614-10	2023-06-27	M	7.99	9.69	4	<0.050	<100	1410	0.115	<0.100	<0.0500	<1000	0.381	<0.000500	<0.000500	0.0136	<0.000100	<0.000100	0.365	<0.0000200	33.7	<0.00100	
WQR1-2	23G2415-10	2023-07-19	M	8.82	5.55	1	<0.050	<100	2060	0.169	<0.100	<0.0500	<1000	0.332	<0.000500	0.000554	0.0163	<0.000100	<0.000100	0.61	<0.0000200	52.8	<0.00100	
WQR1-2	23H3309-02	2023-08-24	M	0.16	0.71	<1	<0.050	<100	11000	0.832	0.0668	0.0072	1560	0.0362	<0.000500	0.00143	0.0118	<0.000100	<0.000100	2.94	0.0000492	263	<0.00100	
WQR1-2	23I2271-02	2023-09-19	M	0.53	1.02	<1	<0.050	<100	10600	0.751	<0.100	<0.0500	1330	0.0530	<0.000500	0.00112	0.0115	<0.000100	<0.000100	2.84	0.0000482	236	<0.00100	
WQR1-2	23J2236-02	2023-10-18	M	1.98	3.14	<1	<0.050	<100	12300	0.840	0.160	<0.0500	1770	0.153	<0.000500	0.00139	0.0141	<0.000100	<0.000100	2.75	0.0000521	266	<0.00100	
WQR1-2	23K1909-10	2023-11-15	M	0.00	0.60	<1.8	<0.050	<100	14500	1.04	0.282	<0.0500	2740	0.0479	<0.000500	0.00137	0.0110	<0.000100	<0.000100	3.79	0.0000580	331	<0.00100	
WQR1-2	23L1905-02	2023-12-14	M	0.48	0.31	<1.8	<0.050	<100	14600	1.12	0.401	<0.0500	1770	0.0354	<0.000500	0.00197	0.00938	<0.000100	<0.000100	3.72	0.0000855	343	<0.00100	
WQR1-2	L2754366-5	2024-01-24	M																					
WQR1-2	VA24A1422-005	2024-01-24	M	0.38	0.19	<10	<0.0050	53.4	15500	<1.0	0.52	<0.10	2120	0.0179	<0.0010	0.00187	0.0087	<0.00050	<0.00050	3.55	0.000069	357	<0.00050	<0.0250
WQR1-2	L2754594-2	2024-02-13	M																					
WQR1-2	VA24A2858-002	2024-02-13	M	0.31	0.69	<10	<0.0050	46.0	13500	<1.0	<0.50	<0.10	1910	0.0342	<0.0010	0.00153	0.0098	<0.00050	<0.00050	3.45	0.000066	303	<0.00050	<0.00150
WQR1-2	L2755033-2	2024-03-20	M																					
WQR1-2	VA24A5955-002	2024-03-20	M	1.11	1.58	<10	<0.0050	48.8	14400	<1.0	<0.50	<0.10	1980	0.0205	<0.0010	0.00239	0.0094	<0.00050	<0.00050	3.22	0.000056	337	<0.00050	<0.00150
WQR1-2	L2755461-2	2024-04-23	M																					
WQR1-2	VA24A8736-002	2024-04-23	M	1.31	1.95	<10	<0.0050	33.1	10000	<1.0	<0.50	<0.10	1380	0.0326	<0.0010	0.00196	0.0090	<0.00050	<0.00050	3.16	0.000062	287	<0.00050	<0.00150
WQR1-2	L2755553-2	2024-04-30	M																					
WQR1-2	VA24A9418-002	2024-04-30	M	-0.23	0.35	10	0.0066	46.9	13600	<1.0	<0.50	<0.10	1850	0.0134	<0.0010	0.00273	0.0047	<0.00050	<0.00050	3.31	0.000061	315	<0.00050	<0.00150
WQR1-2	L2755641-2	2024-05-07	M																					
WQR1-2	VA24B0040-002	2024-05-07	M	0.52	0.83	<10	0.0057	30.9	9040	<1.0	<0.50	<0.10	1320	0.0543	<0.0010	0.00221	0.0068	<0.00050	<0.00050	2.34	0.000040	212	<0.00050	<0.00150
WQR1-2	L2755769-2	2024-05-14	M																					
WQR1-2	VA24B0738-002	2024-05-14	M	3.74	5.62	<10	0.0090	12.6	3850	<1.0	<0.50	<0.10	460	0.412	<0.0010	0.00086	0.0113	<0.00050	<0.00050	0.85	0.000022	86.0	<0.00050	<0.00150
WQR1-2	L2755874-2	2024-05-21	M																					
WQR1-2	VA24B1351-002	2024-05-21	M	6.62	5.34	20	0.0102	11.5	3590	<1.0	<0.50	<0.10	469	0.299	<0.0010	0.00077	0.0124	<0.00050	<0.00050	0.72	0.000024	75.7	<0.00050	<0.00150

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	L2756277-2	2024-06-18	M																					
WQR1-2	VA24B4257-002	2024-06-18	M	5.50	2.40	10	0.0074	12.0	3490	<1.0	<0.50	<0.10	427	0.130	<0.0010	0.00144	0.0087	<0.00050	<0.00050	1.14	0.000026	101	<0.00050	<0.00150
WQR1-2	L2756678-2	2024-07-16	M																					
WQR1-2	VA24B7237-002	2024-07-16	M	20.78	11.6	10	0.0056	14.9	4720	<1.0	<0.50	<0.10	610	0.556	<0.0010	0.00137	0.0176	<0.00050	<0.00050	1.00	0.000024	104	<0.00050	<0.00150
WQR1-2	L2757095-2	2024-08-20	M																					
WQR1-2	VA24C1101-002	2024-08-20	M	5.84	4.32	<10	<0.0050	16.9	5100	<1.0	<0.50	<0.10	669	0.258	<0.0010	0.00113	0.0166	<0.00050	<0.00050	1.20	0.000022	115	<0.00050	<0.00150
WQR1-2	VA24C4483-002	2024-09-17	M	2.07	6.31	20	0.0093	18.1	5640	<1.0	<0.50	<0.10	783	0.204	<0.0010	0.00160	0.0145	<0.00050	<0.00050	1.28	0.000021	140	<0.00050	<0.00150
WQR1-2	VA24C8360-002	2024-10-22	M	4.10	4.70	10	0.0154	40.6	12000	<1.0	<0.50	<0.10	1660	0.187	<0.0010	0.00408	0.0164	<0.00050	<0.00050	2.50	0.000067	255	<0.00050	<0.00150
WQR1-2	VA24C9197-002	2024-10-29	M	0.81	0.84	<10	0.0178	40.9	12100	<1.0	<0.50	<0.10	1600	0.0515	<0.0010	0.00125	0.0120	<0.00050	<0.00050	3.12	0.000075	271	<0.00050	<0.00150
WQR1-2	VA24D0009-002	2024-11-05	M	0.98	0.29	<10	0.0097	43.8	12800	<1.0	<0.50	<0.10	1770	0.0237	<0.0010	0.00128	0.0108	<0.00050	<0.00050	2.48	0.000070	284	<0.00050	<0.00150
WQR1-2	L2758095-2	2024-11-12	M																					
WQR1-2	VA24D0632-002	2024-11-12	M	5.24	2.67	20	0.0103	26.2	8470	<1.0	<0.50	<0.10	1180	0.134	<0.0010	0.00091	0.0118	<0.00050	<0.00050	1.77	0.000049	196	<0.00050	<0.00150
WQR1-2	VA24D1720-002	2024-11-21	M	-0.82	1.00	10	0.0139	27.7	8740	<1.0	<0.50	<0.10	1180	0.0472	<0.0010	0.00094	0.0127	<0.00050	<0.00050	2.33	0.000054	216	<0.00050	<0.00150
WQR1-2	L2758465-2	2024-12-17	M																					
WQR1-2	VA24D3769-002	2024-12-17	M	-0.18	0.28	<10	<0.0050	46.7	14500	<1.0	<0.50	<0.10	2020	0.0138	<0.0010	0.00156	0.0101	<0.00050	<0.00050	3.26	0.000071	298	<0.00050	<0.00150
WQR1-2	L2758719-2	2025-01-21	M																					
WQR1-2	VA25A1408-002	2025-01-21	M	-1.29	0.53	<10	0.0089	39.8	12300	<1.0	<0.50	<0.10	1690	0.0200	<0.0010	0.00109	0.0094	<0.00050	<0.00050	3.37	0.000064	316	<0.00050	<0.00150
WQR1-2	L2758994-2	2025-02-18	M																					
WQR1-2	VA25A3430-002	2025-02-18	M	-2.70	0.62	<10	0.0072	44.7	13600	<1.0	<0.50	<0.10	1870	0.0154	<0.0010	0.00138	0.0105	<0.00050	<0.00050	2.74	0.000068	318	<0.00050	<0.00150
WQR1-2	VA25A6550-002	2025-03-25	M	0.08	0.49	<10	0.0171	43.4	12900	<1.0	<0.50	<0.10	1810	0.0108	<0.0010	0.00117	0.0078	<0.00050	<0.00050	2.47	0.000056	330	<0.00050	<0.00150
WQR1-2	VA25A8962-002	2025-04-22	M	-2.73	0.92	<10	<0.0050	25.4	7180	<1.0	<0.50	<0.10	937	0.0500	<0.0010	0.00069	0.0090	<0.00050	<0.00050	1.61	0.000039	168	<0.00050	<0.00150
WQR1-2	VA25A9878-002	2025-04-30	M	-0.96	1.58	<10	<0.0050	14.8	4430	<1.0	<0.50	<0.10	574	0.124	<0.0010	0.00048	0.0081	<0.00050	<0.00050	1.05	<0.000020	102	<0.00050	<0.00150
WQR1-2	VA25B0358-002	2025-05-06	M	0.29	0.79	<10	0.0243	34.4	9270	<1.0	<0.50	<0.10	1250	0.0399	<0.0010	0.00082	0.0088	<0.00050	<0.00050	1.77	0.000038	186	<0.00050	<0.00150
WQR1-2	VA25B1026-002	2025-05-13	M	-0.27	1.26	<10	<0.0050	18.7	5420	<1.0	<0.50	<0.10	732	0.0861	<0.0010	0.00054	0.0091	<0.00050	<0.00050	1.38	0.000025	126	<0.00050	<0.00150
WQR1-2	VA25B1711-002	2025-05-20	M	0.29	1.32	<10	<0.0050	20.0	5610	<1.0	<0.50	<0.10	744	0.0597	<0.0010	0.00058	0.0082	<0.00050	<0.00050	1.35	<0.000020	124	<0.00050	<0.00150
WQR1-2m	L2755545-8	2024-04-30	M																					
WQR1-2m	VA24A9402-008	2024-04-30	M	1.04	1.04		0.0100	22.4	7030	<1.0	<0.50	<0.10	894	0.0477	<0.0010	0.00192	0.0058	<0.00050	<0.00050	2.33	0.000042	216	<0.00050	<0.00150
WQR1-2m	VA24A9802-012	2024-05-05	M		0.42									0.0220	<0.0010	0.00193	0.0057	<0.00050	<0.00050	3.11	0.000050	264	<0.00050	<0.00150
WQR1-2m	L2755648-11	2024-05-08	M																					
WQR1-2m	VA24B0178-011	2024-05-08	M	1.03	1.68		<0.0050	27.2	8090	<1.0	<0.50	<0.10	1090	0.0737	<0.0010	0.00172	0.0075	<0.00050	<0.00050	1.89	0.000028	174	<0.00050	<0.00150
WQR1-2m	L2755934-2	2024-05-24	M																					
WQR1-2m	VA24B1783-002	2024-05-24	M		3.08		<0.0050	13.8	4140	<1.0	<0.50	<0.10	547	0.147	<0.0010	0.00132	0.0089	<0.00050	<0.00050	1.11	<0.000020	93.2	<0.00050	<0.00150
WQR1-2m	L2755981-2	2024-05-28	M																					
WQR1-2m	VA24B2063-002	2024-05-28	M	3.15	2.09		0.0208	16.7	5380	<1.0	<0.50	<0.10	657	0.0609	<0.0010	0.00212	0.0068	<0.00050	<0.00050	2.04	0.000034	192	<0.00050	<0.00150
WQR1-2m	VA24B2561-006	2024-06-01	M	0.58			0.0104	13.9	4400	<1.0	<0.50	<0.10	611	0.154	<0.0010	0.00109	0.0089	<0.00050	<0.00050	1.15	0.000030	108	<0.00050	
WQR1-2m	L2756068-2	2024-06-04	M																					
WQR1-2m	VA24B2772-002	2024-06-04	M	9.08	15.4		<0.0050	<5.0	254	<1.0	<0.50	<0.10	<30	0.580	<0.0010	0.00046	0.0129	<0.00050	<0.00050	<0.30	<0.000020	8.5	<0.00050	<0.00150
WQR1-2m	VA24B3452-008	2024-06-10	M	4.79	6.37		<0.0050	5.4	1830	<1.0	<0.50	<0.10	226	0.472	<0.0010	0.00048	0.0126	<0.00050	<0.00050	0.47	<0.000020	44.0	<0.00050	<0.00150
WQR1-2m	656-454600000-0	2024-06-17	M	2.48																				
WQR1-2m	VA24B5882-008	2024-07-03	M	18.10	14.6									0.410	<0.0010	<0.00040	0.0140	<0.00050	<0.00050	<0.30	<0.000020	22.4	<0.00050	
WQR1-2m	VA24B6465-002	2024-07-09	M	2.02	3.68		<0.0050	21.3	6680	<1.0	<0.50	<0.10	890	0.229	<0.0010	0.00210	0.0150	<0.00050	<0.00050	1.72	0.000036	150	<0.00050	<0.00150
WQR1-2m	VA24B7867-002	2024-07-20	M	14.30	9.95		0.0071	12.3	3820	<1.0	<0.50	<0.10	494	0.531	<0.0010	0.00087	0.0180	<0.00050	<0.00050	0.80	<0.000020	79.8	<0.00050	<0.00150
WQR1-2m	L2757210-2	2024-08-26	M																					
WQR1-2m	VA24C2208-002	2024-08-26	M	9.73	1.60		0.0072	33.9	10400	<1.0	<0.50	<0.10	1450	0.227	<0.0010	0.00117	0.0160	<0.00050	<0.00050	1.72	0.000033	166	<0.00050	<0.00150
WQR1-2m	L2757680-2	2024-10-06	M																					
WQR1-2m	VA24C6685-002	2024-10-06	M	1.96	0.87		0.0082	44.3	13400	<2.00	0.924	<0.100	1880	<0.150	<0.00500	<0.00500	0.0127	<0.00100	<0.00250	3.48	<0.000250	305	<0.0250	<0.00150
WQR1-2m	VA24C7408-002	2024-10-13	M	1.58	1.43		0.0056	43.6	12800	<1.0	<0.50	<0.10	1800	0.0516	<0.0010	0.00522	0.0127	<0.00050	<0.00050	2.86	0.000073	288	<0.00050	<0.00150
WQR1-2m	L2757830-6	2024-10-20	M																					
WQR1-2m	VA24C8041-006	2024-10-20	M		24.8		0.0117	12.0	3650	<1.0	<0.50	<0.10	494	0.963	<0.0010	0.00160	0.0369	<0.00050	<0.00050	0.89	0.000026	86.0	0.00056	<0.00150
WQR1-2m	L2757872-2	2024-10-22	M																					
WQR1-2m	VA24C8330-002	2024-10-22	M		21.6		0.0143	9.3	2940	<1.0	<0.50	<0.10	378	0.947	<0.0010	0.00194	0.0289	<0.00050	<0.00050	0.81	0.000024	72.0	0.00052	<0.00150
WQR1-2m	L2757933-6	2024-10-28	M																					
WQR1-2m	VA24C9041-006	2024-10-28	M	1.51	13.4		0.0107	7.0	2060	<1.0	<0.50	<0.10	271	0.542	<0.0010	<0.00080	0.0137	<0.00050	<0.00050	0.47	<0.000020	47.6	<0.00050	<0.00150

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2m	L2758002-3	2024-11-01	M																					
WQR1-2m	VA24C9683-003	2024-11-01	M	0.31	1.24		0.0188	30.3	8970	<1.0	<0.50	<0.10	1160	0.0817	<0.0010	0.00081	0.0118	<0.00050	<0.00050	1.82	0.000051	201	<0.00050	<0.00150
WQR1-2m	L2758353-2	2024-12-05	M																					
WQR1-2m	VA24D2842-002	2024-12-05	M	1.55	0.91		0.0130	31.4	9260	<1.0	<0.50	<0.10	1270	0.0238	<0.0010	0.00095	0.0108	<0.00050	<0.00050	2.13	0.000056	219	<0.00050	<0.00150
WQR1-2m	L2758617-8	2025-01-08	M																					
WQR1-2m	VA25A0392-008	2025-01-08	M	1.04	0.73		0.0168	32.3	9800	<1.0	<0.50	<0.10	1360	0.0222	<0.0010	0.00095	0.0105	<0.00050	<0.00050	1.96	0.000058	212	<0.00050	<0.00150
WQR1-2m	L2759040-8	2025-02-20	M																					
WQR1-2m	VA25A3677-008	2025-02-20	M	1.23	1.00		<0.0050	49.6	14700	<1.0	<0.50	<0.10	2030	0.0089	<0.0010	0.00151	0.0098	<0.00050	<0.00050	3.71	0.000072	331	<0.00050	<0.00150
WQR1-2m	L2759227-8	2025-03-13	M																					
WQR1-2m	VA25A5556-008	2025-03-13	M	0.96	0.96		0.0059	31.4	8730	<1.0	<0.50	<0.10	1190	0.0376	<0.0010	0.00093	0.0074	<0.00050	<0.00050	2.23	0.000042	195	<0.00050	<0.00150
WQR1-2m	VA25A6528-014	2025-03-25	M	1.07																				
WQR1-2m	VA25A8147-002	2025-04-11	M	1.63	1.28		0.0054	27.3	7480	<1.0	<0.50	<0.10	974	0.0915	<0.0010	0.00064	0.0077	<0.00050	<0.00050	1.76	0.000046	164	<0.00050	<0.00150
WQR1-2m	VA25A8148-002	2025-04-11	M																					
WQR1-2m	VA25A8281-008	2025-04-14	M	1.08	0.50		0.0070	30.3	8640	<1.0	<0.50	<0.10	1240	0.0386	<0.0010	0.00076	0.0080	<0.00050	<0.00050	1.91	0.000039	189	<0.00050	<0.00150
WQR1-2m	VA25A8283-008	2025-04-14	M																					
WQR1-2m	VA25A9123-009	2025-04-23	M	0.38	0.62		0.0081	30.7	8820	<1.0	<0.50	<0.10	1230	0.0539	<0.0010	0.00058	0.0080	<0.00050	<0.00050	1.22	0.000031	117	<0.00050	<0.00150
WQR1-2m	VA25A9125-009	2025-04-23	M																					
WQR1-2m	VA25B0359-008	2025-05-06	M	0.47	2.86		0.0141	10.5	3300	<1.0	<0.50	<0.10	420	0.156	<0.0010	<0.00040	0.0089	<0.00050	<0.00050	0.74	<0.000020	68.8	<0.00050	<0.00150
WQR1-2m	VA25B0360-008	2025-05-06	M																					
WQR1-2m	VA25B0800-008	2025-05-09	M																					
WQR1-2m	VA25B0802-008	2025-05-09	M	1.07	0.57		0.0251	33.1	9540	<1.0	<0.50	<0.10	1260	0.0416	<0.0010	0.00084	0.0090	<0.00050	<0.00050	2.50	0.000049	225	<0.00050	<0.00150
WQR1-3	23L1905-03	2023-12-14	M	0.83	1.10	<1.8	<0.050	<100	10500	0.729	0.370	<0.0500	1210	0.0558	<0.000500	0.00130	0.0120	<0.000100	<0.000100	2.6	0.0000504	235	<0.00100	
WQR1-3	L2754366-6	2024-01-24	M																					
WQR1-3	VA24A1422-006	2024-01-24	M	1.07	0.89	<10	0.0133	26.8	7840	<1.0	<0.50	<0.10	1050	0.0528	<0.0010	0.00111	0.0090	<0.00050	<0.00050	1.93	0.000040	193	<0.00050	<0.0250
WQR1-3	L2754594-3	2024-02-13	M																					
WQR1-3	VA24A2858-003	2024-02-13	M	0.94	0.57	<10	0.0100	29.6	8760	<1.0	<0.50	<0.10	1230	0.0580	<0.0010	0.00092	0.0099	<0.00050	<0.00050	1.76	0.000040	194	<0.00050	<0.00150
WQR1-3	L2755033-3	2024-03-20	M																					
WQR1-3	VA24A5955-003	2024-03-20	M	1.82	1.63	<10	0.0077	16.6	5060	<1.0	<0.50	<0.10	666	0.0925	<0.0010	0.00098	0.0090	<0.00050	<0.00050	1.34	0.000026	121	<0.00050	<0.00150
WQR1-3	L2755461-3	2024-04-23	M																					
WQR1-3	VA24A8736-003	2024-04-23	M	1.16	2.20	<10	<0.0050	31.4	9310	<1.0	<0.50	<0.10	1290	0.0444	<0.0010	0.00161	0.0090	<0.00050	<0.00050	2.72	0.000048	240	<0.00050	<0.00150
WQR1-3	L2755553-3	2024-04-30	M																					
WQR1-3	VA24A9418-003	2024-04-30	M	1.62	1.53	<10	0.0076	13.8	4120	<1.0	<0.50	<0.10	523	0.0901	<0.0010	0.00133	0.0072	<0.00050	<0.00050	1.12	0.000022	96.3	<0.00050	<0.00150
WQR1-3	L2755641-3	2024-05-07	M																					
WQR1-3	VA24B0040-003	2024-05-07	M	2.61	2.62	<10	<0.0050	19.8	5790	<1.0	<0.50	<0.10	807	0.138	<0.0010	0.00142	0.0084	<0.00050	<0.00050	1.55	0.000029	130	<0.00050	<0.00150
WQR1-3	L2755769-3	2024-05-14	M																					
WQR1-3	VA24B0738-003	2024-05-14	M	8.69	6.66	<10	0.0067	<5.0	890	<1.0	<0.50	<0.10	80	0.635	<0.0010	0.00063	0.0132	<0.00050	<0.00050	<0.30	<0.000020	22.9	<0.00050	<0.00150
WQR1-3	L2755874-3	2024-05-21	M																					
WQR1-3	VA24B1351-003	2024-05-21	M	8.49	6.99	<10	0.0124	<5.0	1420	<1.0	<0.50	<0.10	166	0.373	<0.0010	0.00061	0.0140	<0.00050	<0.00050	0.47	<0.000020	34.8	<0.00050	<0.00150
WQR1-3	L2756277-3	2024-06-18	M																					
WQR1-3	VA24B4257-003	2024-06-18	M	8.90	4.76	<10	<0.0050	5.2	1500	<1.0	<0.50	<0.10	166	0.411	<0.0010	0.00050	0.0126	<0.00050	<0.00050	0.60	<0.000020	38.0	<0.00050	<0.00150
WQR1-3	L2756678-3	2024-07-16	M																					
WQR1-3	VA24B7237-003	2024-07-16	M	20.39	20.5	20	<0.0050	<5.0	1260	<1.0	<0.50	<0.10	142	1.02	<0.0010	0.00069	0.0216	<0.00050	<0.00050	0.33	<0.000020	29.4	<0.00050	<0.00150
WQR1-3	L2757095-3	2024-08-20	M																					
WQR1-3	VA24C1101-003	2024-08-20	M	8.52	7.78	75	<0.0050	11.0	3250	<1.0	<0.50	<0.10	429	0.313	<0.0010	0.00102	0.0188	<0.00050	<0.00050	0.82	0.000020	75.8	<0.00050	<0.00150
WQR1-3	VA24C4483-003	2024-09-17	M	8.31	4.71	10	0.0123	16.8	5290	<1.0	<0.50	<0.10	733	0.256	<0.0010	0.00154	0.0158	<0.00050	<0.00050	1.24	0.000029	130	<0.00050	<0.00150
WQR1-3	VA24C8360-003	2024-10-22	M	29.59	21.8	20	0.0069	<5.0	1530	<1.0	<0.50	<0.10	184	1.02	<0.0010	0.00079	0.0260	<0.00050	<0.00050	0.40	0.000020	34.5	0.00050	<0.00150
WQR1-3	VA24C9197-003	2024-10-29	M	7.03	7.24	20	0.0154	5.2	1580	<1.0	<0.50	<0.10	175	0.336	<0.0010	<0.00040	0.0108	<0.00050	<0.00050	0.45	<0.000020	38.4	<0.00050	<0.00150
WQR1-3	VA24D0009-003	2024-11-05	M	2.40	1.34	20	0.0155	30.6	9100	<1.0	<0.50	<0.10	1260	0.0672	<0.0010	0.00083	0.0109	<0.00050	<0.00050	1.72	0.000045	191	<0.00050	<0.00150
WQR1-3	L2758095-3	2024-11-12	M																					
WQR1-3	VA24D0632-003	2024-11-12	M	7.17	5.06	<10	0.0114	12.7	4240	<1.0	<0.50	<0.10	578	0.227	<0.0010	0.00060	0.0108	<0.00050	<0.00050	0.90	0.000022	96.8	<0.00050	<0.00150
WQR1-3	VA24D1720-003	2024-11-21	M	-0.33	1.09	<10	0.0117	27.1	8530	<1.0	<0.50	<0.10	1170	0.0490	<0.0010	0.00090	0.0125	<0.00050	<0.00050	2.43	0.000046	206	<0.00050	<0.00150
WQR1-3	L2758465-3	2024-12-17	M																					
WQR1-3	VA24D3769-003	2024-12-17	M	-0.16	0.29	<10	<0.0050	45.4	14100	<1.0	<0.50	<0.10	1950	0.0132	<0.0010	0.00137	0.0093	<0.00050	<0.00050	3.35	0.000076	292	<0.00050	<0.00150

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-3	L2758719-3	2025-01-21	M																					
WQR1-3	VA25A1408-003	2025-01-21	M	-1.08	0.63	<10	0.0114	37.7	11600	<1.0	<0.50	<0.10	1560	0.0221	<0.0010	0.00107	0.0097	<0.00050	<0.00050	3.06	0.000062	287	<0.00050	<0.00150
WQR1-3	L2758994-3	2025-02-18	M																					
WQR1-3	VA25A3430-003	2025-02-18	M	-2.49	0.73	<10	0.0068	43.3	13200	<1.0	<0.50	<0.10	1800	0.0154	<0.0010	0.00130	0.0108	<0.00050	<0.00050	3.05	0.000081	314	<0.00050	<0.00150
WQR1-3	VA25A6550-003	2025-03-25	M	0.33	1.06	<10	0.0089	14.8	4690	<1.0	<0.50	<0.10	640	0.0715	<0.0010	0.00051	0.0076	<0.00050	<0.00050	1.04	<0.000020	115	<0.00050	<0.00150
WQR1-3	VA25A8962-003	2025-04-22	M	-1.08	1.14	10	0.0060	13.4	3880	<1.0	<0.50	<0.10	465	0.0692	<0.0010	0.00042	0.0082	<0.00050	<0.00050	0.96	0.000022	88.0	<0.00050	<0.00150
WQR1-3	VA25A9878-003	2025-04-30	M	-0.33	2.30	<10	0.0071	<5.0	1190	<1.0	<0.50	<0.10	138	0.181	<0.0010	<0.00040	0.0080	<0.00050	<0.00050	0.38	<0.000020	30.5	<0.00050	<0.00150
WQR1-3	VA25B0358-003	2025-05-06	M	1.42	3.02	10	0.0099	5.9	1900	<1.0	<0.50	<0.10	232	0.123	<0.0010	<0.00040	0.0086	<0.00050	<0.00050	0.49	<0.000020	39.3	<0.00050	<0.00150
WQR1-3	VA25B1026-003	2025-05-13	M	0.79	1.58	<10	<0.0050	9.7	3440	<1.0	<0.50	<0.10	446	0.106	<0.0010	0.00041	0.0090	<0.00050	<0.00050	0.94	<0.000020	82.3	<0.00050	<0.00150
WQR1-3	VA25B1711-003	2025-05-20	M	1.56	2.33	<10	0.0052	<5.0	1020	<1.0	<0.50	<0.10	112	0.110	<0.0010	<0.00040	0.0081	<0.00050	<0.00050	3.19	<0.000020	23.8	<0.00050	<0.00150
WQR1-SF	L2755545-9	2024-04-30	M																					
WQR1-SF	VA24A9402-009	2024-04-30	M	0.22	0.32		0.0324	49.8	15400	<1.0	<0.50	<0.10	2040	0.0120	<0.0010	0.00331	0.0083	<0.00050	<0.00050	3.94	0.000084	364	<0.00050	<0.00150
WQR1-SF	VA24A9802-013	2024-05-05	M		0.12									0.0073	<0.0010	0.00236	0.0079	<0.00050	<0.00050	3.98	0.000060	346	<0.00050	<0.00150
WQR1-SF	L2755648-12	2024-05-08	M																					
WQR1-SF	VA24B0178-012	2024-05-08	M	0.01	0.22		<0.0050	61.2	17900	<1.0	<0.50	<0.10	2460	0.0054	<0.0010	0.00351	0.0100	<0.00050	<0.00050	3.85	0.000091	380	<0.00050	<0.00150
WQR1-SF	L2755934-3	2024-05-24	M																					
WQR1-SF	VA24B1783-003	2024-05-24	M		0.18		0.0454	54.7	15900	<1.0	<0.50	<0.10	2200	0.0071	<0.0010	0.00359	0.0103	<0.00050	<0.00050	4.05	0.000059	365	<0.00050	<0.00150
WQR1-SF	L2755981-3	2024-05-28	M																					
WQR1-SF	VA24B2063-003	2024-05-28	M	0.27	0.28		0.0410	57.0	16200	<1.0	<0.50	<0.10	2160	0.0102	<0.0010	0.00328	0.0093	<0.00050	<0.00050	4.46	0.000063	355	<0.00050	<0.00150
WQR1-SF	L2756068-3	2024-06-04	M																					
WQR1-SF	VA24B2772-003	2024-06-04	M	0.32	0.40		<0.0050	53.6	15600	<1.0	<0.50	<0.10	2200	0.0104	<0.0010	0.00393	0.0105	<0.00050	<0.00050	4.33	0.000086	389	<0.00050	<0.00150
WQR1-SF	VA24B3452-009	2024-06-10	M	0.90	0.35		0.0183	53.2	15400	<1.0	<0.50	<0.10	2140	0.0174	<0.0010	0.00312	0.0100	<0.00050	<0.00050	3.77	0.000066	374	<0.00050	<0.00150
WQR1-SF	657-454600000-0	2024-06-17	M	0.36																				
WQR1-SF	VA24B5882-009	2024-07-03	M	2.41	3.47									0.0746	<0.0010	0.00305	0.0113	<0.00050	<0.00050	2.48	0.000056	303	<0.00050	
WQR1-SF	VA24B6465-003	2024-07-09	M	0.52	1.67		<0.0050	46.4	13400	<1.0	<0.50	<0.10	1840	0.0448	<0.0010	0.00379	0.0122	<0.00050	<0.00050	3.30	0.000068	356	<0.00050	<0.00150
WQR1-SF	VA24B7867-003	2024-07-20	M	0.21	0.38		<0.0050	50.2	15100	<1.0	<0.50	<0.10	2080	0.0556	<0.0010	0.00323	0.0136	<0.00050	<0.00050	3.15	0.000076	351	<0.00050	<0.00150
WQR1-SF	L2757210-3	2024-08-26	M																					
WQR1-SF	VA24C2208-003	2024-08-26	M	2.08	0.59		<0.0050	56.0	16900	<1.0	<0.50	<0.10	2370	0.0258	<0.0010	0.00405	0.0116	<0.00050	<0.00050	3.64	0.000079	351	<0.00050	<0.00150
WQR1-SF	L2757680-3	2024-10-06	M																					
WQR1-SF	VA24C6685-003	2024-10-06	M	1.17	0.46		<0.0050	56.7	16900	<2.00	<0.500	<0.100	2360	<0.150	<0.00500	<0.00500	0.0113	<0.00100	<0.00250	4.06	<0.000250	368	<0.0250	<0.00150
WQR1-SF	VA24C7408-003	2024-10-13	M	1.25	0.40		<0.0050	55.6	16400	<1.0	<0.50	<0.10	2300	0.0180	<0.0010	0.00586	0.0113	<0.00050	<0.00050	3.40	0.000094	359	<0.00050	<0.00150
WQR1-SF	L2757872-3	2024-10-22	M																					
WQR1-SF	VA24C8330-003	2024-10-22	M		0.90		0.0066	56.5	16500	<1.0	<0.50	<0.10	2230	0.0524	<0.0010	0.00630	0.0132	<0.00050	<0.00050	3.90	0.000091	392	<0.00050	<0.00150
WQR1-SF	L2757933-7	2024-10-28	M																					
WQR1-SF	VA24C9041-007	2024-10-28	M	0.41	0.60		0.0078	58.7	16500	<1.0	<0.50	<0.10	2320	0.0225	<0.0010	<0.00320	0.0130	<0.00050	<0.00050	3.62	0.000084	383	<0.00050	<0.00150
WQR1-SF	L2758002-4	2024-11-01	M																					
WQR1-SF	VA24C9683-004	2024-11-01	M	0.55			0.0065							0.0297	<0.0010	0.00145	0.0123	<0.00050	<0.00050	3.40	0.000083	389	<0.00050	<0.00150
WQR1-SF	VA24D2498-001	2024-11-30	M		0.26		0.0097	49.1	15600	<1.0	<0.50	<0.10	2200									306		
WQR1-SF	L2758353-3	2024-12-05	M																					
WQR1-SF	VA24D2842-003	2024-12-05	M	1.34	0.30		<0.0050	54.1	16000	<1.0	<0.50	<0.10	2220	0.0132	<0.0010	0.00149	0.0102	<0.00050	<0.00050	3.27	0.000079	373	<0.00050	<0.00150
WQR1-SF	L2758617-9	2025-01-08	M																					
WQR1-SF	VA25A0392-009	2025-01-08	M	0.93	0.21		<0.0050	56.2	16600	<1.0	<0.50	<0.10	2350	0.0120	<0.0010	0.00176	0.0090	<0.00050	<0.00050	2.86	0.000081	335	<0.00050	<0.00150
WQR1-SF	L2759040-9	2025-02-20	M																					
WQR1-SF	VA25A3677-009	2025-02-20	M	0.79	0.43		<0.0050	54.7	16100	<1.0	0.53	<0.10	2240	0.0079	<0.0010	0.00159	0.0097	<0.00050	<0.00050	4.12	0.000069	348	<0.00050	<0.00150
WQR1-SF	L2759227-9	2025-03-13	M																					
WQR1-SF	VA25A5556-009	2025-03-13	M	0.54	0.92		0.0295	55.4	15200	<1.0	<0.50	<0.10	2100	0.0128	<0.0010	0.00151	0.0095	<0.00050	<0.00050	4.06	0.000072	343	<0.00050	<0.00150
WQR1-SF	VA25A6528-015	2025-03-25	M	0.78																				
WQR1-SF	VA25A8147-003	2025-04-11	M	0.86	0.89		0.0078	53.5	14700	<1.0	<0.50	<0.10	1950	0.0188	<0.0010	0.00122	0.0080	<0.00050	<0.00050	3.11	0.000057	314	<0.00050	<0.00150
WQR1-SF	VA25A8148-003	2025-04-11	M																					
WQR1-SF	VA25A8281-009	2025-04-14	M	0.82	0.14		0.0080	50.8	15900	<1.0	<0.50	<0.10	2180	0.0072	<0.0010	0.00145	0.0091	<0.00050	<0.00050	3.21	0.000067	357	<0.00050	<0.00150
WQR1-SF	VA25A8283-009	2025-04-14	M																					
WQR1-SF	VA25A9123-010	2025-04-23	M	0.40	0.42		0.0286	58.9	16500	<1.0	<0.50	<0.10	2310	0.0096	<0.0010	0.00178	0.0091	<0.00050	<0.00050	3.56	0.000086	364	<0.00050	<0.00150
WQR1-SF	VA25A9125-010	2025-04-23	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-SF	VA25B0359-007	2025-05-06	M	0.37	0.34		0.0521	47.7	15000	<1.0	<0.50	<0.10	2060	0.0178	<0.0010	0.00161	0.0089	<0.00050	<0.00050	2.45	0.000062	323	<0.00050	<0.00150
WQR1-SF	VA25B0360-007	2025-05-06	M																					
WQR1-SF	VA25B0800-009	2025-05-09	M																					
WQR1-SF	VA25B0802-009	2025-05-09	M	0.26	0.19		0.0261	60.1	17400	<1.0	<0.50	<0.10	2380	0.0054	<0.0010	0.00162	0.0101	<0.00050	<0.00050	4.32	0.000081	410	<0.00050	<0.00150
WQR2-0.5	L2755545-10	2024-04-30	M																					
WQR2-0.5	VA24A9402-010	2024-04-30	M	1.37	1.56		0.0090	12.0	3840	<1.0	<0.50	<0.10	460	0.117	<0.0010	0.00080	0.0072	<0.00050	<0.00050	0.96	0.000023	82.8	<0.00050	<0.00150
WQR2-0.5	L2755648-1	2024-05-08	M																					
WQR2-0.5	VA24B0178-001	2024-05-08	M	1.50	2.31		<0.0050	12.3	3720	<1.0	<0.50	<0.10	471	0.140	<0.0010	0.00089	0.0080	<0.00050	<0.00050	0.78	0.000021	82.4	<0.00050	<0.00150
WQR2-0.5	L2755934-10	2024-05-24	M																					
WQR2-0.5	VA24B1783-010	2024-05-24	M		3.38		<0.0050	5.9	1810	<1.0	<0.50	<0.10	219	0.188	<0.0010	0.00059	0.0096	<0.00050	<0.00050	0.64	<0.000020	51.6	<0.00050	<0.00150
WQR2-0.5	VA24B3452-010	2024-06-10	M	12.80	6.16		<0.0050	<5.0	1230	<1.0	<0.50	<0.10	144	0.288	<0.0010	0.00055	0.0100	<0.00050	<0.00050	0.44	<0.000020	34.8	<0.00050	<0.00150
WQR2-0.5	658-454600000-0	2024-06-17	M	7.65																				
WQR2-0.5	VA24B5882-010	2024-07-03	M	25.90	20.2									0.469	<0.0010	0.00042	0.0149	<0.00050	<0.00050	<0.30	<0.000020	13.1	<0.00050	
WQR2-0.5	VA24B6465-004	2024-07-09	M	8.88	11.9		<0.0050	6.4	2150	<1.0	<0.50	<0.10	262	0.615	<0.0010	0.00106	0.0184	<0.00050	<0.00050	0.65	<0.000020	50.8	<0.00050	<0.00150
WQR2-0.5	VA24B7867-004	2024-07-20	M	14.97	8.30		<0.0050	<5.0	1080	<1.0	<0.50	<0.10	128	0.547	<0.0010	<0.00040	0.0175	<0.00050	<0.00050	<0.30	<0.000020	24.6	<0.00050	<0.00150
WQR2-0.5	L2757210-4	2024-08-26	M																					
WQR2-0.5	VA24C2208-004	2024-08-26	M		3.21		0.0054	20.2	6370	<1.0	<0.50	0.10	867	0.178	<0.0010	0.00061	0.0163	<0.00050	<0.00050	1.45	0.000034	149	<0.00050	<0.00150
WQR2-0.5	VA24C5557-001	2024-09-25	M	3.90	12.0		0.0124	13.4	4200	<1.0	<0.50	<0.10	553	0.263	<0.0010	0.00306	0.0156	<0.00050	<0.00050	1.82	0.000047	175	<0.00050	
WQR2-0.5	L2757680-4	2024-10-06	M																					
WQR2-0.5	VA24C6685-004	2024-10-06	M	3.62	2.38		0.0099	19.0	5440	<2.00	<0.500	<0.100	745	0.195	<0.00100	<0.00100	0.0127	<0.000200	<0.000500	1.43	<0.0000500	127	<0.00500	<0.00150
WQR2-0.5	VA24C7408-004	2024-10-13	M	4.75	3.50		0.0153	28.3	8330	<1.0	<0.50	<0.10	1170	0.123	<0.0010	0.00436	0.0141	<0.00050	<0.00050	1.91	0.000052	196	<0.00050	<0.00150
WQR2-0.5	L2757830-2	2024-10-19	M																					
WQR2-0.5	VA24C8041-002	2024-10-19	M	19.12	34.8		0.0112	13.3	4150	<1.0	<0.50	<0.10	573	1.06	<0.0010	0.00200	0.0252	<0.00050	<0.00050	1.02	0.000031	97.4	0.00052	<0.00150
WQR2-0.5	VA24C8159-004	2024-10-20	M	20.40	22.2		0.0117	8.1	2570	<1.0	<0.50	<0.10	354	1.42	<0.0010	<0.00200	0.0340	<0.00050	<0.00050	0.60	0.000025	59.0	0.00080	<0.00150
WQR2-0.5	L2757872-4	2024-10-22	M																					
WQR2-0.5	VA24C8330-004	2024-10-22	M		24.0		0.0108	<5.0	1520	<1.0	<0.50	<0.10	189	1.16	<0.0010	0.00095	0.0307	<0.00050	<0.00050	0.36	<0.000020	36.3	0.00053	<0.00150
WQR2-0.5	L2757962-5	2024-10-29	M																					
WQR2-0.5	VA24C9185-005	2024-10-29	M	5.79	6.35		0.0121	<5.0	1330	<1.0	<0.50	<0.10	178	0.319	<0.0010	<0.00040	0.0102	<0.00050	<0.00050	0.31	<0.000020	31.3	0.00054	<0.00150
WQR2-0.5	L2758003-1	2024-11-02	M																					
WQR2-0.5	VA24C9732-001	2024-11-02	M	1.44	1.46		0.0291	17.7	5330	<1.0	<0.50	<0.10	644	0.102	<0.0010	0.00059	0.0125	<0.00050	<0.00050	1.21	0.000028	134	<0.00050	<0.00150
WQR2-0.5	L2758142-6	2024-11-14	M																					
WQR2-0.5	VA24D0945-006	2024-11-14	M	6.26	6.81		0.0087	7.0	2400	<1.0	<0.50	<0.10	321	0.357	<0.0010	<0.00040	0.0098	<0.00050	<0.00050	0.50	<0.000020	48.8	<0.00050	<0.00150
WQR2-0.5	VA24D1069-006	2024-11-15	M	3.54	3.30		0.0105	9.0	2910	<1.0	<0.50	<0.10	380	0.258	<0.0010	<0.00040	0.0103	<0.00050	<0.00050	0.70	0.000026	66.4	<0.00050	<0.00150
WQR2-0.5	L2758203-6	2024-11-19	M																					
WQR2-0.5	VA24D1567-006	2024-11-19	M	1.80	1.10		0.0162	15.1	4960	<1.0	<0.50	<0.10	688	0.0859	<0.0010	0.00064	0.0113	<0.00050	<0.00050	1.21	0.000031	114	<0.00050	<0.00150
WQR2-0.5	L2758354-1	2024-12-06	M																					
WQR2-0.5	VA24D3008-001	2024-12-06	M	1.97	1.00		0.0179	22.6	6840	<1.0	<0.50	<0.10	937	0.0407	<0.0010	0.00083	0.0110	<0.00050	<0.00050	1.70	0.000038	162	<0.00050	<0.00150
WQR2-0.5	L2758634-7	2025-01-09	M																					
WQR2-0.5	VA25A0510-007	2025-01-09	M	1.26	0.54		0.0182	42.2	13000	<1.0	<0.50	<0.10	1790	0.0192	<0.0010	0.00108	0.0103	<0.00050	<0.00050	2.49	0.000064	290	<0.00050	<0.00150
WQR2-0.5	L2759010-7	2025-02-18	M																					
WQR2-0.5	VA25A3415-007	2025-02-18	M	0.88	0.47		0.0101	43.4	13700	<1.0	<0.50	<0.10	1870	0.0143	<0.0010	0.00138	0.0110	<0.00050	<0.00050	2.62	0.000074	309	<0.00050	<0.00150
WQR2-0.5	L2759209-7	2025-03-12	M																					
WQR2-0.5	VA25A5429-007	2025-03-12	M	0.97	0.97		0.0159	9.0	2840	<1.0	<0.50	<0.10	385	0.0685	<0.0010	<0.00040	0.0077	<0.00050	<0.00050	0.79	<0.000020	63.2	<0.00050	<0.00150
WQR2-0.5	VA25A6528-016	2025-03-25	M	1.31	1.00		0.0086	19.3	7400	<1.0	<0.50	<0.10	961	0.0599	<0.0010	0.00075	0.0072	<0.00050	<0.00050	1.94	0.000032	166	<0.00050	
WQR2-0.5	VA25A8147-004	2025-04-11	M	1.98	1.48		0.0080	7.6	2420	<1.0	<0.50	<0.10	284	0.127	<0.0010	<0.00040	0.0076	<0.00050	<0.00050	0.83	0.000022	68.0	<0.00050	<0.00150
WQR2-0.5	VA25A8148-004	2025-04-11	M																					
WQR2-0.5	VA25A8280-007	2025-04-13	M	1.39	0.68		0.0070	7.4	2100	<1.0	<0.50	<0.10	281	0.0829	<0.0010	<0.00040	0.0061	<0.00050	<0.00050	0.59	<0.000020	47.4	<0.00050	<0.00150
WQR2-0.5	VA25A8282-007	2025-04-13	M																					
WQR2-0.5	VA25A8854-007	2025-04-21	M	2.54	1.88		0.0078	<5.0	1050	<1.0	<0.50	<0.10	116	0.128	<0.0010	<0.00040	0.0077	<0.00050	<0.00050	0.38	<0.000020	26.4	<0.00050	<0.00150
WQR2-0.5	VA25A8855-007	2025-04-21	M																					
WQR2-0.5	VA25B0359-012	2025-05-06	M	3.21	2.02		0.0155	14.4	4610	<1.0	3.13	<0.10	602	0.124	<0.0010	0.00052	0.0087	<0.00050	<0.00050	0.89	<0.000020	96.9	<0.00050	<0.00150
WQR2-0.5	VA25B0360-012	2025-05-06	M																					
WQR2-0.5	VA25B0499-007	2025-05-07	M	2.45	1.64		0.0126	11.6	3550	<1.0	<0.50	<0.10	435	0.109	<0.0010	<0.00040	0.0086	<0.00050	<0.00050	0.67	<0.000020	74.5	<0.00050	<0.00150
WQR2-0.5	VA25B0502-007	2025-05-07	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-0.5	VA25B2349-006	2025-05-27	M	4.25	3.88		0.0069	<5.0	1520	<1.0	<0.50	<0.10	207	0.169	<0.0010	<0.00040	0.0083	<0.00050	<0.00050	0.44	<0.000020	43.0	<0.00050	<0.00150
WQR2-1	0051710-11	2020-05-20	M	0.64		2	<0.050				<5.00			0.0161	<0.00040	0.00176	<0.0100	<0.00020	<0.00020	4.34	0.000068	454	<0.00100	
WQR2-1	0062209-12	2020-06-22	M	0.41		<1	<0.050				<1.00			0.0187	<0.00040	0.00175	<0.0100	<0.00020	<0.00020	4.37	0.000074	402	<0.00100	
WQR2-1	0071996-11	2020-07-21	M	0.87		<1	<0.050				<1.00			0.612	<0.00040	0.00298	0.0336	<0.00020	<0.00020	4.34	0.000096	310	<0.00100	
WQR2-1	0082292-11	2020-08-24	M	0.44		1	<0.050				<1.00			0.0302	<0.00040	0.00209	0.0101	<0.00020	<0.00020	3.94	0.000073	357	<0.00100	
WQR2-1	0093017-11	2020-09-28	M	0.47		1	<0.050				<1.00			0.0503	<0.00040	0.00157	0.0113	<0.00020	<0.00020	4.45	0.000068	393	<0.00100	
WQR2-1	20J1961-11	2020-10-20	M	0.37			<0.050				<10.0			0.0503	<0.00040	0.00188	0.0128	<0.00020	<0.00020	4.28	0.000083	402	<0.00100	
WQR2-1	20J2778-11	2020-10-27	M	0.41		<1	<0.050				<1.00			0.0229	<0.00040	0.00183	0.0123	<0.00020	<0.00020	3.96	0.000088	374	0.0019	
WQR2-1	20K0360-11	2020-11-03	M	0.31		<1	<0.050				<1.00			0.0361	0.00044	0.00293	0.0224	<0.00020	<0.00020	8.38	0.000173	712	0.00152	
WQR2-1	20K1261-11	2020-11-10	M	0.80		<1	<0.050				<1.00			0.0386	<0.00040	0.00174	0.0124	<0.00020	<0.00020	4.16	0.00008	439	<0.00100	
WQR2-1	20K2100-11	2020-11-18	M			<1.8	<0.050				<1.00			0.0257	<0.00040	0.00244	0.0118	<0.00020	<0.00020	3.92	0.00005	410	<0.00100	
WQR2-1	20L1589-11	2020-12-14	M	-0.01		1	<0.050				<1.00			0.0133	<0.00040	0.0023	0.0122	<0.00020	<0.00020	3.87	0.000084	431	<0.00100	
WQR2-1	21A2590-11	2021-01-27	M	0.20		1	<0.050				<1.00			0.0131	<0.00040	0.00123	<0.0100	<0.00020	<0.00020	4.04	0.000066	377	<0.00100	
WQR2-1	21B2778-11	2021-02-25	M			<1.8	<0.050				<1.00			0.0177	<0.00040	0.00164	<0.0100	<0.00020	<0.00020	3.94	0.000075	378	<0.00100	
WQR2-1	21C3505-12	2021-03-25	M	0.51		<1	<0.050				<1.00			0.0192	<0.000500	0.00171	0.0116	<0.000100	<0.000100	4.91	0.000111	397	<0.00100	
WQR2-1	21D2478-11	2021-04-22	M	0.20		1	<0.050				<1.00			0.0111	<0.000500	0.00165	0.00989	<0.000100	<0.000100	4.47	0.0000841	391	<0.00100	
WQR2-1	21E1990-11	2021-05-18	M	0.36		<1	<0.050				<1.00			0.0136	<0.00040	0.00174	0.0113	<0.00020	<0.00020	5.43	0.000078	402	<0.00100	
WQR2-1	21E2917-11	2021-05-26	M	0.19		<1	<0.050				<1.00			0.0182	<0.000500	0.00156	0.0107	<0.000100	<0.000100	4.12	0.000082	420	<0.00100	
WQR2-1	21F0167-11	2021-06-01	M	0.41		1	0.139				<1.00			0.0319	<0.000500	0.00148	0.00997	<0.000100	<0.000100	3.62	0.0000703	330	<0.00100	
WQR2-1	21F1056-11	2021-06-08	M	2.84		1	0.066				<1.00			0.0323	<0.000500	0.00173	0.019	<0.000100	<0.000100	3.79	0.0000883	381	<0.00100	
WQR2-1	21F2014-11	2021-06-15	M	1.98		1	0.075				<1.00			0.0315	<0.000500	0.00175	0.0107	<0.000100	<0.000100	4.15	0.0000901	368	<0.00100	
WQR2-1	21G2414-11	2021-07-20	M	2.00		<1	<0.050				<1.00			0.0265	<0.000500	0.00163	0.0104	<0.000100	<0.000100	3.77	0.0000716	321	<0.00100	
WQR2-1	21H3040-11	2021-08-25	M			<1	0.067				<1.00			0.0847	<0.000500	0.00151	0.0131	<0.000100	<0.000100	3.91	0.0000891	389	<0.00100	
WQR2-1	21I3814-11	2021-09-28	M	0.89		<1.8	<0.050				<1.00			0.051	<0.000500	0.00139	0.012	<0.000100	<0.000100	3.75	0.0000741	355	<0.00100	
WQR2-1	21J3514-11	2021-10-26	M	-0.62		<1	<0.050				<1.00			0.021	<0.00020	0.00158	0.0115	<0.00010	<0.00010	3.47	0.000067	330	<0.00050	
WQR2-1	21K3046-11	2021-11-23	M	0.65		2	<0.050				<1.00			0.0327	<0.00040	0.0016	0.0138	<0.00020	<0.00020	3.79	0.000068	344	<0.00100	
WQR2-1	21L2125-11	2021-12-14	M	0.40		<1	<0.050				<1.00			<0.0100	<0.00040	0.00187	0.0112	<0.00020	<0.00020	4.8	0.0001	338	<0.00100	
WQR2-1	22A2312-11	2022-01-20	M	0.00		<1.8	<0.050				<1.00			0.0199	<0.00040	0.00239	0.0107	<0.00020	<0.00020	4.93	0.000084	353	<0.00100	
WQR2-1	22B2487-11	2022-02-17	M	0.40		<1	<0.050	<25.0	15300	<25.0	<2.50	<2.50	2380	0.0207	<0.00040	0.00131	0.0108	<0.00020	<0.00020	3.94	0.000085	333	<0.00100	
WQR2-1	22C3145-11	2022-03-22	M	0.40		<1	<0.050	62.9	15900	<25.0	<2.50	<2.50	2150	0.0278	<0.00040	0.0019	<0.0100	<0.00020	<0.00020	3.03	0.000079	293	<0.00100	
WQR2-1	22D2212-14	2022-04-20	M	0.30		<1	<0.050	65.6	15000	<50.0	<5.00	<5.00	2010	0.0501	<0.00040	0.00202	0.0123	<0.00020	<0.00020	5.7	0.000102	375	<0.00100	
WQR2-1	22E2480-11	2022-05-17	M	0.00		<1	<0.050	68.7	16700	<50.0	<5.00	<5.00	2570	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.37	<0.000100	328	<0.00500	
WQR2-1	22F3212-11	2022-06-21	M	-0.11		<1	0.135	60.2	15600	<50.0	<5.00	<5.00	2060	<0.0200	<0.000500	0.0015	0.011	<0.000100	<0.000100	4.08	0.0000771	337	<0.00100	
WQR2-1	22G1763-11	2022-07-13	M	0.04		<1	<0.050	50.3	15000	<50.0	<5.00	<5.00	1990	0.0241	<0.000500	0.00172	0.0117	<0.000100	<0.000100	4.53	0.0000673	335	<0.00100	
WQR2-1	22H2453-11	2022-08-16	M	-0.07		<1	<0.050	52.8	14100	<50.0	<5.00	<5.00	2050	0.0459	<0.000500	0.00145	0.0109	<0.000100	<0.000100	4.27	0.0000688	372	<0.00100	
WQR2-1	22I1926-11	2022-09-14	M	0.96		2	<0.050	52.3	16000	<10.0	<1.00	<1.00	2620	0.0214	<0.000500	0.00161	0.0103	<0.000100	<0.000100	3.85	0.0000855	304	<0.00100	
WQR2-1	22J1560-11	2022-10-12	M	0.25			<0.050	<100	16200	<100	<10.0	<10.0	2900	<0.0200	<0.000500	0.00189	0.0103	<0.000100	<0.000100	4.39	0.0000825	353	<0.00100	
WQR2-1	22K1453-11	2022-11-10	M	0.48		<1	<0.050	38.0	16500	<25.0	0.448	<0.0050	2300	0.0350	<0.000500	0.00211	0.0121	<0.000100	<0.000100	5.23	0.000109	382	<0.00100	
WQR2-1	22K2628-03	2022-11-22	M			<1	<0.050	51.5	15900	<25.0	<2.50	<2.50	2260	0.0334	<0.000500	0.00138	0.0107	<0.000100	<0.000100	3.75	0.0000771	359	<0.00100	
WQR2-1	22K2988-03	2022-11-24	M			<1	<0.050	26.5	16300	<25.0	<2.50	<2.50	2220	0.0376	<0.000500	0.00193	0.0101	<0.000100	<0.000100	4.76	0.000101	358	0.00101	
WQR2-1	22K3123-03	2022-11-25	M			<1	<0.050	<25.0	12200	<25.0	5.45	<0.0050	1680	<0.0200	<0.000500	0.00183	0.00947	<0.000100	<0.000100	3.71	0.0000766	353	<0.00100	
WQR2-1	22L0036-03	2022-11-30	M			<1	<0.050	53.8	16600	<25.0	<2.50	<2.50	2340	0.0242	<0.000500	0.00177	0.0115	<0.000100	<0.000100	4.04	0.0000848	287	<0.00100	
WQR2-1	22L0263-03	2022-12-02	M			<1	0.060	<25.0	16000	<25.0	0.533	<0.0050	2290	<0.0200	<0.000500	0.00185	0.0105	<0.000100	<0.000100	3.84	0.0000815	269	<0.00100	
WQR2-1	22L0499-03	2022-12-05	M			<1	0.064	<25.0	16800	<25.0	0.487	<0.0050	2340	<0.0200	<0.000500	0.00185	0.0124	<0.000100	<0.000100	4.64	0.0000698	304	<0.00100	
WQR2-1	22L0633-03	2022-12-06	M			<1	<0.050	<25.0	16600	<25.0	0.373	<0.0050	2320	<0.0200	<0.000500	0.00191	0.0131	<0.000100	<0.000100	4.06	0.0000845	353	<0.00100	
WQR2-1	22L0774-11	2022-12-07	M	0.30		<1	<0.050	<25.0	16700	<25.0	<2.50	<2.50	2280	<0.0200	<0.000500	0.00166	0.0132	<0.000100	<0.000100	4.38	0.0000624	340	<0.00100	
WQR2-1	22L1436-03	2022-12-13	M			<1	<0.050	<25.0	17300	<25.0	<2.50	<0.0050	2420	<0.0200	<0.000500	0.00181	0.0115	<0.000100	<0.000100	4.34	0.0000817	361	<0.00100	
WQR2-1	23A2847-11	2023-01-27	M	0.00		<1	<0.050	<100	17100	<100	0.397	<0.0050	2440	<0.0200	<0.000500	0.00191	0.00883	<0.000100	<0.000100	4.24	0.0000933	383	<0.00100	
WQR2-1	23C0060-11	2023-02-28	M	0.02		<1	<0.050	<100	16700	<100	<10.0	<10.0	2140	<0.0200	<0.000500	0.00162	0.00871	<0.000100	<0.000100	3.71	0.0000856	393	<0.00100	
WQR2-1	23C1797-11	2023-03-15	M	-0.53		<1	<0.050	<100	15600	<100	<10.0	<10.0	2100	<0.0200	<0.000500	0.00184	0.0103	<0.000100	<0.000100	3.83	0.0000731	345	<0.00100	
WQR2-1	23D2945-11	2023-04-26	M	0.29	0.37	<1	0.148	<100	16300	1.08	0.668	<0.0500	2140	0.0246	<0.000500	0.00197	0.00865	<0.000100	<0.000100	3.82	0.0000814	360	<0.00100	
WQR2-1	23E2392-11	2023-05-17	M	0.55	0.70	<1	0.104	<100	14600	0.905	0.235	0.0590	1980	0.0355	<0.000500	0.00165	0.00955	<0.000100	<0.000100	3.63	0.0000816	381	<0.00100	
WQR2-1	23F3614-11	2023-06-27	M	0.47	0.75	<1	<0.050	<100	16400	1.10	0.448	<0.0500	2790	<0.0500	<0.000500	0.00189	0.0104	<0.000100	<0.000100	4.26	0.0000834	388	<0.00100	
WQR2-1	23G2415-11	2023-07-19	M	0.12	0.64	<1	<0.050	<100	14600	1.13	0.491	<0.0500	2130	0.0271	<0.000500	0.00185	0.0101	<0.000100	<0.000100	4.26	0.0000625	387	<0.00100	
WQR2-1	23H3309-11	2023-08-24	M	0.19	0.72	<1	<0.050	<100	15600	1.13	0.421	0.0088	2430	0.0229	<0.000500	0.00182	0.00970	<0.000100	<0.000100	4.03	0.0000973	360	<0.00100	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-1	23I2271-13	2023-09-19	M	0.43	0.82	<1	<0.050	<100	16800	1.12	0.415	<0.0500	2780	0.0365	<0.000500	0.00190	0.0116	<0.000100	<0.000100	4.16	0.0000570	371	<0.00100	
WQR2-1	23J2236-13	2023-10-18	M	0.01	0.42	<1	<0.050	<100	17200	1.12	0.422	<0.0500	3370	0.0480	<0.000500	0.00166	0.0105	<0.000100	<0.000100	3.94	0.0000846	339	<0.00100	
WQR2-1	23K1909-11	2023-11-15	M	0.13	0.69	<1.8	<0.050	<100	18100	1.23	0.428	<0.0500	3320	0.0365	<0.000500	0.00176	0.0104	<0.000100	<0.000100	4.81	0.0000953	419	<0.00100	
WQR2-1	23L2091-09	2023-12-15	M	0.46	0.42	<1.8	<0.050	<100	16400	1.06	0.433	<0.0050	2090	0.0303	<0.000500	0.00186	0.00844	<0.000100	<0.000100	4.47	0.0000933	385	<0.00100	
WQR2-1	L2754383-7	2024-01-25	M																					
WQR2-1	VA24A1507-009	2024-01-25	M	4.82	0.35	<10	0.0052	54.7	16400	<1.0	<0.50	<0.10	2240	0.0133	<0.0010	0.00215	0.0090	<0.00050	<0.00050	4.32	0.000077	410	<0.00050	<0.00150
WQR2-1	L2754604-7	2024-02-14	M																					
WQR2-1	VA24A2995-009	2024-02-14	M	3.19	0.18	20	<0.0050	52.7	16000	<1.0	<0.50	<0.10	2150	0.0154	<0.0010	0.00167	0.0091	<0.00050	<0.00050	5.06	0.000072	350	<0.00050	<0.00150
WQR2-1	L2755043-9	2024-03-21	M																					
WQR2-1	VA24A6026-009	2024-03-21	M	0.50	0.79	<10	<0.0050	58.6	16900	<1.0	<0.50	<0.10	2270	0.0692	<0.0010	0.00251	0.0099	<0.00050	<0.00050	3.66	0.000078	390	<0.00050	<0.00150
WQR2-1	L2755490-7	2024-04-24	M																					
WQR2-1	VA24A8916-009	2024-04-24	M	0.85	1.42	<10	0.0079	57.0	16600	<1.0	0.65	<0.10	2290	0.0472	<0.0010	0.00362	0.0105	<0.00050	<0.00050	3.92	0.000089	427	<0.00050	<0.00150
WQR2-1	L2755567-7	2024-05-01	M																					
WQR2-1	VA24A9566-009	2024-05-01	M	0.31	0.18	<10	0.0107	57.3	16700	<1.0	<0.50	<0.10	2350	0.0138	<0.0010	0.00338	0.0114	<0.00050	<0.00050	3.72	0.000074	394	<0.00050	<0.00150
WQR2-1	L2755666-7	2024-05-08	M																					
WQR2-1	VA24B0201-009	2024-05-08	M	0.18	0.50	<10	<0.0050	60.5	17700	<1.0	<0.50	<0.10	2430	0.0171	<0.0010	0.00360	0.0098	<0.00050	<0.00050	3.61	0.000061	376	<0.00050	<0.00150
WQR2-1	L2755779-7	2024-05-15	M																					
WQR2-1	VA24B0901-009	2024-05-15	M	0.10	0.58	<10	<0.0050	58.4	17600	<1.0	<0.50	<0.10	2350	0.0259	<0.0010	0.00365	0.0099	<0.00050	<0.00050	3.82	0.000080	384	<0.00050	<0.00150
WQR2-1	L2755888-7	2024-05-22	M																					
WQR2-1	VA24B1500-009	2024-05-22	M	0.03	0.25	<10	<0.0050	60.1	17900	<1.0	<0.50	<0.10	2490	0.0109	<0.0010	0.00324	0.0100	<0.00050	<0.00050	4.60	0.000070	338	<0.00050	<0.00150
WQR2-1	L2756312-7	2024-06-19	M																					
WQR2-1	VA24B4510-009	2024-06-19	M	2.50	0.25	<10	<0.0050	60.0	17100	<1.0	0.59	<0.10	2290	0.0128	<0.0010	0.00560	0.0109	<0.00050	<0.00050	3.77	0.000091	417	<0.00050	<0.00150
WQR2-1	VA24B7397-009	2024-07-17	M	-0.77	0.41	<10	<0.0050	38.7	11800	<1.0	<0.50	<0.10	1620	0.0224	<0.0010	0.00387	0.0110	<0.00050	<0.00050	3.47	0.000070	397	0.00101	<0.00150
WQR2-1	L2756689-7	2024-07-17	M																					
WQR2-1	L2757122-7	2024-08-21	M																					
WQR2-1	VA24C1337-009	2024-08-21	M	0.07	0.22	<10	<0.0050	60.4	17700	<1.0	<0.50	<0.10	2460	0.0128	<0.0010	0.00385	0.0112	<0.00050	<0.00050	3.63	0.000073	365	<0.00050	<0.00150
WQR2-1	VA24C4683-009	2024-09-18	M	0.40	0.36	<10	<0.0050	56.7	16400	<1.0	0.53	<0.10	2300	0.0182	<0.0010	0.00532	0.0108	<0.00050	<0.00050	4.40	0.000089	408	<0.00050	<0.00150
WQR2-1	VA24C8569-009	2024-10-23	M	1.48	0.46	<10	<0.0050	58.6	17400	<1.0	<0.50	<0.10	2390	0.0210	<0.0010	0.00633	0.0103	<0.00050	<0.00050	3.32	0.000079	356	<0.00050	<0.00150
WQR2-1	L2757977-9	2024-10-30	M																					
WQR2-1	VA24C9414-009	2024-10-30	M	1.63	0.29	10	<0.0050	57.1	17700	<1.0	0.51	<0.10	2490	0.0206	<0.0010	0.00161	0.0108	<0.00050	<0.00050	3.78	0.000075	406	<0.00050	<0.00150
WQR2-1	VA24D0180-009	2024-11-06	M	0.63	0.30	<10	0.0084	56.1	16700	<1.0	<0.50	<0.10	2310	0.0240	<0.0010	0.00161	0.0119	<0.00050	<0.00050	3.68	0.000085	386	<0.00050	<0.00150
WQR2-1	VA24D0813-009	2024-11-13	M	2.42	0.36	<10	<0.0050	51.0	16100	<1.0	<0.50	<0.10	2230	0.0339	<0.0010	0.00150	0.0120	<0.00050	<0.00050	3.53	0.000088	388	<0.00050	<0.00150
WQR2-1	L2758221-7	2024-11-22	M																					
WQR2-1	VA24D1791-009	2024-11-22	M	-2.30	0.42	<10	0.0053	53.2	16800	<1.0	<0.50	<0.10	2360	0.0235	<0.0010	0.00170	0.0119	<0.00050	<0.00050	4.96	0.000073	416	<0.00050	<0.00150
WQR2-1	L2758486-7	2024-12-18	M																					
WQR2-1	VA24D3937-009	2024-12-18	M	0.00	0.42	<10	<0.0050	55.5	16400	<1.0	<0.50	<0.10	2260	0.0121	<0.0010	0.00165	0.0094	<0.00050	<0.00050	3.58	0.000091	318	<0.00050	<0.00150
WQR2-1	L2758770-7	2025-01-22	M																					
WQR2-1	VA25A1525-009	2025-01-22	M	-2.81	3.43	<10	<0.0050	64.8	18200	1.0	0.57	<0.10	2570	0.743	<0.0010	0.00175	0.0178	<0.00050	<0.00050	3.58	0.000078	379	0.00075	<0.00150
WQR2-1	L2759008-7	2025-02-19	M																					
WQR2-1	VA25A3570-009	2025-02-19	M	-3.45	0.59	<10	0.0125	57.5	17200	<1.0	<0.50	<0.10	2330	0.0156	<0.0010	0.00170	0.0095	<0.00050	<0.00050	3.55	0.000074	371	<0.00050	<0.00150
WQR2-1	VA25A6679-009	2025-03-26	M	-0.06	0.32	<10	0.0053	57.6	16800	<1.0	0.55	<0.10	2340	0.0069	<0.0010	0.00162	0.0101	<0.00050	<0.00050	4.51	0.000084	411	<0.00050	<0.00150
WQR2-1	VA25A9109-009	2025-04-23	M	-3.15	0.19	<10	0.0196	61.0	17000	<1.0	<0.50	<0.10	2380	0.0066	<0.0010	0.00172	0.0089	<0.00050	<0.00050	3.29	0.000082	371	<0.00050	<0.00150
WQR2-1	VA25A9941-009	2025-05-01	M	-3.06	0.30	<10	0.0443	59.2	16800	<1.0	<0.50	<0.10	2390	0.0088	<0.0010	0.00161	0.0086	<0.00050	<0.00050	3.77	0.000078	391	<0.00050	<0.00150
WQR2-1	VA25B0496-009	2025-05-07	M	0.29	0.12	<10	<0.0050	59.5	17200	<1.0	<0.50	<0.10	2300	0.0085	<0.0010	0.00166	0.0093	<0.00050	<0.00050	3.95	0.000076	412	<0.00050	<0.00150
WQR2-1	VA25B1530-009	2025-05-16	M	-0.98	0.24	<10	0.0094	58.1	17000	<1.0	<0.50	<0.10	2370	0.0157	<0.0010	0.00174	0.0094	<0.00050	<0.00050	3.54	0.000075	361	<0.00050	<0.00150
WQR2-1	VA25B1841-009	2025-05-21	M	-0.96	0.20	<10	<0.0050	62.1	17700	<1.0	<0.50	<0.10	2330	0.0083	<0.0010	0.00138	0.0090	<0.00050	<0.00050	3.89	0.000077	362	<0.00050	<0.00150
WQR2-2	0051710-12	2020-05-20	M	0.65		<1.8	<0.050				2.54			0.219	<0.00040	<0.00100	0.0112	<0.00020	<0.00020	1.41	0.000028	133	<0.00100	
WQR2-2	0062209-11	2020-06-22	M	13.40		6	<0.050				<0.010			0.903	<0.00040	<0.00100	0.0226	<0.00020	<0.00020	0.502	<0.000020	40.2	<0.00100	
WQR2-2	0071996-12	2020-07-21	M	14.45		9	<0.050				<0.010			0.727	<0.00040	<0.00100	0.019	<0.00020	<0.00020	0.403	<0.000020	23.2	<0.00100	
WQR2-2	0082292-12	2020-08-24	M	0.65		<1	<0.050				<1.00			0.181	<0.00040	0.00147	0.0307	<0.00020	<0.00020	2.11	0.000061	185	<0.00100	
WQR2-2	0093017-12	2020-09-28	M	11.27		20	<0.050				<1.00			0.509	<0.00040	<0.00100	0.0183	<0.00020	<0.00020	0.667	0.000026	57.6	0.0012	
WQR2-2	20J1961-12	2020-10-20	M	2.56		4	<0.050				<10.0			0.159	<0.00040	<0.00100	0.0127	<0.00020	<0.00020	0.75	0.000027	64	<0.00100	
WQR2-2	20J2778-12	2020-10-27	M	0.79		3	<0.050				<1.00			0.049	<0.00040	0.00107	0.0137	<0.00020	<0.00020	2.14	0.000048	196	<0.00100	
WQR2-2	20K0360-12	2020-11-03	M	2.66		6	<0.050				<1.00			0.207	<0.00040	<0.00100	0.0103	<0.00020	<0.00020	1.13	0.00003	96.6	<0.00100	
WQR2-2	20K1261-12	2020-11-10	M	2.20		2	<0.050				<1.00			0.139	<0.00040	0.00118	0.0153	<0.00020	<0.00020	2.4	0.000049	233	<0.00100	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	20K2100-12	2020-11-18	M			13	<0.050				<1.00			0.374	<0.00040	<0.00100	0.0155	<0.00020	<0.00020	0.953	<0.000020	97.4	<0.00100	
WQR2-2	20L1589-12	2020-12-14	M	0.21		<1	<0.050				<1.00			0.0374	<0.00040	0.00152	0.0126	<0.00020	<0.00020	2.3	0.000052	232	<0.00100	
WQR2-2	21A2590-12	2021-01-27	M	0.26		1	<0.050				<1.00			0.0177	<0.00040	0.00127	0.0104	<0.00020	<0.00020	3.83	0.000078	357	<0.00100	
WQR2-2	21B2778-12	2021-02-25	M			<1.8	<0.050				<1.00			0.0243	<0.00040	0.00122	0.0108	<0.00020	<0.00020	3.46	0.000071	314	<0.00100	
WQR2-2	21C3505-13	2021-03-25	M	0.76		3	<0.050				<1.00			0.0435	<0.000500	0.00118	0.0089	<0.000100	<0.000100	3.07	0.0000539	246	<0.00100	
WQR2-2	21D2478-12	2021-04-22	M	2.80		3	<0.050				<1.00			0.256	0.000214	0.000371	0.0101	<0.000010	<0.000010	1.09	0.0000193	85.5	0.00043	
WQR2-2	21E1990-12	2021-05-18	M	8.86		22	<0.050				<1.00			0.646	<0.00020	0.00054	0.016	<0.00010	<0.00010	0.179	0.000012	17.4	<0.00050	
WQR2-2	21E2917-12	2021-05-26	M	3.77		10	<0.050				<1.00			0.294	0.000063	0.000292	0.011	<0.000010	<0.000010	0.607	0.0000115	53.9	0.00036	
WQR2-2	21F0167-12	2021-06-01	M	2.37		2	0.117				<1.00			0.238	0.000067	0.000353	0.011	<0.000010	<0.000010	0.678	0.0000144	69.2	0.00035	
WQR2-2	21F1056-12	2021-06-08	M	19.63		5	0.095				<1.00			0.748	0.000061	0.000241	0.0174	0.000011	<0.000010	0.228	0.0000081	21.7	0.00054	
WQR2-2	21F2014-12	2021-06-15	M	19.40		13	0.09				<1.00			1.35	0.000065	0.000329	0.0258	0.000015	<0.000010	0.277	0.0000161	27.5	0.0009	
WQR2-2	21G2414-12	2021-07-20	M	5.69		3	<0.050				<1.00			0.275	<0.000500	<0.000500	0.0126	<0.000100	<0.000100	0.395	<0.0000200	29.6	<0.00100	
WQR2-2	21H3040-12	2021-08-25	M			4	<0.050				<1.00			0.368	<0.000500	<0.000500	0.0178	<0.000100	<0.000100	0.842	<0.0000200	77.6	<0.00100	
WQR2-2	21I3814-12	2021-09-28	M	8.38		17	0.051				<1.00			0.468	<0.000500	0.000502	0.0274	<0.000100	<0.000100	1.2	0.0000205	107	<0.00100	
WQR2-2	21J3514-12	2021-10-26	M	4.77		272	<0.050				<1.00			0.303	<0.00020	0.00056	0.0112	<0.00010	<0.00010	1.06	0.000024	97.4	<0.00050	
WQR2-2	21K3046-12	2021-11-23	M	1.22		3	<0.050				<1.00			0.0531	<0.00040	<0.00100	0.0121	<0.00020	<0.00020	1.83	0.000039	153	<0.00100	
WQR2-2	21L2125-12	2021-12-14	M	0.32		2	<0.050				<1.00			0.141	<0.00040	0.00154	0.0122	<0.00020	<0.00020	3.68	0.000072	256	<0.00100	
WQR2-2	22A2312-12	2022-01-20	M	0.00		<1.8	<0.050				<1.00			0.0206	<0.00040	0.00234	0.0105	<0.00020	<0.00020	4.31	0.000084	319	<0.00100	
WQR2-2	22B2487-12	2022-02-17	M	0.80		<1	<0.050	<25.0	12700	<25.0	<2.50	<2.50	2240	0.019	<0.00040	0.00139	<0.0100	<0.00020	<0.00020	3.34	0.000053	282	<0.00100	
WQR2-2	22C3145-12	2022-03-22	M	0.40		<1	<0.050	56.5	14400	<25.0	<2.50	<2.50	1920	0.0806	<0.00040	0.00124	0.0261	<0.00020	<0.00020	2.47	0.000051	239	<0.00100	
WQR2-2	22D2212-15	2022-04-20	M	0.60		1	<0.050	<50.0	11400	<50.0	<5.00	<5.00	1550	0.0263	<0.00040	0.00106	<0.0100	<0.00020	<0.00020	3.82	0.000065	254	<0.00100	
WQR2-2	22E2480-12	2022-05-17	M	3.00		4	<0.050	<50.0	3590	<50.0	<5.00	<5.00	516	0.193	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	0.863	<0.000100	80.9	<0.00500	
WQR2-2	22F3212-12	2022-06-21	M	4.03		13	0.109	<50.0	1020	<50.0	<5.00	<5.00	<500	0.235	<0.000500	<0.000500	0.00773	<0.000100	<0.000100	0.371	<0.0000200	23.8	<0.00100	
WQR2-2	22G1763-12	2022-07-13	M	10.18		2	<0.050	<50.0	1170	<50.0	<5.00	<5.00	<500	0.378	<0.000500	<0.000500	0.0130	<0.000100	<0.000100	0.509	<0.0000200	33.5	<0.00100	
WQR2-2	22H2453-12	2022-08-16	M	8.07		3	<0.050	<50.0	968	<50.0	<5.00	<5.00	<500	0.326	<0.000500	<0.000500	0.0151	<0.000100	<0.000100	0.354	<0.0000200	31.2	<0.00100	
WQR2-2	22I1926-12	2022-09-14	M	1.17		1	<0.050	34.1	10400	<10.0	<1.00	<1.00	1780	0.0491	<0.000500	0.000931	0.0117	<0.000100	<0.000100	2.54	0.0000547	199	<0.00100	
WQR2-2	22J1560-12	2022-10-12	M	0.21		<1	<0.050	<100	10200	<100	<10.0	<10.0	1950	0.0788	<0.000500	0.000922	0.00973	<0.000100	<0.000100	2.42	0.0000386	181	<0.00100	
WQR2-2	22K1453-12	2022-11-10	M	0.43		<1	<0.050	35.9	14800	<25.0	0.396	<0.0050	2040	0.0365	<0.000500	0.00172	0.0128	<0.000100	<0.000100	4.58	0.0000738	339	<0.00100	
WQR2-2	22K2628-04	2022-11-22	M			<1	<0.050	48.2	15100	<25.0	<2.50	<2.50	2110	<0.0200	<0.000500	0.00153	0.00997	<0.000100	<0.000100	3.6	0.000106	347	<0.00100	
WQR2-2	22K2988-04	2022-11-24	M			1	<0.050	<25.0	11900	<25.0	<2.50	<2.50	1580	0.0393	<0.000500	0.00156	0.0116	<0.000100	<0.000100	3.34	0.0000648	255	<0.00100	
WQR2-2	22K3123-04	2022-11-25	M			1	<0.050	<25.0	14700	<25.0	0.216	<0.0050	2070	<0.0200	<0.000500	0.00180	0.0106	<0.000100	<0.000100	3.61	0.0000585	334	<0.00100	
WQR2-2	22L0036-04	2022-11-30	M			<1	<0.050	49.3	14100	<25.0	<2.50	<2.50	1910	<0.0200	<0.000500	0.00155	0.00996	<0.000100	<0.000100	3.39	0.0000638	246	<0.00100	
WQR2-2	22L0263-04	2022-12-02	M			1	0.062	<25.0	16000	<25.0	0.373	<0.0050	2270	<0.0200	<0.000500	0.00159	0.0114	<0.000100	<0.000100	4.42	0.0000930	314	<0.00100	
WQR2-2	22L0499-04	2022-12-05	M			1	0.082	<25.0	15000	<25.0	0.374	<0.0050	2060	0.0217	<0.000500	0.00173	0.0115	<0.000100	<0.000100	3.5	0.0000647	344	<0.00100	
WQR2-2	22L0633-04	2022-12-06	M			4	<0.050	<25.0	13500	<25.0	0.349	<0.0050	1820	0.0225	<0.000500	0.00151	0.0121	<0.000100	<0.000100	3.32	0.0000739	284	<0.00100	
WQR2-2	22L0774-12	2022-12-07	M	0.33		<1	<0.050	<25.0	15100	<25.0	<2.50	<2.50	1980	<0.0200	<0.000500	0.00167	0.0127	<0.000100	<0.000100	3.98	0.0000687	299	<0.00100	
WQR2-2	22L1436-04	2022-12-13	M			2	<0.050	<25.0	15400	<25.0	<2.50	<0.0050	2100	<0.0200	<0.000500	0.00185	0.0115	<0.000100	<0.000100	3.53	0.0000713	334	<0.00100	
WQR2-2	23A2847-12	2023-01-27	M	0.00		<1	<0.050	<100	11400	<100	0.312	<0.0050	1650	0.0309	<0.000500	0.00154	0.0104	<0.000100	<0.000100	3.06	0.0000574	288	<0.00100	
WQR2-2	23C0060-12	2023-02-28	M	0.08		1	<0.050	<100	13600	<100	<10.0	<10.0	1960	<0.0200	<0.000500	0.00153	0.0104	<0.000100	<0.000100	3.26	0.0000380	341	<0.00100	
WQR2-2	23C1797-12	2023-03-15	M	-0.37		<1	<0.050	<100	13600	<100	<10.0	<10.0	1820	<0.0200	<0.000500	0.00159	0.0109	<0.000100	<0.000100	3.51	0.0000711	307	<0.00100	
WQR2-2	23D2945-12	2023-04-26	M	0.31	0.62	<1	<0.050	<100	8780	0.625	0.237	<0.0500	1160	0.0310	<0.000500	0.00104	0.00685	<0.000100	<0.000100	2.31	0.0000422	196	<0.00100	
WQR2-2	23E2392-12	2023-05-17	M	19.75	26.7	11	0.070	<100	2010	0.150	<0.100	0.0750	<1000	1.2	<0.000250	0.000384	0.0228	<0.000050	<0.000050	0.492	0.0000134	48.7	<0.00100	
WQR2-2	23F3614-12	2023-06-27	M	7.55	9.53	3	<0.050	<100	1870	0.140	<0.100	<0.0500	<1000	0.312	<0.000500	<0.000500	0.0130	<0.000100	<0.000100	0.492	<0.0000200	43.6	<0.00100	
WQR2-2	23G2415-12	2023-07-19	M	3.37	3.54	1	0.069	<100	7890	0.583	<0.100	<0.0500	1120	0.162	<0.000500	0.00127	0.0149	<0.000100	<0.000100	2.39	0.0000318	216	<0.00100	
WQR2-2	23H3309-12	2023-08-24	M	0.08	0.46	1	<0.050	<100	12000	0.914	0.0786	0.0074	1970	<0.0200	<0.000500	0.00157	0.0116	<0.000100	<0.000100	3.23	0.0000907	284	<0.00100	
WQR2-2	23I2271-14	2023-09-19	M	0.66	3.05	1	<0.050	<100	5970	0.529	<0.100	<0.0500	1330	0.126	<0.000500	0.000959	0.0131	<0.000100	<0.000100	2.08	0.0000502	180	<0.00100	
WQR2-2	23J2236-14	2023-10-18	M	16.85	23.4	49	<0.050	<100	3570	0.258	0.124	<0.0500	<1000	0.97	<0.000500	0.000842	0.0245	<0.000100	<0.000100	0.926	0.0000516	83.9	<0.00100	
WQR2-2	23K1909-12	2023-11-15	M	0.13	0.87	2.0	<0.050	<100	12700	0.961	0.277	<0.0500	2230	0.0484	<0.000500	0.00123	0.0114	<0.000100	<0.000100	3.55	0.0000799	304	<0.00100	
WQR2-2	23L2091-10	2023-12-15	M	0.46	0.52	<1.8	<0.050	<100	14700	0.965	0.364	<0.0050	1770	0.0301	<0.000500	0.00160	0.0101	<0.000100	<0.000100	3.93	0.000110	324	<0.00100	
WQR2-2	L2754383-8	2024-01-25	M																					
WQR2-2	VA24A1507-010	2024-01-25	M	2.91	0.33	<10	0.0053	51.9	15600	<1.0	<0.50	<0.10	2140	0.0197	<0.0010	0.00215	0.0087	<0.00050	<0.00050	3.91	0.000079	382	<0.00050	<0.00150
WQR2-2	L2754604-8	2024-02-14	M																					
WQR2-2	VA24A2995-010	2024-02-14	M	3.11	0.36	<10	<0.0050	46.8	14000	<1.0	<0.50	<0.10	1840	0.0238	<0.0010	0.00137	0.0099	<0.00050	<0.00050	4.40	0.000064	304	<0.00050	0.00153
WQR2-2	L2755043-10	2024-03-21	M																					
WQR2-2	VA24A6026-010	2024-03-21	M	1.76	1.59	<10	<0.0050	34.2	10200	<1.0	<0.50	<0.10	1340	0.0509	<0.0010	0.00191	0.0092	<0.00050	<0.00050	2.39	0.000058	248	<0.00050	<0.00150

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	L2755490-8	2024-04-24	M																					
WQR2-2	VA24A8916-010	2024-04-24	M	1.10	1.90	<10	<0.0050	40.3	11900	<1.0	<0.50	<0.10	1640	0.0251	<0.0010	0.00253	0.0081	<0.00050	<0.00050	2.93	0.000047	275	<0.00050	<0.00150
WQR2-2	L2755567-8	2024-05-01	M																					
WQR2-2	VA24A9566-010	2024-05-01	M	-0.13	0.15	<10	0.0081	41.3	12200	<1.0	<0.50	<0.10	1720	0.0180	<0.0010	0.00267	0.0052	<0.00050	<0.00050	2.87	0.000056	282	<0.00050	<0.00150
WQR2-2	L2755666-8	2024-05-08	M																					
WQR2-2	VA24B0201-010	2024-05-08	M	1.33	1.39	<10	<0.0050	25.0	7460	<1.0	<0.50	0.15	947	0.0699	<0.0010	0.00194	0.0076	<0.00050	<0.00050	1.64	0.000028	161	<0.00050	<0.00150
WQR2-2	L2755779-8	2024-05-15	M																					
WQR2-2	VA24B0901-010	2024-05-15	M	0.99	2.14	<10	0.0113	35.3	11000	<1.0	<0.50	<0.10	1450	0.108	<0.0010	0.00255	0.0084	<0.00050	<0.00050	2.40	0.000041	229	<0.00050	<0.00150
WQR2-2	L2755888-8	2024-05-22	M																					
WQR2-2	VA24B1500-010	2024-05-22	M	3.63	3.15	<10	0.0095	19.0	5850	<1.0	<0.50	<0.10	761	0.144	<0.0010	0.00157	0.0091	<0.00050	<0.00050	1.83	0.000035	126	0.00068	<0.00150
WQR2-2	L2756312-8	2024-06-19	M																					
WQR2-2	VA24B4510-010	2024-06-19	M	1.90	1.21	<10	0.0179	58.7	17600	<1.0	<0.50	<0.10	2390	0.0407	<0.0010	0.00419	0.0071	<0.00050	<0.00050	2.37	0.000053	251	<0.00050	<0.00150
WQR2-2	VA24B7397-010	2024-07-17	M	7.33	7.95	10	<0.0050	9.2	3160	<1.0	<0.50	<0.10	406	0.438	<0.0010	0.00152	0.0158	<0.00050	<0.00050	1.00	0.000025	100	<0.00050	<0.00150
WQR2-2	L2756689-8	2024-07-17	M																					
WQR2-2	L2757122-8	2024-08-21	M																					
WQR2-2	VA24C1337-010	2024-08-21	M	5.84	5.81	10	<0.0050	12.9	3880	<1.0	<0.50	<0.10	529	0.255	<0.0010	0.00102	0.0171	<0.00050	<0.00050	0.91	<0.000020	83.7	<0.00050	<0.00150
WQR2-2	VA24C4683-010	2024-09-18	M	9.22	7.26	<10	0.0128	14.8	4390	<1.0	<0.50	<0.10	603	0.245	<0.0010	0.00138	0.0150	<0.00050	<0.00050	1.01	<0.000020	102	<0.00050	<0.00150
WQR2-2	VA24C8569-010	2024-10-23	M	4.53	7.41	<10	0.0138	26.6	7940	<1.0	<0.50	<0.10	1080	0.291	<0.0010	0.00354	0.0185	<0.00050	<0.00050	1.67	0.000051	176	<0.00050	<0.00150
WQR2-2	L2757977-10	2024-10-30	M																					
WQR2-2	VA24C9414-010	2024-10-30	M	0.72	1.66	<10	0.0152	32.2	9920	<1.0	<0.50	<0.10	1380	0.103	<0.0010	0.00093	0.0118	<0.00050	<0.00050	2.16	0.000051	218	<0.00050	<0.00150
WQR2-2	VA24D0180-010	2024-11-06	M	0.57	1.28	10	0.0301	30.2	8630	<1.0	<0.50	<0.10	1180	0.0601	<0.0010	0.00098	0.0114	<0.00050	<0.00050	1.95	0.000036	198	<0.00050	<0.00150
WQR2-2	VA24D0813-010	2024-11-13	M	2.90	1.90	<10	0.0072	21.6	6960	<1.0	<0.50	<0.10	960	0.128	<0.0010	0.00080	0.0101	<0.00050	<0.00050	1.49	0.000040	159	<0.00050	<0.00150
WQR2-2	L2758221-8	2024-11-22	M																					
WQR2-2	VA24D1791-010	2024-11-22	M	-2.33	0.86	<10	0.0066	41.4	13300	<1.0	0.53	<0.10	1870	0.0317	<0.0010	0.00133	0.0118	<0.00050	<0.00050	4.12	0.000060	331	<0.00050	<0.00150
WQR2-2	L2758486-8	2024-12-18	M																					
WQR2-2	VA24D3937-010	2024-12-18	M	-0.22	0.41	<10	0.0091	35.2	10700	<1.0	<0.50	<0.10	1480	0.0321	<0.0010	0.00113	0.0096	<0.00050	<0.00050	2.63	0.000061	228	<0.00050	<0.00150
WQR2-2	L2758770-8	2025-01-22	M																					
WQR2-2	VA25A1525-010	2025-01-22	M	-2.71	0.62	<10	<0.0050	49.8	14200	<1.0	<0.50	<0.10	1990	0.0187	<0.0010	0.00137	0.0092	<0.00050	<0.00050	2.99	0.000063	304	<0.00050	<0.00150
WQR2-2	L2759008-8	2025-02-19	M																					
WQR2-2	VA25A3570-010	2025-02-19	M	-2.81	1.00	<10	0.0113	42.2	12600	<1.0	<0.50	<0.10	1690	0.244	<0.0010	0.00131	0.0108	<0.00050	<0.00050	2.75	0.000066	298	<0.00050	<0.00150
WQR2-2	VA25A6679-010	2025-03-26	M	0.44	1.60	<10	0.0188	42.6	12500	<1.0	<0.50	<0.10	1720	0.0241	<0.0010	0.00119	0.0091	<0.00050	<0.00050	3.38	0.000052	305	<0.00050	<0.00150
WQR2-2	VA25A9109-010	2025-04-23	M	-3.11	0.28	<10	<0.0050	47.3	13400	<1.0	<0.50	<0.10	1870	0.0075	<0.0010	0.00117	0.0083	<0.00050	<0.00050	2.62	0.000053	292	<0.00050	<0.00150
WQR2-2	VA25A9941-010	2025-05-01	M	-2.07	2.07	10	0.0092	20.7	6080	<1.0	<0.50	<0.10	868	0.0770	<0.0010	0.00057	0.0078	<0.00050	<0.00050	1.41	0.000028	134	<0.00050	<0.00150
WQR2-2	VA25B0496-010	2025-05-07	M	0.72	0.44	<10	0.0266	40.3	11800	<1.0	<0.50	<0.10	1580	0.0351	<0.0010	0.00112	0.0091	<0.00050	<0.00050	2.81	0.000044	286	<0.00050	<0.00150
WQR2-2	VA25B1530-010	2025-05-16	M	-0.29	2.08	<10	<0.0050	11.2	3310	<1.0	<0.50	<0.10	431	0.147	<0.0010	<0.00040	0.0086	<0.00050	<0.00050	0.85	0.000023	73.9	<0.00050	<0.00150
WQR2-2	VA25B1841-010	2025-05-21	M	-0.37	0.70	<10	0.0066	26.0	7780	<1.0	<0.50	<0.10	1020	0.0581	<0.0010	0.00075	0.0083	<0.00050	<0.00050	1.78	0.000037	189	<0.00050	<0.00150
WQR2-2m	L2755545-11	2024-04-30	M																					
WQR2-2m	VA24A9402-011	2024-04-30	M	1.30	0.84		0.0088	28.7	8880	<1.0	<0.50	<0.10	1170	0.0569	<0.0010	0.00186	0.0063	<0.00050	<0.00050	2.13	0.000041	214	<0.00050	<0.00150
WQR2-2m	L2755648-2	2024-05-08	M																					
WQR2-2m	VA24B0178-002	2024-05-08	M	1.50	2.32		<0.0050	12.2	3770	<1.0	<0.50	<0.10	498	0.120	<0.0010	0.00101	0.0081	<0.00050	<0.00050	0.90	<0.000020	80.2	<0.00050	<0.00150
WQR2-2m	L2755934-11	2024-05-24	M																					
WQR2-2m	VA24B1783-011	2024-05-24	M		3.84		<0.0050	8.6	2540	<1.0	<0.50	<0.10	310	0.176	<0.0010	0.00097	0.0095	<0.00050	<0.00050	0.78	0.000020	68.4	<0.00050	<0.00150
WQR2-2m	VA24B3452-011	2024-06-10	M	6.52	3.63		<0.0050	10.4	3340	<1.0	<0.50	<0.10	432	0.186	<0.0010	0.00096	0.0092	<0.00050	<0.00050	0.92	<0.000020	84.2	<0.00050	<0.00150
WQR2-2m	659-454600000-0	2024-06-17	M	3.61																				
WQR2-2m	VA24B5882-011	2024-07-03	M	24.40	18.4									0.490	<0.0010	<0.00040	0.0149	<0.00050	<0.00050	<0.30	<0.000020	12.9	<0.00050	
WQR2-2m	VA24B6465-005	2024-07-09	M	5.39	4.79		<0.0050	16.2	5180	<1.0	<0.50	<0.10	668	0.342	<0.0010	0.00147	0.0148	<0.00050	<0.00050	1.33	0.000022	117	<0.00050	<0.00150
WQR2-2m	VA24B7867-005	2024-07-20	M	12.68	8.45		<0.0050	<5.0	1010	<1.0	<0.50	<0.10	123	0.570	<0.0010	0.00050	0.0178	<0.00050	<0.00050	<0.30	<0.000020	23.6	<0.00050	<0.00150
WQR2-2m	L2757210-5	2024-08-26	M																					
WQR2-2m	VA24C2208-005	2024-08-26	M	9.85	10.8		0.0078	<5.0	1550	<1.0	<0.50	<0.10	187	0.472	<0.0010	<0.00040	0.0180	<0.00050	<0.00050	0.32	<0.000020	36.1	<0.00050	<0.00150
WQR2-2m	VA24C5557-002	2024-09-25	M	4.77	2.26		<0.0050	44.4	13400	<1.0	<0.50	<0.10	1830	0.0769	<0.0010	0.00569	0.0145	<0.00050	<0.00050	3.92	0.000059	330	<0.00050	
WQR2-2m	L2757680-5	2024-10-06	M																					
WQR2-2m	VA24C6685-005	2024-10-06	M	1.32	0.54		0.0061	44.7	13300	<2.00	<0.500	<0.100	1870	<0.150	<0.00500	<0.00500	0.0116	<0.00100	<0.00250	3.22	<0.000250	288	<0.0250	<0.00150
WQR2-2m	VA24C7408-005	2024-10-13	M	1.97	2.13		0.0095	37.2	10900	<1.0	<0.50	<0.10	1520	0.0830	<0.0010	0.00440	0.0133	<0.00050	<0.00050	2.35	0.000075	236	<0.00050	<0.00150
WQR2-2m	L2757872-5	2024-10-22	M																					
WQR2-2m	VA24C8330-005	2024-10-22	M		21.4		0.0090	9.5	2980	<1.0	<0.50	<0.10	374	0.976	<0.0010	0.00175	0.0296	<0.00050	<0.00050	0.72	0.000025	71.9	<0.00050	<0.00150
WQR2-2m	VA24C9185-006	2024-10-29	M	1.67	3.42		0.0151	29.9	8890	<1.0	<0.50	<0.10	1250	0.220	<0.0010	<0.00080	0.0102	<0.00050	<0.00050	0.97	0.000036	93.7	<0.00050	<0.00150

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2m	L2757962-6	2024-10-29	M																					
WQR2-2m	L2758003-2	2024-11-02	M																					
WQR2-2m	VA24C9732-002	2024-11-02	M	0.97	1.56		0.0193	21.9	6610	<1.0	<0.50	<0.10	795	0.0932	<0.0010	0.00072	0.0124	<0.00050	<0.00050	1.48	0.000039	161	<0.00050	<0.00150
WQR2-2m	L2758354-2	2024-12-06	M																					
WQR2-2m	VA24D3008-002	2024-12-06	M	1.37	0.77		0.0133	34.7	10100	<1.0	<0.50	<0.10	1400	0.0284	<0.0010	0.00111	0.0109	<0.00050	<0.00050	2.44	0.000054	228	<0.00050	<0.00150
WQR2-2m	L2758634-8	2025-01-09	M																					
WQR2-2m	VA25A0510-008	2025-01-09	M	1.14	0.65		0.0202	48.2	14700	<1.0	<0.50	<0.10	2040	0.0159	<0.0010	0.00132	0.0099	<0.00050	<0.00050	2.50	0.000074	291	<0.00050	<0.00150
WQR2-2m	L2759010-8	2025-02-18	M																					
WQR2-2m	VA25A3415-008	2025-02-18	M	0.68	0.48		<0.0050	50.7	15800	<1.0	<0.50	<0.10	2140	0.0129	<0.0010	0.00154	0.0100	<0.00050	<0.00050	3.08	0.000078	364	<0.00050	<0.00150
WQR2-2m	L2759209-8	2025-03-12	M																					
WQR2-2m	VA25A5429-008	2025-03-12	M	1.15	1.65		<0.0050	49.3	13500	1.1	<0.50	<0.10	1910	0.0238	<0.0010	0.00132	0.0070	<0.00050	<0.00050	3.75	0.000052	298	<0.00050	<0.00150
WQR2-2m	VA25A6528-017	2025-03-25	M	1.34	0.89																			
WQR2-2m	VA25A8147-005	2025-04-11	M	1.42	1.38		0.0068	17.6	5040	<1.0	<0.50	<0.10	628	0.0968	<0.0010	0.00054	0.0076	<0.00050	<0.00050	1.25	0.000024	112	<0.00050	<0.00150
WQR2-2m	VA25A8148-005	2025-04-11	M																					
WQR2-2m	VA25A8280-008	2025-04-13	M	1.39	0.95		0.0094	10.7	3010	<1.0	<0.50	<0.10	414	0.0744	<0.0010	<0.00040	0.0076	<0.00050	<0.00050	0.76	<0.000020	67.0	<0.00050	<0.00150
WQR2-2m	VA25A8282-008	2025-04-13	M																					
WQR2-2m	VA25A8854-008	2025-04-21	M	1.30	1.72		<0.0050	12.6	4620	<1.0	<0.50	<0.10	630	0.0903	<0.0010	0.00044	0.0080	<0.00050	<0.00050	1.09	0.000030	102	<0.00050	<0.00150
WQR2-2m	VA25A8855-008	2025-04-21	M																					
WQR2-2m	VA25B0359-011	2025-05-06	M	0.62	1.26		0.0194	23.6	7560	<1.0	<0.50	<0.10	998	0.0736	<0.0010	0.00069	0.0089	<0.00050	<0.00050	1.64	0.000035	164	<0.00050	<0.00150
WQR2-2m	VA25B0360-011	2025-05-06	M																					
WQR2-2m	VA25B0499-008	2025-05-07	M	2.17	0.92		0.0172	24.1	7250	<1.0	<0.50	<0.10	963	0.0643	<0.0010	0.00068	0.0087	<0.00050	<0.00050	1.30	0.000029	155	<0.00050	<0.00150
WQR2-2m	VA25B0502-008	2025-05-07	M																					
WQR2-3	23L2091-11	2023-12-15	M	0.78	1.03	<1.8	<0.050	<100	12200	0.845	0.316	<0.0050	1480	0.0500	<0.000500	0.00154	0.0110	<0.000100	<0.000100	3.33	0.0000561	274	<0.00100	
WQR2-3	L2754383-9	2024-01-25	M																					
WQR2-3	VA24A1507-011	2024-01-25	M	3.64	0.41	<10	<0.0050	51.3	15400	<1.0	<0.50	<0.10	2090	0.0255	<0.0010	0.00208	0.0089	<0.00050	<0.00050	3.82	0.000075	368	<0.00050	<0.00150
WQR2-3	L2754604-9	2024-02-14	M																					
WQR2-3	VA24A2995-011	2024-02-14	M	0.46	0.58	<10	0.0156	40.0	12300	<1.0	<0.50	<0.10	1610	0.0330	<0.0010	0.00122	0.0100	<0.00050	<0.00050	3.80	0.000063	258	<0.00050	<0.00150
WQR2-3	L2755043-11	2024-03-21	M																					
WQR2-3	VA24A6026-011	2024-03-21	M	1.63	1.68	<10	<0.0050	14.1	4120	<1.0	<0.50	<0.10	491	0.0889	<0.0010	0.00081	0.0090	<0.00050	<0.00050	1.02	0.000021	101	<0.00050	<0.00150
WQR2-3	L2755490-9	2024-04-24	M																					
WQR2-3	VA24A8916-011	2024-04-24	M	1.14	1.31	<10	0.0092	17.2	5130	<1.0	<0.50	<0.10	685	0.0560	<0.0010	0.00070	0.0089	<0.00050	<0.00050	1.16	0.000024	116	<0.00050	<0.00150
WQR2-3	L2755567-9	2024-05-01	M																					
WQR2-3	VA24A9566-011	2024-05-01	M	0.65	0.86	<10	0.0081	11.8	3670	<1.0	<0.50	<0.10	493	0.0738	<0.0010	0.00092	0.0073	<0.00050	<0.00050	0.96	<0.000020	86.7	<0.00050	<0.00150
WQR2-3	L2755666-9	2024-05-08	M																					
WQR2-3	VA24B0201-011	2024-05-08	M	1.44	1.67	<10	0.0051	20.3	6080	<1.0	<0.50	<0.10	785	0.0978	<0.0010	0.00163	0.0081	<0.00050	<0.00050	1.31	0.000024	130	<0.00050	<0.00150
WQR2-3	L2755779-9	2024-05-15	M																					
WQR2-3	VA24B0901-011	2024-05-15	M	5.96	8.73	10	0.0072	<5.0	1590	<1.0	<0.50	<0.10	165	0.375	<0.0010	0.00102	0.0123	<0.00050	<0.00050	0.46	<0.000020	38.1	<0.00050	<0.00150
WQR2-3	L2755888-9	2024-05-22	M																					
WQR2-3	VA24B1500-011	2024-05-22	M	4.22	4.33	20	0.0089	19.4	5440	<1.0	<0.50	<0.10	754	0.211	<0.0010	0.00082	0.0102	<0.00050	<0.00050	0.84	<0.000020	57.7	<0.00050	<0.00150
WQR2-3	L2756312-9	2024-06-19	M																					
WQR2-3	VA24B4510-011	2024-06-19	M	8.60	6.23	20	<0.0050	8.9	2870	<1.0	<0.50	<0.10	364	0.357	<0.0010	0.00157	0.0124	<0.00050	<0.00050	0.30	<0.000020	38.2	<0.00050	<0.00150
WQR2-3	VA24B7397-011	2024-07-17	M	15.69	10.2	10	<0.0050	<5.0	1610	<1.0	<0.50	<0.10	207	0.631	<0.0010	0.00061	0.0169	<0.00050	<0.00050	0.39	<0.000020	37.1	<0.00050	<0.00150
WQR2-3	L2756689-9	2024-07-17	M																					
WQR2-3	L2757122-9	2024-08-21	M																					
WQR2-3	VA24C1337-011	2024-08-21	M	8.50	5.35	41	<0.0050	9.7	2910	<1.0	<0.50	<0.10	388	0.271	<0.0010	0.00074	0.0168	<0.00050	<0.00050	0.68	<0.000020	64.2	<0.00050	<0.00150
WQR2-3	VA24C4683-011	2024-09-18	M	10.66	6.36	30	0.0143	11.2	3370	<1.0	<0.50	<0.10	450	0.282	<0.0010	0.00107	0.0157	<0.00050	<0.00050	0.77	<0.000020	80.9	<0.00050	<0.00150
WQR2-3	VA24C8569-011	2024-10-23	M	5.94	13.4	31	0.0114	12.0	3650	<1.0	<0.50	<0.10	472	0.462	<0.0010	0.00171	0.0205	<0.00050	<0.00050	0.73	<0.000020	75.7	<0.00050	<0.00150
WQR2-3	VA24C9414-011	2024-10-30	M	3.66	4.16	10	0.0130	10.5	3010	<1.0	<0.50	<0.10	402	0.215	<0.0010	0.00044	0.0106	<0.00050	<0.00050	0.73	<0.000020	71.6	<0.00050	<0.00150
WQR2-3	L2757977-11	2024-10-30	M																					
WQR2-3	VA24D0180-011	2024-11-06	M	1.53	1.33	<10	0.0197	22.0	6480	<1.0	<0.50	<0.10	884	0.0791	<0.0010	0.00076	0.0114	<0.00050	<0.00050	1.40	0.000039	145	<0.00050	<0.00150
WQR2-3	L2758221-9	2024-11-22	M																					
WQR2-3	VA24D1791-011	2024-11-22	M	-2.31	0.76	<10	0.0086	36.7	12000	<1.0	<0.50	<0.10	1680	0.0364	<0.0010	0.00115	0.0119	<0.00050	<0.00050	3.66	0.000053	306	<0.00050	<0.00150
WQR2-3	L2758486-9	2024-12-18	M																					
WQR2-3	VA24D3937-011	2024-12-18	M	0.03	0.56	<10	<0.0050	33.2	10000	<1.0	<0.50	<0.10	1370	0.0484	<0.0010	0.00081	0.0072	<0.00050	<0.00050	1.96	0.000032	164	<0.00050	<0.00150
WQR2-3	L2758770-9	2025-01-22	M																					
WQR2-3	VA25A1525-011	2025-01-22	M	-2.68	0.70	<10	<0.0050	49.6	14200	<1.0	<0.50	<0.10	1990	0.0265	<0.0010	0.00133	0.0096	<0.00050	<0.00050	2.98	0.000072	304	<0.00050	<0.00150
WQR2-3	L2759008-9	2025-02-19	M																					

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Turbidity-Field	Turbidity-Lab	E.coli	Total Ammonia (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulphate	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	Total Hexavalent Chromium
				NTU	NTU	MPN/100 ml	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-3	VA25A3570-011	2025-02-19	M	-2.83	0.97	<10	0.0090	42.6	12800	<1.0	<0.50	<0.10	1720	0.0143	<0.0010	0.00128	0.0108	<0.00050	<0.00050	2.90	0.000062	299	<0.00050	<0.00150
WQR2-3	VA25A6679-011	2025-03-26	M	0.62	1.18	<10	0.0144	24.4	7390	<1.0	<0.50	<0.10	989	0.0460	<0.0010	0.00075	0.0077	<0.00050	<0.00050	2.11	0.000041	180	<0.00050	<0.00150
WQR2-3	VA25A9109-011	2025-04-23	M	-2.51	0.89	<10	<0.0050	10.8	3340	<1.0	<0.50	<0.10	470	0.0616	<0.0010	<0.00040	0.0077	<0.00050	<0.00050	0.75	<0.000020	74.1	<0.00050	<0.00150
WQR2-3	VA25A9941-011	2025-05-01	M	-0.88	1.95	<10	<0.0050	9.0	2740	<1.0	<0.50	<0.10	390	0.117	<0.0010	<0.00040	0.0072	<0.00050	<0.00050	0.71	<0.000020	66.2	<0.00050	<0.00150
WQR2-3	VA25B0496-011	2025-05-07	M	2.49	1.73	10	0.0135	12.7	3690	<1.0	<0.50	<0.10	491	0.114	<0.0010	0.00048	0.0089	<0.00050	<0.00050	1.02	<0.000020	92.4	<0.00050	<0.00150
WQR2-3	VA25B1530-011	2025-05-16	M	1.89	3.14	10	0.0053	<5.0	1460	<1.0	<0.50	<0.10	182	0.232	<0.0010	<0.00040	0.0088	<0.00050	<0.00050	0.40	<0.000020	33.8	<0.00050	<0.00150
WQR2-3	VA25B1841-011	2025-05-21	M	2.59	2.74	<10	0.0056	<5.0	870	<1.0	<0.50	<0.10	93	0.153	<0.0010	<0.00040	0.0077	<0.00050	<0.00050	<0.30	<0.000020	21.8	<0.00050	<0.00150
WQR2-SF	L2755545-12	2024-04-30	M																					
WQR2-SF	VA24A9402-012	2024-04-30	M	0.30	0.42		0.0341	52.3	15800	<1.0	<0.50	<0.10	2160	0.0113	<0.0010	0.00351	0.0097	<0.00050	<0.00050	3.88	0.000085	362	<0.00050	<0.00150
WQR2-SF	L2755648-3	2024-05-08	M																					
WQR2-SF	VA24B0178-003	2024-05-08	M	0.00	0.13		0.0348	60.4	17200	<1.0	<0.50	<0.10	2370	0.0066	<0.0010	0.00324	0.0102	<0.00050	<0.00050	3.89	0.000078	384	<0.00050	<0.00150
WQR2-SF	L2755934-12	2024-05-24	M																					
WQR2-SF	VA24B1783-012	2024-05-24	M		0.22		0.0254	51.4	14900	<1.0	<0.50	<0.10	2060	0.0172	<0.0010	0.00321	0.0070	<0.00050	<0.00050	3.62	0.000060	332	<0.00050	<0.00150
WQR2-SF	VA24B3452-012	2024-06-10	M	0.40	0.96		0.0127	42.8	12600	<1.0	<0.50	<0.10	1740	0.0480	<0.0010	0.00269	0.0073	<0.00050	<0.00050	3.18	0.000052	301	<0.00050	<0.00150
WQR2-SF	660-454600000-0	2024-06-17	M	0.23																				
WQR2-SF	VA24B5882-012	2024-07-03	M	2.37	1.47									0.0223	<0.0010	0.00304	0.0075	<0.00050	<0.00050	2.77	0.000050	305	<0.00050	
WQR2-SF	VA24B6465-006	2024-07-09	M	0.77	1.04		<0.0050	50.7	14800	<1.0	<0.50	<0.10	2010	0.0717	<0.0010	0.00349	0.0120	<0.00050	<0.00050	3.74	0.000067	348	<0.00050	<0.00150
WQR2-SF	VA24B7867-006	2024-07-20	M	0.18	3.22		0.0078	30.6	9210	<1.0	<0.50	<0.10	1260	0.0392	<0.0010	0.00359	0.0122	<0.00050	<0.00050	3.28	0.000066	354	<0.00050	<0.00150
WQR2-SF	L2757210-6	2024-08-26	M																					
WQR2-SF	VA24C2208-006	2024-08-26	M	3.42	0.84		<0.0050	50.4	15100	<1.0	<0.50	<0.10	2100	0.0329	<0.0010	0.00362	0.0125	<0.00050	<0.00050	3.54	0.000071	358	<0.00050	<0.00150
WQR2-SF	VA24C5557-003	2024-09-25	M	2.64	0.97		<0.0050	51.0	15300	<1.0	<0.50	<0.10	2070	0.0280	<0.0010	0.00606	0.0125	<0.00050	<0.00050	4.06	0.000086	381	<0.00050	
WQR2-SF	L2757680-6	2024-10-06	M																					
WQR2-SF	VA24C6685-006	2024-10-06	M	1.07	0.22		<0.0050	56.2	16800	<2.00	<0.500	<0.100	2360	<0.150	<0.00500	<0.00500	0.0129	<0.00100	<0.00250	4.20	<0.000250	359	<0.0250	<0.00150
WQR2-SF	VA24C7408-006	2024-10-13	M	1.52	0.46		<0.0050	55.5	16400	<1.0	<0.50	<0.10	2300	0.0191	<0.0010	0.00612	0.0107	<0.00050	<0.00050	3.50	0.000084	361	<0.00050	<0.00150
WQR2-SF	L2757872-6	2024-10-22	M																					
WQR2-SF	VA24C8330-006	2024-10-22	M		4.98		0.0081	45.9	13400	<1.0	<0.50	<0.10	1810	0.208	<0.0010	0.00544	0.0168	<0.00050	<0.00050	3.32	0.000089	327	<0.00050	<0.00150
WQR2-SF	VA24C9185-007	2024-10-29	M	0.56	0.99		0.0160	45.1	13200	<1.0	<0.50	<0.10	1880	0.0468	<0.0010	<0.00120	0.0116	<0.00050	<0.00050	2.87	0.000072	284	<0.00050	<0.00150
WQR2-SF	L2757962-7	2024-10-29	M																					
WQR2-SF	L2758003-3	2024-11-02	M																					
WQR2-SF	VA24C9732-003	2024-11-02	M	0.52	0.77		0.0099	36.1	10700	<1.0	<0.50	<0.10	1380	0.0463	<0.0010	0.00120	0.0115	<0.00050	<0.00050	2.73	0.000061	313	<0.00050	<0.00150
WQR2-SF	L2758354-3	2024-12-06	M																					
WQR2-SF	VA24D3008-003	2024-12-06	M	1.43	0.32		<0.0050	55.3	16200	<1.0	<0.50	<0.10	2230	0.0144	<0.0010	0.00159	0.0100	<0.00050	<0.00050	3.63	0.000086	375	<0.00050	<0.00150
WQR2-SF	L2758634-9	2025-01-09	M																					
WQR2-SF	VA25A0510-009	2025-01-09	M	1.11	0.38		<0.0050	53.2	16100	<1.0	<0.50	<0.10	2220	0.0181	<0.0010	0.00140	0.0094	<0.00050	<0.00050	2.86	0.000082	359	0.00070	<0.00150
WQR2-SF	L2759010-9	2025-02-18	M																					
WQR2-SF	VA25A3415-009	2025-02-18	M	0.64	0.45		<0.0050	53.2	16200	<1.0	<0.50	<0.10	2230	0.0163	<0.0010	0.00166	0.0098	<0.00050	<0.00050	3.14	0.000084	381	<0.00050	<0.00150
WQR2-SF	L2759209-9	2025-03-12	M																					
WQR2-SF	VA25A5429-009	2025-03-12	M	0.65	0.63		0.0386	60.2	16200	1.2	0.57	<0.10	2290	0.0086	<0.0010	0.00152	0.0102	<0.00050	<0.00050	4.40	0.000076	354	<0.00050	<0.00150
WQR2-SF	VA25A6528-018	2025-03-25	M	0.82	0.30																			
WQR2-SF	VA25A8147-006	2025-04-11	M	1.00	0.78		0.0073	50.8	14000	<1.0	<0.50	<0.10	1870	0.0268	<0.0010	0.00116	0.0078	<0.00050	<0.00050	2.93	0.000059	291	<0.00050	<0.00150
WQR2-SF	VA25A8148-006	2025-04-11	M																					
WQR2-SF	VA25A8280-009	2025-04-13	M	0.60	0.25		0.0218	57.6	16100	<1.0	<0.50	<0.10	2280	0.0054	<0.0010	0.00156	0.0093	<0.00050	<0.00050	3.11	0.000075	352	<0.00050	<0.00150
WQR2-SF	VA25A8282-009	2025-04-13	M																					
WQR2-SF	VA25A8854-009	2025-04-21	M	1.52	0.89		0.0232	47.4	16000	<1.0	<0.50	<0.10	2260	0.0106	<0.0010	0.00151	0.0092	<0.00050	<0.00050	3.71	0.000079	354	<0.00050	<0.00150
WQR2-SF	VA25A8855-009	2025-04-21	M																					
WQR2-SF	VA25B0359-010	2025-05-06	M	0.53	0.35		0.0361	56.9	16100	<1.0	<0.50	<0.10	2280	0.0074	<0.0010	0.00170	0.0089	<0.00050	<0.00050	2.89	0.000083	366	<0.00050	<0.00150
WQR2-SF	VA25B0360-010	2025-05-06	M																					
WQR2-SF	VA25B0499-009	2025-05-07	M	0.21	0.12		0.0470	53.6	15800	<1.0	<0.50	<0.10	2180	0.0051	<0.0010	0.00147	0.0092	<0.00050	<0.00050	2.52	0.000068	348	<0.00050	<0.00150
WQR2-SF	VA25B0502-009	2025-05-07	M																					

Notes:
Sample Class 'M' = monitoring sample.
'<' = result is below the indicated detection limit.

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	0051710-01	2020-05-20	M		<0.00020	0.00171	0.021	0.00203	0.16	1060	0.00234	<0.000010		0.0101	0.00136	<0.100	360	<0.00100	<2.0	<0.000100	8780	7.16	859	<0.000040	<0.00040
WQ1-1	0062209-01	2020-06-22	M		<0.00020	0.00159	0.039	0.00074	0.173	1190	0.00314	<0.000010		0.0103	<0.00080	<0.100	348	<0.00100	<2.0	0.000114	9110	7.3	899	<0.000040	<0.00040
WQ1-1	0071996-01	2020-07-21	M		<0.00020	<0.00080	0.028	<0.00040	0.157	1130	0.00396	<0.000010		0.00968	<0.00080	<0.100	315	<0.00100	2	<0.000100	9180	7.09	873	<0.000040	<0.00040
WQ1-1	0082292-01	2020-08-24	M		<0.00020	0.00091	0.056	<0.00040	0.158	1170	0.00489	<0.000010		0.0103	<0.00080	0.108	348	<0.00100	<2.0	<0.000100	10300	7.25	914	<0.000040	<0.00040
WQ1-1	0093017-01	2020-09-28	M		<0.00020	<0.00080	0.049	<0.00040	0.155	981	0.0109	<0.000010		0.0103	0.00164	0.133	318	<0.00100	<2.0	<0.000100	8680	6.96	845	<0.000040	<0.00040
WQ1-1	20J1961-01	2020-10-20	M		<0.00020	0.0015	0.042	<0.00040	0.169	1250	0.0118	<0.000010		0.0108	<0.00080	0.144	353	<0.00100	<2.0	<0.000100	8450	7.61	1060	<0.000040	<0.00040
WQ1-1	20J2778-01	2020-10-27	M		<0.00020	<0.00080	0.022	0.00043	0.142	1090	0.00704	<0.000010		0.0107	<0.00080	0.125	317	<0.00100	<2.0	<0.000100	8600	7.25	915	<0.000040	<0.00040
WQ1-1	20K0360-01	2020-11-03	M		<0.00020	0.00425	0.036	0.00322	0.15	1010	0.0131	<0.000010		0.00947	0.0012	0.126	312	<0.00100	<2.0	<0.000100	8530	6.63	882	<0.000040	<0.00040
WQ1-1	20K1261-01	2020-11-10	M		<0.00020	0.00088	0.026	<0.00040	0.181	1120	0.01	<0.000010		0.0111	<0.00080	0.125	354	<0.00100	<2.0	<0.000100	7270	7.74	960	<0.000040	<0.00040
WQ1-1	20K2100-01	2020-11-18	M		<0.00020	<0.00080	<0.020	<0.00040	0.172	1200	0.00774	<0.000010		0.00948	0.0008	0.111	352	<0.00100	2.2	<0.000100	9630	7.6	985	<0.000040	<0.00040
WQ1-1	20L1589-01	2020-12-14	M		<0.00020	0.00083	0.054	<0.00040	0.158	1270	0.00687	<0.000010		0.0118	<0.00080	0.177	397	<0.00100	<2.0	<0.000100	10200	8.31	1150	<0.000040	<0.00040
WQ1-1	21A2590-01	2021-01-27	M		<0.00020	0.00504	0.021	0.00087	0.147	1120	0.00297	<0.000010		0.0106	<0.00080	0.126	347	<0.00100	2.9	<0.000100	9420	7.21	871	<0.000040	<0.00040
WQ1-1	21B2778-01	2021-02-25	M		<0.00020	<0.00080	0.021	<0.00040	0.204	1220	0.00264	<0.000010		0.0109	<0.00080	0.207	391	<0.00100	3	<0.000100	9870	7.87	1020	<0.000040	<0.00040
WQ1-1	21C3505-01	2021-03-25	M		<0.0000500	<0.00100	0.0278	<0.000500	0.197	1190	0.00271	<0.000010	<0.000000050	0.0105	<0.00300	<0.1	353	<0.00100	4.26	<0.000100	9510	7.76	944	<0.0000400	<0.000500
WQ1-1	21D2478-01	2021-04-22	M		<0.0000500	<0.00100	0.0203	<0.000500	0.185	1310	0.00201	<0.000010		0.012	0.000667	0.13	419	<0.00100	2.58	<0.000100	10200	7.53	1040	<0.0000400	<0.000500
WQ1-1	21E1990-01	2021-05-18	M		<0.00020	<0.00080	<0.020	<0.00040	0.221	1210	0.00203	<0.000010		0.0111	<0.00080	<0.100	382	<0.00100	<2.0	<0.000100	10700	7.38	920	<0.000040	<0.00040
WQ1-1	21E2917-01	2021-05-26	M		0.0000606	<0.00100	0.0507	<0.000500	0.14	989	0.00374	<0.000010	<0.000000024	0.00847	0.000935	0.128	303	<0.00100	1.65	<0.000100	7630	5.68	706	<0.0000400	<0.000500
WQ1-1	21F0167-01	2021-06-01	M		0.0000555	<0.00100	0.0555	<0.000500	0.102	749	0.00371	0.000011	<0.000000024	0.00724	0.000606	<0.1	232	<0.00100	2.03	<0.000100	6000	4.34	510	<0.0000400	<0.000500
WQ1-1	21F1056-01	2021-06-08	M		<0.0000500	<0.00100	0.0244	<0.000500	0.221	1390	0.00314	<0.0000050	<0.000000023	0.011	0.000916	0.135	395	<0.00100	2.67	<0.000100	9640	7.26	956	<0.0000400	<0.000500
WQ1-1	21F2014-01	2021-06-15	M		<0.0000500	<0.00100	0.0333	<0.000500	0.161	1160	0.00345	<0.000010	<0.000000023	0.0107	0.000444	0.114	347	0.00143	1.47	<0.000100	9360	6.92	894	0.0000961	<0.000500
WQ1-1	21G2414-01	2021-07-20	M		0.0000528	<0.00100	0.0394	0.00845	0.159	1150	0.00408	<0.000010	<0.000000025	0.0113	0.000558	<0.1	335	<0.00100	<0.5	<0.000100	9210	6.6	838	<0.0000400	<0.000500
WQ1-1	21H3040-01	2021-08-25	M		<0.0000500	0.00255	0.0293	0.00569	0.162	1100	0.00368	<0.000010	<0.000000050	0.0102	0.000216	<0.1	341	<0.00100	9.9	<0.000100	9540	6.96	875	<0.0000400	<0.000500
WQ1-1	21I3814-01	2021-09-28	M		0.0000641	<0.00100	0.0308	<0.000500	0.146	1110	0.00638	<0.000010	<0.000000024	0.0106	0.000494	0.102	333	<0.00100	1.66	<0.000100	8530	6.29	812	<0.0000400	<0.000500
WQ1-1	21J3514-01	2021-10-26	M		<0.00005	<0.00040	0.028	<0.00020	0.143	1130	0.00698	<0.000010	0.000000063	0.00913	<0.00040	0.08	277	<0.00050	1.5	<0.000050	8840	5.38	0.7	<0.000020	0.00006
WQ1-1	21K3046-01	2021-11-23	M		<0.00020	0.00082	0.02	<0.00040	0.161	1180	0.00506	<0.000010	0.000000033	0.0105	<0.00080	0.112	347	<0.00100	2.1	<0.000100	8630	6.52	847	<0.000040	<0.00040
WQ1-1	21L2125-01	2021-12-14	M		<0.00020	0.00101	0.144	<0.00040	0.0757	519	0.0136	<0.000010	<0.000000023	0.00469	0.0011	<0.100	156	<0.00100	4.1	<0.000100	4300	3.16	383	<0.000040	<0.00040
WQ1-1	22A2312-01	2022-01-20	M		<0.00020	0.00084	0.024	<0.00040	0.172	1080	0.00413	<0.000010	<0.000000024	0.0099	<0.00080	0.129	329	<0.00100	2.3	<0.000100	8980	6.47	839	<0.000040	<0.00040
WQ1-1	22B2487-01	2022-02-17	M		<0.00020	<0.00080	0.036	<0.00040	0.162	1180	0.00348	<0.000010		0.0102	<0.00080	0.118	340	0.00147	2.2	<0.000100	9090	6.2	812	<0.000040	<0.00040
WQ1-1	22C3145-01	2022-03-22	M		<0.00020	<0.00080	0.035	<0.00040	0.16	1230	0.00328	<0.000010		0.0104	<0.00080	0.108	360	0.00125	<2.0	<0.000100	9320	6.63	828	<0.000040	<0.00040
WQ1-1	22D2212-01	2022-04-19	M		<0.00020	0.00163	0.024	0.00054	0.18	1280	0.00228	<0.000010		0.0103	<0.00080	0.137	384	<0.00100	<2.0	<0.000100	10300	7.1	893	0.000264	<0.00040
WQ1-1	22E2480-03	2022-05-17	M		<0.00100	<0.00400	<0.100	<0.00200	0.143	1140	<0.00200	<0.000010	<0.000000024	0.00997	<0.00400	<0.500	371	<0.00500	<10.0	<0.000500	9230	7.57	896	<0.000200	<0.00200
WQ1-1	22F3212-01	2022-06-21	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.151	1050	0.00468	<0.000010		0.00971	<0.000400	<0.1	337	<0.00100	1.32	<0.000100	8520	6.92	903	<0.0000400	<0.000500
WQ1-1	22G1763-01	2022-07-13	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.129	1150	0.00368	<0.000010		0.00997	<0.000400	<0.1	340	<0.00100	1.43	<0.000100	9530	7.06	859	<0.0000400	<0.000500
WQ1-1	22H2453-01	2022-08-16	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.145	996	0.00470	<0.000010	<0.000000028	0.00922	<0.000400	<0.100	334	<0.00100	1.32	<0.000100	8400	6.74	826	<0.0000400	<0.000500
WQ1-1	22I1926-01	2022-09-14	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.132	1020	0.00317	<0.000010		0.00892	0.000453	<0.100	321	<0.00100	1.07	<0.000100	8790	5.70	761	<0.0000400	<0.000500
WQ1-1	22J1560-03	2022-10-12	M		<0.0000500	<0.00200	0.0222	<0.000500	0.173	1120	0.00346	<0.000010		0.00940	0.000632	0.117	314	<0.00100	1.36	<0.000100	9040	6.42	830	<0.0000400	<0.000500
WQ1-1	22K1453-01	2022-11-10	M		0.000136	<0.00200	0.0302	0.00116	0.159	1270	0.0191	<0.000010	<0.000000050	0.0101	0.000708	0.114	372	<0.00100	2.1	<0.000100	10000	6.99	921	<0.0000400	<0.000500
WQ1-1	22L0774-01	2022-12-07	M		0.0000752	<0.00200	0.0293	<0.000500	0.156	1260	0.0438	<0.000010		0.0106	<0.000400	<0.1	356	<0.00100	1.95	<0.000100	9420	6.98	859	<0.0000400	<0.000500
WQ1-1	23A2847-01	2023-01-27	M		0.0000836	<0.00200	<0.0200	<0.000500	0.152	1110	0.00866	<0.000010	<0.000000060	0.00972	0.000523	<0.12	354	<0.00100	1.91	<0.000100	9420	6.74	875	<0.0000400	<0.000500
WQ1-1	23C0060-01	2023-02-28	M		<0.0000500	<0.00200	0.0230	<0.000500	0.13	1190	0.00397	<0.000010		0.00938	<0.000400	<0.1	373	<0.00100	1.84	<0.000100	9560	6.88	936	<0.0000400	<0.000500
WQ1-1	23C1797-01	2023-03-15	M		<0.0000500	<0.00200	0.0310	<0.000500	0.154	1070	0.00353	<0.000010		0.00943	<0.000400	<0.1	335	<0.00100	1.64	<0.000100	11100	6.22	823	<0.0000400	<0.000500
WQ1-1	23D2945-01	2023-04-26	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.145	1080	0.00272	<0.000010		0.0101	<0.000400	<0.1	373	<0.00100	1.5	<0.000100	8240	6.6	790	<0.0000400	<0.000500
WQ1-1	23E2392-01	2023-05-17	M		<0.0000500	<0.00200	0.0269	<0.000500	0.127	1180	0.00228	<0.000010	<0.000000050	0.00978	0.000578	<0.1	387	<0.00100	1.48	<0.000100	10000	7.29	921	<0.0000400	<0.000500
WQ1-1	23F3614-01	2023-06-27	M		<0.0000500	<0.00200	0.0379	<0.000500	0.158	1170	0.00344	<0.000010		0.0102	<0.000400	<0.1	357	<0.00100	1.42	<0.000100	9930	7.11	925	<0.0000400	<0.000500
WQ1-1	23G2415-01	2023-07-19	M		<0.0000500	<0.00200	0.0291	<0.000500	0.161	1100	0.00294	<0.000010		0.00984	<0.000400	<0.1	344	<0.00100	1.46	<0.000100	9020	6.88	868	<0.0000400	<0.000500
WQ1-1	23H3309-03	2023-08-24	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.152	1130	0.00275	<0.000010	<0.000000050	0.0101	<0.000400	<0.1	362	<0.00100	1.28	<0.000100	9250	7.09	878	<0.0000400	<0.000500
WQ1-1	23I2271-03	2023-09-19	M		<0.0000500	<0.00200	0.0462	<0.000500	0.152	1170	0.00479	<0.000010		0.00994	<0.000400	0.101	381	<0.00100	1.49	<0.000100	9440	6.58	934	<0.0000400	<0.000500
WQ1-1	23J2236-03	2023-10-18	M		0.0000567	<0.00200	0.0343	0.00227	0.157	937	0.00489	<0.000010		0.00983	0.000457	<0.1	367	<0.00100	1.29	0.000118	7870	6.57	759	<0.0000400	<0.000500
WQ1-1	23K1909-01	2023-11-15	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.16	1190	0.00537	<0.000010	<0.000000050	0.0102	0.000631	0.108	350	<0.00100	1.86	<0.000100	9850	7.44	970	<0.0000400	<0.000500
WQ1-1	23L1905-04	2023-12-14	M		0.00147	0.00841	3.84	0.00464	0.131	1190	0.0793	<0.000010		0.0107	0.00209	0.232	370	0.00106	6.21	<0.000100	9760	7.47	949	0.0000464	0.000890
WQ1-1	L2754366-7	2024-01-24	M																						
WQ1-1	VA24A1422-007	2024-01-24	M	<0.00179	0.000098	<0.00050	0.027	<0.00010	0.166	1180	0.00282	<0.0000050	<0.000000020	0.0102	<0.00050	0.087	362	0.00052	1.9	<0.00010	10000	6.94	796	<0.000050	<0.0010
WQ1-1	L2754594-4	2024-02-13	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	VA24A2858-004	2024-02-13	M	<0.00050	0.000139	0.00066	0.106	<0.00010	0.088	657	0.0116	<0.0000050	<0.000000020	0.00606	<0.00050	0.062	181	<0.00050	2.8	<0.00010	5130	4.03	481	<0.000050	<0.0010
WQ1-1	L2755033-4	2024-03-20	M																						
WQ1-1	VA24A5955-004	2024-03-20	M	<0.00050	0.000057	<0.00050	0.028	<0.00010	0.152	1130	0.00448	<0.0000050	<0.000000020	0.0103	<0.00050	0.093	357	<0.00050	1.9	<0.00010	10700	6.95	854	<0.000050	<0.0010
WQ1-1	L2755461-4	2024-04-23	M																						
WQ1-1	VA24A8736-004	2024-04-23	M	<0.00050	0.000063	<0.00050	0.016	<0.00010	0.194	1280	0.00186	<0.0000050	<0.000000040	0.0102	<0.00050	0.111	379	<0.00050	1.7	<0.00010	9320	6.93	898	<0.000050	<0.0010
WQ1-1	L2755553-4	2024-04-30	M																						
WQ1-1	VA24A9418-004	2024-04-30	M	<0.00050	0.000057	<0.00050	0.012	<0.00010	0.146	1240	0.00175	<0.0000050	<0.000000080	0.00891	<0.00050	0.099	353	<0.00050	1.9	<0.00010	9410	6.18	829	<0.000050	<0.0010
WQ1-1	L2755641-4	2024-05-07	M																						
WQ1-1	VA24B0040-004	2024-05-07	M	<0.00050	0.000297	<0.00050	0.022	<0.00010	0.175	1070	0.00186	<0.0000050	<0.000000080	0.0106	0.00055	0.095	357	0.00075	1.9	<0.00010	9840	7.34	834	<0.000050	<0.0010
WQ1-1	L2755769-4	2024-05-14	M																						
WQ1-1	VA24B0738-004	2024-05-14	M	<0.00050	0.000075	<0.00050	0.016	<0.00010	0.154	1060	0.00139	<0.0000050	<0.000000020	0.00935	0.00051	0.097	350	<0.00050	1.5	<0.00010	9200	6.18	755	<0.000050	<0.0010
WQ1-1	L2755874-4	2024-05-21	M																						
WQ1-1	VA24B1351-004	2024-05-21	M	<0.00050	0.000094	0.00061	0.032	<0.00010	0.164	1150	0.00285	<0.0000050	<0.000000020	0.00977	<0.00050	0.094	341	0.00448	1.5	<0.00010	8800	6.89	842	<0.000050	<0.0010
WQ1-1	L2756277-4	2024-06-18	M																						
WQ1-1	VA24B4257-004	2024-06-18	M	<0.00050	0.000065	<0.00050	0.021	<0.00010	0.152	1290	0.00399	<0.0000050	<0.000000020	0.00859	<0.00050	0.102	366	<0.00050	1.6	<0.00010	9830	5.90	912	<0.000050	<0.0010
WQ1-1	L2756678-4	2024-07-16	M																						
WQ1-1	VA24B7237-004	2024-07-16	M	<0.00050	0.000063	0.00054	0.026	0.00015	0.139	1240	0.00229	<0.0000050	<0.000000040	0.00966	<0.00050	0.102	385	<0.00050	1.6	<0.00010	9680	6.68	860	<0.000050	<0.0010
WQ1-1	L2757095-4	2024-08-20	M																						
WQ1-1	VA24C1101-004	2024-08-20	M	<0.00050	0.000076	0.00055	0.018	<0.00010	0.174	1180	0.00398	<0.0000050	0.000000088	0.0101	<0.00050	0.102	364	<0.00050	1.9	<0.00010	9950	6.81	823	<0.000050	<0.0010
WQ1-1	VA24C4483-004	2024-09-17	M	<0.00050	0.000118	0.00059	0.059	0.00013	0.138	1270	0.00455	<0.0000050	<0.000000020	0.00921	<0.00050	0.096	361	<0.00050	1.4	<0.00010	9300	6.48	860	<0.000050	<0.0010
WQ1-1	VA24C8360-004	2024-10-22	M	<0.00050	0.000093	0.00058	0.034	<0.00010	0.135	1220	0.00585	<0.0000050	<0.000000020	0.00876	<0.00050	0.088	358	0.00308	1.3	<0.00010	9130	6.21	759	<0.000050	<0.0010
WQ1-1	VA24C9197-004	2024-10-29	M	<0.00050	0.000258	<0.00050	0.017	<0.00010	0.144	1070	0.00525	<0.0000050	<0.000000020	0.00973	<0.00050	0.099	357	0.00480	1.6	<0.00010	7120	6.62	815	<0.000050	<0.0010
WQ1-1	VA24D0009-004	2024-11-05	M		0.000235	<0.00050	0.023	<0.00010	0.132	1130	0.00961	<0.0000050	<0.000000020	0.00901	<0.00050	0.090	342	<0.00050	1.5	<0.00010	8600	6.41	816	<0.000050	<0.0010
WQ1-1	VA24D0813-011	2024-11-13	M	<0.00050	0.000236	0.00074	0.023	<0.00010	0.148	1210	0.00972	<0.0000050	<0.000000080	0.00914	<0.00050	0.101	364	0.00429	1.6	<0.00010	9360	6.54	860	<0.000050	<0.0010
WQ1-1	VA24D1720-004	2024-11-21	M	<0.00050	0.000332	0.00062	0.032	<0.00010	0.183	1320	0.0107	<0.0000050	<0.000000200	0.0104	0.00059	0.102	385	<0.00100	2.0	<0.00010	10300	6.92	940	<0.000050	<0.0010
WQ1-1	L2758465-4	2024-12-17	M																						
WQ1-1	VA24D3769-004	2024-12-17	M	<0.00050	0.000100	<0.00050	0.027	<0.00010	0.149	928	0.00463	<0.0000050	0.000000022	0.0106	<0.00050	0.090	319	<0.00050	1.4	<0.00010	7300	7.12	794	<0.000050	<0.0010
WQ1-1	L2758719-4	2025-01-21	M																						
WQ1-1	VA25A1408-004	2025-01-21	M	<0.00050	0.000070	<0.00050	0.026	<0.00010	0.128	1280	0.00290	<0.0000050	<0.000000020	0.00849	<0.00050	0.116	387	<0.00050	1.8	<0.00010	9580	6.19	866	<0.000050	<0.0010
WQ1-1	L2758994-4	2025-02-18	M																						
WQ1-1	VA25A3430-004	2025-02-18	M	<0.00050	0.000061	<0.00050	0.024	<0.00010	0.173	1220	0.00271	<0.0000050	<0.000000020	0.00827	<0.00050	0.087	372	<0.00050	2.5	<0.00010	10200	5.95	735	<0.000050	<0.0010
WQ1-1	VA25A6550-004	2025-03-25	M	<0.00050	0.000057	<0.00050	0.026	<0.00010	0.155	1430	0.00218	<0.0000050	0.000000023	0.00925	0.00073	0.101	373	<0.00050	1.6	<0.00010	11300	6.64	789	<0.000050	<0.0010
WQ1-1	VA25A8962-004	2025-04-22	M	<0.00050	0.000066	<0.00050	0.013	<0.00010	0.143	1240	0.00142	<0.0000050	<0.000000020	0.00914	<0.00050	0.077	317	0.00055	1.3	<0.00010	8470	6.36	731	<0.000050	<0.0010
WQ1-1	VA25A9878-004	2025-04-30	M	<0.00050	0.000080	0.00086	<0.010	<0.00010	0.143	1150	0.00108	<0.0000050	0.000000023	0.00920	<0.00050	0.100	339	<0.00050	1.4	<0.00010	9180	6.53	801	<0.000050	<0.0010
WQ1-1	VA25B0358-004	2025-05-06	M	<0.00050	0.000080	<0.00050	0.014	<0.00010	0.109	973	0.00157	<0.0000050	0.000000022	0.00995	<0.00050	0.065	291	<0.00080	<1.0	<0.00010	6570	7.07	572	<0.000050	<0.0010
WQ1-1	VA25B1026-004	2025-05-13	M	<0.00050	0.000080	<0.00050	0.020	<0.00010	0.159	1300	0.00176	<0.0000050	<0.000000020	0.00948	<0.00050	0.096	350	<0.00050	1.7	<0.00010	10800	6.48	797	<0.000050	<0.0010
WQ1-1	VA25B1711-004	2025-05-20	M	<0.00050	0.000086	<0.00050	0.017	<0.00010	0.147	1420	0.00184	<0.0000050	0.000000024	0.00982	<0.00050	0.110	324	<0.00050	1.9	<0.00010	9930	6.76	680	<0.000050	<0.0010
WQ1-2	0051710-02	2020-05-20	M		<0.00020	0.003	0.285	<0.00040	0.0127	80.6	0.0104	<0.000010		0.001	0.00109	<0.100	27.8	<0.00100	<2.0	<0.000100	672	0.497	63.1	<0.000040	<0.00040
WQ1-2	0062209-02	2020-06-22	M		0.00053	0.00338	0.977	0.00076	0.00894	54.6	0.0321	<0.000010		0.0007	<0.00080	<0.100	16.6	<0.00100	2.1	<0.000100	449	0.342	39.7	<0.000040	<0.00040
WQ1-2	0071996-02	2020-07-21	M		0.00029	0.0021	0.577	0.00134	0.0116	73.9	0.0178	<0.000010		0.00092	<0.00080	<0.100	23.6	<0.00100	3.3	<0.000100	612	0.447	64	<0.000040	<0.00040
WQ1-2	0082292-02	2020-08-24	M		<0.00020	0.00118	0.043	<0.00040	0.118	650	0.0101	<0.000010		0.00598	<0.00080	<0.100	194	<0.00100	<2.0	<0.000100	5490	3.92	512	<0.000040	<0.00040
WQ1-2	0093017-02	2020-09-28	M		0.00034	0.00249	0.54	<0.00040	0.0343	225	0.0202	<0.000010		0.00253	0.00094	<0.100	68.4	<0.00100	6.4	<0.000100	1850	1.5	189	<0.000040	<0.00040
WQ1-2	20J1961-02	2020-10-20	M		<0.00020	0.00104	0.16	<0.00040	0.0512	361	0.0108	<0.000010		0.0036	<0.00080	<0.100	103	<0.00100	2.1	<0.000100	3010	2.32	307	<0.000040	<0.00040
WQ1-2	20J2778-02	2020-10-27	M		<0.00020	<0.00080	0.105	0.00086	0.0698	499	0.0146	<0.000010		0.00521	<0.00080	<0.100	147	<0.00100	<2.0	<0.000100	4310	3.49	426	<0.000040	<0.00040
WQ1-2	20K0360-02	2020-11-03	M		<0.00020	0.00127	0.139	0.00284	0.0727	457	0.00898	<0.000010		0.00428	<0.00080	<0.100	140	<0.00100	2.6	<0.000100	3930	3.04	381	<0.000040	<0.00040
WQ1-2	20K1261-02	2020-11-10	M		<0.00020	0.00133	0.156	<0.00040	0.0556	330	0.0142	<0.000010		0.00336	<0.00080	<0.100	104	<0.00100	2.2	<0.000100	2800	2.34	280	<0.000040	<0.00040
WQ1-2	20K2100-02	2020-11-18	M		0.00029	0.00131	0.373	<0.00040	0.0399	246	0.0262	<0.000010		0.00238	<0.00080	<0.100	81.2	<0.00100	3.3	<0.000100	2050	1.62	208	<0.000040	<0.00040
WQ1-2	20L1589-02	2020-12-14	M		<0.00020	<0.00080	0.137	<0.00040	0.0851	628	0.0134	<0.000010		0.00668	<0.00080	<0.100	201	<0.00100	2.6	<0.000100	5000	4.32	563	<0.000040	0.00076
WQ1-2	21A2590-02	2021-01-27	M		<0.00020	<0.00080	0.045	<0.00040	0.133	1030	0.00454	<0.000010		0.00894	<0.00080	0.144	316	<0.00100	3.1	<0.000100	8570	6.27	785	<0.000040	<0.00040
WQ1-2	21B2778-02	2021-02-25	M		<0.00020	<0.00080	0.056	<0.00040	0.158	925	0.00592	<0.000010		0.00931	<0.00080	<0.100	290	<0.00100	2.2	<0.000100	7430	6.23	757	<0.000040	<0.00040
WQ1-2	21C3505-02	2021-03-25	M		<0.0000050	<0.00020	0.0076	<0.000050	<0.000050	<0.0050	0.000069	<0.000010	<0.000000050	0.000015	<0.00300	0.011	<0.01	<0.00010	0.23	<0.000010	0.038	<0.00010	<1	<0.0000040	<0.000050
WQ1-2	21D2478-02	2021-04-22	M		0.000131	0.00125	0.189	0.000066	0.0402	261	0.00866	<0.000010		0.00304	0.000403	0.018	81.6	<0.00010	2.85	<0.000010	2120	1.77	197	0.0000062	0.00009
WQ1-2	21E1990-02	2021-05-18	M		0.00033	0.00425	0.633	<0.00020	0.00537	30.6	0.0194	<0.000010		0.00068	<0.00040	<0.050	10	<0.00050	2.4	<0.000050	277	0.201	24	<0.000020	<0.00020

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	21E2917-02	2021-05-26	M		0.000164	0.00121	0.255	0.000069	0.00899	47.1	0.01	<0.000010	<0.000000024	0.000835	0.000291	0.015	14.4	0.00013	3.21	<0.000010	391	0.329	36.1	0.0000047	0.000106
WQ1-2	21F0167-02	2021-06-01	M		0.000123	0.00103	0.163	<0.000050	0.0367	206	0.00768	<0.000010	<0.000000024	0.00225	0.000307	0.016	59.7	0.00053	2.58	<0.000010	1460	1.34	153	0.0000049	<0.000050
WQ1-2	21F1056-02	2021-06-08	M		0.000348	0.00167	0.69	0.000141	0.00663	43.1	0.0209	<0.0000050	<0.000000023	0.0008	0.000592	0.025	13.5	<0.00010	4.06	<0.000010	310	0.262	31.9	0.0000092	<0.000050
WQ1-2	21F2014-02	2021-06-15	M		0.000488	0.00265	0.853	0.000187	0.0215	153	0.0277	<0.000010	<0.000000023	0.00285	0.000589	0.037	45.2	<0.00010	4.15	<0.000010	1210	0.923	113	0.0000122	0.000057
WQ1-2	21G2414-02	2021-07-20	M		0.000166	<0.00100	0.293	0.00176	0.0162	108	0.0123	<0.000010	<0.000000025	0.00125	0.000587	<0.1	35.7	<0.00100	0.52	<0.000100	876	0.65	83.6	<0.0000400	<0.000500
WQ1-2	21H3040-02	2021-08-25	M		0.000109	0.00633	0.14	0.00278	0.0659	440	0.0105	<0.000010	<0.000000050	0.00417	0.000393	<0.1	136	<0.00100	7.09	<0.000100	3840	2.7	341	<0.0000400	<0.000500
WQ1-2	21I3814-02	2021-09-28	M		0.000196	0.00158	0.278	<0.000500	0.0555	399	0.0136	<0.000010	0.00000003	0.00406	0.000572	<0.1	123	<0.00100	2.26	<0.000100	3150	2.33	294	<0.0000400	<0.000500
WQ1-2	21J3514-02	2021-10-26	M		0.00021	0.00119	0.468	0.00023	0.0171	115	0.02	<0.000010	<0.000000050	0.00127	<0.00040	<0.050	33.4	<0.00050	3.4	<0.000050	918	0.641	<0.6	<0.000020	<0.00004
WQ1-2	21K3046-02	2021-11-23	M		<0.00020	0.00119	0.087	<0.00040	0.13	925	0.00805	<0.000010	0.000000048	0.00823	<0.00080	<0.100	271	<0.00100	2.9	<0.000100	6950	5.28	672	<0.000040	<0.00040
WQ1-2	21L2125-02	2021-12-14	M		<0.00020	0.00124	0.146	0.00342	0.0848	579	0.013	<0.000010	<0.000000023	0.00518	<0.00080	<0.100	175	<0.00100	3.9	<0.000100	4840	3.47	424	<0.000040	<0.00040
WQ1-2	22A2312-02	2022-01-20	M		<0.00020	0.00152	0.028	<0.00040	0.157	979	0.00445	<0.000010	<0.000000024	0.009	<0.00080	<0.100	305	<0.00100	2.6	<0.000100	8190	5.89	760	<0.000040	<0.00040
WQ1-2	22B2487-02	2022-02-17	M		<0.00020	<0.00080	0.046	<0.00040	0.14	1010	0.00424	<0.000010		0.00865	0.00099	<0.100	294	0.00244	<2.0	<0.000100	7800	5.33	702	<0.000040	<0.00040
WQ1-2	22C3145-02	2022-03-22	M		<0.00020	<0.00080	<0.020	<0.00040	0.143	1100	0.00258	<0.000010		0.00958	<0.00080	<0.100	322	0.00105	<2.0	<0.000100	8270	5.88	746	<0.000040	<0.00040
WQ1-2	22D2212-02	2022-04-19	M		<0.00020	0.00279	0.033	<0.00040	0.163	1140	0.00305	<0.000010		0.00905	<0.00080	<0.100	338	<0.00100	<2.0	<0.000100	9270	6.34	771	0.000329	<0.00040
WQ1-2	22E2480-04	2022-05-17	M		<0.00100	<0.00400	0.208	<0.00200	0.0176	136	0.00905	<0.000010	<0.000000024	0.00139	<0.00400	<0.500	42	<0.00500	<10.0	<0.000500	1050	0.799	99.6	<0.000200	<0.00200
WQ1-2	22F3212-02	2022-06-21	M		0.000122	<0.00200	0.211	<0.000500	0.0152	92.3	0.0093	<0.000010		0.00105	<0.000400	<0.1	29	<0.00100	2.01	<0.000100	758	0.558	72.4	<0.0000400	<0.000500
WQ1-2	22G1763-02	2022-07-13	M		0.000183	<0.00200	0.302	<0.000500	0.0274	214	0.0116	<0.000010		0.00195	<0.000400	<0.1	64.6	<0.00100	1.82	<0.000100	1780	1.25	156	<0.0000400	<0.000500
WQ1-2	22H2453-02	2022-08-16	M		0.000152	<0.00200	0.342	<0.000500	0.0129	85.3	0.0147	<0.000010	<0.000000028	0.000952	<0.000400	<0.100	27.1	<0.00100	1.95	<0.000100	712	0.535	64.0	<0.0000400	<0.000500
WQ1-2	22I1926-02	2022-09-14	M		0.0000880	<0.00200	0.0637	<0.000500	0.0871	698	0.00778	<0.000010		0.00627	0.000536	<0.100	221	<0.00100	1.32	<0.000100	5970	3.90	516	<0.0000400	<0.000500
WQ1-2	22J1560-04	2022-10-12	M		<0.0000500	<0.00200	0.0581	<0.000500	0.128	809	0.00533	<0.000010		0.00699	<0.000400	<0.1	228	<0.00100	<1	<0.000100	6550	4.71	566	<0.0000400	<0.000500
WQ1-2	22K1453-02	2022-11-10	M		0.000162	<0.00200	0.0946	0.000972	0.143	1110	0.0190	<0.000010	0.000000066	0.00930	0.000748	0.103	329	<0.00100	2.6	<0.000100	8190	6.17	808	<0.0000400	<0.000500
WQ1-2	22L0774-02	2022-12-07	M		0.0000721	<0.00200	0.0573	<0.000500	0.139	1110	0.0289	<0.000010		0.00922	0.000476	0.116	306	<0.00100	2	<0.000100	8270	6.11	731	<0.0000400	<0.000500
WQ1-2	23A2847-02	2023-01-27	M		0.000103	<0.00200	0.117	<0.000500	0.0838	602	0.0140	<0.000010	<0.000000060	0.00549	<0.000400	<0.1	190	<0.00100	3.18	<0.000100	5130	3.51	456	<0.0000400	<0.000500
WQ1-2	23C0060-02	2023-02-28	M		0.0000559	<0.00200	0.0394	<0.000500	0.123	1130	0.00576	<0.000010		0.00921	0.000484	<0.1	352	<0.00100	2.25	<0.000100	9090	6.59	888	<0.0000400	<0.000500
WQ1-2	23C1797-02	2023-03-15	M		<0.0000500	<0.00200	0.0355	0.000500	0.15	1040	0.00436	<0.000010		0.00890	<0.000400	0.108	322	<0.00100	1.76	<0.000100	10600	5.98	786	<0.0000400	<0.000500
WQ1-2	23D2945-02	2023-04-26	M		<0.0000500	<0.00200	0.0697	0.000599	0.0777	569	0.00630	<0.000010		0.00553	<0.000400	<0.1	183	<0.00100	1.5	<0.000100	4450	3.47	419	<0.0000400	<0.000500
WQ1-2	23E2392-02	2023-05-17	M		0.000468	0.00237	0.908	0.000171	0.00754	77.4	0.0267	<0.000010	<0.000000050	0.000912	0.000563	<0.02	24.8	<0.00020	2.89	<0.000020	620	0.458	56.1	0.0000096	<0.000100
WQ1-2	23F3614-02	2023-06-27	M		0.000175	<0.00200	0.337	0.00105	0.0171	116	0.0126	<0.000010		0.00132	<0.000400	<0.1	36.5	<0.00100	2.44	<0.000100	974	0.694	87.5	<0.0000400	<0.000500
WQ1-2	23G2415-02	2023-07-19	M		0.000168	<0.00200	0.234	<0.000500	0.0262	179	0.0132	<0.000010		0.00185	<0.000400	<0.1	56.2	<0.00100	1.67	<0.000100	1430	1.08	132	<0.0000400	<0.000500
WQ1-2	23H3309-04	2023-08-24	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.119	871	0.00355	<0.000010	<0.000000050	0.00802	<0.000400	<0.1	276	<0.00100	<1	<0.000100	7100	5.49	676	<0.0000400	<0.000500
WQ1-2	23I2271-04	2023-09-19	M		0.0000621	<0.00200	0.0470	0.00144	0.0927	725	0.00502	<0.000010		0.00610	<0.000400	<0.1	234	<0.00100	<1	<0.000100	5840	4.1	554	<0.0000400	<0.000500
WQ1-2	23J2236-04	2023-10-18	M		0.000295	0.00252	0.544	0.00100	0.0368	242	0.0228	<0.000010		0.00250	<0.000400	<0.1	83.3	<0.00100	2.46	0.000132	1920	1.49	169	<0.0000400	<0.000500
WQ1-2	23K1909-02	2023-11-15	M		0.0000560	<0.00200	0.0556	<0.000500	0.123	924	0.00757	<0.000010	<0.000000050	0.00780	0.000595	<0.1	269	<0.00100	2.06	<0.000100	7660	5.89	734	<0.0000400	<0.000500
WQ1-2	23L1905-05	2023-12-14	M		0.0000540	<0.00200	0.0720	<0.000500	0.128	1130	0.00577	<0.000010		0.0101	0.000491	<0.1	349	<0.00100	1.98	0.000128	9080	7.09	881	<0.0000400	<0.000500
WQ1-2	L2754366-8	2024-01-24	M																						
WQ1-2	VA24A1422-008	2024-01-24	M	<0.00179	0.000095	0.00058	0.033	<0.00010	0.148	1080	0.00372	<0.0000050	<0.000000020	0.00979	<0.00050	0.085	334	<0.00050	2.1	<0.00010	9050	6.72	734	<0.000050	<0.0010
WQ1-2	L2754594-5	2024-02-13	M																						
WQ1-2	VA24A2858-005	2024-02-13	M	<0.00050	0.000125	0.00062	0.081	<0.00010	0.104	780	0.00913	<0.0000050	<0.000000020	0.00694	<0.00050	0.067	214	<0.00050	2.6	<0.00010	5870	4.64	538	<0.000050	<0.0010
WQ1-2	L2755033-5	2024-03-20	M																						
WQ1-2	VA24A5955-005	2024-03-20	M	<0.00050	0.000078	0.00118	0.099	<0.00010	0.095	718	0.00667	<0.0000050	<0.000000020	0.00636	<0.00050	<0.050	218	<0.00050	1.9	<0.00010	6270	4.26	538	<0.000050	<0.0010
WQ1-2	L2755461-5	2024-04-23	M																						
WQ1-2	VA24A8736-005	2024-04-23	M	<0.00050	0.000073	0.00054	0.066	<0.00010	0.135	906	0.00488	<0.0000050	<0.000000040	0.00700	<0.00050	<0.050	261	<0.00050	<1.0	<0.00010	7120	4.85	628	<0.000050	<0.0010
WQ1-2	L2755553-5	2024-04-30	M																						
WQ1-2	VA24A9418-005	2024-04-30	M	<0.00050	0.000083	0.00086	0.105	<0.00010	0.048	399	0.00646	<0.0000050	<0.000000080	0.00287	<0.00050	<0.050	111	<0.00050	2.2	<0.00010	2930	1.88	268	<0.000050	<0.0010
WQ1-2	L2755641-5	2024-05-07	M																						
WQ1-2	VA24B0040-005	2024-05-07	M	<0.00050	0.000291	0.00056	0.051	<0.00010	0.113	713	0.00420	<0.0000050	<0.000000080	0.00711	<0.00050	<0.050	235	0.00051	1.0	<0.00010	6560	4.79	562	<0.000050	<0.0010
WQ1-2	L2755769-5	2024-05-14	M																						
WQ1-2	VA24B0738-005	2024-05-14	M	<0.00050	0.000216	0.00131	0.355	<0.00010	0.037	287	0.0122	<0.0000050	<0.000000020	0.00248	<0.00050	<0.050	85.1	<0.00050	2.1	<0.00010	2300	1.49	195	<0.000050	<0.0010
WQ1-2	L2755874-5	2024-05-21	M																						
WQ1-2	VA24B1351-005	2024-05-21	M	<0.00050	0.000110	0.00077	0.075	<0.00010	0.109	784	0.00528	<0.0000050	<0.000000020	0.00670	<0.00050	<0.050	231	0.00363	<1.0	<0.00010	6470	4.71	581	<0.000050	<0.0010
WQ1-2	L2756277-5	2024-06-18	M																						
WQ1-2	VA24B4257-005	2024-06-18	M	<0.00050	0.000078	0.00065	0.057	<0.00010	0.074	625	0.00538	<0.0000050	<0.000000020	0.00421	<0.00050	<0.050	178	<0.00050	<1.0	<0.00010	4920	2.75	422	<0.000050	<0.0010
WQ1-2	L2756678-5	2024-07-16	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	VA24B7237-005	2024-07-16	M	<0.00050	0.000351	0.00184	0.708	0.00013	0.040	338	0.0218	<0.0000050	<0.000000020	0.00280	<0.00050	0.056	100	<0.00050	2.7	<0.00010	2590	1.82	245	<0.000050	<0.0010
WQ1-2	L2757095-5	2024-08-20	M																						
WQ1-2	VA24C1101-005	2024-08-20	M	<0.00050	0.000208	0.00125	0.346	<0.00010	0.042	304	0.0141	<0.0000050	0.000000027	0.00282	<0.00050	<0.050	91.2	<0.00050	2.0	<0.00010	2520	1.65	206	<0.000050	<0.0010
WQ1-2	VA24C4483-005	2024-09-17	M	<0.00050	0.000152	0.00085	0.169	<0.00010	0.061	548	0.0115	<0.0000050	<0.000000020	0.00416	<0.00050	<0.050	154	<0.00050	1.4	<0.00010	4060	2.82	368	<0.000050	<0.0010
WQ1-2	VA24C8360-005	2024-10-22	M	<0.00050	0.000096	0.00078	0.059	<0.00010	0.101	913	0.00637	<0.0000050	<0.000000020	0.00655	<0.00050	0.052	270	0.00268	1.3	<0.00010	6710	4.62	574	<0.000050	<0.0010
WQ1-2	VA24C9197-005	2024-10-29	M	<0.00050	0.000197	0.00083	0.076	<0.00010	0.090	686	0.00632	<0.0000050	<0.000000020	0.00540	<0.00050	0.052	210	<0.00050	1.8	<0.00010	5120	3.56	483	<0.000050	<0.0010
WQ1-2	VA24D0009-005	2024-11-05	M		0.000169	0.00056	0.018	<0.00010	0.099	866	0.00530	<0.0000050	<0.000000020	0.00723	<0.00050	0.066	274	0.00078	1.5	<0.00010	6550	5.08	633	<0.000050	<0.0010
WQ1-2	VA24D0813-013	2024-11-13	M	<0.00050	0.000154	0.00120	0.134	<0.00010	0.057	464	0.00779	<0.0000050	<0.000000020	0.00367	<0.00050	0.051	138	0.00123	2.4	<0.00010	3570	2.49	331	<0.000050	<0.0010
WQ1-2	VA24D1720-005	2024-11-21	M	<0.00050	0.000252	0.00066	0.052	<0.00010	0.146	1070	0.00642	<0.0000050	<0.000000400	0.00835	<0.00050	0.088	312	<0.00100	2.2	<0.00010	8550	5.65	783	<0.000050	<0.0010
WQ1-2	L2758465-5	2024-12-17	M																						
WQ1-2	VA24D3769-005	2024-12-17	M	<0.00050	0.000088	0.00066	0.031	<0.00010	0.126	767	0.00402	<0.0000050	<0.000000020	0.00903	<0.00050	0.076	266	<0.00050	1.4	<0.00010	6100	5.88	660	<0.000050	<0.0010
WQ1-2	L2758719-5	2025-01-21	M																						
WQ1-2	VA25A1408-005	2025-01-21	M	<0.00050	0.000086	0.00052	0.081	<0.00010	0.099	965	0.00765	<0.0000050	<0.000000020	0.00641	<0.00050	0.092	290	<0.00050	2.8	<0.00010	7210	4.54	642	<0.000050	<0.0010
WQ1-2	L2758994-5	2025-02-18	M																						
WQ1-2	VA25A3430-005	2025-02-18	M	<0.00050	0.000075	<0.00050	0.065	<0.00010	0.142	1000	0.00699	<0.0000050	<0.000000080	0.00712	<0.00050	0.070	300	<0.00050	3.2	<0.00010	7980	4.95	594	<0.000050	<0.0010
WQ1-2	VA25A6550-005	2025-03-25	M	<0.00050	<0.000050	<0.00050	0.019	<0.00010	0.131	1240	0.00150	<0.0000050	<0.000000020	0.00820	<0.00050	<0.050	324	<0.00050	<1.0	<0.00010	9690	5.75	708	<0.000050	<0.0010
WQ1-2	VA25A8962-005	2025-04-22	M	<0.00050	0.000092	0.00071	0.071	<0.00010	0.070	629	0.00508	<0.0000050	<0.000000020	0.00496	<0.00050	<0.050	166	<0.00050	1.2	<0.00010	4390	3.32	377	<0.000050	<0.0010
WQ1-2	VA25A9878-005	2025-04-30	M	<0.00050	0.000125	0.00109	0.181	<0.00010	0.024	190	0.00824	<0.0000050	<0.000000020	0.00197	<0.00050	<0.050	57.6	<0.00050	2.4	<0.00010	1540	1.15	140	<0.000050	<0.0010
WQ1-2	VA25B0358-005	2025-05-06	M	<0.00050	0.000084	0.00080	0.013	<0.00010	0.095	783	0.00330	<0.0000050	<0.000000020	0.00819	<0.00050	<0.050	243	<0.00070	<1.0	<0.00010	5400	5.80	448	<0.000050	<0.0010
WQ1-2	VA25B1026-005	2025-05-13	M	<0.00050	0.000076	0.00070	0.037	<0.00010	0.082	635	0.00441	<0.0000050	<0.000000020	0.00504	<0.00050	<0.050	178	<0.00050	<1.0	<0.00010	5300	3.34	412	<0.000050	<0.0010
WQ1-2	VA25B1711-005	2025-05-20	M	<0.00050	0.000091	0.00082	0.115	<0.00010	0.024	162	0.00586	<0.0000050	<0.000000020	0.00183	<0.00050	<0.050	46.3	<0.00050	2.6	<0.00010	1280	1.00	109	<0.000050	<0.0010
WQ1-3	23L1905-06	2023-12-14	M		0.000110	<0.00200	0.123	<0.000500	0.0845	740	0.0166	0.000011		0.00671	<0.000400	<0.1	226	<0.00100	2.48	<0.000100	6010	4.7	567	<0.0000400	<0.000500
WQ1-3	L2754366-9	2024-01-24	M																						
WQ1-3	VA24A1422-009	2024-01-24	M	<0.00179	0.000118	0.00532	0.138	0.00053	0.071	574	0.00938	<0.0000050	<0.000000020	0.00507	<0.00050	0.052	173	<0.00050	3.1	<0.00010	4690	3.33	383	<0.000050	<0.0010
WQ1-3	L2754594-6	2024-02-13	M																						
WQ1-3	VA24A2858-006	2024-02-13	M	<0.00050	0.000148	0.00071	0.109	<0.00010	0.083	605	0.0120	<0.0000050	<0.000000020	0.00530	<0.00050	0.056	165	<0.00050	2.8	<0.00010	4620	3.63	418	<0.000050	<0.0010
WQ1-3	L2755033-6	2024-03-20	M																						
WQ1-3	VA24A5955-006	2024-03-20	M	<0.00050	0.000104	0.00085	0.164	<0.00010	0.059	453	0.00954	<0.0000050	<0.000000020	0.00396	<0.00050	<0.050	134	<0.00050	2.9	<0.00010	3730	2.50	327	<0.000050	<0.0010
WQ1-3	L2755461-6	2024-04-23	M																						
WQ1-3	VA24A8736-006	2024-04-23	M	<0.00050	0.000078	0.00057	0.083	<0.00010	0.119	824	0.00593	<0.0000050	<0.000000040	0.00640	<0.00050	<0.050	235	<0.00050	<1.0	<0.00010	6050	4.30	558	<0.000050	<0.0010
WQ1-3	L2755553-6	2024-04-30	M																						
WQ1-3	VA24A9418-006	2024-04-30	M	<0.00050	0.000065	0.00065	0.056	<0.00010	0.087	698	0.00393	<0.0000050	<0.000000020	0.00483	<0.00050	<0.050	196	<0.00050	1.1	<0.00010	5160	3.22	463	<0.000050	<0.0010
WQ1-3	L2755641-6	2024-05-07	M																						
WQ1-3	VA24B0040-006	2024-05-07	M	<0.00050	0.000338	0.00128	0.159	<0.00010	0.068	437	0.00765	<0.0000050	<0.000000080	0.00438	<0.00050	<0.050	140	<0.00050	2.0	<0.00010	3870	2.80	327	<0.000050	<0.0010
WQ1-3	L2755769-6	2024-05-14	M																						
WQ1-3	VA24B0738-006	2024-05-14	M	<0.00050	0.000183	0.00135	0.344	<0.00010	<0.020	92.3	0.0110	<0.0000050	<0.000000020	0.00095	<0.00050	<0.050	26.2	<0.00050	2.1	<0.00010	724	0.479	60.9	<0.000050	<0.0010
WQ1-3	L2755874-6	2024-05-21	M																						
WQ1-3	VA24B1351-006	2024-05-21	M	<0.00050	0.000193	0.00130	0.377	0.00011	<0.020	77.7	0.0150	<0.0000050	<0.000000020	0.00105	<0.00050	<0.050	23.5	<0.00050	2.9	<0.00010	672	0.454	57.5	<0.000050	<0.0010
WQ1-3	L2756277-6	2024-06-18	M																						
WQ1-3	VA24B4257-006	2024-06-18	M	<0.00050	0.000222	0.00113	0.423	<0.00010	<0.020	56.8	0.0158	<0.0000050	0.000000026	0.00091	<0.00050	<0.050	16.2	<0.00050	2.8	<0.00010	444	0.333	38.7	<0.000050	<0.0010
WQ1-3	L2756678-6	2024-07-16	M																						
WQ1-3	VA24B7237-006	2024-07-16	M	<0.00050	0.000369	0.00190	0.753	0.00018	<0.020	106	0.0227	<0.0000050	0.000000022	0.00105	<0.00050	0.056	32.5	<0.00050	3.2	<0.00010	881	0.606	76.3	<0.000050	<0.0010
WQ1-3	L2757095-6	2024-08-20	M																						
WQ1-3	VA24C1101-006	2024-08-20	M	<0.00050	0.000200	0.00120	0.305	<0.00010	0.031	242	0.0136	<0.0000050	0.000000026	0.00204	<0.00050	<0.050	69.0	<0.00050	2.1	<0.00010	1920	1.22	164	<0.000050	<0.0010
WQ1-3	VA24C4483-006	2024-09-17	M	<0.00050	0.000164	0.00172	0.199	0.00012	0.051	420	0.0134	<0.0000050	<0.000000020	0.00328	<0.00050	<0.050	119	<0.00050	1.7	<0.00010	3070	2.22	285	<0.000050	<0.0010
WQ1-3	VA24C8360-006	2024-10-22	M	<0.00050	0.000409	0.00247	0.734	0.00021	0.020	186	0.0279	<0.0000050	<0.000000020	0.00157	0.00054	<0.050	53.8	<0.00050	3.6	<0.00010	1410	0.926	121	<0.000050	<0.0010
WQ1-3	VA24C9197-006	2024-10-29	M	<0.00050	0.000178	0.00153	0.258	0.00054	<0.020	124	0.0105	<0.0000050	<0.000000020	0.00118	0.00075	<0.050	36.6	<0.00050	2.8	<0.00010	930	0.642	83.0	<0.000050	<0.0010
WQ1-3	VA24D0009-006	2024-11-05	M		0.000148	0.00091	0.102	<0.00010	0.048	425	0.0104	<0.0000050	<0.000000020	0.00353	<0.00050	<0.050	127	<0.00050	2.5	<0.00010	3170	2.35	298	<0.000050	<0.0010
WQ1-3	VA24D0813-014	2024-11-13	M	<0.00050	0.000193	0.00165	0.241	0.00010	0.031	258	0.00994	<0.0000050	<0.000000020	0.00218	<0.00050	<0.050	74.7	<0.00050	2.6	<0.00010	1960	1.32	165	<0.000050	<0.0010
WQ1-3	VA24D1720-006	2024-11-21	M	<0.00050	0.000240	0.00081	0.112	<0.00010	0.096	689	0.0123	<0.0000050	<0.000000200	0.00537	<0.00050	0.064	195	<0.00100	3.0	<0.00010	5280	3.48	484	<0.000050	<0.0010
WQ1-3	L2758465-6	2024-12-17	M																						
WQ1-3	VA24D3769-006	2024-12-17	M	<0.00050	0.000111	0.00171	0.059	<0.00010	0.117	735	0.00501	<0.0000050	<0.000000020	0.00868	<0.00050	0.073	253	<0.00050	1.4	<0.00010	5710	5.68	618	<0.000050	<0.0010
WQ1-3	L2758719-6	2025-01-21	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-3	VA25A1408-006	2025-01-21	M	<0.00050	0.000097	0.00055	0.102	<0.00010	0.091	855	0.00938	<0.0000050	<0.000000020	0.00575	<0.00050	0.086	256	<0.00050	3.2	<0.00010	6530	4.10	588	<0.000050	<0.0010
WQ1-3	L2758994-6	2025-02-18	M																						
WQ1-3	VA25A3430-006	2025-02-18	M	<0.00050	0.000080	0.00055	0.068	<0.00010	0.143	996	0.00745	<0.0000050	<0.000000080	0.00691	<0.00050	0.070	297	<0.00050	3.4	<0.00010	8090	4.82	582	<0.000050	<0.0010
WQ1-3	VA25A6550-006	2025-03-25	M	<0.00050	0.000052	0.00068	0.099	<0.00010	0.079	635	0.00638	<0.0000050	<0.000000080	0.00451	<0.00050	<0.050	177	<0.00050	1.7	<0.00010	4840	3.04	411	<0.000050	<0.0010
WQ1-3	VA25A8962-006	2025-04-22	M	<0.00050	0.000083	0.00077	0.116	<0.00010	0.034	293	0.00668	<0.0000050	<0.000000020	0.00262	<0.00050	<0.050	80.0	<0.00050	2.2	<0.00010	2120	1.60	182	<0.000050	<0.0010
WQ1-3	VA25A9878-006	2025-04-30	M	<0.00050	0.000132	0.00120	0.185	<0.00010	0.020	157	0.00825	<0.0000050	<0.000000020	0.00166	<0.00050	<0.050	48.5	<0.00050	2.6	<0.00010	1270	0.972	114	<0.000050	<0.0010
WQ1-3	VA25B0358-006	2025-05-06	M	<0.00050	0.000131	0.00102	0.191	<0.00010	0.024	194	0.00861	<0.0000050	<0.000000020	0.00248	<0.00050	<0.050	63.8	<0.00050	1.4	<0.00010	1410	1.51	118	<0.000050	<0.0010
WQ1-3	VA25B1026-006	2025-05-13	M	<0.00050	0.000095	0.00078	0.112	<0.00010	0.040	282	0.00698	<0.0000050	<0.000000020	0.00263	<0.00050	<0.050	83.4	<0.00050	2.2	<0.00010	2350	1.61	196	<0.000050	<0.0010
WQ1-3	VA25B1711-006	2025-05-20	M	<0.00050	0.000095	0.00087	0.158	<0.00010	<0.020	60.1	0.00699	<0.0000050	0.000000027	0.00084	<0.00050	<0.050	18.5	<0.00050	3.2	<0.00010	498	0.393	43.4	<0.000050	<0.0010
WQ2-1	0051710-03	2020-05-20	M		<0.00020	0.00335	0.022	0.00663	0.165	1160	0.00249	<0.000010		0.0103	0.00116	<0.100	398	<0.00100	<2.0	0.000119	8790	7.57	935	<0.000040	<0.00040
WQ2-1	0062209-03	2020-06-22	M		<0.00020	0.00124	0.034	<0.00040	0.167	1160	0.003	<0.000010		0.0104	<0.00080	<0.100	341	<0.00100	<2.0	0.000114	9210	7.27	859	<0.000040	<0.00040
WQ2-1	0071996-03	2020-07-21	M		<0.00020	<0.00080	0.022	<0.00040	0.157	1110	0.0037	<0.000010		0.00965	<0.00080	0.118	309	<0.00100	2	<0.000100	8770	6.92	857	<0.000040	<0.00040
WQ2-1	0082292-03	2020-08-24	M		<0.00020	0.00144	0.052	<0.00040	0.167	1270	0.00466	<0.000010		0.0109	<0.00080	0.123	379	0.00158	<2.0	<0.000100	10600	7.78	981	<0.000040	<0.00040
WQ2-1	0093017-03	2020-09-28	M		<0.00020	0.00108	0.06	0.00074	0.159	1000	0.0109	<0.000010		0.0103	0.00304	0.111	324	<0.00100	<2.0	<0.000100	8760	6.9	841	<0.000040	<0.00040
WQ2-1	20J1961-03	2020-10-20	M		<0.00020	<0.00080	0.05	0.00044	0.174	1230	0.0119	<0.000010		0.011	<0.00080	<0.100	347	<0.00100	<2.0	<0.000100	9470	7.56	1020	<0.000040	<0.00040
WQ2-1	20J2778-03	2020-10-27	M		<0.00020	<0.00080	0.028	0.00051	0.148	1120	0.0069	<0.000010		0.0108	<0.00080	0.127	324	<0.00100	<2.0	<0.000100	8460	7.36	942	<0.000040	<0.00040
WQ2-1	20K0360-03	2020-11-03	M		<0.00020	0.00149	<0.020	0.00122	0.17	1050	0.0085	<0.000010		0.0099	<0.00080	0.126	322	<0.00100	<2.0	0.000119	8520	6.94	902	<0.000040	<0.00040
WQ2-1	20K1261-03	2020-11-10	M		<0.00020	<0.00080	0.027	<0.00040	0.185	1090	0.0118	<0.000010		0.0115	<0.00080	0.128	340	<0.00100	<2.0	<0.000100	8140	7.91	924	<0.000040	<0.00040
WQ2-1	20K2100-03	2020-11-18	M		<0.00020	<0.00080	<0.020	<0.00040	0.18	1180	0.00857	<0.000010		0.00944	<0.00080	<0.100	351	<0.00100	2.1	<0.000100	10000	7.65	970	<0.000040	<0.00040
WQ2-1	20L1589-03	2020-12-14	M		<0.00020	<0.00080	<0.020	<0.00040	0.154	1250	0.00612	<0.000010		0.0118	<0.00080	<0.100	397	<0.00100	<2.0	<0.000100	10000	8.25	1120	<0.000040	<0.00040
WQ2-1	21A2590-03	2021-01-27	M		<0.00020	<0.00080	0.022	<0.00040	0.154	1100	0.00271	<0.000010		0.0106	<0.00080	<0.100	338	<0.00100	2.6	<0.000100	9250	7.23	850	<0.000040	<0.00040
WQ2-1	21B2778-03	2021-02-25	M		<0.00020	0.0011	0.027	<0.00040	0.206	1200	0.00304	<0.000010		0.0117	<0.00080	0.155	381	<0.00100	2.2	<0.000100	9700	8.02	977	<0.000040	<0.00040
WQ2-1	21C3505-03	2021-03-25	M		<0.0000500	<0.00100	0.0263	<0.000500	0.214	1250	0.00272	<0.000010	<0.000000050	0.0105	<0.00300	0.211	373	<0.00100	4.15	<0.000100	10000	8.05	997	<0.0000400	<0.000500
WQ2-1	21D2478-03	2021-04-22	M		<0.0000500	<0.00100	0.0258	<0.000500	0.183	1230	0.00217	<0.000010		0.0116	0.000549	0.167	394	<0.00100	2.5	<0.000100	9540	7.23	980	<0.0000400	<0.000500
WQ2-1	21E1990-03	2021-05-18	M		<0.00020	0.00218	<0.020	<0.00040	0.224	1220	0.0031	<0.000010		0.0115	<0.00080	<0.100	379	<0.00100	<2.0	<0.000100	10600	7.46	906	<0.000040	<0.00040
WQ2-1	21E2917-03	2021-05-26	M		0.0000676	0.00474	0.0553	<0.000500	0.16	1100	0.00382	<0.000010	<0.000000024	0.00975	0.000635	<0.1	333	<0.00100	1.93	<0.000100	8490	6.16	767	<0.0000400	<0.000500
WQ2-1	21F0167-03	2021-06-01	M		<0.0000500	<0.00100	0.0305	<0.000500	0.162	1200	0.00317	<0.000010	<0.000000024	0.0109	0.000569	0.143	362	<0.00100	2.52	<0.000100	9620	6.91	788	<0.0000400	<0.000500
WQ2-1	21F1056-03	2021-06-08	M		<0.0000500	<0.00100	<0.0200	<0.000500	0.206	1270	0.00168	<0.0000050	<0.000000023	0.0109	0.000757	<0.1	363	<0.00100	1.68	<0.000100	8840	6.78	864	<0.0000400	<0.000500
WQ2-1	21F2014-03	2021-06-15	M		<0.0000500	<0.00100	0.0247	<0.000500	0.166	1170	0.00309	<0.000010	<0.000000023	0.0108	0.000988	<0.1	348	0.00147	2.33	<0.000100	9470	7.09	906	0.0000812	<0.000500
WQ2-1	21G2414-03	2021-07-20	M		0.0000621	<0.00100	0.0376	<0.000500	0.164	1110	0.00551	<0.000010	<0.000000025	0.0101	0.000636	<0.1	321	<0.00100	<0.5	<0.000100	8800	6.4	801	<0.0000400	<0.000500
WQ2-1	21H3040-03	2021-08-25	M		<0.0000500	0.00155	<0.0200	<0.000500	0.169	1140	0.00344	<0.0001	<0.000000050	0.0102	0.000351	0.112	347	<0.00100	10.9	<0.000100	9790	7.06	903	<0.0000400	<0.000500
WQ2-1	21I3814-03	2021-09-28	M		0.0000744	<0.00100	0.0356	<0.000500	0.155	1130	0.00666	<0.000010	<0.000000024	0.0106	0.000694	<0.1	347	0.00217	2.2	<0.000100	8770	6.98	821	<0.0000400	<0.000500
WQ2-1	21J3514-03	2021-10-26	M		<0.00005	<0.00040	0.03	<0.00020	0.131	1000	0.0056	<0.000010	<0.000000050	0.0084	<0.00040	0.072	251	<0.00050	1.8	<0.000050	7850	5.08	0.7	<0.000020	<0.00004
WQ2-1	21K3046-03	2021-11-23	M		<0.00020	0.00122	0.025	<0.00040	0.171	1230	0.00617	<0.000010	0.000000037	0.0107	0.0008	<0.100	357	<0.00100	2.5	<0.000100	9020	6.82	862	<0.000040	<0.00040
WQ2-1	21L2125-03	2021-12-14	M		<0.00020	0.001	0.028	<0.00040	0.177	1180	0.00516	<0.000010	0.000000024	0.01	<0.00080	0.104	357	<0.00100	2.6	<0.000100	9830	7.19	881	<0.000040	<0.00040
WQ2-1	22A2312-03	2022-01-20	M		<0.00020	0.00261	<0.020	<0.00040	0.168	1070	0.00387	<0.000010	<0.000000024	0.00965	<0.00080	<0.100	331	<0.00100	2.1	0.000129	8900	6.41	826	<0.000040	<0.00040
WQ2-1	22B2487-03	2022-02-17	M		<0.00020	<0.00080	0.03	<0.00040	0.155	1200	0.00367	<0.000010		0.00924	<0.00080	<0.100	347	0.00258	2.2	<0.000100	8970	6.21	829	<0.000040	<0.00040
WQ2-1	22C3145-03	2022-03-22	M		<0.00020	0.00131	0.082	<0.00040	0.132	995	0.00315	<0.000010		0.00812	0.0017	<0.100	297	<0.00100	<2.0	<0.000100	7530	5.34	668	<0.000040	<0.00040
WQ2-1	22D2212-03	2022-04-19	M		<0.00020	0.00129	0.05	<0.00040	0.188	1300	0.00248	<0.000010		0.0101	<0.00080	0.138	380	<0.00100	<2.0	0.000285	10500	7.18	904	<0.000040	<0.00040
WQ2-1	22E2480-05	2022-05-17	M		<0.00100	<0.00400	<0.100	<0.00200	0.131	1080	<0.00200	<0.000010	<0.000000024	0.00955	<0.00400	<0.500	348	<0.00500	<10.0	<0.000500	8600	7.04	833	<0.000200	<0.00200
WQ2-1	22F3212-03	2022-06-21	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.144	1060	0.00284	<0.000010		0.00969	<0.000400	<0.1	343	<0.00100	1.25	<0.000100	8650	6.86	877	<0.0000400	<0.000500
WQ2-1	22G1763-03	2022-07-13	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.132	1140	0.00343	<0.000010		0.00968	<0.000400	<0.1	340	<0.00100	1.24	<0.000100	9390	6.89	852	<0.0000400	<0.000500
WQ2-1	22H2453-03	2022-08-16	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.142	974	0.00420	<0.000010	<0.000000028	0.00872	<0.000400	<0.100	335	<0.00100	1.30	<0.000100	8330	6.62	802	<0.0000400	<0.000500
WQ2-1	22I1926-03	2022-09-14	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.137	1070	0.00328	<0.000010		0.00905	<0.000400	<0.100	335	<0.00100	1.10	<0.000100	9210	5.84	769	<0.0000400	<0.000500
WQ2-1	22J1560-05	2022-10-12	M		0.0000508	<0.00200	0.0222	<0.000500	0.185	1220	0.00405	<0.000010		0.0100	0.000575	0.103	335	<0.00100	1.32	<0.000100	9580	6.97	804	<0.0000400	<0.000500
WQ2-1	22K1453-03	2022-11-10	M		0.000134	<0.00200	0.0293	0.000809	0.172	1310	0.0182	<0.000010	0.000000066	0.0109	0.000474	0.121	393	<0.00100	2.14	0.000146	9950	7.23	952	<0.0000400	<0.000500
WQ2-1	22L0774-03	2022-12-07	M		0.0000813	<0.00200	0.0244	<0.000500	0.147	1180	0.0408	<0.000010		0.00988	<0.000400	<0.1	331	<0.00100	1.74	<0.000100	8950	6.63	788	<0.0000400	<0.000500
WQ2-1	23A2847-03	2023-01-27	M		0.0000758	<0.00200	0.0648	<0.000500	0.155	1150	0.00962	<0.000010	<0.000000060	0.00983	0.000441	<0.1	356	<0.00100	2.02	<0.000100	9650	6.81	895	<0.0000400	<0.000500
WQ2-1	23C0060-03	2023-02-28	M		0.0000550	<0.00200	0.0298	<0.000500	0.134	1250	0.00453	<0.000010		0.0100	0.000527	0.105	392	<0.00100	1.93	<0.000100	9980	7.26	971	<0.0000400	<0.000500
WQ2-1	23C1797-03	2023-03-15	M		<0.0000500	<0.00200	<0.0200	0.00363	0.162	1100	0.00293	<0.000010		0.00934	<0.000400	0.103	334	<0.00100	1.65	<0.000100	11100	6.24	848	<0.0000400	<0.000500
WQ2-1	23D2945-03	2023-04-26	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.157	1130	0.00306	<0.000010		0.0100	0.000455	<0.1	384	<0.00100	1.53	<0.000100	8480	6.74	824	<0.0000400	<0.000500
WQ2-1	23E2392-03	2023-05-17	M		<0.0000500	<0.00200	0.0280	<0.000500	0.122	1210	0.00209	<0.000010	<0.000000050	0.0103	0.000536	<0.1	399	<0.00100	1.65	<0.000100	10400	7.36	977	<0.0000400	<0.000500
WQ2-1	23F3614-03	2023-06-27	M		<0.0000500	<0.00200	0.0259	<0.000500	0.147	1120	0.00299	<0.000010		0.0108	<0.000400	<0.1	351	<0.00100	1.45	<0.000100	8930	7.2	876	<0.0000800	<0.00100

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-1	23G2415-03	2023-07-19	M		<0.0000500	<0.00200	0.0282	<0.000500	0.164	1150	0.00251	<0.000010		0.00997	0.000456	<0.1	360	<0.00100	1.45	<0.000100	9380	7.14	924	<0.0000400	<0.000500
WQ2-1	23H3309-05	2023-08-24	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.148	1070	0.00255	<0.000010	<0.000000050	0.00937	<0.000400	<0.1	346	<0.00100	1.26	<0.000100	8810	6.69	854	<0.0000400	<0.000500
WQ2-1	23I2271-05	2023-09-19	M		0.0000518	<0.00200	0.0456	<0.000500	0.15	1150	0.00434	<0.000010		0.00977	<0.000400	<0.1	376	<0.00100	1.52	<0.000100	9280	6.49	931	<0.0000400	<0.000500
WQ2-1	23J2236-05	2023-10-18	M		0.000218	<0.00200	0.404	0.000540	0.15	923	0.0133	<0.000010		0.00981	0.000641	<0.1	376	<0.00100	1.79	0.000106	7870	6.62	723	<0.0000400	<0.000500
WQ2-1	23K1909-03	2023-11-15	M		0.0000653	<0.00200	0.0336	0.000749	0.276	1220	0.00584	<0.000010	<0.000000050	0.0104	0.00103	<0.1	361	<0.00100	2.04	0.000171	10400	6.98	1080	<0.0000400	<0.000500
WQ2-1	23L1905-07	2023-12-14	M		<0.0000500	0.00316	0.0354	<0.000500	0.124	1130	0.00413	0.000010		0.0105	<0.000400	<0.1	351	<0.00100	1.62	0.000174	9290	7.14	877	<0.0000400	<0.000500
WQ2-1	L2754383-1	2024-01-25	M																						
WQ2-1	VA24A1507-001	2024-01-25	M	<0.00050	0.000097	<0.00050	0.020	<0.00010	0.168	1160	0.00251	<0.0000050	<0.000000020	0.0101	<0.00050	0.091	340	<0.00050	1.8	<0.00010	9670	6.93	822	<0.000050	<0.0010
WQ2-1	L2754594-7	2024-02-13	M																						
WQ2-1	VA24A2858-007	2024-02-13	M	<0.00050	0.000082	<0.00050	0.018	<0.00010	0.159	910	0.00274	<0.0000050	<0.000000020	0.00946	<0.00050	0.082	313	<0.00050	1.9	<0.00010	8420	7.06	777	<0.000050	<0.0010
WQ2-1	L2755033-7	2024-03-20	M																						
WQ2-1	VA24A5955-007	2024-03-20	M	<0.00050	0.000057	<0.00050	0.035	<0.00010	0.149	1170	0.00431	<0.0000050	<0.000000020	0.0102	<0.00050	0.096	365	<0.00050	1.9	<0.00010	10200	6.86	872	<0.000050	<0.0010
WQ2-1	L2755461-7	2024-04-23	M																						
WQ2-1	VA24A8736-007	2024-04-23	M	<0.00050	0.000075	<0.00050	0.034	<0.00010	0.195	1270	0.00244	<0.0000050	<0.000000040	0.0103	<0.00050	0.113	378	<0.00050	1.8	<0.00010	9450	7.17	931	<0.000050	<0.0010
WQ2-1	L2755553-7	2024-04-30	M																						
WQ2-1	VA24A9418-007	2024-04-30	M	<0.00050	0.000055	<0.00050	<0.010	<0.00010	0.120	1010	0.00191	<0.0000050	<0.000000020	0.00654	<0.00050	<0.050	284	<0.00050	<1.0	<0.00010	7250	4.54	663	<0.000050	<0.0010
WQ2-1	L2755641-7	2024-05-07	M																						
WQ2-1	VA24B0040-007	2024-05-07	M	<0.00050	0.000292	<0.00050	0.021	<0.00010	0.171	1010	0.00137	<0.0000050	<0.000000080	0.0104	<0.00050	0.092	347	0.00064	1.4	<0.00010	9450	7.10	802	<0.000050	<0.0010
WQ2-1	L2755769-7	2024-05-14	M																						
WQ2-1	VA24B0738-007	2024-05-14	M	<0.00050	0.000081	<0.00050	0.011	<0.00010	0.155	1120	0.00126	<0.0000050	<0.000000020	0.00919	<0.00050	0.100	354	<0.00050	1.5	<0.00010	9070	6.03	764	<0.000050	<0.0010
WQ2-1	L2755874-7	2024-05-21	M																						
WQ2-1	VA24B1351-007	2024-05-21	M	<0.00050	0.000094	<0.00050	0.022	<0.00010	0.162	1160	0.00270	<0.0000050	<0.000000020	0.00946	<0.00050	0.095	338	0.00412	1.6	<0.00010	8930	6.74	830	<0.000050	<0.0010
WQ2-1	L2756277-7	2024-06-18	M																						
WQ2-1	VA24B4257-007	2024-06-18	M	<0.00050	0.000063	<0.00050	0.022	<0.00010	0.150	1260	0.00346	<0.0000050	<0.000000020	0.00825	<0.00050	0.100	364	<0.00050	2.1	<0.00010	10100	5.70	874	<0.000050	<0.0010
WQ2-1	L2756678-7	2024-07-16	M																						
WQ2-1	VA24B7237-007	2024-07-16	M	<0.00050	0.000073	<0.00050	0.033	0.00011	0.131	1130	0.00330	<0.0000050	<0.000000020	0.00875	0.00051	0.093	351	<0.00050	1.6	<0.00010	9460	6.22	821	<0.000050	<0.0010
WQ2-1	L2757095-7	2024-08-20	M																						
WQ2-1	VA24C1101-007	2024-08-20	M	<0.00050	0.000063	0.00054	0.018	<0.00010	0.165	1160	0.00350	<0.0000050	<0.000000080	0.00890	<0.00050	0.093	342	<0.00050	1.9	<0.00010	10200	6.15	765	<0.000050	<0.0010
WQ2-1	VA24C4483-007	2024-09-17	M	<0.00050	0.000098	0.00062	0.024	0.00013	0.184	1200	0.00402	<0.0000050	<0.000000020	0.0101	<0.00050	0.106	342	<0.00050	1.4	<0.00010	9810	6.82	926	<0.000050	<0.0010
WQ2-1	VA24C8360-007	2024-10-22	M	<0.00050	0.000098	<0.00050	0.038	<0.00010	0.135	1210	0.00618	<0.0000050	<0.000000080	0.00910	<0.00050	0.089	359	0.00432	1.4	<0.00010	8970	6.27	754	<0.000050	<0.0010
WQ2-1	VA24C9197-007	2024-10-29	M	<0.00050	0.000283	<0.00050	0.065	<0.00010	0.148	1030	0.00771	<0.0000050	<0.000000020	0.0100	<0.00050	0.099	348	0.00571	1.7	<0.00010	7010	6.68	814	<0.000050	<0.0010
WQ2-1	VA24D0009-007	2024-11-05	M		0.000229	0.00205	0.042	0.00016	0.122	1100	0.0111	<0.0000050	<0.000000020	0.00910	<0.00050	0.086	346	0.00073	1.5	<0.00010	8120	6.30	786	<0.000050	<0.0010
WQ2-1	L2758095-4	2024-11-12	M																						
WQ2-1	VA24D0632-004	2024-11-12	M	<0.00050	0.000212	0.00072	0.018	<0.00010	0.146	1190	0.00909	<0.0000050	<0.000000020	0.00918	<0.00050	0.101	362	0.00131	1.6	<0.00010	8720	6.48	824	<0.000050	<0.0010
WQ2-1	VA24D1720-007	2024-11-21	M	<0.00050	0.000327	0.00074	0.075	0.00012	0.169	1260	0.0126	<0.0000050	<0.000000080	0.00975	0.00057	0.101	381	<0.00100	2.0	<0.00010	9820	6.62	934	<0.000050	<0.0010
WQ2-1	L2758465-7	2024-12-17	M																						
WQ2-1	VA24D3769-007	2024-12-17	M	<0.00050	0.000091	<0.00050	0.018	<0.00010	0.138	871	0.00401	<0.0000050	<0.000000080	0.0101	<0.00050	0.079	298	<0.00050	1.2	<0.00010	6850	6.74	723	<0.000050	<0.0010
WQ2-1	L2758719-7	2025-01-21	M																						
WQ2-1	VA25A1408-007	2025-01-21	M	<0.00050	0.000070	<0.00050	0.025	<0.00010	0.127	1280	0.00277	<0.0000050	0.000000022	0.00833	<0.00050	0.112	388	<0.00050	1.8	<0.00010	9520	6.08	838	<0.000050	<0.0010
WQ2-1	L2758994-7	2025-02-18	M																						
WQ2-1	VA25A3430-007	2025-02-18	M	<0.00050	0.000095	0.00059	0.093	0.00012	0.168	1190	0.00415	<0.0000050	<0.000000080	0.00848	<0.00050	0.090	362	<0.00050	2.6	<0.00010	9740	5.90	715	<0.000050	<0.0010
WQ2-1	VA25A6550-007	2025-03-25	M	<0.00050	<0.000050	<0.00050	0.020	<0.00010	0.167	1470	0.00194	<0.0000050	<0.000000020	0.00920	<0.00050	0.102	385	<0.00050	1.6	<0.00010	11400	6.41	815	<0.000050	<0.0010
WQ2-1	VA25A8962-007	2025-04-22	M	<0.00050	0.000076	<0.00050	0.015	<0.00010	0.144	1280	0.00125	<0.0000050	0.000000022	0.00945	<0.00050	0.086	325	0.00051	1.5	<0.00010	8730	6.58	741	<0.000050	<0.0010
WQ2-1	VA25A9878-007	2025-04-30	M	<0.00050	0.000092	<0.00050	0.011	<0.00010	0.142	1130	0.00146	<0.0000050	<0.000000020	0.00916	<0.00050	0.094	333	<0.00050	1.3	<0.00010	9120	6.46	784	<0.000050	<0.0010
WQ2-1	VA25B0358-007	2025-05-06	M	<0.00050	0.000081	<0.00050	0.017	<0.00010	0.113	1020	0.00185	<0.0000050	0.000000022	0.0105	0.00055	0.066	306	<0.00080	<1.0	<0.00010	6900	7.27	570	<0.000050	<0.0010
WQ2-1	VA25B1026-007	2025-05-13	M	<0.00050	0.000076	<0.00050	0.020	<0.00010	0.153	1250	0.00180	<0.0000050	<0.000000020	0.00946	0.00052	0.091	338	<0.00050	1.6	<0.00010	10400	6.23	778	<0.000050	<0.0010
WQ2-1	VA25B1711-007	2025-05-20	M	<0.00050	0.000085	<0.00050	0.013	<0.00010	0.138	1350	0.00208	<0.0000050	0.000000023	0.00922	<0.00050	0.089	308	<0.00050	1.2	<0.00010	9530	6.32	672	<0.000050	<0.0010
WQ2-2	0051710-04	2020-05-20	M		<0.00020	0.00316	0.316	0.00167	0.00654	38.4	0.011	<0.000010		0.00065	0.00143	<0.100	14.3	<0.00100	<2.0	<0.000100	320	0.242	30.2	<0.000040	<0.00040
WQ2-2	0062209-04	2020-06-22	M		0.0005	0.00342	0.862	0.00103	0.00845	53.8	0.0292	<0.000010		0.00064	0.00081	<0.100	16.4	<0.00100	<2.0	<0.000100	440	0.327	40	<0.000040	<0.00040
WQ2-2	0071996-04	2020-07-21	M		0.00028	0.0016	0.521	0.00052	0.0116	72.8	0.0175	<0.000010		0.00084	<0.00080	<0.100	23.1	<0.00100	3.2	<0.000100	603	0.443	62.6	<0.000040	<0.00040
WQ2-2	0082292-04	2020-08-24	M		<0.00020	0.00184	0.146	<0.00040	0.0931	514	0.014	<0.000010		0.00453	<0.00080	<0.100	153	0.0018	<2.0	<0.000100	4240	3.08	399	<0.000040	0.00045
WQ2-2	0093017-04	2020-09-28	M		0.00022	<0.00080	0.363	<0.00040	0.0441	274	0.0195	<0.000010		0.00783	0.00098	<0.100	98.4	<0.00100	2.6	<0.000100	2340	1.94	229	<0.000040	<0.00040
WQ2-2	20J1961-04	2020-10-20	M		<0.00020	0.0008	0.14	<0.00040	0.053	364	0.0109	<0.000010		0.00381	<0.00080	<0.100	105	<0.00100	2.2	<0.000100	3100	2.41	313	<0.000040	<0.00040

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	20J2778-04	2020-10-27	M		<0.00020	0.00125	0.108	0.00571	0.0679	486	0.0162	<0.000010		0.00532	<0.00080	<0.100	144	<0.00100	<2.0	<0.000100	4200	3.38	418	<0.000040	0.00044
WQ2-2	20K0360-04	2020-11-03	M		<0.00020	0.00222	0.158	0.00156	0.0598	374	0.0105	<0.000010		0.00375	<0.00080	<0.100	117	<0.00100	2.5	<0.000100	3210	2.47	329	<0.000040	<0.00040
WQ2-2	20K1261-04	2020-11-10	M		<0.00020	0.00124	0.188	<0.00040	0.0631	385	0.0152	<0.000010		0.00373	<0.00080	<0.100	120	<0.00100	2.4	<0.000100	3240	2.6	324	<0.000040	<0.00040
WQ2-2	20K2100-04	2020-11-18	M		0.00027	0.00097	0.378	<0.00040	0.0374	224	0.0259	<0.000010		0.00221	<0.00080	<0.100	74.8	<0.00100	3.4	<0.000100	1880	1.5	189	<0.000040	<0.00040
WQ2-2	20L1589-04	2020-12-14	M		<0.00020	0.00084	0.142	<0.00040	0.0838	618	0.0138	<0.000010		0.00617	<0.00080	<0.100	197	<0.00100	2.6	<0.000100	4870	4.29	563	<0.000040	<0.00040
WQ2-2	21A2590-04	2021-01-27	M		<0.00020	<0.00080	0.034	<0.00040	0.144	1040	0.00375	<0.000010		0.0098	<0.00080	0.123	324	<0.00100	<2.0	<0.000100	8710	6.54	815	<0.000040	0.00054
WQ2-2	21B2778-04	2021-02-25	M		<0.00020	<0.00080	0.039	<0.00040	0.166	979	0.00485	<0.000010		0.00895	<0.00080	0.14	307	<0.00100	2.7	<0.000100	7830	6.47	799	<0.000040	<0.00040
WQ2-2	21C3505-04	2021-03-25	M		0.0000698	0.00148	0.147	<0.000500	0.0786	431	0.0112	<0.000010	<0.000000050	0.00416	<0.00300	<0.1	143	<0.00100	5.23	<0.000100	3420	2.82	345	<0.0000400	<0.000500
WQ2-2	21D2478-04	2021-04-22	M		0.000139	0.00126	0.2	0.000078	0.0553	345	0.00923	<0.000010		0.00392	0.000335	0.03	108	<0.00010	2.91	<0.000010	2460	2.36	265	0.0000067	0.000086
WQ2-2	21E1990-04	2021-05-18	M		0.0003	0.00173	0.578	<0.00020	0.0048	29.1	0.0175	<0.000010		0.0007	0.00065	<0.050	9.44	<0.00050	2	<0.000050	260	0.188	18.2	<0.000020	<0.00020
WQ2-2	21E2917-04	2021-05-26	M		0.000167	0.00116	0.251	0.000106	0.00768	40.2	0.0101	<0.000010	<0.000000024	0.000832	0.000239	0.015	12.4	0.00017	3.27	<0.000010	331	0.277	31.2	0.000004	0.000112
WQ2-2	21F0167-04	2021-06-01	M		0.000116	0.00097	0.137	<0.000050	0.081	463	0.00691	<0.000010	<0.000000024	0.00418	0.000365	0.022	127	0.00083	2.47	<0.000010	3080	2.18	325	0.0000065	0.000053
WQ2-2	21F1056-04	2021-06-08	M		0.000292	0.00144	0.526	0.000127	0.00718	40.6	0.0176	<0.0000050	<0.000000023	0.00111	0.000508	0.021	12.6	<0.00010	3.54	<0.000010	291	0.243	29.7	0.0000071	0.000089
WQ2-2	21F2014-04	2021-06-15	M		0.000377	0.00213	0.643	0.000169	0.0199	141	0.0219	<0.000010		0.00155	0.00049	0.035	42	<0.00010	3.35	<0.000010	1130	0.843	107	0.0000095	<0.000050
WQ2-2	21G2414-04	2021-07-20	M		0.000153	<0.00100	0.276	0.014	0.0156	107	0.0116	<0.000010	<0.000000025	0.00114	0.000465	<0.1	35.1	<0.00100	0.78	<0.000100	854	0.616	85.3	<0.0000400	<0.000500
WQ2-2	21H3040-04	2021-08-25	M		0.000168	0.0015	0.253	<0.000500	0.0334	222	0.015	<0.000010	<0.000000050	0.00671	<0.000200	<0.1	74.6	<0.00100	6.51	<0.000100	1960	1.38	173	<0.0000400	<0.000500
WQ2-2	21I3814-04	2021-09-28	M		0.0000915	0.00131	0.0901	<0.000500	0.0755	550	0.00804	<0.000010	0.000000068	0.00558	0.000646	<0.1	173	0.00464	2.01	<0.000100	4320	3.22	414	<0.0000400	<0.000500
WQ2-2	21J3514-04	2021-10-26	M		0.00022	0.00117	0.451	0.00025	0.0194	124	0.0207	<0.000010	<0.000000050	0.00133	<0.00040	<0.050	37	<0.00050	3.2	<0.000050	1010	0.717	<0.6	0.000044	<0.00004
WQ2-2	21K3046-04	2021-11-23	M		<0.00020	0.00124	0.049	<0.00040	0.126	892	0.00684	<0.000010	<0.000000023	0.00804	0.00083	<0.100	260	<0.00100	2.8	<0.000100	6750	5.06	640	<0.000040	<0.00040
WQ2-2	21L2125-04	2021-12-14	M		<0.00020	0.00106	0.108	<0.00040	0.0986	648	0.0123	<0.000010	<0.000000023	0.0058	<0.00080	<0.100	196	<0.00100	3.7	<0.000100	5390	3.9	481	<0.000040	<0.00040
WQ2-2	22A2312-04	2022-01-20	M		0.00029		0.026	<0.00040	0.156	953	0.00423	<0.000010	<0.000000024	0.00858	0.127	<0.100	295	<0.00100	2.4	0.000112	8000	5.74	740	<0.000040	<0.00040
WQ2-2	22B2487-04	2022-02-17	M		<0.00020	<0.00080	0.036	<0.00040	0.138	1080	0.00334	<0.000010		0.00863	<0.00080	<0.100	311	0.00225	<2.0	<0.000100	8040	5.67	749	<0.000040	<0.00040
WQ2-2	22C3145-04	2022-03-22	M		<0.00020	0.00138	0.061	<0.00040	0.12	913	0.00239	<0.000010		0.00769	<0.00080	<0.100	270	<0.00100	<2.0	<0.000100	6840	4.96	594	<0.000040	<0.00040
WQ2-2	22D2212-11	2022-04-19	M		<0.00020	0.00104	0.031	<0.00040	0.146	1120	0.00277	<0.000010		0.0089	<0.00080	<0.100	326	<0.00100	<2.0	<0.000100	9140	5.98	753	0.000174	<0.00040
WQ2-2	22E2480-06	2022-05-17	M		<0.00100	<0.00400	0.115	<0.00200	0.0252	210	0.00624	<0.000010	<0.000000024	0.00205	<0.00400	<0.500	66.5	<0.00500	<10.0	<0.000500	1660	1.25	153	<0.000200	<0.00200
WQ2-2	22F3212-04	2022-06-21	M		0.000114	<0.00200	0.195	<0.000500	0.014	85.9	0.00815	<0.000010		0.00101	<0.000400	<0.1	27.1	<0.00100	1.98	<0.000100	701	0.522	69.4	<0.0000400	<0.000500
WQ2-2	22G1763-04	2022-07-13	M		0.000154	<0.00200	0.255	<0.000500	0.0176	133	0.0105	<0.000010		0.00125	<0.000400	<0.1	40.7	<0.00100	1.71	<0.000100	1100	0.785	94.2	<0.0000400	<0.000500
WQ2-2	22H2453-04	2022-08-16	M		0.000160	<0.00200	0.349	<0.000500	0.0134	89.4	0.0149	<0.000010	<0.000000026	0.000930	<0.000400	<0.100	27.7	<0.00100	1.97	<0.000100	729	0.538	65.4	<0.0000400	<0.000500
WQ2-2	22I1926-04	2022-09-14	M		0.0000708	<0.00200	0.0597	<0.000500	0.0875	674	0.00711	<0.000010		0.00592	0.000518	<0.100	210	<0.00100	1.23	<0.000100	5730	3.72	497	<0.0000400	<0.000500
WQ2-2	22J1560-06	2022-10-12	M		0.0000642	<0.00200	0.0855	0.0111	0.144	954	0.00688	<0.000010		0.00806	<0.000400	<0.1	254	<0.00100	<1	<0.000100	7420	5.39	622	<0.0000400	<0.000500
WQ2-2	22K1453-04	2022-11-10	M		0.000157	<0.00200	0.0858	<0.000500	0.145	1100	0.0172	<0.000010	<0.000000050	0.00891	0.000691	<0.1	331	<0.00100	2.45	<0.000100	8600	6.07	810	<0.0000400	<0.000500
WQ2-2	22L0774-04	2022-12-07	M		0.0000661	<0.00200	0.0594	<0.000500	0.137	1080	0.0289	<0.000010		0.00892	0.000587	<0.1	300	<0.00100	1.91	<0.000100	8270	6.07	708	<0.0000400	<0.000500
WQ2-2	23A2847-04	2023-01-27	M		0.000122	<0.00200	0.137	<0.000500	0.0838	590	0.0154	<0.000010	<0.000000060	0.00529	<0.000400	<0.1	186	<0.00100	3.7	<0.000100	5000	3.4	455	<0.0000400	<0.000500
WQ2-2	23C0060-04	2023-02-28	M		0.0000701	<0.00200	0.0522	<0.000500	0.121	1140	0.00620	<0.000010		0.00948	0.000451	0.114	358	<0.00100	2.27	<0.000100	9080	6.45	882	<0.0000400	<0.000500
WQ2-2	23C1797-04	2023-03-15	M		<0.0000500	<0.00200	0.0505	0.00138	0.142	988	0.00608	<0.000010		0.00807	<0.000400	0.103	301	<0.00100	2	<0.000100	10100	5.47	742	<0.0000400	<0.000500
WQ2-2	23D2945-04	2023-04-26	M		<0.0000500	<0.00200	0.0690	<0.000500	0.0811	620	0.00889	<0.000010		0.00563	<0.000400	<0.1	190	0.00102	1.43	<0.000100	4740	3.71	450	<0.0000400	<0.000500
WQ2-2	23E2392-04	2023-05-17	M		0.000422	0.00209	0.796	0.000167	0.00916	87.5	0.0235	<0.000010	<0.000000050	0.000954	0.000494	<0.02	28.4	<0.00020	2.78	<0.000020	705	0.509	63.2	0.0000104	<0.000100
WQ2-2	23F3614-04	2023-06-27	M		0.000179	<0.00200	0.385	0.00165	0.0140	91.3	0.0139	<0.000010		0.00110	<0.000400	<0.1	27.4	<0.00100	2.02	<0.000100	766	0.546	68.1	<0.0000400	<0.000500
WQ2-2	23G2415-04	2023-07-19	M		0.000169	<0.00200	0.248	0.000539	0.0243	165	0.0139	<0.000010		0.00170	<0.000400	<0.1	53.1	<0.00100	1.8	0.000321	1340	1.01	126	<0.0000400	<0.000500
WQ2-2	23H3309-06	2023-08-24	M		0.000155	<0.00200	0.232	0.00186	0.0526	372	0.0149	<0.000010	<0.000000050	0.00359	<0.000400	<0.1	122	<0.00100	1.74	<0.000100	3020	2.25	286	<0.0000400	<0.000500
WQ2-2	23I2271-06	2023-09-19	M		0.0000687	<0.00200	0.0955	0.000597	0.0615	456	0.00900	<0.000010		0.00394	<0.000400	<0.1	145	<0.00100	1.47	<0.000100	3620	2.58	355	<0.0000400	<0.000500
WQ2-2	23J2236-06	2023-10-18	M		0.000476	0.00256	0.898	0.00110	0.0157	119	0.0345	<0.000010		0.00135	0.000610	<0.1	38.3	<0.00100	3.23	<0.000100	970	0.754	102	<0.0000400	<0.000500
WQ2-2	23K1909-04	2023-11-15	M		0.0000832	<0.00200	0.102	0.000983	0.158	558	0.0107	<0.000010	<0.000000050	0.00494	0.000407	<0.1	157	<0.00100	3.27	<0.000100	4620	3.16	510	<0.0000400	<0.000500
WQ2-2	23L1905-08	2023-12-14	M		<0.0000500	0.00213	0.0772	<0.000500	0.117	1000	0.00655	0.000011		0.00894	0.000418	<0.1	309	<0.00100	1.85	<0.000100	8130	6.31	783	<0.0000400	<0.000500
WQ2-2	L2754383-2	2024-01-25	M																						
WQ2-2	VA24A1507-002	2024-01-25	M	<0.00050	0.000099	0.00054	0.042	0.00017	0.144	1040	0.00382	<0.0000050	0.000000028	0.00939	<0.00050	0.082	325	<0.00050	2.2	<0.00010	9100	6.41	732	<0.000050	<0.0010
WQ2-2	L2754594-8	2024-02-13	M																						
WQ2-2	VA24A2858-008	2024-02-13	M	<0.00050	0.000140	0.00074	0.085	0.00012	0.107	785	0.00939	<0.0000050	<0.000000020	0.00708	<0.00050	0.068	217	<0.00050	2.6	<0.00010	6080	4.79	549	0.000052	<0.0010
WQ2-2	L2755033-8	2024-03-20	M																						
WQ2-2	VA24A5955-008	2024-03-20	M	<0.00050	0.000066	0.00064	0.058	<0.00010	0.115	864	0.00466	<0.0000050	<0.000000020	0.00768	<0.00050	0.053	274	<0.00050	<1.0	<0.00010	8020	5.20	658	<0.000050	<0.0010
WQ2-2	L2755461-8	2024-04-23	M																						
WQ2-2	VA24A8736-008	2024-04-23	M	0.00052	0.000065	<0.00050	0.049	<0.00010	0.153	1060	0.00501	<0.0000050	<0.000000040	0.00817	<0.00050	0.053	308	<0.00050	<1.0	<0.00010	7780	5.57	726	<0.000050	<0.0010
WQ2-2	L2755553-8	2024-04-30	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	VA24A9418-008	2024-04-30	M	<0.00050	0.000076	0.00103	0.114	<0.00010	0.042	333	0.00693	<0.0000050	<0.000000020	0.00236	<0.00050	<0.050	92.5	<0.00050	3.5	<0.00010	2390	1.49	216	<0.000050	<0.0010
WQ2-2	L2755641-8	2024-05-07	M																						
WQ2-2	VA24B0040-008	2024-05-07	M	<0.00050	0.000298	0.00078	0.113	<0.00010	0.106	642	0.00564	<0.0000050	<0.000000040	0.00658	<0.00050	<0.050	215	0.00061	1.1	<0.00010	6050	4.45	509	<0.000050	<0.0010
WQ2-2	L2755769-8	2024-05-14	M																						
WQ2-2	VA24B0738-008	2024-05-14	M	<0.00050	0.000158	0.00111	0.192	<0.00010	0.063	462	0.00913	<0.0000050	<0.000000020	0.00384	<0.00050	<0.050	143	<0.00050	1.4	<0.00010	3620	2.37	300	<0.000050	<0.0010
WQ2-2	L2755874-8	2024-05-21	M																						
WQ2-2	VA24B1351-008	2024-05-21	M	<0.00050	0.000111	0.00081	0.086	<0.00010	0.109	755	0.00667	<0.0000050	<0.000000020	0.00644	<0.00050	<0.050	224	0.00288	<1.0	<0.00010	5830	4.53	558	<0.000050	<0.0010
WQ2-2	L2756277-8	2024-06-18	M																						
WQ2-2	VA24B4257-008	2024-06-18	M	0.00286	0.000120	0.00130	0.171	<0.00010	0.057	477	0.0130	<0.0000050	0.000000026	0.00367	0.00247	<0.050	137	<0.00050	1.5	<0.00010	3990	2.39	323	<0.000050	<0.0010
WQ2-2	L2756678-8	2024-07-16	M																						
WQ2-2	VA24B7237-008	2024-07-16	M	<0.00050	0.000216	0.00128	0.378	0.00012	0.056	478	0.0134	<0.0000050	<0.000000020	0.00403	<0.00050	<0.050	144	<0.00050	2.0	<0.00010	3720	2.69	340	<0.000050	<0.0010
WQ2-2	L2757095-8	2024-08-20	M																						
WQ2-2	VA24C1101-008	2024-08-20	M	<0.00050	0.000084	0.00073	0.058	<0.00010	0.118	817	0.00319	<0.0000050	<0.000000080	0.00639	<0.00050	<0.050	244	<0.00050	1.0	<0.00010	6860	4.38	555	<0.000050	<0.0010
WQ2-2	VA24C4483-008	2024-09-17	M	<0.00050	0.000154	0.00153	0.143	0.00032	0.069	607	0.0137	<0.0000050	<0.000000020	0.00446	<0.00050	<0.050	169	<0.00050	1.4	<0.00010	4450	3.04	408	<0.000050	<0.0010
WQ2-2	VA24C8360-008	2024-10-22	M	<0.00050	0.000110	0.00127	0.094	<0.00010	0.097	885	0.00744	<0.0000050	<0.000000080	0.00668	<0.00050	0.059	267	0.00269	1.3	<0.00010	6700	4.57	586	<0.000050	<0.0010
WQ2-2	VA24C9197-008	2024-10-29	M	<0.00050	0.000202	0.00089	0.130	0.00012	0.076	588	0.00799	<0.0000050	0.000000021	0.00470	<0.00050	<0.050	180	<0.00050	2.0	<0.00010	4430	3.08	411	<0.000050	<0.0010
WQ2-2	VA24D0009-008	2024-11-05	M		0.000164	0.00103	0.038	<0.00010	0.100	845	0.00607	<0.0000050	<0.000000020	0.00599	<0.00050	0.063	250	<0.00050	1.7	<0.00010	6460	4.22	579	<0.000050	<0.0010
WQ2-2	L2758095-5	2024-11-12	M																						
WQ2-2	VA24D0632-005	2024-11-12	M	<0.00050	0.000183	0.00135	0.154	<0.00010	0.071	587	0.00807	<0.0000050	<0.000000020	0.00463	<0.00050	0.059	176	0.00074	2.0	<0.00010	4320	3.18	405	<0.000050	<0.0010
WQ2-2	VA24D1720-008	2024-11-21	M	<0.00050	0.000266	0.00092	0.066	<0.00010	0.138	1030	0.00738	<0.0000050	<0.00000200	0.00790	<0.00050	0.083	305	<0.00100	2.1	<0.00010	8120	5.35	738	<0.000050	<0.0010
WQ2-2	L2758465-8	2024-12-17	M																						
WQ2-2	VA24D3769-008	2024-12-17	M	<0.00050	0.000092	0.00082	0.034	<0.00010	0.120	745	0.00434	<0.0000050	<0.000000020	0.00864	<0.00050	0.069	254	<0.00050	1.3	<0.00010	5770	5.74	619	<0.000050	<0.0010
WQ2-2	L2758719-8	2025-01-21	M																						
WQ2-2	VA25A1408-008	2025-01-21	M	<0.00050	0.000085	0.00067	0.076	<0.00010	0.101	1020	0.00700	<0.0000050	0.000000021	0.00670	<0.00050	0.097	304	<0.00050	2.6	<0.00010	7520	4.79	666	<0.000050	<0.0010
WQ2-2	L2758994-8	2025-02-18	M																						
WQ2-2	VA25A3430-008	2025-02-18	M	<0.00050	0.000073	0.00066	0.068	<0.00010	0.141	1020	0.00734	<0.0000050	<0.000000020	0.00698	<0.00050	0.068	304	<0.00050	3.2	<0.00010	8130	4.95	598	<0.000050	<0.0010
WQ2-2	VA25A6550-008	2025-03-25	M	<0.00050	<0.000050	0.00056	0.049	<0.00010	0.116	990	0.00339	<0.0000050	<0.000000020	0.00642	<0.00050	<0.050	268	<0.00050	<1.0	<0.00010	7850	4.54	574	<0.000050	<0.0010
WQ2-2	VA25A8962-008	2025-04-22	M	<0.00050	0.000079	0.00075	0.064	<0.00010	0.073	631	0.00472	<0.0000050	<0.000000020	0.00505	<0.00050	<0.050	166	<0.00050	1.3	<0.00010	4370	3.36	378	<0.000050	<0.0010
WQ2-2	VA25A9878-008	2025-04-30	M	<0.00050	0.000120	0.00100	0.134	<0.00010	0.040	311	0.00728	<0.0000050	<0.000000020	0.00288	<0.00050	<0.050	93.6	<0.00050	2.0	<0.00010	2500	1.86	226	<0.000050	<0.0010
WQ2-2	VA25B0358-008	2025-05-06	M	<0.00050	0.000081	0.00064	0.014	<0.00010	0.092	727	0.00365	<0.0000050	<0.000000020	0.00777	<0.00050	<0.050	223	<0.00060	<1.0	<0.00010	4960	5.34	424	<0.000050	<0.0010
WQ2-2	VA25B1026-008	2025-05-13	M	<0.00050	0.000092	0.00068	0.099	<0.00010	0.048	339	0.00609	<0.0000050	<0.000000020	0.00314	<0.00050	<0.050	100	<0.00050	1.8	<0.00010	2820	1.91	228	<0.000050	<0.0010
WQ2-2	VA25B1711-008	2025-05-20	M	<0.00050	0.000086	0.00092	0.089	<0.00010	0.042	281	0.00528	<0.0000050	<0.000000020	0.00263	<0.00050	<0.050	77.2	<0.00050	2.1	<0.00010	2150	1.61	178	<0.000050	<0.0010
WQ2-3	23L1905-09	2023-12-14	M		0.0000629	0.00256	0.155	<0.000500	0.125	1040	0.00867	<0.000010		0.00933	0.000532	<0.1	322	<0.00100	2.04	<0.000100	8450	6.58	822	<0.0000400	<0.000500
WQ2-3	L2754383-3	2024-01-25	M																						
WQ2-3	VA24A1507-003	2024-01-25	M	<0.00050	0.000101	0.00079	0.119	0.00016	0.075	557	0.00834	<0.0000050	0.000000022	0.00471	<0.00050	0.053	160	<0.00050	2.8	<0.00010	4220	3.12	373	<0.000050	<0.0010
WQ2-3	L2754594-9	2024-02-13	M																						
WQ2-3	VA24A2858-009	2024-02-13	M	<0.00050	0.000141	0.00077	0.118	0.00016	0.077	581	0.0124	<0.0000050	<0.000000020	0.00536	<0.00050	0.056	160	<0.00050	2.7	<0.00010	4480	3.56	398	<0.000050	<0.0010
WQ2-3	L2755033-9	2024-03-20	M																						
WQ2-3	VA24A5955-009	2024-03-20	M	<0.00050	0.000115	0.00077	0.135	<0.00010	0.063	481	0.00862	<0.0000050	<0.000000020	0.00406	<0.00050	<0.050	147	<0.00050	2.5	<0.00010	4200	2.69	351	<0.000050	<0.0010
WQ2-3	L2755461-9	2024-04-23	M																						
WQ2-3	VA24A8736-009	2024-04-23	M	<0.00050	0.000076	0.00057	0.082	<0.00010	0.101	712	0.00631	<0.0000050	<0.000000040	0.00544	<0.00050	<0.050	203	<0.00050	1.0	<0.00010	5170	3.62	473	<0.000050	<0.0010
WQ2-3	L2755553-9	2024-04-30	M																						
WQ2-3	VA24A9418-009	2024-04-30	M	<0.00050	0.000082	0.00090	0.113	<0.00010	0.039	307	0.00668	<0.0000050	<0.000000020	0.00211	<0.00050	<0.050	85.4	<0.00050	2.6	<0.00010	2220	1.37	203	<0.000050	<0.0010
WQ2-3	L2755641-9	2024-05-07	M																						
WQ2-3	VA24B0040-009	2024-05-07	M	<0.00050	0.000339	0.00099	0.172	<0.00010	0.057	376	0.00860	<0.0000050	<0.000000080	0.00391	<0.00050	<0.050	121	<0.00050	1.9	<0.00010	3470	2.48	290	<0.000050	<0.0010
WQ2-3	L2755769-9	2024-05-14	M																						
WQ2-3	VA24B0738-009	2024-05-14	M	<0.00050	0.000271	0.00150	0.472	<0.00010	<0.020	63.0	0.0142	<0.0000050	<0.000000020	0.00081	<0.00050	<0.050	18.5	<0.00050	2.5	<0.00010	494	0.330	41.5	<0.000050	<0.0010
WQ2-3	L2755874-9	2024-05-21	M																						
WQ2-3	VA24B1351-009	2024-05-21	M	<0.00050	0.000204	0.00117	0.380	<0.00010	<0.020	91.2	0.0147	<0.0000050	<0.000000020	0.00109	<0.00050	<0.050	26.1	<0.00050	2.6	<0.00010	732	0.560	66.5	<0.000050	<0.0010
WQ2-3	L2756277-9	2024-06-18	M																						
WQ2-3	VA24B4257-010	2024-06-18	M	<0.00050	0.000153	0.00093	0.277	<0.00010	<0.020	23.1	0.0130	<0.0000050	0.000000021	0.00068	<0.00050	<0.050	7.4	<0.00050	2.8	<0.00010	207	0.164	17.8	<0.000050	<0.0010
WQ2-3	L2756678-9	2024-07-16	M																						
WQ2-3	VA24B7237-009	2024-07-16	M	0.00061	0.000329	0.00169	0.668	0.00015	<0.020	141	0.0202	<0.0000050	<0.000000020	0.00131	<0.00050	0.052	40.9	<0.00050	2.8	<0.00010	1080	0.727	94.0	<0.000050	<0.0010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-3	L2757095-9	2024-08-20	M																						
WQ2-3	VA24C1101-009	2024-08-20	M	<0.00050	0.000283	0.00205	0.460	0.00225	0.036	265	0.0169	0.0000150	0.000000132	0.00224	0.00112	<0.050	78.3	<0.00050	2.4	<0.00010	2100	1.34	170	<0.000050	<0.0010
WQ2-3	VA24C4483-009	2024-09-17	M	<0.00050	0.000140	0.00091	0.165	<0.00010	0.045	397	0.0129	<0.0000050	<0.000000020	0.00297	<0.00050	<0.050	110	<0.00050	1.7	<0.00010	2900	1.93	264	<0.000050	<0.0010
WQ2-3	VA24C8360-009	2024-10-22	M	<0.00050	0.000348	0.00227	0.616	0.00019	0.020	187	0.0243	<0.0000050	0.000000030	0.00147	0.00058	<0.050	55.0	<0.00050	3.1	<0.00010	1420	0.920	120	<0.000050	<0.0010
WQ2-3	VA24C9197-009	2024-10-29	M	<0.00050	0.000216	0.00205	0.285	0.00022	0.028	220	0.0111	<0.0000050	<0.000000020	0.00193	<0.00050	<0.050	66.4	<0.00050	2.7	<0.00010	1640	1.12	148	<0.000050	<0.0010
WQ2-3	VA24D0009-009	2024-11-05	M		0.000148	0.00110	0.105	<0.00010	0.049	411	0.0107	<0.0000050	<0.000000020	0.00316	<0.00050	<0.050	124	<0.00050	2.5	<0.00010	3140	2.12	287	<0.000050	<0.0010
WQ2-3	L2758095-6	2024-11-12	M																						
WQ2-3	VA24D0632-006	2024-11-12	M	<0.00050	0.000177	0.00159	0.243	<0.00010	0.028	226	0.00966	<0.0000050	<0.000000020	0.00199	<0.00050	<0.050	66.2	<0.00050	2.5	<0.00010	1660	1.19	152	<0.000050	<0.0010
WQ2-3	VA24D1720-009	2024-11-21	M	<0.00050	0.000262	0.00115	0.127	<0.00010	0.106	772	0.0120	<0.0000050	<0.000000080	0.00614	<0.00050	0.068	230	<0.00100	2.7	<0.00010	6020	4.12	557	<0.000050	<0.0010
WQ2-3	L2758465-9	2024-12-17	M																						
WQ2-3	VA24D3769-009	2024-12-17	M	<0.00050	0.000088	0.00114	0.033	<0.00010	0.117	717	0.00461	<0.0000050	<0.000000080	0.00876	<0.00050	0.070	251	<0.00050	1.3	<0.00010	5690	5.68	607	<0.000050	<0.0010
WQ2-3	L2758719-9	2025-01-21	M																						
WQ2-3	VA25A1408-009	2025-01-21	M	<0.00050	0.000093	0.00063	0.100	<0.00010	0.088	873	0.00898	<0.0000050	<0.000000020	0.00586	<0.00050	0.085	265	<0.00050	3.0	<0.00010	6500	4.19	576	<0.000050	<0.0010
WQ2-3	L2758994-9	2025-02-18	M																						
WQ2-3	VA25A3430-009	2025-02-18	M	<0.00050	0.000077	0.00054	0.076	<0.00010	0.135	962	0.00796	<0.0000050	<0.000000020	0.00689	<0.00050	0.068	284	<0.00050	3.3	<0.00010	7780	4.79	573	<0.000050	<0.0010
WQ2-3	VA25A6550-009	2025-03-25	M	<0.00050	0.000065	0.00054	0.085	<0.00010	0.088	724	0.00543	<0.0000050	<0.000000020	0.00507	<0.00050	<0.050	201	<0.00050	1.2	<0.00010	5670	3.47	434	<0.000050	<0.0010
WQ2-3	VA25A8962-009	2025-04-22	M	<0.00050	0.000082	0.00081	0.106	<0.00010	0.036	314	0.00626	<0.0000050	<0.000000020	0.00282	<0.00050	<0.050	85.2	<0.00050	2.1	<0.00010	2260	1.71	194	<0.000050	<0.0010
WQ2-3	VA25A9878-009	2025-04-30	M	<0.00050	0.000109	0.00186	0.163	<0.00010	<0.020	146	0.00786	<0.0000050	<0.000000020	0.00163	<0.00050	<0.050	45.1	<0.00050	2.4	<0.00010	1200	0.882	105	<0.000050	<0.0010
WQ2-3	VA25B0358-009	2025-05-06	M	<0.00050	0.000127	0.00102	0.189	<0.00010	0.026	210	0.00851	<0.0000050	<0.000000020	0.00264	<0.00050	<0.050	67.5	<0.00050	1.3	<0.00010	1520	1.61	126	<0.000050	<0.0010
WQ2-3	VA25B1026-009	2025-05-13	M	<0.00050	0.000073	0.00062	0.096	<0.00010	0.030	211	0.00628	<0.0000050	<0.000000020	0.00209	<0.00050	<0.050	64.5	<0.00050	1.9	<0.00010	1780	1.23	150	<0.000050	<0.0010
WQ2-3	VA25B1711-009	2025-05-20	M	<0.00050	0.000093	0.00087	0.152	<0.00010	<0.020	64.6	0.00688	<0.0000050	0.000000025	0.00097	<0.00050	<0.050	19.2	<0.00050	3.2	<0.00010	524	0.414	46.7	<0.000050	<0.0010
WQ3-1	0051710-05	2020-05-20	M		<0.00020	0.00153	0.03	0.00277	0.157	1100	0.00274	<0.000010		0.0101	0.00136	<0.100	374	<0.00100	<2.0	<0.000100	8490	7.06	879	<0.000040	<0.00040
WQ3-1	0062209-05	2020-06-22	M		<0.00020	0.00111	0.023	0.00057	0.166	1140	0.00239	<0.000010		0.0102	<0.00080	<0.100	335	<0.00100	<2.0	0.000102	9240	7.17	844	<0.000040	<0.00040
WQ3-1	0071996-05	2020-07-21	M		<0.00020	<0.00080	0.038	<0.00040	0.16	1150	0.00447	<0.000010		0.00979	<0.00080	<0.100	316	<0.00100	<2.0	<0.000100	9020	7.03	875	<0.000040	<0.00040
WQ3-1	0082292-05	2020-08-24	M		<0.00020	0.00182	0.035	<0.00040	0.167	1270	0.00407	<0.000010		0.0109	<0.00080	0.101	382	0.00576	<2.0	<0.000100	9860	7.77	983	<0.000040	<0.00040
WQ3-1	0093017-05	2020-09-28	M		<0.00020	<0.00080	0.037	<0.00040	0.15	944	0.0103	<0.000010		0.00993	0.00115	0.115	304	<0.00100	<2.0	<0.000100	8280	6.59	785	<0.000040	<0.00040
WQ3-1	20J1961-05	2020-10-20	M		<0.00020	<0.00080	0.024	<0.00040	0.169	1220	0.0103	<0.000010		0.0108	<0.00080	<0.100	345	<0.00100	<2.0	<0.000100	8740	7.58	1030	<0.000040	<0.00040
WQ3-1	20J2778-05	2020-10-27	M		<0.00020	0.00085	0.03	0.00076	0.152	1120	0.0086	<0.000010		0.0111	<0.00080	0.101	322	<0.00100	<2.0	<0.000100	8530	7.51	931	<0.000040	<0.00040
WQ3-1	20K0360-05	2020-11-03	M		<0.00020	0.00126	<0.020	0.00093	0.166	1020	0.00871	<0.000010		0.00939	<0.00080	0.146	314	<0.00100	<2.0	0.000107	8780	6.86	888	<0.000040	<0.00040
WQ3-1	20K1261-05	2020-11-10	M		<0.00020	0.00082	0.024	<0.00040	0.187	1140	0.012	<0.000010		0.0113	<0.00080	<0.100	355	<0.00100	<2.0	<0.000100	7380	8.16	980	<0.000040	<0.00040
WQ3-1	20K2100-05	2020-11-18	M		<0.00020	<0.00080	<0.020	<0.00040	0.185	1200	0.0071	<0.000010		0.0101	<0.00080	0.214	359	<0.00100	<2.0	<0.000100	10000	7.94	1020	<0.000040	<0.00040
WQ3-1	20L1589-05	2020-12-14	M		<0.00020	<0.00080	<0.020	<0.00040	0.147	1180	0.00529	<0.000010		0.0108	<0.00080	0.122	373	<0.00100	<2.0	<0.000100	9460	7.84	1060	<0.000040	0.012
WQ3-1	21A2590-05	2021-01-27	M		<0.00020	<0.00080	0.033	<0.00040	0.145	1090	0.0028	<0.000010		0.0108	<0.00080	0.162	344	<0.00100	<2.0	<0.000100	9230	7.1	859	<0.000040	<0.00040
WQ3-1	21B2778-05	2021-02-25	M		<0.00020	<0.00080	<0.020	<0.00040	0.203	1240	0.00265	<0.000010		0.0118	<0.00080	0.128	390	<0.00100	2.4	<0.000100	9990	8.01	1020	<0.000040	<0.00040
WQ3-1	21C3505-05	2021-03-25	M		<0.0000500	<0.00100	0.0218	<0.000500	0.21	1200	0.00241	<0.000010	<0.000000050	0.0105	<0.00300	0.114	359	<0.00100	4.45	<0.000100	9630	7.8	917	<0.0000400	<0.000500
WQ3-1	21D2478-05	2021-04-22	M		<0.0000500	<0.00100	<0.0200	<0.000500	0.182	1240	0.00153	<0.000010		0.0114	0.000543	0.167	395	<0.00100	2.09	<0.000100	9630	7.08	948	<0.0000400	<0.000500
WQ3-1	21E1990-05	2021-05-18	M		<0.00010	<0.00040	0.017	<0.00020	0.13	932	0.0028	<0.000010		0.00926	0.00053	0.055	324	<0.00050	1.6	<0.000050	10500	7.22	796	<0.000020	<0.00020
WQ3-1	21E2917-05	2021-05-26	M		<0.0000500	<0.00100	0.0227	<0.000500	0.185	1280	0.00263	<0.000010	<0.000000024	0.0111	0.000702	0.127	389	<0.00100	2.13	<0.000100	9830	7.21	892	<0.0000400	<0.000500
WQ3-1	21F0167-05	2021-06-01	M		<0.0000500	<0.00100	0.0316	<0.000500	0.161	1180	0.00212	<0.000010	<0.000000024	0.0106	0.00113	<0.1	359	<0.00100	2.59	<0.000100	9620	6.72	783	<0.0000400	0.000589
WQ3-1	21F1056-05	2021-06-08	M		<0.0000500	<0.00100	0.0219	<0.000500	0.203	1290	0.00198	<0.0000050	<0.000000023	0.0115	0.000672	<0.1	371	<0.00100	2.21	<0.000100	8890	7	884	<0.0000400	<0.000500
WQ3-1	21F2014-05	2021-06-15	M		0.0000567	<0.00100	0.0279	<0.000500	0.166	1200	0.00327	<0.000010	<0.000000023	0.0107	0.000303	<0.1	353	0.00256	1.93	<0.000100	9510	7.12	900	0.000059	<0.000500
WQ3-1	21G2414-05	2021-07-20	M		<0.0000500	<0.00100	<0.0200	0.000583	0.161	1100	0.00409	<0.000010	<0.000000025	0.00929	0.000486	<0.1	317	<0.00100	<0.5	<0.000100	8710	6.36	804	<0.0000400	<0.000500
WQ3-1	21H3040-05	2021-08-25	M		<0.0000500	0.00153	0.0319	<0.000500	0.168	1120	0.00462	<0.000010	<0.000000050	0.0104	0.000303	<0.1	344	<0.00100	13.7	<0.000100	9760	7.13	883	<0.0000400	<0.000500
WQ3-1	21I3814-05	2021-09-28	M		0.0000996	<0.00100	0.32	<0.000500	0.159	1150	0.00718	<0.000010	<0.000000024	0.0105	0.000722	<0.1	359	0.00566	2.44	<0.000100	8900	7.16	828	<0.0000400	<0.000500
WQ3-1	21J3514-05	2021-10-26	M		0.00006	<0.00040	0.05	<0.00020	0.151	1150	0.00968	<0.000010	<0.000000050	0.00976	<0.00040	0.081	294	<0.00050	1.5	<0.000050	9070	5.92	0.8	0.00002	<0.00004
WQ3-1	21K3046-05	2021-11-23	M		<0.00020	0.00098	0.021	<0.00040	0.173	1170	0.00489	<0.000010	0.000000037	0.0105	<0.00080	<0.100	341	<0.00100	2.2	<0.000100	8730	6.71	825	<0.000040	<0.00040
WQ3-1	21L2125-05	2021-12-14	M		<0.00020	<0.00080	0.036	<0.00040	0.164	1070	0.0056	<0.000010	<0.000000023	0.00933	<0.00080	<0.100	326	<0.00100	2.5	<0.000100	8910	6.58	813	<0.000040	<0.00040
WQ3-1	22A2312-05	2022-01-20	M		<0.00020	0.00203	0.023	0.00073	0.173	1080	0.00413	<0.000010	<0.000000024	0.00966	<0.00080	0.105	338	<0.00100	2.2	<0.000100	9050	6.4	837	<0.000040	<0.00040
WQ3-1	22B2487-05	2022-02-17	M		<0.00020	<0.00080	0.027	<0.00040	0.153	1190	0.00337	<0.000010		0.00983	<0.00080	<0.100	343	0.00219	2.1	<0.000100	8920	6.39	826	<0.000040	<0.00040
WQ3-1	22C3145-05	2022-03-22	M		<0.00020	0.00285	0.037	<0.00040	0.139	1090	0.00409	<0.000010		0.00889	0.00089	<0.100	322	0.00103	<2.0	<0.000100	8110	5.84	696	<0.000040	<0.00040
WQ3-1	22D2212-04	2022-04-19	M		<0.00020	0.007	0.035	<0.00040	0.204	1380	0.00218	<0.000010		0.0106	<0.00080	0.124	411	<0.00100	<2.0	0.000153	11400	7.59	946	0.000224	<0.00040
WQ3-1	22E2480-07	2022-05-17	M		<0.00100	<0.00400	<0.100	<0.00200	0.122	1040	<0.00200	<0.000010	0.000000038	0.00925	<0.00400	<0.500	340	<0.00500	<10.0	<0.000500	8380	6.9	835	<0.000200	<0.00200
WQ3-1	22F3212-05	2022-06-21	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.149	1040	0.00332	<0.000010		0.00949	<0.000400	<0.1	338	<0.00100	1.17	<0.000100	8440	6.75	869	<0.0000400	<0.000500

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	22G1763-05	2022-07-13	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.136	1140	0.00380	<0.000010		0.00984	<0.000400	0.107	335	<0.00100	1.28	<0.000100	9510	7.08	839	<0.0000400	<0.000500
WQ3-1	22H2453-05	2022-08-16	M		<0.0000500	<0.00200	0.0210	<0.000500	0.142	992	0.00473	<0.000010	0.000000033	0.00908	<0.000400	<0.100	334	<0.00100	1.38	<0.000100	8450	6.67	812	<0.0000400	<0.000500
WQ3-1	22I1926-05	2022-09-14	M		<0.0000500	<0.00200	0.0299	<0.000500	0.129	1040	0.00390	<0.000010		0.00909	0.000469	<0.100	334	<0.00100	1.11	<0.000100	8800	5.93	765	<0.0000400	<0.000500
WQ3-1	22J1560-07	2022-10-12	M		0.000116	<0.00200	0.194	<0.000500	0.0627	380	0.0125	<0.000010		0.00345	<0.000400	<0.1	103	<0.00100	1.69	<0.000100	3060	2.2	268	<0.0000400	<0.000500
WQ3-1	22K1453-05	2022-11-10	M		0.000148	<0.00200	0.0321	<0.000500	0.18	1370	0.0184	<0.000010	<0.000000050	0.0110	0.000677	0.102	411	<0.00100	2.28	<0.000100	10000	7.47	1010	<0.0000400	<0.000500
WQ3-1	22L0774-05	2022-12-07	M		0.0000727	<0.00200	0.0328	<0.000500	0.151	1190	0.0353	<0.000010		0.0100	0.000430	<0.1	339	<0.00100	1.69	<0.000100	8980	6.83	798	<0.0000400	<0.000500
WQ3-1	23A2847-05	2023-01-27	M		0.0000757	<0.00200	0.0302	<0.000500	0.162	1190	0.00871	<0.000010	<0.000000060	0.00990	<0.000400	<0.11	376	<0.00100	1.95	<0.000100	9940	7.02	917	<0.0000400	<0.000500
WQ3-1	23C0060-05	2023-02-28	M		<0.0000500	<0.00200	0.0206	<0.000500	0.124	1220	0.00355	<0.000010		0.00965	0.000532	<0.1	392	<0.00100	1.98	<0.000100	9880	6.89	953	<0.0000400	<0.000500
WQ3-1	23C1797-05	2023-03-15	M		<0.0000500	<0.00200	<0.0200	0.000731	0.166	1130	0.00288	<0.000010		0.00922	<0.000400	<0.1	340	<0.00100	1.67	<0.000100	11600	6.21	858	<0.0000400	<0.000500
WQ3-1	23D2945-05	2023-04-26	M		<0.0000500	<0.00200	0.0219	0.000701	0.153	1110	0.00285	<0.000010		0.0102	<0.000400	0.108	377	<0.00100	1.57	0.000108	8650	6.78	829	<0.0000400	<0.000500
WQ3-1	23E2392-05	2023-05-17	M		<0.0000500	<0.00200	0.0247	<0.000500	0.117	1200	0.00204	<0.000010	<0.000000050	0.0102	0.000653	<0.1	405	<0.00100	1.71	0.000121	10300	7.37	940	<0.0000400	<0.000500
WQ3-1	23F3614-05	2023-06-27	M		<0.0000500	<0.00200	0.0329	<0.000500	0.156	1090	0.00390	<0.000010		0.00952	<0.000400	<0.15	336	<0.00100	1.46	<0.000100	9440	6.67	887	<0.0000400	<0.000500
WQ3-1	23G2415-05	2023-07-19	M		<0.0000500	<0.00200	0.0246	<0.000500	0.164	1150	0.00253	<0.000010		0.0101	<0.000400	<0.1	363	<0.00100	1.47	<0.000100	9450	7.07	949	<0.0000400	<0.000500
WQ3-1	23H3309-07	2023-08-24	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.143	1060	0.00268	<0.000010	<0.000000050	0.00921	<0.000400	<0.1	333	<0.00100	1.22	<0.000100	8650	6.56	841	<0.0000400	<0.000500
WQ3-1	23I2271-07	2023-09-19	M		<0.0000500	<0.00200	0.0570	<0.000500	0.152	1160	0.00603	<0.000010		0.00993	0.000550	0.102	380	<0.00100	1.47	<0.000100	9270	6.6	950	<0.0000400	<0.000500
WQ3-1	23J2236-07	2023-10-18	M		0.0000638	<0.00200	0.0722	<0.000500	0.159	1030	0.00576	<0.000010		0.0101	0.000548	0.124	330	<0.00100	1.48	0.000176	8970	6.72	826	<0.0000400	<0.000500
WQ3-1	23K1909-05	2023-11-15	M		<0.0000500	<0.00200	0.0279	<0.000500	0.258	1180	0.00519	<0.000010	<0.000000050	0.00999	0.000744	0.103	346	<0.00100	1.91	<0.000100	9910	6.79	1020	<0.0000400	<0.000500
WQ3-1	23L2091-01	2023-12-15	M		<0.0000500	<0.00200	0.0407	<0.000500	0.16	1230	0.00471	<0.000010		0.00981	<0.000400	0.103	366	<0.00100	1.67	<0.000100	10100	6.88	899	<0.0000400	<0.000500
WQ3-1	L2754366-1	2024-01-24	M																						
WQ3-1	VA24A1422-001	2024-01-24	M	<0.00050	0.000102	<0.00050	0.031	0.00022	0.162	1180	0.00292	<0.0000050	<0.000000020	0.0105	<0.00050	0.091	351	<0.00050	2.0	<0.00010	9740	7.25	831	<0.000050	<0.0010
WQ3-1	L2754604-1	2024-02-14	M																						
WQ3-1	VA24A2995-001	2024-02-14	M	<0.00050	0.000078	<0.00050	0.015	<0.00010	0.167	907	0.00274	<0.0000050	<0.000000020	0.00900	<0.00050	0.086	301	<0.00050	1.8	<0.00010	8650	6.62	782	<0.000050	<0.0010
WQ3-1	L2755043-1	2024-03-21	M																						
WQ3-1	VA24A6026-001	2024-03-21	M	<0.00050	0.000074	<0.00050	0.047	<0.00010	0.138	1100	0.00504	<0.0000050	<0.000000020	0.00993	<0.00050	0.098	344	<0.00050	1.6	<0.00010	8810	6.64	846	<0.000050	<0.0010
WQ3-1	L2755490-1	2024-04-24	M																						
WQ3-1	VA24A8916-001	2024-04-24	M	<0.00050	0.000060	<0.00050	0.022	<0.00010	0.152	1240	0.00172	<0.0000050	<0.000000020	0.00992	<0.00050	0.104	351	<0.00050	1.6	<0.00010	9730	6.74	897	<0.000050	<0.0010
WQ3-1	L2755567-1	2024-05-01	M																						
WQ3-1	VA24A9566-001	2024-05-01	M	<0.00050	0.000061	<0.00050	0.014	<0.00010	0.150	1280	0.00167	<0.0000050	<0.000000020	0.00868	<0.00050	0.105	359	<0.00050	1.4	<0.00010	9470	6.05	868	<0.000050	<0.0010
WQ3-1	L2755666-1	2024-05-08	M																						
WQ3-1	VA24B0201-001	2024-05-08	M	<0.00050	0.000086	<0.00050	0.015	<0.00010	0.153	1100	0.00148	<0.0000050	<0.000000020	0.0104	<0.00050	0.097	337	<0.00050	1.5	<0.00010	9790	7.32	820	<0.000050	<0.0010
WQ3-1	L2755779-1	2024-05-15	M																						
WQ3-1	VA24B0901-001	2024-05-15	M	<0.00050	0.000090	<0.00050	0.030	<0.00010	0.166	1130	0.00202	<0.0000050	<0.000000020	0.0100	<0.00050	0.102	347	<0.00050	1.8	<0.00010	9110	7.22	859	<0.000050	<0.0010
WQ3-1	L2755888-1	2024-05-22	M																						
WQ3-1	VA24B1500-001	2024-05-22	M	<0.00050	0.000082	<0.00050	0.030	0.00066	0.155	1090	0.00263	<0.0000050	<0.000000020	0.00952	<0.00050	0.091	330	<0.00050	1.6	<0.00010	9190	6.61	809	<0.000050	<0.0010
WQ3-1	L2756312-1	2024-06-19	M																						
WQ3-1	VA24B4510-001	2024-06-19	M	<0.00050	0.000078	<0.00050	0.037	<0.00010	0.148	1180	0.00403	<0.0000050	<0.000000020	0.00979	<0.00050	0.095	362	<0.00050	1.6	<0.00010	9340	6.58	883	<0.000050	<0.0010
WQ3-1	VA24B7397-001	2024-07-17	M	<0.00050	0.000061	<0.00050	0.020	<0.00010	0.132	1160	0.00184	<0.0000050	0.000000025	0.00904	<0.00050	0.100	355	<0.00050	1.4	<0.00010	9260	6.19	871	<0.000050	<0.0010
WQ3-1	L2756689-1	2024-07-17	M																						
WQ3-1	L2757122-1	2024-08-21	M																						
WQ3-1	VA24C1337-001	2024-08-21	M	<0.00050	0.000064	0.00051	0.017	<0.00010	0.158	1130	0.00334	<0.0000050	<0.000000080	0.00890	<0.00050	0.092	331	<0.00050	1.7	<0.00010	8940	6.16	774	<0.000050	<0.0010
WQ3-1	VA24C4683-001	2024-09-18	M	<0.00050	0.000083	0.00056	0.021	0.00016	0.179	1020	0.00426	<0.0000050	<0.000000020	0.00939	0.00050	0.099	324	0.00152	1.2	<0.00010	8470	6.40	846	<0.000050	<0.0010
WQ3-1	VA24C8569-001	2024-10-23	M	<0.00050	0.000075	<0.00050	0.023	<0.00010	0.146	1200	0.00465	<0.0000050	<0.000000080	0.00900	<0.00050	0.094	343	<0.00050	1.5	<0.00010	8920	5.91	797	<0.000050	<0.0010
WQ3-1	L2757977-1	2024-10-30	M																						
WQ3-1	VA24C9414-001	2024-10-30	M	<0.00050	0.000232	<0.00050	0.027	<0.00010	0.169	1220	0.00550	<0.0000050	<0.000000080	0.0107	0.00066	0.104	379	<0.00050	1.8	<0.00010	9870	7.05	918	<0.000050	<0.0010
WQ3-1	VA24D0180-001	2024-11-06	M	<0.00050	0.000179	<0.00050	0.027	<0.00010	0.154	1230	0.00875	<0.0000050	<0.000000020	0.00944	0.00067	0.102	349	<0.00050	1.8	<0.00010	9110	6.46	840	<0.000050	<0.0010
WQ3-1	VA24D0813-001	2024-11-13	M	<0.00050	0.000215	0.00088	0.037	<0.00010	0.147	1200	0.0101	<0.0000050	<0.000000020	0.00910	<0.00050	0.104	363	0.00348	1.6	<0.00010	9340	6.32	848	<0.000050	<0.0010
WQ3-1	L2758221-1	2024-11-22	M																						
WQ3-1	VA24D1791-001	2024-11-22	M	<0.00050	0.000311	0.00067	0.023	<0.00010	0.195	1290	0.0105	<0.0000050	<0.000000020	0.0106	0.00068	0.106	389	<0.00050	2.0	<0.00010	9700	7.32	984	<0.000050	<0.0010
WQ3-1	L2758486-1	2024-12-18	M																						
WQ3-1	VA24D3937-001	2024-12-18	M	<0.00050	0.000099	<0.00050	0.024	<0.00010	0.142	991	0.00408	<0.0000050	0.000000027	0.0106	<0.00050	0.094	329	<0.00050	1.6	<0.00010	7760	6.75	840	<0.000050	<0.0010
WQ3-1	L2758770-1	2025-01-22	M																						
WQ3-1	VA25A1525-001	2025-01-22	M	<0.00050	0.000053	<0.00050	0.020	<0.00010	0.144	1200	0.00260	<0.0000050	<0.000000020	0.00887	<0.00050	0.103	363	<0.00050	1.8	<0.00010	8680	6.26	834	<0.000050	<0.0010
WQ3-1	L2759008-1	2025-02-19	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	VA25A3570-001	2025-02-19	M	<0.00050	0.000060	<0.00050	0.028	<0.00010	0.168	1500	0.00285	<0.0000050	<0.000000020	0.00859	<0.00050	0.096	339	<0.00050	3.3	<0.00010	9940	6.03	810	<0.000050	<0.0010
WQ3-1	VA25A6679-001	2025-03-26	M	<0.00050	0.000081	0.00050	0.044	<0.00010	0.168	1690	0.00462	<0.0000050	<0.000000080	0.0102	0.00054	0.087	416	<0.00050	1.4	<0.00010	12700	7.07	733	<0.000050	<0.0010
WQ3-1	VA25A9109-001	2025-04-23	M	<0.00050	0.000059	<0.00050	0.024	<0.00010	0.154	1200	0.00163	<0.0000050	<0.000000080	0.00987	<0.00050	0.095	312	<0.00050	1.6	<0.00010	9030	6.35	784	<0.000050	<0.0010
WQ3-1	VA25A9941-001	2025-05-01	M	<0.00050	0.000081	<0.00050	0.010	<0.00010	0.155	1190	0.00114	<0.0000050	0.000000037	0.00928	<0.00050	0.091	343	<0.00050	1.5	<0.00010	9740	6.57	813	<0.000050	<0.0010
WQ3-1	VA25B0496-001	2025-05-07	M	<0.00050	0.000067	<0.00050	0.012	<0.00010	0.192	1380	0.00136	<0.0000050	<0.000000020	0.00974	<0.00050	0.060	344	0.00051	1.7	<0.00010	10300	7.05	842	<0.000050	<0.0010
WQ3-1	VA25B1530-001	2025-05-16	M	<0.00050	0.000087	<0.00050	0.029	<0.00010	0.154	1200	0.00181	<0.0000050	0.000000030	0.00949	0.00055	0.101	341	<0.00050	1.6	<0.00010	10700	6.19	808	<0.000050	<0.0010
WQ3-1	VA25B1841-001	2025-05-21	M	<0.00050	0.000076	<0.00050	0.024	<0.00010	0.143	1230	0.00208	<0.0000050	0.000000027	0.00974	<0.00050	0.098	345	<0.00050	1.7	<0.00010	9220	7.12	892	<0.000050	<0.0010
WQ3-2	0051710-06	2020-05-20	M		<0.00020	0.00208	0.279	0.00165	0.0152	94.3	0.00997	<0.000010		0.00118	0.00102	<0.100	32.2	<0.00100	<2.0	<0.000100	794	0.574	75.4	<0.000040	<0.00040
WQ3-2	0062209-06	2020-06-22	M		0.00046	0.00275	0.812	0.00043	0.00815	49.2	0.0271	<0.000010		0.0007	<0.00080	<0.100	15.7	<0.00100	<2.0	<0.000100	407	0.305	35.6	<0.000040	0.0005
WQ3-2	0071996-06	2020-07-21	M		0.00027	0.00152	0.503	<0.00040	0.0138	88.4	0.0165	<0.000010		0.00105	<0.00080	<0.100	28.1	<0.00100	2.8	<0.000100	736	0.541	75.1	<0.000040	<0.00040
WQ3-2	0082292-06	2020-08-24	M		<0.00020	0.00249	0.167	<0.00040	0.112	681	0.014	<0.000010		0.00624	<0.00080	<0.100	204	0.00631	<2.0	<0.000100	5300	4	530	<0.000040	0.00076
WQ3-2	0093017-06	2020-09-28	M		0.00022	0.00111	0.384	<0.00040	0.0337	207	0.0175	<0.000010		0.00312	0.00091	<0.100	73	<0.00100	2.9	<0.000100	1760	1.44	171	<0.000040	<0.00040
WQ3-2	20J1961-06	2020-10-20	M		<0.00020	0.00081	0.127	<0.00040	0.0527	369	0.01	<0.000010		0.00371	<0.00080	<0.100	107	<0.00100	<2.0	<0.000100	3100	2.41	314	<0.000040	<0.00040
WQ3-2	20J2778-06	2020-10-27	M		<0.00020	0.00119	0.108	0.00218	0.0663	471	0.0145	<0.000010		0.00504	<0.00080	<0.100	139	<0.00100	<2.0	<0.000100	4070	3.27	399	<0.000040	0.00049
WQ3-2	20K0360-06	2020-11-03	M		<0.00020	<0.00080	0.143	0.00135	0.0428	264	0.00797	<0.000010		0.00258	<0.00080	<0.100	89.2	<0.00100	2.8	<0.000100	2260	1.72	227	<0.000040	<0.00040
WQ3-2	20K1261-06	2020-11-10	M		<0.00020	0.00204	0.178	<0.00040	0.0595	348	0.0147	<0.000010		0.00371	<0.00080	<0.100	109	<0.00100	2.7	<0.000100	2940	2.48	297	<0.000040	<0.00040
WQ3-2	20K2100-06	2020-11-18	M		<0.00020	0.00098	0.241	<0.00040	0.0347	211	0.0161	<0.000010		0.00196	<0.00080	<0.100	70.9	<0.00100	3.5	<0.000100	1770	1.43	179	<0.000040	<0.00040
WQ3-2	20L1589-06	2020-12-14	M		<0.00020	0.0012	0.148	<0.00040	0.0916	691	0.014	<0.000010		0.00688	<0.00080	<0.100	221	<0.00100	3.2	<0.000100	5480	4.61	626	<0.000040	<0.00040
WQ3-2	21A2590-06	2021-01-27	M		<0.00020	<0.00080	0.066	<0.00040	0.125	885	0.00675	<0.000010		0.00847	<0.00080	<0.100	277	<0.00100	2.4	<0.000100	7430	5.69	701	<0.000040	<0.00040
WQ3-2	21B2778-06	2021-02-25	M		<0.00020	<0.00080	0.039	<0.00040	0.164	996	0.00536	<0.000010		0.00929	<0.00080	<0.100	314	<0.00100	2.9	<0.000100	7930	6.48	824	<0.000040	<0.00040
WQ3-2	21C3505-06	2021-03-25	M		0.0000681	0.00118	0.0841	<0.000500	0.129	735	0.00663	<0.000010	<0.000000050	0.00646	<0.00300	0.144	224	<0.00100	3.69	<0.000100	5810	4.73	575	<0.0000400	<0.000500
WQ3-2	21D2478-06	2021-04-22	M		0.000128	0.00119	0.18	0.000068	0.0607	345	0.00894	<0.000010		0.00359	0.000395	0.034	110	<0.00010	3.17	<0.000010	2580	2.41	282	0.0000063	0.000068
WQ3-2	21E1990-06	2021-05-18	M		0.00037	0.00264	0.62	<0.00040	0.00777	40.2	0.0194	<0.000010		0.0008	<0.00080	<0.100	13	<0.00100	3.3	<0.000100	325	0.228	29.4	<0.000040	<0.00040
WQ3-2	21E2917-06	2021-05-26	M		0.000129	0.00109	0.187	0.000071	0.00872	46.1	0.0081	<0.000010	<0.000000024	0.00111	0.000255	0.015	14.2	0.0002	2.89	<0.000010	384	0.315	36.6	0.0000044	0.000104
WQ3-2	21F0167-06	2021-06-01	M		0.000129	0.0011	0.18	0.00005	0.0318	177	0.00817	<0.000010	<0.000000024	0.00196	0.00029	0.019	51.5	0.00077	2.74	<0.000010	1260	1.14	134	0.0000048	<0.000050
WQ3-2	21F1056-06	2021-06-08	M		0.000392	0.0018	0.726	0.000143	0.00994	52.1	0.0235	<0.0000050	<0.000000023	0.000795	0.000546	0.022	16	<0.00010	4.19	<0.000010	373	0.315	38.9	0.0000092	0.000056
WQ3-2	21F2014-06	2021-06-15	M		0.00049	0.0028	0.905	0.000224	0.0216	149	0.0291	<0.000010	<0.000000023	0.00347	0.000693	0.041	44.2	<0.00010	3.94	<0.000010	1180	0.903	113	0.0000134	0.000104
WQ3-2	21G2414-06	2021-07-20	M		0.000212	0.0014	0.373	0.000505	0.0114	78.1	0.0137	<0.000010	<0.000000025	0.000884	0.000765	<0.1	25.8	<0.00100	0.55	<0.000100	622	0.45	62.9	<0.0000400	<0.000500
WQ3-2	21H3040-06	2021-08-25	M		0.000177	0.00179	0.293	0.00215	0.0322	216	0.0146	<0.000010	<0.000000050	0.00228	<0.000200	<0.1	72	<0.00100	3.37	<0.000100	1900	1.35	166	<0.0000400	<0.000500
WQ3-2	21I3814-06	2021-09-28	M		0.000189	0.00127	0.263	<0.000500	0.0534	350	0.0124	<0.000010	<0.000000024	0.0034	0.000878	<0.1	112	0.0048	2.52	<0.000100	2750	2.07	263	<0.0000400	<0.000500
WQ3-2	21J3514-06	2021-10-26	M		0.00021	0.00257	0.438	0.0002	0.0167	106	0.0209	<0.000010	<0.000000050	0.00115	<0.00040	<0.050	32.8	<0.00050	2.9	<0.000050	890	0.632	<0.6	<0.000020	<0.00004
WQ3-2	21K3046-06	2021-11-23	M		<0.00020	0.0015	0.08	<0.00040	0.122	846	0.00831	<0.000010	0.00000008	0.00782	<0.00080	<0.100	246	<0.00100	3.1	<0.000100	6360	4.73	607	<0.000040	<0.00040
WQ3-2	21L2125-06	2021-12-14	M		<0.00020	0.00103	0.051	<0.00040	0.131	870	0.00722	<0.000010	0.000000056	0.00771	<0.00080	<0.100	265	<0.00100	3.1	<0.000100	7210	5.36	661	<0.000040	<0.00040
WQ3-2	22A2312-06	2022-01-20	M		<0.00020	0.00172	0.029	<0.00040	0.159	993	0.00442	<0.000010	<0.000000024	0.00916	<0.00080	<0.100	308	<0.00100	2.5	<0.000100	8310	5.89	766	<0.000040	<0.00040
WQ3-2	22B2487-06	2022-02-17	M		<0.00020	<0.00080	0.046	0.0016	0.133	1020	0.00477	<0.000010		0.00843	<0.00080	<0.100	296	0.00294	<2.0	<0.000100	7750	5.46	716	<0.000040	<0.00040
WQ3-2	22C3145-06	2022-03-22	M		<0.00020	0.00123	<0.020	<0.00040	0.125	944	0.00209	<0.000010		0.00802	<0.00080	<0.100	287	<0.00100	<2.0	<0.000100	7040	5.13	623	<0.000040	<0.00040
WQ3-2	22D2212-05	2022-04-19	M		<0.00020	0.00148	0.032	<0.00040	0.154	1110	0.0026	<0.000010		0.00834	<0.00080	<0.100	324	<0.00100	<2.0	<0.000100	8890	5.8	736	0.000521	<0.00040
WQ3-2	22E2480-08	2022-05-17	M		<0.00100	<0.00400	0.179	<0.00200	0.0358	271	0.00871	<0.000010	<0.000000024	0.0026	<0.00400	<0.500	88.5	<0.00500	<10.0	<0.000500	2150	1.61	216	<0.000200	<0.00200
WQ3-2	22F3212-06	2022-06-21	M		0.000105	<0.00200	0.17	<0.000500	0.0153	93.7	0.00767	<0.000010		0.0011	<0.000400	<0.1	29.8	<0.00100	1.9	<0.000100	765	0.572	81.3	<0.0000400	<0.000500
WQ3-2	22G1763-06	2022-07-13	M		0.000137	<0.00200	0.22	<0.000500	0.0209	157	0.00930	<0.000010		0.00144	<0.000400	<0.1	47.8	<0.00100	1.59	<0.000100	1290	0.905	114	<0.0000400	<0.000500
WQ3-2	22H2453-06	2022-08-16	M		0.000167	<0.00200	0.308	<0.000500	0.0131	86.6	0.0134	<0.000010	<0.000000028	0.000992	<0.000400	<0.100	27.3	<0.00100	1.98	<0.000100	725	0.531	66.1	<0.0000400	<0.000500
WQ3-2	22I1926-06	2022-09-14	M		<0.0000500	<0.00200	0.0375	0.00196	0.0814	657	0.00631	<0.000010		0.00575	0.000457	<0.100	212	<0.00100	1.18	<0.000100	5520	3.75	494	<0.0000400	<0.000500
WQ3-2	22J1560-08	2022-10-12	M		<0.0000500	<0.00200	0.0320	<0.000500	0.146	921	0.00378	<0.000010		0.00790	<0.000400	<0.1	257	<0.00100	<1	<0.000100	7370	5.35	712	<0.0000400	<0.000500
WQ3-2	22K1453-06	2022-11-10	M		0.000159	<0.00200	0.0736	<0.000500	0.154	1180	0.0153	<0.000010	<0.000000050	0.00923	0.000674	<0.1	354	<0.00100	2.43	<0.000100	8890	6.51	855	<0.0000400	<0.000500
WQ3-2	22L0774-06	2022-12-07	M		0.0000835	<0.00200	0.0834	<0.000500	0.139	1070	0.0304	<0.000010		0.00911	0.000415	<0.1	306	<0.00100	1.88	<0.000100	8150	6.19	710	<0.0000400	<0.000500
WQ3-2	23A2847-06	2023-01-27	M		0.0000630	<0.00200	0.0424	<0.000500	0.134	961	0.00870	<0.000010	<0.000000060	0.00833	<0.000400	<0.1	300	<0.00100	2.24	<0.000100	8000	5.82	742	<0.0000400	<0.000500
WQ3-2	23C0060-06	2023-02-28	M		0.0000649	<0.00200	0.0599	<0.000500	0.116	1100	0.00679	<0.000010		0.00885	<0.000400	<0.1	347	<0.00100	2.46	<0.000100	8780	6.3	854	<0.0000400	<0.000500
WQ3-2	23C1797-06	2023-03-15	M		<0.0000500	<0.00200	0.0398	0.00170	0.15	1040	0.00503	<0.000010		0.00853	<0.000400	<0.1	316	<0.00100	1.82	<0.000100	10700	5.66	782	<0.0000400	<0.000500
WQ3-2	23D2945-06	2023-04-26	M		<0.0000500	<0.00200	0.0512	<0.000500	0.0919	673	0.00488	<0.000010		0.00622	<0.000400	<0.1	213	<0.00100	1.23	0.000132	5260	4.09	498	<0.0000400	<0.000500
WQ3-2	23E2392-06	2023-05-17	M		0.000417	0.00205	0.792	0.000237	0.00886	80.9	0.0232	<0.000010	<0.000000050	0.000936	0.000555	<0.02	26.5	<0.00020	2.66	<0.000020	653	0.47	58.1	0.0000096	<0.000100
WQ3-2	23F3614-06	2023-06-27	M		0.000190	<0.00200	0.377	0.00283	0.0160	105	0.0132	<0.000010		0.00120	<0.000400	<0.1	31.9	<0.00100	1.97	<0.000100	884	0.622	82	<0.0000400	<0.000500
WQ3-2	23G2415-06	2023-07-19	M		0.000221	<0.00200	0.333	<0.000500	0.0227	156	0.0160	<0.000010		0.00173	0.000449	<0.1	49.7	<0.00100	1.99	<0.000100	1250	0.938	118	<0.0000400	<0.000500
WQ3-2	23H3309-08	2023-08-24	M		0.0000553	<0.00200	0.0310	<0.000500	0.113	818	0.00499	<0.000010	<0.000000050	0.00738	<0.000400	<0.1	262	<0.00100	<1	<0.000100	6680	5.18	648	<0.0000400	<0.000500

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-2	23I2271-08	2023-09-19	M		0.0000608	<0.00200	0.0737	<0.000500	0.0837	631	0.00676	<0.000010		0.00564	<0.000400	<0.1	206	<0.00100	1.18	<0.000100	5000	3.57	495	<0.0000400	<0.000500
WQ3-2	23J2236-08	2023-10-18	M		0.000214	<0.00200	0.337	<0.000500	0.0380	313	0.0150	<0.000010		0.00304	0.0147	<0.1	96.7	<0.00100	1.86	<0.000100	2460	1.89	253	<0.0000400	<0.000500
WQ3-2	23K1909-06	2023-11-15	M		0.0000862	<0.00200	0.112	<0.000500	0.101	408	0.0113	<0.000010	<0.000000050	0.00377	0.000450	<0.1	114	<0.00100	3.84	<0.000100	3380	2.31	362	<0.0000400	<0.000500
WQ3-2	23L2091-02	2023-12-15	M		0.0000835	<0.00200	0.0739	<0.000500	0.126	985	0.00998	0.000010		0.00807	0.000514	<0.1	294	<0.00100	2.18	<0.000100	8080	5.48	711	<0.0000400	<0.000500
WQ3-2	L2754366-2	2024-01-24	M																						
WQ3-2	VA24A1422-002	2024-01-24	M	<0.00050	0.000094	<0.00050	0.032	0.00149	0.156	1090	0.00330	<0.0000050	0.000000032	0.00981	<0.00050	0.084	335	0.00054	1.9	<0.00010	9260	6.73	750	<0.000050	<0.0010
WQ3-2	L2754604-2	2024-02-14	M																						
WQ3-2	VA24A2995-002	2024-02-14	M	<0.00050	0.000105	<0.00050	0.073	<0.00010	0.144	736	0.00877	<0.0000050	<0.000000020	0.00689	<0.00050	0.071	228	<0.00050	2.6	<0.00010	6340	4.95	587	<0.000050	<0.0010
WQ3-2	L2755043-2	2024-03-21	M																						
WQ3-2	VA24A6026-002	2024-03-21	M	<0.00050	0.000076	0.00065	0.096	<0.00010	0.080	609	0.00676	<0.0000050	<0.000000020	0.00536	<0.00050	<0.050	186	<0.00050	1.8	<0.00010	4830	3.47	447	<0.000050	<0.0010
WQ3-2	L2755490-2	2024-04-24	M																						
WQ3-2	VA24A8916-002	2024-04-24	M	<0.00050	0.000066	<0.00050	0.050	<0.00010	0.110	903	0.00403	<0.0000050	<0.000000020	0.00705	<0.00050	<0.050	254	<0.00050	<1.0	<0.00010	7400	4.79	658	<0.000050	<0.0010
WQ3-2	L2755567-2	2024-05-01	M																						
WQ3-2	VA24A9566-002	2024-05-01	M	<0.00050	0.000139	0.00067	0.032	<0.00010	0.110	935	0.00278	<0.0000050	<0.000000020	0.00663	<0.00050	<0.050	261	<0.00050	<1.0	<0.00010	7160	4.54	625	<0.000050	<0.0010
WQ3-2	L2755666-2	2024-05-08	M																						
WQ3-2	VA24B0201-002	2024-05-08	M	<0.00050	0.000100	0.00130	0.132	<0.00010	0.033	232	0.00735	<0.0000050	<0.000000020	0.00251	<0.00050	<0.050	75.4	<0.00050	2.7	<0.00010	1980	1.51	179	<0.000050	<0.0010
WQ3-2	L2755779-2	2024-05-15	M																						
WQ3-2	VA24B0901-002	2024-05-15	M	<0.00050	0.000141	0.00117	0.209	<0.00010	0.061	431	0.00925	<0.0000050	<0.000000020	0.00378	<0.00050	<0.050	128	<0.00050	1.6	<0.00010	3550	2.55	312	<0.000050	<0.0010
WQ3-2	L2755888-2	2024-05-22	M																						
WQ3-2	VA24B1500-002	2024-05-22	M	<0.00050	0.000151	0.00108	0.249	<0.00010	0.026	188	0.0105	<0.0000050	<0.000000020	0.00174	<0.00050	<0.050	55.3	<0.00050	2.7	<0.00010	1560	1.05	131	<0.000050	<0.0010
WQ3-2	L2756312-2	2024-06-19	M																						
WQ3-2	VA24B4510-002	2024-06-19	M	<0.00050	0.000156	0.00125	0.252	<0.00010	0.031	250	0.0120	<0.0000050	<0.000000020	0.00234	<0.00050	<0.050	75.2	<0.00050	2.1	<0.00010	1970	1.31	180	<0.000050	<0.0010
WQ3-2	VA24B7397-002	2024-07-17	M	<0.00050	0.000189	0.00108	0.334	<0.00010	0.030	264	0.0124	<0.0000050	0.000000022	0.00220	<0.00050	<0.050	78.3	<0.00050	2.1	<0.00010	2180	1.37	190	<0.000050	<0.0010
WQ3-2	L2756689-2	2024-07-17	M																						
WQ3-2	L2757122-2	2024-08-21	M																						
WQ3-2	VA24C1337-002	2024-08-21	M	<0.00050	0.000161	0.00153	0.256	<0.00010	0.033	249	0.0120	<0.0000050	<0.000000020	0.00211	0.00067	<0.050	70.5	<0.00050	2.0	<0.00010	1930	1.32	175	<0.000050	<0.0010
WQ3-2	VA24C4683-002	2024-09-18	M	<0.00050	0.000125	0.00148	0.107	0.00046	0.079	677	0.0105	<0.0000050	<0.000000020	0.00508	<0.00050	<0.050	188	<0.00050	1.0	<0.00010	4960	3.44	460	<0.000050	<0.0010
WQ3-2	VA24C8569-002	2024-10-23	M	<0.00050	0.000169	0.00125	0.253	<0.00010	0.074	653	0.0127	<0.0000050	<0.000000080	0.00503	<0.00050	0.055	198	0.00140	1.8	<0.00010	4600	3.42	433	<0.000050	<0.0010
WQ3-2	L2757977-2	2024-10-30	M																						
WQ3-2	VA24C9414-002	2024-10-30	M	<0.00050	0.000185	0.00083	0.036	<0.00010	0.120	854	0.00610	<0.0000050	<0.000000080	0.00687	<0.00050	0.061	266	0.00479	1.7	<0.00010	6840	4.57	630	<0.000050	<0.0010
WQ3-2	VA24D0180-002	2024-11-06	M	<0.00050	0.000140	0.00060	0.016	<0.00010	0.122	967	0.00492	<0.0000050	<0.000000020	0.00750	0.00061	0.072	282	<0.00050	1.6	<0.00010	7240	5.16	660	<0.000050	<0.0010
WQ3-2	VA24D0813-002	2024-11-13	M	<0.00050	0.000146	0.00124	0.104	<0.00010	0.066	498	0.00657	<0.0000050	0.000000046	0.00408	<0.00050	0.051	148	<0.00050	2.2	<0.00010	3810	2.68	348	<0.000050	<0.0010
WQ3-2	L2758221-2	2024-11-22	M																						
WQ3-2	VA24D1791-002	2024-11-22	M	<0.00050	0.000245	0.00088	0.074	<0.00010	0.141	919	0.00912	<0.0000050	<0.000000080	0.00712	<0.00050	0.084	273	<0.00050	2.5	<0.00010	6980	4.93	690	<0.000050	<0.0010
WQ3-2	L2758486-2	2024-12-18	M																						
WQ3-2	VA24D3937-002	2024-12-18	M	<0.00050	0.000096	0.00051	0.054	<0.00010	0.106	650	0.00557	<0.0000050	0.000000024	0.00781	<0.00050	0.073	233	<0.00050	1.7	<0.00010	5260	5.05	596	<0.000050	<0.0010
WQ3-2	L2758770-2	2025-01-22	M																						
WQ3-2	VA25A1525-002	2025-01-22	M	<0.00050	0.000062	0.00081	0.067	<0.00010	0.106	700	0.00640	<0.0000050	<0.000000020	0.00655	<0.00050	0.081	266	<0.00050	2.4	<0.00010	5200	4.55	586	<0.000050	<0.0010
WQ3-2	L2759008-2	2025-02-19	M																						
WQ3-2	VA25A3570-002	2025-02-19	M	<0.00050	0.000080	0.00082	0.081	<0.00010	0.129	1180	0.00796	<0.0000050	<0.000000080	0.00746	<0.00050	0.078	274	<0.00050	3.8	<0.00010	8000	5.12	700	<0.000050	<0.0010
WQ3-2	VA25A6679-002	2025-03-26	M	<0.00050	0.000069	0.00057	0.110	<0.00010	0.089	793	0.00608	<0.0000050	<0.000000020	0.00570	<0.00050	<0.050	219	<0.00050	1.0	<0.00010	6210	3.85	383	<0.000050	<0.0010
WQ3-2	VA25A9109-002	2025-04-23	M	<0.00050	0.000064	0.00051	0.013	<0.00010	0.117	904	0.00212	<0.0000050	<0.000000080	0.00736	<0.00050	<0.050	241	0.00062	<1.0	<0.00010	6980	4.94	605	<0.000050	<0.0010
WQ3-2	VA25A9941-002	2025-05-01	M	<0.00050	0.000112	0.00106	0.162	<0.00010	0.025	192	0.00728	<0.0000050	<0.000000020	0.00192	<0.00050	<0.050	59.2	<0.00050	2.3	<0.00010	1600	1.18	142	<0.000050	<0.0010
WQ3-2	VA25B0496-002	2025-05-07	M	<0.00050	0.000093	0.00086	0.108	0.00035	0.058	398	0.00694	<0.0000050	<0.000000020	0.00318	<0.00050	<0.050	106	<0.00050	1.8	<0.00010	2960	2.13	244	<0.000050	<0.0010
WQ3-2	VA25B1530-002	2025-05-16	M	<0.00050	0.000095	0.00178	0.124	<0.00010	0.033	216	0.00628	<0.0000050	0.000000024	0.00253	<0.00050	<0.050	67.3	<0.00050	1.9	<0.00010	1970	1.40	170	<0.000050	<0.0010
WQ3-2	VA25B1841-002	2025-05-21	M	<0.00050	0.000080	0.00090	0.112	<0.00010	0.037	209	0.00626	<0.0000050	<0.000000020	0.00213	<0.00050	<0.050	63.2	<0.00050	2.1	<0.00010	1620	1.33	171	<0.000050	<0.0010
WQ3-3	23L2091-03	2023-12-15	M		0.0000748	<0.00200	0.0782	<0.000500	0.124	931	0.0103	0.000012		0.00741	<0.000400	<0.1	282	<0.00100	2.2	<0.000100	7560	5.25	688	<0.0000400	<0.000500
WQ3-3	L2754366-3	2024-01-24	M																						
WQ3-3	VA24A1422-003	2024-01-24	M	<0.00179	0.000105	0.00108	0.124	0.00013	0.063	497	0.00836	<0.0000050	<0.000000020	0.00442	<0.00050	<0.050	144	<0.00050	2.8	<0.00010	3870	2.88	337	<0.000050	<0.0010
WQ3-3	L2754604-3	2024-02-14	M																						
WQ3-3	VA24A2995-003	2024-02-14	M	<0.00050	0.000098	<0.00050	0.064	<0.00010	0.134	680	0.00799	<0.0000050	<0.000000020	0.00625	<0.00050	0.066	214	<0.00050	2.6	<0.00010	6250	4.59	550	<0.000050	<0.0010
WQ3-3	L2755043-3	2024-03-21	M																						
WQ3-3	VA24A6026-003	2024-03-21	M	<0.00050	0.000109	0.00084	0.163	<0.00010	0.028	210	0.0108	<0.0000050	<0.000000020	0.00192	<0.00050	<0.050	60.7	<0.00050	3.0	<0.00010	1570	1.15	150	<0.000050	<0.0010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-3	L2755490-3	2024-04-24	M																						
WQ3-3	VA24A8916-003	2024-04-24	M	<0.00050	0.000068	0.00085	0.067	0.00012	0.095	779	0.00519	<0.0000050	<0.000000020	0.00608	<0.00050	<0.050	215	<0.00050	1.0	<0.00010	5800	4.10	539	<0.000050	<0.0010
WQ3-3	L2755567-3	2024-05-01	M																						
WQ3-3	VA24A9566-003	2024-05-01	M	<0.00050	0.000163	0.00096	0.130	<0.00010	0.028	214	0.00814	<0.0000050	<0.000000020	0.00172	<0.00050	<0.050	58.8	<0.00050	2.5	<0.00010	1570	0.980	145	<0.000050	<0.0010
WQ3-3	L2755666-3	2024-05-08	M																						
WQ3-3	VA24B0201-003	2024-05-08	M	<0.00050	0.000096	0.00082	0.127	<0.00010	0.032	229	0.00753	<0.0000050	<0.000000020	0.00243	<0.00050	<0.050	71.0	<0.00050	2.0	<0.00010	1980	1.44	168	<0.000050	<0.0010
WQ3-3	L2755779-3	2024-05-15	M																						
WQ3-3	VA24B0901-003	2024-05-15	M	<0.00050	0.000162	0.00218	0.253	0.00010	0.040	287	0.0104	<0.0000050	<0.000000020	0.00262	<0.00050	<0.050	85.0	<0.00050	2.0	<0.00010	2270	1.65	202	<0.000050	<0.0010
WQ3-3	L2755888-3	2024-05-22	M																						
WQ3-3	VA24B1500-003	2024-05-22	M	<0.00050	0.000150	0.00091	0.229	0.00018	0.025	172	0.0101	<0.0000050	<0.000000020	0.00172	<0.00050	<0.050	50.9	<0.00050	2.2	<0.00010	1490	0.999	118	<0.000050	<0.0010
WQ3-3	L2756312-3	2024-06-19	M																						
WQ3-3	VA24B4510-003	2024-06-19	M	<0.00050	0.000187	0.00139	0.349	<0.00010	<0.020	35.2	0.0120	<0.0000050	<0.000000020	0.00066	<0.00050	<0.050	11.4	<0.00050	2.6	<0.00010	297	0.208	25.5	<0.000050	<0.0010
WQ3-3	VA24B7397-003	2024-07-17	M	<0.00050	0.000231	0.00120	0.459	0.00013	<0.020	50.8	0.0154	<0.0000050	0.000000021	0.00059	<0.00050	<0.050	15.4	<0.00050	3.4	<0.00010	422	0.267	36.6	<0.000050	<0.0010
WQ3-3	L2756689-3	2024-07-17	M																						
WQ3-3	L2757122-3	2024-08-21	M																						
WQ3-3	VA24C1337-003	2024-08-21	M	<0.00050	0.000172	0.00102	0.278	<0.00010	0.027	184	0.0125	<0.0000050	<0.000000020	0.00158	<0.00050	<0.050	55.4	<0.00050	2.1	<0.00010	1470	0.983	126	<0.000050	<0.0010
WQ3-3	VA24C4683-003	2024-09-18	M	<0.00050	0.000182	0.00095	0.275	<0.00010	0.027	220	0.0163	<0.0000050	<0.000000020	0.00186	<0.00050	<0.050	61.1	<0.00050	2.2	<0.00010	1660	1.11	150	<0.000050	<0.0010
WQ3-3	VA24C8569-003	2024-10-23	M	<0.00050	0.000206	0.00149	0.329	<0.00010	0.066	580	0.0154	<0.0000050	<0.000000020	0.00430	<0.00050	0.053	167	0.00152	2.2	<0.00010	4170	2.83	362	<0.000050	<0.0010
WQ3-3	L2757977-3	2024-10-30	M																						
WQ3-3	VA24C9414-003	2024-10-30	M	<0.00050	0.000143	0.00103	0.192	<0.00010	0.024	164	0.0104	<0.0000050	0.000000022	0.00164	<0.00050	<0.050	49.9	<0.00050	2.9	<0.00010	1310	0.940	117	<0.000050	<0.0010
WQ3-3	VA24D0180-003	2024-11-06	M	<0.00050	0.000122	0.00078	0.099	<0.00010	0.049	377	0.0108	<0.0000050	<0.000000020	0.00310	<0.00050	<0.050	111	<0.00050	2.8	<0.00010	2860	2.00	258	<0.000050	<0.0010
WQ3-3	VA24D0813-003	2024-11-13	M	<0.00050	0.000116	0.00104	0.136	<0.00010	0.027	208	0.00648	<0.0000050	<0.000000020	0.00185	<0.00050	<0.050	60.6	<0.00050	2.3	<0.00010	1580	1.10	142	<0.000050	<0.0010
WQ3-3	L2758221-3	2024-11-22	M																						
WQ3-3	VA24D1791-003	2024-11-22	M	<0.00050	0.000226	0.00091	0.082	<0.00010	0.126	791	0.00956	<0.0000050	<0.000000020	0.00656	<0.00050	0.074	235	<0.00050	2.6	<0.00010	5990	4.42	614	<0.000050	<0.0010
WQ3-3	L2758486-3	2024-12-18	M																						
WQ3-3	VA24D3937-003	2024-12-18	M	<0.00050	0.000104	0.00076	0.074	<0.00010	0.069	432	0.00612	<0.0000050	<0.000000020	0.00518	<0.00050	0.051	157	<0.00050	1.7	<0.00010	3480	3.35	404	<0.000050	<0.0010
WQ3-3	L2758770-3	2025-01-22	M																						
WQ3-3	VA25A1525-003	2025-01-22	M	<0.00050	0.000066	0.00078	0.075	<0.00010	0.103	764	0.00685	<0.0000050	<0.000000020	0.00654	<0.00050	0.078	267	<0.00050	2.5	<0.00010	5460	4.57	570	<0.000050	<0.0010
WQ3-3	L2759008-3	2025-02-19	M																						
WQ3-3	VA25A3570-003	2025-02-19	M	<0.00050	0.000078	0.00085	0.081	<0.00010	0.122	1110	0.00807	<0.0000050	<0.000000080	0.00670	<0.00050	0.068	260	<0.00050	3.8	<0.00010	7540	4.68	603	<0.000050	<0.0010
WQ3-3	VA25A6679-003	2025-03-26	M	<0.00050	0.000065	0.00057	0.102	<0.00010	0.070	595	0.00603	<0.0000050	<0.000000020	0.00433	<0.00050	<0.050	162	<0.00050	1.1	<0.00010	4490	2.84	280	<0.000050	<0.0010
WQ3-3	VA25A9109-003	2025-04-23	M	<0.00050	0.000072	0.00072	0.107	<0.00010	<0.020	147	0.00619	<0.0000050	<0.000000080	0.00172	<0.00050	<0.050	42.0	<0.00050	2.6	<0.00010	1200	0.878	106	<0.000050	<0.0010
WQ3-3	VA25A9941-003	2025-05-01	M	<0.00050	0.000110	0.00101	0.144	<0.00010	0.024	175	0.00695	<0.0000050	<0.000000020	0.00180	<0.00050	<0.050	53.0	<0.00050	2.3	<0.00010	1460	1.05	128	<0.000050	<0.0010
WQ3-3	VA25B0496-003	2025-05-07	M	<0.00050	0.000089	0.00079	0.128	0.00023	0.032	206	0.00669	<0.0000050	<0.000000020	0.00191	<0.00050	<0.050	55.5	<0.00050	2.1	<0.00010	1550	1.14	134	<0.000050	<0.0010
WQ3-3	VA25B1530-003	2025-05-16	M	<0.00050	0.000108	0.00099	0.156	<0.00010	<0.020	112	0.00656	<0.0000050	0.000000036	0.00146	<0.00050	<0.050	36.2	<0.00050	2.1	<0.00010	1020	0.716	89.1	<0.000050	<0.0010
WQ3-3	VA25B1841-003	2025-05-21	M	<0.00050	0.000097	0.00091	0.153	<0.00010	<0.020	57.0	0.00678	<0.0000050	0.000000020	0.00084	<0.00050	<0.050	17.2	<0.00050	2.7	<0.00010	446	0.377	49.8	<0.000050	<0.0010
WQ4-1	0051710-07	2020-05-20	M		<0.00020	0.00153	0.031	0.00072	0.172	1200	0.00268	<0.000010		0.0106	0.00128	<0.100	409	<0.00100	<2.0	<0.000100	8700	7.6	950	<0.000040	<0.00040
WQ4-1	0062209-07	2020-06-22	M		<0.00020	0.00117	0.025	0.00042	0.17	1190	0.00263	<0.000010		0.0108	<0.00080	<0.100	352	<0.00100	<2.0	<0.000100	9340	7.4	878	<0.000040	<0.00040
WQ4-1	0071996-07	2020-07-21	M		<0.00020	0.00082	0.023	0.0006	0.16	1120	0.00538	<0.000010		0.0101	<0.00080	<0.100	309	0.00112	<2.0	<0.000100	8990	6.99	856	<0.000040	<0.00040
WQ4-1	0082292-07	2020-08-24	M		<0.00020	0.0013	0.049	<0.00040	0.151	1130	0.00453	0.000029		0.00981	<0.00080	0.118	339	0.00609	<2.0	<0.000100	9760	6.88	877	<0.000040	<0.00040
WQ4-1	0093017-07	2020-09-28	M		<0.00020	<0.00080	0.041	<0.00040	0.147	908	0.00908	<0.000010		0.00956	0.00136	<0.100	292	<0.00100	<2.0	<0.000100	7880	6.23	762	<0.000040	<0.00040
WQ4-1	20J1961-07	2020-10-20	M		<0.00020	0.00462	0.037	0.00044	0.151	1070	0.00986	<0.000010		0.01	<0.00080	0.101	307	<0.00100	<2.0	<0.000100	7880	6.79	905	<0.000040	<0.00040
WQ4-1	20J2778-07	2020-10-27	M		<0.00020	<0.00080	0.026	0.00041	0.146	1100	0.00861	<0.000010		0.0105	<0.00080	0.127	317	<0.00100	<2.0	<0.000100	8590	7.33	918	<0.000040	<0.00040
WQ4-1	20K0360-07	2020-11-03	M		<0.00020	<0.00080	<0.020	0.0008	0.167	1050	0.00887	<0.000010		0.00973	<0.00080	0.149	325	0.00119	<2.0	<0.000100	8800	6.97	906	<0.000040	<0.00040
WQ4-1	20K1261-07	2020-11-10	M		<0.00020	0.00101	0.022	<0.00040	0.185	1140	0.0109	<0.000010		0.0108	<0.00080	0.11	355	<0.00100	<2.0	<0.000100	8380	8.04	965	<0.000040	<0.00040
WQ4-1	20K2100-07	2020-11-18	M		<0.00020	<0.00080	<0.020	<0.00040	0.183	1140	0.00624	<0.000010		0.00937	<0.00080	0.13	343	<0.00100	<2.0	<0.000100	9610	7.62	963	<0.000040	<0.00040
WQ4-1	20L1589-07	2020-12-14	M		<0.00020	0.00151	0.261	<0.00040	0.161	1240	0.0119	<0.000010		0.0121	<0.00080	0.121	395	<0.00100	<2.0	<0.000100	9870	8.55	1090	<0.000040	<0.00040
WQ4-1	21A2590-07	2021-01-27	M		<0.00020	<0.00080	<0.020	<0.00040	0.158	1120	0.00272	<0.000010		0.0106	<0.00080	0.111	349	<0.00100	<2.0	<0.000100	9360	7.26	872	<0.000040	<0.00040
WQ4-1	21B2778-07	2021-02-25	M		<0.00020	0.00254	0.117	<0.00040	0.203	1220	0.00355	<0.000010		0.0129	0.00159	0.107	387	<0.00100	2.2	<0.000100	10000	8.13	1020	<0.000040	0.00121
WQ4-1	21C3505-07	2021-03-25	M		<0.0000500	<0.00100	0.0302	<0.000500	0.217	1250	0.00304	<0.000010	<0.000000050	0.0108	<0.00300	0.209	369	<0.00100	4.84	<0.000100	10000	8.01	951	<0.0000400	<0.000500
WQ4-1	21D2478-07	2021-04-22	M		<0.0000500	<0.00100	0.0509	<0.000500	0.194	1300	0.00269	<0.000010		0.012	0.000587	0.175	411	<0.00100	2.5	<0.000100	10100	7.46	1000	<0.0000400	<0.000500
WQ4-1	21E1990-07	2021-05-18	M		<0.00020	0.0009	0.03	<0.00040	0.222	1150	0.00346	<0.000010		0.0109	0.00092	<0.100	362	<0.00100	2.1	<0.000100	10300	7.11	907	<0.000040	0.00065
WQ4-1	21E2917-07	2021-05-26	M		0.000062	<0.00100	0.0555	<0.000500	0.161	1140	0.00353	<0.000010	<0.000000024	0.0102	0.000629	<0.1	350	<0.00100	1.56	<0.000100	8860	6.52	803	<0.0000400	<0.000500

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	21F0167-07	2021-06-01	M		<0.0000500	<0.00100	<0.0200	<0.000500	0.158	1170	0.00232	<0.000010	<0.000000024	0.0107	0.000497	<0.1	355	<0.00100	2.14	<0.000100	9420	6.79	770	<0.0000400	<0.000500
WQ4-1	21F1056-07	2021-06-08	M		<0.0000500	<0.00100	0.0265	<0.000500	0.19	1250	0.00168	<0.0000050	<0.000000023	0.0115	0.000608	<0.1	364	<0.00100	2.22	<0.000100	8590	6.91	871	<0.0000400	<0.000500
WQ4-1	21F2014-07	2021-06-15	M		<0.0000500	<0.00100	0.0305	<0.000500	0.162	1130	0.00287	<0.000010	<0.000000023	0.0104	0.000386	<0.1	336	0.00362	1.59	<0.000100	9040	6.93	868	0.0000732	<0.000500
WQ4-1	21G2414-07	2021-07-20	M		<0.0000500	<0.00100	0.028	0.00181	0.163	1140	0.00395	<0.000010	<0.000000025	0.00971	0.00063	<0.1	329	<0.00100	<0.5	<0.000100	9050	6.43	834	<0.0000400	<0.000500
WQ4-1	21H3040-07	2021-08-25	M		0.0000545	0.00156	0.0252	<0.000500	0.164	1110	0.00647	<0.000010	<0.000000050	0.0102	0.000328	0.133	339	<0.00100	11.9	<0.000100	9620	6.94	876	<0.0000400	<0.000500
WQ4-1	21I3814-07	2021-09-28	M		0.0000819	<0.00100	0.0403	<0.000500	0.158	1110	0.00644	<0.000010	<0.000000024	0.0103	0.000629	<0.1	346	0.00664	2.42	<0.000100	8560	6.88	813	<0.0000400	<0.000500
WQ4-1	21J3514-07	2021-10-26	M		<0.00005	<0.00040	0.018	0.00029	0.144	1130	0.0087	<0.000010	<0.000000050	0.00953	<0.00040	0.077	292	<0.00050	1.5	<0.000050	8910	5.91	0.8	0.00002	<0.00004
WQ4-1	21K3046-07	2021-11-23	M		<0.00020	0.00113	0.044	<0.00040	0.183	1270	0.00628	<0.000010	0.000000028	0.0113	<0.00080	0.123	369	<0.00100	2.4	<0.000100	9200	6.95	891	<0.000040	<0.00040
WQ4-1	21L2125-07	2021-12-14	M		<0.00020	<0.00080	0.047	<0.00040	0.171	1130	0.00552	<0.000010	<0.000000023	0.0096	<0.00080	<0.100	351	<0.00100	2.5	<0.000100	9470	7.1	872	<0.000040	<0.00040
WQ4-1	22A2312-07	2022-01-20	M		<0.00020	0.00177	0.022	<0.00040	0.178	1070	0.00402	<0.000010	<0.000000024	0.0103	<0.00080	<0.100	332	<0.00100	2.3	<0.000100	9020	6.32	833	<0.000040	<0.00040
WQ4-1	22B2487-07	2022-02-17	M		<0.00020	<0.00080	0.039	<0.00040	0.158	1250	0.00381	<0.000010		0.0104	<0.00080	0.105	356	0.00314	<2.0	<0.000100	9380	6.66	862	<0.000040	<0.00040
WQ4-1	22C3145-07	2022-03-22	M		<0.00020	<0.00080	<0.020	<0.00040	0.137	1100	0.00317	<0.000010		0.00925	0.00096	0.12	334	<0.00100	<2.0	<0.000100	8300	5.99	699	<0.000040	<0.00040
WQ4-1	22D2212-12	2022-04-20	M		<0.00020	<0.00080	<0.020	<0.00040	0.165	1330	0.0021	<0.000010		0.0104	<0.00080	0.114	393	<0.00100	<2.0	<0.000100	10800	7.15	886	0.000051	<0.00040
WQ4-1	22E2480-09	2022-05-17	M		<0.00100	<0.00400	<0.100	<0.00200	0.12	1080	0.00201	<0.000010	<0.000000024	0.00969	<0.00400	<0.500	351	<0.00500	<10.0	<0.000500	8680	7.12	857	<0.000200	<0.00200
WQ4-1	22F3212-07	2022-06-21	M		<0.0000500	<0.00200	0.0251	<0.000500	0.154	989	0.00385	<0.000010		0.00912	<0.000400	<0.1	324	<0.00100	1.11	<0.000100	8080	6.46	867	<0.0000400	<0.000500
WQ4-1	22G1763-07	2022-07-13	M		<0.0000500	<0.00200	0.0212	<0.000500	0.134	1140	0.00424	<0.000010		0.00963	<0.000400	0.103	339	<0.00100	1.39	<0.000100	9540	6.98	852	<0.0000400	<0.000500
WQ4-1	22H2453-07	2022-08-16	M		<0.0000500	<0.00200	0.0278	<0.000500	0.156	1070	0.00452	<0.000010	<0.000000028	0.00976	<0.000400	<0.100	360	<0.00100	1.42	<0.000100	9150	7.27	874	<0.0000400	<0.000500
WQ4-1	22I1926-07	2022-09-14	M		<0.0000500	<0.00200	0.0205	<0.000500	0.130	1020	0.00324	<0.000010		0.00888	0.000508	<0.100	325	<0.00100	1.12	<0.000100	8730	5.66	761	<0.0000400	<0.000500
WQ4-1	22J1560-09	2022-10-12	M		<0.0000500	<0.00200	0.0305	<0.000500	0.178	1150	0.00437	<0.000010		0.00982	0.000436	<0.1	316	<0.00100	1.36	<0.000100	8970	6.6	772	<0.0000400	<0.000500
WQ4-1	22K1453-07	2022-11-10	M		0.000123	<0.00200	0.0425	<0.000500	0.169	1350	0.0177	<0.000010	<0.000000050	0.0106	0.000675	<0.1	394	<0.00100	2.21	<0.000100	10000	7.62	975	<0.0000400	<0.000500
WQ4-1	22L0774-07	2022-12-07	M		0.0000656	<0.00200	0.0247	<0.000500	0.149	1160	0.0325	<0.000010		0.0101	<0.000400	<0.1	329	<0.00100	1.63	<0.000100	8700	6.73	778	<0.0000400	<0.000500
WQ4-1	23A2847-07	2023-01-27	M		0.0000865	<0.00200	0.0247	<0.000500	0.145	1120	0.0102	<0.000010	<0.000000060	0.00982	0.000513	<0.1	343	<0.00100	1.77	<0.000100	9320	6.88	852	<0.0000400	<0.000500
WQ4-1	23C0060-07	2023-02-28	M		0.0000614	<0.00200	0.0245	<0.000500	0.128	1260	0.00452	<0.000010		0.0103	<0.000400	<0.1	402	<0.00100	2.03	<0.000100	10300	7.11	1000	<0.0000400	<0.000500
WQ4-1	23C1797-07	2023-03-15	M		<0.0000500	<0.00200	0.0224	<0.000500	0.171	1140	0.00266	<0.000010		0.00960	<0.000400	0.133	358	<0.00100	1.71	<0.000100	12000	6.42	886	<0.0000400	<0.000500
WQ4-1	23D2945-07	2023-04-26	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.155	1190	0.00295	<0.000010		0.0109	<0.000400	<0.1	410	<0.00100	1.59	0.000209	9280	7.27	841	<0.0000400	<0.000500
WQ4-1	23E2392-07	2023-05-17	M		<0.0000500	<0.00200	0.0280	<0.000500	0.12	1200	0.00223	<0.000010	<0.000000050	0.00973	0.000521	<0.1	402	<0.00100	1.7	0.000138	10400	7.32	939	<0.0000400	<0.000500
WQ4-1	23F3614-07	2023-06-27	M		0.0000550	<0.00200	0.0548	<0.000500	0.16	1150	0.00464	<0.000010		0.00937	<0.000400	<0.1	348	<0.00100	1.47	<0.000100	9820	6.85	905	<0.0000400	<0.000500
WQ4-1	23G2415-07	2023-07-19	M		<0.0000500	<0.00200	0.0323	0.000613	0.158	1120	0.00309	<0.000010		0.00968	<0.000400	<0.1	351	<0.00100	1.54	<0.000100	9220	6.99	900	<0.0000400	<0.000500
WQ4-1	23H3309-09	2023-08-24	M		<0.0000500	<0.00200	0.0275	<0.000500	0.149	1090	0.00315	<0.000010	<0.000000050	0.00963	<0.000400	<0.1	347	<0.00100	1.27	<0.000100	8910	6.79	868	<0.0000400	<0.000500
WQ4-1	23I2271-09	2023-09-19	M		0.0000605	<0.00200	0.0661	<0.000500	0.151	1180	0.00533	<0.000010		0.0101	<0.000400	<0.1	387	<0.00100	1.51	<0.000100	9480	6.57	945	<0.0000400	<0.000500
WQ4-1	23J2236-09	2023-10-18	M		<0.0000500	<0.00200	0.0572	<0.000500	0.131	957	0.00521	<0.000010		0.00946	0.000461	0.118	330	<0.00100	1.29	0.000105	7670	6.42	930	<0.0000400	<0.000500
WQ4-1	23K1909-07	2023-11-15	M		<0.0000500	<0.00200	0.0210	<0.000500	0.166	1190	0.00468	<0.000010	<0.000000050	0.0101	0.000489	<0.1	342	<0.00100	1.67	<0.000100	9950	6.83	885	<0.0000400	<0.000500
WQ4-1	23L2091-04	2023-12-15	M		0.0000636	<0.00200	0.0451	<0.000500	0.181	1320	0.00540	0.000010		0.0102	0.000449	0.122	396	<0.00100	1.72	<0.000100	11100	6.98	958	<0.0000400	<0.000500
WQ4-1	L2754383-4	2024-01-25	M																						
WQ4-1	VA24A1507-004	2024-01-25	M	<0.00050	0.000095	<0.00050	0.015	<0.00010	0.180	1240	0.00235	<0.0000050	0.000000023	0.0104	<0.00050	0.094	365	<0.00050	1.9	<0.00010	9230	7.14	856	<0.000050	<0.0010
WQ4-1	L2754604-4	2024-02-14	M																						
WQ4-1	VA24A2995-004	2024-02-14	M	<0.00050	0.000082	<0.00050	0.016	<0.00010	0.194	986	0.00272	<0.0000050	<0.000000040	0.00964	<0.00050	0.091	321	<0.00050	1.8	<0.00010	8840	6.91	817	<0.000050	<0.0010
WQ4-1	L2755043-4	2024-03-21	M																						
WQ4-1	VA24A6026-004	2024-03-21	M	<0.00050	0.000064	<0.00050	0.032	<0.00010	0.151	1140	0.00430	<0.0000050	<0.000000020	0.00992	<0.00050	0.097	359	<0.00050	2.0	<0.00010	9000	6.68	868	<0.000050	<0.0010
WQ4-1	L2755490-4	2024-04-24	M																						
WQ4-1	VA24A8916-004	2024-04-24	M	<0.00050	0.000061	<0.00050	0.014	0.00016	0.146	1180	0.00188	<0.0000050	<0.000000020	0.00956	<0.00050	0.100	342	<0.00050	1.6	<0.00010	9470	6.71	843	<0.000050	<0.0010
WQ4-1	L2755567-4	2024-05-01	M																						
WQ4-1	VA24A9566-004	2024-05-01	M	<0.00050	0.000131	0.00052	0.021	<0.00010	0.150	1240	0.00180	<0.0000050	<0.000000020	0.00844	<0.00050	0.100	353	<0.00050	1.5	<0.00010	9390	5.88	814	<0.000050	<0.0010
WQ4-1	L2755666-4	2024-05-08	M																						
WQ4-1	VA24B0201-004	2024-05-08	M	<0.00050	0.000104	<0.00050	0.052	<0.00010	0.154	1020	0.00250	<0.0000050	<0.000000020	0.0109	<0.00050	0.095	338	0.00094	1.5	<0.00010	9830	7.70	815	<0.000050	<0.0010
WQ4-1	L2755779-4	2024-05-15	M																						
WQ4-1	VA24B0901-004	2024-05-15	M	<0.00050	0.000072	<0.00050	0.019	<0.00010	0.174	1050	0.00168	<0.0000050	<0.000000020	0.00996	<0.00050	0.096	342	<0.00050	1.5	<0.00010	9190	6.93	837	<0.000050	<0.0010
WQ4-1	L2755888-4	2024-05-22	M																						
WQ4-1	VA24B1500-004	2024-05-22	M	<0.00050	0.000088	<0.00050	0.044	0.00028	0.156	1060	0.00255	<0.0000050	<0.000000020	0.00922	<0.00050	0.084	319	<0.00050	1.4	<0.00010	9500	6.49	795	<0.000050	<0.0010
WQ4-1	L2756312-4	2024-06-19	M																						
WQ4-1	VA24B4510-004	2024-06-19	M	<0.00050	0.000065	<0.00050	0.033	0.00012	0.144	1120	0.00360	<0.0000050	0.000000022	0.00968	<0.00050	0.098	364	<0.00050	1.9	<0.00010	9750	6.60	838	<0.000050	<0.0010
WQ4-1	VA24B7397-004	2024-07-17	M	<0.00050	0.000057	<0.00050	0.023	<0.00010	0.127	1110	0.00188	<0.0000050	0.000000022	0.00836	<0.00050	0.093	340	<0.00050	1.3	<0.00010	9540	5.98	831	<0.000050	<0.0010
WQ4-1	L2756689-4	2024-07-17	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	L2757122-4	2024-08-21	M																						
WQ4-1	VA24C1337-004	2024-08-21	M	<0.00050	0.000068	<0.00050	0.018	<0.00010	0.160	1060	0.00337	<0.0000050	<0.000000080	0.00871	<0.00050	0.087	330	<0.00050	1.6	<0.00010	9090	6.05	762	<0.000050	<0.0010
WQ4-1	VA24C4683-004	2024-09-18	M	<0.00050	0.000075	0.00060	0.022	0.00015	0.182	1020	0.00383	<0.0000050	<0.000000020	0.00928	<0.00050	0.103	320	0.00153	1.2	<0.00010	8350	6.22	841	<0.000050	<0.0010
WQ4-1	VA24C8569-004	2024-10-23	M	<0.00050	0.000080	<0.00050	0.016	<0.00010	0.138	1200	0.00549	<0.0000050	<0.000000020	0.00924	<0.00050	0.093	353	0.00402	1.4	<0.00010	8590	6.20	772	<0.000050	<0.0010
WQ4-1	L2757977-4	2024-10-30	M																						
WQ4-1	VA24C9414-004	2024-10-30	M	<0.00050	0.000224	<0.00050	0.012	<0.00010	0.178	1260	0.00442	<0.0000050	<0.000000160	0.0101	0.00058	0.102	391	0.00185	1.7	<0.00010	10200	6.83	914	<0.000050	<0.0010
WQ4-1	VA24D0180-004	2024-11-06	M	<0.00050	0.000193	<0.00050	0.023	<0.00010	0.153	1220	0.0109	<0.0000050	<0.000000020	0.00961	0.00063	0.101	351	<0.00050	1.7	<0.00010	8940	6.56	838	<0.000050	<0.0010
WQ4-1	VA24D0813-004	2024-11-13	M	<0.00050	0.000210	0.00075	0.024	<0.00010	0.150	1200	0.00925	<0.0000050	<0.000000020	0.00915	<0.00050	0.098	360	0.00254	1.6	<0.00010	9360	6.47	845	<0.000050	<0.0010
WQ4-1	L2758221-4	2024-11-22	M																						
WQ4-1	VA24D1791-004	2024-11-22	M	<0.00050	0.000337	<0.00050	0.039	<0.00010	0.202	1300	0.0124	<0.0000050	<0.000000080	0.0101	0.00071	0.110	395	<0.00050	2.0	<0.00010	9830	6.93	983	<0.000050	<0.0010
WQ4-1	L2758486-4	2024-12-18	M																						
WQ4-1	VA24D3937-004	2024-12-18	M	<0.00050	0.000108	<0.00050	0.041	<0.00010	0.137	856	0.00435	<0.0000050	0.000000027	0.00998	<0.00050	0.088	304	<0.00050	1.4	<0.00010	6810	6.62	753	<0.000050	<0.0010
WQ4-1	L2758770-4	2025-01-22	M																						
WQ4-1	VA25A1525-004	2025-01-22	M	<0.00050	<0.000050	0.00065	0.026	<0.00010	0.128	919	0.00262	<0.0000050	0.000000040	0.00831	<0.00050	0.090	353	<0.00060	1.6	<0.00010	6460	6.01	723	<0.000050	<0.0010
WQ4-1	L2759008-4	2025-02-19	M																						
WQ4-1	VA25A3570-004	2025-02-19	M	<0.00050	0.000058	<0.00050	0.030	<0.00010	0.162	1460	0.00283	<0.0000050	<0.000000020	0.00836	<0.00050	0.086	332	<0.00050	3.4	<0.00010	9810	5.94	740	<0.000050	<0.0010
WQ4-1	VA25A6679-004	2025-03-26	M	<0.00050	0.000099	0.00066	0.149	<0.00010	0.091	742	0.00766	<0.0000050	<0.000000080	0.00668	<0.00050	<0.050	208	<0.00050	1.4	<0.00010	5810	4.59	493	<0.000050	<0.0010
WQ4-1	VA25A9109-004	2025-04-23	M	<0.00050	0.000065	<0.00050	<0.010	<0.00010	0.142	1130	0.00120	<0.0000050	<0.000000080	0.00891	<0.00050	0.086	295	0.00066	1.6	<0.00010	8510	6.11	740	<0.000050	<0.0010
WQ4-1	VA25A9941-004	2025-05-01	M	<0.00050	0.000081	<0.00050	<0.010	<0.00010	0.150	1150	0.00115	<0.0000050	0.000000038	0.00941	<0.00050	0.092	341	<0.00050	1.5	<0.00010	9650	6.60	799	<0.000050	<0.0010
WQ4-1	VA25B0496-004	2025-05-07	M	<0.00050	0.000068	<0.00050	0.012	<0.00010	0.189	1340	0.00125	<0.0000050	0.000000020	0.00952	<0.00050	0.053	333	<0.00050	1.6	<0.00010	10000	6.92	820	<0.000050	<0.0010
WQ4-1	VA25B1530-004	2025-05-16	M	<0.00050	0.000078	<0.00050	0.016	<0.00010	0.148	1180	0.00160	<0.0000050	0.000000028	0.00972	0.00054	0.097	331	<0.00050	1.5	<0.00010	10300	6.21	813	<0.000050	<0.0010
WQ4-1	VA25B1841-004	2025-05-21	M	<0.00050	0.000074	<0.00050	0.022	<0.00010	0.134	1210	0.00206	<0.0000050	0.000000036	0.00978	<0.00050	0.095	339	<0.00050	1.7	<0.00010	8970	7.02	902	<0.000050	<0.0010
WQ4-2	0051710-08	2020-05-20	M		<0.00020	0.00203	0.244	0.00093	0.0123	75.9	0.00923	<0.000010		0.00095	0.00127	<0.100	26	<0.00100	<2.0	<0.000100	633	0.464	60.5	<0.000040	<0.00040
WQ4-2	0062209-08	2020-06-22	M		0.00061	0.00395	1.08	0.00099	0.00908	55.4	0.0345	<0.000010		0.00079	<0.00080	<0.100	17.2	<0.00100	2.1	<0.000100	459	0.353	39.9	<0.000040	0.00477
WQ4-2	0071996-08	2020-07-21	M		0.00026	0.00174	0.489	<0.00040	0.0145	95.4	0.0165	<0.000010		0.00113	<0.00080	<0.100	30.1	<0.00100	2.9	<0.000100	793	0.585	77.1	<0.000040	<0.00040
WQ4-2	0082292-08	2020-08-24	M		<0.00020	0.0022	0.141	<0.00040	0.0988	624	0.0125	<0.000010		0.00558	<0.00080	<0.100	186	0.00591	<2.0	<0.000100	5140	3.67	478	<0.000040	<0.00040
WQ4-2	0093017-08	2020-09-28	M		<0.00020	0.00095	0.288	<0.00040	0.0541	329	0.0149	<0.000010		0.00358	0.00137	<0.100	117	<0.00100	<2.0	<0.000100	2790	2.39	284	<0.000040	<0.00040
WQ4-2	20J1961-08	2020-10-20	M		<0.00020	0.00105	0.23	0.00046	0.0255	182	0.0176	<0.000010		0.00199	<0.00080	<0.100	51.3	<0.00100	2.4	<0.000100	1510	1.16	151	0.000149	<0.00040
WQ4-2	20J2778-08	2020-10-27	M		<0.00020	0.00083	0.126	0.0009	0.0592	416	0.0137	<0.000010		0.00439	0.00188	<0.100	123	0.00153	<2.0	<0.000100	3590	2.9	357	<0.000040	0.00056
WQ4-2	20K0360-08	2020-11-03	M		<0.00020	<0.00080	0.168	0.0006	0.039	236	0.0104	<0.000010		0.00249	<0.00080	<0.100	79.3	<0.00100	3	<0.000100	2000	1.57	201	<0.000040	<0.00040
WQ4-2	20K1261-08	2020-11-10	M		<0.00020	0.00147	0.169	<0.00040	0.0848	502	0.0144	<0.000010		0.00519	<0.00080	<0.100	157	<0.00100	2.4	<0.000100	4260	3.54	433	<0.000040	<0.00040
WQ4-2	20K2100-08	2020-11-18	M		0.00021	<0.00080	0.237	<0.00040	0.0329	194	0.0167	<0.000010		0.00194	<0.00080	<0.100	65.2	<0.00100	3	<0.000100	1620	1.33	171	<0.000040	<0.00040
WQ4-2	20L1589-08	2020-12-14	M		<0.00020	0.00503	0.162	<0.00040	0.0875	650	0.014	<0.000010		0.0187	<0.00080	<0.100	208	<0.00100	2.5	<0.000100	5190	4.45	580	<0.000040	<0.00040
WQ4-2	21A2590-08	2021-01-27	M		<0.00020	<0.00080	0.06	<0.00040	0.127	965	0.00606	<0.000010		0.00889	<0.00080	<0.100	302	<0.00100	3.2	<0.000100	8090	6.19	751	<0.000040	<0.00040
WQ4-2	21B2778-08	2021-02-25	M		<0.00020	<0.00080	0.044	<0.00040	0.165	1010	0.0046	<0.000010		0.00945	<0.00080	0.103	320	<0.00100	2.5	<0.000100	8180	6.54	849	<0.000040	<0.00040
WQ4-2	21C3505-08	2021-03-25	M		0.00007	<0.00100	0.106	<0.000500	0.118	656	0.00804	<0.000010	0.000000082	0.00629	<0.00300	<0.1	208	<0.00100	4.09	<0.000100	5290	4.24	518	<0.0000400	<0.000500
WQ4-2	21D2478-08	2021-04-22	M		0.000124	0.00191	0.159	0.000082	0.0897	485	0.00763	<0.000010		0.00542	0.000367	0.028	164	<0.00010	2.51	<0.000010	3790	2.83	426	0.000008	0.000111
WQ4-2	21E1990-08	2021-05-18	M		0.00023	0.00207	0.454	0.00023	0.00514	31.4	0.0147	<0.000010		0.00055	<0.00040	<0.050	10.4	<0.00050	2.2	<0.000050	277	0.213	27	<0.000020	<0.00020
WQ4-2	21E2917-08	2021-05-26	M		0.000141	0.00367	0.206	0.000776	0.0184	106	0.00861	<0.000010	<0.000000024	0.0014	0.000378	0.018	31.6	0.00027	2.92	<0.000010	747	0.682	79.4	0.0000042	0.000121
WQ4-2	21F0167-08	2021-06-01	M		0.000129	0.00103	0.175	<0.000050	0.0458	251	0.00783	<0.000010	<0.000000024	0.00261	0.000335	0.02	72.1	0.00074	2.86	<0.000010	1740	1.6	187	0.000005	<0.000050
WQ4-2	21F1056-08	2021-06-08	M		0.00034	0.0017	0.63	0.000135	0.0124	68	0.0213	<0.0000050		0.00162	0.000525	0.026	20.5	<0.00010	4.08	<0.000010	481	0.389	49.6	0.0000081	0.000059
WQ4-2	21F2014-08	2021-06-15	M		0.000505	0.00284	0.959	0.000213	0.0149	101	0.0297	<0.000010	<0.000000023	0.00119	0.000685	0.021	30.6	<0.00010	4.11	<0.000010	803	0.623	77.3	0.0000127	0.000059
WQ4-2	21G2414-08	2021-07-20	M		0.000177	<0.00100	0.28	0.000744	0.0166	114	0.0124	<0.000010	<0.000000025	0.00113	0.000703	<0.1	37.5	<0.00100	0.8	<0.000100	916	0.677	87.9	<0.0000400	<0.000500
WQ4-2	21H3040-08	2021-08-25	M		0.000166	0.00103	0.256	<0.000500	0.0307	205	0.0154	<0.000010	<0.000000050	0.00205	0.000508	<0.1	69.2	<0.00100	6.23	<0.000100	1810	1.29	161	<0.0000400	<0.000500
WQ4-2	21I3814-08	2021-09-28	M		0.000131	0.00163	0.128	<0.000500	0.0807	552	0.00918	<0.000010	<0.000000024	0.0055	0.000759	<0.1	175	0.00628	2.25	<0.000100	4330	3.23	412	<0.0000400	<0.000500
WQ4-2	21J3514-08	2021-10-26	M		0.00016	0.00161	0.331	<0.00020	0.0151	95.3	0.0156	<0.000010	<0.000000050	0.00108	<0.00040	<0.050	29.6	<0.00050	2.6	<0.000050	811	0.569	<0.6	<0.000020	<0.00004
WQ4-2	21K3046-08	2021-11-23	M		<0.00020	0.00304	0.124	<0.00040	0.0684	434	0.0115	<0.000010	<0.000000023	0.00414	<0.00080	<0.100	130	<0.00100	3	<0.000100	3530	2.5	315	<0.000040	<0.00040
WQ4-2	21L2125-08	2021-12-14	M		<0.00020	<0.00080	0.14	<0.00040	0.0769	515	0.0129	<0.000010	<0.000000023	0.00445	<0.00080	<0.100	157	<0.00100	3.8	<0.000100	4280	3.19	395	<0.000040	<0.00040
WQ4-2	22A2312-08	2022-01-20	M		<0.00020	0.0016	0.042	<0.00040	0.171	1060	0.00447	<0.000010	<0.000000024	0.00964	<0.00080	<0.100	328	<0.00100	2.9	<0.000100	8850	6.27	811	<0.000040	<0.00040
WQ4-2	22B2487-08	2022-02-17	M		<0.00020	<0.00080	0.045	0.00127	0.134	1020	0.00497	<0.000010		0.00841	<0.00080	<0.100	289	0.00441	2.3	<0.000100	7980	5.59	693	<0.000040	<0.00040
WQ4-2	22C3145-08	2022-03-22	M		<0.00020	0.00342	<0.020	<0.00040	0.118	924	0.00226	<0.000010		0.00809	<0.00080	<0.100	283	0.00106	<2.0	<0.000100	6990	5.11	601	<0.000040	<0.00040
WQ4-2	22D2212-13	2022-04-20	M		<0.00020	0.00087	0.07	<0.00040	0.114	920	0.00461	<0.000010		0.0073	<0.00080	<0.100	275	<0.00100	<2.0	<0.000100	7440	4.96	607	0.00018	<0.00040
WQ4-2	22E2480-10	2022-05-17	M		<0.00100	<0.00400	0.217	<0.00200	0.0264	221	0.0101	<0.000010	<0.000000024	0.00222	<0.00400	<0.500	72.6	<0.00500	<10.0	<0.000500	1780	1.33	222	<0.000200	<0.00200

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	22F3212-08	2022-06-21	M		0.000103	<0.00200	0.183	<0.000500	0.0117	69.3	0.00766	<0.000010		0.000827	<0.000400	<0.1	22.1	<0.00100	2.02	<0.000100	578	0.427	60.8	<0.0000400	<0.000500
WQ4-2	22G1763-08	2022-07-13	M		0.000228	<0.00200	0.382	<0.000500	0.0130	93.2	0.0135	<0.000010		0.000906	<0.000400	<0.1	27.4	<0.00100	1.99	<0.000100	767	0.545	67.1	<0.0000400	<0.000500
WQ4-2	22H2453-08	2022-08-16	M		0.000179	<0.00200	0.355	0.00150	0.0125	80.2	0.0150	<0.000010	<0.000000028	0.000948	<0.000400	<0.100	25.0	<0.00100	2.07	<0.000100	654	0.484	60.6	<0.0000400	<0.000500
WQ4-2	22I1926-08	2022-09-14	M		0.0000552	<0.00200	0.0310	<0.000500	0.0928	727	0.00564	<0.000010		0.00620	<0.000400	<0.100	228	<0.00100	1.17	<0.000100	6110	4.02	541	<0.0000400	<0.000500
WQ4-2	22J1560-10	2022-10-12	M		<0.0000500	<0.00200	0.0231	0.00255	0.143	935	0.00339	<0.000010		0.00773	0.000450	<0.1	253	<0.00100	<1	<0.000100	7240	5.31	650	<0.0000400	<0.000500
WQ4-2	22K1453-08	2022-11-10	M		0.000164	<0.00200	0.0776	<0.000500	0.158	1230	0.0148	<0.000010	0.000000079	0.0103	0.000584	<0.1	362	<0.00100	2.31	<0.000100	9140	6.81	893	<0.0000400	<0.000500
WQ4-2	22L0774-08	2022-12-07	M		0.0000714	<0.00200	0.0548	<0.000500	0.142	1150	0.0283	<0.000010		0.00926	<0.000400	0.124	322	<0.00100	2.14	<0.000100	8750	6.38	790	<0.0000400	<0.000500
WQ4-2	23A2847-08	2023-01-27	M		0.0000871	<0.00200	0.0580	<0.000500	0.115	847	0.00938	<0.000010	<0.000000060	0.00743	<0.000400	<0.1	257	<0.00100	2.36	<0.000100	6990	5.2	647	<0.0000400	<0.000500
WQ4-2	23C0060-08	2023-02-28	M		0.0000702	<0.00200	0.0617	0.00410	0.112	1110	0.00676	<0.000010		0.00906	0.000445	<0.1	354	<0.00100	2.36	<0.000100	8960	6.02	843	<0.0000400	<0.000500
WQ4-2	23C1797-08	2023-03-15	M		0.0000625	<0.00200	0.0823	<0.000500	0.114	851	0.00776	<0.000010		0.00715	<0.000400	<0.1	268	<0.00100	2.43	<0.000100	8820	4.78	639	<0.0000400	<0.000500
WQ4-2	23D2945-08	2023-04-26	M		<0.0000500	<0.00200	0.0431	0.000940	0.0999	720	0.00453	<0.000010		0.00682	<0.000400	<0.1	242	<0.00100	1.05	0.000166	5660	4.35	537	<0.0000400	<0.000500
WQ4-2	23E2392-08	2023-05-17	M		0.000510	0.00236	0.911	0.000357	0.0285	242	0.0281	<0.000010	<0.000000050	0.00222	0.000589	<0.05	77.6	<0.00050	3.16	<0.000050	1950	1.38	179	<0.0000200	<0.000250
WQ4-2	23F3614-08	2023-06-27	M		0.000211	<0.00200	0.412	0.000639	0.0116	72.7	0.0141	<0.000010		0.000968	<0.000400	<0.1	21.6	<0.00100	2.01	<0.000100	607	0.426	54.9	<0.0000400	<0.000500
WQ4-2	23G2415-08	2023-07-19	M		0.000154	<0.00200	0.222	<0.000500	0.0680	486	0.0104	<0.000010		0.00443	<0.000400	<0.1	151	<0.00100	1.59	<0.000100	3970	3.06	372	<0.0000400	<0.000500
WQ4-2	23H3309-10	2023-08-24	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.118	854	0.00446	<0.000010	0.000000147	0.00769	<0.000400	<0.1	274	<0.00100	<1	<0.000100	6940	5.29	664	<0.0000400	<0.000500
WQ4-2	23I2271-11	2023-09-19	M		0.0000926	<0.00200	0.106	<0.000500	0.0535	389	0.00921	<0.000010		0.00353	<0.000400	<0.1	124	<0.00100	1.46	<0.000100	3070	2.2	300	<0.0000400	<0.000500
WQ4-2	23J2236-11	2023-10-18	M		0.000403	0.00257	0.797	<0.000500	0.0496	370	0.0307	<0.000010		0.00328	0.000558	<0.1	108	<0.00100	2.92	<0.000100	3070	2.16	268	<0.0000400	<0.000500
WQ4-2	23K1909-08	2023-11-15	M		0.000133	<0.00200	0.137	<0.000500	0.0546	414	0.0134	<0.000010	<0.000000050	0.00371	<0.000400	<0.1	116	<0.00100	2.75	<0.000100	3420	2.37	281	<0.0000400	<0.000500
WQ4-2	23L2091-05	2023-12-15	M		0.0000677	<0.00200	0.0556	<0.000500	0.151	1060	0.00805	0.000010		0.00832	<0.000400	<0.1	318	<0.00100	2.13	<0.000100	8780	5.7	776	<0.0000400	<0.000500
WQ4-2	L2754383-5	2024-01-25	M																						
WQ4-2	VA24A1507-005	2024-01-25	M	<0.00050	0.000101	0.00077	0.090	0.00015	0.098	700	0.00650	<0.0000050	0.000000021	0.00573	<0.00050	0.058	202	<0.00050	2.3	<0.00010	5380	3.91	478	<0.000050	<0.0010
WQ4-2	L2754604-5	2024-02-14	M																						
WQ4-2	VA24A2995-005	2024-02-14	M	<0.00050	0.000090	<0.00050	0.038	<0.00010	0.167	836	0.00574	<0.0000050	<0.000000040	0.00811	<0.00050	0.082	265	<0.00050	2.2	<0.00010	7350	5.79	686	<0.000050	<0.0010
WQ4-2	L2755043-5	2024-03-21	M																						
WQ4-2	VA24A6026-005	2024-03-21	M	<0.00050	0.000102	0.00085	0.147	<0.00010	0.040	301	0.00990	<0.0000050	<0.000000020	0.00283	<0.00050	<0.050	89.0	<0.00050	3.2	<0.00010	2300	1.67	219	<0.000050	<0.0010
WQ4-2	L2755490-5	2024-04-24	M																						
WQ4-2	VA24A8916-005	2024-04-24	M	<0.00050	0.000065	<0.00050	0.063	<0.00010	0.097	810	0.00473	<0.0000050	<0.000000020	0.00620	<0.00050	<0.050	228	<0.00050	<1.0	<0.00010	6180	4.27	562	<0.000050	<0.0010
WQ4-2	L2755567-5	2024-05-01	M																						
WQ4-2	VA24A9566-005	2024-05-01	M	<0.00050	0.000120	0.00070	<0.010	<0.00010	0.127	1060	0.00170	<0.0000050	<0.000000020	0.00714	<0.00050	<0.050	299	<0.00050	<1.0	<0.00010	7670	4.96	704	<0.000050	<0.0010
WQ4-2	L2755666-5	2024-05-08	M																						
WQ4-2	VA24B0201-005	2024-05-08	M	<0.00050	0.000114	0.00092	0.156	<0.00010	0.034	246	0.00845	<0.0000050	<0.000000020	0.00270	<0.00050	<0.050	80.0	<0.00050	2.2	<0.00010	2250	1.63	192	<0.000050	<0.0010
WQ4-2	L2755779-5	2024-05-15	M																						
WQ4-2	VA24B0901-005	2024-05-15	M	<0.00050	0.000150	0.00109	0.212	<0.00010	0.069	458	0.00940	<0.0000050	<0.000000020	0.00413	<0.00050	<0.050	140	<0.00050	1.5	<0.00010	3910	2.76	337	<0.000050	<0.0010
WQ4-2	L2755888-5	2024-05-22	M																						
WQ4-2	VA24B1500-005	2024-05-22	M	<0.00050	0.000116	0.00075	0.117	0.00017	0.075	516	0.00685	<0.0000050	<0.000000020	0.00425	<0.00050	<0.050	154	<0.00050	1.6	<0.00010	4400	2.99	360	<0.000050	<0.0010
WQ4-2	L2756312-5	2024-06-19	M																						
WQ4-2	VA24B4510-005	2024-06-19	M	<0.00050	0.000095	0.00074	0.114	0.00013	0.053	439	0.00678	<0.0000050	0.000000023	0.00410	<0.00050	<0.050	143	<0.00050	1.3	<0.00010	3850	2.60	337	<0.000050	<0.0010
WQ4-2	VA24B7397-005	2024-07-17	M	<0.00050	0.000133	0.00096	0.195	<0.00010	0.075	615	0.00682	<0.0000050	<0.000000020	0.00500	<0.00050	<0.050	182	<0.00050	1.3	<0.00010	4900	3.44	469	<0.000050	<0.0010
WQ4-2	L2756689-5	2024-07-17	M																						
WQ4-2	L2757122-5	2024-08-21	M																						
WQ4-2	VA24C1337-005	2024-08-21	M	<0.00050	0.000167	0.00100	0.280	<0.00010	0.025	175	0.0130	<0.0000050	<0.000000020	0.00156	<0.00050	<0.050	53.2	<0.00050	2.1	<0.00010	1450	0.943	120	<0.000050	<0.0010
WQ4-2	VA24C4683-005	2024-09-18	M	<0.00050	0.000203	0.00110	0.299	<0.00010	0.028	238	0.0167	<0.0000050	<0.000000020	0.00202	<0.00050	<0.050	65.0	<0.00050	2.1	<0.00010	1750	1.20	158	<0.000050	<0.0010
WQ4-2	VA24C8569-005	2024-10-23	M	<0.00050	0.000146	0.00131	0.185	<0.00010	0.091	803	0.0110	<0.0000050	0.000000025	0.00607	<0.00050	0.061	240	0.00253	1.7	<0.00010	5880	4.07	521	<0.000050	<0.0010
WQ4-2	L2757977-5	2024-10-30	M																						
WQ4-2	VA24C9414-005	2024-10-30	M	<0.00050	0.000188	0.00068	0.026	<0.00010	0.127	918	0.00588	<0.0000050	<0.000000020	0.00708	<0.00050	0.064	281	0.00234	1.7	<0.00010	7500	4.92	667	<0.000050	<0.0010
WQ4-2	VA24D0180-005	2024-11-06	M	<0.00050	0.000127	0.00069	0.018	<0.00010	0.118	945	0.00532	<0.0000050	<0.000000020	0.00772	0.00059	0.072	276	<0.00050	1.6	<0.00010	6910	5.14	658	<0.000050	<0.0010
WQ4-2	VA24D0813-005	2024-11-13	M	<0.00050	0.000136	0.00095	0.105	<0.00010	0.050	409	0.00613	<0.0000050	0.000000021	0.00314	<0.00050	<0.050	122	0.00098	1.8	<0.00010	3140	2.13	283	<0.000050	<0.0010
WQ4-2	L2758221-5	2024-11-22	M																						
WQ4-2	VA24D1791-005	2024-11-22	M	<0.00050	0.000206	0.00110	0.069	<0.00010	0.120	803	0.00777	<0.0000050	<0.000000080	0.00635	<0.00050	0.073	240	<0.00050	2.3	<0.00010	6080	4.41	605	<0.000050	<0.0010
WQ4-2	L2758486-5	2024-12-18	M																						
WQ4-2	VA24D3937-005	2024-12-18	M	<0.00050	0.000093	<0.00050	0.046	<0.00010	0.112	696	0.00527	<0.0000050	0.000000022	0.00844	<0.00050	0.075	250	<0.00050	1.6	<0.00010	5570	5.46	618	<0.000050	<0.0010
WQ4-2	VA25A1525-005	2025-01-22	M	<0.00050	0.000069	0.00062	0.074	<0.00010	0.103	681	0.00664	<0.0000050	<0.000000020	0.00660	<0.00050	0.073	256	<0.00050	2.3	<0.00010	4870	4.45	550	<0.000050	<0.0010
WQ4-2	L2758770-5	2025-01-22	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	L2759008-5	2025-02-19	M																						
WQ4-2	VA25A3570-005	2025-02-19	M	<0.00050	0.000070	<0.00050	0.088	<0.00010	0.115	1030	0.00771	<0.0000050	<0.000000020	0.00632	<0.00050	0.059	242	<0.00050	3.8	<0.00010	6990	4.38	517	<0.000050	<0.0010
WQ4-2	VA25A6679-005	2025-03-26	M	<0.00050	0.000057	0.00057	0.110	<0.00010	0.076	643	0.00627	<0.0000050	<0.000000080	0.00447	<0.00050	<0.050	177	<0.00050	1.2	<0.00010	4980	3.09	331	<0.000050	<0.0010
WQ4-2	VA25A9109-005	2025-04-23	M	<0.00050	0.000068	<0.00050	0.019	<0.00010	0.113	900	0.00243	<0.0000050	<0.000000080	0.00728	<0.00050	<0.050	237	<0.00050	<1.0	<0.00010	6740	4.70	595	<0.000050	<0.0010
WQ4-2	VA25A9941-005	2025-05-01	M	<0.00050	0.000083	0.00083	0.045	<0.00010	0.084	585	0.00486	<0.0000050	<0.000000020	0.00519	<0.00050	<0.050	174	<0.00050	1.0	<0.00010	4960	3.46	417	<0.000050	<0.0010
WQ4-2	VA25B0496-005	2025-05-07	M	<0.00050	0.000095	0.00069	0.072	0.00011	0.093	623	0.00521	<0.0000050	<0.000000020	0.00478	<0.00050	<0.050	161	<0.00050	1.3	<0.00010	4670	3.29	384	<0.000050	<0.0010
WQ4-2	VA25B1530-005	2025-05-16	M	<0.00050	0.000095	0.00093	0.105	<0.00010	0.039	283	0.00592	<0.0000050	<0.000000020	0.00289	<0.00050	<0.050	85.2	<0.00050	1.6	<0.00010	2490	1.72	218	<0.000050	<0.0010
WQ4-2	VA25B1841-005	2025-05-21	M	<0.00050	0.000091	0.00080	0.141	<0.00010	<0.020	59.3	0.00613	<0.0000050	0.000000020	0.00083	<0.00050	<0.050	17.8	<0.00050	2.4	<0.00010	461	0.398	52.6	<0.000050	<0.0010
WQ4-3	23L2091-07	2023-12-15	M		0.0000869	<0.00200	0.0809	<0.000500	0.116	875	0.0122	<0.000010		0.00680	<0.000400	<0.1	265	<0.00100	2.23	<0.000100	7230	4.82	610	<0.0000400	<0.000500
WQ4-3	L2754383-6	2024-01-25	M																						
WQ4-3	VA24A1507-006	2024-01-25	M	<0.00050	0.000088	0.00062	0.108	<0.00010	0.056	404	0.00669	<0.0000050	0.000000034	0.00337	<0.00050	<0.050	115	<0.00050	2.5	<0.00010	3020	2.21	268	<0.000050	<0.0010
WQ4-3	L2754604-6	2024-02-14	M																						
WQ4-3	VA24A2995-006	2024-02-14	M	<0.00050	0.000107	0.00064	0.082	<0.00010	0.137	689	0.00769	<0.0000050	<0.000000040	0.00663	<0.00050	0.068	217	<0.00050	2.3	<0.00010	6040	4.72	572	<0.000050	<0.0010
WQ4-3	L2755043-6	2024-03-21	M																						
WQ4-3	VA24A6026-006	2024-03-21	M	<0.00050	0.000106	0.00083	0.165	<0.00010	<0.020	121	0.0111	<0.0000050	<0.000000020	0.00132	<0.00050	<0.050	34.5	<0.00050	3.4	<0.00010	939	0.664	85.1	<0.000050	<0.0010
WQ4-3	L2755490-6	2024-04-24	M																						
WQ4-3	VA24A8916-006	2024-04-24	M	<0.00050	0.000077	0.00052	0.127	<0.00010	0.036	289	0.00888	<0.0000050	<0.000000020	0.00253	<0.00050	<0.050	79.9	<0.00050	2.8	<0.00010	2170	1.58	203	<0.000050	<0.0010
WQ4-3	L2755567-6	2024-05-01	M																						
WQ4-3	VA24A9566-006	2024-05-01	M	<0.00050	0.000182	0.00084	0.105	<0.00010	0.045	358	0.00700	<0.0000050	<0.000000020	0.00258	<0.00050	<0.050	100	<0.00050	2.3	<0.00010	2680	1.64	234	<0.000050	<0.0010
WQ4-3	L2755666-6	2024-05-08	M																						
WQ4-3	VA24B0201-006	2024-05-08	M	<0.00050	0.000104	0.00081	0.135	<0.00010	0.030	211	0.00760	<0.0000050	<0.000000020	0.00224	<0.00050	<0.050	65.9	<0.00050	2.4	<0.00010	1850	1.38	160	<0.000050	<0.0010
WQ4-3	L2755779-6	2024-05-15	M																						
WQ4-3	VA24B0901-006	2024-05-15	M	<0.00050	0.000202	0.00152	0.367	<0.00010	0.025	166	0.0128	<0.0000050	<0.000000020	0.00167	<0.00050	<0.050	48.2	<0.00050	2.4	<0.00010	1330	0.969	120	<0.000050	<0.0010
WQ4-3	L2755888-6	2024-05-22	M																						
WQ4-3	VA24B1500-006	2024-05-22	M	<0.00050	0.000133	0.00082	0.177	<0.00010	0.031	220	0.00861	<0.0000050	<0.000000020	0.00201	<0.00050	<0.050	64.4	<0.00050	2.2	<0.00010	1790	1.25	151	<0.000050	<0.0010
WQ4-3	L2756312-6	2024-06-19	M																						
WQ4-3	VA24B4510-006	2024-06-19	M	<0.00050	0.000153	0.00126	0.223	<0.00010	0.040	315	0.00935	<0.0000050	0.000000029	0.00298	0.00149	<0.050	102	<0.00050	2.0	<0.00010	2710	1.81	233	<0.000050	<0.0010
WQ4-3	VA24B7397-006	2024-07-17	M	<0.00050	0.000240	0.00131	0.459	0.00012	<0.020	50.6	0.0153	<0.0000050	<0.000000020	0.00062	<0.00050	<0.050	15.4	<0.00050	2.6	<0.00010	415	0.276	36.5	<0.000050	<0.0010
WQ4-3	L2756689-6	2024-07-17	M																						
WQ4-3	L2757122-6	2024-08-21	M																						
WQ4-3	VA24C1337-006	2024-08-21	M	<0.00050	0.000163	0.00092	0.259	<0.00010	0.023	164	0.0128	<0.0000050	<0.000000020	0.00149	<0.00050	<0.050	49.0	<0.00050	2.1	<0.00010	1330	0.890	117	<0.000050	<0.0010
WQ4-3	VA24C4683-006	2024-09-18	M	<0.00050	0.000214	0.00093	0.327	<0.00010	0.021	192	0.0171	<0.0000050	0.000000037	0.00165	<0.00050	<0.050	52.4	<0.00050	2.3	<0.00010	1400	1.00	129	<0.000050	<0.0010
WQ4-3	VA24C8569-006	2024-10-23	M	<0.00050	0.000250	0.00150	0.416	<0.00010	0.030	266	0.0186	<0.0000050	0.000000021	0.00216	<0.00050	<0.050	78.0	0.00066	2.8	<0.00010	1980	1.32	173	<0.000050	<0.0010
WQ4-3	L2757977-6	2024-10-30	M																						
WQ4-3	VA24C9414-006	2024-10-30	M	<0.00050	0.000141	0.00104	0.183	<0.00010	0.026	185	0.00997	<0.0000050	<0.000000080	0.00185	<0.00050	<0.050	56.4	<0.00050	2.7	<0.00010	1480	1.05	132	<0.000050	<0.0010
WQ4-3	VA24D0180-006	2024-11-06	M	<0.00050	0.000139	0.00077	0.106	<0.00010	0.064	492	0.0115	<0.0000050	0.000000022	0.00402	<0.00050	<0.050	142	<0.00050	2.7	<0.00010	3680	2.63	330	<0.000050	<0.0010
WQ4-3	VA24D0813-006	2024-11-13	M	<0.00050	0.000125	0.00115	0.154	<0.00010	0.023	181	0.00734	<0.0000050	0.000000023	0.00160	<0.00050	<0.050	53.6	<0.00050	2.4	<0.00010	1390	0.957	123	<0.000050	<0.0010
WQ4-3	L2758221-6	2024-11-22	M																						
WQ4-3	VA24D1791-006	2024-11-22	M	<0.00050	0.000238	0.00070	0.064	<0.00010	0.142	902	0.00808	<0.0000050	<0.000000020	0.00728	0.00053	0.081	270	<0.00050	2.4	<0.00010	6780	4.98	700	<0.000050	<0.0010
WQ4-3	L2758486-6	2024-12-18	M																						
WQ4-3	VA24D3937-006	2024-12-18	M	<0.00050	0.000097	0.00059	0.054	<0.00010	0.081	486	0.00532	<0.0000050	0.000000032	0.00613	<0.00050	0.057	179	<0.00050	1.5	<0.00010	3980	4.06	447	<0.000050	<0.0010
WQ4-3	L2758770-6	2025-01-22	M																						
WQ4-3	VA25A1525-006	2025-01-22	M	<0.00050	0.000066	0.00056	0.071	<0.00010	0.098	634	0.00659	<0.0000050	0.000000024	0.00628	<0.00050	0.071	246	<0.00050	2.3	<0.00010	4730	4.30	535	<0.000050	<0.0010
WQ4-3	L2759008-6	2025-02-19	M																						
WQ4-3	VA25A3570-006	2025-02-19	M	<0.00050	0.000070	0.00060	0.097	<0.00010	0.115	1020	0.00812	<0.0000050	<0.000000080	0.00636	<0.00050	0.057	234	<0.00050	3.8	<0.00010	6870	4.42	500	<0.000050	<0.0010
WQ4-3	VA25A6679-006	2025-03-26	M	<0.00050	0.000055	0.00050	0.100	<0.00010	0.062	540	0.00563	<0.0000050	<0.000000080	0.00393	<0.00050	<0.050	146	<0.00050	1.2	<0.00010	4070	2.58	283	<0.000050	<0.0010
WQ4-3	VA25A9109-006	2025-04-23	M	<0.00050	0.000083	0.00072	0.131	<0.00010	0.022	170	0.00756	<0.0000050	<0.000000020	0.00186	<0.00050	<0.050	48.0	<0.00050	3.0	<0.00010	1360	0.957	120	<0.000050	<0.0010
WQ4-3	VA25A9941-006	2025-05-01	M	<0.00050	0.000092	0.00089	0.124	<0.00010	0.022	165	0.00618	<0.0000050	<0.000000020	0.00188	<0.00050	<0.050	50.4	<0.00050	2.2	<0.00010	1390	1.01	123	<0.000050	<0.0010
WQ4-3	VA25B0496-006	2025-05-07	M	<0.00050	0.000100	0.00081	0.105	0.00026	0.063	431	0.00601	<0.0000050	<0.000000020	0.00356	<0.00050	<0.050	113	<0.00050	1.6	<0.00010	3250	2.36	268	<0.000050	<0.0010
WQ4-3	VA25B1530-006	2025-05-16	M	<0.00050	0.000099	0.00097	0.175	<0.00010	<0.020	76.6	0.00701	<0.0000050	0.000000026	0.00103	<0.00050	<0.050	25.2	<0.00050	2.2	<0.00010	709	0.504	64.7	<0.000050	<0.0010
WQ4-3	VA25B1841-006	2025-05-21	M	<0.00050	0.000100	0.00084	0.161	<0.00010	<0.020	71.9	0.00701	<0.0000050	<0.000000020	0.00096	<0.00050	<0.050	21.5	<0.00050	2.6	<0.00010	563	0.480	61.1	<0.000050	<0.0010
WQR1-0.5	L2755545-7	2024-04-30	M																						
WQR1-0.5	VA24A9402-007	2024-04-30	M		0.000086	0.00075	0.108	<0.00010	0.059	456	0.00671	<0.0000050	<0.000000020	0.00388	<0.00050	<0.050	125	<0.00050	1.5	<0.00010	3390	2.54	319	<0.000050	<0.0010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA24A9802-011	2024-05-05	M		0.000080	0.00071	0.115	<0.00010	0.054	402	0.00719	<0.0000050		0.00368	<0.00050	<0.050	114	<0.00050	2.4	<0.00010	3350	2.24	276	<0.000050	<0.0010
WQR1-0.5	L2755648-10	2024-05-08	M																						
WQR1-0.5	VA24B0178-010	2024-05-08	M		0.000108	0.00080	0.113	<0.00010	0.064	412	0.00680	<0.0000050	<0.000000020	0.00418	<0.00050	<0.050	138	<0.00050	1.6	<0.00010	3840	2.72	330	<0.000050	<0.0010
WQR1-0.5	L2755934-1	2024-05-24	M																						
WQR1-0.5	VA24B1783-001	2024-05-24	M		0.000127	0.00123	0.201	0.00017	0.027	175	0.00997	<0.0000050	<0.000000020	0.00187	<0.00050	<0.050	60.0	<0.00050	2.3	<0.00010	1570	1.13	140	<0.000050	<0.0010
WQR1-0.5	L2755981-1	2024-05-28	M																						
WQR1-0.5	VA24B2063-001	2024-05-28	M		0.000133	0.00108	0.228	<0.00010	0.022	139	0.00932	<0.0000050	<0.000000020	0.00138	<0.00050	<0.050	39.2	<0.00050	2.4	<0.00010	1140	0.801	101	<0.000050	<0.0010
WQR1-0.5	VA24B2561-005	2024-06-01	M		0.000125	0.00444	0.182	0.00438	<0.020	110	0.00937	<0.0000050		0.00117	<0.00050	<0.050	29.9	<0.00050	2.8	<0.00010	768	0.578	72.1	<0.000050	<0.0010
WQR1-0.5	L2756068-1	2024-06-04	M																						
WQR1-0.5	VA24B2772-001	2024-06-04	M		0.000285	0.00212	0.529	0.00015	<0.020	10.9	0.0151	<0.0000050	<0.000000020	0.00040	<0.00050	<0.050	3.7	<0.00050	2.7	<0.00010	83.5	0.079	8.2	<0.000050	<0.0010
WQR1-0.5	VA24B3452-007	2024-06-10	M		0.000268	0.00192	0.506	0.00013	<0.020	48.8	0.0158	<0.0000050	0.000000021	0.00062	<0.00050	<0.050	13.6	<0.00050	2.6	<0.00010	365	0.255	32.2	<0.000050	<0.0010
WQR1-0.5	655-454600000-0	2024-06-17	M																						
WQR1-0.5	VA24B5880-003	2024-07-02	M		0.000357	0.00173	0.748	0.00013	<0.020	32.1	0.0222	<0.0000050		0.00058	<0.00050	<0.050	9.6	<0.00050	3.3	<0.00010	267	0.183	21.4	<0.000050	<0.0010
WQR1-0.5	VA24B5882-007	2024-07-03	M		0.000170	0.00109	0.330	<0.00010	<0.020	53.5	0.0123	<0.0000050		0.00069	<0.00050	<0.050	15.6	<0.00050	2.1	<0.00010	424	0.282	35.0	<0.000050	<0.0010
WQR1-0.5	VA24B6465-001	2024-07-09	M		0.000223	0.00179	0.413	<0.00010	<0.020	146	0.0153	<0.0000050	0.000000026	0.00142	<0.00050	<0.050	41.8	<0.00050	2.1	<0.00010	1160	0.841	102	<0.000050	<0.0010
WQR1-0.5	VA24B7867-001	2024-07-20	M		0.000173	0.00088	0.279	<0.00010	<0.020	118	0.0118	<0.0000050	<0.000000020	0.00122	<0.00050	<0.050	34.6	<0.00050	1.9	<0.00010	919	0.662	84.4	<0.000050	<0.0010
WQR1-0.5	L2757210-1	2024-08-26	M																						
WQR1-0.5	VA24C2208-001	2024-08-26	M		0.000302	0.00057	0.529	0.00015	0.026	182	0.0206	<0.0000050	<0.000000080	0.00177	<0.00050	<0.050	56.2	<0.00050	2.7	<0.00010	1510	1.08	127	<0.000050	<0.0010
WQR1-0.5	L2757680-1	2024-10-06	M																						
WQR1-0.5	VA24C6685-001	2024-10-06	M		<0.00200	<0.0100	<0.200	<0.00100	0.0832	614	0.00865	<0.0000050	<0.000000020	0.00539	<0.0100	<1.00	189	<0.00100	2.27	<0.000200	4890	3.50	496	<0.000200	<0.00200
WQR1-0.5	VA24C7408-001	2024-10-13	M		0.000140	0.00092	0.174	<0.00010	0.097	698	0.0138	<0.0000050	<0.000000020	0.00613	<0.00050	0.060	206	<0.00050	1.9	<0.00010	5420	4.05	476	<0.000050	<0.0010
WQR1-0.5	L2757830-3	2024-10-19	M																						
WQR1-0.5	VA24C8041-003	2024-10-19	M		0.000170	0.00076	0.200	0.00011	0.053	403	0.0125	<0.0000050	0.000000024	0.00300	<0.00150	<0.050	114	<0.00050	2.3	<0.00010	3040	2.03	260	<0.000050	<0.0010
WQR1-0.5	VA24C8159-005	2024-10-20	M		0.000488	0.00240	0.824	0.00020	0.027	199	0.0338	<0.0000050	0.000000026	0.00161	0.00050	0.053	56.5	<0.00050	3.4	<0.00010	1480	1.04	132	<0.000050	<0.0010
WQR1-0.5	L2757872-1	2024-10-22	M																						
WQR1-0.5	VA24C8330-001	2024-10-22	M		0.000469	0.00233	0.842	0.00020	0.028	209	0.0303	<0.0000050	<0.000000080	0.00182	0.00060	0.051	61.0	<0.00050	4.0	<0.00010	1680	1.08	142	<0.000050	<0.0010
WQR1-0.5	L2757933-5	2024-10-28	M																						
WQR1-0.5	VA24C9041-005	2024-10-28	M		0.000228	0.00175	0.432	0.00016	<0.020	80.8	0.0148	<0.0000050	0.000000022	0.00089	<0.00050	<0.050	23.0	<0.00050	3.3	<0.00010	648	0.459	55.9	<0.000050	<0.0010
WQR1-0.5	L2758002-1	2024-11-01	M																						
WQR1-0.5	VA24C9683-001	2024-11-01	M		0.000165	0.00112	0.098	<0.00010	0.078	569	0.0102	<0.0000050	<0.000000020	0.00503	<0.00050	0.056	175	<0.00050	2.4	<0.00010	4550	3.20	416	<0.000050	<0.0010
WQR1-0.5	L2758142-5	2024-11-14	M																						
WQR1-0.5	VA24D0945-005	2024-11-14	M		0.000159	0.00112	0.218	<0.00010	0.028	216	0.00977	<0.0000050	0.000000024	0.00211	<0.00050	<0.050	63.2	<0.00050	2.7	<0.00010	1610	1.18	147	<0.000050	<0.0010
WQR1-0.5	VA24D1069-005	2024-11-15	M		0.000149	0.00110	0.179	<0.00010	0.031	257	0.00987	<0.0000050	0.000000023	0.00212	<0.00050	<0.050	71.6	<0.00050	3.2	<0.00010	2000	1.33	172	<0.000050	<0.0010
WQR1-0.5	L2758203-5	2024-11-19	M																						
WQR1-0.5	VA24D1567-005	2024-11-19	M		0.000155	0.00109	0.125	<0.00010	0.062	507	0.0111	<0.0000050	<0.000000020	0.00396	<0.00050	<0.050	140	<0.00050	2.8	<0.00010	3690	2.69	360	<0.000050	<0.0010
WQR1-0.5	L2758353-1	2024-12-05	M																						
WQR1-0.5	VA24D2842-001	2024-12-05	M		0.000142	0.00078	0.110	<0.00010	0.081	584	0.0126	<0.0000050	0.000000057	0.00528	0.00053	0.064	175	<0.00050	3.1	<0.00010	4790	3.37	423	<0.000050	<0.0010
WQR1-0.5	L2758617-7	2025-01-08	M																						
WQR1-0.5	VA25A0392-007	2025-01-08	M		0.000110	0.00058	0.128	<0.00010	0.090	536	0.0114	<0.0000050	<0.000000020	0.00623	<0.00050	0.070	190	<0.00050	2.6	<0.00010	4300	4.11	445	<0.000050	<0.0010
WQR1-0.5	L2759040-7	2025-02-20	M																						
WQR1-0.5	VA25A3677-007	2025-02-20	M		0.000084	0.00065	0.086	<0.00010	0.098	762	0.00863	<0.0000050	<0.000000020	0.00603	<0.00050	<0.050	217	<0.00050	3.5	<0.00010	6090	4.05	438	<0.000050	<0.0010
WQR1-0.5	L2759227-7	2025-03-13	M																						
WQR1-0.5	VA25A5556-007	2025-03-13	M		0.000090	0.00066	0.100	<0.00010	0.054	393	0.00725	<0.0000050	<0.000000020	0.00396	<0.00050	<0.050	124	<0.00050	2.1	<0.00010	2880	2.46	286	<0.000050	<0.0010
WQR1-0.5	VA25A6528-013	2025-03-25	M		0.000083	0.00065	0.107	<0.00010	0.061	460	0.00761	<0.0000050		0.00447	<0.00050	<0.050	141	<0.00050	1.9	<0.00010	3860	2.80	334	<0.000050	<0.0010
WQR1-0.5	VA25A8147-001	2025-04-11	M		0.000090	0.00079	0.166	<0.00010	0.026	137	0.00691	<0.0000050	<0.000000020	0.00161	<0.00050	<0.050	41.1	<0.00050	3.2	<0.00010	1280	0.780	118	<0.000050	<0.0010
WQR1-0.5	VA25A8148-001	2025-04-11	M																						
WQR1-0.5	VA25A8281-007	2025-04-14	M		0.000070	0.00062	0.105	<0.00010	0.042	303	0.00693	<0.0000050	<0.000000020	0.00296	<0.00050	<0.050	91.5	<0.00050	2.0	<0.00010	2480	1.96	227	<0.000050	<0.0010
WQR1-0.5	VA25A8283-007	2025-04-14	M																						
WQR1-0.5	VA25A9123-008	2025-04-23	M		0.000084	0.00082	0.147	<0.00010	<0.020	135	0.00842	<0.0000050	<0.000000020	0.00144	<0.00050	<0.050	38.0	<0.00050	3.0	<0.00010	1000	0.747	87.3	<0.000050	<0.0010
WQR1-0.5	VA25A9125-008	2025-04-23	M																						
WQR1-0.5	VA25B0359-009	2025-05-06	M		0.000124	0.00088	0.178	<0.00010	<0.020	132	0.00790	<0.0000050	<0.000000020	0.00174	<0.00050	<0.050	45.2	<0.00050	2.1	<0.00010	1100	0.980	127	<0.000050	<0.0010
WQR1-0.5	VA25B0360-009	2025-05-06	M																						
WQR1-0.5	VA25B0800-007	2025-05-09	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA25B0802-007	2025-05-09	M		0.000110	0.00091	0.164	<0.00010	0.035	238	0.00686	<0.0000050	0.000000025	0.00241	<0.00050	<0.050	70.6	<0.00050	1.8	<0.00010	1980	1.37	160	<0.000050	<0.0010
WQR1-0.5	VA25B2349-005	2025-05-27	M		0.000098	0.00098	0.132	<0.00010	0.024	176	0.00665	<0.0000050		0.00185	<0.00050	<0.050	53.1	<0.00050	2.0	<0.00010	1400	1.06	123	<0.000050	<0.0010
WQR1-1	0051710-09	2020-05-20	M		<0.00020	0.00115	0.024	0.00108	0.172	1190	0.00278	<0.000010		0.0102	0.00117	<0.100	401	<0.00100	<2.0	<0.000100	8690	7.38	932	<0.000040	<0.00040
WQR1-1	0062209-10	2020-06-22	M		<0.00020	0.0016	0.041	0.00217	0.168	1170	0.00326	<0.000010		0.0105	<0.00080	<0.100	348	<0.00100	<2.0	<0.000100	9580	7.4	852	<0.000040	<0.00040
WQR1-1	0071996-09	2020-07-21	M		<0.00020	0.00181	0.052	0.00078	0.155	1120	0.00526	<0.000010		0.00947	0.00463	<0.100	309	<0.00100	2	<0.000100	9380	6.87	866	<0.000040	<0.00040
WQR1-1	0082292-09	2020-08-24	M		<0.00020	0.00156	0.037	<0.00040	0.152	1130	0.00464	<0.000010		0.00997	<0.00080	<0.100	339	0.00307	<2.0	<0.000100	9780	7.05	882	<0.000040	<0.00040
WQR1-1	0093017-09	2020-09-28	M		<0.00020	0.00083	0.043	0.00041	0.158	998	0.0116	<0.000010		0.0104	0.00152	<0.100	322	<0.00100	<2.0	<0.000100	8930	6.94	837	<0.000040	<0.00040
WQR1-1	20J1961-09	2020-10-20	M		<0.00020	0.00157	0.053	0.00166	0.171	1250	0.0121	<0.000010		0.011	0.00107	<0.100	348	<0.00100	<2.0	<0.000100	9260	7.63	1030	<0.000040	<0.00040
WQR1-1	20J2778-09	2020-10-27	M		<0.00020	0.00442	0.027	0.00178	0.148	1110	0.00701	<0.000010		0.0105	0.00106	0.121	318	0.00225	<2.0	<0.000100	8690	7.21	929	<0.000040	0.00041
WQR1-1	20K0360-09	2020-11-03	M		<0.00020	0.00274	0.037	0.00126	0.171	1040	0.00883	<0.000010		0.00972	<0.00080	0.148	322	<0.00100	<2.0	<0.000100	8780	6.94	909	<0.000040	<0.00040
WQR1-1	20K1261-09	2020-11-10	M		<0.00020	0.00198	0.031	0.00119	0.187	1120	0.0124	<0.000010		0.0109	<0.00080	0.11	353	<0.00100	<2.0	<0.000100	7570	7.97	967	<0.000040	<0.00040
WQR1-1	20K2100-09	2020-11-18	M		<0.00020	<0.00080	<0.020	<0.00040	0.187	1170	0.00829	<0.000010		0.00984	<0.00080	<0.100	354	<0.00100	<2.0	<0.000100	9670	8	985	<0.000040	<0.00040
WQR1-1	20L1589-09	2020-12-14	M		<0.00020	0.0014	0.022	<0.00040	0.166	1370	0.00659	<0.000010		0.0125	<0.00080	0.137	433	<0.00100	<2.0	<0.000100	10900	9.06	1220	<0.000040	0.00112
WQR1-1	21A2590-09	2021-01-27	M		<0.00020	<0.00080	<0.020	<0.00040	0.151	1100	0.00257	<0.000010		0.011	<0.00080	0.135	345	<0.00100	2	<0.000100	9330	7.34	873	<0.000040	<0.00040
WQR1-1	21B2778-09	2021-02-25	M		<0.00020	<0.00080	<0.020	<0.00040	0.2	1190	0.00274	<0.000010		0.0115	<0.00080	0.152	383	<0.00100	2.4	<0.000100	9830	7.99	979	<0.000040	<0.00040
WQR1-1	21C3505-10	2021-03-25	M		<0.0000500	<0.00100	<0.0200	<0.000500	0.216	1260	0.0027	<0.000010	<0.000000050	0.0113	<0.00300	0.242	373	<0.00100	4.1	<0.000100	10000	8.02	978	<0.0000400	<0.000500
WQR1-1	21D2478-09	2021-04-22	M		<0.0000500	0.00101	0.0209	<0.000500	0.182	1200	0.00234	<0.000010		0.0109	0.000706	0.155	382	<0.00100	2.21	<0.000100	9270	6.99	946	<0.0000400	<0.000500
WQR1-1	21E1990-09	2021-05-18	M		<0.00020	<0.00080	<0.020	<0.00040	0.23	1220	0.00229	<0.000010		0.0112	<0.00080	<0.100	376	<0.00100	<2.0	<0.000100	10700	7.42	934	<0.000040	<0.00040
WQR1-1	21E2917-09	2021-05-26	M		0.0000543	0.00225	0.0235	0.000583	0.171	1220	0.0028	<0.000010	<0.000000024	0.0112	0.000549	<0.1	374	<0.00100	1.36	<0.000100	9450	7	842	<0.0000400	<0.000500
WQR1-1	21F0167-09	2021-06-01	M		0.0000525	<0.00100	0.0211	0.0017	0.159	1210	0.00286	<0.000010	<0.000000024	0.0114	0.000708	<0.1	367	<0.00100	2.44	<0.000100	9780	7.03	805	<0.0000400	<0.000500
WQR1-1	21F1056-09	2021-06-08	M		<0.0000500	<0.00100	<0.0200	<0.000500	0.177	1170	0.00287	<0.0000050	<0.000000023	0.0114	0.000638	0.137	345	<0.00100	1.99	<0.000100	8090	6.88	818	<0.0000400	<0.000500
WQR1-1	21F2014-09	2021-06-15	M		0.0000629	<0.00100	0.05	<0.000500	0.164	1180	0.00513	<0.000010	<0.000000023	0.0105	0.00231	<0.1	351	0.00421	2.43	<0.000100	9560	6.97	925	0.000055	<0.000500
WQR1-1	21G2414-09	2021-07-20	M		<0.0000500	<0.00100	0.0275	0.000702	0.16	1110	0.00416	<0.000010	0.000000028	0.00949	0.000534	<0.1	319	<0.00100	<0.5	<0.000100	8730	6.3	809	<0.0000400	<0.000500
WQR1-1	21H3040-09	2021-08-25	M		<0.0000500	0.003	<0.0200	0.00375	0.159	1080	0.00334	<0.000010	<0.000000050	0.0101	0.000237	<0.1	336	<0.00100	10.3	<0.000100	9380	6.92	842	<0.0000400	<0.000500
WQR1-1	21I3814-09	2021-09-28	M		0.0000793	0.00108	0.0309	<0.000500	0.158	1130	0.0081	<0.000010	<0.000000047	0.011	0.000622	<0.1	355	0.00696	2.24	<0.000100	8780	7.1	818	<0.0000400	<0.000500
WQR1-1	21J3514-09	2021-10-26	M		0.00005	0.00101	0.021	<0.00020	0.147	1120	0.0106	<0.000010	<0.000000050	0.00965	<0.00040	0.077	288	<0.00050	1.3	<0.000050	8860	5.94	0.8	<0.000020	<0.00004
WQR1-1	21K3046-09	2021-11-23	M		<0.00020	0.00151	0.043	<0.00040	0.178	1180	0.0174	<0.000010	0.000000031	0.0106	0.00131	<0.100	341	<0.00100	<2.0	<0.000100	8840	6.69	835	<0.000040	<0.00040
WQR1-1	21L2125-09	2021-12-14	M		<0.00020	<0.00080	0.033	<0.00040	0.174	1160	0.00504	<0.000010	<0.000000023	0.0101	<0.00080	<0.100	361	<0.00100	2.4	<0.000100	9690	7.38	902	<0.000040	<0.00040
WQR1-1	22A2312-09	2022-01-20	M		<0.00020	0.00089	<0.020	<0.00040	0.187	1130	0.00413	<0.000010	<0.000000024	0.0102	<0.00080	<0.100	351	<0.00100	2.4	<0.000100	9480	6.69	858	<0.000040	<0.00040
WQR1-1	22B2487-09	2022-02-17	M		<0.00020	0.00108	0.025	<0.00040	0.154	1180	0.00416	<0.000010		0.00971	<0.00080	<0.100	337	0.00558	<2.0	<0.000100	9160	6.38	811	<0.000040	<0.00040
WQR1-1	22C3145-09	2022-03-22	M		<0.00020	0.00176	<0.020	<0.00040	0.129	994	0.00223	<0.000010		0.00879	<0.00080	<0.100	302	<0.00100	<2.0	<0.000100	7500	5.5	660	<0.000040	<0.00040
WQR1-1	22D2212-06	2022-04-19	M		<0.00020	0.00097	0.026	<0.00040	0.179	1380	0.0029	<0.000010		0.0107	<0.00080	0.119	410	<0.00100	<2.0	<0.000100	11300	7.37	903	0.000089	<0.00040
WQR1-1	22E2480-01	2022-05-17	M		<0.00100	<0.00400	<0.100	<0.00200	0.145	1100	<0.00200	<0.000010	<0.000000024	0.0095	<0.00400	<0.500	351	<0.00500	<10.0	<0.000500	8810	7.19	898	<0.000200	<0.00200
WQR1-1	22F3212-09	2022-06-21	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.152	991	0.00214	<0.000010		0.00894	<0.000400	<0.1	324	<0.00100	1.3	<0.000100	8110	6.42	878	<0.0000400	<0.000500
WQR1-1	22G1763-09	2022-07-13	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.139	1140	0.00323	<0.000010		0.00939	<0.000400	0.112	336	<0.00100	1.28	<0.000100	9500	6.82	853	<0.0000400	<0.000500
WQR1-1	22H2453-09	2022-08-16	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.157	1080	0.00372	<0.000010	<0.000000026	0.00971	<0.000400	<0.100	363	<0.00100	1.44	<0.000100	9090	7.19	879	<0.0000400	<0.000500
WQR1-1	22I1926-09	2022-09-14	M		0.0000541	<0.00200	0.0251	<0.000500	0.140	1110	0.00380	<0.000010		0.00931	0.00121	<0.100	340	<0.00100	1.16	<0.000100	9360	5.94	803	<0.0000400	<0.000500
WQR1-1	22J1560-01	2022-10-12	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.181	1190	0.00421	<0.000010		0.0102	0.000839	0.121	339	<0.00100	1.41	<0.000100	9670	6.86	856	<0.0000400	<0.000500
WQR1-1	22K1453-09	2022-11-10	M		0.000124	<0.00200	0.0289	<0.000500	0.175	1360	0.0172	<0.000010	<0.000000050	0.0107	0.000554	0.104	407	<0.00100	2.18	<0.000100	9940	7.54	984	<0.0000400	<0.000500
WQR1-1	22L0774-09	2022-12-07	M		0.0000827	<0.00200	0.0232	<0.000500	0.156	1250	0.0427	<0.000010		0.0101	0.000484	0.108	347	<0.00100	1.88	<0.000100	9300	6.89	841	<0.0000400	<0.000500
WQR1-1	23A2847-09	2023-01-27	M		0.0000689	<0.00200	0.0203	<0.000500	0.152	1150	0.00652	<0.000010	<0.000000060	0.00960	0.000436	<0.12	354	<0.00100	1.75	<0.000100	9570	6.87	875	<0.0000400	<0.000500
WQR1-1	23C0060-09	2023-02-28	M		<0.0000500	<0.00200	0.0246	<0.000500	0.123	1280	0.00442	<0.000010		0.0101	0.000633	<0.1	405	<0.00100	2.07	<0.000100	10300	6.98	969	<0.0000400	<0.000500
WQR1-1	23C1797-09	2023-03-15	M		<0.0000500	<0.00200	0.0220	<0.000500	0.164	1130	0.00314	<0.000010		0.00972	<0.000400	0.123	357	<0.00100	1.76	<0.000100	11700	6.53	883	<0.0000400	<0.000500
WQR1-1	23D2945-09	2023-04-26	M		<0.0000500	<0.00200	<0.0200	0.00106	0.162	1120	0.00275	<0.000010		0.0102	0.00124	0.111	382	<0.00100	1.59	0.000204	8780	6.86	850	<0.0000400	<0.000500
WQR1-1	23E2392-09	2023-05-17	M		<0.0000500	<0.00200	0.0276	0.000520	0.126	1230	0.00212	<0.000010	<0.000000050	0.0102	0.000446	<0.1	415	<0.00100	1.57	0.000144	10600	7.46	971	<0.0000400	<0.000500
WQR1-1	23F3614-09	2023-06-27	M		<0.0000500	<0.00200	0.0253	0.00105	0.159	1140	0.00222	<0.000010		0.00953	<0.000400	<0.1	347	<0.00100	1.45	<0.000100	9750	6.87	926	<0.0000400	<0.000500
WQR1-1	23G2415-09	2023-07-19	M		<0.0000500	<0.00200	0.0254	<0.000500	0.163	1180	0.00281	<0.000010		0.0100	0.000509	<0.1	366	<0.00100	1.47	<0.000100	9640	7.22	957	<0.0000400	<0.000500
WQR1-1	23H3309-01	2023-08-24	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.151	1110	0.00347	<0.000010	<0.000000050	0.00996	<0.000400	<0.1	349	<0.00100	1.27	<0.000100	9000	6.85	870	<0.0000400	<0.000500
WQR1-1	23I2271-01	2023-09-19	M		<0.0000500	<0.00200	0.0331	<0.000500	0.152	1140	0.00401	<0.000010		0.00999	<0.000400	0.121	371	<0.00100	1.42	<0.000100	9320	6.45	909	<0.0000400	<0.000500
WQR1-1	23J2236-01	2023-10-18	M		0.0000631	<0.00200	0.0406	0.000807	0.15	949	0.00563	<0.000010		0.00990	0.000529	<0.1	369	<0.00100	1.33	<0.000100	8120	6.66	787	<0.0000400	<0.000500
WQR1-1	23K1909-09	2023-11-15	M		<0.0000500	<0.00200	<0.0200	0.000729	0.164	1220	0.00472	<0.000010	<0.000000050	0.0102	0.000512	0.109	360	<0.00100	1.79	<0.000100	10000	7.54	988	<0.0000400	<0.000500
WQR1-1	23L1905-01	2023-12-14	M		0.000237	<0.00200	0.0485	0.00115	0.126	1140	0.00540	<0.000010		0.0102	<0.000400	<0.1	356	<0.00100	1.65	0.000120	9550	7.28	896	<0.0000400	<0.000500
WQR1-1	L2754366-4	2024-01-24	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-1	VA24A1422-004	2024-01-24	M	<0.00179	0.000094	<0.00050	0.025	<0.00010	0.162	1190	0.00286	<0.0000050	<0.000000020	0.0103	<0.00050	0.088	360	<0.00050	1.8	<0.00010	9460	7.10	827	<0.000050	<0.0010
WQR1-1	L2754594-1	2024-02-13	M																						
WQR1-1	VA24A2858-001	2024-02-13	M	<0.00050	0.000084	<0.00050	0.020	<0.00010	0.163	947	0.00282	<0.0000050	0.000000021	0.00998	<0.00050	0.083	322	<0.00050	1.8	<0.00010	8740	7.24	793	<0.000050	<0.0010
WQR1-1	L2755033-1	2024-03-20	M																						
WQR1-1	VA24A5955-001	2024-03-20	M	<0.00050	0.000057	<0.00050	0.025	0.00015	0.144	1140	0.00423	<0.0000050	0.000000027	0.0106	<0.00050	0.093	354	<0.00050	2.0	<0.00010	9910	7.22	853	<0.000050	<0.0010
WQR1-1	L2755461-1	2024-04-23	M																						
WQR1-1	VA24A8736-001	2024-04-23	M	<0.00050	0.000069	<0.00050	0.019	<0.00010	0.172	1210	0.00210	<0.0000050	<0.000000040	0.00985	<0.00050	0.101	358	<0.00050	1.6	<0.00010	9480	6.79	874	<0.000050	<0.0010
WQR1-1	L2755553-1	2024-04-30	M																						
WQR1-1	VA24A9418-001	2024-04-30	M	<0.00050	0.000070	<0.00050	0.015	<0.00010	0.144	1230	0.00199	<0.0000050	<0.000000080	0.00938	<0.00050	0.100	355	<0.00050	1.7	<0.00010	9660	6.65	830	<0.000050	<0.0010
WQR1-1	L2755641-1	2024-05-07	M																						
WQR1-1	VA24B0040-001	2024-05-07	M	<0.00050	0.000093	<0.00050	<0.010	<0.00010	0.160	1110	0.00150	<0.0000050	<0.000000080	0.0109	<0.00050	0.099	349	<0.00050	1.5	<0.00010	9660	7.64	866	<0.000050	<0.0010
WQR1-1	L2755769-1	2024-05-14	M																						
WQR1-1	VA24B0738-001	2024-05-14	M	<0.00050	0.000079	<0.00050	0.017	<0.00010	0.152	1130	0.00139	<0.0000050	<0.000000020	0.00932	<0.00050	0.101	349	<0.00050	1.3	<0.00010	9300	6.10	776	<0.000050	<0.0010
WQR1-1	L2755874-1	2024-05-21	M																						
WQR1-1	VA24B1351-001	2024-05-21	M	<0.00050	0.000088	<0.00050	0.013	<0.00010	0.156	1140	0.00189	<0.0000050	<0.000000020	0.00966	<0.00050	0.095	331	<0.00050	1.8	<0.00010	9010	6.92	836	<0.000050	<0.0010
WQR1-1	L2756277-1	2024-06-18	M																						
WQR1-1	VA24B4257-001	2024-06-18	M	0.00063	0.000076	<0.00050	0.038	0.00016	0.146	1260	0.00474	<0.0000050	<0.000000020	0.00968	<0.00050	0.106	358	<0.00050	1.4	<0.00010	9930	6.60	928	<0.000050	<0.0010
WQR1-1	L2756678-1	2024-07-16	M																						
WQR1-1	VA24B7237-001	2024-07-16	M	<0.00050	0.000070	0.00058	0.038	0.00027	0.133	1170	0.00270	<0.0000050	0.000000022	0.00958	<0.00050	0.105	356	<0.00050	1.7	<0.00010	9280	6.59	849	<0.000050	<0.0010
WQR1-1	L2757095-1	2024-08-20	M																						
WQR1-1	VA24C1101-001	2024-08-20	M	<0.00050	0.000080	0.00052	0.021	0.00010	0.158	1170	0.00370	<0.0000050	<0.000000080	0.00944	<0.00050	0.109	345	<0.00050	1.9	<0.00010	9340	6.50	807	<0.000050	<0.0010
WQR1-1	VA24C4483-001	2024-09-17	M	<0.00050	0.000097	<0.00050	0.019	<0.00010	0.144	1270	0.00354	<0.0000050	<0.000000080	0.00928	<0.00050	0.094	357	<0.00050	1.4	<0.00010	9440	6.52	865	<0.000050	<0.0010
WQR1-1	VA24C8360-001	2024-10-22	M	<0.00050	0.000098	<0.00050	0.034	<0.00010	0.141	1220	0.00609	<0.0000050	<0.000000020	0.00943	<0.00050	0.088	352	0.00310	1.4	<0.00010	9150	6.37	788	<0.000050	<0.0010
WQR1-1	VA24C9197-001	2024-10-29	M	<0.00050	0.000267	<0.00050	0.036	<0.00010	0.151	1280	0.00646	<0.0000050	<0.000000020	0.00972	0.00059	0.103	359	0.00060	1.8	<0.00010	9240	6.73	871	<0.000050	<0.0010
WQR1-1	VA24D0009-001	2024-11-05	M		0.000235	0.00050	0.022	<0.00010	0.137	1150	0.00952	<0.0000050	<0.000000020	0.00892	<0.00050	0.089	341	<0.00050	1.5	<0.00010	8760	6.31	829	<0.000050	<0.0010
WQR1-1	L2758095-1	2024-11-12	M																						
WQR1-1	VA24D0632-001	2024-11-12	M	<0.00050	0.000211	0.00085	0.028	<0.00010	0.150	1190	0.00976	<0.0000050	<0.000000020	0.00911	0.00053	0.101	351	0.00078	1.6	<0.00010	8990	6.38	834	<0.000050	<0.0010
WQR1-1	VA24D1720-001	2024-11-21	M	<0.00050	0.000323	0.00055	0.034	<0.00010	0.197	1330	0.0119	<0.0000050	<0.000000080	0.0103	0.00071	0.107	394	<0.00100	2.0	<0.00010	9590	7.12	945	<0.000050	<0.0010
WQR1-1	L2758465-1	2024-12-17	M																						
WQR1-1	VA24D3769-001	2024-12-17	M	<0.00050	0.000098	<0.00050	0.023	0.00024	0.144	1000	0.00427	<0.0000050	<0.000000020	0.00993	<0.00050	0.095	317	<0.00050	1.6	<0.00010	7900	6.50	842	<0.000050	<0.0010
WQR1-1	L2758719-1	2025-01-21	M																						
WQR1-1	VA25A1408-001	2025-01-21	M	<0.00050	0.000066	<0.00050	0.022	0.00010	0.118	1240	0.00260	<0.0000050	<0.000000020	0.00828	<0.00050	0.114	381	<0.00050	1.8	<0.00010	9480	5.92	834	<0.000050	<0.0010
WQR1-1	L2758994-1	2025-02-18	M																						
WQR1-1	VA25A3430-001	2025-02-18	M	<0.00050	0.000066	<0.00050	0.031	<0.00010	0.180	1240	0.00289	<0.0000050	<0.000000020	0.00872	<0.00050	0.095	369	<0.00050	2.5	<0.00010	10400	6.06	749	<0.000050	<0.0010
WQR1-1	VA25A6550-001	2025-03-25	M	<0.00050	<0.000050	<0.00050	0.017	<0.00010	0.161	1430	0.00165	<0.0000050	<0.000000020	0.00868	<0.00050	0.098	382	<0.00050	1.5	<0.00010	11300	6.11	766	<0.000050	<0.0010
WQR1-1	VA25A8962-001	2025-04-22	M	<0.00050	0.000077	<0.00050	<0.010	<0.00010	0.142	1260	0.00120	<0.0000050	0.000000025	0.00890	<0.00050	0.079	324	0.00075	1.4	<0.00010	8620	6.29	735	0.000084	<0.0010
WQR1-1	VA25A9878-001	2025-04-30	M	<0.00050	0.000086	<0.00050	0.014	<0.00010	0.146	1190	0.00141	<0.0000050	<0.000000080	0.00958	<0.00050	0.099	362	<0.00050	1.6	<0.00010	9400	6.85	846	<0.000050	<0.0010
WQR1-1	VA25B0358-001	2025-05-06	M	<0.00050	0.000085	<0.00050	0.014	<0.00010	0.109	979	0.00143	<0.0000050	0.000000025	0.0106	<0.00050	0.068	300	<0.00080	<1.0	<0.00010	6630	7.33	578	<0.000050	<0.0010
WQR1-1	VA25B1026-001	2025-05-13	M	<0.00050	0.000090	0.00055	0.074	<0.00010	0.080	637	0.00516	<0.0000050	<0.000000020	0.00500	<0.00050	<0.050	168	<0.00050	1.6	<0.00010	4580	3.21	404	<0.000050	<0.0010
WQR1-1	VA25B1711-001	2025-05-20	M	<0.00050	0.000080	<0.00050	0.015	<0.00010	0.148	1370	0.00179	<0.0000050	<0.000000020	0.00917	<0.00050	0.105	318	<0.00050	1.8	<0.00010	9590	6.47	702	<0.000050	<0.0010
WQR1-2	0051710-10	2020-05-20	M		<0.00020	0.00232	0.295	0.00059	0.0162	101	0.0107	<0.000010		0.00119	0.00122	<0.100	34.3	<0.00100	<2.0	<0.000100	854	0.619	81.3	<0.000040	<0.00040
WQR1-2	0062209-09	2020-06-22	M		0.00058	0.00346	1.07	0.00094	0.00995	61	0.0342	<0.000010		0.00076	<0.00080	<0.100	18.8	<0.00100	2.1	<0.000100	506	0.379	45.4	<0.000040	<0.00040
WQR1-2	0071996-10	2020-07-21	M		<0.00020	<0.00080	<0.020	<0.00040	<0.00020	0.025	<0.00040	<0.000010		<0.00020	<0.00080	<0.100	0.51	<0.00100	<2.0	<0.000100	4.54	<0.0020	14.8	<0.000040	<0.00040
WQR1-2	0082292-10	2020-08-24	M		<0.00020	0.00171	0.153	<0.00040	0.099	552	0.013	<0.000010		0.00508	<0.00080	<0.100	165	0.0028	<2.0	<0.000100	4570	3.33	432	<0.000040	<0.00040
WQR1-2	0093017-10	2020-09-28	M		0.00022	0.0014	0.35	<0.00040	0.0236	146	0.0176	<0.000010		0.00153	0.00113	<0.100	51.8	0.00106	2.1	<0.000100	1220	1.03	124	<0.000040	<0.00040
WQR1-2	20J1961-10	2020-10-20	M		<0.00020	0.00128	0.155	0.00058	0.0625	411	0.0117	<0.000010		0.0041	<0.00080	<0.100	120	<0.00100	<2.0	<0.000100	3520	2.73	354	<0.000040	<0.00040
WQR1-2	20J2778-10	2020-10-27	M		<0.00020	0.00102	0.106	0.00104	0.0832	603	0.015	<0.000010		0.00626	0.00095	<0.100	178	0.00414	<2.0	<0.000100	4930	4.14	519	<0.000040	<0.00040
WQR1-2	20K0360-10	2020-11-03	M		<0.00020	0.00096	0.2	0.00044	0.0521	316	0.0115	<0.000010		0.00314	<0.00080	<0.100	105	<0.00100	3.1	<0.000100	2680	2.05	265	<0.000040	<0.00040
WQR1-2	20K1261-10	2020-11-10	M		<0.00020	0.00172	0.199	<0.00040	0.0674	400	0.0161	<0.000010		0.00422	<0.00080	<0.100	125	<0.00100	2.7	0.000351	3360	2.82	346	<0.000040	<0.00040
WQR1-2	20K2100-10	2020-11-18	M		0.00026	0.00109	0.365	<0.00040	0.0471	279	0.0266	<0.000010		0.00257	0.00091	<0.100	93.7	<0.00100	4.7	<0.000100	2340	1.9	238	<0.000040	<0.00040
WQR1-2	20L1589-10	2020-12-14	M		<0.00020	0.0017	0.12	<0.00040	0.0914	654	0.0127	<0.000010		0.00647	<0.00080	<0.100	208	<0.00100	2.4	<0.000100	5220	4.53	593	<0.000040	<0.00040
WQR1-2	21A2590-10	2021-01-27	M		<0.00020	<0.00080	0.055	<0.00040	0.124	925	0.0059	<0.000010		0.00866	<0.00080	<0.100	288	0.00104	3	<0.000100	7650	5.89	717	<0.000040	<0.00040
WQR1-2	21B2778-10	2021-02-25	M		<0.00020	<0.00080	0.043	0.00047	0.159	962	0.0055	<0.000010		0.00941	<0.00080	<0.100	307	<0.00100	2.4	<0.000100	7770	6.37	802	<0.000040	<0.00040

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	21C3505-11	2021-03-25	M		0.0000936	0.00188	0.145	<0.000500	0.077	417	0.0108	<0.000010	<0.000000050	0.0041	<0.00800	0.102	138	<0.00100	6.16	<0.000100	3260	2.64	323	<0.0000400	0.0058
WQR1-2	21D2478-10	2021-04-22	M		0.000127	0.00133	0.168	0.000052	0.0752	397	0.00839	<0.000010		0.00398	0.000481	0.023	125	0.00108	2.78	<0.000010	2880	2.17	318	0.0000067	0.000075
WQR1-2	21E1990-10	2021-05-18	M		0.00033	0.00245	0.685	0.00021	0.00516	29.7	0.0208	<0.000010		0.00062	0.00076	<0.050	10	<0.00050	3.4	<0.000050	266	0.204	22.2	<0.000020	<0.00020
WQR1-2	21E2917-10	2021-05-26	M		0.000152	0.00265	0.248	0.000134	0.00761	39.3	0.00992	<0.000010	<0.000000024	0.000748	0.000243	0.013	12.2	0.00032	3.28	<0.000010	325	0.27	31.1	0.0000044	0.000082
WQR1-2	21F0167-10	2021-06-01	M		0.000121	0.00117	0.162	0.000061	0.0532	299	0.00753	<0.000010	<0.000000024	0.0029	0.000312	0.019	84.7	0.00079	2.82	<0.000010	1970	1.81	221	0.000005	<0.000050
WQR1-2	21F1056-10	2021-06-08	M		0.000361	0.00172	0.704	0.000143	0.00565	28.9	0.0223	<0.0000050	<0.000000023	0.000666	0.000525	0.023	9.41	<0.00010	4.43	<0.000010	207	0.18	21.6	0.0000083	0.000172
WQR1-2	21F2014-10	2021-06-15	M		0.00043	0.00241	0.762	0.000174	0.0172	122	0.025	<0.000010	<0.000000023	0.00194	0.000546	0.038	36.5	<0.00010	3.57	<0.000010	968	0.725	92.8	0.0000109	<0.000050
WQR1-2	21G2414-10	2021-07-20	M		0.000164	<0.00100	0.262	<0.000500	0.0201	139	0.0111	<0.000010	<0.000000025	0.00147	0.000338	<0.1	46.6	<0.00100	0.63	<0.000100	1130	0.799	105	<0.0000400	<0.000500
WQR1-2	21H3040-10	2021-08-25	M		0.000159	0.00115	0.203	<0.000500	0.0488	322	0.0124	<0.000010	<0.000000050	0.00325	<0.000200	<0.1	108	<0.00100	7.63	<0.000100	2830	2.02	247	<0.0000400	<0.000500
WQR1-2	21I3814-10	2021-09-28	M		0.000262	0.00234	0.325	<0.000500	0.0378	250	0.0158	<0.000010	0.000000034	0.00259	0.000542	<0.1	81.5	0.00729	2.42	<0.000100	1970	1.48	187	<0.0000400	<0.000500
WQR1-2	21J3514-10	2021-10-26	M		0.00022	0.00313	0.436	0.00131	0.0231	147	0.0192	<0.000010	<0.000000050	0.0016	<0.00040	<0.050	45.4	<0.00050	3.2	<0.000050	1230	0.895	<0.6	<0.000020	<0.00004
WQR1-2	21K3046-10	2021-11-23	M		<0.00020	0.00095	0.044	0.00058	0.135	905	0.00643	<0.000010	0.000000034	0.00799	<0.00080	<0.100	266	0.001	2.5	<0.000100	6990	5.18	654	<0.000040	0.0024
WQR1-2	21L2125-10	2021-12-14	M		<0.00020	<0.00080	0.132	<0.00040	0.0813	522	0.0126	<0.000010	<0.000000023	0.00461	<0.00080	<0.100	161	<0.00100	3.8	<0.000100	4370	3.24	402	<0.000040	<0.00040
WQR1-2	22A2312-10	2022-01-20	M		<0.00020	0.00141	0.037	<0.00040	0.166	1010	0.00417	<0.000010	<0.000000024	0.00928	<0.00080	<0.100	311	<0.00100	2.5	<0.000100	8360	5.97	788	<0.000040	<0.00040
WQR1-2	22B2487-10	2022-02-17	M		<0.00020	0.00167	0.05	<0.00040	0.134	1030	0.00441	<0.000010		0.00875	<0.00080	<0.100	294	0.00264	2.2	<0.000100	8090	5.68	706	<0.000040	<0.00040
WQR1-2	22C3145-10	2022-03-22	M		<0.00020	0.0031	<0.020	<0.00040	0.123	953	0.00255	<0.000010		0.00839	<0.00080	<0.100	289	<0.00100	<2.0	<0.000100	7310	5.29	630	<0.000040	<0.00040
WQR1-2	22D2212-07	2022-04-19	M		<0.00020	0.00146	0.043	<0.00040	0.145	1090	0.00293	<0.000010		0.00869	<0.00080	<0.100	321	<0.00100	<2.0	<0.000100	8870	5.84	730	0.000139	<0.00040
WQR1-2	22E2480-02	2022-05-17	M		<0.00100	<0.00400	0.201	<0.00200	0.0312	238	0.00948	<0.000010	<0.000000024	0.00239	<0.00400	<0.500	75.4	<0.00500	<10.0	<0.000500	1900	1.42	171	<0.000200	<0.00200
WQR1-2	22F3212-10	2022-06-21	M		0.000119	<0.00200	0.23	<0.000500	0.0163	104	0.00918	<0.000010		0.00116	<0.000400	<0.1	32.9	<0.00100	2	<0.000100	844	0.631	80.3	<0.0000400	<0.000500
WQR1-2	22G1763-10	2022-07-13	M		0.000158	<0.00200	0.25	<0.000500	0.0310	203	0.0102	<0.000010		0.00180	<0.000400	<0.1	60.5	<0.00100	1.76	<0.000100	1660	1.17	144	<0.0000400	<0.000500
WQR1-2	22H2453-10	2022-08-16	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.0388	262	0.00462	<0.000010	<0.000000028	0.00261	<0.000400	<0.100	91.3	<0.00100	1.47	<0.000100	2190	1.56	209	<0.0000400	<0.000500
WQR1-2	22I1926-10	2022-09-14	M		0.0000852	<0.00200	0.0879	<0.000500	0.0876	712	0.00880	<0.000010		0.00604	0.000544	<0.100	220	<0.00100	1.44	<0.000100	5920	3.84	516	<0.0000400	<0.000500
WQR1-2	22J1560-02	2022-10-12	M		<0.0000500	<0.00200	0.0339	<0.000500	0.144	919	0.00393	<0.000010		0.00787	0.000434	<0.1	257	<0.00100	<1	<0.000100	7420	5.27	666	<0.0000400	<0.000500
WQR1-2	22K1453-10	2022-11-10	M		0.000161	<0.00200	0.0818	<0.000500	0.148	1100	0.0169	<0.000010	<0.000000050	0.00891	0.000496	<0.1	330	<0.00100	2.42	<0.000100	8820	6.04	817	<0.0000400	<0.000500
WQR1-2	22L0774-10	2022-12-07	M		0.0000669	<0.00200	0.0503	<0.000500	0.139	1110	0.0288	<0.000010		0.00901	0.000570	<0.1	311	<0.00100	1.96	<0.000100	8310	6.23	730	<0.0000400	<0.000500
WQR1-2	23A2847-10	2023-01-27	M		0.000124	<0.00200	0.11	<0.000500	0.0901	655	0.0134	<0.000010	<0.000000060	0.00591	<0.000400	<0.1	203	<0.00100	3.01	<0.000100	5410	3.91	501	<0.0000400	<0.000500
WQR1-2	23C0060-10	2023-02-28	M		0.0000632	<0.00200	0.0522	<0.000500	0.111	1110	0.00673	<0.000010		0.00883	0.000461	<0.1	353	<0.00100	2.37	<0.000100	8970	6.26	858	<0.0000400	<0.000500
WQR1-2	23C1797-10	2023-03-15	M		<0.0000500	<0.00200	0.0379	<0.000500	0.153	1060	0.00438	<0.000010		0.00889	<0.000400	0.115	334	<0.00100	1.77	<0.000100	10800	5.98	793	<0.0000400	<0.000500
WQR1-2	23D2945-10	2023-04-26	M		0.0000534	<0.00200	0.0825	<0.000500	0.0701	526	0.00631	<0.000010		0.00488	<0.000400	<0.1	164	<0.00100	1.68	<0.000100	4150	3.2	390	<0.0000400	<0.000500
WQR1-2	23E2392-10	2023-05-17	M		0.000444	0.00218	0.821	0.000258	0.0112	98.8	0.0248	<0.000010	<0.000000050	0.00106	0.000566	<0.02	31.9	<0.00020	2.76	<0.000020	804	0.572	70.1	0.0000098	<0.000100
WQR1-2	23F3614-10	2023-06-27	M		0.000187	<0.00200	0.353	0.00230	0.0148	98.9	0.0128	<0.000010		0.00104	<0.000400	<0.1	29.6	<0.00100	1.97	<0.000100	836	0.594	74.1	<0.0000400	<0.000500
WQR1-2	23G2415-10	2023-07-19	M		0.000163	<0.00200	0.298	<0.000500	0.0232	158	0.0147	<0.000010		0.00164	<0.000400	<0.1	50.3	<0.00100	1.89	<0.000100	1290	0.965	118	<0.0000400	<0.000500
WQR1-2	23H3309-02	2023-08-24	M		<0.0000500	<0.00200	<0.0200	0.00321	0.108	783	0.00507	<0.000010	<0.000000050	0.00694	<0.000400	<0.1	252	<0.00100	1.05	<0.000100	6410	4.94	631	<0.0000400	<0.000500
WQR1-2	23I2271-02	2023-09-19	M		<0.0000500	<0.00200	0.0427	<0.000500	0.0993	729	0.00471	<0.000010		0.00645	<0.000400	<0.1	237	<0.00100	<1	<0.000100	5900	4.13	567	<0.0000400	<0.000500
WQR1-2	23J2236-02	2023-10-18	M		0.000109	<0.00200	0.149	0.000557	0.112	712	0.0108	<0.000010		0.00719	<0.000400	<0.1	261	<0.00100	1.21	0.000108	5860	4.75	567	<0.0000400	<0.000500
WQR1-2	23K1909-10	2023-11-15	M		<0.0000500	<0.00200	0.0340	<0.000500	0.132	964	0.00527	<0.000010	<0.000000050	0.00811	0.000617	<0.1	288	<0.00100	1.88	<0.000100	7990	6.1	812	<0.0000400	<0.000500
WQR1-2	23L1905-02	2023-12-14	M		<0.0000500	0.00228	0.0469	0.00174	0.126	1110	0.00526	0.000011		0.00983	<0.000400	<0.1	343	<0.00100	1.87	0.000150	9130	7.1	858	<0.0000400	<0.000500
WQR1-2	L2754366-5	2024-01-24	M																						
WQR1-2	VA24A1422-005	2024-01-24	M	<0.00179	0.000102	0.00143	0.032	0.00010	0.141	1050	0.00353	<0.0000050	<0.000000020	0.00930	<0.00050	0.081	327	<0.00050	2.1	<0.00010	9470	6.50	736	<0.000050	<0.0010
WQR1-2	L2754594-2	2024-02-13	M																						
WQR1-2	VA24A2858-002	2024-02-13	M	<0.00050	0.000111	0.00054	0.058	<0.00010	0.119	909	0.00696	<0.0000050	0.000000069	0.00828	<0.00050	0.072	252	<0.00050	2.2	<0.00010	6870	5.57	602	<0.000050	<0.0010
WQR1-2	L2755033-2	2024-03-20	M																						
WQR1-2	VA24A5955-002	2024-03-20	M	<0.00050	0.000064	<0.00050	0.042	<0.00010	0.123	934	0.00391	<0.0000050	<0.000000020	0.00822	<0.00050	0.059	301	<0.00050	<1.0	<0.00010	8340	5.52	701	<0.000050	<0.0010
WQR1-2	L2755461-2	2024-04-23	M																						
WQR1-2	VA24A8736-002	2024-04-23	M	<0.00050	0.000079	0.00052	0.071	<0.00010	0.130	903	0.00510	<0.0000050	<0.000000040	0.00724	<0.00050	<0.050	259	<0.00050	<1.0	<0.00010	6710	4.83	633	<0.000050	<0.0010
WQR1-2	L2755553-2	2024-04-30	M																						
WQR1-2	VA24A9418-002	2024-04-30	M	<0.00050	0.000078	0.00064	<0.010	0.00012	0.124	1010	0.00302	<0.0000050	<0.000000080	0.00680	<0.00050	<0.050	288	<0.00050	<1.0	<0.00010	7780	4.65	683	<0.000050	<0.0010
WQR1-2	L2755641-2	2024-05-07	M																						
WQR1-2	VA24B0040-002	2024-05-07	M	<0.00050	0.000106	0.00074	0.076	<0.00010	0.092	577	0.00543	<0.0000050	<0.000000080	0.00607	<0.00050	<0.050	190	<0.00050	1.3	<0.00010	5280	3.96	454	<0.000050	<0.0010
WQR1-2	L2755769-2	2024-05-14	M																						
WQR1-2	VA24B0738-002	2024-05-14	M	<0.00050	0.000208	0.00144	0.330	<0.00010	0.034	271	0.0128	<0.0000050	<0.000000020	0.00218	<0.00050	<0.050	80.8	<0.00050	2.3	<0.00010	2070	1.37	173	<0.000050	<0.0010
WQR1-2	L2755874-2	2024-05-21	M																						
WQR1-2	VA24B1351-002	2024-05-21	M	<0.00050	0.000172	0.00142	0.276	<0.00010	0.029	231	0.0122	<0.0000050	<0.000000020	0.00217	<0.00050	<0.050	66.5	<0.00050	2.4	<0.00010	1820	1.40	171	<0.000050	<0.0010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	L2756277-2	2024-06-18	M																						
WQR1-2	VA24B4257-002	2024-06-18	M	<0.00050	0.000097	0.00088	0.118	<0.00010	0.040	331	0.00768	<0.0000050	<0.000000020	0.00255	<0.00050	<0.050	92.6	<0.00050	1.2	<0.00010	2680	1.59	229	<0.000050	<0.0010
WQR1-2	L2756678-2	2024-07-16	M																						
WQR1-2	VA24B7237-002	2024-07-16	M	<0.00050	0.000271	0.00142	0.504	0.00013	0.037	305	0.0165	<0.0000050	0.000000030	0.00264	<0.00050	0.056	89.6	<0.00050	2.1	<0.00010	2400	1.66	214	<0.000050	<0.0010
WQR1-2	L2757095-2	2024-08-20	M																						
WQR1-2	VA24C1101-002	2024-08-20	M	<0.00050	0.000166	0.00096	0.245	<0.00010	0.048	359	0.0110	<0.0000050	<0.000000080	0.00279	<0.00050	<0.050	102	<0.00050	2.1	<0.00010	2770	1.83	235	<0.000050	<0.0010
WQR1-2	VA24C4483-002	2024-09-17	M	<0.00050	0.000163	0.00082	0.203	<0.00010	0.051	432	0.0131	<0.0000050	<0.000000020	0.00319	<0.00050	<0.050	122	<0.00050	1.7	<0.00010	3180	2.11	286	<0.000050	<0.0010
WQR1-2	VA24C8360-002	2024-10-22	M	<0.00050	0.000140	0.00101	0.158	<0.00010	0.097	837	0.0103	<0.0000050	<0.000000020	0.00622	<0.00050	0.055	238	0.00210	1.6	<0.00010	6230	4.16	529	<0.000050	<0.0010
WQR1-2	VA24C9197-002	2024-10-29	M	<0.00050	0.000206	<0.00050	0.036	<0.00010	0.108	874	0.00624	<0.0000050	<0.000000020	0.00711	<0.00050	0.064	246	0.00284	1.8	<0.00010	6150	4.69	606	<0.000050	<0.0010
WQR1-2	VA24D0009-002	2024-11-05	M		0.000163	0.00057	0.017	<0.00010	0.106	882	0.00470	<0.0000050	<0.000000020	0.00647	<0.00050	0.065	265	<0.00050	1.5	<0.00010	6750	4.51	616	<0.000050	<0.0010
WQR1-2	L2758095-2	2024-11-12	M																						
WQR1-2	VA24D0632-002	2024-11-12	M	<0.00050	0.000161	0.00114	0.126	<0.00010	0.073	591	0.00766	<0.0000050	<0.000000020	0.00475	<0.00050	0.058	178	0.00061	2.0	<0.00010	4380	3.16	406	<0.000050	<0.0010
WQR1-2	VA24D1720-002	2024-11-21	M	<0.00050	0.000211	0.00071	0.107	<0.00010	0.094	681	0.0120	<0.0000050	<0.000000020	0.00510	<0.00050	0.064	200	<0.00050	2.9	<0.00010	5170	3.44	477	<0.000050	<0.0010
WQR1-2	L2758465-2	2024-12-17	M																						
WQR1-2	VA24D3769-002	2024-12-17	M	<0.00050	0.000096	<0.00050	0.032	<0.00010	0.126	789	0.00492	<0.0000050	0.000000024	0.00943	<0.00050	0.082	274	<0.00050	1.7	<0.00010	6260	6.08	692	<0.000050	<0.0010
WQR1-2	L2758719-2	2025-01-21	M																						
WQR1-2	VA25A1408-002	2025-01-21	M	<0.00050	0.000085	0.00055	0.083	<0.00010	0.098	965	0.00749	<0.0000050	<0.000000020	0.00651	<0.00050	0.096	286	<0.00050	2.8	<0.00010	7120	4.64	638	<0.000050	<0.0010
WQR1-2	L2758994-2	2025-02-18	M																						
WQR1-2	VA25A3430-002	2025-02-18	M	<0.00050	0.000080	0.00050	0.076	<0.00010	0.130	996	0.00792	<0.0000050	<0.000000160	0.00742	<0.00050	0.073	285	<0.00050	3.1	<0.00010	8050	4.95	614	<0.000050	<0.0010
WQR1-2	VA25A6550-002	2025-03-25	M	<0.00050	<0.000050	<0.00050	0.033	<0.00010	0.109	1070	0.00209	<0.0000050	<0.000000020	0.00677	<0.00050	<0.050	293	<0.00050	<1.0	<0.00010	8590	4.70	594	<0.000050	<0.0010
WQR1-2	VA25A8962-002	2025-04-22	M	<0.00050	0.000088	0.00083	0.077	<0.00010	0.061	556	0.00566	<0.0000050	<0.000000020	0.00438	<0.00050	<0.050	146	<0.00050	1.6	<0.00010	3860	2.96	345	<0.000050	<0.0010
WQR1-2	VA25A9878-002	2025-04-30	M	<0.00050	0.000119	0.00097	0.139	<0.00010	0.037	289	0.00754	<0.0000050	0.000000028	0.00276	<0.00050	<0.050	87.9	<0.00050	2.1	<0.00010	2340	1.72	209	<0.000050	<0.0010
WQR1-2	VA25B0358-002	2025-05-06	M	<0.00050	0.000090	0.00075	0.058	<0.00010	0.066	538	0.00517	<0.0000050	<0.000000020	0.00548	<0.00050	<0.050	161	<0.00050	<1.0	<0.00010	3760	3.72	317	<0.000050	<0.0010
WQR1-2	VA25B1026-002	2025-05-13	M	<0.00050	0.000086	0.00076	0.101	<0.00010	0.050	380	0.00640	<0.0000050	<0.000000020	0.00354	<0.00050	<0.050	111	<0.00050	1.8	<0.00010	3130	2.10	259	<0.000050	<0.0010
WQR1-2	VA25B1711-002	2025-05-20	M	<0.00050	0.000088	0.00074	0.069	<0.00010	0.054	418	0.00500	<0.0000050	<0.000000020	0.00349	<0.00050	<0.050	108	<0.00050	1.6	<0.00010	3080	2.18	253	<0.000050	<0.0010
WQR1-2m	L2755545-8	2024-04-30	M																						
WQR1-2m	VA24A9402-008	2024-04-30	M		0.000073	0.00070	0.058	<0.00010	0.088	697	0.00462	<0.0000050	<0.000000020	0.00548	<0.00050	<0.050	191	<0.00050	<1.0	<0.00010	5060	3.80	466	<0.000050	<0.0010
WQR1-2m	VA24A9802-012	2024-05-05	M		0.000065	<0.00050	0.032	<0.00010	0.117	838	0.00302	<0.0000050		0.00723	<0.00050	<0.050	246	0.00056	<1.0	<0.00010	7450	4.84	598	<0.000050	<0.0010
WQR1-2m	L2755648-11	2024-05-08	M																						
WQR1-2m	VA24B0178-011	2024-05-08	M		0.000102	0.00074	0.098	<0.00010	0.074	468	0.00618	<0.0000050	<0.000000020	0.00458	<0.00050	<0.050	155	<0.00050	1.3	<0.00010	4370	3.09	375	<0.000050	<0.0010
WQR1-2m	L2755934-2	2024-05-24	M																						
WQR1-2m	VA24B1783-002	2024-05-24	M		0.000116	0.00102	0.164	<0.00010	0.038	249	0.00902	<0.0000050	<0.000000020	0.00241	<0.00050	<0.050	82.0	<0.00050	1.9	<0.00010	2240	1.56	198	<0.000050	<0.0010
WQR1-2m	L2755981-2	2024-05-28	M																						
WQR1-2m	VA24B2063-002	2024-05-28	M		0.000084	0.00068	0.060	<0.00010	0.080	503	0.00591	<0.0000050	<0.000000020	0.00509	<0.00050	<0.050	165	0.00125	1.1	<0.00010	4540	3.36	417	<0.000050	<0.0010
WQR1-2m	VA24B2561-006	2024-06-01	M		0.000122	0.00355	0.160	0.00750	0.046	346	0.00856	<0.0000050		0.00281	<0.00050	<0.050	97.8	<0.00050	2.4	<0.00010	2330	1.81	235	<0.000050	<0.0010
WQR1-2m	L2756068-2	2024-06-04	M																						
WQR1-2m	VA24B2772-002	2024-06-04	M		0.000248	0.00180	0.490	0.00016	<0.020	17.5	0.0142	<0.0000050	<0.000000020	0.00044	<0.00050	<0.050	5.7	<0.00050	2.8	<0.00010	142	0.100	12.2	<0.000050	<0.0010
WQR1-2m	VA24B3452-008	2024-06-10	M		0.000241	0.00137	0.415	<0.00010	<0.020	138	0.0143	<0.0000050	0.000000020	0.00135	<0.00050	<0.050	38.0	<0.00050	2.2	<0.00010	1030	0.773	96.6	<0.000050	<0.0010
WQR1-2m	656-454600000-0	2024-06-17	M																						
WQR1-2m	VA24B5882-008	2024-07-03	M		0.000180	0.00117	0.354	<0.00010	<0.020	64.4	0.0128	<0.0000050		0.00071	<0.00050	<0.050	18.8	<0.00050	2.3	<0.00010	508	0.342	42.7	<0.000050	<0.0010
WQR1-2m	VA24B6465-002	2024-07-09	M		0.000140	0.00096	0.199	<0.00010	0.063	466	0.00837	<0.0000050	0.000000026	0.00368	<0.00050	<0.050	133	<0.00050	1.4	<0.00010	3580	2.41	323	<0.000050	<0.0010
WQR1-2m	VA24B7867-002	2024-07-20	M		0.000243	0.00128	0.454	<0.00010	0.030	244	0.0153	<0.0000050	<0.000000020	0.00206	<0.00050	<0.050	69.8	<0.00050	1.8	<0.00010	1830	1.32	173	<0.000050	<0.0010
WQR1-2m	L2757210-2	2024-08-26	M																						
WQR1-2m	VA24C2208-002	2024-08-26	M		0.000168	<0.00050	0.193	<0.00010	0.071	506	0.00994	<0.0000050	<0.000000080	0.00450	<0.00050	<0.050	152	<0.00050	1.4	<0.00010	4170	3.00	348	<0.000050	<0.0010
WQR1-2m	L2757680-2	2024-10-06	M																						
WQR1-2m	VA24C6685-002	2024-10-06	M		<0.00500	<0.0250	<0.500	<0.00250	0.128	974	<0.00500	<0.0000050	<0.000000020	0.00798	<0.0250	<2.50	293	<0.00250	<5.00	<0.000500	7560	5.48	761	<0.000500	<0.00500
WQR1-2m	VA24C7408-002	2024-10-13	M		0.000080	0.00062	0.079	<0.00010	0.129	805	0.00789	<0.0000050	<0.000000020	0.00716	<0.00050	0.061	254	<0.00050	1.2	<0.00010	6180	5.04	566	<0.000050	<0.0010
WQR1-2m	L2757830-6	2024-10-20	M																						
WQR1-2m	VA24C8041-006	2024-10-20	M		0.000513	0.00292	0.813	0.00027	0.037	276	0.0388	<0.0000050	0.000000025	0.00209	<0.00150	0.057	78.1	<0.00050	3.2	<0.00010	2060	1.37	172	<0.000050	<0.0010
WQR1-2m	L2757872-2	2024-10-22	M																						
WQR1-2m	VA24C8330-002	2024-10-22	M		0.000433	0.00229	0.821	0.00026	0.028	230	0.0300	<0.0000050	<0.000000020	0.00179	0.00051	<0.050	65.5	<0.00050	3.9	<0.00010	1810	1.07	142	<0.000050	<0.0010
WQR1-2m	L2757933-6	2024-10-28	M																						
WQR1-2m	VA24C9041-006	2024-10-28	M		0.000224	0.00180	0.419	0.00014	<0.020	140	0.0149	<0.0000050	0.000000021	0.00129	<0.00050	<0.050	39.9	<0.00050	3.3	<0.00010	57.024786	0.761	96.5	<0.000050	<0.0010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2m	L2758002-3	2024-11-01	M																						
WQR1-2m	VA24C9683-003	2024-11-01	M		0.000181	0.00086	0.094	<0.00010	0.081	590	0.0100	<0.0000050	<0.000000020	0.00513	<0.00050	0.058	180	<0.00050	2.3	<0.00010	4740	3.24	432	<0.000050	<0.0010
WQR1-2m	L2758353-2	2024-12-05	M																						
WQR1-2m	VA24D2842-002	2024-12-05	M		0.000119	0.00058	0.093	<0.00010	0.084	637	0.0120	<0.0000050	<0.000000020	0.00537	<0.00050	0.065	191	<0.00050	2.8	<0.00010	5300	3.48	468	<0.000050	<0.0010
WQR1-2m	L2758617-8	2025-01-08	M																						
WQR1-2m	VA25A0392-008	2025-01-08	M		0.000108	0.00057	0.132	<0.00010	0.083	504	0.0114	<0.0000050	<0.000000020	0.00584	<0.00050	0.067	179	<0.00050	2.6	<0.00010	3960	3.81	420	<0.000050	<0.0010
WQR1-2m	L2759040-8	2025-02-20	M																						
WQR1-2m	VA25A3677-008	2025-02-20	M		0.000074	0.00056	0.027	<0.00010	0.129	1110	0.00354	<0.0000050	<0.000000020	0.00793	<0.00050	0.055	302	<0.00050	2.2	<0.00010	8550	5.58	600	<0.000050	<0.0010
WQR1-2m	L2759227-8	2025-03-13	M																						
WQR1-2m	VA25A5556-008	2025-03-13	M		0.000092	0.00063	0.084	<0.00010	0.070	538	0.00611	<0.0000050	<0.000000020	0.00518	<0.00050	<0.050	166	<0.00050	1.7	<0.00010	3910	3.35	396	<0.000050	<0.0010
WQR1-2m	VA25A6528-014	2025-03-25	M																						
WQR1-2m	VA25A8147-002	2025-04-11	M		0.000092	0.00069	0.109	<0.00010	0.075	440	0.00486	<0.0000050	<0.000000020	0.00417	<0.00050	<0.050	125	<0.00050	1.7	<0.00010	4100	2.34	360	<0.000050	<0.0010
WQR1-2m	VA25A8148-002	2025-04-11	M																						
WQR1-2m	VA25A8281-008	2025-04-14	M		0.000070	0.00055	0.067	<0.00010	0.077	535	0.00500	<0.0000050	<0.000000020	0.00504	<0.00050	<0.050	163	<0.00050	1.2	<0.00010	4480	3.44	391	<0.000050	<0.0010
WQR1-2m	VA25A8283-008	2025-04-14	M																						
WQR1-2m	VA25A9123-009	2025-04-23	M		0.000082	0.00081	0.095	<0.00010	0.046	341	0.00664	<0.0000050	<0.000000020	0.00311	<0.00050	<0.050	103	<0.00050	2.1	<0.00010	2730	2.03	249	<0.000050	<0.0010
WQR1-2m	VA25A9125-009	2025-04-23	M																						
WQR1-2m	VA25B0359-008	2025-05-06	M		0.000110	0.00092	0.171	<0.00010	0.027	152	0.00782	<0.0000050	<0.000000020	0.00190	<0.00050	<0.050	58.5	<0.00050	2.1	<0.00010	1280	1.17	137	<0.000050	<0.0010
WQR1-2m	VA25B0360-008	2025-05-06	M																						
WQR1-2m	VA25B0800-008	2025-05-09	M																						
WQR1-2m	VA25B0802-008	2025-05-09	M		0.000080	0.00065	0.038	<0.00010	0.096	719	0.00443	<0.0000050	<0.000000020	0.00563	<0.00050	<0.050	199	<0.00050	<1.0	<0.00010	5930	3.70	444	<0.000050	<0.0010
WQR1-3	23L1905-03	2023-12-14	M		0.000113	<0.00200	0.142	<0.000500	0.0862	738	0.0163	0.000011		0.00674	0.000954	<0.1	226	<0.00100	2.57	0.000204	6070	4.78	577	<0.0000400	<0.000500
WQR1-3	L2754366-6	2024-01-24	M																						
WQR1-3	VA24A1422-006	2024-01-24	M	<0.00179	0.000105	0.00074	0.112	<0.00010	0.075	582	0.00923	<0.0000050	<0.000000020	0.00494	<0.00050	0.051	170	<0.00050	3.0	<0.00010	4670	3.34	390	<0.000050	<0.0010
WQR1-3	L2754594-3	2024-02-13	M																						
WQR1-3	VA24A2858-003	2024-02-13	M	<0.00050	0.000129	0.00072	0.093	<0.00010	0.075	567	0.0107	<0.0000050	<0.000000020	0.00520	<0.00050	0.058	160	<0.00050	3.0	<0.00010	4530	3.44	432	<0.000050	<0.0010
WQR1-3	L2755033-3	2024-03-20	M																						
WQR1-3	VA24A5955-003	2024-03-20	M	<0.00050	0.000092	0.00086	0.153	<0.00010	0.049	364	0.0101	<0.0000050	<0.000000020	0.00338	<0.00050	<0.050	106	<0.00050	3.0	<0.00010	2920	2.04	264	<0.000050	<0.0010
WQR1-3	L2755461-3	2024-04-23	M																						
WQR1-3	VA24A8736-003	2024-04-23	M	<0.00050	0.000078	0.00059	0.094	<0.00010	0.110	768	0.00626	<0.0000050	<0.000000040	0.00616	<0.00050	<0.050	215	<0.00050	1.1	<0.00010	5800	4.03	524	<0.000050	<0.0010
WQR1-3	L2755553-3	2024-04-30	M																						
WQR1-3	VA24A9418-003	2024-04-30	M	<0.00050	0.000085	0.00090	0.120	<0.00010	0.038	307	0.00739	<0.0000050	<0.000000080	0.00256	<0.00050	<0.050	85.2	<0.00050	2.6	<0.00010	2220	1.54	205	<0.000050	<0.0010
WQR1-3	L2755641-3	2024-05-07	M																						
WQR1-3	VA24B0040-003	2024-05-07	M	<0.00050	0.000143	0.00104	0.184	<0.00010	0.057	371	0.00852	<0.0000050	<0.000000080	0.00391	<0.00050	<0.050	116	<0.00050	2.0	<0.00010	3230	2.47	276	<0.000050	<0.0010
WQR1-3	L2755769-3	2024-05-14	M																						
WQR1-3	VA24B0738-003	2024-05-14	M	<0.00050	0.000295	0.00189	0.540	<0.00010	<0.020	63.0	0.0164	<0.0000050	<0.000000020	0.00081	<0.00050	<0.050	19.2	<0.00050	2.4	<0.00010	494	0.340	41.3	<0.000050	<0.0010
WQR1-3	L2755874-3	2024-05-21	M																						
WQR1-3	VA24B1351-003	2024-05-21	M	<0.00050	0.000218	0.00152	0.395	<0.00010	<0.020	93.4	0.0156	<0.0000050	<0.000000020	0.00115	<0.00050	<0.050	28.5	<0.00050	3.2	<0.00010	772	0.562	70.5	<0.000050	<0.0010
WQR1-3	L2756277-3	2024-06-18	M																						
WQR1-3	VA24B4257-003	2024-06-18	M	<0.00050	0.000211	0.00118	0.385	<0.00010	<0.020	116	0.0151	<0.0000050	0.000000023	0.00122	<0.00050	<0.050	32.3	<0.00050	2.8	<0.00010	919	0.646	77.7	<0.000050	<0.0010
WQR1-3	L2756678-3	2024-07-16	M																						
WQR1-3	VA24B7237-003	2024-07-16	M	<0.00050	0.000385	0.00197	0.807	0.00016	<0.020	84.6	0.0239	<0.0000050	0.000000024	0.00084	<0.00050	0.057	25.0	<0.00050	2.9	<0.00010	619	0.438	56.4	<0.000050	<0.0010
WQR1-3	L2757095-3	2024-08-20	M																						
WQR1-3	VA24C1101-003	2024-08-20	M	<0.00050	0.000191	0.00117	0.325	<0.00010	0.031	226	0.0139	<0.0000050	<0.000000080	0.00197	<0.00050	<0.050	68.7	<0.00050	2.3	<0.00010	1890	1.23	154	<0.000050	<0.0010
WQR1-3	VA24C4483-003	2024-09-17	M	<0.00050	0.000174	0.00090	0.256	<0.00010	0.048	408	0.0150	<0.0000050	<0.000000020	0.00321	<0.00050	<0.050	113	<0.00050	1.9	<0.00010	3000	2.12	274	<0.000050	<0.0010
WQR1-3	VA24C8360-003	2024-10-22	M	0.00050	0.000443	0.00263	0.850	0.00023	<0.020	108	0.0305	<0.0000050	0.000000024	0.00101	0.00054	<0.050	30.9	<0.00050	3.8	<0.00010	833	0.542	68.8	<0.000050	<0.0010
WQR1-3	VA24C9197-003	2024-10-29	M	<0.00050	0.000179	0.00147	0.254	0.00011	<0.020	113	0.0105	<0.0000050	<0.000000020	0.00112	<0.00050	<0.050	32.3	<0.00050	3.0	<0.00010	848	0.560	77.5	<0.000050	<0.0010
WQR1-3	VA24D0009-003	2024-11-05	M		0.000167	0.00069	0.080	<0.00010	0.068	582	0.00926	<0.0000050	<0.000000020	0.00497	<0.00050	0.051	179	<0.00050	2.1	<0.00010	4420	3.30	421	<0.000050	<0.0010
WQR1-3	L2758095-3	2024-11-12	M																						
WQR1-3	VA24D0632-003	2024-11-12	M	<0.00050	0.000162	0.00138	0.204	<0.00010	0.035	285	0.00899	<0.0000050	<0.000000020	0.00245	<0.00050	<0.050	85.5	<0.00050	2.5	<0.00010	2130	1.53	197	<0.000050	<0.0010
WQR1-3	VA24D1720-003	2024-11-21	M	<0.00050	0.000232	0.00074	0.115	<0.00010	0.095	665	0.0126	<0.0000050	<0.000000800	0.00525	<0.00050	0.061	192	<0.00050	2.9	<0.00010	5120	3.49	464	<0.000050	<0.0010
WQR1-3	L2758465-3	2024-12-17	M																						
WQR1-3	VA24D3769-003	2024-12-17	M	<0.00050	0.000216	<0.00050	0.029	<0.00010	0.126	778	0.00433	<0.0000050	<0.000000020	0.00934	<0.00050	0.078	269	<0.00050	1.6	<0.00010	6190	5.92	691	<0.000050	<0.0010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-3	L2758719-3	2025-01-21	M																						
WQR1-3	VA25A1408-003	2025-01-21	M	<0.00050	0.000102	0.00051	0.104	<0.00010	0.090	861	0.00942	<0.0000050	<0.000000020	0.00586	<0.00050	0.092	264	<0.00050	3.2	<0.00010	6530	4.10	592	<0.000050	<0.0010
WQR1-3	L2758994-3	2025-02-18	M																						
WQR1-3	VA25A3430-003	2025-02-18	M	<0.00050	0.000076	0.00053	0.076	<0.00010	0.135	965	0.00806	<0.0000050	<0.000000080	0.00648	<0.00050	0.066	286	<0.00050	3.5	<0.00010	7760	4.60	563	<0.000050	<0.0010
WQR1-3	VA25A6550-003	2025-03-25	M	<0.00050	0.000055	0.00055	0.122	<0.00010	0.044	350	0.00815	<0.0000050	<0.000000020	0.00285	<0.00050	<0.050	99.9	<0.00050	2.4	<0.00010	2640	1.81	232	<0.000050	<0.0010
WQR1-3	VA25A8962-003	2025-04-22	M	<0.00050	0.000084	0.00084	0.119	<0.00010	0.032	276	0.00677	<0.0000050	<0.000000020	0.00244	<0.00050	<0.050	76.2	<0.00050	2.3	<0.00010	2010	1.56	171	<0.000050	<0.0010
WQR1-3	VA25A9878-003	2025-04-30	M	<0.00050	0.000118	0.00102	0.194	<0.00010	<0.020	78.0	0.00786	<0.0000050	<0.000000020	0.00101	<0.00050	<0.050	24.5	<0.00050	2.8	<0.00010	628	0.483	58.6	<0.000050	<0.0010
WQR1-3	VA25B0358-003	2025-05-06	M	<0.00050	0.000124	0.00108	0.197	<0.00010	<0.020	98.5	0.00841	<0.0000050	0.000000020	0.00147	<0.00050	<0.050	33.2	<0.00050	1.4	<0.00010	724	0.792	60.5	<0.000050	<0.0010
WQR1-3	VA25B1026-003	2025-05-13	M	<0.00050	0.000093	0.00075	0.130	<0.00010	0.034	238	0.00712	<0.0000050	<0.000000020	0.00230	<0.00050	<0.050	71.8	<0.00050	2.4	<0.00010	2010	1.34	164	<0.000050	<0.0010
WQR1-3	VA25B1711-003	2025-05-20	M	<0.00050	0.000093	0.00085	0.152	<0.00010	0.130	62.0	0.00693	<0.0000050	<0.000000020	0.00096	<0.00050	<0.050	18.7	<0.00050	3.1	<0.00010	515	0.416	47.5	<0.000050	<0.0010
WQR1-SF	L2755545-9	2024-04-30	M																						
WQR1-SF	VA24A9402-009	2024-04-30	M		0.000057	<0.00050	0.017	<0.00010	0.146	1190	0.00133	<0.0000050	<0.000000020	0.00940	<0.00050	0.054	325	<0.00050	<1.0	<0.00010	8480	6.56	813	<0.000050	<0.0010
WQR1-SF	VA24A9802-013	2024-05-05	M		0.000057	<0.00050	0.012	<0.00010	0.149	1090	0.00118	<0.0000050		0.00914	<0.00050	0.050	324	0.00080	<1.0	<0.00010	9240	6.10	760	<0.000050	<0.0010
WQR1-SF	L2755648-12	2024-05-08	M																						
WQR1-SF	VA24B0178-012	2024-05-08	M		0.000084	<0.00050	<0.010	<0.00010	0.162	967	0.00123	<0.0000050	<0.000000020	0.00986	<0.00050	0.102	341	0.00103	1.5	<0.00010	9830	6.98	857	<0.000050	<0.0010
WQR1-SF	L2755934-3	2024-05-24	M																						
WQR1-SF	VA24B1783-003	2024-05-24	M		0.000059	<0.00050	<0.010	<0.00010	0.153	937	0.00215	<0.0000050	<0.000000020	0.00921	<0.00050	0.062	330	<0.00050	<1.0	<0.00010	8770	6.42	795	<0.000050	<0.0010
WQR1-SF	L2755981-3	2024-05-28	M																						
WQR1-SF	VA24B2063-003	2024-05-28	M		0.000067	<0.00050	0.012	<0.00010	0.179	1040	0.00175	<0.0000050	<0.000000020	0.00910	<0.00050	0.053	313	0.00098	<1.0	<0.00010	8640	6.37	787	<0.000050	<0.0010
WQR1-SF	L2756068-3	2024-06-04	M																						
WQR1-SF	VA24B2772-003	2024-06-04	M		0.000061	<0.00050	0.013	<0.00010	0.165	1230	0.00157	<0.0000050	<0.000000020	0.00896	<0.00050	0.097	357	<0.00050	1.6	<0.00010	8700	6.39	810	<0.000050	<0.0010
WQR1-SF	VA24B3452-009	2024-06-10	M		0.000071	0.00055	0.023	<0.00010	0.136	1160	0.00257	<0.0000050	0.000000021	0.00839	<0.00050	0.063	352	<0.00050	<1.0	<0.00010	8630	5.86	789	<0.000050	<0.0010
WQR1-SF	657-454600000-0	2024-06-17	M																						
WQR1-SF	VA24B5882-009	2024-07-03	M		0.000087	0.00059	0.081	<0.00010	0.100	900	0.00423	<0.0000050		0.00756	<0.00050	0.064	279	<0.00050	1.2	<0.00010	7430	5.01	635	<0.000050	<0.0010
WQR1-SF	VA24B6465-003	2024-07-09	M		0.000086	0.00074	0.044	<0.00010	0.132	1080	0.00283	<0.0000050	0.000000021	0.00896	<0.00050	0.052	320	<0.00050	<1.0	<0.00010	8680	6.14	777	<0.000050	<0.0010
WQR1-SF	VA24B7867-003	2024-07-20	M		0.000070	0.00060	0.049	<0.00010	0.122	1070	0.00357	<0.0000050	0.000000022	0.00825	<0.00050	0.064	311	<0.00050	<1.0	<0.00010	8210	5.63	764	<0.000050	<0.0010
WQR1-SF	L2757210-3	2024-08-26	M																						
WQR1-SF	VA24C2208-003	2024-08-26	M		0.000079	0.00055	0.028	<0.00010	0.133	1080	0.00375	<0.0000050	<0.000000080	0.00882	<0.00050	0.087	313	<0.00050	1.2	<0.00010	9680	6.15	782	<0.000050	<0.0010
WQR1-SF	L2757680-3	2024-10-06	M																						
WQR1-SF	VA24C6685-003	2024-10-06	M		<0.00500	<0.0250	<0.500	<0.00250	0.158	1170	<0.00500	<0.0000050	<0.000000020	0.0105	<0.0250	<2.50	367	<0.00250	<5.00	<0.000500	9350	6.80	951	<0.000500	<0.00500
WQR1-SF	VA24C7408-003	2024-10-13	M		0.000076	<0.00050	0.024	<0.00010	0.162	1060	0.00633	<0.0000050	<0.000000020	0.00917	<0.00050	0.086	319	<0.00050	1.1	<0.00010	8080	6.46	729	<0.000050	<0.0010
WQR1-SF	L2757872-3	2024-10-22	M																						
WQR1-SF	VA24C8330-003	2024-10-22	M		0.000135	<0.00050	0.057	0.00015	0.153	1280	0.00959	<0.0000050	<0.000000080	0.00869	<0.00050	0.095	359	<0.00050	1.4	<0.00010	9900	6.18	818	<0.000050	<0.0010
WQR1-SF	L2757933-7	2024-10-28	M																						
WQR1-SF	VA24C9041-007	2024-10-28	M		0.000142	0.00054	0.021	<0.00010	0.144	1170	0.00987	<0.0000050	<0.000000080	0.00887	<0.00050	0.091	339	0.00077	1.4	<0.00010	9850	6.46	775	<0.000050	<0.0010
WQR1-SF	L2758002-4	2024-11-01	M																						
WQR1-SF	VA24C9683-004	2024-11-01	M		0.000249	0.00058	0.024	<0.00010	0.160	1150	0.0101	<0.0000050	<0.000000020	0.00950	0.00051	0.096	352	0.00127	1.6	<0.00010	9140	6.29	834	<0.000050	0.0012
WQR1-SF	VA24D2498-001	2024-11-30	M							1080															
WQR1-SF	L2758353-3	2024-12-05	M																						
WQR1-SF	VA24D2842-003	2024-12-05	M		0.000115	<0.00050	0.010	<0.00010	0.151	1080	0.00427	<0.0000050	<0.000000020	0.00891	<0.00050	0.093	324	<0.00050	1.6	<0.00010	8510	6.08	721	<0.000050	<0.0010
WQR1-SF	L2758617-9	2025-01-08	M																						
WQR1-SF	VA25A0392-009	2025-01-08	M		0.000071	<0.00050	0.020	<0.00010	0.131	745	0.00297	<0.0000050	<0.000000020	0.00859	<0.00050	0.094	285	<0.00050	1.4	<0.00010	6000	5.99	674	<0.000050	<0.0010
WQR1-SF	L2759040-9	2025-02-20	M																						
WQR1-SF	VA25A3677-009	2025-02-20	M		0.000070	0.00066	0.018	<0.00010	0.145	1210	0.00235	<0.0000050	<0.000000020	0.00818	<0.00050	0.062	315	<0.00050	2.6	<0.00010	9390	5.81	627	<0.000050	<0.0010
WQR1-SF	L2759227-9	2025-03-13	M																						
WQR1-SF	VA25A5556-009	2025-03-13	M		0.000079	<0.00050	0.020	<0.00010	0.122	968	0.00222	<0.0000050	<0.000000020	0.00884	<0.00050	0.068	292	<0.00050	<1.0	<0.00010	6880	5.92	679	<0.000050	<0.0010
WQR1-SF	VA25A6528-015	2025-03-25	M																						
WQR1-SF	VA25A8147-003	2025-04-11	M		0.000083	0.00050	0.020	<0.00010	0.146	871	0.00154	<0.0000050	<0.000000020	0.00753	<0.00050	<0.050	245	<0.00050	<1.0	<0.00010	8380	4.42	682	<0.000050	<0.0010
WQR1-SF	VA25A8148-003	2025-04-11	M																						
WQR1-SF	VA25A8281-009	2025-04-14	M		<0.000050	<0.00050	0.012	<0.00010	0.150	1050	0.00138	<0.0000050	<0.000000020	0.00933	<0.00050	0.092	316	<0.00050	1.5	<0.00010	8740	6.48	755	<0.000050	<0.0010
WQR1-SF	VA25A8283-009	2025-04-14	M																						
WQR1-SF	VA25A9123-010	2025-04-23	M		0.000070	<0.00050	0.018	<0.00010	0.150	1280	0.00137	<0.0000050	<0.000000020	0.00905	<0.00050	0.092	324	<0.00050	1.4	<0.00010	8740	6.22	754	<0.000050	<0.0010
WQR1-SF	VA25A9125-010	2025-04-23	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-SF	VA25B0359-007	2025-05-06	M		0.000084	<0.00050	0.019	<0.00010	0.101	845	0.00225	<0.0000050	<0.000000020	0.00845	<0.00050	0.066	259	<0.00070	<1.0	<0.00010	5960	6.02	686	<0.000050	<0.0010
WQR1-SF	VA25B0360-007	2025-05-06	M																						
WQR1-SF	VA25B0800-009	2025-05-09	M																						
WQR1-SF	VA25B0802-009	2025-05-09	M		0.000077	<0.00050	0.012	<0.00010	0.164	1370	0.00113	<0.0000050	0.000000035	0.0100	<0.00050	0.094	360	<0.00050	1.5	<0.00010	11300	6.92	804	<0.000050	<0.0010
WQR2-0.5	L2755545-10	2024-04-30	M																						
WQR2-0.5	VA24A9402-010	2024-04-30	M		0.000096	0.00087	0.146	<0.00010	0.034	262	0.00810	<0.0000050	<0.000000020	0.00240	<0.00050	<0.050	72.5	<0.00050	2.0	<0.00010	2000	1.44	179	<0.000050	<0.0010
WQR2-0.5	L2755648-1	2024-05-08	M																						
WQR2-0.5	VA24B0178-001	2024-05-08	M		0.000123	0.00094	0.162	<0.00010	0.033	250	0.00878	<0.0000050	<0.000000020	0.00248	<0.00050	<0.050	71.5	<0.00050	2.1	<0.00010	2010	1.51	177	<0.000050	<0.0010
WQR2-0.5	L2755934-10	2024-05-24	M																						
WQR2-0.5	VA24B1783-010	2024-05-24	M		0.000142	0.00102	0.207	<0.00010	<0.020	138	0.00987	<0.0000050	<0.000000020	0.00150	<0.00050	<0.050	43.6	<0.00050	2.3	<0.00010	1170	0.838	106	<0.000050	<0.0010
WQR2-0.5	VA24B3452-010	2024-06-10	M		0.000151	0.00131	0.270	0.00022	<0.020	104	0.00980	<0.0000050	<0.000000020	0.00097	<0.00050	<0.050	29.1	<0.00050	2.1	<0.00010	752	0.511	67.4	<0.000050	<0.0010
WQR2-0.5	658-454600000-0	2024-06-17	M																						
WQR2-0.5	VA24B5882-010	2024-07-03	M		0.000214	0.00131	0.412	<0.00010	<0.020	34.0	0.0144	<0.0000050		0.00055	<0.00050	<0.050	10.2	<0.00050	2.3	<0.00010	274	0.186	22.6	<0.000050	<0.0010
WQR2-0.5	VA24B6465-004	2024-07-09	M		0.000257	0.00136	0.494	<0.00010	0.023	159	0.0169	<0.0000050	0.000000021	0.00145	<0.00050	<0.050	44.9	<0.00050	2.3	<0.00010	1260	0.854	107	<0.000050	<0.0010
WQR2-0.5	VA24B7867-004	2024-07-20	M		0.000218	0.00132	0.399	<0.00010	<0.020	74.5	0.0153	<0.0000050	0.000000021	0.00069	<0.00050	<0.050	21.1	<0.00050	2.0	<0.00010	554	0.393	49.8	<0.000050	<0.0010
WQR2-0.5	L2757210-4	2024-08-26	M																						
WQR2-0.5	VA24C2208-004	2024-08-26	M		0.000130	0.00073	0.142	<0.00010	0.059	436	0.00843	<0.0000050	0.000000022	0.00353	<0.00050	<0.050	131	<0.00050	1.3	<0.00010	3540	2.38	307	<0.000050	<0.0010
WQR2-0.5	VA24C5557-001	2024-09-25	M		0.000145	0.00104	0.268	<0.00010	0.066	519	0.0124	<0.0000050		0.00428	<0.00050	<0.050	157	<0.00050	1.5	<0.00010	4150	2.88	371	<0.000050	<0.0010
WQR2-0.5	L2757680-4	2024-10-06	M																						
WQR2-0.5	VA24C6685-004	2024-10-06	M		<0.00100	<0.00500	0.169	<0.000500	0.0545	378	0.0118	<0.0000050	<0.000000020	0.00359	<0.00500	<0.500	119	<0.000500	2.90	<0.000100	3010	2.16	310	<0.000100	<0.00100
WQR2-0.5	VA24C7408-004	2024-10-13	M		0.000116	0.00128	0.175	<0.00010	0.083	580	0.0124	<0.0000050	<0.000000020	0.00505	<0.00050	<0.050	173	<0.00050	1.8	<0.00010	4540	3.43	400	<0.000050	<0.0010
WQR2-0.5	L2757830-2	2024-10-19	M																						
WQR2-0.5	VA24C8041-002	2024-10-19	M		0.000347	0.00340	0.650	0.00719	0.042	310	0.0255	<0.0000050	0.000000024	0.00244	<0.00150	0.076	87.0	<0.00050	3.8	<0.00010	2300	1.54	197	<0.000050	<0.0010
WQR2-0.5	VA24C8159-004	2024-10-20	M		0.000692	0.00370	1.14	0.00031	0.026	186	0.0412	<0.0000050	0.000000033	0.00162	0.00068	0.063	52.0	<0.00050	4.0	<0.00010	1380	0.989	123	<0.000050	<0.0010
WQR2-0.5	L2757872-4	2024-10-22	M																						
WQR2-0.5	VA24C8330-004	2024-10-22	M		0.000497	0.00288	0.919	0.00026	<0.020	106	0.0327	<0.0000050	<0.000000020	0.00104	0.00063	<0.050	30.6	<0.00050	4.1	<0.00010	836	0.560	72.1	<0.000050	<0.0010
WQR2-0.5	L2757962-5	2024-10-29	M																						
WQR2-0.5	VA24C9185-005	2024-10-29	M		0.000161	0.00127	0.241	<0.00010	<0.020	87.4	0.0102	<0.0000050	<0.000000080	0.00092	<0.00050	<0.050	25.1	<0.00050		<0.00010		0.491	58.0	<0.000050	<0.0010
WQR2-0.5	L2758003-1	2024-11-02	M																						
WQR2-0.5	VA24C9732-001	2024-11-02	M		0.000166	0.00088	0.120	<0.00010	0.053	385	0.0132	<0.0000050	<0.000000020	0.00325	<0.00050	<0.050	116	<0.00050	2.8	<0.00010	3090	2.06	273	<0.000050	<0.0010
WQR2-0.5	L2758142-6	2024-11-14	M																						
WQR2-0.5	VA24D0945-006	2024-11-14	M		0.000171	0.00119	0.286	0.00010	<0.020	149	0.0113	<0.0000050	0.000000033	0.00140	<0.00050	<0.050	42.9	<0.00050	3.0	<0.00010	1100	0.825	101	<0.000050	<0.0010
WQR2-0.5	VA24D1069-006	2024-11-15	M		0.000155	0.00116	0.222	0.00017	0.026	210	0.0108	<0.0000050	0.000000020	0.00178	<0.00050	<0.050	58.2	<0.00050	3.3	<0.00010	1630	1.10	142	<0.000050	<0.0010
WQR2-0.5	L2758203-6	2024-11-19	M																						
WQR2-0.5	VA24D1567-006	2024-11-19	M		0.000131	0.00098	0.135	<0.00010	0.045	362	0.0113	<0.0000050	0.000000022	0.00277	<0.00050	<0.050	101	<0.00050	2.9	<0.00010	2630	1.85	250	<0.000050	<0.0010
WQR2-0.5	L2758354-1	2024-12-06	M																						
WQR2-0.5	VA24D3008-001	2024-12-06	M		0.000118	0.00057	0.101	<0.00010	0.066	502	0.0118	<0.0000050	<0.000000020	0.00429	<0.00050	<0.050	146	<0.00050	2.8	<0.00010	3830	2.70	346	<0.000050	<0.0010
WQR2-0.5	L2758634-7	2025-01-09	M																						
WQR2-0.5	VA25A0510-007	2025-01-09	M		0.000095	0.00061	0.073	<0.00010	0.117	684	0.00819	<0.0000050	<0.000000020	0.00757	<0.00050	0.088	247	<0.00050	2.3	<0.00010	5250	5.20	620	<0.000050	<0.0010
WQR2-0.5	L2759010-7	2025-02-18	M																						
WQR2-0.5	VA25A3415-007	2025-02-18	M		0.000078	<0.00050	0.075	<0.00010	0.110	864	0.00795	<0.0000050	<0.000000020	0.00698	<0.00050	0.072	275	<0.00050	3.4	<0.00010	6860	4.84	567	<0.000050	<0.0010
WQR2-0.5	L2759209-7	2025-03-12	M																						
WQR2-0.5	VA25A5429-007	2025-03-12	M		0.000090	0.00073	0.145	<0.00010	0.027	195	0.00966	<0.0000050	<0.000000020	0.00201	<0.00050	<0.050	55.6	<0.00050	2.8	<0.00010	1560	1.14	130	<0.000050	<0.0010
WQR2-0.5	VA25A6528-016	2025-03-25	M		0.000083	0.00061	0.100	<0.00010	0.068	497	0.00692	<0.0000050		0.00451	<0.00050	<0.050	150	<0.00050	1.6	<0.00010	4180	3.04	352	<0.000050	<0.0010
WQR2-0.5	VA25A8147-004	2025-04-11	M		0.000092	0.00078	0.159	<0.00010	0.032	169	0.00684	<0.0000050	<0.000000020	0.00180	<0.00050	<0.050	50.4	<0.00050	3.1	<0.00010	1580	0.923	144	<0.000050	<0.0010
WQR2-0.5	VA25A8148-004	2025-04-11	M																						
WQR2-0.5	VA25A8280-007	2025-04-13	M		<0.000050	<0.00050	0.088	<0.00010	<0.020	124	0.00498	<0.0000050	<0.000000020	0.00129	<0.00050	<0.050	39.2	<0.00050	2.1	<0.00010	1000	0.764	95.0	<0.000050	<0.0010
WQR2-0.5	VA25A8282-007	2025-04-13	M																						
WQR2-0.5	VA25A8854-007	2025-04-21	M		0.000093	0.00096	0.167	<0.00010	<0.020	69.0	0.00805	<0.0000050		0.00102	<0.00050	<0.050	21.2	<0.00050	2.7	<0.00010	572	0.402	46.1	<0.000050	<0.0010
WQR2-0.5	VA25A8855-007	2025-04-21	M																						
WQR2-0.5	VA25B0359-012	2025-05-06	M		0.000128	0.00085	0.152	<0.00010	0.031	222	0.00724	<0.0000050	<0.000000020	0.00268	<0.00050	<0.050	76.4	<0.00050	1.6	<0.00010	1820	1.70	214	<0.000050	<0.0010
WQR2-0.5	VA25B0360-012	2025-05-06	M																						
WQR2-0.5	VA25B0499-007	2025-05-07	M		0.000106	0.00082	0.159	<0.00010	0.022	149	0.00702	<0.0000050	<0.000000020	0.00236	<0.00050	<0.050	57.9	<0.00050	1.7	<0.00010	1270	1.34	160	<0.000050	<0.0010
WQR2-0.5	VA25B0502-007	2025-05-07	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-0.5	VA25B2349-006	2025-05-27	M		0.000099	0.00106	0.166	<0.00010	<0.020	125	0.00752	<0.0000050		0.00135	<0.00050	<0.050	37.7	<0.00050	2.1	<0.00010	982	0.737	85.4	<0.000050	<0.0010
WQR2-1	0051710-11	2020-05-20	M		<0.00020	0.001	0.022	0.00055	0.182	1210	0.00223	<0.000010		0.0107	0.00159	<0.100	409	<0.00100	<2.0	<0.000100	8510	7.52	957	<0.000040	<0.00040
WQR2-1	0062209-12	2020-06-22	M		<0.00020	0.0011	0.033	<0.00040	0.169	1160	0.00258	<0.000010		0.0105	<0.00080	<0.100	339	<0.00100	<2.0	<0.000100	9560	7.26	846	<0.000040	<0.00040
WQR2-1	0071996-11	2020-07-21	M		0.00033	0.00208	0.487	0.00184	0.166	1190	0.0205	<0.000010		0.0108	0.00115	<0.100	327	<0.00100	4.2	<0.000100	9360	7.4	926	<0.000040	<0.00040
WQR2-1	0082292-11	2020-08-24	M		<0.00020	0.00269	0.031	<0.00040	0.154	1140	0.00305	0.000014		0.0102	<0.00080	<0.100	340	0.00249	<2.0	<0.000100	9820	7.14	891	<0.000040	<0.00040
WQR2-1	0093017-11	2020-09-28	M		<0.00020	<0.00080	0.029	<0.00040	0.159	995	0.00962	<0.000010		0.0102	0.00129	<0.100	320	0.00126	<2.0	<0.000100	8730	7.25	832	<0.000040	<0.00040
WQR2-1	20J1961-11	2020-10-20	M		<0.00020	<0.00080	0.024	<0.00040	0.167	1220	0.0109	<0.000010		0.0108	<0.00080	0.101	343	<0.00100	<2.0	<0.000100	9410	7.4	1010	<0.000040	<0.00040
WQR2-1	20J2778-11	2020-10-27	M		<0.00020	0.00098	0.025	0.00063	0.151	1120	0.00912	<0.000010		0.0109	0.00383	0.121	320	0.00485	<2.0	<0.000100	8680	7.41	939	<0.000040	<0.00040
WQR2-1	20K0360-11	2020-11-03	M		<0.00020	0.00094	0.028	0.00161	0.338	2040	0.0149	<0.000010		0.0198	0.00109	0.18	632	0.00123	3.3	<0.000100	8470	14.4	1790	<0.000040	<0.00040
WQR2-1	20K1261-11	2020-11-10	M		<0.00020	0.0013	0.03	<0.00040	0.185	1090	0.0129	<0.000010		0.0112	<0.00080	<0.100	342	<0.00100	<2.0	0.000548	7670	7.96	941	<0.000040	<0.00040
WQR2-1	20K2100-11	2020-11-18	M		<0.00020	<0.00080	<0.020	<0.00040	0.188	1170	0.00695	<0.000010		0.00984	<0.00080	<0.100	352	<0.00100	<2.0	<0.000100	9830	7.96	996	<0.000040	<0.00040
WQR2-1	20L1589-11	2020-12-14	M		<0.00020	0.00101	<0.020	<0.00040	0.156	1210	0.00526	<0.000010		0.0113	<0.00080	0.154	387	<0.00100	<2.0	<0.000100	9720	8.27	1090	<0.000040	<0.00040
WQR2-1	21A2590-11	2021-01-27	M		<0.00020	0.00132	<0.020	<0.00040	0.149	1100	0.00257	<0.000010		0.00994	<0.00080	<0.100	341	0.00128	<2.0	<0.000100	9250	6.95	854	<0.000040	<0.00040
WQR2-1	21B2778-11	2021-02-25	M		<0.00020	<0.00080	0.021	<0.00040	0.181	1070	0.00242	<0.000010		0.0102	<0.00080	0.164	345	<0.00100	2.2	<0.000100	8690	7	890	<0.000040	<0.00040
WQR2-1	21C3505-12	2021-03-25	M		<0.0000500	<0.00100	0.0202	<0.000500	0.218	1260	0.0023	<0.000010	<0.000000050	0.0112	<0.00300	0.164	374	<0.00100	3.97	<0.000100	10100	8.12	939	<0.0000400	<0.000500
WQR2-1	21D2478-11	2021-04-22	M		<0.0000500	<0.00100	<0.0200	<0.000500	0.184	1210	0.00165	<0.000010		0.0111	0.000439	0.129	380	0.00217	1.94	<0.000100	9380	6.92	943	<0.0000400	<0.000500
WQR2-1	21E1990-11	2021-05-18	M		<0.00020	<0.00080	<0.020	<0.00040	0.223	1200	0.00235	<0.000010		0.0112	<0.00080	<0.100	378	<0.00100	<2.0	<0.000100	10600	7.27	912	<0.000040	<0.00040
WQR2-1	21E2917-11	2021-05-26	M		<0.0000500	<0.00100	0.0533	<0.000500	0.172	1240	0.00266	<0.000010	<0.000000024	0.0115	0.000591	0.124	379	<0.00100	1.94	<0.000100	9670	7.07	874	<0.0000400	<0.000500
WQR2-1	21F0167-11	2021-06-01	M		<0.0000500	<0.00100	0.125	<0.000500	0.145	1090	0.00244	<0.000010	<0.000000024	0.00969	0.000766	<0.1	331	<0.00100	2.19	<0.000100	8760	6.33	719	<0.0000400	<0.000500
WQR2-1	21F1056-11	2021-06-08	M		<0.0000500	0.0017	0.0254	<0.000500	0.173	1160	0.00184	<0.0000050	<0.000000023	0.0108	0.0011	<0.1	350	0.00102	2.07	<0.000100	8070	7.05	835	<0.0000400	<0.000500
WQR2-1	21F2014-11	2021-06-15	M		<0.0000500	<0.00100	0.0322	<0.000500	0.169	1180	0.00287	<0.000010	<0.000000023	0.0106	0.000462	<0.1	354	0.00364	1.09	<0.000100	9560	7.15	904	0.0000777	<0.000500
WQR2-1	21G2414-11	2021-07-20	M		<0.0000500	<0.00100	0.0245	0.00139	0.161	1080	0.00321	<0.000010	<0.000000025	0.00901	0.000526	<0.1	313	<0.00100	<0.5	<0.000100	8540	6.05	804	<0.0000400	<0.000500
WQR2-1	21H3040-11	2021-08-25	M		0.00021	0.00215	0.148	0.000844	0.154	1060	0.00816	<0.000010	<0.000000050	0.0102	0.00139	<0.1	323	<0.00100	11.3	0.000137	9160	6.72	812	<0.0000400	0.00135
WQR2-1	21I3814-11	2021-09-28	M		0.0000595	<0.00100	0.0477	<0.000500	0.156	1160	0.00605	<0.000010	<0.000000024	0.011	0.00566	<0.1	365	0.00783	2.31	<0.000100	8950	7.32	864	<0.0000400	<0.000500
WQR2-1	21J3514-11	2021-10-26	M		<0.00005	0.00058	0.013	<0.00020	0.137	1060	0.00545	<0.000010	<0.000000050	0.00951	<0.00040	0.075	278	<0.00050	1.4	<0.000050	8370	5.65	0.7	<0.000020	<0.00004
WQR2-1	21K3046-11	2021-11-23	M		<0.00020	0.00176	0.04	<0.00040	0.179	1210	0.00762	<0.000010	0.000000037	0.0106	<0.00080	0.111	353	<0.00100	2.4	<0.000100	9190	6.91	871	<0.000040	<0.00040
WQR2-1	21L2125-11	2021-12-14	M		<0.00020	<0.00080	0.034	<0.00040	0.175	1160	0.00505	<0.000010	<0.000000023	0.0102	<0.00080	<0.100	364	<0.00100	2.6	<0.000100	9720	7.33	899	<0.000040	<0.00040
WQR2-1	22A2312-11	2022-01-20	M		<0.00020	0.001	0.023	<0.00040	0.189	1120	0.0043	<0.000010	<0.000000024	0.0102	<0.00080	<0.100	350	<0.00100	2.4	<0.000100	9420	6.64	869	<0.000040	<0.00040
WQR2-1	22B2487-11	2022-02-17	M		<0.00020	0.00136	0.023	<0.00040	0.154	1190	0.00376	<0.000010		0.0102	0.00089	<0.100	337	0.00437	<2.0	<0.000100	9280	6.65	829	<0.000040	0.00208
WQR2-1	22C3145-11	2022-03-22	M		<0.00020	<0.00080	<0.020	<0.00040	0.13	1000	0.0026	<0.000010		0.00871	<0.00080	<0.100	311	<0.00100	<2.0	<0.000100	7730	5.58	659	<0.000040	<0.00040
WQR2-1	22D2212-14	2022-04-20	M		<0.00020	<0.00080	0.033	<0.00040	0.164	1330	0.00241	<0.000010		0.0108	<0.00080	0.137	400	<0.00100	<2.0	<0.000100	10800	7.26	896	0.00011	<0.00040
WQR2-1	22E2480-11	2022-05-17	M		<0.00100	<0.00400	<0.100	<0.00200	0.125	1090	<0.00200		<0.000000024	0.00961	<0.00400	<0.500	356	<0.00500	<10.0	<0.000500	8790	7.18	873	<0.000200	<0.00200
WQR2-1	22F3212-11	2022-06-21	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.141	972	0.00233	<0.000010		0.00912	<0.000400	<0.1	320	<0.00100	1.21	<0.000100	7940	6.4	888	<0.0000400	<0.000500
WQR2-1	22G1763-11	2022-07-13	M		<0.0000500	<0.00200	0.0285	<0.000500	0.143	1180	0.00396	<0.000010		0.0101	<0.000400	<0.1	348	<0.00100	1.44	<0.000100	9750	7.04	894	<0.0000400	<0.000500
WQR2-1	22H2453-11	2022-08-16	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.158	1060	0.00344	<0.000010	<0.000000028	0.00928	<0.000400	<0.100	358	<0.00100	1.42	<0.000100	8940	7.03	871	<0.0000400	<0.000500
WQR2-1	22I1926-11	2022-09-14	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.138	1100	0.00267	<0.000010		0.00928	0.000638	0.107	341	<0.00100	1.16	<0.000100	9340	5.93	792	<0.0000400	<0.000500
WQR2-1	22J1560-11	2022-10-12	M		<0.0000500	<0.00200	0.0215	<0.000500	0.191	1220	0.00439	<0.000010		0.0103	<0.000400	0.112	333	<0.00100	1.35	<0.000100	9480	6.99	780	<0.0000400	<0.000500
WQR2-1	22K1453-11	2022-11-10	M		0.000132	<0.00200	0.0430	<0.000500	0.181	1350	0.0181	<0.000010	<0.000000050	0.0109	0.000603	<0.1	406	<0.00100	2.26	<0.000100	10100	7.44	1010	0.0000412	<0.000500
WQR2-1	22K2628-03	2022-11-22	M		0.0000561	<0.00200	0.0268	<0.000500	0.143	1060	0.00922	<0.000010	<0.000000050	0.00967	<0.000400	<0.1	340	<0.00100	1.82	<0.000100	8940	6.65	866	<0.0000400	<0.000500
WQR2-1	22K2988-03	2022-11-24	M		0.0000684	<0.00200	0.0551	<0.000500	0.135	1260	0.00556	<0.000010	<0.000000050	0.0102	0.000624	0.141	394	<0.00100	2.03	<0.000100	10100	6.72	977	<0.0000400	<0.000500
WQR2-1	22K3123-03	2022-11-25	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.149	1080	0.00433	<0.000010	<0.000000050	0.00965	0.000764	<0.15	342	<0.00100	1.65	<0.000100	8660	6.61	844	<0.0000400	<0.000500
WQR2-1	22L0036-03	2022-11-30	M		0.0000641	<0.00200	0.0260	<0.000500	0.146	1140	0.0136	<0.000010	0.000000097	0.0103	0.000763	<0.1	348	<0.00100	2.09	<0.000100	9690	7.19	932	<0.0000400	<0.000500
WQR2-1	22L0263-03	2022-12-02	M		0.0000510	<0.00200	0.0342	<0.000500	0.139	1090	0.00958	<0.000010	<0.000000050	0.00954	0.000927	<0.1	335	<0.00100	2.12	<0.000100	9270	6.68	889	<0.0000400	<0.000500
WQR2-1	22L0499-03	2022-12-05	M		0.0000635	<0.00200	0.0220	<0.000500	0.159	1300	0.0403	<0.000010	<0.000000023	0.0102	<0.000400	<0.1	331	<0.00100	1.98	<0.000100	10000	6.66	846	<0.0000400	<0.000500
WQR2-1	22L0633-03	2022-12-06	M		0.0000783	<0.00200	0.0262	<0.000500	0.159	1100	0.0478	<0.000010	<0.000000023	0.0104	<0.000400	<0.1	354	<0.00100	2.18	<0.000100	8640	6.87	876	<0.0000400	<0.000500
WQR2-1	22L0774-11	2022-12-07	M		0.0000787	<0.00200	0.0270	<0.000500	0.154	1180	0.0418	<0.000010		0.0100	0.000464	0.103	343	<0.00100	1.76	<0.000100	9030	6.83	800	<0.0000400	<0.000500
WQR2-1	22L1436-03	2022-12-13	M		<0.0000500	<0.00200	0.0210	<0.000500	0.154	1180	0.0240	<0.000010	<0.000000049	0.00961	<0.000400	<0.1	349	<0.00100	1.91	<0.000100	8830	6.47	857	<0.0000400	<0.000500
WQR2-1	23A2847-11	2023-01-27	M		0.0000698	<0.00200	0.0208	<0.000500	0.156	1170	0.00602	<0.000010	<0.000000060	0.0101	<0.000400	<0.1	366	<0.00100	1.88	<0.000100	9780	7.01	902	<0.0000400	<0.000500
WQR2-1	23C0060-11	2023-02-28	M		<0.0000500	<0.00200	0.0200	<0.000500	0.123	1260	0.00432	<0.000010		0.00995	0.000479	<0.1	401	<0.00100	2.06	<0.000100	10200	6.96	983	<0.0000400	<0.000500
WQR2-1	23C1797-11	2023-03-15	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.171	1130	0.00271	<0.000010		0.00950	<0.000400	0.142	355	<0.00100	1.7	<0.000100	11700	6.49	882	<0.0000400	<0.000500
WQR2-1	23D2945-11	2023-04-26	M		<0.0000500	<0.00200	<0.0200	<0.000500	0.148	1090	0.00255	<0.000010		0.00948	<0.000400	<0.1	363	<0.00100	1.49	0.000285	8360	6.53	806	<0.0000400	<0.000500
WQR2-1	23E2392-11	2023-05-17	M		<0.0000500	<0.00200	0.0295	<0.000500	0.118	1130	0.00208	<0.000010	<0.000000050	0.00960	0.000484	<0.1	382	<0.00100	<1	0.000141	9860	6.79	892	<0.0000400	<0.000500
WQR2-1	23F3614-11	2023-06-27	M		<0.0000500	<0.00200	0.0412	<0.000500	0.157	1130	0.00339	<0.000010		0.00961	<0.000400	<0.1	343	<0.00100	1.46	<0.000100	9700	7.02	921	<0.0000400	<0.000500
WQR2-1	23G2415-11	2023-07-19	M		<0.0000500	<0.00200	0.0323	<0.000500	0.164	1150	0.00266	<0.000010		0.00971	0.000438	<0.1	357	<0.00100	1.49	<0.000100	9390	7.07	917	<0.0000400	<0.000500
WQR2-1	23H3309-11	2023-08-24	M		<0.0000500	<0.00200	<0.0200	0.000991	0.15	1070	0.00239	<0.000010	<0.000000050	0.00954	0.000469	<0.1	341	<0.00100	1.31	<0.000100	8850	6.72	850	<0.0000400	<0.000500

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-1	23I2271-13	2023-09-19	M		<0.0000500	<0.00200	0.0438	0.000743	0.151	1170	0.00444	<0.000010		0.00963	<0.000400	<0.1	384	<0.00100	1.54	<0.000100	9260	6.55	974	<0.0000400	<0.000500
WQR2-1	23J2236-13	2023-10-18	M		<0.0000500	<0.00200	0.0379	<0.000500	0.157	980	0.00395	<0.000010		0.00981	0.000962	0.105	335	<0.00100	1.32	<0.000100	8560	6.49	803	<0.0000400	<0.000500
WQR2-1	23K1909-11	2023-11-15	M		<0.0000500	<0.00200	0.0218	<0.000500	0.167	1220	0.00489	<0.000010	<0.000000050	0.0100	0.000401	0.104	372	<0.00100	1.85	<0.000100	10100	7.62	1000	<0.0000400	<0.000500
WQR2-1	23L2091-09	2023-12-15	M		<0.0000500	<0.00200	0.0262	<0.000500	0.164	1250	0.00363	0.000011		0.00981	0.000458	<0.1	373	<0.00100	1.63	<0.000100	10400	6.86	872	<0.0000400	<0.000500
WQR2-1	L2754383-7	2024-01-25	M																						
WQR2-1	VA24A1507-009	2024-01-25	M	<0.00050	0.000091	<0.00050	0.021	<0.00010	0.171	1190	0.00262	<0.0000050	0.000000026	0.0105	<0.00050	0.090	364	<0.00050	1.9	<0.00010	9520	7.20	849	<0.000050	<0.0010
WQR2-1	L2754604-7	2024-02-14	M																						
WQR2-1	VA24A2995-009	2024-02-14	M	<0.00050	0.000076	<0.00050	0.014	<0.00010	0.197	957	0.00208	<0.0000050	<0.000000040	0.00945	<0.00050	0.089	313	<0.00050	1.7	<0.00010	8700	6.84	804	<0.000050	<0.0010
WQR2-1	L2755043-9	2024-03-21	M																						
WQR2-1	VA24A6026-009	2024-03-21	M	<0.00050	0.000086	<0.00050	0.087	<0.00010	0.148	1120	0.00486	<0.0000050	<0.000000020	0.0100	<0.00050	0.101	352	<0.00050	1.5	<0.00010	9020	6.67	858	<0.000050	<0.0010
WQR2-1	L2755490-7	2024-04-24	M																						
WQR2-1	VA24A8916-009	2024-04-24	M	<0.00050	0.000081	<0.00050	0.059	<0.00010	0.147	1340	0.00311	<0.0000050	<0.000000020	0.00926	<0.00050	0.098	388	<0.00050	1.7	<0.00010	9230	6.40	821	<0.000050	<0.0010
WQR2-1	L2755567-7	2024-05-01	M																						
WQR2-1	VA24A9566-009	2024-05-01	M	<0.00050	0.000055	<0.00050	<0.010	<0.00010	0.144	1220	0.00125	<0.0000050	<0.000000020	0.00921	<0.00050	0.099	347	<0.00050	1.3	<0.00010	9350	6.39	809	<0.000050	<0.0010
WQR2-1	L2755666-7	2024-05-08	M																						
WQR2-1	VA24B0201-009	2024-05-08	M	<0.00050	0.000080	<0.00050	0.024	<0.00010	0.152	954	0.00164	<0.0000050	<0.000000020	0.0102	<0.00050	0.099	335	0.00082	1.6	<0.00010	9890	7.18	816	<0.000050	<0.0010
WQR2-1	L2755779-7	2024-05-15	M																						
WQR2-1	VA24B0901-009	2024-05-15	M	<0.00050	0.000084	<0.00050	0.036	<0.00010	0.169	1070	0.00210	<0.0000050	<0.000000020	0.00968	<0.00050	0.095	342	<0.00050	1.8	<0.00010	9440	6.82	801	<0.000050	<0.0010
WQR2-1	L2755888-7	2024-05-22	M																						
WQR2-1	VA24B1500-009	2024-05-22	M	<0.00050	0.000066	<0.00050	0.014	0.00018	0.158	1050	0.00183	<0.0000050	<0.000000020	0.00934	<0.00050	0.088	324	<0.00050	1.3	<0.00010	9020	6.58	777	<0.000050	<0.0010
WQR2-1	L2756312-7	2024-06-19	M																						
WQR2-1	VA24B4510-009	2024-06-19	M	<0.00050	0.000070	<0.00050	0.019	<0.00010	0.153	1190	0.00339	<0.0000050	<0.000000020	0.0102	<0.00050	0.103	375	<0.00050	1.6	<0.00010	9940	6.70	876	<0.000050	<0.0010
WQR2-1	VA24B7397-009	2024-07-17	M	0.00101	0.000121	<0.00050	0.033	<0.00010	0.138	1180	0.00352	<0.0000050	0.000000022	0.00904	0.00085	0.099	348	<0.00050	1.6	<0.00010	9300	6.39	875	<0.000050	<0.0010
WQR2-1	L2756689-7	2024-07-17	M																						
WQR2-1	L2757122-7	2024-08-21	M																						
WQR2-1	VA24C1337-009	2024-08-21	M	<0.00050	0.000066	<0.00050	0.014	<0.00010	0.160	1080	0.00325	<0.0000050	<0.000000160	0.00872	<0.00050	0.088	335	<0.00050	1.6	<0.00010	8970	6.15	772	<0.000050	<0.0010
WQR2-1	VA24C4683-009	2024-09-18	M	<0.00050	0.000075	0.00060	0.017	<0.00010	0.184	1060	0.00328	<0.0000050	0.000000020	0.00967	<0.00050	0.104	338	0.00167	1.3	<0.00010	8580	6.52	849	<0.000050	<0.0010
WQR2-1	VA24C8569-009	2024-10-23	M	<0.00050	0.000085	<0.00050	0.019	<0.00010	0.133	1120	0.00485	<0.0000050	<0.000000020	0.00909	<0.00050	0.085	338	0.00438	1.3	<0.00010	8030	6.08	737	<0.000050	<0.0010
WQR2-1	L2757977-9	2024-10-30	M																						
WQR2-1	VA24C9414-009	2024-10-30	M	<0.00050	0.000223	<0.00050	0.018	<0.00010	0.166	1210	0.00508	<0.0000050	<0.000000080	0.00992	0.00051	0.099	380	0.00472	1.7	<0.00010	9750	6.55	897	<0.000050	<0.0010
WQR2-1	VA24D0180-009	2024-11-06	M	<0.00050	0.000193	<0.00050	0.019	<0.00010	0.150	1220	0.0113	<0.0000050	<0.000000020	0.00944	0.00059	0.095	357	<0.00050	1.7	<0.00010	8910	6.37	831	<0.000050	<0.0010
WQR2-1	VA24D0813-009	2024-11-13	M	<0.00050	0.000227	0.00077	0.034	<0.00010	0.150	1210	0.00896	<0.0000050	<0.000000020	0.00912	<0.00050	0.097	361	0.00319	1.6	<0.00010	9460	6.44	810	<0.000050	<0.0010
WQR2-1	L2758221-7	2024-11-22	M																						
WQR2-1	VA24D1791-009	2024-11-22	M	<0.00050	0.000295	0.00055	0.023	<0.00010	0.191	1260	0.00849	<0.0000050	<0.000000020	0.00991	0.00058	0.106	385	<0.00050	1.9	<0.00010	9530	6.92	972	<0.000050	<0.0010
WQR2-1	L2758486-7	2024-12-18	M																						
WQR2-1	VA24D3937-009	2024-12-18	M	<0.00050	0.000104	<0.00050	0.022	<0.00010	0.138	831	0.00405	<0.0000050	0.000000023	0.0104	<0.00050	0.080	294	<0.00050	1.2	<0.00010	6580	6.90	715	<0.000050	<0.0010
WQR2-1	L2758770-7	2025-01-22	M																						
WQR2-1	VA25A1525-009	2025-01-22	M	0.00075	0.000404	0.00221	0.911	0.00024	0.142	989	0.0193	<0.0000050	0.000000030	0.00856	0.00078	0.139	362	<0.00060	3.4	<0.00010	7330	6.02	771	<0.000050	<0.0010
WQR2-1	L2759008-7	2025-02-19	M																						
WQR2-1	VA25A3570-009	2025-02-19	M	<0.00050	0.000077	<0.00050	0.030	<0.00010	0.144	1150	0.00315	<0.0000050	<0.000000020	0.00921	<0.00050	0.088	338	<0.00050	3.0	<0.00010	8350	6.41	736	<0.000050	<0.0010
WQR2-1	VA25A6679-009	2025-03-26	M	<0.00050	0.000064	<0.00050	0.011	<0.00010	0.151	1500	0.00250	<0.0000050	<0.000000020	0.00973	<0.00050	0.082	381	<0.00050	1.2	<0.00010	11600	6.77	685	<0.000050	<0.0010
WQR2-1	VA25A9109-009	2025-04-23	M	<0.00050	0.000068	<0.00050	0.011	<0.00010	0.152	1180	0.00122	<0.0000050	<0.000000400	0.00938	<0.00050	0.086	306	0.00079	1.6	<0.00010	8840	6.14	750	<0.000050	<0.0010
WQR2-1	VA25A9941-009	2025-05-01	M	<0.00050	0.000085	<0.00050	0.013	<0.00010	0.147	1140	0.00137	<0.0000050	<0.000000020	0.00928	<0.00050	0.092	336	<0.00050	1.4	<0.00010	9430	6.57	774	<0.000050	<0.0010
WQR2-1	VA25B0496-009	2025-05-07	M	<0.00050	0.000078	<0.00050	0.011	<0.00010	0.184	1340	0.00137	<0.0000050	<0.000000020	0.00963	<0.00050	<0.050	339	0.00062	1.6	<0.00010	10000	6.92	764	<0.000050	<0.0010
WQR2-1	VA25B1530-009	2025-05-16	M	<0.00050	0.000079	<0.00050	0.019	<0.00010	0.148	1160	0.00169	<0.0000050	0.000000025	0.00999	0.00051	0.103	327	<0.00050	1.6	<0.00010	10200	6.30	852	<0.000050	<0.0010
WQR2-1	VA25B1841-009	2025-05-21	M	<0.00050	0.000076	<0.00050	0.012	<0.00010	0.136	1220	0.00178	<0.0000050	0.000000024	0.00957	<0.00050	0.098	345	<0.00050	1.8	<0.00010	9090	7.06	916	<0.000050	<0.0010
WQR2-2	0051710-12	2020-05-20	M		<0.00020	0.00186	0.214	0.00252	0.053	351	0.00869	<0.000010		0.00335	0.00159	<0.100	119	<0.00100	<2.0	<0.000100	2960	2.14	278	<0.000040	<0.00040
WQR2-2	0062209-11	2020-06-22	M		0.00047	0.00275	0.826	<0.00040	0.0173	114	0.0278	<0.000010		0.00128	<0.00080	<0.100	34.4	<0.00100	<2.0	<0.000100	954	0.706	84.3	<0.000040	0.00127
WQR2-2	0071996-12	2020-07-21	M		0.00032	0.00165	0.58	0.00079	0.0132	84.9	0.0187	<0.000010		0.00087	<0.00080	<0.100	25.4	<0.00100	2.8	<0.000100	705	0.527	67.7	<0.000040	<0.00040
WQR2-2	0082292-12	2020-08-24	M		<0.00020	0.00209	0.129	<0.00040	0.0784	614	0.0131	<0.000010		0.00541	<0.00080	<0.100	183	0.00583	<2.0	<0.000100	5050	3.66	477	<0.000040	<0.00040
WQR2-2	0093017-12	2020-09-28	M		0.00027	0.00339	0.476	<0.00040	0.0228	137	0.0201	<0.000010		0.00163	0.00115	<0.100	49.2	0.0014	2.8	<0.000100	1160	0.979	116	<0.000040	<0.00040
WQR2-2	20J1961-12	2020-10-20	M		<0.00020	0.00093	0.18	0.00042	0.0266	185	0.0121	<0.000010		0.00202	<0.00080	<0.100	51.8	<0.00100	<2.0	<0.000100	1520	1.17	151	<0.000040	<0.00040
WQR2-2	20J2778-12	2020-10-27	M		<0.00020	0.00136	0.099	0.0123	0.0804	574	0.0142	<0.000010		0.00573	<0.00080	<0.100	169	0.0061	<2.0	<0.000100	4930	3.88	493	<0.000040	0.00409
WQR2-2	20K0360-12	2020-11-03	M		<0.00020	<0.00080	0.144	0.005	0.0463	265	0.00976	<0.000010		0.00258	<0.00080	<0.100	88.5	<0.00100	2.3	<0.000100	2250	1.77	235	<0.000040	0.00053
WQR2-2	20K1261-12	2020-11-10	M		<0.00020	0.00157	0.153	<0.00040	0.101	602	0.0144	<0.000010		0.0059	<0.00080	<0.100	189	<0.00100	2.1	0.000422	4260	4.39	523	<0.000040	<0.00040

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	20K2100-12	2020-11-18	M		0.00025	0.00099	0.356	<0.00040	0.0453	260	0.0241	<0.000010		0.00255	<0.00080	<0.100	88.9	<0.00100	4.2	<0.000100	2190	1.83	232	<0.000040	<0.00040
WQR2-2	20L1589-12	2020-12-14	M		<0.00020	0.00123	0.108	<0.00040	0.0904	661	0.0106	<0.000010		0.00664	<0.00080	<0.100	214	<0.00100	<2.0	<0.000100	5270	4.54	592	<0.000040	<0.00040
WQR2-2	21A2590-12	2021-01-27	M		<0.00020	0.00199	0.041	<0.00040	0.139	980	0.00555	<0.000010		0.00932	<0.00080	0.144	305	0.00307	2.8	<0.000100	8230	6.41	771	<0.000040	<0.00040
WQR2-2	21B2778-12	2021-02-25	M		<0.00020	<0.00080	0.058	<0.00040	0.154	925	0.00624	<0.000010		0.00872	<0.00080	0.101	292	<0.00100	3.1	<0.000100	7510	6.08	774	<0.000040	<0.00040
WQR2-2	21C3505-13	2021-03-25	M		0.0000576	0.00106	0.0837	<0.000500	0.133	749	0.00694	<0.000010	<0.000000050	0.00671	<0.00300	<0.1	232	<0.00100	4.12	<0.000100	5930	4.89	568	<0.0000400	<0.000500
WQR2-2	21D2478-12	2021-04-22	M		0.000139	0.00187	0.183	0.00009	0.0448	220	0.00981	<0.000010		0.0223	0.00047	0.038	71.7	0.00129	3.22	<0.000010	1760	1.62	184	0.0000064	0.00016
WQR2-2	21E1990-12	2021-05-18	M		0.00032	0.00974	0.557	<0.00020	0.00722	44.1	0.0173	<0.000010		0.00071	0.00079	<0.050	14.7	<0.00050	2.6	<0.000050	398	0.298	35.1	<0.000020	0.00022
WQR2-2	21E2917-12	2021-05-26	M		0.000159	0.00114	0.224	0.000054	0.0249	143	0.0101	<0.000010	0.000000033	0.00169	0.000326	0.017	41.7	0.00035	3.22	<0.000010	1060	0.923	107	0.000005	0.000109
WQR2-2	21F0167-12	2021-06-01	M		0.000147	0.00112	0.211	<0.000050	0.0359	195	0.00911	<0.000010	<0.000000024	0.00209	0.0003	0.021	56.7	0.00072	3.11	<0.000010	1370	0.955	148	0.0000046	0.00009
WQR2-2	21F1056-12	2021-06-08	M		0.000323	0.00155	0.59	0.000121	0.0102	58.1	0.0197	<0.0000050	<0.000000023	0.000901	0.000437	0.021	17.7	<0.00010	3.89	<0.000010	414	0.342	41.6	0.0000074	0.000066
WQR2-2	21F2014-12	2021-06-15	M		0.000578	0.00292	1.08	0.00024	0.0118	78.4	0.0329	<0.000010	<0.000000023	0.000969	0.000754	0.03	24	<0.00010	4.53	<0.000010	623	0.486	60.7	0.000014	<0.000050
WQR2-2	21G2414-12	2021-07-20	M		0.000151	<0.00100	0.259	0.00813	0.0133	90.4	0.0114	<0.000010	<0.000000025	0.00301	0.000471	<0.1	30.4	<0.00100	0.69	<0.000100	727	0.509	75.5	<0.0000400	<0.000500
WQR2-2	21H3040-12	2021-08-25	M		0.000202	0.00125	0.305	0.00386	0.031	214	0.0162	<0.000010	<0.000000050	0.00214	<0.000200	<0.1	72.7	<0.00100	8.39	<0.000100	1910	1.31	159	<0.0000400	<0.000500
WQR2-2	21I3814-12	2021-09-28	M		0.000278	0.00205	0.389	<0.000500	0.048	331	0.0159	<0.000010	0.000000031	0.0033	0.00057	<0.1	106	0.00734	2.86	<0.000100	2590	1.95	245	<0.0000400	<0.000500
WQR2-2	21J3514-12	2021-10-26	M		0.00017	0.0018	0.306	<0.00020	0.0428	290	0.0144	<0.000010	<0.000000050	0.00267	<0.00040	<0.050	88.6	<0.00050	2.6	<0.000050	2400	1.73	<0.6	<0.000020	<0.00004
WQR2-2	21K3046-12	2021-11-23	M		<0.00020	0.00204	0.107	<0.00040	0.0774	507	0.0104	<0.000010	0.000000034	0.00511	<0.00080	<0.100	153	0.00198	3.3	<0.000100	4080	2.95	377	<0.000040	<0.00040
WQR2-2	21L2125-12	2021-12-14	M		<0.00020	<0.00080	0.04	<0.00040	0.133	877	0.00621	<0.000010	<0.000000023	0.00765	<0.00080	<0.100	272	<0.00100	2.7	<0.000100	7330	5.54	668	<0.000040	<0.00040
WQR2-2	22A2312-12	2022-01-20	M		<0.00020	0.00083	0.024	<0.00040	0.164	991	0.00401	<0.000010	<0.000000024	0.00895	<0.00080	<0.100	307	<0.00100	2.7	<0.000100	8290	5.87	754	<0.000040	<0.00040
WQR2-2	22B2487-12	2022-02-17	M		<0.00020	<0.00080	0.043	<0.00040	0.132	1000	0.00416	<0.000010		0.0085	<0.00080	<0.100	289	0.00255	<2.0	<0.000100	7740	5.6	684	<0.000040	<0.00040
WQR2-2	22C3145-12	2022-03-22	M		<0.00020	0.00326	0.065	0.00089	0.104	804	0.00285	<0.000010		0.00698	0.00706	<0.100	254	<0.00100	<2.0	<0.000100	6160	4.5	537	<0.000040	<0.00040
WQR2-2	22D2212-15	2022-04-20	M		<0.00020	0.00142	0.065	<0.00040	0.112	904	0.00469	<0.000010		0.00735	<0.00080	<0.100	270	<0.00100	<2.0	<0.000100	7300	4.87	614	0.000045	<0.00040
WQR2-2	22E2480-12	2022-05-17	M		<0.00100	<0.00400	0.237	<0.00200	0.0297	248	0.0103	<0.000010	<0.000000024	0.00233	<0.00400	<0.500	78.9	<0.00500	<10.0	<0.000500	1980	1.45	186	<0.000200	<0.00200
WQR2-2	22F3212-12	2022-06-21	M		0.000107	<0.00200	0.191	0.0012	0.0106	65	0.00772	<0.000010		0.000834	<0.000400	<0.1	20.8	<0.00100	1.88	<0.000100	533	0.399	51.5	<0.0000400	<0.000500
WQR2-2	22G1763-12	2022-07-13	M		0.000166	<0.00200	0.319	0.00142	0.0152	103	0.0123	<0.000010		0.000989	<0.000400	<0.1	30.1	<0.00100	1.82	<0.000100	851	0.599	77.7	<0.0000400	<0.000500
WQR2-2	22H2453-12	2022-08-16	M		0.000166	<0.00200	0.309	<0.000500	0.0137	86.0	0.0138	<0.000010	<0.000000026	0.000979	<0.000400	<0.100	27.5	<0.00100	1.97	<0.000100	718	0.522	67.6	<0.0000400	<0.000500
WQR2-2	22I1926-12	2022-09-14	M		0.0000509	<0.00200	0.0463	<0.000500	0.0889	724	0.00664	<0.000010		0.00597	0.000413	<0.100	225	<0.00100	1.22	<0.000100	6140	3.90	528	<0.0000400	<0.000500
WQR2-2	22J1560-12	2022-10-12	M		0.0000879	<0.00200	0.0925	<0.000500	0.104	630	0.00773	<0.000010		0.00549	<0.000400	<0.1	175	<0.00100	1.03	<0.000100	5020	3.64	431	<0.0000400	<0.000500
WQR2-2	22K1453-12	2022-11-10	M		0.000157	<0.00200	0.0723	<0.000500	0.159	1190	0.0161	<0.000010	0.000000054	0.00952	0.000471	<0.1	359	<0.00100	2.63	<0.000100	8780	6.44	873	<0.0000400	<0.000500
WQR2-2	22K2628-04	2022-11-22	M		<0.0000500	<0.00200	0.0217	<0.000500	0.138	1020	0.00623	<0.000010	<0.000000050	0.00973	<0.000400	<0.1	321	<0.00100	1.81	<0.000100	8500	6.44	822	<0.0000400	<0.000500
WQR2-2	22K2988-04	2022-11-24	M		0.0000888	<0.00200	0.0916	0.00145	0.0973	909	0.0136	<0.000010	<0.000000050	0.00710	0.000482	<0.1	281	<0.00100	3.07	<0.000100	7300	4.72	691	<0.0000400	<0.000500
WQR2-2	22K3123-04	2022-11-25	M		<0.0000500	<0.00200	0.0378	<0.000500	0.146	1040	0.00579	<0.000010	<0.000000050	0.00935	0.000685	<0.15	321	<0.00100	1.84	<0.000100	8200	6.28	801	<0.0000400	<0.000500
WQR2-2	22L0036-04	2022-11-30	M		<0.0000500	<0.00200	0.0365	<0.000500	0.125	957	0.00622	<0.000010	<0.000000050	0.00847	0.000765	<0.1	292	<0.00100	2.15	<0.000100	8140	6.03	779	<0.0000400	<0.000500
WQR2-2	22L0263-04	2022-12-02	M		0.0000523	<0.00200	0.0329	0.000935	0.159	1220	0.0105	<0.000010	<0.000000050	0.0103	0.000785	0.113	371	<0.00100	2.44	<0.000100	10300	7.37	990	<0.0000400	<0.000500
WQR2-2	22L0499-04	2022-12-05	M		0.000100	<0.00200	0.0524	<0.000500	0.137	949	0.0347	<0.000010	0.000000031	0.00887	<0.000400	<0.1	309	<0.00100	2.54	<0.000100	7630	5.94	759	<0.0000400	<0.000500
WQR2-2	22L0633-04	2022-12-06	M		0.000101	<0.00200	0.0742	<0.000500	0.131	876	0.0368	<0.000010	<0.000000023	0.00822	<0.000400	<0.1	283	<0.00100	2.68	<0.000100	6970	5.47	705	<0.0000400	<0.000500
WQR2-2	22L0774-12	2022-12-07	M		0.000103	<0.00200	0.0636	0.00871	0.138	1090	0.0290	<0.000010		0.00872	<0.000400	<0.1	304	<0.00100	1.96	<0.000100	8240	6.18	709	<0.0000400	<0.000500
WQR2-2	22L1436-04	2022-12-13	M		0.0000509	<0.00200	0.0407	<0.000500	0.124	1020	0.0132	<0.000010	<0.000000049	0.00867	<0.000400	<0.1	306	<0.00100	2.19	<0.000100	7810	5.83	761	<0.0000400	<0.000500
WQR2-2	23A2847-12	2023-01-27	M		0.0000832	<0.00200	0.0712	<0.000500	0.116	844	0.0107	<0.000010	<0.000000060	0.00736	0.000432	<0.1	262	<0.00100	2.66	<0.000100	7010	5.09	663	<0.0000400	<0.000500
WQR2-2	23C0060-12	2023-02-28	M		0.0000576	<0.00200	0.0633	<0.000500	0.108	1090	0.00655	<0.000010		0.00877	<0.000400	<0.1	342	<0.00100	2.52	<0.000100	8810	6.08	830	<0.0000400	<0.000500
WQR2-2	23C1797-12	2023-03-15	M		<0.0000500	<0.00200	0.0439	<0.000500	0.155	1000	0.00513	<0.000010		0.00845	<0.000400	<0.1	310	<0.00100	1.93	<0.000100	10700	5.76	799	<0.0000400	<0.000500
WQR2-2	23D2945-12	2023-04-26	M		<0.0000500	<0.00200	0.0600	<0.000500	0.0889	645	0.00552	<0.000010		0.00572	0.000456	<0.1	198	<0.00100	1.28	0.000239	5040	3.79	475	<0.0000400	<0.000500
WQR2-2	23E2392-12	2023-05-17	M		0.000531	0.00273	1.01	0.000317	0.0181	147	0.0308	<0.000010	<0.000000050	0.00148	0.000787	<0.05	47.5	<0.00050	3.16	<0.000050	1180	0.85	106	<0.0000200	<0.000250
WQR2-2	23F3614-12	2023-06-27	M		0.000145	<0.00200	0.303	<0.000500	0.0189	125	0.0112	<0.000010		0.00138	<0.000400	<0.1	38.3	<0.00100	1.88	<0.000100	1050	0.746	95.4	<0.0000400	<0.000500
WQR2-2	23G2415-12	2023-07-19	M		0.0000967	<0.00200	0.146	<0.000500	0.0931	644	0.00808	<0.000010		0.00548	<0.000400	<0.1	199	<0.00100	1.62	<0.000100	5250	4.03	513	<0.0000400	<0.000500
WQR2-2	23H3309-12	2023-08-24	M		<0.0000500	<0.00200	<0.0200	0.00100	0.118	855	0.00388	<0.000010		0.00797	<0.000400	<0.1	273	<0.00100	<1	<0.000100	6890	5.35	687	<0.0000400	<0.000500
WQR2-2	23I2271-14	2023-09-19	M		0.0000815	<0.00200	0.11	<0.000500	0.0752	551	0.00786	<0.000010		0.00504	<0.000400	<0.1	183	<0.00100	1.37	<0.000100	4350	3.1	439	<0.0000400	<0.000500
WQR2-2	23J2236-14	2023-10-18	M		0.000471	0.00283	0.949	0.00168	0.0362	253	0.0360	<0.000010		0.00237	0.000765	<0.1	78.8	<0.00100	3.58	<0.000100	2150	1.52	192	<0.0000400	<0.000500
WQR2-2	23K1909-12	2023-11-15	M		<0.0000500	<0.00200	0.0369	<0.000500	0.124	896	0.00589	<0.000010	<0.000000050	0.00755	<0.000400	<0.1	267	<0.00100	2.04	<0.000100	7370	5.67	733	<0.0000400	<0.000500
WQR2-2	23L2091-10	2023-12-15	M		0.0000628	<0.00200	0.0532	<0.000500	0.142	1080	0.00695	<0.000010		0.00852	0.000449	0.121	322	<0.00100	1.95	<0.000100	8840	5.9	747	<0.0000400	<0.000500
WQR2-2	L2754383-8	2024-01-25	M																						
WQR2-2	VA24A1507-010	2024-01-25	M	<0.00050	0.000092	0.00055	0.037	0.00014	0.152	1090	0.00332	<0.0000050	0.000000020	0.00962	<0.00050	0.082	334	<0.00050	2.1	<0.00010	9080	6.57	758	<0.000050	<0.0010
WQR2-2	L2754604-8	2024-02-14	M																						
WQR2-2	VA24A2995-010	2024-02-14	M	<0.00050	0.000095	<0.00050	0.040	<0.00010	0.171	827	0.00562	<0.0000050	<0.000000040	0.00794	<0.00050	0.077	270	<0.00050	2.1	<0.00010	7420	5.80	674	<0.000050	<0.0010
WQR2-2	L2755043-10	2024-03-21	M																						
WQR2-2	VA24A6026-010	2024-03-21	M	<0.00050	0.000070	0.00071	0.084	<0.00010	0.093	714	0.00619	<0.0000050	<0.000000020	0.00617	<0.00050	0.054	220	<0.00050	1.6	<0.00010	5440	4.14	540	<0.000050	<0.0010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	L2755490-8	2024-04-24	M																						
WQR2-2	VA24A8916-010	2024-04-24	M	<0.00050	0.000075	<0.00050	0.062	<0.00010	0.105	874	0.00444	<0.0000050	<0.000000040	0.00676	<0.00050	<0.050	247	<0.00050	<1.0	<0.00010	6770	4.66	600	<0.000050	<0.0010
WQR2-2	L2755567-8	2024-05-01	M																						
WQR2-2	VA24A9566-010	2024-05-01	M	<0.00050	0.000061	0.00069	0.024	<0.00010	0.107	886	0.00261	<0.0000050	<0.000000020	0.00625	<0.00050	<0.050	249	<0.00050	<1.0	<0.00010	6810	4.27	588	<0.000050	<0.0010
WQR2-2	L2755666-8	2024-05-08	M																						
WQR2-2	VA24B0201-010	2024-05-08	M	<0.00050	0.000098	0.00076	0.104	<0.00010	0.062	403	0.00647	<0.0000050	<0.000000020	0.00448	<0.00050	<0.050	142	<0.00050	1.5	<0.00010	4150	2.98	353	<0.000050	<0.0010
WQR2-2	L2755779-8	2024-05-15	M																						
WQR2-2	VA24B0901-010	2024-05-15	M	<0.00050	0.000119	0.00086	0.126	<0.00010	0.098	642	0.00657	<0.0000050	<0.000000020	0.00596	<0.00050	<0.050	203	<0.00050	1.0	<0.00010	5540	4.10	490	<0.000050	<0.0010
WQR2-2	L2755888-8	2024-05-22	M																						
WQR2-2	VA24B1500-010	2024-05-22	M	0.00068	0.000127	0.00080	0.156	0.00012	0.058	398	0.00819	<0.0000050	<0.000000020	0.00369	<0.00050	<0.050	119	<0.00050	1.5	<0.00010	3270	2.46	284	<0.000050	<0.0010
WQR2-2	L2756312-8	2024-06-19	M																						
WQR2-2	VA24B4510-010	2024-06-19	M	<0.00050	0.000078	0.00073	0.042	<0.00010	0.087	662	0.00457	<0.0000050	0.000000025	0.00592	<0.00050	<0.050	216	<0.00050	<1.0	<0.00010	5670	3.83	520	<0.000050	<0.0010
WQR2-2	VA24B7397-010	2024-07-17	M	<0.00050	0.000199	0.00119	0.342	<0.00010	0.035	298	0.0115	<0.0000050	<0.000000020	0.00234	<0.00050	<0.050	86.2	<0.00050	2.2	<0.00010	2360	1.52	212	<0.000050	<0.0010
WQR2-2	L2756689-8	2024-07-17	M																						
WQR2-2	L2757122-8	2024-08-21	M																						
WQR2-2	VA24C1337-010	2024-08-21	M	<0.00050	0.000166	0.00092	0.260	<0.00010	0.035	247	0.0124	<0.0000050	<0.000000080	0.00221	<0.00050	<0.050	75.0	<0.00050	2.3	<0.00010	2030	1.35	175	<0.000050	<0.0010
WQR2-2	VA24C4683-010	2024-09-18	M	<0.00050	0.000180	0.00088	0.241	<0.00010	0.040	334	0.0151	<0.0000050	0.000000043	0.00273	<0.00050	<0.050	91.5	<0.00050	1.9	<0.00010	2430	1.69	228	<0.000050	<0.0010
WQR2-2	VA24C8569-010	2024-10-23	M	<0.00050	0.000183	0.00129	0.294	<0.00010	0.060	536	0.0143	<0.0000050	<0.000000020	0.00429	<0.00050	0.051	162	0.00164	2.0	<0.00010	3800	2.83	350	<0.000050	<0.0010
WQR2-2	L2757977-10	2024-10-30	M																						
WQR2-2	VA24C9414-010	2024-10-30	M	<0.00050	0.000170	0.00081	0.087	<0.00010	0.092	653	0.00765	<0.0000050	<0.000000020	0.00529	<0.00050	<0.050	201	0.00347	2.1	<0.00010	5220	3.36	471	<0.000050	<0.0010
WQR2-2	VA24D0180-010	2024-11-06	M	<0.00050	0.000144	0.00066	0.084	<0.00010	0.077	606	0.00968	<0.0000050	<0.000000020	0.00500	<0.00050	0.053	182	<0.00050	2.4	<0.00010	4610	3.34	423	<0.000050	<0.0010
WQR2-2	VA24D0813-010	2024-11-13	M	<0.00050	0.000155	0.00119	0.116	<0.00010	0.058	494	0.00705	<0.0000050	<0.000000020	0.00376	<0.00050	0.054	146	0.00152	2.3	<0.00010	3800	2.57	334	<0.000050	<0.0010
WQR2-2	L2758221-8	2024-11-22	M																						
WQR2-2	VA24D1791-010	2024-11-22	M	<0.00050	0.000257	0.00056	0.059	<0.00010	0.160	998	0.00784	<0.0000050	0.000000020	0.00775	0.00055	0.089	300	<0.00050	2.3	<0.00010	7480	5.42	773	<0.000050	<0.0010
WQR2-2	L2758486-8	2024-12-18	M																						
WQR2-2	VA24D3937-010	2024-12-18	M	<0.00050	0.000105	0.00051	0.063	<0.00010	0.093	564	0.00639	<0.0000050	<0.000000020	0.00736	<0.00050	0.062	207	<0.00050	1.7	<0.00010	4550	4.89	509	<0.000050	<0.0010
WQR2-2	L2758770-8	2025-01-22	M																						
WQR2-2	VA25A1525-010	2025-01-22	M	<0.00050	0.000065	0.00050	0.060	<0.00010	0.113	757	0.00526	<0.0000050	0.000000024	0.00695	<0.00050	0.084	282	<0.00060	2.2	<0.00010	5600	4.72	645	<0.000050	<0.0010
WQR2-2	L2759008-8	2025-02-19	M																						
WQR2-2	VA25A3570-010	2025-02-19	M	<0.00050	0.000092	0.00067	0.105	<0.00010	0.106	839	0.00889	<0.0000050	<0.000000020	0.00706	<0.00050	0.063	248	<0.00050	3.7	<0.00010	6310	4.89	557	<0.000050	<0.0010
WQR2-2	VA25A6679-010	2025-03-26	M	<0.00050	0.000062	<0.00050	0.069	<0.00010	0.116	1050	0.00372	<0.0000050	<0.000000020	0.00688	<0.00050	<0.050	286	<0.00050	<1.0	<0.00010	8170	4.92	494	<0.000050	<0.0010
WQR2-2	VA25A9109-010	2025-04-23	M	<0.00050	0.000065	<0.00050	0.010	<0.00010	0.107	896	0.00220	<0.0000050	<0.000000080	0.00746	<0.00050	<0.050	236	<0.00050	<1.0	<0.00010	6810	4.79	594	<0.000050	<0.0010
WQR2-2	VA25A9941-010	2025-05-01	M	<0.00050	0.000092	0.00090	0.093	<0.00010	0.048	370	0.00610	<0.0000050	0.000000024	0.00343	<0.00050	<0.050	113	<0.00050	1.7	<0.00010	3110	2.23	264	<0.000050	<0.0010
WQR2-2	VA25B0496-010	2025-05-07	M	<0.00050	0.000088	0.00056	0.034	<0.00010	0.134	883	0.00392	<0.0000050	<0.000000020	0.00673	<0.00050	<0.050	228	<0.00050	<1.0	<0.00010	6690	4.71	508	<0.000050	<0.0010
WQR2-2	VA25B1530-010	2025-05-16	M	<0.00050	0.000103	0.00088	0.151	<0.00010	0.028	197	0.00723	<0.0000050	<0.000000020	0.00226	<0.00050	<0.050	61.1	<0.00050	2.0	<0.00010	1740	1.26	153	<0.000050	<0.0010
WQR2-2	VA25B1841-010	2025-05-21	M	<0.00050	0.000076	0.00072	0.051	<0.00010	0.079	608	0.00461	<0.0000050	<0.000000160	0.00489	<0.00050	<0.050	164	<0.00050	<1.0	<0.00010	4480	3.13	370	<0.000050	<0.0010
WQR2-2m	L2755545-11	2024-04-30	M																						
WQR2-2m	VA24A9402-011	2024-04-30	M		0.000080	0.00097	0.075	0.00012	0.081	673	0.00509	<0.0000050	<0.000000020	0.00528	<0.00050	<0.050	189	<0.00050	1.0	<0.00010	4540	3.56	458	<0.000050	<0.0010
WQR2-2m	L2755648-2	2024-05-08	M																						
WQR2-2m	VA24B0178-002	2024-05-08	M		0.000116	0.00098	0.161	<0.00010	0.033	209	0.00849	<0.0000050	<0.000000020	0.00227	<0.00050	<0.050	69.4	<0.00050	2.6	<0.00010	1970	1.37	165	<0.000050	<0.0010
WQR2-2m	L2755934-11	2024-05-24	M																						
WQR2-2m	VA24B1783-011	2024-05-24	M		0.000129	0.00103	0.194	<0.00010	0.026	187	0.00936	<0.0000050	<0.000000020	0.00183	<0.00050	<0.050	58.6	<0.00050	2.5	<0.00010	1570	1.11	139	<0.000050	<0.0010
WQR2-2m	VA24B3452-011	2024-06-10	M		0.000121	0.00107	0.168	<0.00010	0.034	274	0.00825	<0.0000050	<0.000000020	0.00215	<0.00050	<0.050	76.8	<0.00050	2.0	<0.00010	1940	1.32	176	<0.000050	<0.0010
WQR2-2m	659-454600000-0	2024-06-17	M																						
WQR2-2m	VA24B5882-011	2024-07-03	M		0.000217	0.00118	0.434	<0.00010	<0.020	32.9	0.0148	<0.0000050		0.00048	<0.00050	<0.050	10.0	<0.00050	2.8	<0.00010	277	0.182	22.2	<0.000050	<0.0010
WQR2-2m	VA24B6465-005	2024-07-09	M		0.000177	0.00107	0.292	<0.00010	0.051	367	0.0109	<0.0000050	0.000000021	0.00311	<0.00050	<0.050	105	<0.00050	1.6	<0.00010	2960	1.96	256	<0.000050	<0.0010
WQR2-2m	VA24B7867-005	2024-07-20	M		0.000223	0.00143	0.427	<0.00010	<0.020	69.9	0.0159	<0.0000050	<0.000000080	0.00076	<0.00050	<0.050	19.7	<0.00050	1.8	<0.00010	507	0.369	47.0	<0.000050	<0.0010
WQR2-2m	L2757210-5	2024-08-26	M																						
WQR2-2m	VA24C2208-005	2024-08-26	M		0.000234	0.00075	0.380	<0.00010	<0.020	96.8	0.0176	<0.0000050	<0.000000020	0.00107	<0.00050	<0.050	31.1	<0.00050	2.3	<0.00010	832	0.605	70.8	<0.000050	<0.0010
WQR2-2m	VA24C5557-002	2024-09-25	M		0.000090	0.00072	0.075	<0.00010	0.134	963	0.00542	<0.0000050		0.00743	<0.00050	<0.050	300	<0.00050	<1.0	<0.00010	7500	5.49	689	<0.000050	<0.0010
WQR2-2m	L2757680-5	2024-10-06	M																						
WQR2-2m	VA24C6685-005	2024-10-06	M		<0.00500	<0.0250	<0.500	<0.00250	0.123	889	<0.00500	<0.0000050	<0.000000020	0.00714	<0.0250	<2.50	271	<0.00250	<5.00	<0.000500	6980	5.10	734	<0.000500	<0.00500
WQR2-2m	VA24C7408-005	2024-10-13	M		0.000095	0.00075	0.112	<0.00010	0.104	698	0.00995	<0.0000050	0.000000049	0.00598	<0.00050	0.053	208	<0.00050	1.5	<0.00010	5400	4.08	482	<0.000050	<0.0010
WQR2-2m	L2757872-5	2024-10-22	M																						
WQR2-2m	VA24C8330-005	2024-10-22	M		0.000456	0.00230	0.817	0.00021	0.029	222	0.0294	<0.0000050	<0.000000020	0.00174	0.00060	<0.050	64.4	<0.00050	3.8	<0.00010	1760	1.13	148	<0.000050	<0.0010
WQR2-2m	VA24C9185-006	2024-10-29	M		0.000148	0.00107	0.175	<0.00010	0.037	276	0.00864	<0.0000050	<0.000000080	0.00232	<0.00050	<0.050	82.8	<0.00050		<0.00010		1.56	189	<0.000050	<0.0010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2m	L2757962-6	2024-10-29	M																						
WQR2-2m	L2758003-2	2024-11-02	M																						
WQR2-2m	VA24C9732-002	2024-11-02	M		0.000168	0.00080	0.108	<0.00010	0.066	473	0.0123	<0.0000050	<0.000000020	0.00391	<0.00050	<0.050	143	0.00076	2.7	<0.00010	3800	2.55	339	<0.000050	<0.0010
WQR2-2m	L2758354-2	2024-12-06	M																						
WQR2-2m	VA24D3008-002	2024-12-06	M		0.000107	0.00076	0.071	<0.00010	0.100	724	0.00919	<0.0000050	0.000000021	0.00613	<0.00050	0.064	213	<0.00050	2.4	<0.00010	5550	3.96	517	<0.000050	<0.0010
WQR2-2m	L2758634-8	2025-01-09	M																						
WQR2-2m	VA25A0510-008	2025-01-09	M		0.000090	0.00066	0.060	<0.00010	0.115	669	0.00662	<0.0000050	<0.000000020	0.00766	<0.00050	0.090	252	<0.00050	2.1	<0.00010	5450	5.30	607	<0.000050	<0.0010
WQR2-2m	L2759010-8	2025-02-18	M																						
WQR2-2m	VA25A3415-008	2025-02-18	M		0.000065	<0.00050	0.031	<0.00010	0.131	1010	0.00411	<0.0000050	<0.000000020	0.00809	<0.00050	0.074	323	<0.00050	2.6	<0.00010	8170	5.61	643	<0.000050	<0.0010
WQR2-2m	L2759209-8	2025-03-12	M																						
WQR2-2m	VA25A5429-008	2025-03-12	M		0.000086	0.00054	0.041	<0.00010	0.122	1000	0.00307	<0.0000050	<0.000000020	0.00809	<0.00050	<0.050	273	<0.00050	<1.0	<0.00010	7410	5.51	628	<0.000050	<0.0010
WQR2-2m	VA25A6528-017	2025-03-25	M																						
WQR2-2m	VA25A8147-005	2025-04-11	M		0.000082	0.00072	0.126	<0.00010	0.053	289	0.00568	<0.0000050	<0.000000020	0.00284	<0.00050	<0.050	85.0	<0.00050	2.5	<0.00010	2710	1.58	247	<0.000050	<0.0010
WQR2-2m	VA25A8148-005	2025-04-11	M																						
WQR2-2m	VA25A8280-008	2025-04-13	M		0.000067	0.00067	0.113	<0.00010	0.025	186	0.00669	<0.0000050	<0.000000020	0.00185	<0.00050	<0.050	55.7	<0.00050	2.3	<0.00010	1470	1.11	137	<0.000050	<0.0010
WQR2-2m	VA25A8282-008	2025-04-13	M																						
WQR2-2m	VA25A8854-008	2025-04-21	M		0.000087	0.00090	0.120	<0.00010	0.042	311	0.00639	<0.0000050		0.00271	<0.00050	<0.050	91.1	<0.00050	1.9	<0.00010	2480	1.69	200	<0.000050	<0.0010
WQR2-2m	VA25A8855-008	2025-04-21	M																						
WQR2-2m	VA25B0359-011	2025-05-06	M		0.000095	0.00074	0.090	<0.00010	0.070	365	0.00570	<0.0000050	<0.000000020	0.00419	<0.00050	<0.050	139	<0.00050	1.4	<0.00010	2870	2.80	328	<0.000050	<0.0010
WQR2-2m	VA25B0360-011	2025-05-06	M																						
WQR2-2m	VA25B0499-008	2025-05-07	M		0.000094	0.00067	0.088	<0.00010	0.054	347	0.00553	<0.0000050	<0.000000020	0.00468	<0.00050	<0.050	122	<0.00050	1.1	<0.00010	2800	2.82	334	<0.000050	<0.0010
WQR2-2m	VA25B0502-008	2025-05-07	M																						
WQR2-3	23L2091-11	2023-12-15	M		0.0000770	<0.00200	0.0811	0.000686	0.116	884	0.0122	<0.000010		0.00710	0.000431	<0.1	266	<0.00100	2.3	<0.000100	7240	4.88	630	<0.0000400	<0.000500
WQR2-3	L2754383-9	2024-01-25	M																						
WQR2-3	VA24A1507-011	2024-01-25	M	<0.00050	0.000093	0.00075	0.041	0.00012	0.140	1050	0.00357	<0.0000050	0.000000020	0.00946	<0.00050	0.083	332	<0.00050	2.0	<0.00010	8580	6.41	734	<0.000050	<0.0010
WQR2-3	L2754604-9	2024-02-14	M																						
WQR2-3	VA24A2995-011	2024-02-14	M	<0.00050	0.000107	<0.00050	0.061	<0.00010	0.146	728	0.00778	<0.0000050	<0.000000040	0.00742	<0.00050	0.071	231	<0.00050	2.2	<0.00010	6520	5.24	594	<0.000050	<0.0010
WQR2-3	L2755043-11	2024-03-21	M																						
WQR2-3	VA24A6026-011	2024-03-21	M	<0.00050	0.000100	0.00085	0.149	<0.00010	0.038	291	0.00945	<0.0000050	<0.000000020	0.00263	<0.00050	<0.050	85.8	<0.00050	3.0	<0.00010	2220	1.57	208	<0.000050	<0.0010
WQR2-3	L2755490-9	2024-04-24	M																						
WQR2-3	VA24A8916-011	2024-04-24	M	<0.00050	0.000089	0.00061	0.141	<0.00010	0.046	366	0.00889	<0.0000050	<0.000000040	0.00321	<0.00050	<0.050	101	<0.00050	2.7	<0.00010	2860	2.00	253	<0.000050	<0.0010
WQR2-3	L2755567-9	2024-05-01	M																						
WQR2-3	VA24A9566-011	2024-05-01	M	<0.00050	0.000073	0.00084	0.106	<0.00010	0.034	270	0.00708	<0.0000050	<0.000000020	0.00212	<0.00050	<0.050	75.5	<0.00050	2.6	<0.00010	2040	1.30	177	<0.000050	<0.0010
WQR2-3	L2755666-9	2024-05-08	M																						
WQR2-3	VA24B0201-011	2024-05-08	M	<0.00050	0.000117	0.00090	0.140	<0.00010	0.050	333	0.00760	<0.0000050	<0.000000020	0.00367	<0.00050	<0.050	114	<0.00050	1.7	<0.00010	3310	2.39	276	<0.000050	<0.0010
WQR2-3	L2755779-9	2024-05-15	M																						
WQR2-3	VA24B0901-011	2024-05-15	M	<0.00050	0.000205	0.00158	0.394	<0.00010	<0.020	110	0.0132	<0.0000050	<0.000000020	0.00123	<0.00050	<0.050	32.0	<0.00050	2.7	<0.00010	896	0.644	80.5	<0.000050	<0.0010
WQR2-3	L2755888-9	2024-05-22	M																						
WQR2-3	VA24B1500-011	2024-05-22	M	<0.00050	0.000141	0.00088	0.215	<0.00010	0.026	176	0.00997	<0.0000050	<0.000000020	0.00176	<0.00050	<0.050	52.3	<0.00050	2.5	<0.00010	1480	1.06	125	<0.000050	<0.0010
WQR2-3	L2756312-9	2024-06-19	M																						
WQR2-3	VA24B4510-011	2024-06-19	M	<0.00050	0.000205	0.00142	0.371	<0.00010	<0.020	100	0.0126	<0.0000050	0.000000030	0.00112	<0.00050	<0.050	31.2	<0.00050	2.7	<0.00010	822	0.535	73.9	<0.000050	<0.0010
WQR2-3	VA24B7397-011	2024-07-17	M	<0.00050	0.000248	0.00136	0.475	0.00013	<0.020	109	0.0158	<0.0000050	0.000000023	0.00104	<0.00050	<0.050	31.6	<0.00050	2.6	<0.00010	934	0.552	75.0	<0.000050	<0.0010
WQR2-3	L2756689-9	2024-07-17	M																						
WQR2-3	L2757122-9	2024-08-21	M																						
WQR2-3	VA24C1337-011	2024-08-21	M	<0.00050	0.000167	0.00096	0.260	<0.00010	0.027	191	0.0127	<0.0000050	<0.000000080	0.00181	<0.00050	<0.050	57.1	<0.00050	1.9	<0.00010	1560	1.04	134	<0.000050	<0.0010
WQR2-3	VA24C4683-011	2024-09-18	M	<0.00050	0.000186	0.00109	0.281	<0.00010	0.031	256	0.0164	<0.0000050	<0.000000020	0.00218	<0.00050	<0.050	70.3	<0.00050	2.1	<0.00010	1880	1.33	172	<0.000050	<0.0010
WQR2-3	VA24C8569-011	2024-10-23	M	<0.00050	0.000248	0.00155	0.444	<0.00010	0.025	226	0.0192	<0.0000050	<0.000000020	0.00189	<0.00050	<0.050	68.3	<0.00050	2.9	<0.00010	1610	1.17	150	<0.000050	<0.0010
WQR2-3	VA24C9414-011	2024-10-30	M	<0.00050	0.000158	0.00116	0.186	<0.00010	0.030	208	0.0106	<0.0000050	<0.000000020	0.00188	<0.00050	<0.050	63.6	0.00125	2.9	<0.00010	1650	1.10	146	<0.000050	<0.0010
WQR2-3	L2757977-11	2024-10-30	M																						
WQR2-3	VA24D0180-011	2024-11-06	M	<0.00050	0.000139	0.00071	0.112	<0.00010	0.059	448	0.0120	<0.0000050	<0.000000020	0.00392	<0.00050	<0.050	133	<0.00050	2.8	<0.00010	3370	2.51	315	<0.000050	<0.0010
WQR2-3	L2758221-9	2024-11-22	M																						
WQR2-3	VA24D1791-011	2024-11-22	M	<0.00050	0.000234	0.00067	0.073	<0.00010	0.146	924	0.00920	<0.0000050	0.000000022	0.00719	<0.00050	0.082	277	<0.00050	2.5	<0.00010	6930	4.97	690	<0.000050	<0.0010
WQR2-3	L2758486-9	2024-12-18	M																						
WQR2-3	VA24D3937-011	2024-12-18	M	<0.00050	0.000096	0.00074	0.052	<0.00010	0.068	386	0.00498	<0.0000050	<0.000000020	0.00505	<0.00050	<0.050	151	<0.00050	1.5	<0.00010	3240	3.38	360	<0.000050	<0.0010
WQR2-3	L2758770-9	2025-01-22	M																						
WQR2-3	VA25A1525-011	2025-01-22	M	<0.00050	0.000064	0.00060	0.071	<0.00010	0.109	735	0.00549	<0.0000050	<0.000000020	0.00695	<0.00050	0.080	283	<0.00060	2.2	<0.00010	5120	4.85	622	<0.000050	<0.0010
WQR2-3	L2759008-9	2025-02-19	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Total Trivalent Chromium	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	Total Methylmercury	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-S	T-Tl	T-Sn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-3	VA25A3570-011	2025-02-19	M	<0.00050	0.000096	0.00056	0.104	<0.00010	0.109	882	0.00877	<0.0000050	<0.000000020	0.00723	<0.00050	0.066	265	<0.00050	3.7	<0.00010	6280	4.94	567	<0.000050	<0.0010
WQR2-3	VA25A6679-011	2025-03-26	M	<0.00050	0.000061	0.00057	0.120	<0.00010	0.068	594	0.00652	<0.0000050	<0.000000020	0.00441	<0.00050	<0.050	166	<0.00050	1.2	<0.00010	4480	2.94	296	<0.000050	<0.0010
WQR2-3	VA25A9109-011	2025-04-23	M	<0.00050	0.000070	0.00069	0.115	<0.00010	0.026	207	0.00669	<0.0000050	<0.000000020	0.00215	<0.00050	<0.050	58.0	<0.00050	2.6	<0.00010	1680	1.19	144	<0.000050	<0.0010
WQR2-3	VA25A9941-011	2025-05-01	M	<0.00050	0.000103	0.00094	0.132	<0.00010	0.023	174	0.00660	<0.0000050	<0.000000020	0.00178	<0.00050	<0.050	53.8	<0.00050	2.2	<0.00010	1470	1.07	125	<0.000050	<0.0010
WQR2-3	VA25B0496-011	2025-05-07	M	<0.00050	0.000109	0.00081	0.129	0.00020	0.041	272	0.00688	<0.0000050	<0.000000020	0.00239	<0.00050	<0.050	74.3	<0.00050	2.1	<0.00010	2070	1.54	175	<0.000050	<0.0010
WQR2-3	VA25B1530-011	2025-05-16	M	<0.00050	0.000122	0.00096	0.220	<0.00010	<0.020	82.4	0.00836	<0.0000050	0.000000021	0.00122	<0.00050	<0.050	26.8	<0.00050	2.6	<0.00010	760	0.562	68.6	<0.000050	<0.0010
WQR2-3	VA25B1841-011	2025-05-21	M	<0.00050	0.000105	0.00092	0.166	<0.00010	<0.020	57.1	0.00741	<0.0000050	<0.000000020	0.00092	<0.00050	<0.050	17.2	<0.00050	2.8	<0.00010	446	0.383	51.3	<0.000050	<0.0010
WQR2-SF	L2755545-12	2024-04-30	M																						
WQR2-SF	VA24A9402-012	2024-04-30	M		0.000055	<0.00050	0.014	<0.00010	0.142	1170	0.00116	<0.0000050	<0.000000020	0.00912	<0.00050	0.074	320	<0.00050	<1.0	<0.00010	8760	6.38	794	<0.000050	<0.0010
WQR2-SF	L2755648-3	2024-05-08	M																						
WQR2-SF	VA24B0178-003	2024-05-08	M		0.000086	<0.00050	<0.010	<0.00010	0.162	1110	0.00098	<0.0000050	<0.000000020	0.0105	<0.00050	0.078	345	0.00075	<1.0	<0.00010	9890	7.26	845	<0.000050	<0.0010
WQR2-SF	L2755934-12	2024-05-24	M																						
WQR2-SF	VA24B1783-012	2024-05-24	M		0.000058	0.00053	0.014	<0.00010	0.133	876	0.00230	<0.0000050	<0.000000020	0.00831	<0.00050	<0.050	298	<0.00050	<1.0	<0.00010	8040	5.74	701	<0.000050	<0.0010
WQR2-SF	VA24B3452-012	2024-06-10	M		0.000082	0.00070	0.055	0.00010	0.116	970	0.00358	<0.0000050	<0.000000020	0.00677	<0.00050	<0.050	284	<0.00050	<1.0	<0.00010	6800	4.74	638	<0.000050	<0.0010
WQR2-SF	660-454600000-0	2024-06-17	M																						
WQR2-SF	VA24B5882-012	2024-07-03	M		0.000058	<0.00050	0.018	<0.00010	0.101	892	0.00190	<0.0000050		0.00668	<0.00050	<0.050	278	<0.00050	<1.0	<0.00010	7610	4.57	666	<0.000050	<0.0010
WQR2-SF	VA24B6465-006	2024-07-09	M		0.000101	0.00078	0.076	<0.00010	0.148	1080	0.00356	<0.0000050	0.000000024	0.00857	<0.00050	<0.050	313	<0.00050	<1.0	<0.00010	8840	5.75	764	<0.000050	<0.0010
WQR2-SF	VA24B7867-006	2024-07-20	M		0.000061	0.00071	0.035	<0.00010	0.125	1070	0.00228	<0.0000050	<0.000000160	0.00829	<0.00050	0.050	311	<0.00050	<1.0	<0.00010	8460	5.62	766	<0.000050	<0.0010
WQR2-SF	L2757210-6	2024-08-26	M																						
WQR2-SF	VA24C2208-006	2024-08-26	M		0.000080	0.00071	0.033	<0.00010	0.128	1040	0.00311	<0.0000050	<0.000000080	0.00842	<0.00050	0.053	310	<0.00050	<1.0	<0.00010	8930	5.84	722	<0.000050	<0.0010
WQR2-SF	VA24C5557-003	2024-09-25	M		0.000074	0.00083	0.031	<0.00010	0.142	1100	0.00484	<0.0000050		0.00996	<0.00050	0.077	341	<0.00050	1.1	<0.00010	8600	5.81	776	<0.000050	<0.0010
WQR2-SF	L2757680-6	2024-10-06	M																						
WQR2-SF	VA24C6685-006	2024-10-06	M		<0.00500	<0.0250	<0.500	<0.00250	0.156	1140	<0.00500	<0.0000050	<0.000000020	0.00997	<0.0250	<2.50	358	<0.00250	<5.00	<0.000500	9100	6.50	928	<0.000500	<0.00500
WQR2-SF	VA24C7408-006	2024-10-13	M		0.000075	<0.00050	0.027	<0.00010	0.162	1050	0.00596	<0.0000050	<0.000000020	0.00875	<0.00050	0.086	322	<0.00050	1.2	<0.00010	8060	6.29	714	<0.000050	<0.0010
WQR2-SF	L2757872-6	2024-10-22	M																						
WQR2-SF	VA24C8330-006	2024-10-22	M		0.000189	0.00086	0.202	0.00015	0.132	1070	0.0101	<0.0000050	0.000000163	0.00777	<0.00050	0.085	301	<0.00050	1.7	<0.00010	8240	5.39	699	<0.000050	<0.0010
WQR2-SF	VA24C9185-007	2024-10-29	M		0.000176	0.00062	0.039	<0.00010	0.108	813	0.00512	<0.0000050	<0.000000080	0.00679	<0.00050	0.062	250	<0.00050		<0.00010		4.67	569	<0.000050	<0.0010
WQR2-SF	L2757962-7	2024-10-29	M																						
WQR2-SF	L2758003-3	2024-11-02	M																						
WQR2-SF	VA24C9732-003	2024-11-02	M		0.000202	0.00065	0.043	<0.00010	0.124	919	0.00666	<0.0000050	<0.000000020	0.00743	<0.00050	0.078	281	0.00180	1.8	<0.00010	7370	4.90	667	<0.000050	0.0011
WQR2-SF	L2758354-3	2024-12-06	M																						
WQR2-SF	VA24D3008-003	2024-12-06	M		0.000105	<0.00050	0.018	<0.00010	0.147	1090	0.00404	<0.0000050	0.000000023	0.00895	<0.00050	0.088	333	<0.00050	1.5	<0.00010	8320	6.06	797	<0.000050	<0.0010
WQR2-SF	L2758634-9	2025-01-09	M																						
WQR2-SF	VA25A0510-009	2025-01-09	M		0.000081	<0.00050	0.028	<0.00010	0.140	796	0.00306	<0.0000050	0.000000021	0.00921	0.00051	0.098	309	<0.00050	1.6	<0.00010	6310	6.37	733	<0.000050	<0.0010
WQR2-SF	L2759010-9	2025-02-18	M																						
WQR2-SF	VA25A3415-009	2025-02-18	M		0.000061	<0.00050	0.023	<0.00010	0.137	1060	0.00260	<0.0000050	<0.000000020	0.00840	<0.00050	0.081	340	<0.00050	2.4	<0.00010	8640	5.89	659	<0.000050	<0.0010
WQR2-SF	L2759209-9	2025-03-12	M																						
WQR2-SF	VA25A5429-009	2025-03-12	M		0.000062	<0.00050	0.014	<0.00010	0.147	1230	0.00168	<0.0000050	<0.000000020	0.00942	<0.00050	0.081	329	<0.00050	1.2	<0.00010	9110	6.53	743	<0.000050	<0.0010
WQR2-SF	VA25A6528-018	2025-03-25	M																						
WQR2-SF	VA25A8147-006	2025-04-11	M		0.000076	<0.00050	0.031	<0.00010	0.140	807	0.00205	<0.0000050	<0.000000020	0.00683	<0.00050	<0.050	226	<0.00050	<1.0	<0.00010	7670	4.08	640	<0.000050	<0.0010
WQR2-SF	VA25A8148-006	2025-04-11	M																						
WQR2-SF	VA25A8280-009	2025-04-13	M		<0.000050	<0.00050	<0.010	<0.00010	0.151	1090	0.00121	<0.0000050	<0.000000020	0.00880	<0.00050	0.093	318	<0.00050	1.4	<0.00010	8830	6.23	773	<0.000050	<0.0010
WQR2-SF	VA25A8282-009	2025-04-13	M																						
WQR2-SF	VA25A8854-009	2025-04-21	M		0.000068	<0.00050	0.014	<0.00010	0.137	1230	0.00150	<0.0000050		0.00867	0.00052	0.079	322	<0.00050	<1.0	<0.00010	9370	6.04	713	<0.000050	<0.0010
WQR2-SF	VA25A8855-009	2025-04-21	M																						
WQR2-SF	VA25B0359-010	2025-05-06	M		0.000079	<0.00050	0.011	<0.00010	0.128	1080	0.00130	<0.0000050	<0.000000020	0.00984	<0.00050	0.090	295	<0.00070	1.3	<0.00010	7560	6.51	819	<0.000050	<0.0010
WQR2-SF	VA25B0360-010	2025-05-06	M																						
WQR2-SF	VA25B0499-009	2025-05-07	M		0.000088	<0.00050	<0.010	<0.00010	0.107	907	0.00216	<0.0000050	<0.000000020	0.00940	<0.00050	<0.050	272	<0.00070	<1.0	<0.00010	6530	6.40	762	<0.000050	<0.0010
WQR2-SF	VA25B0502-009	2025-05-07	M																						

Notes:
Sample Class 'M' = monitoring sample.
'<' = result is below the indicated detection limit.

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	0051710-01	2020-05-20	M	<0.0100	0.00274	0.0024	<0.0080																
WQ1-1	0062209-01	2020-06-22	M	<0.0100	0.00293	0.0049	<0.0080																
WQ1-1	0071996-01	2020-07-21	M	<0.0100	0.00269	<0.0020	<0.0080																
WQ1-1	0082292-01	2020-08-24	M	<0.0100	0.00303	0.0088	<0.0080																
WQ1-1	0093017-01	2020-09-28	M	<0.0100	0.00287	<0.0020	0.0215																
WQ1-1	20J1961-01	2020-10-20	M	<0.0100	0.00276	0.006	0.126																
WQ1-1	20J2778-01	2020-10-27	M	<0.0100	0.0029	0.0022	<0.0080																
WQ1-1	20K0360-01	2020-11-03	M	<0.0100	0.00253	0.0035	0.0292																
WQ1-1	20K1261-01	2020-11-10	M	<0.0100	0.00301	<0.0020	<0.0080																
WQ1-1	20K2100-01	2020-11-18	M	<0.0100	0.00285	0.0023	<0.0080																
WQ1-1	20L1589-01	2020-12-14	M	<0.0100	0.00302	<0.0020	<0.0080																
WQ1-1	21A2590-01	2021-01-27	M	<0.0100	0.00287	<0.0020	<0.0080																
WQ1-1	21B2778-01	2021-02-25	M	<0.0100	0.00292	0.0043	<0.0080																
WQ1-1	21C3505-01	2021-03-25	M	<0.00200	0.00284	<0.00200	<0.0100																
WQ1-1	21D2478-01	2021-04-22	M	<0.00200	0.00321	<0.00200	<0.0100																
WQ1-1	21E1990-01	2021-05-18	M	<0.0100	0.00302	0.0023	<0.0080																
WQ1-1	21E2917-01	2021-05-26	M	0.00297	0.00231	0.00258	<0.0100																
WQ1-1	21F0167-01	2021-06-01	M	0.00484	0.00183	<0.00200	<0.0100																
WQ1-1	21F1056-01	2021-06-08	M	0.00226	0.00307	0.00427	<0.0100																
WQ1-1	21F2014-01	2021-06-15	M	0.00224	0.00277	0.0021	<0.0100																
WQ1-1	21G2414-01	2021-07-20	M	0.00266	0.00266	<0.00200	<0.0100																
WQ1-1	21H3040-01	2021-08-25	M	<0.00200	0.00267	0.00345	<0.0100																
WQ1-1	21I3814-01	2021-09-28	M	0.00216	0.00251	<0.00200	<0.0100																
WQ1-1	21J3514-01	2021-10-26	M	<0.0050	0.00247	0.0024	<0.0040																
WQ1-1	21K3046-01	2021-11-23	M	<0.0100	0.00271	<0.0020	<0.0080																
WQ1-1	21L2125-01	2021-12-14	M	<0.0100	0.00123	<0.0020	0.0154																
WQ1-1	22A2312-01	2022-01-20	M	<0.0100	0.00302	0.0038	<0.0080																
WQ1-1	22B2487-01	2022-02-17	M	<0.0100	0.0027	0.0028	<0.0080	<0.0100	<0.00040	0.00169	<0.0100	<0.00020	<0.00020	3.49	0.000065	323	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ1-1	22C3145-01	2022-03-22	M	<0.0100	0.00264	0.0052	<0.0080	<0.0100	<0.00040	0.0021	0.0104	<0.00020	<0.00020	3.58	0.000088	342	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ1-1	22D2212-01	2022-04-19	M	<0.0100	0.00279	<0.0100	<0.0080	<0.0100	<0.00040	0.00173	0.0111	<0.00020	<0.00020	4.36	0.000132	335	<0.00100			<0.00020	0.00146	<0.020	<0.00040
WQ1-1	22E2480-03	2022-05-17	M	<0.0500	0.00255	<0.0500	<0.0400	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.49	<0.000100	361	<0.00500			<0.00100	<0.00400	<0.100	<0.00200
WQ1-1	22F3212-01	2022-06-21	M	<0.00200	0.00249	<0.0100	<0.0100	0.0111	<0.000500	0.00181	0.0112	<0.000100	<0.000100	4.02	0.0000719	354	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	22G1763-01	2022-07-13	M	<0.00200	0.00261	<0.0100	<0.0100	<0.0100	<0.000500	0.00170	0.0103	<0.000100	<0.000100	4.31	0.0000847	329	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	22H2453-01	2022-08-16	M	<0.00200	0.00237	<0.0100	<0.0100	0.0201	<0.000500	0.00188	0.0114	<0.000100	<0.000100	4.15	0.0000914	366	<0.00100			<0.0000500	0.00238	<0.0200	<0.000500
WQ1-1	22I1926-01	2022-09-14	M	<0.00200	0.00246	<0.0100	<0.0100	0.0140	<0.000500	0.00159	0.0120	<0.000100	<0.000100	3.86	0.0000931	347	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	22J1560-03	2022-10-12	M	<0.00200	0.00246	<0.00500	<0.0100	<0.0100	<0.000500	0.00144	0.0100	<0.000100	<0.000100	3.93	0.0000828	307	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	22K1453-01	2022-11-10	M	<0.00200	0.00289	<0.0100	<0.0100	<0.0100	<0.000500	0.00194	0.0141	<0.000100	<0.000100	4.8	0.000104	371	0.00101			0.000141	0.00132	<0.0200	0.00119
WQ1-1	22L0774-01	2022-12-07	M	<0.00200	0.00295	<0.0100	<0.0100	0.0120	<0.000500	0.00178	0.0123	<0.000100	<0.000100	4.59	0.0000890	433	<0.00100			0.0000770	<0.00100	<0.0200	<0.000500
WQ1-1	23A2847-01	2023-01-27	M	<0.00200	0.00279	<0.0100	0.0174	<0.0100	<0.000500	0.00190	0.00956	0.000146	<0.000100	4.14	0.000115	385	<0.00100			0.0000780	<0.00100	<0.0200	<0.000500
WQ1-1	23C0060-01	2023-02-28	M	<0.00200	0.00261	<0.0100	<0.0100	<0.0100	<0.000500	0.00164	0.00978	<0.000100	<0.000100	3.7	0.0000805	373	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	23C1797-01	2023-03-15	M	<0.00200	0.00250	<0.0100	<0.0100	<0.0100	<0.000500	0.00179	0.0117	<0.000100	<0.000100	3.89	0.0000657	349	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	23D2945-01	2023-04-26	M	<0.00200	0.00285	<0.0100	<0.0100	<0.0100	<0.000500	0.00179	0.0102	<0.000100	<0.000100	3.47	0.0000750	382	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	23E2392-01	2023-05-17	M	<0.00200	0.00262	<0.0100	<0.0100	0.0104	<0.000500	0.00231	0.0112	<0.000100	<0.000100	3.58	0.0000950	391	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	23F3614-01	2023-06-27	M	<0.00200	0.00275	<0.0100	<0.0100	<0.0100	<0.000500	0.00188	0.0109	<0.000100	<0.000100	4.33	0.0000916	388	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	23G2415-01	2023-07-19	M	0.00209	0.00269	<0.0100	<0.0100	<0.0100	<0.000500	0.00201	0.0103	<0.000100	<0.000100	4.5	0.0000856	404	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	23H3309-03	2023-08-24	M	<0.00200	0.00274	<0.0100	<0.0100	0.0103	<0.000500	0.00175	0.0113	<0.000100	<0.000100	4.07	0.0000860	363	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	23I2271-03	2023-09-19	M	<0.00200	0.00266	<0.0100	<0.0100	<0.0100	<0.000500	0.00186	0.00979	<0.000100	<0.000100	3.53	0.0000775	290	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	23J2236-03	2023-10-18	M	0.00206	0.00276	<0.00400	<0.0100	<0.0100	<0.000500	0.00181	0.0103	<0.000100	<0.000100	4.13	0.0000870	375	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	23K1909-01	2023-11-15	M	<0.00200	0.00264	<0.00400	<0.0100	0.0127	<0.000500	0.00160	0.0102	<0.000100	<0.000100	4.59	0.0000943	400	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	23L1905-04	2023-12-14	M	0.208	0.00297	0.00992	0.0128	<0.0100	<0.000500	0.00187	0.00935	<0.000100	<0.000100	3.79	0.0000676	333	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-1	L2754366-7	2024-01-24	M																				
WQ1-1	VA24A1422-007	2024-01-24	M	<0.0050	0.00274	0.00164	<0.0030	<0.0050	<0.0010	0.00199	0.0085	<0.00050	<0.00050	4.06	0.000063	396	<0.00050			0.000085	<0.00050	<0.010	<0.00010
WQ1-1	L2754594-4	2024-02-13	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	VA24A2858-004	2024-02-13	M	<0.0050	0.00168	0.00126	<0.0030	0.0116	<0.0010	0.00092	0.0104	<0.00050	<0.00050	2.33	0.000053	216	<0.00050	<0.00150	<0.00150	0.000112	0.00053	<0.010	<0.00010
WQ1-1	L2755033-4	2024-03-20	M																				
WQ1-1	VA24A5955-004	2024-03-20	M	<0.0050	0.00296	0.00164	<0.0030	<0.0050	<0.0010	0.00243	0.0090	<0.00050	<0.00050	3.89	0.000071	390	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ1-1	L2755461-4	2024-04-23	M																				
WQ1-1	VA24A8736-004	2024-04-23	M	<0.0050	0.00285	0.00162	<0.0030	<0.0050	<0.0010	0.00308	0.0093	<0.00050	<0.00050	4.15	0.000080	381	<0.00050	<0.00150	<0.00150	0.000051	<0.00050	<0.010	<0.00010
WQ1-1	L2755553-4	2024-04-30	M																				
WQ1-1	VA24A9418-004	2024-04-30	M	<0.0050	0.00280	0.00133	<0.0030	<0.0050	<0.0010	0.00347	0.0102	<0.00050	<0.00050	4.06	0.000082	382	<0.00050	<0.00150	<0.00150	0.000054	<0.00050	<0.010	<0.00010
WQ1-1	L2755641-4	2024-05-07	M																				
WQ1-1	VA24B0040-004	2024-05-07	M	<0.0050	0.00279	0.00156	<0.0030	<0.0050	<0.0010	0.00343	0.0094	<0.00050	<0.00050	3.95	0.000080	384	<0.00050	<0.00150	<0.00150	0.000285	<0.00050	<0.010	<0.00010
WQ1-1	L2755769-4	2024-05-14	M																				
WQ1-1	VA24B0738-004	2024-05-14	M	<0.0050	0.00278	0.00144	<0.0030	0.0060	<0.0010	0.00259	0.0094	<0.00050	<0.00050	4.03	0.000087	377	<0.00050	<0.00150	<0.00150	0.000073	<0.00050	<0.010	<0.00010
WQ1-1	L2755874-4	2024-05-21	M																				
WQ1-1	VA24B1351-004	2024-05-21	M	<0.0050	0.00285	0.00154	<0.0030	0.0051	<0.0010	0.00246	0.0101	<0.00050	<0.00050	3.82	0.000080	373	<0.00050	<0.00150	<0.00150	0.000085	<0.00050	<0.010	<0.00010
WQ1-1	L2756277-4	2024-06-18	M																				
WQ1-1	VA24B4257-004	2024-06-18	M	<0.0050	0.00313	0.00123	<0.0030	<0.0050	<0.0010	0.00228	0.0103	<0.00050	<0.00050	3.60	0.000078	374	<0.00050	<0.00150	<0.00150	0.000081	<0.00050	<0.010	<0.00010
WQ1-1	L2756678-4	2024-07-16	M																				
WQ1-1	VA24B7237-004	2024-07-16	M	<0.0050	0.00316	0.00145	<0.0030	<0.0050	<0.0010	0.00441	0.0108	<0.00050	<0.00050	3.52	0.000087	413	<0.00050	<0.00150	<0.00150	0.000056	<0.00050	<0.010	<0.00010
WQ1-1	L2757095-4	2024-08-20	M																				
WQ1-1	VA24C1101-004	2024-08-20	M	<0.0050	0.00282	0.00143	<0.0030	<0.0050	<0.0010	0.00386	0.0115	<0.00050	<0.00050	4.20	0.000074	393	<0.00050	<0.00150	<0.00150	0.000087	0.00052	<0.010	0.00014
WQ1-1	VA24C4483-004	2024-09-17	M	<0.0050	0.00286	0.00153	<0.0030	<0.0050	<0.0010	0.00498	0.0105	<0.00050	<0.00050	4.32	0.000073	376	<0.00050	<0.00150	<0.00150	0.000076	<0.00050	<0.010	<0.00010
WQ1-1	VA24C8360-004	2024-10-22	M	<0.0050	0.00286	0.00115	<0.0030	<0.0050	<0.0010	0.00601	0.0112	<0.00050	<0.00050	3.25	0.000080	349	<0.00050	<0.00150	<0.00150	0.000073	<0.00050	<0.010	<0.00010
WQ1-1	VA24C9197-004	2024-10-29	M	<0.0050	0.00267	0.00159	<0.0030	<0.0050	<0.0010	0.00159	0.0101	<0.00050	<0.00050	4.13	0.000074	388	<0.00050	<0.00150	<0.00150	0.000215	<0.00050	<0.010	<0.00010
WQ1-1	VA24D0009-004	2024-11-05	M	<0.0050	0.00272	0.00143	<0.0030	0.0063	<0.0010	0.00153	0.0112	<0.00050	<0.00050	3.01	0.000081	365	<0.00050	<0.00150		0.000211	<0.00050	<0.010	<0.00010
WQ1-1	VA24D0813-011	2024-11-13	M	<0.0050	0.00264	0.00141	0.0070	0.0069	<0.0010	0.00160	0.0118	<0.00050	<0.00050	3.43	0.000068	378	<0.00050	<0.00150	<0.00150	0.000201	<0.00050	<0.010	<0.00010
WQ1-1	VA24D1720-004	2024-11-21	M	<0.0050	0.00231	0.00176	<0.0030	0.0065	<0.0010	0.00161	0.0117	<0.00050	<0.00050	4.35	0.000058	364	<0.00050	<0.00150	<0.00150	0.000295	<0.00050	<0.010	<0.00010
WQ1-1	L2758465-4	2024-12-17	M																				
WQ1-1	VA24D3769-004	2024-12-17	M	<0.0050	0.00241	0.00160	<0.0030	<0.0050	<0.0010	0.00156	0.0094	<0.00050	<0.00050	3.69	0.000078	333	<0.00050	<0.00150	<0.00150	0.000089	<0.00050	<0.010	<0.00010
WQ1-1	L2758719-4	2025-01-21	M																				
WQ1-1	VA25A1408-004	2025-01-21	M	<0.0050	0.00269	0.00151	<0.0030	<0.0050	<0.0010	0.00152	0.0093	<0.00050	<0.00050	3.36	0.000066	358	<0.00050	<0.00150	<0.00150	0.000098	<0.00050	<0.010	<0.00010
WQ1-1	L2758994-4	2025-02-18	M																				
WQ1-1	VA25A3430-004	2025-02-18	M	<0.0050	0.00259	0.00142	<0.0030	<0.0050	<0.0010	0.00179	0.0095	<0.00050	<0.00050	3.38	0.000066	397	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ1-1	VA25A6550-004	2025-03-25	M	<0.0050	0.00310	0.00146	0.0060	0.0113	<0.0010	0.00167	0.0099	<0.00050	<0.00050	3.11	0.000070	388	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ1-1	VA25A8962-004	2025-04-22	M	<0.0050	0.00236	0.00151	<0.0030	<0.0050	<0.0010	0.00148	0.0084	<0.00050	<0.00050	3.64	0.000086	348	<0.00050	<0.00150	<0.00150	0.000062	<0.00050	<0.010	<0.00010
WQ1-1	VA25A9878-004	2025-04-30	M	<0.0050	0.00258	0.00174	<0.0030	<0.0050	<0.0010	0.00154	0.0090	<0.00050	<0.00050	3.34	0.000082	351	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ1-1	VA25B0358-004	2025-05-06	M	<0.0050	0.00240	0.00162	<0.0030	<0.0050	<0.0010	0.00164	0.0089	<0.00050	<0.00050	3.22	0.000080	348	<0.00050	<0.00150	<0.00150	0.000083	<0.00050	<0.010	<0.00010
WQ1-1	VA25B1026-004	2025-05-13	M	<0.0050	0.00266	0.00158	<0.0030	<0.0050	<0.0010	0.00165	0.0095	<0.00050	<0.00050	4.06	0.000076	383	<0.00050	<0.00150	<0.00150	0.000073	<0.00050	<0.010	<0.00010
WQ1-1	VA25B1711-004	2025-05-20	M	<0.0050	0.00256	0.00156	<0.0030	<0.0050	<0.0010	0.00143	0.0089	<0.00050	<0.00050	4.14	0.000072	359	<0.00050	<0.00150	<0.00150	0.000063	0.00050	<0.010	<0.00010
WQ1-2	0051710-02	2020-05-20	M	0.0204	0.000263	<0.0020	<0.0080																
WQ1-2	0062209-02	2020-06-22	M	0.0695	0.000203	0.0035	<0.0080																
WQ1-2	0071996-02	2020-07-21	M	0.0462	0.000214	<0.0020	0.0082																
WQ1-2	0082292-02	2020-08-24	M	<0.0100	0.00192	0.0076	<0.0080																
WQ1-2	0093017-02	2020-09-28	M	0.036	0.000661	<0.0020	<0.0080																
WQ1-2	20J1961-02	2020-10-20	M	0.0118	0.000938	0.006	<0.0080																
WQ1-2	20J2778-02	2020-10-27	M	<0.0100	0.0014	<0.0020	<0.0080																
WQ1-2	20K0360-02	2020-11-03	M	0.0109	0.00125	0.0027	<0.0080																
WQ1-2	20K1261-02	2020-11-10	M	0.0102	0.000969	<0.0020	<0.0080																
WQ1-2	20K2100-02	2020-11-18	M	0.0133	0.000612	<0.0020	<0.0080																
WQ1-2	20L1589-02	2020-12-14	M	<0.0100	0.00158	<0.0020	0.0123																
WQ1-2	21A2590-02	2021-01-27	M	<0.0100	0.00248	<0.0020	<0.0080																
WQ1-2	21B2778-02	2021-02-25	M	<0.0100	0.00239	0.0047	<0.0080																
WQ1-2	21C3505-02	2021-03-25	M	<0.00020	<0.0000010	<0.00020	<0.0010																
WQ1-2	21D2478-02	2021-04-22	M	0.0109	0.000702	0.00122	0.0026																
WQ1-2	21E1990-02	2021-05-18	M	0.0356	0.000137	<0.0010	0.0041																

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	21E2917-02	2021-05-26	M	0.0201	0.000166	0.00069	0.0022																
WQ1-2	21F0167-02	2021-06-01	M	0.0137	0.000553	0.00049	0.0016																
WQ1-2	21F1056-02	2021-06-08	M	0.0555	0.000177	0.00225	0.0028																
WQ1-2	21F2014-02	2021-06-15	M	0.0636	0.000447	0.00286	0.004																
WQ1-2	21G2414-02	2021-07-20	M	0.0233	0.000303	<0.00200	<0.0100																
WQ1-2	21H3040-02	2021-08-25	M	0.011	0.0011	0.00254	<0.0100																
WQ1-2	21I3814-02	2021-09-28	M	0.0228	0.00103	<0.00200	0.0174																
WQ1-2	21J3514-02	2021-10-26	M	0.0191	0.000336	0.0014	<0.0040																
WQ1-2	21K3046-02	2021-11-23	M	<0.0100	0.00212	<0.0020	<0.0080																
WQ1-2	21L2125-02	2021-12-14	M	<0.0100	0.00138	<0.0020	0.0131																
WQ1-2	22A2312-02	2022-01-20	M	<0.0100	0.00273	0.0037	<0.0080																
WQ1-2	22B2487-02	2022-02-17	M	<0.0100	0.00238	0.0029	<0.0080	<0.0100	<0.00040	0.00139	<0.0100	<0.00020	<0.00020	3.11	0.000074	273	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ1-2	22C3145-02	2022-03-22	M	<0.0100	0.00239	0.0043	<0.0080	<0.0100	<0.00040	0.00184	<0.0100	<0.00020	<0.00020	3.22	0.000091	307	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ1-2	22D2212-02	2022-04-19	M	<0.0100	0.00231	<0.0100	<0.0080	0.0207	<0.00040	0.00133	<0.0100	<0.00020	<0.00020	4.65	0.000078	283	<0.00100			<0.00020	0.00332	<0.020	<0.00040
WQ1-2	22E2480-04	2022-05-17	M	<0.0500	0.000391	<0.0500	<0.0400	0.0614	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	0.501	<0.000100	46.5	<0.00500			<0.00100	<0.00400	<0.100	<0.00200
WQ1-2	22F3212-02	2022-06-21	M	0.0125	0.000267	<0.0100	<0.0100	0.042	<0.000500	<0.000500	0.00684	<0.000100	<0.000100	0.414	<0.0000200	31.1	<0.00100			<0.0000500	<0.00100	0.0214	<0.000500
WQ1-2	22G1763-02	2022-07-13	M	0.0204	0.000539	<0.0100	<0.0100	0.0206	<0.000500	<0.000500	0.00946	<0.000100	<0.000100	0.902	<0.0000200	67.8	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-2	22H2453-02	2022-08-16	M	0.0253	0.000214	<0.0100	<0.0100	0.0289	<0.000500	<0.000500	0.0101	<0.000100	<0.000100	0.357	<0.0000200	32.8	<0.00100			<0.0000500	0.00165	0.0300	<0.000500
WQ1-2	22I1926-02	2022-09-14	M	0.00443	0.00168	<0.0100	<0.0100	0.0179	<0.000500	0.00107	0.0121	<0.000100	<0.000100	2.36	0.0000641	207	<0.00100			<0.0000500	0.00147	<0.0200	<0.000500
WQ1-2	22J1560-04	2022-10-12	M	0.00397	0.00189	<0.00500	<0.0100	<0.0100	<0.000500	0.00114	0.00883	<0.000100	<0.000100	3.01	0.0000620	221	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-2	22K1453-02	2022-11-10	M	0.00225	0.00269	<0.0100	<0.0100	0.0119	<0.000500	0.00137	0.0113	<0.000100	<0.000100	3.96	0.0000868	327	<0.00100			0.000141	<0.00100	<0.0200	<0.000500
WQ1-2	22L0774-02	2022-12-07	M	<0.00200	0.00249	<0.0100	<0.0100	<0.0100	<0.000500	0.00168	0.0126	<0.000100	<0.000100	4.36	0.0000785	355	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-2	23A2847-02	2023-01-27	M	<0.00200	0.00153	<0.0100	<0.0100	0.0195	<0.000500	0.00106	0.0105	0.000102	<0.000100	2.2	0.0000527	208	<0.00100			0.000109	<0.00100	<0.0200	<0.000500
WQ1-2	23C0060-02	2023-02-28	M	<0.00200	0.00247	<0.0100	<0.0100	<0.0100	<0.000500	0.00160	0.00952	<0.000100	<0.000100	3.55	0.0000846	347	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-2	23C1797-02	2023-03-15	M	<0.00200	0.00239	<0.0100	<0.0100	<0.0100	<0.000500	0.00167	0.00948	<0.000100	<0.000100	3.74	0.0000558	317	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-2	23D2945-02	2023-04-26	M	<0.00200	0.00155	<0.0100	<0.0100	0.0218	<0.000500	0.00106	0.00813	<0.000100	<0.000100	2.11	0.0000223	219	<0.00100			0.0000521	<0.00100	<0.0200	<0.000500
WQ1-2	23E2392-02	2023-05-17	M	0.0594	0.000237	0.00246	0.0037	0.0406	<0.000050	0.000191	0.0108	<0.000010	<0.000010	0.234	0.0000092	27	<0.00050			0.0000664	0.00088	0.0174	<0.000050
WQ1-2	23F3614-02	2023-06-27	M	0.0255	0.000312	<0.0100	<0.0100	0.0273	<0.000100	0.000265	0.00935	<0.000020	<0.000020	0.442	0.0000113	42.5	<0.00100			0.0000326	0.00045	<0.0040	<0.000100
WQ1-2	23G2415-02	2023-07-19	M	0.0149	0.000483	<0.0100	<0.0100	0.0171	<0.000500	<0.000500	0.0137	<0.000100	<0.000100	0.661	<0.0000200	58.1	<0.00100			0.0000525	<0.00100	<0.0200	<0.000500
WQ1-2	23H3309-04	2023-08-24	M	<0.00200	0.00216	<0.0100	<0.0100	0.0127	<0.000500	0.00157	0.0127	<0.000100	<0.000100	3.47	0.0000570	309	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-2	23I2271-04	2023-09-19	M	0.00243	0.00163	<0.0100	<0.0100	<0.0100	<0.000500	0.00113	0.0118	<0.000100	<0.000100	2.52	0.0000451	175	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-2	23J2236-04	2023-10-18	M	0.0405	0.000726	<0.00400	<0.0100	0.0612	<0.000500	0.000531	0.0123	<0.000100	<0.000100	0.931	0.0000385	86.3	<0.00500			0.0000660	0.00134	<0.0200	<0.000500
WQ1-2	23K1909-02	2023-11-15	M	<0.00200	0.00206	<0.00400	<0.0100	0.0358	<0.000500	0.00117	0.0109	<0.000100	<0.000100	3.44	0.0000652	309	<0.00500			<0.0000500	0.00114	<0.0200	<0.000500
WQ1-2	23L1905-05	2023-12-14	M	0.00245	0.00265	<0.00400	<0.0100	0.0103	<0.000500	0.00201	0.0105	<0.000100	<0.000100	3.5	0.0000866	310	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ1-2	L2754366-8	2024-01-24	M																				
WQ1-2	VA24A1422-008	2024-01-24	M	<0.0050	0.00262	0.00156	<0.0030	<0.0050	<0.0010	0.00199	0.0085	<0.00050	<0.00050	3.66	0.000069	362	<0.00050			0.000092	<0.00050	<0.010	<0.00010
WQ1-2	L2754594-5	2024-02-13	M																				
WQ1-2	VA24A2858-005	2024-02-13	M	<0.0050	0.00188	0.00135	<0.0030	0.0109	<0.0010	0.00110	0.0100	<0.00050	<0.00050	2.94	0.000058	244	<0.00050	<0.00150	<0.00150	0.000096	<0.00050	<0.010	<0.00010
WQ1-2	L2755033-5	2024-03-20	M																				
WQ1-2	VA24A5955-005	2024-03-20	M	<0.0050	0.00184	0.00130	0.0039	0.0123	<0.0010	0.00163	0.0085	<0.00050	<0.00050	2.63	0.000040	249	<0.00050	<0.00150	<0.00150	0.000059	0.00089	<0.010	<0.00010
WQ1-2	L2755461-5	2024-04-23	M																				
WQ1-2	VA24A8736-005	2024-04-23	M	<0.0050	0.00205	0.00129	<0.0030	<0.0050	<0.0010	0.00219	0.0077	<0.00050	<0.00050	3.09	0.000053	275	<0.00050	<0.00150	<0.00150	0.000056	<0.00050	<0.010	<0.00010
WQ1-2	L2755553-5	2024-04-30	M																				
WQ1-2	VA24A9418-005	2024-04-30	M	<0.0050	0.000962	0.00077	<0.0030	0.0324	<0.0010	0.00137	0.0064	<0.00050	<0.00050	1.44	0.000022	123	<0.00050	<0.00150	<0.00150	0.000060	0.00067	0.020	<0.00010
WQ1-2	L2755641-5	2024-05-07	M																				
WQ1-2	VA24B0040-005	2024-05-07	M	<0.0050	0.00200	0.00114	<0.0030	0.0099	<0.0010	0.00230	0.0061	<0.00050	<0.00050	2.72	0.000047	255	<0.00050	<0.00150	<0.00150	0.000311	<0.00050	<0.010	<0.00010
WQ1-2	L2755769-5	2024-05-14	M																				
WQ1-2	VA24B0738-005	2024-05-14	M	0.0256	0.000726	0.00142	<0.0030	0.239	<0.0010	0.00118	0.0106	<0.00050	<0.00050	1.09	<0.000020	96.9	<0.00050	<0.00150	<0.00150	0.000160	0.00116	0.235	<0.00010
WQ1-2	L2755874-5	2024-05-21	M																				
WQ1-2	VA24B1351-005	2024-05-21	M	<0.0050	0.00190	0.00118	<0.0030	0.0203	<0.0010	0.00181	0.0068	<0.00050	<0.00050	2.73	0.000045	260	<0.00050	<0.00150	<0.00150	0.000085	0.00057	<0.010	<0.00010
WQ1-2	L2756277-5	2024-06-18	M																				
WQ1-2	VA24B4257-005	2024-06-18	M	<0.0050	0.00157	0.00086	<0.0030	0.0190	<0.0010	0.00261	0.0056	<0.00050	<0.00050	2.19	0.000039	180	<0.00050	<0.00150	<0.00150	0.000052	0.00060	<0.010	<0.00010
WQ1-2	L2756678-5	2024-07-16	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	VA24B7237-005	2024-07-16	M	0.0536	0.000933	0.00225	<0.0030	0.0182	<0.0010	0.00206	0.0111	<0.00050	<0.00050	1.05	0.000025	110	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ1-2	L2757095-5	2024-08-20	M																				
WQ1-2	VA24C1101-005	2024-08-20	M	0.0272	0.000768	0.00148	<0.0030	0.0114	<0.0010	0.00087	0.0132	<0.00050	<0.00050	1.12	<0.000020	96.9	<0.00050	<0.00150	<0.00150	0.000053	<0.00050	<0.010	<0.00010
WQ1-2	VA24C4483-005	2024-09-17	M	0.0120	0.00125	0.00118	<0.0030	0.0117	<0.0010	0.00212	0.0111	<0.00050	<0.00050	1.57	0.000035	164	<0.00050	<0.00150	<0.00150	0.000070	<0.00050	<0.010	<0.00010
WQ1-2	VA24C8360-005	2024-10-22	M	<0.0050	0.00222	0.00106	<0.0030	0.0225	<0.0010	0.00541	0.0136	<0.00050	<0.00050	2.68	0.000071	281	<0.00050	<0.00150	<0.00150	0.000069	<0.00050	<0.010	<0.00010
WQ1-2	VA24C9197-005	2024-10-29	M	<0.0050	0.00167	0.00112	<0.0030	0.0263	<0.0010	0.00105	0.0106	<0.00050	<0.00050	2.30	0.000052	227	<0.00050	<0.00150	<0.00150	0.000162	<0.00050	0.010	<0.00010
WQ1-2	VA24D0009-005	2024-11-05	M	<0.0050	0.00217	0.00134	<0.0030	0.0098	<0.0010	0.00134	0.0110	<0.00050	<0.00050	2.40	0.000059	292	<0.00050	<0.00150		0.000156	<0.00050	<0.010	<0.00010
WQ1-2	VA24D0813-013	2024-11-13	M	0.0071	0.00115	0.00108	<0.0030	0.0415	<0.0010	0.00080	0.0098	<0.00050	<0.00050	1.41	0.000032	151	<0.00050	<0.00150	<0.00150	0.000106	0.00078	0.025	<0.00010
WQ1-2	VA24D1720-005	2024-11-21	M	<0.0050	0.00198	0.00155	<0.0030	0.0109	<0.0010	0.00151	0.0111	<0.00050	<0.00050	3.65	0.000061	308	<0.00050	<0.00150	<0.00150	0.000239	0.00050	<0.010	<0.00010
WQ1-2	L2758465-5	2024-12-17	M																				
WQ1-2	VA24D3769-005	2024-12-17	M	<0.0050	0.00210	0.00137	0.0037	0.0053	<0.0010	0.00140	0.0090	<0.00050	<0.00050	3.32	0.000066	277	<0.00050	<0.00150	<0.00150	0.000078	0.00060	<0.010	<0.00010
WQ1-2	L2758719-5	2025-01-21	M																				
WQ1-2	VA25A1408-005	2025-01-21	M	<0.0050	0.00206	0.00135	<0.0030	<0.0050	<0.0010	0.00110	0.0102	<0.00050	<0.00050	2.51	0.000060	272	<0.00050	<0.00150	<0.00150	0.000113	<0.00050	<0.010	<0.00010
WQ1-2	L2758994-5	2025-02-18	M																				
WQ1-2	VA25A3430-005	2025-02-18	M	<0.0050	0.00214	0.00124	<0.0030	<0.0050	<0.0010	0.00133	0.0104	<0.00050	<0.00050	2.86	0.000059	326	<0.00050	<0.00150	<0.00150	0.000064	<0.00050	<0.010	<0.00010
WQ1-2	VA25A6550-005	2025-03-25	M	<0.0050	0.00265	0.00131	<0.0030	<0.0050	<0.0010	0.00135	0.0078	<0.00050	<0.00050	2.74	0.000051	328	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ1-2	VA25A8962-005	2025-04-22	M	<0.0050	0.00128	0.00066	<0.0030	0.0135	<0.0010	0.00078	0.0076	<0.00050	<0.00050	2.14	0.000033	183	<0.00050	<0.00150	<0.00150	0.000063	0.00057	0.012	<0.00010
WQ1-2	VA25A9878-005	2025-04-30	M	0.0099	0.000490	0.00078	<0.0030	0.0372	<0.0010	<0.00040	0.0073	<0.00050	<0.00050	0.69	<0.000020	61.8	<0.00050	<0.00150	<0.00150	0.000056	0.00068	0.025	<0.00010
WQ1-2	VA25B0358-005	2025-05-06	M	<0.0050	0.00195	0.00105	0.0043	0.0052	<0.0010	0.00122	0.0087	<0.00050	<0.00050	2.65	0.000048	280	<0.00050	<0.00150	<0.00150	0.000074	0.00052	<0.010	<0.00010
WQ1-2	VA25B1026-005	2025-05-13	M	<0.0050	0.00141	0.00082	<0.0030	0.0198	<0.0010	0.00080	0.0083	<0.00050	<0.00050	2.23	0.000042	194	<0.00050	<0.00150	<0.00150	0.000073	0.00059	<0.010	<0.00010
WQ1-2	VA25B1711-005	2025-05-20	M	0.0082	0.000457	0.00069	<0.0030	0.0293	<0.0010	<0.00040	0.0065	<0.00050	<0.00050	0.60	<0.000020	53.9	<0.00050	<0.00150	<0.00150	<0.000050	0.00075	0.022	<0.00010
WQ1-3	23L1905-06	2023-12-14	M	0.00251	0.00179	<0.00400	<0.0100	0.0185	<0.000500	0.00127	0.0113	<0.000100	<0.000100	2.58	0.0000658	224	<0.00500			0.0000872	<0.00100	0.0202	<0.000500
WQ1-3	L2754366-9	2024-01-24	M																				
WQ1-3	VA24A1422-009	2024-01-24	M	<0.0050	0.00139	0.00114	<0.0030	0.0200	<0.0010	0.00108	0.0087	<0.00050	<0.00050	2.00	0.000029	191	<0.00050			0.000090	<0.00050	0.035	<0.00010
WQ1-3	L2754594-6	2024-02-13	M																				
WQ1-3	VA24A2858-006	2024-02-13	M	<0.0050	0.00151	0.00113	<0.0030	0.0136	<0.0010	0.00084	0.0103	<0.00050	<0.00050	2.00	0.000044	190	<0.00050	<0.00150	<0.00150	0.000113	0.00059	<0.010	<0.00010
WQ1-3	L2755033-6	2024-03-20	M																				
WQ1-3	VA24A5955-006	2024-03-20	M	0.0057	0.00122	0.00111	<0.0030	0.0240	<0.0010	0.00120	0.0086	<0.00050	<0.00050	1.61	0.000032	148	<0.00050	<0.00150	<0.00150	0.000074	0.00052	0.020	<0.00010
WQ1-3	L2755461-6	2024-04-23	M																				
WQ1-3	VA24A8736-006	2024-04-23	M	<0.0050	0.00188	0.00122	<0.0030	0.0060	<0.0010	0.00201	0.0071	<0.00050	<0.00050	2.71	0.000044	237	<0.00050	<0.00150	<0.00150	0.000053	<0.00050	<0.010	<0.00010
WQ1-3	L2755553-6	2024-04-30	M																				
WQ1-3	VA24A9418-006	2024-04-30	M	<0.0050	0.00157	0.00087	<0.0030	0.0198	<0.0010	0.00216	0.0054	<0.00050	<0.00050	2.36	0.000034	215	<0.00050	<0.00150	<0.00150	0.000056	0.00054	0.011	<0.00010
WQ1-3	L2755641-6	2024-05-07	M																				
WQ1-3	VA24B0040-006	2024-05-07	M	0.0085	0.00118	0.00110	<0.0030	0.0232	<0.0010	0.00162	0.0067	<0.00050	<0.00050	1.81	0.000031	148	<0.00050	<0.00150	<0.00150	0.000266	0.00065	<0.010	<0.00010
WQ1-3	L2755769-6	2024-05-14	M																				
WQ1-3	VA24B0738-006	2024-05-14	M	0.0255	0.000314	0.00118	<0.0030	0.128	<0.0010	0.00079	0.0074	<0.00050	<0.00050	0.38	<0.000020	30.8	<0.00050	<0.00150	<0.00150	0.000094	0.00070	0.106	<0.00010
WQ1-3	L2755874-6	2024-05-21	M																				
WQ1-3	VA24B1351-006	2024-05-21	M	0.0237	0.000273	0.00123	<0.0030	0.0287	<0.0010	0.00065	0.0086	<0.00050	<0.00050	0.31	<0.000020	28.7	<0.00050	<0.00150	<0.00150	0.000057	<0.00050	0.020	<0.00010
WQ1-3	L2756277-6	2024-06-18	M																				
WQ1-3	VA24B4257-006	2024-06-18	M	0.0236	0.000178	0.00135	<0.0030	0.0242	<0.0010	<0.00040	0.0086	<0.00050	<0.00050	0.38	<0.000020	20.8	<0.00050	<0.00150	<0.00150	0.000064	0.00054	0.026	<0.00010
WQ1-3	L2756678-6	2024-07-16	M																				
WQ1-3	VA24B7237-006	2024-07-16	M	0.0537	0.000274	0.00211	0.0033	0.0185	<0.0010	0.00042	0.0110	<0.00050	<0.00050	0.36	<0.000020	36.4	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ1-3	L2757095-6	2024-08-20	M																				
WQ1-3	VA24C1101-006	2024-08-20	M	0.0253	0.000574	0.00121	<0.0030	0.0131	<0.0010	0.00075	0.0133	<0.00050	<0.00050	0.87	<0.000020	73.7	<0.00050	<0.00150	<0.00150	0.000050	<0.00050	<0.010	<0.00010
WQ1-3	VA24C4483-006	2024-09-17	M	0.0136	0.000936	0.00111	<0.0030	0.0112	<0.0010	0.00165	0.0115	<0.00050	<0.00050	1.22	0.000031	131	<0.00050	<0.00150	<0.00150	0.000068	<0.00050	<0.010	<0.00010
WQ1-3	VA24C8360-006	2024-10-22	M	0.0531	0.000557	0.00213	0.0036	0.0418	<0.0010	0.00098	0.0163	<0.00050	<0.00050	0.56	0.000020	56.3	<0.00050	<0.00150	<0.00150	0.000086	0.00076	0.022	<0.00010
WQ1-3	VA24C9197-006	2024-10-29	M	0.0139	0.000369	0.00103	0.0064	0.0668	<0.0010	<0.00040	0.0079	<0.00050	<0.00050	0.51	<0.000020	41.1	<0.00050	<0.00150	<0.00150	0.000087	0.00075	0.038	<0.00010
WQ1-3	VA24D0009-006	2024-11-05	M	<0.0050	0.00107	0.00096	<0.0030	0.0306	<0.0010	0.00065	0.0100	<0.00050	<0.00050	1.18	0.000030	135	<0.00050	<0.00150		0.000121	0.00070	0.026	<0.00010
WQ1-3	VA24D0813-014	2024-11-13	M	0.0133	0.000673	0.00110	0.0036	0.0700	<0.0010	0.00041	0.0084	<0.00050	<0.00050	0.80	0.000024	79.5	<0.00050	<0.00150	<0.00150	0.000076	0.00082	0.039	<0.00010
WQ1-3	VA24D1720-006	2024-11-21	M	<0.0050	0.00138	0.00116	<0.0030	0.0235	<0.0010	0.00085	0.0113	<0.00050	<0.00050	2.25	0.000038	188	<0.00050	<0.00150	<0.00150	0.000201	0.00058	0.029	<0.00010
WQ1-3	L2758465-6	2024-12-17	M																				
WQ1-3	VA24D3769-006	2024-12-17	M	<0.0050	0.00198	0.00139	0.0039	0.0068	<0.0010	0.00148	0.0092	<0.00050	<0.00050	3.16	0.000071	266	<0.00050	<0.00150	<0.00150	0.000085	0.00154	<0.010	<0.00010
WQ1-3	L2758719-6	2025-01-21	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-3	VA25A1408-006	2025-01-21	M	<0.0050	0.00192	0.00123	<0.0030	<0.0055	<0.0010	0.00094	0.0102	<0.00050	<0.00050	2.33	0.000056	245	<0.00050	<0.00150	<0.00150	0.000120	<0.00050	<0.010	<0.00010
WQ1-3	L2758994-6	2025-02-18	M																				
WQ1-3	VA25A3430-006	2025-02-18	M	<0.0050	0.00204	0.00129	<0.0030	<0.0050	<0.0010	0.00128	0.0105	<0.00050	<0.00050	2.75	0.000062	315	<0.00050	<0.00150	<0.00150	0.000073	0.00052	<0.010	<0.00010
WQ1-3	VA25A6550-006	2025-03-25	M	<0.0050	0.00151	0.00091	<0.0030	0.0220	<0.0010	0.00077	0.0079	<0.00050	<0.00050	1.60	0.000035	180	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	0.022	<0.00010
WQ1-3	VA25A8962-006	2025-04-22	M	<0.0050	0.000654	0.00061	<0.0030	0.0244	<0.0010	0.00042	0.0073	<0.00050	<0.00050	0.99	0.000023	90.6	<0.00050	<0.00150	<0.00150	0.000066	0.00064	0.031	<0.00010
WQ1-3	VA25A9878-006	2025-04-30	M	0.0092	0.000467	0.00081	<0.0030	0.0386	<0.0010	<0.00040	0.0072	<0.00050	<0.00050	0.56	<0.000020	50.8	<0.00050	<0.00150	<0.00150	0.000063	0.00067	0.030	<0.00010
WQ1-3	VA25B0358-006	2025-05-06	M	0.0102	0.000619	0.00094	<0.0030	0.0244	<0.0010	<0.00040	0.0076	<0.00050	<0.00050	0.90	<0.000020	73.7	<0.00050	<0.00150	<0.00150	0.000061	0.00062	0.020	<0.00010
WQ1-3	VA25B1026-006	2025-05-13	M	<0.0050	0.000742	0.00077	<0.0030	0.0290	<0.0010	0.00041	0.0080	<0.00050	<0.00050	1.11	0.000032	93.0	<0.00050	<0.00150	<0.00150	0.000067	0.00064	0.024	<0.00010
WQ1-3	VA25B1711-006	2025-05-20	M	0.0114	0.000202	0.00072	<0.0030	0.0265	<0.0010	<0.00040	0.0068	<0.00050	<0.00050	<0.30	<0.000020	22.7	<0.00050	<0.00150	<0.00150	<0.000050	0.00068	0.037	<0.00010
WQ2-1	0051710-03	2020-05-20	M	<0.0100	0.00282	0.0026	<0.0080																
WQ2-1	0062209-03	2020-06-22	M	<0.0100	0.00291	0.0028	<0.0080																
WQ2-1	0071996-03	2020-07-21	M	<0.0100	0.00266	<0.0020	<0.0080																
WQ2-1	0082292-03	2020-08-24	M	<0.0100	0.00331	0.006	<0.0080																
WQ2-1	0093017-03	2020-09-28	M	<0.0100	0.00295	<0.0020	0.0143																
WQ2-1	20J1961-03	2020-10-20	M	<0.0100	0.00301	0.0073	<0.0080																
WQ2-1	20J2778-03	2020-10-27	M	<0.0100	0.00293	0.0026	<0.0080																
WQ2-1	20K0360-03	2020-11-03	M	<0.0100	0.00284	0.0034	<0.0080																
WQ2-1	20K1261-03	2020-11-10	M	<0.0100	0.00307	<0.0020	<0.0080																
WQ2-1	20K2100-03	2020-11-18	M	<0.0100	0.00288	0.002	<0.0080																
WQ2-1	20L1589-03	2020-12-14	M	<0.0100	0.00301	0.0023	<0.0080																
WQ2-1	21A2590-03	2021-01-27	M	<0.0100	0.00293	<0.0020	<0.0080																
WQ2-1	21B2778-03	2021-02-25	M	<0.0100	0.00317	0.0054	0.0119																
WQ2-1	21C3505-03	2021-03-25	M	0.00234	0.00304	<0.00200	<0.0100																
WQ2-1	21D2478-03	2021-04-22	M	<0.00200	0.00305	<0.00200	<0.0100																
WQ2-1	21E1990-03	2021-05-18	M	<0.0100	0.00309	0.0025	<0.0080																
WQ2-1	21E2917-03	2021-05-26	M	0.00982	0.00262	0.00381	<0.0100																
WQ2-1	21F0167-03	2021-06-01	M	0.00201	0.00293	0.0024	<0.0100																
WQ2-1	21F1056-03	2021-06-08	M	<0.00200	0.00285	0.00247	<0.0100																
WQ2-1	21F2014-03	2021-06-15	M	<0.00200	0.0029	<0.00200	<0.0100																
WQ2-1	21G2414-03	2021-07-20	M	0.00264	0.00261	<0.00200	<0.0100																
WQ2-1	21H3040-03	2021-08-25	M	<0.00200	0.00269	0.0031	<0.0100																
WQ2-1	21I3814-03	2021-09-28	M	0.00546	0.00273	<0.00200	<0.0100																
WQ2-1	21J3514-03	2021-10-26	M	<0.0050	0.00231	0.0015	<0.0040																
WQ2-1	21K3046-03	2021-11-23	M	<0.0100	0.00267	<0.0020	<0.0080																
WQ2-1	21L2125-03	2021-12-14	M	<0.0100	0.00271	<0.0020	<0.0080																
WQ2-1	22A2312-03	2022-01-20	M	<0.0100	0.00288	0.0039	<0.0080																
WQ2-1	22B2487-03	2022-02-17	M	<0.0100	0.00267	<0.0020	<0.0080	<0.0100	<0.00040	0.00149	<0.0100	<0.00020	<0.00020	3.71	0.000072	327	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ2-1	22C3145-03	2022-03-22	M	<0.0100	0.00211	0.006	0.0278	<0.0100	<0.00040	0.00207	0.0108	<0.00020	<0.00020	3.7	0.000054	340	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ2-1	22D2212-03	2022-04-19	M	<0.0100	0.00272	<0.0100	<0.0080	0.0111	<0.00040	0.00167	0.0123	<0.00020	<0.00020	5.83	0.000118	339	<0.00100			<0.00020	0.0035	<0.020	<0.00040
WQ2-1	22E2480-05	2022-05-17	M	<0.0500	0.00244	<0.0500	<0.0400	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.56	<0.000100	364	<0.00500			<0.00100	<0.00400	<0.100	<0.00200
WQ2-1	22F3212-03	2022-06-21	M	<0.00200	0.00256	<0.0100	<0.0100	0.0127	<0.000500	0.0019	0.0116	<0.000100	<0.000100	4.06	0.0000755	357	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	22G1763-03	2022-07-13	M	<0.00200	0.00252	<0.0100	<0.0100	<0.0100	<0.000500	0.00164	0.0109	<0.000100	<0.000100	4.25	0.0000754	330	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	22H2453-03	2022-08-16	M	<0.00200	0.00227	<0.0100	<0.0100	0.0176	<0.000500	0.00162	0.0113	<0.000100	<0.000100	4.05	0.0000697	366	<0.00100			<0.0000500	0.00218	<0.0200	<0.000500
WQ2-1	22I1926-03	2022-09-14	M	<0.00200	0.00255	<0.0100	<0.0100	0.0125	<0.000500	0.00167	0.0101	<0.000100	<0.000100	3.93	0.0000561	347	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	22J1560-05	2022-10-12	M	<0.00200	0.00264	<0.00500	<0.0100	<0.0100	<0.000500	0.00152	0.00972	<0.000100	<0.000100	4.08	0.0000706	313	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	22K1453-03	2022-11-10	M	<0.00200	0.00312	<0.0100	<0.0100	0.0106	<0.000500	0.00176	0.0125	<0.000100	<0.000100	4.91	0.0000769	368	<0.00100			0.000102	<0.00100	<0.0200	<0.000500
WQ2-1	22L0774-03	2022-12-07	M	<0.00200	0.00266	<0.0100	<0.0100	<0.0100	<0.000500	0.00212	0.0130	<0.000100	<0.000100	4.91	0.0000683	385	<0.00100			0.0000661	<0.00100	<0.0200	<0.000500
WQ2-1	23A2847-03	2023-01-27	M	0.00410	0.00280	<0.0100	<0.0100	<0.0100	<0.000500	0.00190	0.00938	0.000138	<0.000100	4.3	0.000105	392	<0.00100			0.0000700	<0.00100	<0.0200	<0.000500
WQ2-1	23C0060-03	2023-02-28	M	<0.00200	0.00282	<0.0100	<0.0100	<0.0100	<0.000500	0.00171	0.00905	<0.000100	<0.000100	3.81	0.0000658	383	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	23C1797-03	2023-03-15	M	<0.00200	0.00250	<0.0100	<0.0100	<0.0100	<0.000500	0.00176	0.00963	<0.000100	<0.000100	3.93	0.0000624	339	<0.00100			<0.0000500	<0.00100	<0.0200	0.000847
WQ2-1	23D2945-03	2023-04-26	M	<0.00200	0.00299	<0.0100	<0.0100	<0.0100	<0.000500	0.00180	0.0101	<0.000100	<0.000100	3.59	0.0000749	382	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	23E2392-03	2023-05-17	M	<0.00200	0.00253	<0.0100	<0.0100	<0.0100	<0.000500	0.00219	0.0116	<0.000100	0.000113	3.65	0.0000888	409	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	23F3614-03	2023-06-27	M	<0.00400	0.00279	<0.0200	<0.0200	0.0103	<0.000500	0.00166	0.0114	<0.000100	<0.000100	4.38	0.0000763	397	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-1	23G2415-03	2023-07-19	M	<0.00200	0.00274	<0.0100	<0.0100	<0.0100	<0.000500	0.00198	0.0106	<0.000100	<0.000100	4.45	0.0000762	397	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	23H3309-05	2023-08-24	M	<0.00200	0.00269	<0.0100	<0.0100	<0.0100	<0.000500	0.00204	0.0106	<0.000100	<0.000100	4.15	0.0000903	363	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	23I2271-05	2023-09-19	M	0.00241	0.00261	<0.0100	<0.0100	0.0133	<0.000500	0.00169	0.0112	<0.000100	<0.000100	4.01	0.000100	277	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	23J2236-05	2023-10-18	M	0.0220	0.00273	<0.00400	<0.0100	<0.0100	<0.000500	0.00192	0.0106	<0.000100	<0.000100	4.15	0.0000781	384	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	23K1909-03	2023-11-15	M	<0.00200	0.00298	<0.00400	<0.0100	0.0115	<0.000500	0.00154	0.0103	<0.000100	<0.000100	4.66	0.0000614	403	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	23L1905-07	2023-12-14	M	<0.00200	0.00273	<0.00400	<0.0100	<0.0100	<0.000500	0.00241	0.00975	<0.000100	<0.000100	4.05	0.0000935	341	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-1	L2754383-1	2024-01-25	M																				
WQ2-1	VA24A1507-001	2024-01-25	M	<0.0050	0.00278	0.00163	<0.0030	<0.0050	<0.0010	0.00195	0.0085	<0.00050	<0.00050	3.97	0.000080	391	<0.00050			0.000089	0.00070	<0.010	<0.00010
WQ2-1	L2754594-7	2024-02-13	M																				
WQ2-1	VA24A2858-007	2024-02-13	M	<0.0050	0.00251	0.00163	<0.0030	0.0065	<0.0010	0.00150	0.0089	<0.00050	<0.00050	4.08	0.000070	357	<0.00050	<0.00150	<0.00150	0.000069	<0.00050	<0.010	<0.00010
WQ2-1	L2755033-7	2024-03-20	M																				
WQ2-1	VA24A5955-007	2024-03-20	M	<0.0050	0.00300	0.00167	<0.0030	<0.0050	<0.0010	0.00266	0.0093	<0.00050	<0.00050	3.90	0.000074	391	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ2-1	L2755461-7	2024-04-23	M																				
WQ2-1	VA24A8736-007	2024-04-23	M	<0.0050	0.00298	0.00170	<0.0030	<0.0050	<0.0010	0.00320	0.0094	<0.00050	<0.00050	4.12	0.000070	382	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ2-1	L2755553-7	2024-04-30	M																				
WQ2-1	VA24A9418-007	2024-04-30	M	<0.0050	0.00221	0.00098	<0.0030	0.0061	<0.0010	0.00290	0.0046	<0.00050	<0.00050	3.26	0.000045	306	<0.00050	<0.00150	<0.00150	0.000055	<0.00050	<0.010	<0.00010
WQ2-1	L2755641-7	2024-05-07	M																				
WQ2-1	VA24B0040-007	2024-05-07	M	<0.0050	0.00280	0.00155	<0.0030	<0.0050	<0.0010	0.00335	0.0102	<0.00050	<0.00050	3.82	0.000080	368	<0.00050	<0.00150	<0.00150	0.000077	<0.00050	<0.010	<0.00010
WQ2-1	L2755769-7	2024-05-14	M																				
WQ2-1	VA24B0738-007	2024-05-14	M	<0.0050	0.00279	0.00148	<0.0030	<0.0050	<0.0010	0.00278	0.0093	<0.00050	<0.00050	3.95	0.000078	380	<0.00050	<0.00150	<0.00150	0.000065	<0.00050	<0.010	<0.00010
WQ2-1	L2755874-7	2024-05-21	M																				
WQ2-1	VA24B1351-007	2024-05-21	M	<0.0050	0.00255	0.00151	<0.0030	<0.0050	<0.0010	0.00248	0.0102	<0.00050	<0.00050	3.79	0.000080	363	<0.00050	<0.00150	<0.00150	0.000083	<0.00050	<0.010	<0.00010
WQ2-1	L2756277-7	2024-06-18	M																				
WQ2-1	VA24B4257-007	2024-06-18	M	<0.0050	0.00300	0.00127	<0.0030	<0.0050	<0.0010	0.00255	0.0103	<0.00050	<0.00050	3.70	0.000083	389	<0.00050	<0.00150	<0.00150	0.000068	<0.00050	<0.010	<0.00010
WQ2-1	L2756678-7	2024-07-16	M																				
WQ2-1	VA24B7237-007	2024-07-16	M	<0.0050	0.00299	0.00138	<0.0030	<0.0050	<0.0010	0.00419	0.0102	<0.00050	<0.00050	3.26	0.000077	379	<0.00050	<0.00150	<0.00150	0.000051	<0.00050	<0.010	<0.00010
WQ2-1	L2757095-7	2024-08-20	M																				
WQ2-1	VA24C1101-007	2024-08-20	M	<0.0050	0.00257	0.00123	<0.0030	<0.0050	<0.0010	0.00398	0.0111	<0.00050	<0.00050	4.07	0.000078	386	<0.00050	<0.00150	<0.00150	0.000080	<0.00050	<0.010	<0.00010
WQ2-1	VA24C4483-007	2024-09-17	M	<0.0050	0.00326	0.00140	<0.0030	<0.0050	<0.0010	0.00449	0.0106	<0.00050	<0.00050	4.02	0.000081	401	<0.00050	<0.00150	<0.00150	0.000083	<0.00050	<0.010	<0.00010
WQ2-1	VA24C8360-007	2024-10-22	M	<0.0050	0.00287	0.00153	<0.0030	<0.0050	<0.0010	0.00631	0.0110	<0.00050	<0.00050	3.25	0.000088	363	<0.00050	<0.00150	<0.00150	0.000079	<0.00050	<0.010	<0.00010
WQ2-1	VA24C9197-007	2024-10-29	M	<0.0050	0.00282	0.00175	<0.0030	<0.0050	<0.0010	0.00163	0.0106	<0.00050	<0.00050	4.10	0.000080	401	<0.00050	<0.00150	<0.00150	0.000245	<0.00050	<0.010	<0.00010
WQ2-1	VA24D0009-007	2024-11-05	M	<0.0050	0.00272	0.00153	<0.0030	0.0064	<0.0010	0.00152	0.0115	<0.00050	<0.00050	2.93	0.000072	359	<0.00050	<0.00150		0.000208	<0.00050	<0.010	<0.00010
WQ2-1	L2758095-4	2024-11-12	M																				
WQ2-1	VA24D0632-004	2024-11-12	M	<0.0050	0.00268	0.00151	0.0057	0.0077	<0.0010	0.00149	0.0115	<0.00050	<0.00050	3.46	0.000076	376	<0.00050	<0.00150	<0.00150	0.000199	0.00066	<0.010	<0.00010
WQ2-1	VA24D1720-007	2024-11-21	M	<0.0050	0.00236	0.00179	<0.0030	0.0063	<0.0010	0.00159	0.0120	<0.00050	<0.00050	4.32	0.000086	364	<0.00050	<0.00150	<0.00150	0.000320	0.00050	<0.010	<0.00010
WQ2-1	L2758465-7	2024-12-17	M																				
WQ2-1	VA24D3769-007	2024-12-17	M	<0.0050	0.00228	0.00147	<0.0030	<0.0050	<0.0010	0.00164	0.0093	<0.00050	<0.00050	3.78	0.000064	318	<0.00050	<0.00150	<0.00150	0.000086	<0.00050	<0.010	<0.00010
WQ2-1	L2758719-7	2025-01-21	M																				
WQ2-1	VA25A1408-007	2025-01-21	M	<0.0050	0.00270	0.00151	<0.0030	<0.0050	<0.0010	0.00150	0.0094	<0.00050	<0.00050	3.28	0.000072	365	<0.00050	<0.00150	<0.00150	0.000101	<0.00050	<0.010	<0.00010
WQ2-1	L2758994-7	2025-02-18	M																				
WQ2-1	VA25A3430-007	2025-02-18	M	<0.0050	0.00248	0.00150	<0.0030	<0.0050	<0.0010	0.00167	0.0093	<0.00050	<0.00050	3.00	0.000075	383	<0.00050	<0.00150	<0.00150	0.000060	<0.00050	<0.010	<0.00010
WQ2-1	VA25A6550-007	2025-03-25	M	<0.0050	0.00292	0.00146	<0.0030	<0.0050	<0.0010	0.00170	0.0099	<0.00050	<0.00050	2.99	0.000077	377	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ2-1	VA25A8962-007	2025-04-22	M	<0.0050	0.00241	0.00152	<0.0030	<0.0050	<0.0010	0.00156	0.0088	<0.00050	<0.00050	3.79	0.000073	363	<0.00050	<0.00150	<0.00150	0.000060	<0.00050	<0.010	<0.00010
WQ2-1	VA25A9878-007	2025-04-30	M	<0.0050	0.00250	0.00166	<0.0030	<0.0050	<0.0010	0.00149	0.0092	<0.00050	<0.00050	3.13	0.000068	337	<0.00050	<0.00150	<0.00150	0.000054	<0.00050	<0.010	<0.00010
WQ2-1	VA25B0358-007	2025-05-06	M	<0.0050	0.00244	0.00160	<0.0030	<0.0050	<0.0010	0.00145	0.0090	<0.00050	<0.00050	3.49	0.000084	352	<0.00050	<0.00150	<0.00150	0.000067	<0.00050	<0.010	<0.00010
WQ2-1	VA25B1026-007	2025-05-13	M	<0.0050	0.00252	0.00153	<0.0030	<0.0050	<0.0010	0.00167	0.0097	<0.00050	<0.00050	3.95	0.000066	383	<0.00050	<0.00150	<0.00150	0.000069	<0.00050	<0.010	<0.00010
WQ2-1	VA25B1711-007	2025-05-20	M	<0.0050	0.00250	0.00160	<0.0030	<0.0050	<0.0010	0.00134	0.0090	<0.00050	<0.00050	3.89	0.000068	343	<0.00050	<0.00150	<0.00150	0.000078	<0.00050	<0.010	<0.00010
WQ2-2	0051710-04	2020-05-20	M	0.0217	0.000173	<0.0020	<0.0080																
WQ2-2	0062209-04	2020-06-22	M	0.0627	0.00021	0.0022	<0.0080																
WQ2-2	0071996-04	2020-07-21	M	0.0394	0.000209	<0.0020	<0.0080																
WQ2-2	0082292-04	2020-08-24	M	<0.0100	0.00152	0.0083	<0.0080																
WQ2-2	0093017-04	2020-09-28	M	0.0201	0.000877	<0.0020	0.0082																
WQ2-2	20J1961-04	2020-10-20	M	0.0119	0.000993	0.0063	<0.0080																

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	20J2778-04	2020-10-27	M	<0.0100	0.00136	0.0027	<0.0080																
WQ2-2	20K0360-04	2020-11-03	M	0.0142	0.00103	0.0026	0.0108																
WQ2-2	20K1261-04	2020-11-10	M	0.0101	0.00106	<0.0020	<0.0080																
WQ2-2	20K2100-04	2020-11-18	M	0.0125	0.000574	<0.0020	<0.0080																
WQ2-2	20L1589-04	2020-12-14	M	<0.0100	0.00152	<0.0020	<0.0080																
WQ2-2	21A2590-04	2021-01-27	M	<0.0100	0.0027	0.0021	<0.0080																
WQ2-2	21B2778-04	2021-02-25	M	<0.0100	0.00253	0.004	<0.0080																
WQ2-2	21C3505-04	2021-03-25	M	<0.00200	0.0011	<0.00200	<0.0100																
WQ2-2	21D2478-04	2021-04-22	M	0.0118	0.000872	0.00141	0.0017																
WQ2-2	21E1990-04	2021-05-18	M	0.0342	0.000121	0.0025	<0.0040																
WQ2-2	21E2917-04	2021-05-26	M	0.0241	0.000186	0.00048	0.0019																
WQ2-2	21F0167-04	2021-06-01	M	0.0102	0.00108	0.00062	0.001																
WQ2-2	21F1056-04	2021-06-08	M	0.0467	0.0002	0.00228	0.0033																
WQ2-2	21F2014-04	2021-06-15	M	0.0502	0.000455	0.00224	0.0029																
WQ2-2	21G2414-04	2021-07-20	M	0.0213	0.000297	<0.00200	<0.0100																
WQ2-2	21H3040-04	2021-08-25	M	0.0206	0.000567	<0.00200	<0.0100																
WQ2-2	21I3814-04	2021-09-28	M	0.00556	0.00135	<0.00200	<0.0100																
WQ2-2	21J3514-04	2021-10-26	M	0.0149	0.000354	0.0012	<0.0040																
WQ2-2	21K3046-04	2021-11-23	M	<0.0100	0.00204	<0.0020	<0.0080																
WQ2-2	21L2125-04	2021-12-14	M	<0.0100	0.00151	<0.0020	<0.0080																
WQ2-2	22A2312-04	2022-01-20	M	<0.0100	0.00262	0.0034	<0.0080																
WQ2-2	22B2487-04	2022-02-17	M	<0.0100	0.00233	<0.0020	<0.0080	<0.0100	<0.00040	0.00142	<0.0100	<0.00020	<0.00020	3.4	0.000065	294	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ2-2	22C3145-04	2022-03-22	M	<0.0100	0.00201	0.005	<0.0080	0.0107	<0.00040	0.00184	<0.0100	<0.00020	<0.00020	3.08	0.000059	292	<0.00100			<0.00020	0.00169	<0.020	<0.00040
WQ2-2	22D2212-11	2022-04-19	M	<0.0100	0.00229	<0.0100	<0.0080	0.0139	<0.00040	0.00123	<0.0100	<0.00020	<0.00020	4.47	0.000062	280	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ2-2	22E2480-06	2022-05-17	M	<0.0500	0.000536	<0.0500	<0.0400	0.0634	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	0.875	<0.000100	85.7	<0.00500			<0.00100	<0.00400	<0.100	<0.00200
WQ2-2	22F3212-04	2022-06-21	M	0.0124	0.000245	<0.0100	<0.0100	0.0398	<0.000500	<0.000500	0.00701	<0.000100	<0.000100	0.433	<0.0000200	31.9	<0.00100			<0.0000500	<0.00100	0.0207	<0.000500
WQ2-2	22G1763-04	2022-07-13	M	0.0162	0.000349	<0.0100	<0.0100	0.0249	<0.000500	<0.000500	0.00895	<0.000100	<0.000100	0.593	<0.0000200	42.2	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-2	22H2453-04	2022-08-16	M	0.0273	0.000228	<0.0100	<0.0100	0.0314	<0.000500	<0.000500	0.00987	<0.000100	<0.000100	0.366	<0.0000200	33.3	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-2	22I1926-04	2022-09-14	M	0.00429	0.00162	<0.0100	<0.0100	0.0164	<0.000500	0.000985	0.0121	<0.000100	<0.000100	2.52	0.0000571	212	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-2	22J1560-06	2022-10-12	M	0.00524	0.00208	<0.00500	<0.0100	<0.0100	<0.000500	0.00111	0.00835	<0.000100	<0.000100	2.94	0.0000404	216	<0.00100			<0.0000500	<0.00100	<0.0200	0.00149
WQ2-2	22K1453-04	2022-11-10	M	<0.00200	0.00262	<0.0100	<0.0100	<0.0100	<0.000500	0.00143	0.0119	<0.000100	<0.000100	4.29	0.0000984	321	<0.00100			0.000125	<0.00100	<0.0200	<0.000500
WQ2-2	22L0774-04	2022-12-07	M	<0.00200	0.00236	<0.0100	<0.0100	<0.0100	<0.000500	0.00150	0.0130	<0.000100	<0.000100	4.62	0.0000965	343	<0.00100			0.0000762	<0.00100	<0.0200	<0.000500
WQ2-2	23A2847-04	2023-01-27	M	<0.00200	0.00149	<0.0100	<0.0100	0.0150	<0.000500	0.000857	0.0114	0.000126	<0.000100	2.1	0.0000465	197	<0.00100			0.000116	<0.00100	0.0329	<0.000500
WQ2-2	23C0060-04	2023-02-28	M	<0.00200	0.00256	<0.0100	<0.0100	<0.0100	<0.000500	0.00165	0.0100	<0.000100	<0.000100	3.65	0.0000876	348	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-2	23C1797-04	2023-03-15	M	<0.00200	0.00230	<0.0100	<0.0100	<0.0100	<0.000500	0.00150	0.0106	<0.000100	<0.000100	3.57	0.0000816	293	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-2	23D2945-04	2023-04-26	M	<0.00200	0.00171	<0.0100	<0.0100	0.0199	<0.000500	0.000908	0.00920	<0.000100	<0.000100	2.12	0.0000459	222	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-2	23E2392-04	2023-05-17	M	0.0538	0.000271	0.00235	0.0032	0.0450	<0.000050	0.000216	0.00978	<0.000010	<0.000010	0.262	0.0000103	30.2	<0.00050			0.0000599	0.00054	0.0159	<0.000050
WQ2-2	23F3614-04	2023-06-27	M	0.0266	0.000238	<0.0100	<0.0100	0.0185	<0.000500	<0.000500	0.00929	<0.000100	<0.000100	0.305	<0.0000200	29.8	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-2	23G2415-04	2023-07-19	M	0.0179	0.000439	<0.0100	<0.0100	0.0168	<0.000500	<0.000500	0.0130	<0.000100	<0.000100	0.602	<0.0000200	55.9	<0.00100			0.0000567	<0.00100	<0.0200	<0.000500
WQ2-2	23H3309-06	2023-08-24	M	0.0175	0.000965	<0.0100	<0.0100	0.0134	<0.000500	0.000655	0.0147	<0.000100	<0.000100	1.53	0.0000309	130	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-2	23I2271-06	2023-09-19	M	0.00606	0.00107	<0.0100	<0.0100	0.0125	<0.000500	0.000702	0.0131	<0.000100	<0.000100	1.53	0.0000348	146	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-2	23J2236-06	2023-10-18	M	0.0694	0.000411	<0.00400	<0.0100	0.0399	<0.000500	<0.000500	0.0140	<0.000100	<0.000100	0.51	0.0000291	45.4	<0.00500			0.0000638	0.00111	0.0219	<0.000500
WQ2-2	23K1909-04	2023-11-15	M	0.00376	0.00136	<0.00400	<0.0100	0.0327	<0.000500	0.000730	0.0108	<0.000100	<0.000100	2.04	0.0000520	183	<0.00500			0.0000570	<0.00100	0.0237	<0.000500
WQ2-2	23L1905-08	2023-12-14	M	0.00230	0.00238	<0.00400	<0.0100	0.0132	<0.000500	0.00176	0.0113	<0.000100	<0.000100	4.22	0.0000888	325	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-2	L2754383-2	2024-01-25	M																				
WQ2-2	VA24A1507-002	2024-01-25	M	<0.0050	0.00254	0.00152	<0.0030	0.0054	<0.0010	0.00194	0.0087	<0.00050	<0.00050	3.97	0.000067	371	<0.00050			0.000087	0.00053	<0.010	<0.00010
WQ2-2	L2754594-8	2024-02-13	M																				
WQ2-2	VA24A2858-008	2024-02-13	M	<0.0050	0.00196	0.00141	<0.0030	0.0094	<0.0010	0.00105	0.0101	<0.00050	<0.00050	3.02	0.000059	245	<0.00050	<0.00150	<0.00150	0.000099	<0.00050	<0.010	<0.00010
WQ2-2	L2755033-8	2024-03-20	M																				
WQ2-2	VA24A5955-008	2024-03-20	M	<0.0050	0.00230	0.00139	<0.0030	<0.0050	<0.0010	0.00224	0.0090	<0.00050	<0.00050	3.06	0.000058	301	<0.00050	<0.00150	<0.00150	0.000051	0.00051	<0.010	<0.00010
WQ2-2	L2755461-8	2024-04-23	M																				
WQ2-2	VA24A8736-008	2024-04-23	M	<0.0050	0.00242	0.00137	<0.0030	<0.0050	<0.0010	0.00257	0.0081	<0.00050	<0.00050	3.59	0.000050	327	<0.00050	<0.00150	<0.00150	0.000057	<0.00050	<0.010	<0.00010
WQ2-2	L2755553-8	2024-04-30	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	VA24A9418-008	2024-04-30	M	<0.0050	0.000790	0.00074	<0.0030	0.0342	<0.0010	0.00119	0.0067	<0.00050	<0.00050	1.18	0.000022	101	<0.00050	<0.00150	<0.00150	0.000060	0.00056	0.024	<0.00010
WQ2-2	L2755641-8	2024-05-07	M																				
WQ2-2	VA24B0040-008	2024-05-07	M	0.0060	0.00179	0.00123	<0.0030	0.0139	<0.0010	0.00238	0.0062	<0.00050	<0.00050	2.51	0.000031	231	<0.00050	<0.00150	<0.00150	0.000072	0.00056	<0.010	<0.00010
WQ2-2	L2755769-8	2024-05-14	M																				
WQ2-2	VA24B0738-008	2024-05-14	M	0.0126	0.00110	0.00115	<0.0030	0.0334	<0.0010	0.00142	0.0078	<0.00050	<0.00050	1.63	0.000028	152	<0.00050	<0.00150	<0.00150	0.000073	0.00068	<0.010	<0.00010
WQ2-2	L2755874-8	2024-05-21	M																				
WQ2-2	VA24B1351-008	2024-05-21	M	0.0062	0.00197	0.00116	<0.0030	0.0237	<0.0010	0.00161	0.0072	<0.00050	<0.00050	2.46	0.000029	245	<0.00050	<0.00150	<0.00150	0.000082	0.00078	0.011	<0.00010
WQ2-2	L2756277-8	2024-06-18	M																				
WQ2-2	VA24B4257-008	2024-06-18	M	0.0081	0.00117	0.00104	<0.0030	0.0189	<0.0010	0.00222	0.0073	<0.00050	<0.00050	1.82	0.000031	148	<0.00050	<0.00150	<0.00150	0.000054	0.00052	<0.010	<0.00010
WQ2-2	L2756678-8	2024-07-16	M																				
WQ2-2	VA24B7237-008	2024-07-16	M	0.0266	0.00126	0.00160	<0.0030	0.0179	<0.0010	0.00180	0.0107	<0.00050	<0.00050	1.46	0.000034	157	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ2-2	L2757095-8	2024-08-20	M																				
WQ2-2	VA24C1101-008	2024-08-20	M	<0.0050	0.00188	0.00105	<0.0030	0.0069	<0.0010	0.00269	0.0128	<0.00050	<0.00050	3.08	0.000039	284	<0.00050	<0.00150	<0.00150	0.000073	0.00062	<0.010	<0.00010
WQ2-2	VA24C4483-008	2024-09-17	M	0.0089	0.00131	0.00116	<0.0030	0.0105	<0.0010	0.00236	0.0119	<0.00050	<0.00050	1.58	0.000028	175	<0.00050	<0.00150	<0.00150	0.000077	0.00065	<0.010	<0.00010
WQ2-2	VA24C8360-008	2024-10-22	M	0.0064	0.00211	0.00114	<0.0030	0.0216	<0.0010	0.00559	0.0138	<0.00050	<0.00050	2.51	0.000062	269	<0.00050	<0.00150	<0.00150	0.000072	0.00062	<0.010	<0.00010
WQ2-2	VA24C9197-008	2024-10-29	M	0.0076	0.00145	0.00115	<0.0030	0.0331	<0.0010	0.00089	0.0105	<0.00050	<0.00050	2.35	0.000047	200	<0.00050	<0.00150	<0.00150	0.000146	0.00062	0.015	<0.00010
WQ2-2	VA24D0009-008	2024-11-05	M	<0.0050	0.00203	0.00116	<0.0030	0.0134	<0.0010	0.00110	0.0111	<0.00050	<0.00050	2.14	0.000056	262	<0.00050	<0.00150		0.000150	0.00086	<0.010	<0.00010
WQ2-2	L2758095-5	2024-11-12	M																				
WQ2-2	VA24D0632-005	2024-11-12	M	0.0092	0.00138	0.00117	<0.0030	0.0347	<0.0010	0.00088	0.0103	<0.00050	<0.00050	1.85	0.000040	194	<0.00050	<0.00150	<0.00150	0.000117	0.00089	0.016	<0.00010
WQ2-2	VA24D1720-008	2024-11-21	M	<0.0050	0.00203	0.00152	<0.0030	0.0118	<0.0010	0.00121	0.0112	<0.00050	<0.00050	3.97	0.000063	304	<0.00050	<0.00150	<0.00150	0.000239	0.00070	<0.010	<0.00010
WQ2-2	L2758465-8	2024-12-17	M																				
WQ2-2	VA24D3769-008	2024-12-17	M	<0.0050	0.00206	0.00138	<0.0030	0.0055	<0.0010	0.00152	0.0097	<0.00050	<0.00050	3.35	0.000065	264	<0.00050	<0.00150	<0.00150	0.000090	0.00070	<0.010	<0.00010
WQ2-2	L2758719-8	2025-01-21	M																				
WQ2-2	VA25A1408-008	2025-01-21	M	<0.0050	0.00215	0.00136	<0.0030	<0.0050	<0.0010	0.00116	0.0100	<0.00050	<0.00050	2.70	0.000062	281	<0.00050	<0.00150	<0.00150	0.000112	0.00062	<0.010	<0.00010
WQ2-2	L2758994-8	2025-02-18	M																				
WQ2-2	VA25A3430-008	2025-02-18	M	<0.0050	0.00214	0.00135	<0.0030	<0.0050	<0.0010	0.00122	0.0105	<0.00050	<0.00050	2.69	0.000063	320	<0.00050	<0.00150	<0.00150	0.000069	0.00052	<0.010	<0.00010
WQ2-2	VA25A6550-008	2025-03-25	M	<0.0050	0.00222	0.00108	<0.0030	0.0067	<0.0010	0.00116	0.0084	<0.00050	<0.00050	2.37	0.000047	273	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	0.012	<0.00010
WQ2-2	VA25A8962-008	2025-04-22	M	<0.0050	0.00123	0.00058	<0.0030	0.0140	<0.0010	0.00069	0.0076	<0.00050	<0.00050	2.12	0.000038	183	<0.00050	<0.00150	<0.00150	0.000062	0.00055	0.014	<0.00010
WQ2-2	VA25A9878-008	2025-04-30	M	0.0074	0.000762	0.00078	<0.0030	0.0316	<0.0010	0.00042	0.0075	<0.00050	<0.00050	1.03	<0.000020	96.1	<0.00050	<0.00150	<0.00150	0.000060	0.00071	0.015	<0.00010
WQ2-2	VA25B0358-008	2025-05-06	M	<0.0050	0.00184	0.00102	<0.0030	0.0078	<0.0010	0.00113	0.0087	<0.00050	<0.00050	2.56	0.000049	264	<0.00050	<0.00150	<0.00150	0.000076	0.00052	<0.010	<0.00010
WQ2-2	VA25B1026-008	2025-05-13	M	<0.0050	0.000808	0.00082	<0.0030	0.0328	<0.0010	0.00046	0.0081	<0.00050	<0.00050	1.34	0.000027	113	<0.00050	<0.00150	<0.00150	0.000070	0.00061	0.019	<0.00010
WQ2-2	VA25B1711-008	2025-05-20	M	0.0065	0.000703	0.00072	<0.0030	0.0266	<0.0010	0.00042	0.0070	<0.00050	<0.00050	1.04	<0.000020	83.9	<0.00050	<0.00150	<0.00150	<0.000050	0.00072	0.018	<0.00010
WQ2-3	23L1905-09	2023-12-14	M	0.00355	0.00252	<0.00400	<0.0100	0.0119	<0.000500	0.00205	0.0106	<0.000100	<0.000100	3.99	0.0000557	325	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ2-3	L2754383-3	2024-01-25	M																				
WQ2-3	VA24A1507-003	2024-01-25	M	<0.0050	0.00137	0.00106	<0.0030	0.0308	<0.0010	0.00100	0.0078	<0.00050	<0.00050	2.01	0.000039	180	<0.00050			0.000081	0.00054	0.028	<0.00010
WQ2-3	L2754594-9	2024-02-13	M																				
WQ2-3	VA24A2858-009	2024-02-13	M	<0.0050	0.00143	0.00121	<0.0030	0.0148	<0.0010	0.00081	0.0102	<0.00050	<0.00050	2.02	0.000037	186	<0.00050	<0.00150	<0.00150	0.000112	0.00051	<0.010	<0.00010
WQ2-3	L2755033-9	2024-03-20	M																				
WQ2-3	VA24A5955-009	2024-03-20	M	<0.0050	0.00126	0.00106	<0.0030	0.0222	<0.0010	0.00133	0.0085	<0.00050	<0.00050	1.73	0.000042	160	<0.00050	<0.00150	<0.00150	0.000058	0.00067	0.018	<0.00010
WQ2-3	L2755461-9	2024-04-23	M																				
WQ2-3	VA24A8736-009	2024-04-23	M	<0.0050	0.00155	0.00111	<0.0030	0.0088	<0.0010	0.00186	0.0072	<0.00050	<0.00050	2.50	0.000034	220	<0.00050	<0.00150	<0.00150	0.000055	<0.00050	<0.010	<0.00010
WQ2-3	L2755553-9	2024-04-30	M																				
WQ2-3	VA24A9418-009	2024-04-30	M	<0.0050	0.000716	0.00074	<0.0030	0.0348	<0.0010	0.00106	0.0066	<0.00050	<0.00050	1.06	<0.000020	94.4	<0.00050	<0.00150	<0.00150	0.000057	0.00058	0.023	<0.00010
WQ2-3	L2755641-9	2024-05-07	M																				
WQ2-3	VA24B0040-009	2024-05-07	M	0.0089	0.00108	0.00107	<0.0030	0.0275	<0.0010	0.00163	0.0067	<0.00050	<0.00050	1.49	0.000026	134	<0.00050	<0.00150	<0.00150	0.000070	0.00058	<0.010	<0.00010
WQ2-3	L2755769-9	2024-05-14	M																				
WQ2-3	VA24B0738-009	2024-05-14	M	0.0333	0.000229	0.00145	<0.0030	0.0404	<0.0010	0.00065	0.0069	<0.00050	<0.00050	0.30	<0.000020	21.5	<0.00050	<0.00150	<0.00150	0.000055	0.00060	0.020	<0.00010
WQ2-3	L2755874-9	2024-05-21	M																				
WQ2-3	VA24B1351-009	2024-05-21	M	0.0248	0.000295	0.00125	<0.0030	0.0308	<0.0010	0.00077	0.0079	<0.00050	<0.00050	0.32	<0.000020	31.6	<0.00050	<0.00150	<0.00150	0.000053	<0.00050	0.017	<0.00010
WQ2-3	L2756277-9	2024-06-18	M																				
WQ2-3	VA24B4257-010	2024-06-18	M	0.0157	0.000164	0.00095	<0.0030	0.0411	<0.0010	<0.00040	0.0055	<0.00050	<0.00050	<0.30	<0.000020	10.1	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	0.025	<0.00010
WQ2-3	L2756678-9	2024-07-16	M																				
WQ2-3	VA24B7237-009	2024-07-16	M	0.0506	0.000416	0.00200	0.0031	0.0194	<0.0010	0.00074	0.0110	<0.00050	<0.00050	0.48	<0.000020	44.3	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-3	L2757095-9	2024-08-20	M																				
WQ2-3	VA24C1101-009	2024-08-20	M	0.0339	0.000679	0.00167	<0.0030	0.0170	<0.0010	0.00104	0.0151	<0.00050	<0.00050	1.02	<0.000020	87.5	<0.00050	<0.00150	<0.00150	0.000094	0.00059	<0.010	<0.00010
WQ2-3	VA24C4483-009	2024-09-17	M	0.0107	0.000859	0.00103	<0.0030	0.0117	<0.0010	0.00138	0.0120	<0.00050	<0.00050	1.12	0.000026	117	<0.00050	<0.00150	<0.00150	0.000064	<0.00050	<0.010	<0.00010
WQ2-3	VA24C8360-009	2024-10-22	M	0.0449	0.000542	0.00178	<0.0030	0.0375	<0.0010	0.00139	0.0158	<0.00050	<0.00050	0.60	0.000021	58.2	<0.00050	<0.00150	<0.00150	0.000080	0.00076	0.021	<0.00010
WQ2-3	VA24C9197-009	2024-10-29	M	0.0170	0.000601	0.00116	0.0039	0.0579	<0.0010	0.00042	0.0087	<0.00050	<0.00050	0.92	0.000030	73.5	<0.00050	<0.00150	<0.00150	0.000093	0.00105	0.031	<0.00010
WQ2-3	VA24D0009-009	2024-11-05	M	<0.0050	0.00106	0.00093	<0.0030	0.0297	<0.0010	0.00060	0.0103	<0.00050	<0.00050	1.16	0.000033	133	<0.00050	<0.00150		0.000132	0.00079	0.029	<0.00010
WQ2-3	L2758095-6	2024-11-12	M																				
WQ2-3	VA24D0632-006	2024-11-12	M	0.0130	0.000577	0.00107	<0.0030	0.0605	<0.0010	0.00045	0.0086	<0.00050	<0.00050	0.74	0.000028	73.4	<0.00050	<0.00150	<0.00150	0.000077	0.00105	0.038	<0.00010
WQ2-3	VA24D1720-009	2024-11-21	M	<0.0050	0.00162	0.00131	<0.0030	0.0198	<0.0010	0.00098	0.0118	<0.00050	<0.00050	2.85	0.000064	236	<0.00050	<0.00150	<0.00150	0.000222	0.00083	0.017	<0.00010
WQ2-3	L2758465-9	2024-12-17	M																				
WQ2-3	VA24D3769-009	2024-12-17	M	<0.0050	0.00197	0.00137	0.0043	0.0061	<0.0010	0.00136	0.0102	<0.00050	<0.00050	3.31	0.000061	258	<0.00050	<0.00150	<0.00150	0.000087	0.00102	<0.010	<0.00010
WQ2-3	L2758719-9	2025-01-21	M																				
WQ2-3	VA25A1408-009	2025-01-21	M	<0.0050	0.00190	0.00129	<0.0030	<0.0050	<0.0010	0.00099	0.0104	<0.00050	<0.00050	2.36	0.000055	245	<0.00050	<0.00150	<0.00150	0.000110	0.00055	<0.010	<0.00010
WQ2-3	L2758994-9	2025-02-18	M																				
WQ2-3	VA25A3430-009	2025-02-18	M	<0.0050	0.00204	0.00127	<0.0030	<0.0050	<0.0010	0.00123	0.0105	<0.00050	<0.00050	2.57	0.000071	308	<0.00050	<0.00150	<0.00150	0.000077	<0.00050	<0.010	<0.00010
WQ2-3	VA25A6550-009	2025-03-25	M	<0.0050	0.00168	0.00093	<0.0030	0.0136	<0.0010	0.00091	0.0079	<0.00050	<0.00050	1.84	0.000040	204	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	0.016	<0.00010
WQ2-3	VA25A8962-009	2025-04-22	M	<0.0050	0.000726	0.00056	<0.0030	0.0249	<0.0010	0.00046	0.0071	<0.00050	<0.00050	1.10	0.000022	98.6	<0.00050	<0.00150	<0.00150	0.000062	0.00063	0.030	<0.00010
WQ2-3	VA25A9878-009	2025-04-30	M	0.0084	0.000423	0.00070	<0.0030	0.0410	<0.0010	<0.00040	0.0069	<0.00050	<0.00050	0.53	<0.000020	47.0	<0.00050	<0.00150	<0.00150	<0.000050	0.00064	0.028	<0.00010
WQ2-3	VA25B0358-009	2025-05-06	M	0.0099	0.000627	0.00094	<0.0030	0.0255	<0.0010	<0.00040	0.0078	<0.00050	<0.00050	0.88	<0.000020	82.4	<0.00050	<0.00150	<0.00150	0.000060	0.00071	0.020	<0.00010
WQ2-3	VA25B1026-009	2025-05-13	M	<0.0050	0.000594	0.00063	<0.0030	0.0482	<0.0010	<0.00040	0.0068	<0.00050	<0.00050	0.85	<0.000020	71.6	<0.00050	<0.00150	<0.00150	0.000056	<0.00050	0.022	<0.00010
WQ2-3	VA25B1711-009	2025-05-20	M	0.0108	0.000204	0.00073	<0.0030	0.0256	<0.0010	<0.00040	0.0069	<0.00050	<0.00050	0.32	<0.000020	23.9	<0.00050	<0.00150	<0.00150	<0.000050	0.00069	0.036	<0.00010
WQ3-1	0051710-05	2020-05-20	M	<0.0100	0.00262	0.0024	<0.0080																
WQ3-1	0062209-05	2020-06-22	M	<0.0100	0.00292	<0.0020	<0.0080																
WQ3-1	0071996-05	2020-07-21	M	<0.0100	0.00272	<0.0020	<0.0080																
WQ3-1	0082292-05	2020-08-24	M	<0.0100	0.00323	<0.0020	<0.0080																
WQ3-1	0093017-05	2020-09-28	M	<0.0100	0.0028	<0.0020	0.0138																
WQ3-1	20J1961-05	2020-10-20	M	<0.0100	0.00303	0.0067	<0.0080																
WQ3-1	20J2778-05	2020-10-27	M	<0.0100	0.00296	0.0036	<0.0080																
WQ3-1	20K0360-05	2020-11-03	M	<0.0100	0.0027	0.0035	<0.0080																
WQ3-1	20K1261-05	2020-11-10	M	<0.0100	0.00311	<0.0020	<0.0080																
WQ3-1	20K2100-05	2020-11-18	M	<0.0100	0.00292	<0.0020	<0.0080																
WQ3-1	20L1589-05	2020-12-14	M	<0.0100	0.0029	<0.0020	<0.0080																
WQ3-1	21A2590-05	2021-01-27	M	<0.0100	0.0027	<0.0020	<0.0080																
WQ3-1	21B2778-05	2021-02-25	M	<0.0100	0.0031	0.0036	<0.0080																
WQ3-1	21C3505-05	2021-03-25	M	<0.00200	0.0029	<0.00200	<0.0100																
WQ3-1	21D2478-05	2021-04-22	M	<0.00200	0.00301	<0.00200	<0.0100																
WQ3-1	21E1990-05	2021-05-18	M	<0.0050	0.00255	0.0028	<0.0040																
WQ3-1	21E2917-05	2021-05-26	M	<0.00200	0.00304	0.00367	<0.0100																
WQ3-1	21F0167-05	2021-06-01	M	<0.00200	0.0029	0.00259	0.0323																
WQ3-1	21F1056-05	2021-06-08	M	0.00202	0.00293	<0.00200	<0.0100																
WQ3-1	21F2014-05	2021-06-15	M	<0.00200	0.00289	<0.00200	<0.0100																
WQ3-1	21G2414-05	2021-07-20	M	<0.00200	0.0026	0.00212	<0.0100																
WQ3-1	21H3040-05	2021-08-25	M	0.00217	0.00268	0.00355	<0.0100																
WQ3-1	21I3814-05	2021-09-28	M	0.00251	0.00277	<0.00200	<0.0100																
WQ3-1	21J3514-05	2021-10-26	M	<0.0050	0.00279	0.0015	<0.0040																
WQ3-1	21K3046-05	2021-11-23	M	<0.0100	0.00269	<0.0020	<0.0080																
WQ3-1	21L2125-05	2021-12-14	M	<0.0100	0.00244	<0.0020	0.0165																
WQ3-1	22A2312-05	2022-01-20	M	<0.0100	0.0029	0.0036	<0.0080																
WQ3-1	22B2487-05	2022-02-17	M	<0.0100	0.0027	<0.0020	0.0204	<0.0100	<0.00040	0.00132	0.0109	<0.00020	<0.00020	3.69	0.000071	318	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ3-1	22C3145-05	2022-03-22	M	<0.0100	0.00239	0.0052	<0.0080	<0.0100	<0.00040	0.00211	<0.0100	<0.00020	<0.00020	3.51	0.000078	340	<0.00100			<0.00020	0.00318	<0.020	<0.00040
WQ3-1	22D2212-04	2022-04-19	M	<0.0100	0.00303	<0.0100	<0.0080	0.0109	<0.00040	0.0016	0.0112	<0.00020	<0.00020	5.85	0.000153	333	<0.00100			<0.00020	0.00747	0.068	<0.00040
WQ3-1	22E2480-07	2022-05-17	M	<0.0500	0.00228	<0.0500	<0.0400	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.46	<0.000100	361	<0.00500			<0.00100	<0.00400	<0.100	<0.00200
WQ3-1	22F3212-05	2022-06-21	M	<0.00200	0.00253	<0.0100	<0.0100	0.0122	<0.000500	0.00176	0.0116	<0.000100	<0.000100	4.19	0.0000836	355	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	22G1763-05	2022-07-13	M	<0.00200	0.00251	<0.0100	<0.0100	<0.0100	<0.000500	0.00179	0.0109	<0.000100	<0.000100	4.34	0.0000764	323	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	22H2453-05	2022-08-16	M	<0.00200	0.00237	<0.0100	<0.0100	0.0199	<0.000500	0.00167	0.0115	<0.000100	<0.000100	4.12	0.0000765	371	<0.00100			<0.0000500	0.00105	<0.0200	<0.000500
WQ3-1	22I1926-05	2022-09-14	M	0.00369	0.00258	<0.0100	<0.0100	0.0149	<0.000500	0.00164	0.0103	<0.000100	<0.000100	3.98	0.0000825	351	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	22J1560-07	2022-10-12	M	0.0124	0.000872	<0.00500	<0.0100	0.0112	<0.000500	0.000566	0.00885	<0.000100	<0.000100	1.41	<0.0000200	96.2	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	22K1453-05	2022-11-10	M	<0.00200	0.00263	<0.0100	<0.0100	<0.0100	<0.000500	0.00191	0.0110	<0.000100	<0.000100	5.11	0.000101	384	<0.00100			0.000125	<0.00100	<0.0200	<0.000500
WQ3-1	22L0774-05	2022-12-07	M	<0.00200	0.00271	<0.0100	<0.0100	<0.0100	<0.000500	0.00186	0.0122	<0.000100	<0.000100	5.17	0.0000523	377	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	23A2847-05	2023-01-27	M	<0.00200	0.00295	<0.0100	<0.0100	<0.0100	<0.000500	0.00191	0.0103	0.000118	<0.000100	4.29	0.0000832	395	<0.00100			0.0000643	<0.00100	<0.0200	<0.000500
WQ3-1	23C0060-05	2023-02-28	M	<0.00200	0.00265	<0.0100	<0.0100	<0.0100	<0.000500	0.00178	0.00940	<0.000100	<0.000100	3.87	0.0000896	391	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	23C1797-05	2023-03-15	M	<0.00200	0.00262	<0.0100	<0.0100	<0.0100	<0.000500	0.00176	0.0104	<0.000100	<0.000100	4.18	0.0000791	346	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	23D2945-05	2023-04-26	M	0.00215	0.00299	<0.0100	<0.0100	<0.0100	<0.000500	0.00186	0.00943	<0.000100	<0.000100	3.56	0.0000859	394	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	23E2392-05	2023-05-17	M	<0.00200	0.00256	<0.0100	<0.0100	0.0113	<0.000500	0.00213	0.0100	<0.000100	<0.000100	3.47	0.0000985	385	<0.00100			<0.0000500	0.00298	<0.0200	<0.000500
WQ3-1	23F3614-05	2023-06-27	M	<0.00200	0.00253	<0.0100	<0.0100	0.0121	<0.000500	0.00176	0.0104	<0.000100	<0.000100	4.27	0.0000834	353	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	23G2415-05	2023-07-19	M	0.00201	0.00269	<0.0100	<0.0100	<0.0100	<0.000500	0.00207	0.0114	<0.000100	<0.000100	4.93	0.000111	446	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	23H3309-07	2023-08-24	M	<0.00200	0.00258	<0.0100	<0.0100	<0.0100	<0.000500	0.00178	0.0106	<0.000100	<0.000100	4.03	0.0000606	359	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	23I2271-07	2023-09-19	M	0.00328	0.00267	<0.0100	<0.0100	<0.0100	<0.000500	0.00176	0.00952	<0.000100	<0.000100	4.08	0.0000723	343	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	23J2236-07	2023-10-18	M	0.00405	0.00277	<0.00400	<0.0100	<0.0100	<0.000500	0.00177	0.0105	<0.000100	<0.000100	4.01	0.0000739	385	<0.00500			<0.0000500	<0.00100	<0.0200	0.000649
WQ3-1	23K1909-05	2023-11-15	M	<0.00200	0.00276	<0.00400	<0.0100	0.0101	<0.000500	0.00147	0.00998	<0.000100	<0.000100	4.64	0.0000764	409	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	23L2091-01	2023-12-15	M	0.00213	0.00283	<0.00400	<0.0100	0.0104	<0.000500	0.00201	0.00947	<0.000100	<0.000100	4.2	0.0000820	366	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-1	L2754366-1	2024-01-24	M																				
WQ3-1	VA24A1422-001	2024-01-24	M	<0.0050	0.00281	0.00169	<0.0030	0.0073	<0.0010	0.00190	0.0084	<0.00050	<0.00050	3.80	0.000068	386	<0.00050			0.000092	<0.00050	<0.010	0.00011
WQ3-1	L2754604-1	2024-02-14	M																				
WQ3-1	VA24A2995-001	2024-02-14	M	<0.0050	0.00234	0.00160	<0.0030	0.0068	<0.0010	0.00158	0.0090	<0.00050	<0.00050	3.74	0.000076	363	<0.00050	<0.00150	<0.00150	0.000075	<0.00050	<0.010	<0.00010
WQ3-1	L2755043-1	2024-03-21	M																				
WQ3-1	VA24A6026-001	2024-03-21	M	<0.0050	0.00297	0.00170	<0.0030	<0.0050	<0.0010	0.00258	0.0095	<0.00050	<0.00050	3.58	0.000075	403	<0.00050	<0.00150	<0.00150	0.000052	<0.00050	<0.010	<0.00010
WQ3-1	L2755490-1	2024-04-24	M																				
WQ3-1	VA24A8916-001	2024-04-24	M	<0.0050	0.00280	0.00146	<0.0030	<0.0050	<0.0010	0.00352	0.0090	<0.00050	<0.00050	4.32	0.000082	397	<0.00050	<0.00150	<0.00150	0.000062	<0.00050	<0.010	<0.00010
WQ3-1	L2755567-1	2024-05-01	M																				
WQ3-1	VA24A9566-001	2024-05-01	M	<0.0050	0.00269	0.00135	<0.0030	<0.0050	<0.0010	0.00344	0.0102	<0.00050	<0.00050	3.42	0.000077	379	<0.00050	<0.00150	<0.00150	0.000057	<0.00050	<0.010	<0.00010
WQ3-1	L2755666-1	2024-05-08	M																				
WQ3-1	VA24B0201-001	2024-05-08	M	<0.0050	0.00289	0.00154	<0.0030	<0.0050	<0.0010	0.00333	0.0099	<0.00050	<0.00050	3.61	0.000082	381	<0.00050	<0.00150	<0.00150	0.000078	<0.00050	<0.010	<0.00010
WQ3-1	L2755779-1	2024-05-15	M																				
WQ3-1	VA24B0901-001	2024-05-15	M	<0.0050	0.00293	0.00153	<0.0030	<0.0050	<0.0010	0.00340	0.0096	<0.00050	<0.00050	3.62	0.000078	364	<0.00050	<0.00150	<0.00150	0.000063	<0.00050	<0.010	<0.00010
WQ3-1	L2755888-1	2024-05-22	M																				
WQ3-1	VA24B1500-001	2024-05-22	M	<0.0050	0.00252	0.00138	<0.0030	<0.0050	<0.0010	0.00229	0.0101	<0.00050	<0.00050	3.53	0.000074	357	<0.00050	<0.00150	<0.00150	0.000087	<0.00050	<0.010	<0.00010
WQ3-1	L2756312-1	2024-06-19	M																				
WQ3-1	VA24B4510-001	2024-06-19	M	<0.0050	0.00288	0.00149	<0.0030	0.0201	<0.0010	0.00347	0.0102	<0.00050	<0.00050	3.75	0.000080	361	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ3-1	VA24B7397-001	2024-07-17	M	<0.0050	0.00310	0.00136	<0.0030	<0.0050	<0.0010	0.00377	0.0105	<0.00050	<0.00050	3.56	0.000072	407	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ3-1	L2756689-1	2024-07-17	M																				
WQ3-1	L2757122-1	2024-08-21	M																				
WQ3-1	VA24C1337-001	2024-08-21	M	<0.0050	0.00264	0.00118	<0.0030	<0.0050	<0.0010	0.00338	0.0109	<0.00050	<0.00050	3.72	0.000089	377	<0.00050	<0.00150	<0.00150	0.000081	<0.00050	<0.010	<0.00010
WQ3-1	VA24C4683-001	2024-09-18	M	<0.0050	0.00302	0.00132	<0.0030	<0.0050	<0.0010	0.00539	0.0106	<0.00050	<0.00050	4.20	0.000071	374	<0.00050	<0.00150	<0.00150	0.000070	<0.00050	<0.010	0.00013
WQ3-1	VA24C8569-001	2024-10-23	M	<0.0050	0.00285	0.00115	<0.0030	<0.0050	<0.0010	0.00587	0.0100	<0.00050	<0.00050	3.70	0.000071	378	<0.00050	<0.00150	<0.00150	0.000070	<0.00050	<0.010	<0.00010
WQ3-1	L2757977-1	2024-10-30	M																				
WQ3-1	VA24C9414-001	2024-10-30	M	<0.0050	0.00279	0.00174	<0.0030	<0.0050	<0.0010	0.00148	0.0096	<0.00050	<0.00050	3.31	0.000082	378	<0.00050	<0.00150	<0.00150	0.000199	<0.00050	<0.010	<0.00010
WQ3-1	VA24D0180-001	2024-11-06	M	<0.0050	0.00263	0.00153	<0.0030	<0.0050	<0.0010	0.00158	0.0106	<0.00050	<0.00050	3.19	0.000068	367	<0.00050	<0.00150	<0.00150	0.000202	<0.00050	<0.010	<0.00010
WQ3-1	VA24D0813-001	2024-11-13	M	<0.0050	0.00262	0.00138	<0.0030	0.0130	<0.0010	0.00148	0.0111	<0.00050	<0.00050	3.21	0.000069	347	<0.00050	<0.00150	<0.00150	0.000186	0.00056	<0.010	0.00010
WQ3-1	L2758221-1	2024-11-22	M																				
WQ3-1	VA24D1791-001	2024-11-22	M	<0.0050	0.00250	0.00184	<0.0030	0.0062	<0.0010	0.00158	0.0108	<0.00050	<0.00050	4.48	0.000071	382	<0.00050	<0.00150	<0.00150	0.000268	<0.00050	<0.010	<0.00010
WQ3-1	L2758486-1	2024-12-18	M																				
WQ3-1	VA24D3937-001	2024-12-18	M	<0.0050	0.00252	0.00160	<0.0030	<0.0050	<0.0010	0.00177	0.0092	<0.00050	<0.00050	3.90	0.000082	353	<0.00050	<0.00150	<0.00150	0.000070	<0.00050	<0.010	<0.00010
WQ3-1	L2758770-1	2025-01-22	M																				
WQ3-1	VA25A1525-001	2025-01-22	M	<0.0050	0.00272	0.00146	<0.0030	<0.0050	<0.0010	0.00161	0.0084	<0.00050	<0.00050	3.64	0.000075	375	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ3-1	L2759008-1	2025-02-19	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	VA25A3570-001	2025-02-19	M	<0.0050	0.00254	0.00150	<0.0030	<0.0050	<0.0010	0.00167	0.0089	<0.00050	<0.00050	3.21	0.000081	381	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ3-1	VA25A6679-001	2025-03-26	M	<0.0050	0.00276	0.00162	0.0036	<0.0050	<0.0010	0.00180	0.0092	<0.00050	<0.00050	3.80	0.000085	422	<0.00050	<0.00150	<0.00150	0.000063	<0.00050	<0.010	<0.00010
WQ3-1	VA25A9109-001	2025-04-23	M	<0.0050	0.00253	0.00156	<0.0030	<0.0050	<0.0010	0.00173	0.0085	<0.00050	<0.00050	3.23	0.000075	363	<0.00050	<0.00150	<0.00150	0.000056	<0.00050	<0.010	<0.00010
WQ3-1	VA25A9941-001	2025-05-01	M	<0.0050	0.00240	0.00150	<0.0030	<0.0050	<0.0010	0.00150	0.0089	<0.00050	<0.00050	4.04	0.000083	353	<0.00050	<0.00150	<0.00150	0.000052	<0.00050	<0.010	<0.00010
WQ3-1	VA25B0496-001	2025-05-07	M	<0.0050	0.00275	0.00166	<0.0030	<0.0050	<0.0010	0.00163	0.0088	<0.00050	<0.00050	4.30	0.000073	380	<0.00050	<0.00150	<0.00150	0.000065	<0.00050	<0.010	0.00010
WQ3-1	VA25B1530-001	2025-05-16	M	<0.0050	0.00261	0.00162	<0.0030	<0.0050	<0.0010	0.00162	0.0091	<0.00050	<0.00050	3.68	0.000076	356	<0.00050	<0.00150	<0.00150	0.000070	<0.00050	<0.010	<0.00010
WQ3-1	VA25B1841-001	2025-05-21	M	<0.0050	0.00276	0.00157	<0.0030	<0.0050	<0.0010	0.00141	0.0088	<0.00050	<0.00050	3.26	0.000078	382	<0.00050	<0.00150	<0.00150	0.000066	<0.00050	<0.010	<0.00010
WQ3-2	0051710-06	2020-05-20	M	0.0188	0.000315	<0.0020	<0.0080																
WQ3-2	0062209-06	2020-06-22	M	0.0645	0.000218	0.0023	<0.0080																
WQ3-2	0071996-06	2020-07-21	M	0.0446	0.000269	<0.0020	<0.0080																
WQ3-2	0082292-06	2020-08-24	M	0.0112	0.00187	<0.0020	<0.0080																
WQ3-2	0093017-06	2020-09-28	M	0.0244	0.000678	<0.0020	<0.0080																
WQ3-2	20J1961-06	2020-10-20	M	<0.0100	0.000984	0.0065	<0.0080																
WQ3-2	20J2778-06	2020-10-27	M	<0.0100	0.0013	0.004	<0.0080																
WQ3-2	20K0360-06	2020-11-03	M	0.0136	0.000851	<0.0020	<0.0080																
WQ3-2	20K1261-06	2020-11-10	M	<0.0100	0.001	<0.0020	<0.0080																
WQ3-2	20K2100-06	2020-11-18	M	<0.0100	0.00063	<0.0020	<0.0080																
WQ3-2	20L1589-06	2020-12-14	M	<0.0100	0.00172	<0.0020	<0.0080																
WQ3-2	21A2590-06	2021-01-27	M	<0.0100	0.00236	<0.0020	<0.0080																
WQ3-2	21B2778-06	2021-02-25	M	<0.0100	0.00255	0.0036	<0.0080																
WQ3-2	21C3505-06	2021-03-25	M	<0.00200	0.0018	<0.00200	<0.0100																
WQ3-2	21D2478-06	2021-04-22	M	0.0109	0.000871	0.00125	0.0018																
WQ3-2	21E1990-06	2021-05-18	M	0.0403	0.000175	0.0024	<0.0080																
WQ3-2	21E2917-06	2021-05-26	M	0.0417	0.00019	0.0003	0.002																
WQ3-2	21F0167-06	2021-06-01	M	0.0134	0.000473	0.00044	0.0012																
WQ3-2	21F1056-06	2021-06-08	M	0.0787	0.00019	0.00271	0.0034																
WQ3-2	21F2014-06	2021-06-15	M	0.0743	0.000423	0.00289	0.0041																
WQ3-2	21G2414-06	2021-07-20	M	0.0281	0.000227	<0.00200	<0.0100																
WQ3-2	21H3040-06	2021-08-25	M	0.0168	0.000573	0.00213	<0.0100																
WQ3-2	21I3814-06	2021-09-28	M	0.021	0.00101	<0.00200	<0.0100																
WQ3-2	21J3514-06	2021-10-26	M	0.0145	0.000329	0.001	<0.0040																
WQ3-2	21K3046-06	2021-11-23	M	<0.0100	0.00188	<0.0020	<0.0080																
WQ3-2	21L2125-06	2021-12-14	M	<0.0100	0.00199	<0.0020	<0.0080																
WQ3-2	22A2312-06	2022-01-20	M	<0.0100	0.00264	0.0035	<0.0080																
WQ3-2	22B2487-06	2022-02-17	M	<0.0100	0.0023	<0.0020	<0.0080	<0.0100	<0.00040	0.00118	<0.0100	<0.00020	<0.00020	3.25	0.000073	274	<0.00100			<0.00020	<0.00080	0.089	<0.00040
WQ3-2	22C3145-06	2022-03-22	M	<0.0100	0.00211	0.0041	<0.0080	<0.0100	<0.00040	0.00184	<0.0100	<0.00020	<0.00020	2.96	0.000097	290	<0.00100			<0.00020	0.00418	<0.020	<0.00040
WQ3-2	22D2212-05	2022-04-19	M	<0.0100	0.00223	<0.0100	<0.0080	0.0107	<0.00040	0.00116	<0.0100	<0.00020	<0.00020	4.8	0.000063	281	<0.00100			<0.00020	0.00097	0.028	<0.00040
WQ3-2	22E2480-08	2022-05-17	M	<0.0500	0.000728	<0.0500	<0.0400	0.0544	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	1.16	<0.000100	120	<0.00500			<0.00100	<0.00400	<0.100	<0.00200
WQ3-2	22F3212-06	2022-06-21	M	0.011	0.000302	<0.0100	<0.0100	0.0527	<0.000500	<0.000500	0.00616	<0.000100	<0.000100	0.472	<0.0000200	34.6	<0.00100			<0.0000500	<0.00100	0.0212	<0.000500
WQ3-2	22G1763-06	2022-07-13	M	0.0146	0.000417	<0.0100	<0.0100	0.0272	<0.000500	<0.000500	0.00807	<0.000100	<0.000100	0.701	<0.0000200	49.6	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-2	22H2453-06	2022-08-16	M	0.0231	0.000233	<0.0100	<0.0100	0.0306	<0.000500	<0.000500	0.00947	<0.000100	<0.000100	0.362	<0.0000200	32.2	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-2	22I1926-06	2022-09-14	M	0.00321	0.00154	<0.0100	<0.0100	0.0158	<0.000500	0.000982	0.0127	<0.000100	<0.000100	2.49	0.0000348	216	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-2	22J1560-08	2022-10-12	M	<0.00200	0.00206	<0.00500	<0.0100	<0.0100	<0.000500	0.00137	0.0101	<0.000100	<0.000100	3.6	0.0000565	277	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-2	22K1453-06	2022-11-10	M	<0.00200	0.00275	<0.0100	<0.0100	<0.0100	<0.000500	0.00157	0.0124	<0.000100	<0.000100	4.57	0.0000699	338	<0.00100			0.000112	<0.00100	<0.0200	<0.000500
WQ3-2	22L0774-06	2022-12-07	M	<0.00200	0.00245	<0.0100	<0.0100	<0.0100	<0.000500	0.00193	0.0136	<0.000100	<0.000100	4.91	0.0000752	352	<0.00100			0.000101	<0.00100	<0.0200	<0.000500
WQ3-2	23A2847-06	2023-01-27	M	<0.00200	0.00238	<0.0100	<0.0100	0.0136	<0.000500	0.00144	0.0101	0.000132	<0.000100	3.54	0.0000619	323	<0.00100			0.0000839	<0.00100	<0.0200	<0.000500
WQ3-2	23C0060-06	2023-02-28	M	<0.00200	0.00239	<0.0100	<0.0100	<0.0100	<0.000500	0.00145	0.0103	<0.000100	<0.000100	3.35	0.0000588	335	<0.00100			0.0000605	<0.00100	<0.0200	<0.000500
WQ3-2	23C1797-06	2023-03-15	M	<0.00200	0.00239	<0.0100	<0.0100	<0.0100	<0.000500	0.00157	0.0103	<0.000100	<0.000100	3.81	0.0000635	316	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-2	23D2945-06	2023-04-26	M	<0.00200	0.00179	<0.0100	<0.0100	0.0193	<0.000500	0.00104	0.00881	<0.000100	<0.000100	2.27	0.0000364	234	<0.00100			0.0000529	<0.00100	<0.0200	<0.000500
WQ3-2	23E2392-06	2023-05-17	M	0.0533	0.000304	0.00222	0.0061	0.0550	<0.000050	0.000201	0.00956	<0.000010	<0.000010	0.248	0.0000113	27.9	<0.00050			0.0000560	0.00087	0.0170	<0.000050
WQ3-2	23F3614-06	2023-06-27	M	0.0286	0.000268	<0.0100	<0.0100	0.0278	<0.000500	<0.000500	0.00937	<0.000100	<0.000100	0.438	<0.0000200	36	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-2	23G2415-06	2023-07-19	M	0.0232	0.000397	<0.0100	<0.0100	0.0170	<0.000500	<0.000500	0.0135	<0.000100	<0.000100	0.59	0.0000201	51.7	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-2	23H3309-08	2023-08-24	M	0.00213	0.00207	<0.0100	<0.0100	0.0420	<0.000500	0.00153	0.0129	<0.000100	<0.000100	3.06	0.0000351	270	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-2	23I2271-08	2023-09-19	M	0.00405	0.00150	<0.0100	<0.0100	0.0101	<0.000500	0.00105	0.0123	<0.000100	<0.000100	2.22	0.0000495	181	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-2	23J2236-08	2023-10-18	M	0.0229	0.000948	<0.00400	<0.0100	0.0890	<0.000500	0.000554	0.00962	<0.000100	<0.000100	1.19	0.0000350	106	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-2	23K1909-06	2023-11-15	M	0.00351	0.00102	<0.00400	<0.0100	0.0397	<0.000500	0.000590	0.0104	<0.000100	<0.000100	1.57	0.0000273	138	<0.00500			0.0000700	0.00119	0.0276	<0.000500
WQ3-2	23L2091-02	2023-12-15	M	<0.00200	0.00224	<0.00400	<0.0100	0.0149	<0.000500	0.00156	0.0105	<0.000100	<0.000100	3.38	0.0000687	292	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ3-2	L2754366-2	2024-01-24	M																				
WQ3-2	VA24A1422-002	2024-01-24	M	<0.0050	0.00262	0.00155	<0.0030	<0.0050	<0.0010	0.00184	0.0088	<0.00050	<0.00050	3.69	0.000075	384	<0.00050			0.000090	<0.00050	<0.010	0.00013
WQ3-2	L2754604-2	2024-02-14	M																				
WQ3-2	VA24A2995-002	2024-02-14	M	<0.0050	0.00190	0.00145	<0.0030	0.0169	<0.0010	0.00115	0.0094	<0.00050	<0.00050	2.88	0.000059	262	<0.00050	<0.00150	<0.00150	0.000097	<0.00050	<0.010	<0.00010
WQ3-2	L2755043-2	2024-03-21	M																				
WQ3-2	VA24A6026-002	2024-03-21	M	<0.0050	0.00162	0.00119	<0.0030	0.0163	<0.0010	0.00163	0.0085	<0.00050	<0.00050	2.07	0.000036	215	<0.00050	<0.00150	<0.00150	0.000052	0.00053	0.022	<0.00010
WQ3-2	L2755490-2	2024-04-24	M																				
WQ3-2	VA24A8916-002	2024-04-24	M	<0.0050	0.00211	0.00118	<0.0030	<0.0050	<0.0010	0.00260	0.0064	<0.00050	<0.00050	3.23	0.000058	293	<0.00050	<0.00150	<0.00150	0.000056	<0.00050	<0.010	<0.00010
WQ3-2	L2755567-2	2024-05-01	M																				
WQ3-2	VA24A9566-002	2024-05-01	M	<0.0050	0.00206	0.00103	<0.0030	0.0088	<0.0010	0.00305	0.0053	<0.00050	<0.00050	2.85	0.000044	287	<0.00050	<0.00150	<0.00150	0.000055	<0.00050	<0.010	<0.00010
WQ3-2	L2755666-2	2024-05-08	M																				
WQ3-2	VA24B0201-002	2024-05-08	M	0.0056	0.000731	0.00080	<0.0030	0.0344	<0.0010	0.00104	0.0064	<0.00050	<0.00050	0.89	<0.000020	86.8	<0.00050	<0.00150	<0.00150	0.000062	0.00064	0.021	<0.00010
WQ3-2	L2755779-2	2024-05-15	M																				
WQ3-2	VA24B0901-002	2024-05-15	M	0.0114	0.00119	0.00114	<0.0030	0.0290	<0.0010	0.00192	0.0080	<0.00050	<0.00050	1.52	0.000028	144	<0.00050	<0.00150	<0.00150	0.000067	0.00063	<0.010	<0.00010
WQ3-2	L2755888-2	2024-05-22	M																				
WQ3-2	VA24B1500-002	2024-05-22	M	0.0182	0.000500	0.00104	<0.0030	0.0328	<0.0010	0.00063	0.0083	<0.00050	<0.00050	0.69	<0.000020	61.2	<0.00050	<0.00150	<0.00150	0.000056	0.00056	0.014	<0.00010
WQ3-2	L2756312-2	2024-06-19	M																				
WQ3-2	VA24B4510-002	2024-06-19	M	0.0181	0.000674	0.00113	<0.0030	0.0188	<0.0010	0.00124	0.0081	<0.00050	<0.00050	0.93	<0.000020	78.9	<0.00050	<0.00150	<0.00150	<0.000050	0.00053	<0.010	<0.00010
WQ3-2	VA24B7397-002	2024-07-17	M	0.0257	0.000718	0.00129	<0.0030	0.0192	<0.0010	0.00131	0.0117	<0.00050	<0.00050	0.89	<0.000020	88.9	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ3-2	L2756689-2	2024-07-17	M																				
WQ3-2	L2757122-2	2024-08-21	M																				
WQ3-2	VA24C1337-002	2024-08-21	M	0.0196	0.000613	0.00109	<0.0030	0.0149	<0.0010	0.00069	0.0126	<0.00050	<0.00050	0.87	<0.000020	80.3	<0.00050	<0.00150	<0.00150	<0.000050	0.00053	<0.010	<0.00010
WQ3-2	VA24C4683-002	2024-09-18	M	0.0059	0.00157	0.00114	<0.0030	0.0103	<0.0010	0.00212	0.0097	<0.00050	<0.00050	1.82	0.000038	209	<0.00050	<0.00150	<0.00150	0.000071	0.00058	<0.010	<0.00010
WQ3-2	VA24C8569-002	2024-10-23	M	0.0196	0.00171	0.00136	<0.0030	0.0256	<0.0010	0.00453	0.0135	<0.00050	<0.00050	2.09	0.000034	220	<0.00050	<0.00150	<0.00150	0.000077	0.00054	<0.010	<0.00010
WQ3-2	L2757977-2	2024-10-30	M																				
WQ3-2	VA24C9414-002	2024-10-30	M	<0.0050	0.00189	0.00133	<0.0030	0.0177	<0.0010	0.00120	0.0109	<0.00050	<0.00050	2.48	0.000055	270	<0.00050	<0.00150	<0.00150	0.000162	<0.00050	<0.010	<0.00010
WQ3-2	VA24D0180-002	2024-11-06	M	<0.0050	0.00228	0.00130	<0.0030	0.0095	<0.0010	0.00132	0.0109	<0.00050	<0.00050	2.40	0.000055	292	<0.00050	<0.00150	<0.00150	0.000149	<0.00050	<0.010	<0.00010
WQ3-2	VA24D0813-002	2024-11-13	M	0.0056	0.00118	0.00099	<0.0030	0.0468	<0.0010	0.00074	0.0089	<0.00050	<0.00050	1.51	0.000034	157	<0.00050	<0.00150	<0.00150	0.000101	0.00090	0.022	<0.00010
WQ3-2	L2758221-2	2024-11-22	M																				
WQ3-2	VA24D1791-002	2024-11-22	M	<0.0050	0.00177	0.00136	<0.0030	0.0155	<0.0010	0.00127	0.0112	<0.00050	<0.00050	3.27	0.000063	270	<0.00050	<0.00150	<0.00150	0.000225	0.00080	0.011	<0.00010
WQ3-2	L2758486-2	2024-12-18	M																				
WQ3-2	VA24D3937-002	2024-12-18	M	<0.0050	0.00186	0.00130	<0.0030	0.0124	<0.0010	0.00129	0.0092	<0.00050	<0.00050	3.08	0.000060	269	<0.00050	<0.00150	<0.00150	0.000072	<0.00050	0.010	<0.00010
WQ3-2	L2758770-2	2025-01-22	M																				
WQ3-2	VA25A1525-002	2025-01-22	M	<0.0050	0.00204	0.00126	<0.0030	<0.0100	<0.0010	0.00116	0.0091	<0.00050	<0.00050	2.70	0.000065	270	<0.00050	<0.00150	<0.00150	0.000064	0.00062	<0.010	<0.00010
WQ3-2	L2759008-2	2025-02-19	M																				
WQ3-2	VA25A3570-002	2025-02-19	M	<0.0050	0.00211	0.00140	<0.0030	<0.0050	<0.0010	0.00127	0.0104	<0.00050	<0.00050	2.88	0.000058	289	<0.00050	<0.00150	<0.00150	0.000057	0.00054	<0.010	<0.00010
WQ3-2	VA25A6679-002	2025-03-26	M	<0.0050	0.00155	0.00100	<0.0030	0.0071	<0.0010	0.00112	0.0076	<0.00050	<0.00050	2.60	0.000051	271	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ3-2	VA25A9109-002	2025-04-23	M	<0.0050	0.00196	0.00057	<0.0030	<0.0050	<0.0010	0.00104	0.0080	<0.00050	<0.00050	2.69	0.000046	298	<0.00050	<0.00150	<0.00150	0.000057	<0.00050	<0.010	<0.00010
WQ3-2	VA25A9941-002	2025-05-01	M	0.0086	0.000510	0.00075	<0.0030	0.0369	<0.0010	<0.00040	0.0065	<0.00050	<0.00050	0.75	<0.000020	69.1	<0.00050	<0.00150	<0.00150	0.000056	0.00067	0.022	<0.00010
WQ3-2	VA25B0496-002	2025-05-07	M	0.0058	0.000858	0.00078	<0.0030	0.0317	<0.0010	0.00056	0.0078	<0.00050	<0.00050	1.34	<0.000020	124	<0.00050	<0.00150	<0.00150	<0.000050	0.00053	0.019	0.00025
WQ3-2	VA25B1530-002	2025-05-16	M	0.0060	0.000637	0.00074	<0.0030	0.0383	<0.0010	<0.00040	0.0070	<0.00050	<0.00050	0.87	<0.000020	75.9	<0.00050	<0.00150	<0.00150	0.000057	0.00064	0.019	<0.00010
WQ3-2	VA25B1841-002	2025-05-21	M	0.0065	0.000563	0.00068	<0.0030	0.0338	<0.0010	<0.00040	0.0068	<0.00050	<0.00050	0.73	<0.000020	70.6	<0.00050	<0.00150	<0.00150	0.000050	0.00067	0.023	<0.00010
WQ3-3	23L2091-03	2023-12-15	M	0.00244	0.00214	<0.00400	<0.0100	0.0110	<0.000500	0.00159	0.00967	<0.000100	<0.000100	3.15	0.0000538	282	<0.00500			0.0000547	<0.00100	<0.0200	<0.000500
WQ3-3	L2754366-3	2024-01-24	M																				
WQ3-3	VA24A1422-003	2024-01-24	M	<0.0050	0.00124	0.00108	<0.0030	0.0294	<0.0010	0.00094	0.0078	<0.00050	<0.00050	1.80	0.000038	164	<0.00050			0.000086	0.00053	0.039	<0.00010
WQ3-3	L2754604-3	2024-02-14	M																				
WQ3-3	VA24A2995-003	2024-02-14	M	<0.0050	0.00176	0.00126	<0.0030	0.0161	<0.0010	0.00109	0.0090	<0.00050	<0.00050	2.72	0.000051	251	<0.00050	<0.00150	<0.00150	0.000084	<0.00050	<0.010	<0.00010
WQ3-3	L2755043-3	2024-03-21	M																				
WQ3-3	VA24A6026-003	2024-03-21	M	<0.0050	0.000577	0.00091	<0.0030	0.0354	<0.0010	0.00064	0.0081	<0.00050	<0.00050	0.77	<0.000020	71.1	<0.00050	<0.00150	<0.00150	0.000076	0.00069	0.051	<0.00010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-3	L2755490-3	2024-04-24	M																				
WQ3-3	VA24A8916-003	2024-04-24	M	<0.0050	0.00173	0.00110	<0.0030	0.0076	<0.0010	0.00213	0.0064	<0.00050	<0.00050	2.67	0.000042	238	<0.00050	<0.00150	<0.00150	0.000058	<0.00050	<0.010	<0.00010
WQ3-3	L2755567-3	2024-05-01	M																				
WQ3-3	VA24A9566-003	2024-05-01	M	<0.0050	0.000564	0.00068	<0.0030	0.0427	<0.0010	0.00098	0.0074	<0.00050	<0.00050	0.76	<0.000020	68.3	<0.00050	<0.00150	<0.00150	0.000068	0.00066	0.054	<0.00010
WQ3-3	L2755666-3	2024-05-08	M																				
WQ3-3	VA24B0201-003	2024-05-08	M	0.0054	0.000661	0.00076	<0.0030	0.0367	<0.0010	0.00102	0.0062	<0.00050	<0.00050	0.89	<0.000020	80.4	<0.00050	<0.00150	<0.00150	0.000065	0.00060	0.022	<0.00010
WQ3-3	L2755779-3	2024-05-15	M																				
WQ3-3	VA24B0901-003	2024-05-15	M	0.0155	0.000766	0.00110	<0.0030	0.0340	<0.0010	0.00152	0.0083	<0.00050	<0.00050	1.04	<0.000020	93.0	<0.00050	<0.00150	<0.00150	0.000056	0.00068	<0.010	<0.00010
WQ3-3	L2755888-3	2024-05-22	M																				
WQ3-3	VA24B1500-003	2024-05-22	M	0.0137	0.000492	0.00095	<0.0030	0.0362	<0.0010	0.00089	0.0075	<0.00050	<0.00050	0.64	<0.000020	56.6	<0.00050	<0.00150	<0.00150	0.000054	<0.00050	0.014	<0.00010
WQ3-3	L2756312-3	2024-06-19	M																				
WQ3-3	VA24B4510-003	2024-06-19	M	0.0238	0.000159	0.00119	<0.0030	0.0339	<0.0010	<0.00040	0.0073	<0.00050	<0.00050	<0.30	<0.000020	13.9	<0.00050	<0.00150	<0.00150	0.000069	<0.00050	0.026	<0.00010
WQ3-3	VA24B7397-003	2024-07-17	M	0.0390	0.000222	0.00144	<0.0030	0.0298	<0.0010	0.00050	0.0093	<0.00050	<0.00050	<0.30	<0.000020	18.9	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ3-3	L2756689-3	2024-07-17	M																				
WQ3-3	L2757122-3	2024-08-21	M																				
WQ3-3	VA24C1337-003	2024-08-21	M	0.0216	0.000470	0.00108	<0.0030	0.0140	<0.0010	0.00077	0.0130	<0.00050	<0.00050	0.76	<0.000020	75.6	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ3-3	VA24C4683-003	2024-09-18	M	0.0164	0.000484	0.00120	<0.0030	0.0122	<0.0010	0.00090	0.0110	<0.00050	<0.00050	0.71	<0.000020	69.7	<0.00050	<0.00150	<0.00150	0.000068	<0.00050	<0.010	<0.00010
WQ3-3	VA24C8569-003	2024-10-23	M	0.0230	0.00145	0.00145	<0.0030	0.0299	<0.0010	0.00349	0.0142	<0.00050	<0.00050	1.74	0.000028	178	<0.00050	<0.00150	<0.00150	0.000074	0.00056	<0.010	<0.00010
WQ3-3	L2757977-3	2024-10-30	M																				
WQ3-3	VA24C9414-003	2024-10-30	M	0.0089	0.000412	0.00093	<0.0030	0.0531	<0.0010	<0.00040	0.0083	<0.00050	<0.00050	0.57	<0.000020	56.2	<0.00050	<0.00150	<0.00150	0.000084	0.00068	0.041	<0.00010
WQ3-3	VA24D0180-003	2024-11-06	M	<0.0050	0.000927	0.00086	<0.0030	0.0297	<0.0010	0.00054	0.0096	<0.00050	<0.00050	1.03	0.000023	118	<0.00050	<0.00150	<0.00150	0.000115	<0.00050	0.032	<0.00010
WQ3-3	VA24D0813-003	2024-11-13	M	0.0070	0.000613	0.00074	<0.0030	0.0805	<0.0010	<0.00040	0.0068	<0.00050	<0.00050	0.64	<0.000020	64.7	<0.00050	<0.00150	<0.00150	0.000083	0.00067	0.032	<0.00010
WQ3-3	L2758221-3	2024-11-22	M																				
WQ3-3	VA24D1791-003	2024-11-22	M	<0.0050	0.00170	0.00133	<0.0030	0.0186	<0.0010	0.00105	0.0110	<0.00050	<0.00050	2.72	0.000047	242	<0.00050	<0.00150	<0.00150	0.000211	0.00071	0.014	<0.00010
WQ3-3	L2758486-3	2024-12-18	M																				
WQ3-3	VA24D3937-003	2024-12-18	M	<0.0050	0.00128	0.00100	<0.0030	0.0517	<0.0010	0.00092	0.0073	<0.00050	<0.00050	2.04	0.000050	176	<0.00050	<0.00150	<0.00150	0.000081	<0.00050	0.017	<0.00010
WQ3-3	L2758770-3	2025-01-22	M																				
WQ3-3	VA25A1525-003	2025-01-22	M	<0.0050	0.00203	0.00125	<0.0030	<0.0100	<0.0010	0.00111	0.0092	<0.00050	<0.00050	2.85	0.000052	262	<0.00050	<0.00150	<0.00150	0.000059	0.00067	<0.010	<0.00010
WQ3-3	L2759008-3	2025-02-19	M																				
WQ3-3	VA25A3570-003	2025-02-19	M	<0.0050	0.00194	0.00126	<0.0030	<0.0050	<0.0010	0.00124	0.0102	<0.00050	<0.00050	2.96	0.000056	320	<0.00050	<0.00150	<0.00150	0.000071	0.00064	<0.010	<0.00010
WQ3-3	VA25A6679-003	2025-03-26	M	<0.0050	0.00116	0.00085	<0.0030	0.0234	<0.0010	0.00072	0.0067	<0.00050	<0.00050	1.80	0.000035	172	<0.00050	<0.00150	<0.00150	0.000050	0.00058	0.019	<0.00010
WQ3-3	VA25A9109-003	2025-04-23	M	<0.0050	0.000468	<0.00050	<0.0030	0.0390	<0.0010	<0.00040	0.0062	<0.00050	<0.00050	0.61	<0.000020	53.2	<0.00050	<0.00150	<0.00150	0.000051	0.00051	0.043	<0.00010
WQ3-3	VA25A9941-003	2025-05-01	M	0.0076	0.000473	0.00068	<0.0030	0.0404	<0.0010	<0.00040	0.0063	<0.00050	<0.00050	0.78	<0.000020	64.0	<0.00050	<0.00150	<0.00150	0.000058	0.00068	0.022	<0.00010
WQ3-3	VA25B0496-003	2025-05-07	M	0.0067	0.000519	0.00069	<0.0030	0.0398	<0.0010	<0.00040	0.0071	<0.00050	<0.00050	0.90	<0.000020	67.4	<0.00050	<0.00150	<0.00150	<0.000050	0.00055	0.025	0.00018
WQ3-3	VA25B1530-003	2025-05-16	M	0.0078	0.000355	0.00072	<0.0030	0.0434	<0.0010	<0.00040	0.0065	<0.00050	<0.00050	0.56	<0.000020	43.0	<0.00050	<0.00150	<0.00150	<0.000050	0.00053	0.025	<0.00010
WQ3-3	VA25B1841-003	2025-05-21	M	0.0104	0.000212	0.00070	<0.0030	0.0431	<0.0010	<0.00040	0.0059	<0.00050	<0.00050	0.32	<0.000020	21.2	<0.00050	<0.00150	<0.00150	<0.000050	0.00059	0.036	<0.00010
WQ4-1	0051710-07	2020-05-20	M	<0.0100	0.0029	0.0027	<0.0080																
WQ4-1	0062209-07	2020-06-22	M	<0.0100	0.00301	0.002	<0.0080																
WQ4-1	0071996-07	2020-07-21	M	<0.0100	0.00268	<0.0020	<0.0080																
WQ4-1	0082292-07	2020-08-24	M	<0.0100	0.00303	<0.0020	<0.0080																
WQ4-1	0093017-07	2020-09-28	M	<0.0100	0.00268	<0.0020	0.011																
WQ4-1	20J1961-07	2020-10-20	M	<0.0100	0.00268	0.0067	<0.0080																
WQ4-1	20J2778-07	2020-10-27	M	<0.0100	0.00287	0.0032	<0.0080																
WQ4-1	20K0360-07	2020-11-03	M	<0.0100	0.00269	0.0031	0.0085																
WQ4-1	20K1261-07	2020-11-10	M	<0.0100	0.00296	<0.0020	<0.0080																
WQ4-1	20K2100-07	2020-11-18	M	<0.0100	0.00284	<0.0020	<0.0080																
WQ4-1	20L1589-07	2020-12-14	M	0.0174	0.00319	0.0036	<0.0080																
WQ4-1	21A2590-07	2021-01-27	M	<0.0100	0.00301	<0.0020	<0.0080																
WQ4-1	21B2778-07	2021-02-25	M	<0.0100	0.00302	0.0031	0.0149																
WQ4-1	21C3505-07	2021-03-25	M	<0.00200	0.00299	<0.00200	<0.0100																
WQ4-1	21D2478-07	2021-04-22	M	0.00208	0.00317	<0.00200	<0.0100																
WQ4-1	21E1990-07	2021-05-18	M	<0.0100	0.00295	0.0024	0.0105																
WQ4-1	21E2917-07	2021-05-26	M	0.00453	0.00278	0.00396	<0.0100																

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	21F0167-07	2021-06-01	M	<0.00200	0.00279	0.00222	<0.0100																
WQ4-1	21F1056-07	2021-06-08	M	0.00206	0.00293	<0.00200	<0.0100																
WQ4-1	21F2014-07	2021-06-15	M	0.00275	0.00279	<0.00200	<0.0100																
WQ4-1	21G2414-07	2021-07-20	M	<0.00200	0.00266	<0.00200	<0.0100																
WQ4-1	21H3040-07	2021-08-25	M	<0.00200	0.0027	0.0026	0.0104																
WQ4-1	21I3814-07	2021-09-28	M	0.00582	0.00282	<0.00200	<0.0100																
WQ4-1	21J3514-07	2021-10-26	M	<0.0050	0.00269	0.0012	<0.0040																
WQ4-1	21K3046-07	2021-11-23	M	<0.0100	0.00278	<0.0020	<0.0080																
WQ4-1	21L2125-07	2021-12-14	M	<0.0100	0.0026	<0.0020	<0.0080																
WQ4-1	22A2312-07	2022-01-20	M	<0.0100	0.00292	0.0037	<0.0080																
WQ4-1	22B2487-07	2022-02-17	M	<0.0100	0.00276	<0.0020	<0.0080	<0.0100	<0.00040	0.00157	<0.0100	<0.00020	<0.00020	3.8	0.000074	320	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ4-1	22C3145-07	2022-03-22	M	<0.0100	0.00242	0.0051	<0.0080	0.0263	<0.00040	0.00205	0.01	<0.00020	<0.00020	3.39	0.000062	334	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ4-1	22D2212-12	2022-04-20	M	<0.0100	0.00269	<0.0100	<0.0080	0.011	<0.00040	0.00165	0.0112	<0.00020	<0.00020	5.29	0.000087	325	0.00101			<0.00020	<0.00080	<0.020	<0.00040
WQ4-1	22E2480-09	2022-05-17	M	<0.0500	0.0023	<0.0500	<0.0400	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.31	<0.000100	348	<0.00500			<0.00100	<0.00400	<0.100	<0.00200
WQ4-1	22F3212-07	2022-06-21	M	<0.00200	0.00246	<0.0100	<0.0100	0.0165	<0.000500	0.00155	0.0122	<0.000100	<0.000100	3.49	0.0000741	377	<0.00100			<0.0000500	0.00119	<0.0200	<0.000500
WQ4-1	22G1763-07	2022-07-13	M	<0.00200	0.00258	<0.0100	<0.0100	<0.0100	<0.000500	0.00168	0.0116	<0.000100	<0.000100	4.46	0.000106	334	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	22H2453-07	2022-08-16	M	0.00259	0.00252	<0.0100	<0.0100	0.0199	<0.000500	0.00170	0.0113	<0.000100	<0.000100	4.39	0.0000836	389	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	22I1926-07	2022-09-14	M	<0.00200	0.00246	<0.0100	<0.0100	0.0164	<0.000500	0.00166	0.0109	<0.000100	<0.000100	3.92	0.0000441	336	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	22J1560-09	2022-10-12	M	<0.00200	0.00258	<0.00500	<0.0100	<0.0100	<0.000500	0.00161	0.0101	<0.000100	<0.000100	4.09	0.000101	313	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	22K1453-07	2022-11-10	M	0.00246	0.00323	<0.0100	<0.0100	<0.0100	<0.000500	0.00199	0.0116	<0.000100	<0.000100	5.29	0.0000844	385	0.00105			0.000135	<0.00100	<0.0200	<0.000500
WQ4-1	22L0774-07	2022-12-07	M	<0.00200	0.00268	<0.0100	<0.0100	<0.0100	<0.000500	0.00164	0.0117	<0.000100	<0.000100	4.51	0.0000674	425	<0.00100			0.0000715	<0.00100	<0.0200	<0.000500
WQ4-1	23A2847-07	2023-01-27	M	<0.00200	0.00285	<0.0100	<0.0100	0.0361	<0.000500	0.00198	0.00961	0.000114	<0.000100	3.9	0.0000865	384	<0.00100			0.0000748	<0.00100	<0.0200	<0.000500
WQ4-1	23C0060-07	2023-02-28	M	<0.00200	0.00270	<0.0100	<0.0100	<0.0100	<0.000500	0.00182	0.00989	<0.000100	<0.000100	3.95	0.000100	406	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	23C1797-07	2023-03-15	M	<0.00200	0.00273	<0.0100	<0.0100	<0.0100	<0.000500	0.00170	0.00922	<0.000100	<0.000100	3.68	0.0000836	375	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	23D2945-07	2023-04-26	M	<0.00200	0.00320	<0.0100	<0.0100	<0.0100	<0.000500	0.00168	0.0102	<0.000100	<0.000100	3.61	0.0000616	393	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	23E2392-07	2023-05-17	M	<0.00200	0.00247	<0.0100	<0.0100	<0.0100	<0.000500	0.00215	0.0100	<0.000100	<0.000100	3.61	0.000104	393	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	23F3614-07	2023-06-27	M	0.00228	0.00263	<0.0100	<0.0100	<0.0100	<0.000500	0.00175	0.0103	<0.000100	<0.000100	4.21	0.0000767	363	<0.00100			<0.0000500	<0.00100	<0.0200	0.000864
WQ4-1	23G2415-07	2023-07-19	M	<0.00200	0.00264	<0.0100	<0.0100	<0.0100	<0.000500	0.00218	0.0110	<0.000100	<0.000100	4.95	0.000101	450	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	23H3309-09	2023-08-24	M	<0.00200	0.00269	<0.0100	<0.0100	<0.0100	<0.000500	0.00203	0.00955	<0.000100	<0.000100	4.02	0.000111	353	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	23I2271-09	2023-09-19	M	0.00232	0.00278	<0.0100	<0.0100	<0.0100	<0.000500	0.00171	0.0105	<0.000100	<0.000100	4.11	0.0000778	305	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	23J2236-09	2023-10-18	M	0.00374	0.00271	<0.00400	<0.0100	<0.0100	<0.000500	0.00178	0.0110	<0.000100	<0.000100	4.06	0.000106	380	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	23K1909-07	2023-11-15	M	<0.00200	0.00277	<0.00400	<0.0100	0.0108	<0.000500	0.00175	0.00980	<0.000100	<0.000100	4.68	0.0000761	413	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	23L2091-04	2023-12-15	M	0.00250	0.00295	<0.00400	<0.0100	<0.0100	<0.000500	0.00199	0.00941	<0.000100	<0.000100	4.22	0.0000642	368	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-1	L2754383-4	2024-01-25	M																				
WQ4-1	VA24A1507-004	2024-01-25	M	<0.0050	0.00285	0.00162	<0.0030	<0.0050	<0.0010	0.00217	0.0082	<0.00050	<0.00050	4.16	0.000077	384	<0.00050			0.000089	<0.00050	<0.010	<0.00010
WQ4-1	L2754604-4	2024-02-14	M																				
WQ4-1	VA24A2995-004	2024-02-14	M	<0.0050	0.00246	0.00167	<0.0030	0.0065	<0.0010	0.00161	0.0087	<0.00050	<0.00050	3.76	0.000074	356	<0.00050	<0.00150	<0.00150	0.000071	<0.00050	<0.010	<0.00010
WQ4-1	L2755043-4	2024-03-21	M																				
WQ4-1	VA24A6026-004	2024-03-21	M	<0.0050	0.00294	0.00159	<0.0030	<0.0050	<0.0010	0.00246	0.0092	<0.00050	<0.00050	3.81	0.000067	397	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ4-1	L2755490-4	2024-04-24	M																				
WQ4-1	VA24A8916-004	2024-04-24	M	<0.0050	0.00280	0.00144	<0.0030	<0.0050	<0.0010	0.00324	0.0092	<0.00050	<0.00050	4.02	0.000071	373	<0.00050	<0.00150	<0.00150	0.000057	<0.00050	<0.010	0.00010
WQ4-1	L2755567-4	2024-05-01	M																				
WQ4-1	VA24A9566-004	2024-05-01	M	<0.0050	0.00274	0.00132	<0.0030	<0.0050	<0.0010	0.00360	0.0104	<0.00050	<0.00050	3.63	0.000066	385	<0.00050	<0.00150	<0.00150	0.000054	<0.00050	<0.010	<0.00010
WQ4-1	L2755666-4	2024-05-08	M																				
WQ4-1	VA24B0201-004	2024-05-08	M	<0.0050	0.00304	0.00164	<0.0030	<0.0050	<0.0010	0.00358	0.0093	<0.00050	<0.00050	3.77	0.000078	383	<0.00050	<0.00150	<0.00150	0.000078	<0.00050	<0.010	<0.00010
WQ4-1	L2755779-4	2024-05-15	M																				
WQ4-1	VA24B0901-004	2024-05-15	M	<0.0050	0.00281	0.00152	<0.0030	<0.0050	<0.0010	0.00386	0.0101	<0.00050	<0.00050	3.79	0.000084	372	<0.00050	<0.00150	<0.00150	0.000075	<0.00050	<0.010	<0.00010
WQ4-1	L2755888-4	2024-05-22	M																				
WQ4-1	VA24B1500-004	2024-05-22	M	<0.0050	0.00252	0.00143	<0.0030	<0.0050	<0.0010	0.00241	0.0101	<0.00050	<0.00050	3.75	0.000065	366	<0.00050	<0.00150	<0.00150	0.000075	<0.00050	<0.010	<0.00010
WQ4-1	L2756312-4	2024-06-19	M																				
WQ4-1	VA24B4510-004	2024-06-19	M	<0.0050	0.00295	0.00152	<0.0030	<0.0050	<0.0010	0.00370	0.0104	<0.00050	<0.00050	4.40	0.000074	386	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	0.00028
WQ4-1	VA24B7397-004	2024-07-17	M	<0.0050	0.00293	0.00135	<0.0030	<0.0050	<0.0010	0.00372	0.0104	<0.00050	<0.00050	3.42	0.000076	398	<0.00050	<0.00150	<0.00150	0.000051	<0.00050	<0.010	<0.00010
WQ4-1	L2756689-4	2024-07-17	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	L2757122-4	2024-08-21	M																				
WQ4-1	VA24C1337-004	2024-08-21	M	<0.0050	0.00263	0.00124	0.0046	<0.0050	<0.0010	0.00344	0.0110	<0.00050	<0.00050	4.18	0.000072	395	<0.00050	<0.00150	<0.00150	0.000082	<0.00050	<0.010	<0.00010
WQ4-1	VA24C4683-004	2024-09-18	M	<0.0050	0.00303	0.00124	<0.0030	<0.0050	<0.0010	0.00501	0.0104	<0.00050	<0.00050	4.28	0.000064	375	<0.00050	<0.00150	<0.00150	0.000071	<0.00050	<0.010	<0.00010
WQ4-1	VA24C8569-004	2024-10-23	M	<0.0050	0.00297	0.00122	<0.0030	<0.0050	<0.0010	0.00646	0.0103	<0.00050	<0.00050	3.62	0.000084	368	<0.00050	<0.00150	<0.00150	0.000083	<0.00050	<0.010	<0.00010
WQ4-1	L2757977-4	2024-10-30	M																				
WQ4-1	VA24C9414-004	2024-10-30	M	<0.0050	0.00271	0.00163	<0.0030	<0.0050	<0.0010	0.00162	0.0095	<0.00050	<0.00050	3.32	0.000076	386	<0.00050	<0.00150	<0.00150	0.000187	<0.00050	<0.010	<0.00010
WQ4-1	VA24D0180-004	2024-11-06	M	<0.0050	0.00277	0.00158	<0.0030	0.0055	<0.0010	0.00148	0.0108	<0.00050	<0.00050	2.99	0.000054	363	<0.00050	<0.00150	<0.00150	0.000208	<0.00050	<0.010	<0.00010
WQ4-1	VA24D0813-004	2024-11-13	M	<0.0050	0.00277	0.00148	<0.0030	0.0063	<0.0010	0.00160	0.0115	<0.00050	<0.00050	3.38	0.000082	378	<0.00050	<0.00150	<0.00150	0.000202	<0.00050	<0.010	<0.00010
WQ4-1	L2758221-4	2024-11-22	M																				
WQ4-1	VA24D1791-004	2024-11-22	M	<0.0050	0.00238	0.00167	<0.0030	0.0063	<0.0010	0.00149	0.0117	<0.00050	<0.00050	4.96	0.000080	398	<0.00050	<0.00150	<0.00150	0.000290	<0.00050	<0.010	<0.00010
WQ4-1	L2758486-4	2024-12-18	M																				
WQ4-1	VA24D3937-004	2024-12-18	M	<0.0050	0.00238	0.00153	<0.0030	<0.0050	<0.0010	0.00171	0.0089	<0.00050	<0.00050	3.84	0.000079	351	<0.00050	<0.00150	<0.00150	0.000077	<0.00050	<0.010	<0.00010
WQ4-1	L2758770-4	2025-01-22	M																				
WQ4-1	VA25A1525-004	2025-01-22	M	<0.0050	0.00243	0.00149	<0.0030	<0.0050	<0.0010	0.00146	0.0085	<0.00050	<0.00050	3.49	0.000074	345	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ4-1	L2759008-4	2025-02-19	M																				
WQ4-1	VA25A3570-004	2025-02-19	M	<0.0050	0.00244	0.00146	<0.0030	<0.0050	<0.0010	0.00153	0.0092	<0.00050	<0.00050	3.50	0.000077	373	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ4-1	VA25A6679-004	2025-03-26	M	<0.0050	0.00173	0.00118	<0.0030	0.0079	<0.0010	0.00163	0.0089	<0.00050	<0.00050	3.01	0.000067	365	<0.00050	<0.00150	<0.00150	0.000062	<0.00050	<0.010	<0.00010
WQ4-1	VA25A9109-004	2025-04-23	M	<0.0050	0.00246	0.00143	<0.0030	<0.0050	<0.0010	0.00151	0.0085	<0.00050	<0.00050	3.21	0.000081	362	<0.00050	<0.00150	<0.00150	0.000058	<0.00050	<0.010	<0.00010
WQ4-1	VA25A9941-004	2025-05-01	M	<0.0050	0.00236	0.00153	<0.0030	<0.0050	<0.0010	0.00146	0.0090	<0.00050	<0.00050	3.96	0.000080	357	<0.00050	<0.00150	<0.00150	<0.000050	0.00052	<0.010	<0.00010
WQ4-1	VA25B0496-004	2025-05-07	M	<0.0050	0.00266	0.00158	<0.0030	<0.0050	<0.0010	0.00166	0.0088	<0.00050	<0.00050	4.23	0.000075	379	<0.00050	<0.00150	<0.00150	0.000073	<0.00050	<0.010	<0.00010
WQ4-1	VA25B1530-004	2025-05-16	M	<0.0050	0.00257	0.00164	<0.0030	<0.0050	<0.0010	0.00169	0.0090	<0.00050	<0.00050	3.61	0.000087	349	<0.00050	<0.00150	<0.00150	0.000074	<0.00050	<0.010	<0.00010
WQ4-1	VA25B1841-004	2025-05-21	M	<0.0050	0.00275	0.00151	<0.0030	<0.0050	<0.0010	0.00146	0.0086	<0.00050	<0.00050	3.23	0.000084	378	<0.00050	<0.00150	<0.00150	0.000064	<0.00050	<0.010	<0.00010
WQ4-2	0051710-08	2020-05-20	M	0.0152	0.000259	<0.0020	<0.0080																
WQ4-2	0062209-08	2020-06-22	M	0.0838	0.000206	0.003	<0.0080																
WQ4-2	0071996-08	2020-07-21	M	0.0416	0.000258	0.0035	0.0091																
WQ4-2	0082292-08	2020-08-24	M	0.0101	0.00183	<0.0020	<0.0080																
WQ4-2	0093017-08	2020-09-28	M	0.02	0.00105	<0.0020	0.0181																
WQ4-2	20J1961-08	2020-10-20	M	0.0167	0.000641	0.0073	<0.0080																
WQ4-2	20J2778-08	2020-10-27	M	<0.0100	0.00124	0.0032	<0.0080																
WQ4-2	20K0360-08	2020-11-03	M	<0.0100	0.000764	0.0024	<0.0080																
WQ4-2	20K1261-08	2020-11-10	M	0.016	0.00138	<0.0020	<0.0080																
WQ4-2	20K2100-08	2020-11-18	M	<0.0100	0.000589	<0.0020	<0.0080																
WQ4-2	20L1589-08	2020-12-14	M	<0.0100	0.00161	0.003	<0.0080																
WQ4-2	21A2590-08	2021-01-27	M	<0.0100	0.00235	<0.0020	<0.0080																
WQ4-2	21B2778-08	2021-02-25	M	<0.0100	0.00245	0.0023	<0.0080																
WQ4-2	21C3505-08	2021-03-25	M	<0.00200	0.00158	<0.00200	<0.0100																
WQ4-2	21D2478-08	2021-04-22	M	0.00912	0.00131	0.00133	0.0017																
WQ4-2	21E1990-08	2021-05-18	M	0.0293	0.000209	0.0024	<0.0040																
WQ4-2	21E2917-08	2021-05-26	M	0.014	0.000382	0.00045	0.0041																
WQ4-2	21F0167-08	2021-06-01	M	0.015	0.000667	0.00055	0.0018																
WQ4-2	21F1056-08	2021-06-08	M	0.0582	0.000229	0.00244	0.0033																
WQ4-2	21F2014-08	2021-06-15	M	0.0729	0.000311	0.00359	0.0044																
WQ4-2	21G2414-08	2021-07-20	M	0.0254	0.000385	<0.00200	<0.0100																
WQ4-2	21H3040-08	2021-08-25	M	0.0217	0.000531	0.0022	<0.0100																
WQ4-2	21I3814-08	2021-09-28	M	0.0088	0.00138	<0.00200	<0.0100																
WQ4-2	21J3514-08	2021-10-26	M	0.0101	0.000346	<0.0010	<0.0040																
WQ4-2	21K3046-08	2021-11-23	M	<0.0100	0.00104	<0.0020	<0.0080																
WQ4-2	21L2125-08	2021-12-14	M	<0.0100	0.00118	<0.0020	<0.0080																
WQ4-2	22A2312-08	2022-01-20	M	<0.0100	0.00277	0.0037	<0.0080																
WQ4-2	22B2487-08	2022-02-17	M	<0.0100	0.0024	<0.0020	0.0098	0.0121	<0.00040	0.00107	<0.0100	<0.00020	<0.00020	3.32	0.000066	279	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQ4-2	22C3145-08	2022-03-22	M	<0.0100	0.00204	0.0049	<0.0080	<0.0100	<0.00040	0.00197	<0.0100	<0.00020	<0.00020	3.11	0.000098	304	<0.00100			<0.00020	0.0151	<0.020	<0.00040
WQ4-2	22D2212-13	2022-04-20	M	<0.0100	0.00192	<0.0100	<0.0080	0.0148	<0.00040	<0.00100	<0.0100	<0.00020	<0.00020	3.76	0.000045	240	<0.00100			<0.00020	0.00126	0.095	<0.00040
WQ4-2	22E2480-10	2022-05-17	M	<0.0500	0.000538	<0.0500	<0.0400	0.0577	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	0.749	<0.000100	73.5	<0.00500			<0.00100	<0.00400	<0.100	<0.00200

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	22F3212-08	2022-06-21	M	0.0108	0.000234	<0.0100	<0.0100	0.0528	<0.000500	<0.000500	0.00685	<0.000100	<0.000100	0.385	<0.0000200	26.3	<0.00100			<0.0000500	<0.00100	0.0215	<0.000500
WQ4-2	22G1763-08	2022-07-13	M	0.0267	0.000254	<0.0100	<0.0100	0.0258	<0.000500	<0.000500	0.00896	<0.000100	<0.000100	0.461	<0.0000200	30.9	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-2	22H2453-08	2022-08-16	M	0.0270	0.000211	<0.0100	<0.0100	0.0286	<0.000500	<0.000500	0.00994	<0.000100	<0.000100	0.337	<0.0000200	30.0	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-2	22I1926-08	2022-09-14	M	0.00249	0.00170	<0.0100	<0.0100	0.0358	<0.000500	0.00113	0.0126	<0.000100	<0.000100	2.70	0.0000593	237	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-2	22J1560-10	2022-10-12	M	<0.00200	0.00197	<0.00500	<0.0100	<0.0100	<0.000500	0.00134	0.00929	<0.000100	<0.000100	3.57	0.0000541	272	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-2	22K1453-08	2022-11-10	M	<0.00200	0.00284	<0.0100	<0.0100	<0.0100	<0.000500	0.00177	0.0112	<0.000100	<0.000100	4.78	0.0000648	351	<0.00100			0.000133	<0.00100	<0.0200	<0.000500
WQ4-2	22L0774-08	2022-12-07	M	<0.00200	0.00253	<0.0100	<0.0100	<0.0100	<0.000500	0.00186	0.0126	<0.000100	<0.000100	4.48	0.0000766	364	<0.00100			0.0000817	<0.00100	<0.0200	<0.000500
WQ4-2	23A2847-08	2023-01-27	M	<0.00200	0.00216	<0.0100	<0.0100	0.0115	<0.000500	0.00131	0.0105	0.000123	<0.000100	3.07	0.0000671	294	<0.00100			0.0000915	<0.00100	<0.0200	<0.000500
WQ4-2	23C0060-08	2023-02-28	M	<0.00200	0.00240	<0.0100	<0.0100	<0.0100	<0.000500	0.00151	0.00890	<0.000100	<0.000100	3.34	0.0000512	344	<0.00100			0.0000630	<0.00100	<0.0200	<0.000500
WQ4-2	23C1797-08	2023-03-15	M	<0.00200	0.00202	<0.0100	<0.0100	<0.0100	<0.000500	0.00131	0.0113	<0.000100	<0.000100	2.87	0.0000636	252	<0.00100			0.0000597	<0.00100	<0.0200	<0.000500
WQ4-2	23D2945-08	2023-04-26	M	<0.00200	0.00197	<0.0100	<0.0100	0.0150	<0.000500	0.00116	0.00754	<0.000100	<0.000100	2.45	0.0000222	254	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-2	23E2392-08	2023-05-17	M	0.0657	0.000627	<0.00500	<0.0050	0.0513	<0.000500	0.000697	0.0118	<0.000100	<0.000100	0.827	0.0000285	77.8	<0.00100			0.0000708	<0.00100	<0.0200	<0.000500
WQ4-2	23F3614-08	2023-06-27	M	0.0282	0.000209	<0.0100	<0.0100	0.0199	<0.000500	<0.000500	0.00840	<0.000100	<0.000100	0.291	<0.0000200	24.9	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-2	23G2415-08	2023-07-19	M	0.0160	0.00122	<0.0100	<0.0100	0.0191	<0.000500	0.000871	0.0130	<0.000100	<0.000100	1.81	0.0000274	160	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-2	23H3309-10	2023-08-24	M	<0.00200	0.00210	<0.0100	<0.0100	<0.0100	<0.000500	0.00182	0.0133	<0.000100	<0.000100	3.3	0.0000575	288	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-2	23I2271-11	2023-09-19	M	0.00634	0.000905	<0.0100	<0.0100	0.0123	<0.000500	0.000636	0.0123	<0.000100	<0.000100	1.43	0.0000519	104	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-2	23J2236-11	2023-10-18	M	0.0435	0.00100	<0.00400	<0.0100	0.0396	<0.000500	0.000656	0.0142	<0.000100	<0.000100	1.35	<0.0000200	120	<0.00500			0.0000598	<0.00100	<0.0200	<0.000500
WQ4-2	23K1909-08	2023-11-15	M	0.00327	0.00105	<0.00400	<0.0100	0.0396	<0.000500	0.000572	0.0102	<0.000100	<0.000100	1.62	0.0000226	140	<0.00500			0.0000713	<0.00100	0.0286	<0.000500
WQ4-2	23L2091-05	2023-12-15	M	<0.00200	0.00249	<0.00400	<0.0100	0.0154	<0.000500	0.00189	0.00998	<0.000100	<0.000100	3.5	0.0000857	304	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQ4-2	L2754383-5	2024-01-25	M																				
WQ4-2	VA24A1507-005	2024-01-25	M	<0.0050	0.00170	0.00114	<0.0030	0.0286	<0.0010	0.00119	0.0077	<0.00050	<0.00050	2.51	0.000038	224	<0.00050			0.000084	0.00054	0.019	<0.00010
WQ4-2	L2754604-5	2024-02-14	M																				
WQ4-2	VA24A2995-005	2024-02-14	M	<0.0050	0.00202	0.00146	<0.0030	0.0078	<0.0010	0.00142	0.0095	<0.00050	<0.00050	3.39	0.000058	305	<0.00050	<0.00150	<0.00150	0.000084	<0.00050	<0.010	<0.00010
WQ4-2	L2755043-5	2024-03-21	M																				
WQ4-2	VA24A6026-005	2024-03-21	M	<0.0050	0.000803	0.00094	<0.0030	0.0312	<0.0010	0.00090	0.0081	<0.00050	<0.00050	1.08	<0.000020	101	<0.00050	<0.00150	<0.00150	0.000075	0.00061	0.044	<0.00010
WQ4-2	L2755490-5	2024-04-24	M																				
WQ4-2	VA24A8916-005	2024-04-24	M	<0.0050	0.00186	0.00108	<0.0030	0.0147	<0.0010	0.00168	0.0062	<0.00050	<0.00050	2.37	0.000042	206	<0.00050	<0.00150	<0.00150	0.000061	<0.00050	<0.010	<0.00010
WQ4-2	L2755567-5	2024-05-01	M																				
WQ4-2	VA24A9566-005	2024-05-01	M	<0.0050	0.00238	0.00106	<0.0030	<0.0050	<0.0010	0.00316	0.0045	<0.00050	<0.00050	3.16	0.000058	319	<0.00050	<0.00150	<0.00150	0.000057	<0.00050	<0.010	<0.00010
WQ4-2	L2755666-5	2024-05-08	M																				
WQ4-2	VA24B0201-005	2024-05-08	M	0.0076	0.000709	0.00089	<0.0030	0.0315	<0.0010	0.00123	0.0069	<0.00050	<0.00050	1.00	<0.000020	90.7	<0.00050	<0.00150	<0.00150	0.000068	0.00067	0.023	<0.00010
WQ4-2	L2755779-5	2024-05-15	M																				
WQ4-2	VA24B0901-005	2024-05-15	M	0.0129	0.00123	0.00119	<0.0030	0.0307	<0.0010	0.00201	0.0079	<0.00050	<0.00050	1.63	0.000038	150	<0.00050	<0.00150	<0.00150	0.000067	0.00065	<0.010	<0.00010
WQ4-2	L2755888-5	2024-05-22	M																				
WQ4-2	VA24B1500-005	2024-05-22	M	0.0072	0.00127	0.00100	<0.0030	0.0224	<0.0010	0.00136	0.0066	<0.00050	<0.00050	1.78	0.000028	164	<0.00050	<0.00150	<0.00150	0.000066	<0.00050	<0.010	<0.00010
WQ4-2	L2756312-5	2024-06-19	M																				
WQ4-2	VA24B4510-005	2024-06-19	M	0.0080	0.00117	0.00095	<0.0030	0.0170	<0.0010	0.00187	0.0062	<0.00050	<0.00050	1.91	0.000024	155	<0.00050	<0.00150	<0.00150	<0.000050	0.00054	<0.010	<0.00010
WQ4-2	VA24B7397-005	2024-07-17	M	0.0154	0.00164	0.00130	<0.0030	0.0164	<0.0010	0.00239	0.0104	<0.00050	<0.00050	2.03	0.000038	219	<0.00050	<0.00150	<0.00150	<0.000050	0.00060	<0.010	<0.00010
WQ4-2	L2756689-5	2024-07-17	M																				
WQ4-2	L2757122-5	2024-08-21	M																				
WQ4-2	VA24C1337-005	2024-08-21	M	0.0217	0.000443	0.00108	<0.0030	0.0130	<0.0010	0.00059	0.0132	<0.00050	<0.00050	0.73	<0.000020	61.7	<0.00050	<0.00150	<0.00150	0.000051	<0.00050	<0.010	<0.00010
WQ4-2	VA24C4683-005	2024-09-18	M	0.0209	0.000518	0.00135	<0.0030	0.0139	<0.0010	0.00105	0.0121	<0.00050	<0.00050	0.75	0.000022	75.0	<0.00050	<0.00150	<0.00150	0.000074	<0.00050	<0.010	<0.00010
WQ4-2	VA24C8569-005	2024-10-23	M	0.0133	0.00192	0.00129	<0.0030	0.0244	<0.0010	0.00455	0.0139	<0.00050	<0.00050	2.42	0.000045	249	<0.00050	<0.00150	<0.00150	0.000079	0.00056	<0.010	<0.00010
WQ4-2	L2757977-5	2024-10-30	M																				
WQ4-2	VA24C9414-005	2024-10-30	M	<0.0050	0.00195	0.00135	<0.0030	0.0150	<0.0010	0.00128	0.0109	<0.00050	<0.00050	2.50	0.000060	274	<0.00050	<0.00150	<0.00150	0.000150	<0.00050	<0.010	<0.00010
WQ4-2	VA24D0180-005	2024-11-06	M	<0.0050	0.00218	0.00139	<0.0030	0.0094	<0.0010	0.00112	0.0104	<0.00050	<0.00050	2.37	0.000069	286	<0.00050	<0.00150	<0.00150	0.000146	<0.00050	<0.010	<0.00010
WQ4-2	VA24D0813-005	2024-11-13	M	0.0057	0.00110	0.00086	<0.0030	0.0885	<0.0010	0.00055	0.0069	<0.00050	<0.00050	1.17	0.000037	121	<0.00050	<0.00150	<0.00150	0.000086	0.00052	0.022	<0.00010
WQ4-2	L2758221-5	2024-11-22	M																				
WQ4-2	VA24D1791-005	2024-11-22	M	<0.0050	0.00160	0.00128	<0.0030	0.0269	<0.0010	0.00102	0.0101	<0.00050	<0.00050	2.82	0.000046	243	<0.00050	<0.00150	<0.00150	0.000197	0.00059	0.012	<0.00010
WQ4-2	L2758486-5	2024-12-18	M																				
WQ4-2	VA24D3937-005	2024-12-18	M	<0.0050	0.00194	0.00134	<0.0030	0.0101	<0.0010	0.00136	0.0090	<0.00050	<0.00050	3.24	0.000069	285	<0.00050	<0.00150	<0.00150	0.000073	<0.00050	<0.010	<0.00010
WQ4-2	VA25A1525-005	2025-01-22	M	<0.0050	0.00196	0.00122	<0.0030	<0.0100	<0.0010	0.00122	0.0093	<0.00050	<0.00050	2.82	0.000061	276	<0.00050	<0.00150	<0.00150	0.000064	0.00050	<0.010	<0.00010
WQ4-2	L2758770-5	2025-01-22	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	L2759008-5	2025-02-19	M																				
WQ4-2	VA25A3570-005	2025-02-19	M	<0.0050	0.00184	0.00122	<0.0030	0.0062	<0.0010	0.00119	0.0099	<0.00050	<0.00050	2.76	0.000052	273	<0.00050	<0.00150	<0.00150	0.000059	<0.00050	<0.010	<0.00010
WQ4-2	VA25A6679-005	2025-03-26	M	<0.0050	0.00131	0.00090	<0.0030	0.0196	<0.0010	0.00081	0.0069	<0.00050	<0.00050	1.98	0.000032	187	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	0.015	<0.00010
WQ4-2	VA25A9109-005	2025-04-23	M	<0.0050	0.00200	0.00051	<0.0030	<0.0050	<0.0010	0.00124	0.0086	<0.00050	<0.00050	2.72	0.000074	311	<0.00050	<0.00150	<0.00150	0.000059	<0.00050	<0.010	<0.00010
WQ4-2	VA25A9941-005	2025-05-01	M	<0.0050	0.00137	0.00071	<0.0030	0.0170	<0.0010	0.00081	0.0080	<0.00050	<0.00050	2.23	0.000032	181	<0.00050	<0.00150	<0.00150	0.000053	0.00074	<0.010	<0.00010
WQ4-2	VA25B0496-005	2025-05-07	M	<0.0050	0.00130	0.00086	<0.0030	0.0209	<0.0010	0.00090	0.0084	<0.00050	<0.00050	2.34	0.000036	209	<0.00050	<0.00150	<0.00150	0.000060	0.00053	<0.010	<0.00010
WQ4-2	VA25B1530-005	2025-05-16	M	0.0057	0.000796	0.00079	<0.0030	0.0333	<0.0010	0.00046	0.0075	<0.00050	<0.00050	1.28	0.000020	112	<0.00050	<0.00150	<0.00150	0.000055	0.00063	0.012	<0.00010
WQ4-2	VA25B1841-005	2025-05-21	M	0.0092	0.000281	0.00064	<0.0030	0.0538	<0.0010	<0.00040	0.0054	<0.00050	<0.00050	0.33	<0.000020	22.4	<0.00050	<0.00150	<0.00150	<0.000050	0.00052	0.033	<0.00010
WQ4-3	23L2091-07	2023-12-15	M	0.00260	0.00209	<0.00400	<0.0100	0.0169	<0.000500	0.00152	0.00989	<0.000100	<0.000100	3.33	0.0000835	277	<0.00500			0.0000592	<0.00100	<0.0200	<0.000500
WQ4-3	L2754383-6	2024-01-25	M																				
WQ4-3	VA24A1507-006	2024-01-25	M	<0.0050	0.00112	0.00086	<0.0030	0.0542	<0.0010	0.00076	0.0066	<0.00050	<0.00050	1.46	0.000027	130	<0.00050			0.000070	0.00051	0.029	<0.00010
WQ4-3	L2754604-6	2024-02-14	M																				
WQ4-3	VA24A2995-006	2024-02-14	M	<0.0050	0.00176	0.00133	<0.0030	0.0204	<0.0010	0.00103	0.0089	<0.00050	<0.00050	2.79	0.000052	248	<0.00050	<0.00150	<0.00150	0.000088	<0.00050	<0.010	<0.00010
WQ4-3	L2755043-6	2024-03-21	M																				
WQ4-3	VA24A6026-006	2024-03-21	M	<0.0050	0.000350	0.00080	<0.0030	0.0421	<0.0010	0.00041	0.0075	<0.00050	<0.00050	0.47	<0.000020	42.6	<0.00050	<0.00150	<0.00150	0.000077	0.00060	0.059	<0.00010
WQ4-3	L2755490-6	2024-04-24	M																				
WQ4-3	VA24A8916-006	2024-04-24	M	<0.0050	0.000768	0.00081	<0.0030	0.0179	<0.0010	0.00054	0.0084	<0.00050	<0.00050	0.89	<0.000020	87.7	<0.00050	<0.00150	<0.00150	0.000062	<0.00050	0.013	<0.00010
WQ4-3	L2755567-6	2024-05-01	M																				
WQ4-3	VA24A9566-006	2024-05-01	M	<0.0050	0.000844	0.00075	<0.0030	0.0324	<0.0010	0.00128	0.0070	<0.00050	<0.00050	1.18	0.000028	111	<0.00050	<0.00150	<0.00150	0.000064	0.00058	0.030	<0.00010
WQ4-3	L2755666-6	2024-05-08	M																				
WQ4-3	VA24B0201-006	2024-05-08	M	0.0055	0.000682	0.00078	<0.0030	0.0404	<0.0010	0.00102	0.0065	<0.00050	<0.00050	0.85	<0.000020	78.9	<0.00050	<0.00150	<0.00150	0.000064	0.00063	0.024	<0.00010
WQ4-3	L2755779-6	2024-05-15	M																				
WQ4-3	VA24B0901-006	2024-05-15	M	0.0226	0.000475	0.00127	<0.0030	0.0345	<0.0010	0.00109	0.0080	<0.00050	<0.00050	0.63	<0.000020	54.0	<0.00050	<0.00150	<0.00150	0.000055	0.00062	0.015	<0.00010
WQ4-3	L2755888-6	2024-05-22	M																				
WQ4-3	VA24B1500-006	2024-05-22	M	0.0109	0.000575	0.00092	<0.0030	0.0356	<0.0010	0.00066	0.0076	<0.00050	<0.00050	0.74	<0.000020	74.8	<0.00050	<0.00150	<0.00150	0.000058	0.00052	<0.010	<0.00010
WQ4-3	L2756312-6	2024-06-19	M																				
WQ4-3	VA24B4510-006	2024-06-19	M	0.0155	0.000873	0.00118	<0.0030	0.0237	<0.0010	0.00094	0.0073	<0.00050	<0.00050	0.69	<0.000020	53.9	<0.00050	<0.00150	<0.00150	<0.000050	0.00051	0.013	<0.00010
WQ4-3	VA24B7397-006	2024-07-17	M	0.0342	0.000122	0.00142	<0.0030	0.0203	<0.0010	0.00055	0.0104	<0.00050	<0.00050	<0.30	<0.000020	18.7	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ4-3	L2756689-6	2024-07-17	M																				
WQ4-3	L2757122-6	2024-08-21	M																				
WQ4-3	VA24C1337-006	2024-08-21	M	0.0189	0.000438	0.00103	<0.0030	0.0127	<0.0010	0.00055	0.0134	<0.00050	<0.00050	0.65	<0.000020	57.0	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQ4-3	VA24C4683-006	2024-09-18	M	0.0245	0.000452	0.00126	<0.0030	0.0187	<0.0010	0.00105	0.0123	<0.00050	<0.00050	0.53	<0.000020	55.8	<0.00050	<0.00150	<0.00150	0.000066	<0.00050	<0.010	<0.00010
WQ4-3	VA24C8569-006	2024-10-23	M	0.0287	0.000752	0.00147	<0.0030	0.0334	<0.0010	0.00216	0.0151	<0.00050	<0.00050	0.89	0.000025	85.6	<0.00050	<0.00150	<0.00150	0.000067	0.00069	0.018	<0.00010
WQ4-3	L2757977-6	2024-10-30	M																				
WQ4-3	VA24C9414-006	2024-10-30	M	0.0088	0.000517	0.00093	<0.0030	0.0585	<0.0010	0.00043	0.0078	<0.00050	<0.00050	0.62	<0.000020	62.2	<0.00050	<0.00150	<0.00150	0.000090	0.00060	0.040	<0.00010
WQ4-3	VA24D0180-006	2024-11-06	M	<0.0050	0.00112	0.00105	<0.0030	0.0235	<0.0010	0.00079	0.0101	<0.00050	<0.00050	1.34	0.000026	152	<0.00050	<0.00150	<0.00150	0.000123	0.00054	0.029	<0.00010
WQ4-3	VA24D0813-006	2024-11-13	M	0.0075	0.000499	0.00077	<0.0030	0.0770	<0.0010	<0.00040	0.0072	<0.00050	<0.00050	0.57	<0.000020	56.7	<0.00050	<0.00150	<0.00150	0.000070	0.00097	0.039	<0.00010
WQ4-3	L2758221-6	2024-11-22	M																				
WQ4-3	VA24D1791-006	2024-11-22	M	<0.0050	0.00176	0.00139	<0.0030	0.0140	<0.0010	0.00136	0.0108	<0.00050	<0.00050	3.57	0.000061	281	<0.00050	<0.00150	<0.00150	0.000216	<0.00050	0.012	<0.00010
WQ4-3	L2758486-6	2024-12-18	M																				
WQ4-3	VA24D3937-006	2024-12-18	M	<0.0050	0.00149	0.00109	<0.0030	0.0382	<0.0010	0.00095	0.0076	<0.00050	<0.00050	2.42	0.000043	193	<0.00050	<0.00150	<0.00150	0.000060	<0.00050	0.016	<0.00010
WQ4-3	L2758770-6	2025-01-22	M																				
WQ4-3	VA25A1525-006	2025-01-22	M	<0.0050	0.00188	0.00115	<0.0030	<0.0100	<0.0010	0.00106	0.0089	<0.00050	<0.00050	2.74	0.000055	255	<0.00050	<0.00150	<0.00150	0.000055	<0.00050	<0.010	<0.00010
WQ4-3	L2759008-6	2025-02-19	M																				
WQ4-3	VA25A3570-006	2025-02-19	M	<0.0050	0.00173	0.00122	<0.0030	<0.0050	<0.0010	0.00110	0.0100	<0.00050	<0.00050	2.68	0.000054	268	<0.00050	<0.00150	<0.00150	0.000062	<0.00050	<0.010	<0.00010
WQ4-3	VA25A6679-006	2025-03-26	M	<0.0050	0.00118	0.00080	<0.0030	0.0285	<0.0010	0.00064	0.0060	<0.00050	<0.00050	1.67	0.000036	158	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	0.015	<0.00010
WQ4-3	VA25A9109-006	2025-04-23	M	<0.0050	0.000462	0.00053	0.0035	0.0300	<0.0010	<0.00040	0.0073	<0.00050	<0.00050	0.63	<0.000020	59.4	<0.00050	<0.00150	<0.00150	0.000062	0.00055	0.047	<0.00010
WQ4-3	VA25A9941-006	2025-05-01	M	0.0068	0.000472	0.00060	<0.0030	0.0373	<0.0010	<0.00040	0.0067	<0.00050	<0.00050	0.75	<0.000020	58.1	<0.00050	<0.00150	<0.00150	<0.000050	0.00080	0.021	<0.00010
WQ4-3	VA25B0496-006	2025-05-07	M	0.0060	0.000978	0.00081	<0.0030	0.0325	<0.0010	0.00060	0.0078	<0.00050	<0.00050	1.55	0.000027	137	<0.00050	<0.00150	<0.00150	0.000062	0.00051	0.012	0.00015
WQ4-3	VA25B1530-006	2025-05-16	M	0.0089	0.000295	0.00074	<0.0030	0.0482	<0.0010	<0.00040	0.0064	<0.00050	<0.00050	0.39	<0.000020	31.2	<0.00050	<0.00150	<0.00150	0.000051	0.00051	0.030	<0.00010
WQ4-3	VA25B1841-006	2025-05-21	M	0.0106	0.000244	0.00068	<0.0030	0.0418	<0.0010	<0.00040	0.0064	<0.00050	<0.00050	0.32	<0.000020	27.1	<0.00050	<0.00150	<0.00150	<0.000050	0.00056	0.036	<0.00010
WQR1-0.5	L2755545-7	2024-04-30	M																				
WQR1-0.5	VA24A9402-007	2024-04-30	M	<0.0050	0.00102	0.00089	<0.0030	0.0365	<0.0010	0.00082	0.0062	<0.00050	<0.00050	1.21	0.000025	105	<0.00050	<0.00150		0.000065	0.00061	0.021	<0.00010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA24A9802-011	2024-05-05	M	<0.0050	0.000963	0.00089	<0.0030	0.0198	<0.0010	0.00080	0.0070	<0.00050	<0.00050	1.46	0.000022	122	<0.00050	<0.00150		0.000167	0.00060	0.017	<0.00010
WQR1-0.5	L2755648-10	2024-05-08	M																				
WQR1-0.5	VA24B0178-010	2024-05-08	M	0.0054	0.00107	0.00100	<0.0030	0.0227	<0.0010	0.00161	0.0066	<0.00050	<0.00050	1.65	0.000026	151	<0.00050	<0.00150		0.000079	0.00070	<0.010	<0.00010
WQR1-0.5	L2755934-1	2024-05-24	M																				
WQR1-0.5	VA24B1783-001	2024-05-24	M	0.0117	0.000542	0.00090	0.0046	0.0307	<0.0010	0.00045	0.0073	<0.00050	<0.00050	0.58	<0.000020	43.2	<0.00050	<0.00150		0.000056	0.00078	0.012	<0.00010
WQR1-0.5	L2755981-1	2024-05-28	M																				
WQR1-0.5	VA24B2063-001	2024-05-28	M	0.0130	0.000416	0.00095	<0.0030	0.0379	<0.0010	0.00050	0.0068	<0.00050	<0.00050	0.57	<0.000020	44.6	<0.00050	<0.00150		0.000051	0.00054	0.017	<0.00010
WQR1-0.5	VA24B2561-005	2024-06-01	M	0.0082	0.000303	0.00084	0.0034	0.0320	<0.0010	<0.00040	0.0069	<0.00050	<0.00050	0.40	<0.000020	34.1	<0.00050			0.000062	0.00094	0.035	0.00076
WQR1-0.5	L2756068-1	2024-06-04	M																				
WQR1-0.5	VA24B2772-001	2024-06-04	M	0.0342	0.000109	0.00148	<0.0030	0.0392	<0.0010	0.00044	0.0060	<0.00050	<0.00050	<0.30	<0.000020	5.7	<0.00050	0.00178		<0.000050	0.00091	0.024	<0.00010
WQR1-0.5	VA24B3452-007	2024-06-10	M	0.0322	0.000153	0.00156	<0.0030	0.0190	<0.0010	<0.00040	0.0078	<0.00050	<0.00050	<0.30	<0.000020	18.4	<0.00050	<0.00150		0.000055	0.00072	0.011	<0.00010
WQR1-0.5	655-454600000-0	2024-06-17	M																				
WQR1-0.5	VA24B5880-003	2024-07-02	M	0.0568	0.000142	0.00215	<0.0030																
WQR1-0.5	VA24B5882-007	2024-07-03	M	0.0245	0.000134	0.00111	<0.0030																
WQR1-0.5	VA24B6465-001	2024-07-09	M	0.0300	0.000366	0.00142	0.0086	0.0153	<0.0010	0.00059	0.0116	<0.00050	<0.00050	0.54	<0.000020	51.2	<0.00050	<0.00150		0.000050	<0.00050	<0.010	<0.00010
WQR1-0.5	VA24B7867-001	2024-07-20	M	0.0226	0.000294	0.00114	<0.0030	0.0190	<0.0010	0.00053	0.0119	<0.00050	<0.00050	0.39	<0.000020	39.6	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR1-0.5	L2757210-1	2024-08-26	M																				
WQR1-0.5	VA24C2208-001	2024-08-26	M	0.0351	0.000494	0.00187	0.0032	0.0142	<0.0010	<0.00040	0.0127	<0.00050	<0.00050	0.54	<0.000020	54.6	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR1-0.5	L2757680-1	2024-10-06	M																				
WQR1-0.5	VA24C6685-001	2024-10-06	M	0.00782	0.00145	<0.0100	<0.0600	0.0334	<0.00200	<0.00200	0.0107	<0.000400	<0.00100	1.88	<0.000100	180	<0.0100	<0.00150		<0.00200	<0.00400	<0.200	<0.00100
WQR1-0.5	VA24C7408-001	2024-10-13	M	0.0108	0.00192	0.00131	<0.0030	0.0061	<0.0010	0.00453	0.0123	<0.00050	<0.00050	2.17	0.000057	221	<0.00050	<0.00150		0.000075	0.00058	<0.010	<0.00010
WQR1-0.5	L2757830-3	2024-10-19	M																				
WQR1-0.5	VA24C8041-003	2024-10-19	M	0.0126	0.00105	0.00110	<0.0030	0.0390	<0.0010	0.00272	0.0129	<0.00050	<0.00050	1.34	0.000028	130	<0.00050	<0.00150		0.000098	<0.00050	0.012	<0.00010
WQR1-0.5	VA24C8159-005	2024-10-20	M	0.0543	0.000617	0.00230	<0.0030	0.0534	<0.0010	<0.00200	0.0227	<0.00050	<0.00050	0.67	<0.000020	64.1	<0.00050	<0.00150		0.000135	0.00066	0.024	<0.00010
WQR1-0.5	L2757872-1	2024-10-22	M																				
WQR1-0.5	VA24C8330-001	2024-10-22	M	0.0566	0.000620	0.00244	0.0062	0.0347	<0.0010	0.00122	0.0183	<0.00050	<0.00050	0.57	0.000022	58.4	<0.00050	<0.00150		0.000107	0.00060	0.020	<0.00010
WQR1-0.5	L2757933-5	2024-10-28	M																				
WQR1-0.5	VA24C9041-005	2024-10-28	M	0.0234	0.000323	0.00137	<0.0030	0.0548	<0.0010	<0.00080	0.0088	<0.00050	<0.00050	<0.30	<0.000020	29.4	<0.00050	<0.00150		0.000070	0.00092	0.030	<0.00010
WQR1-0.5	L2758002-1	2024-11-01	M																				
WQR1-0.5	VA24C9683-001	2024-11-01	M	<0.0050	0.00136	0.00113	<0.0030	0.0257	<0.0010	0.00083	0.0112	<0.00050	<0.00050	1.68	0.000053	184	<0.00050	<0.00150		0.000148	0.00061	0.022	<0.00010
WQR1-0.5	L2758142-5	2024-11-14	M																				
WQR1-0.5	VA24D0945-005	2024-11-14	M	0.0116	0.000561	0.00101	<0.0030	0.0682	<0.0010	<0.00040	0.0125	<0.00050	<0.00050	0.53	0.000028	53.8	<0.00050	<0.00150		0.000154	0.00092	0.040	<0.00020
WQR1-0.5	VA24D1069-005	2024-11-15	M	0.0077	0.000641	0.00093	<0.0030	0.0569	<0.0010	<0.00040	0.0083	<0.00050	<0.00050	0.91	0.000025	82.5	<0.00050	<0.00150		0.000090	0.00070	0.038	<0.00010
WQR1-0.5	L2758203-5	2024-11-19	M																				
WQR1-0.5	VA24D1567-005	2024-11-19	M	<0.0050	0.00112	0.00104	<0.0030	0.0237	<0.0010	0.00079	0.0108	<0.00050	<0.00050	1.68	0.000035	157	<0.00050	<0.00150		0.000114	<0.00050	0.034	<0.00010
WQR1-0.5	L2758353-1	2024-12-05	M																				
WQR1-0.5	VA24D2842-001	2024-12-05	M	<0.0050	0.00135	0.00112	0.0032	0.0133	<0.0010	0.00066	0.0111	<0.00050	<0.00050	1.76	0.000042	185	<0.00050	<0.00150		0.000125	0.00055	<0.010	0.00014
WQR1-0.5	L2758617-7	2025-01-08	M																				
WQR1-0.5	VA25A0392-007	2025-01-08	M	<0.0050	0.00144	0.00129	<0.0030	0.0075	<0.0010	0.00107	0.0104	<0.00050	<0.00050	2.18	0.000058	240	<0.00050	<0.00150		0.000107	<0.00050	<0.010	<0.00010
WQR1-0.5	L2759040-7	2025-02-20	M																				
WQR1-0.5	VA25A3677-007	2025-02-20	M	<0.0050	0.00159	0.00119	<0.0030	0.0055	<0.0010	0.00105	0.0103	<0.00050	<0.00050	2.58	0.000057	240	<0.00050	<0.00150		0.000078	<0.00050	<0.010	<0.00010
WQR1-0.5	L2759227-7	2025-03-13	M																				
WQR1-0.5	VA25A5556-007	2025-03-13	M	<0.0050	0.00104	0.00087	<0.0030	0.0208	<0.0010	0.00068	0.0068	<0.00050	<0.00050	2.26	0.000040	162	<0.00050	<0.00150		0.000134	0.00053	0.022	<0.00010
WQR1-0.5	VA25A6528-013	2025-03-25	M	<0.0050	0.00117	0.00085	0.0069	0.0196	<0.0010	0.00071	0.0072	<0.00050	<0.00050	1.95	0.000038	172	0.00191			0.000115	0.00068	0.022	<0.00010
WQR1-0.5	VA25A8147-001	2025-04-11	M	<0.0050	0.000430	0.00110	<0.0030	0.0494	<0.0010	<0.00040	0.0070	<0.00050	<0.00050	0.71	<0.000020	56.7	<0.00050	<0.00150		0.000072	0.00052	0.050	<0.00010
WQR1-0.5	VA25A8148-001	2025-04-11	M																				
WQR1-0.5	VA25A8281-007	2025-04-14	M	<0.0050	0.000833	0.00071	<0.0030	0.0275	<0.0010	0.00042	0.0076	<0.00050	<0.00050	1.15	0.000026	101	<0.00050	<0.00150		0.000062	<0.00050	0.028	<0.00010
WQR1-0.5	VA25A8283-007	2025-04-14	M																				
WQR1-0.5	VA25A9123-008	2025-04-23	M	<0.0050	0.000339	0.00060	<0.0030	0.0238	<0.0010	<0.00040	0.0074	<0.00050	<0.00050	0.53	<0.000020	43.3	<0.00050	<0.00150		0.000078	0.00054	0.060	<0.00010
WQR1-0.5	VA25A9125-008	2025-04-23	M																				
WQR1-0.5	VA25B0359-009	2025-05-06	M	0.0100	0.000456	0.00082	<0.0030	0.0274	<0.0010	<0.00040	0.0068	<0.00050	<0.00050	0.46	<0.000020	46.8	<0.00050	<0.00150		0.000056	0.00054	0.019	<0.00010
WQR1-0.5	VA25B0360-009	2025-05-06	M																				
WQR1-0.5	VA25B0800-007	2025-05-09	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA25B0802-007	2025-05-09	M	0.0081	0.000636	0.00080	<0.0030	0.0388	<0.0010	<0.00040	0.0062	<0.00050	<0.00050	0.82	<0.000020	61.3	<0.00050	<0.00150		<0.000050	0.00053	0.011	<0.00010
WQR1-0.5	VA25B2349-005	2025-05-27	M	0.0057	0.000465	0.00070	<0.0030	0.0312	<0.0010	<0.00040	0.0070	<0.00050	<0.00050	0.78	<0.000020	72.2	<0.00050	<0.00150		<0.000050	0.00071	0.015	<0.00010
WQR1-1	0051710-09	2020-05-20	M	<0.0100	0.00283	0.0026	<0.0080																
WQR1-1	0062209-10	2020-06-22	M	<0.0100	0.003	0.0024	<0.0080																
WQR1-1	0071996-09	2020-07-21	M	<0.0100	0.00273	<0.0020	<0.0080																
WQR1-1	0082292-09	2020-08-24	M	<0.0100	0.00302	0.0028	<0.0080																
WQR1-1	0093017-09	2020-09-28	M	<0.0100	0.00295	<0.0020	0.0175																
WQR1-1	20J1961-09	2020-10-20	M	<0.0100	0.00307	0.0074	0.0157																
WQR1-1	20J2778-09	2020-10-27	M	<0.0100	0.0029	0.0029	<0.0080																
WQR1-1	20K0360-09	2020-11-03	M	<0.0100	0.00271	0.0032	0.0153																
WQR1-1	20K1261-09	2020-11-10	M	<0.0100	0.00306	<0.0020	<0.0080																
WQR1-1	20K2100-09	2020-11-18	M	<0.0100	0.0029	<0.0020	<0.0080																
WQR1-1	20L1589-09	2020-12-14	M	<0.0100	0.00324	0.0028	<0.0080																
WQR1-1	21A2590-09	2021-01-27	M	<0.0100	0.00284	<0.0020	<0.0080																
WQR1-1	21B2778-09	2021-02-25	M	<0.0100	0.00309	0.0026	<0.0080																
WQR1-1	21C3505-10	2021-03-25	M	0.00318	0.003	<0.00200	<0.0100																
WQR1-1	21D2478-09	2021-04-22	M	<0.00200	0.00303	<0.00200	<0.0100																
WQR1-1	21E1990-09	2021-05-18	M	<0.0100	0.00309	0.0026	<0.0080																
WQR1-1	21E2917-09	2021-05-26	M	<0.00200	0.00292	0.00365	<0.0100																
WQR1-1	21F0167-09	2021-06-01	M	<0.00200	0.00293	<0.00200	<0.0100																
WQR1-1	21F1056-09	2021-06-08	M	<0.00200	0.00285	<0.00200	0.0134																
WQR1-1	21F2014-09	2021-06-15	M	0.00486	0.00282	<0.00200	0.0111																
WQR1-1	21G2414-09	2021-07-20	M	<0.00200	0.00259	0.00203	<0.0100																
WQR1-1	21H3040-09	2021-08-25	M	<0.00200	0.00259	0.00248	<0.0100																
WQR1-1	21I3814-09	2021-09-28	M	0.00278	0.00273	<0.00200	<0.0100																
WQR1-1	21J3514-09	2021-10-26	M	<0.0050	0.00274	0.0013	<0.0040																
WQR1-1	21K3046-09	2021-11-23	M	<0.0100	0.00274	<0.0020	<0.0080																
WQR1-1	21L2125-09	2021-12-14	M	<0.0100	0.00266	<0.0020	<0.0080																
WQR1-1	22A2312-09	2022-01-20	M	<0.0100	0.00295	0.0035	<0.0080																
WQR1-1	22B2487-09	2022-02-17	M	<0.0100	0.00274	<0.0020	<0.0080	<0.0100	<0.00040	0.00155	<0.0100	<0.00020	<0.00020	3.75	0.000056	315	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQR1-1	22C3145-09	2022-03-22	M	<0.0100	0.00221	0.0047	<0.0080	<0.0100	<0.00040	0.00181	<0.0100	<0.00020	<0.00020	3.32	0.000061	327	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQR1-1	22D2212-06	2022-04-19	M	<0.0100	0.00276	<0.0100	<0.0080	0.0118	<0.00040	0.00163	0.0127	<0.00020	<0.00020	5.92	0.000096	351	<0.00100			<0.00020	0.00085	<0.020	<0.00040
WQR1-1	22E2480-01	2022-05-17	M	<0.0500	0.00258	<0.0500	<0.0400	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.54	0.000104	355	<0.00500			<0.00100	<0.00400	<0.100	<0.00200
WQR1-1	22F3212-09	2022-06-21	M	<0.00200	0.0024	<0.0100	<0.0100	0.011	<0.000500	0.00177	0.011	<0.000100	<0.000100	4.12	0.0000826	352	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	22G1763-09	2022-07-13	M	<0.00200	0.00249	<0.0100	<0.0100	<0.0100	<0.000500	0.00176	0.0115	<0.000100	<0.000100	4.46	0.0000735	330	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	22H2453-09	2022-08-16	M	<0.00200	0.00245	<0.0100	<0.0100	0.0215	<0.000500	0.00167	0.0110	<0.000100	<0.000100	4.33	0.0000864	392	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	22I1926-09	2022-09-14	M	<0.00200	0.00252	<0.0100	<0.0100	0.0159	<0.000500	0.00155	0.0109	<0.000100	<0.000100	4.03	0.0000960	345	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	22J1560-01	2022-10-12	M	<0.00200	0.00270	<0.00500	<0.0100	<0.0100	<0.000500	0.00143	0.0101	<0.000100	<0.000100	4.02	0.0000797	329	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	22K1453-09	2022-11-10	M	<0.00200	0.00317	<0.0100	<0.0100	<0.0100	<0.000500	0.00198	0.0135	<0.000100	<0.000100	5.48	0.0000880	391	<0.00100			0.000132	0.00186	<0.0200	<0.000500
WQR1-1	22L0774-09	2022-12-07	M	<0.00200	0.00275	<0.0100	<0.0100	0.0102	<0.000500	0.00199	0.0120	<0.000100	<0.000100	5.17	0.0000758	398	<0.00100			0.0000790	<0.00100	<0.0200	<0.000500
WQR1-1	23A2847-09	2023-01-27	M	<0.00200	0.00282	<0.0100	<0.0100	<0.0100	<0.000500	0.00184	0.00922	0.000125	<0.000100	4.27	0.0000735	390	<0.00100			0.0000660	<0.00100	<0.0200	<0.000500
WQR1-1	23C0060-09	2023-02-28	M	<0.00200	0.00271	<0.0100	<0.0100	<0.0100	<0.000500	0.00182	0.00862	<0.000100	<0.000100	3.79	0.0000827	399	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	23C1797-09	2023-03-15	M	<0.00200	0.00280	<0.0100	<0.0100	<0.0100	<0.000500	0.00183	0.0104	<0.000100	<0.000100	3.98	0.0000688	344	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	23D2945-09	2023-04-26	M	<0.00200	0.00299	<0.0100	<0.0100	<0.0100	<0.000500	0.00180	0.00932	<0.000100	<0.000100	3.55	0.000109	386	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	23E2392-09	2023-05-17	M	0.00202	0.00252	<0.0100	<0.0100	0.0102	<0.000500	0.00219	0.0112	<0.000100	<0.000100	3.83	0.0000830	413	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	23F3614-09	2023-06-27	M	<0.00200	0.00255	<0.0100	<0.0100	0.0152	<0.000500	0.00167	0.0100	<0.000100	<0.000100	4.39	0.0000644	361	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	23G2415-09	2023-07-19	M	<0.00200	0.00280	<0.0100	<0.0100	<0.0100	<0.000500	0.00229	0.0115	<0.000100	<0.000100	4.73	0.0000916	427	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	23H3309-01	2023-08-24	M	<0.00200	0.00277	<0.0100	<0.0100	<0.0100	<0.000500	0.00169	0.0102	<0.000100	<0.000100	4.05	0.0000711	361	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	23I2271-01	2023-09-19	M	<0.00200	0.00269	<0.0100	<0.0100	<0.0100	<0.000500	0.00170	0.0112	<0.000100	<0.000100	4.1	0.000109	321	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	23J2236-01	2023-10-18	M	0.00224	0.00283	<0.00400	<0.0100	<0.0100	<0.000500	0.00191	0.0107	<0.000100	<0.000100	3.97	0.000121	373	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	23K1909-09	2023-11-15	M	<0.00200	0.00265	<0.00400	<0.0100	0.0115	<0.000500	0.00155	0.0100	<0.000100	<0.000100	4.8	0.0000928	413	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	23L1905-01	2023-12-14	M	<0.00200	0.00272	<0.00400	<0.0100	<0.0100	<0.000500	0.00228	0.00955	<0.000100	<0.000100	3.96	0.0000891	340	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-1	L2754366-4	2024-01-24	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-1	VA24A1422-004	2024-01-24	M	<0.0050	0.00283	0.00162	<0.0030	<0.0050	<0.0010	0.00208	0.0084	<0.00050	<0.00050	4.03	0.000067	391	<0.00050			0.000081	<0.00050	<0.010	<0.00010
WQR1-1	L2754594-1	2024-02-13	M																				
WQR1-1	VA24A2858-001	2024-02-13	M	<0.0050	0.00251	0.00171	<0.0030	0.0074	<0.0010	0.00168	0.0088	<0.00050	<0.00050	3.98	0.000069	360	<0.00050	<0.00150	<0.00150	0.000061	<0.00050	<0.010	<0.00010
WQR1-1	L2755033-1	2024-03-20	M																				
WQR1-1	VA24A5955-001	2024-03-20	M	<0.0050	0.00294	0.00170	<0.0030	<0.0050	<0.0010	0.00239	0.0094	<0.00050	<0.00050	3.87	0.000078	400	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR1-1	L2755461-1	2024-04-23	M																				
WQR1-1	VA24A8736-001	2024-04-23	M	<0.0050	0.00288	0.00164	<0.0030	<0.0050	<0.0010	0.00287	0.0093	<0.00050	<0.00050	3.90	0.000066	381	<0.00050	<0.00150	<0.00150	0.000051	<0.00050	<0.010	<0.00010
WQR1-1	L2755553-1	2024-04-30	M																				
WQR1-1	VA24A9418-001	2024-04-30	M	<0.0050	0.00290	0.00142	<0.0030	0.0070	<0.0010	0.00342	0.0104	<0.00050	<0.00050	3.94	0.000079	379	<0.00050	<0.00150	<0.00150	0.000055	<0.00050	<0.010	<0.00010
WQR1-1	L2755641-1	2024-05-07	M																				
WQR1-1	VA24B0040-001	2024-05-07	M	<0.0050	0.00292	0.00160	<0.0030	<0.0050	<0.0010	0.00331	0.0093	<0.00050	<0.00050	3.71	0.000081	370	<0.00050	<0.00150	<0.00150	0.000078	<0.00050	<0.010	<0.00010
WQR1-1	L2755769-1	2024-05-14	M																				
WQR1-1	VA24B0738-001	2024-05-14	M	<0.0050	0.00274	0.00150	<0.0030	<0.0050	<0.0010	0.00244	0.0094	<0.00050	<0.00050	4.11	0.000076	381	<0.00050	<0.00150	<0.00150	0.000071	<0.00050	<0.010	<0.00010
WQR1-1	L2755874-1	2024-05-21	M																				
WQR1-1	VA24B1351-001	2024-05-21	M	<0.0050	0.00275	0.00151	<0.0030	<0.0050	<0.0010	0.00233	0.0096	<0.00050	<0.00050	3.61	0.000081	368	<0.00050	<0.00150	<0.00150	0.000076	<0.00050	<0.010	<0.00010
WQR1-1	L2756277-1	2024-06-18	M																				
WQR1-1	VA24B4257-001	2024-06-18	M	<0.0050	0.00331	0.00147	0.0046	<0.0050	<0.0010	0.00364	0.0106	<0.00050	<0.00050	3.65	0.000070	370	<0.00050	<0.00150	<0.00150	0.000060	<0.00050	<0.010	0.00015
WQR1-1	L2756678-1	2024-07-16	M																				
WQR1-1	VA24B7237-001	2024-07-16	M	<0.0050	0.00295	0.00148	0.0055	<0.0050	<0.0010	0.00431	0.0104	<0.00050	<0.00050	3.42	0.000077	379	<0.00050	<0.00150	<0.00150	0.000054	<0.00050	<0.010	<0.00010
WQR1-1	L2757095-1	2024-08-20	M																				
WQR1-1	VA24C1101-001	2024-08-20	M	<0.0050	0.00268	0.00132	0.0047	<0.0050	<0.0010	0.00384	0.0110	<0.00050	<0.00050	3.87	0.000087	378	<0.00050	<0.00150	<0.00150	0.000086	<0.00050	<0.010	0.00015
WQR1-1	VA24C4483-001	2024-09-17	M	<0.0050	0.00266	0.00141	<0.0030	<0.0050	<0.0010	0.00354	0.0105	<0.00050	<0.00050	3.40	0.000080	371	<0.00050	<0.00150	<0.00150	0.000076	<0.00050	<0.010	<0.00010
WQR1-1	VA24C8360-001	2024-10-22	M	<0.0050	0.00290	0.00126	<0.0030	<0.0050	<0.0010	0.00544	0.0106	<0.00050	<0.00050	3.54	0.000083	368	<0.00050	<0.00150	<0.00150	0.000077	<0.00050	<0.010	<0.00010
WQR1-1	VA24C9197-001	2024-10-29	M	<0.0050	0.00265	0.00164	<0.0030	<0.0050	<0.0010	0.00162	0.0101	<0.00050	<0.00050	4.22	0.000082	384	<0.00050	<0.00150	<0.00150	0.000246	<0.00050	<0.010	<0.00010
WQR1-1	VA24D0009-001	2024-11-05	M	<0.0050	0.00273	0.00141	<0.0030	0.0082	<0.0010	0.00166	0.0121	<0.00050	<0.00050	3.25	0.000072	376	<0.00050	<0.00150		0.000225	<0.00050	<0.010	<0.00010
WQR1-1	L2758095-1	2024-11-12	M																				
WQR1-1	VA24D0632-001	2024-11-12	M	<0.0050	0.00256	0.00145	0.0070	0.0084	<0.0010	0.00143	0.0116	<0.00050	<0.00050	3.47	0.000087	376	<0.00050	<0.00150	<0.00150	0.000198	0.00066	<0.010	<0.00010
WQR1-1	VA24D1720-001	2024-11-21	M	<0.0050	0.00249	0.00178	<0.0030	0.0066	<0.0010	0.00163	0.0118	<0.00050	<0.00050	4.49	0.000059	383	<0.00050	<0.00150	<0.00150	0.000291	<0.00050	<0.010	<0.00010
WQR1-1	L2758465-1	2024-12-17	M																				
WQR1-1	VA24D3769-001	2024-12-17	M	<0.0050	0.00243	0.00154	0.0057	<0.0050	<0.0010	0.00157	0.0096	<0.00050	<0.00050	3.66	0.000096	368	<0.00050	<0.00150	<0.00150	0.000090	<0.00050	<0.010	<0.00010
WQR1-1	L2758719-1	2025-01-21	M																				
WQR1-1	VA25A1408-001	2025-01-21	M	<0.0050	0.00275	0.00147	<0.0030	<0.0050	<0.0010	0.00155	0.0090	<0.00050	<0.00050	3.38	0.000070	363	<0.00050	<0.00150	<0.00150	0.000098	<0.00050	<0.010	<0.00010
WQR1-1	L2758994-1	2025-02-18	M																				
WQR1-1	VA25A3430-001	2025-02-18	M	<0.0050	0.00258	0.00139	<0.0030	<0.0050	<0.0010	0.00165	0.0093	<0.00050	<0.00050	3.40	0.000067	387	<0.00050	<0.00150	<0.00150	0.000052	<0.00050	<0.010	<0.00010
WQR1-1	VA25A6550-001	2025-03-25	M	<0.0050	0.00293	0.00139	<0.0030	<0.0050	<0.0010	0.00179	0.0100	<0.00050	<0.00050	3.37	0.000075	409	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR1-1	VA25A8962-001	2025-04-22	M	<0.0050	0.00242	0.00145	0.0032	<0.0050	<0.0010	0.00156	0.0085	<0.00050	<0.00050	3.87	0.000066	370	<0.00050	<0.00150	<0.00150	0.000066	<0.00050	<0.010	<0.00010
WQR1-1	VA25A9878-001	2025-04-30	M	<0.0050	0.00264	0.00162	<0.0030	<0.0050	<0.0010	0.00155	0.0093	<0.00050	<0.00050	3.27	0.000083	358	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR1-1	VA25B0358-001	2025-05-06	M	<0.0050	0.00252	0.00166	<0.0030	<0.0050	<0.0010	0.00168	0.0097	<0.00050	<0.00050	3.62	0.000069	378	<0.00050	<0.00150	<0.00150	0.000079	<0.00050	<0.010	<0.00010
WQR1-1	VA25B1026-001	2025-05-13	M	<0.0050	0.00137	0.00099	<0.0030	0.0188	<0.0010	0.00085	0.0086	<0.00050	<0.00050	2.26	0.000043	195	<0.00050	<0.00150	<0.00150	0.000060	0.00052	0.018	<0.00010
WQR1-1	VA25B1711-001	2025-05-20	M	<0.0050	0.00256	0.00148	<0.0030	<0.0050	<0.0010	0.00137	0.0087	<0.00050	<0.00050	4.04	0.000079	361	<0.00050	<0.00150	<0.00150	0.000068	<0.00050	<0.010	<0.00010
WQR1-2	0051710-10	2020-05-20	M	0.0199	0.000292	<0.0020	<0.0080																
WQR1-2	0062209-09	2020-06-22	M	0.0823	0.000208	0.0033	<0.0080																
WQR1-2	0071996-10	2020-07-21	M	<0.0100	<0.000040	0.0054	<0.0080																
WQR1-2	0082292-10	2020-08-24	M	<0.0100	0.00151	0.0035	<0.0080																
WQR1-2	0093017-10	2020-09-28	M	0.0171	0.000506	<0.0020	0.0117																
WQR1-2	20J1961-10	2020-10-20	M	0.01	0.00113	0.008	0.008																
WQR1-2	20J2778-10	2020-10-27	M	<0.0100	0.00161	0.0027	<0.0080																
WQR1-2	20K0360-10	2020-11-03	M	0.0191	0.000861	0.0024	<0.0080																
WQR1-2	20K1261-10	2020-11-10	M	0.0124	0.00112	<0.0020	<0.0080																
WQR1-2	20K2100-10	2020-11-18	M	0.0128	0.000714	<0.0020	<0.0080																
WQR1-2	20L1589-10	2020-12-14	M	<0.0100	0.00172	0.0021	<0.0080																
WQR1-2	21A2590-10	2021-01-27	M	<0.0100	0.00242	<0.0020	<0.0080																
WQR1-2	21B2778-10	2021-02-25	M	<0.0100	0.00245	0.004	<0.0080																

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	21C3505-11	2021-03-25	M	<0.00200	0.00101	<0.00200	0.0167																
WQR1-2	21D2478-10	2021-04-22	M	0.0107	0.000983	0.00117	0.0015																
WQR1-2	21E1990-10	2021-05-18	M	0.0421	0.000135	0.0021	0.0045																
WQR1-2	21E2917-10	2021-05-26	M	0.0179	0.000144	0.00052	0.0024																
WQR1-2	21F0167-10	2021-06-01	M	0.0114	0.000714	0.00052	0.0032																
WQR1-2	21F1056-10	2021-06-08	M	0.0602	0.00013	0.00232	0.0034																
WQR1-2	21F2014-10	2021-06-15	M	0.0555	0.000369	0.00265	0.0032																
WQR1-2	21G2414-10	2021-07-20	M	0.0177	0.000384	<0.00200	<0.0100																
WQR1-2	21H3040-10	2021-08-25	M	0.0151	0.000797	<0.00200	<0.0100																
WQR1-2	21I3814-10	2021-09-28	M	0.026	0.00069	<0.00200	<0.0100																
WQR1-2	21J3514-10	2021-10-26	M	0.0174	0.000417	0.0011	<0.0040																
WQR1-2	21K3046-10	2021-11-23	M	<0.0100	0.00202	<0.0020	<0.0080																
WQR1-2	21L2125-10	2021-12-14	M	<0.0100	0.00127	<0.0020	0.0108																
WQR1-2	22A2312-10	2022-01-20	M	<0.0100	0.00269	0.0034	<0.0080																
WQR1-2	22B2487-10	2022-02-17	M	<0.0100	0.00229	<0.0020	<0.0080	0.0109	<0.00040	<0.00100	<0.0100	<0.00020	<0.00020	3.37	0.000068	282	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQR1-2	22C3145-10	2022-03-22	M	<0.0100	0.00212	0.0045	<0.0080	<0.0100	<0.00040	0.00167	<0.0100	<0.00020	<0.00020	3.03	0.000053	298	<0.00100			<0.00020	0.00126	<0.020	<0.00040
WQR1-2	22D2212-07	2022-04-19	M	<0.0100	0.00228	<0.0100	<0.0080	0.0132	<0.00040	0.00124	<0.0100	<0.00020	<0.00020	4.69	0.000052	279	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQR1-2	22E2480-02	2022-05-17	M	<0.0500	0.000696	<0.0500	<0.0400	0.0586	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	1.04	<0.000100	97.8	<0.00500			<0.00100	<0.00400	<0.100	<0.00200
WQR1-2	22F3212-10	2022-06-21	M	0.0145	0.000285	<0.0100	<0.0100	0.0429	<0.000500	<0.000500	0.00746	<0.000100	<0.000100	0.521	<0.0000200	37.2	<0.00100			<0.0000500	<0.00100	0.0229	<0.000500
WQR1-2	22G1763-10	2022-07-13	M	0.0169	0.000490	<0.0100	<0.0100	0.0231	<0.000500	<0.000500	0.00911	<0.000100	<0.000100	0.872	<0.0000200	62.8	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-2	22H2453-10	2022-08-16	M	<0.00200	0.000617	<0.0100	<0.0100	0.0211	<0.000500	<0.000500	0.0109	<0.000100	<0.000100	1.07	0.0000279	94.6	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-2	22I1926-10	2022-09-14	M	0.00668	0.00163	<0.0100	<0.0100	0.0384	<0.000500	0.00100	0.0124	<0.000100	<0.000100	2.46	0.0000669	206	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-2	22J1560-02	2022-10-12	M	<0.00200	0.00201	<0.00500	<0.0100	<0.0100	<0.000500	0.00131	0.00885	<0.000100	<0.000100	3.3	0.0000429	255	<0.00100			<0.0000500	0.00294	<0.0200	<0.000500
WQR1-2	22K1453-10	2022-11-10	M	<0.00200	0.00262	<0.0100	<0.0100	<0.0100	<0.000500	0.00149	0.0117	<0.000100	<0.000100	4.55	0.0000636	327	<0.00100			0.000150	<0.00100	<0.0200	<0.000500
WQR1-2	22L0774-10	2022-12-07	M	<0.00200	0.00239	<0.0100	<0.0100	<0.0100	<0.000500	0.00153	0.0118	<0.000100	<0.000100	4.63	0.0000573	339	<0.00100			0.0000832	<0.00100	<0.0200	<0.000500
WQR1-2	23A2847-10	2023-01-27	M	<0.00200	0.00167	<0.0100	<0.0100	0.0127	<0.000500	0.000876	0.0102	0.000109	<0.000100	2.37	0.0000797	224	<0.00100			0.0000928	<0.00100	<0.0200	<0.000500
WQR1-2	23C0060-10	2023-02-28	M	<0.00200	0.00247	<0.0100	<0.0100	<0.0100	<0.000500	0.00165	0.0102	<0.000100	<0.000100	3.4	0.0000671	357	<0.00100			0.0000594	<0.00100	<0.0200	<0.000500
WQR1-2	23C1797-10	2023-03-15	M	<0.00200	0.00258	<0.0100	<0.0100	<0.0100	<0.000500	0.00150	0.00982	<0.000100	<0.000100	3.74	0.0000850	311	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-2	23D2945-10	2023-04-26	M	<0.00200	0.00144	<0.0100	<0.0100	0.0214	<0.000500	0.000790	0.00827	<0.000100	<0.000100	1.98	0.0000487	194	<0.00100			<0.0000500	0.00111	<0.0200	<0.000500
WQR1-2	23E2392-10	2023-05-17	M	0.0557	0.000285	0.00235	0.0037	0.0429	<0.000050	0.000218	0.0114	<0.000010	<0.000010	0.327	0.0000110	36.5	<0.00050			0.0000668	0.00088	0.0155	<0.000050
WQR1-2	23F3614-10	2023-06-27	M	0.0266	0.000275	<0.0100	<0.0100	0.0193	<0.000500	<0.000500	0.00923	<0.000100	<0.000100	0.416	<0.0000200	34.9	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-2	23G2415-10	2023-07-19	M	0.0227	0.000406	<0.0100	<0.0100	0.0246	<0.000500	<0.000500	0.0149	<0.000100	<0.000100	0.667	0.0000201	56.4	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-2	23H3309-02	2023-08-24	M	<0.00200	0.00200	<0.0100	<0.0100	0.0236	<0.000500	0.00159	0.0132	<0.000100	<0.000100	3.02	0.0000470	267	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-2	23I2271-02	2023-09-19	M	0.00250	0.00170	<0.0100	<0.0100	0.0101	<0.000500	0.00108	0.0104	<0.000100	<0.000100	2.59	0.0000600	193	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-2	23J2236-02	2023-10-18	M	0.00975	0.00203	<0.00400	<0.0100	0.0161	<0.000500	0.00127	0.0115	<0.000100	<0.000100	3	0.0000640	275	<0.00500			0.0000600	<0.00100	<0.0200	<0.000500
WQR1-2	23K1909-10	2023-11-15	M	<0.00200	0.00221	<0.00400	<0.0100	0.0187	<0.000500	0.00147	0.0108	<0.000100	<0.000100	3.88	0.0000473	334	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-2	23L1905-02	2023-12-14	M	0.00209	0.00262	<0.00400	<0.0100	0.0123	<0.000500	0.00223	0.0102	<0.000100	<0.000100	3.67	0.0000711	312	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR1-2	L2754366-5	2024-01-24	M																				
WQR1-2	VA24A1422-005	2024-01-24	M	<0.0050	0.00256	0.00152	<0.0030	<0.0050	<0.0010	0.00187	0.0083	<0.00050	<0.00050	3.74	0.000080	367	<0.00050			0.000091	0.00050	<0.010	<0.00010
WQR1-2	L2754594-2	2024-02-13	M																				
WQR1-2	VA24A2858-002	2024-02-13	M	<0.0050	0.00218	0.00145	<0.0030	0.0088	<0.0010	0.00138	0.0098	<0.00050	<0.00050	3.24	0.000057	278	<0.00050	<0.00150	<0.00150	0.000087	0.00052	<0.010	<0.00010
WQR1-2	L2755033-2	2024-03-20	M																				
WQR1-2	VA24A5955-002	2024-03-20	M	<0.0050	0.00254	0.00141	<0.0030	<0.0050	<0.0010	0.00236	0.0088	<0.00050	<0.00050	3.27	0.000057	322	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR1-2	L2755461-2	2024-04-23	M																				
WQR1-2	VA24A8736-002	2024-04-23	M	<0.0050	0.00202	0.00129	<0.0030	<0.0050	<0.0010	0.00233	0.0070	<0.00050	<0.00050	3.02	0.000047	272	<0.00050	<0.00150	<0.00150	0.000060	<0.00050	<0.010	<0.00010
WQR1-2	L2755553-2	2024-04-30	M																				
WQR1-2	VA24A9418-002	2024-04-30	M	<0.0050	0.00224	0.00100	<0.0030	0.0065	<0.0010	0.00266	0.0043	<0.00050	<0.00050	3.01	0.000046	305	<0.00050	<0.00150	<0.00150	0.000053	<0.00050	<0.010	<0.00010
WQR1-2	L2755641-2	2024-05-07	M																				
WQR1-2	VA24B0040-002	2024-05-07	M	<0.0050	0.00152	0.00107	<0.0030	0.0159	<0.0010	0.00222	0.0063	<0.00050	<0.00050	2.30	0.000039	206	<0.00050	<0.00150	<0.00150	0.000269	<0.00050	<0.010	<0.00010
WQR1-2	L2755769-2	2024-05-14	M																				
WQR1-2	VA24B0738-002	2024-05-14	M	0.0221	0.000683	0.00131	<0.0030	0.149	<0.0010	0.00102	0.0095	<0.00050	<0.00050	0.89	0.000022	86.1	<0.00050	<0.00150	<0.00150	0.000117	0.00104	0.136	<0.00010
WQR1-2	L2755874-2	2024-05-21	M																				
WQR1-2	VA24B1351-002	2024-05-21	M	0.0182	0.000582	0.00119	<0.0030	0.0321	<0.0010	0.00070	0.0091	<0.00050	<0.00050	0.78	<0.000020	76.8	<0.00050	<0.00150	<0.00150	0.000069	0.00064	<0.010	<0.00010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	L2756277-2	2024-06-18	M																				
WQR1-2	VA24B4257-002	2024-06-18	M	0.0083	0.000856	0.00087	<0.0030	0.0224	<0.0010	0.00142	0.0069	<0.00050	<0.00050	1.07	<0.000020	103	<0.00050	<0.00150	<0.00150	0.000053	0.00058	<0.010	<0.00010
WQR1-2	L2756678-2	2024-07-16	M																				
WQR1-2	VA24B7237-002	2024-07-16	M	0.0374	0.000819	0.00168	0.0034	0.0182	<0.0010	0.00136	0.0110	<0.00050	<0.00050	0.97	<0.000020	99.4	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR1-2	L2757095-2	2024-08-20	M																				
WQR1-2	VA24C1101-002	2024-08-20	M	0.0194	0.000884	0.00116	<0.0030	0.0108	<0.0010	0.00120	0.0132	<0.00050	<0.00050	1.27	<0.000020	111	<0.00050	<0.00150	<0.00150	0.000051	<0.00050	<0.010	<0.00010
WQR1-2	VA24C4483-002	2024-09-17	M	0.0135	0.000945	0.00122	<0.0030	0.0122	<0.0010	0.00171	0.0116	<0.00050	<0.00050	1.19	0.000025	128	<0.00050	<0.00150	<0.00150	0.000073	<0.00050	<0.010	<0.00010
WQR1-2	VA24C8360-002	2024-10-22	M	0.0108	0.00198	0.00118	<0.0030	0.0274	<0.0010	0.00464	0.0141	<0.00050	<0.00050	2.26	0.000056	237	<0.00050	<0.00150	<0.00150	0.000071	<0.00050	<0.010	<0.00010
WQR1-2	VA24C9197-002	2024-10-29	M	<0.0050	0.00194	0.00129	<0.0030	0.0171	<0.0010	0.00116	0.0112	<0.00050	<0.00050	2.84	0.000053	264	<0.00050	<0.00150	<0.00150	0.000160	<0.00050	<0.010	<0.00010
WQR1-2	VA24D0009-002	2024-11-05	M	<0.0050	0.00214	0.00116	<0.0030	0.0118	<0.0010	0.00137	0.0112	<0.00050	<0.00050	2.30	0.000060	279	<0.00050	<0.00150		0.000154	<0.00050	<0.010	<0.00010
WQR1-2	L2758095-2	2024-11-12	M																				
WQR1-2	VA24D0632-002	2024-11-12	M	0.0077	0.00137	0.00117	<0.0030	0.0352	<0.0010	0.00088	0.0107	<0.00050	<0.00050	1.80	0.000034	189	<0.00050	<0.00150	<0.00150	0.000121	0.00091	0.015	<0.00010
WQR1-2	VA24D1720-002	2024-11-21	M	<0.0050	0.00135	0.00115	<0.0030	0.0225	<0.0010	0.00088	0.0114	<0.00050	<0.00050	2.38	0.000051	200	<0.00050	<0.00150	<0.00150	0.000198	0.00058	0.031	<0.00010
WQR1-2	L2758465-2	2024-12-17	M																				
WQR1-2	VA24D3769-002	2024-12-17	M	<0.0050	0.00212	0.00147	<0.0030	0.0056	<0.0010	0.00140	0.0090	<0.00050	<0.00050	3.09	0.000072	253	<0.00050	<0.00150	<0.00150	0.000076	<0.00050	<0.010	<0.00010
WQR1-2	L2758719-2	2025-01-21	M																				
WQR1-2	VA25A1408-002	2025-01-21	M	<0.0050	0.00210	0.00135	<0.0030	<0.0050	<0.0010	0.00113	0.0104	<0.00050	<0.00050	2.64	0.000053	270	<0.00050	<0.00150	<0.00150	0.000110	0.00051	<0.010	<0.00010
WQR1-2	L2758994-2	2025-02-18	M																				
WQR1-2	VA25A3430-002	2025-02-18	M	<0.0050	0.00205	0.00128	0.0059	<0.0050	<0.0010	0.00126	0.0104	<0.00050	<0.00050	2.55	0.000067	309	<0.00050	<0.00150	<0.00150	0.000079	<0.00050	<0.010	<0.00010
WQR1-2	VA25A6550-002	2025-03-25	M	<0.0050	0.00227	0.00106	<0.0030	<0.0050	<0.0010	0.00122	0.0075	<0.00050	<0.00050	2.46	0.000052	297	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR1-2	VA25A8962-002	2025-04-22	M	<0.0050	0.00119	0.00067	<0.0030	0.0171	<0.0010	0.00064	0.0075	<0.00050	<0.00050	1.63	0.000034	159	<0.00050	<0.00150	<0.00150	0.000059	0.00057	<0.010	<0.00010
WQR1-2	VA25A9878-002	2025-04-30	M	0.0066	0.000720	0.00073	<0.0030	0.0325	<0.0010	<0.00040	0.0076	<0.00050	<0.00050	0.94	<0.000020	93.7	<0.00050	<0.00150	<0.00150	0.000051	0.00071	0.016	<0.00010
WQR1-2	VA25B0358-002	2025-05-06	M	<0.0050	0.00138	0.00077	<0.0030	0.0156	<0.0010	0.00082	0.0084	<0.00050	<0.00050	1.89	0.000029	188	<0.00050	<0.00150	<0.00150	0.000074	0.00060	<0.010	<0.00010
WQR1-2	VA25B1026-002	2025-05-13	M	<0.0050	0.000933	0.00083	<0.0030	0.0256	<0.0010	0.00054	0.0082	<0.00050	<0.00050	1.36	0.000028	121	<0.00050	<0.00150	<0.00150	0.000071	0.00078	0.020	<0.00010
WQR1-2	VA25B1711-002	2025-05-20	M	<0.0050	0.000948	0.00077	<0.0030	0.0193	<0.0010	0.00051	0.0075	<0.00050	<0.00050	1.34	<0.000020	119	<0.00050	<0.00150	<0.00150	0.000054	0.00077	0.010	<0.00010
WQR1-2m	L2755545-8	2024-04-30	M																				
WQR1-2m	VA24A9402-008	2024-04-30	M	<0.0050	0.00160	0.00096	<0.0030	0.0183	<0.0010	0.00169	0.0053	<0.00050	<0.00050	2.30	0.000040	209	<0.00050	<0.00150		0.000055	0.00071	<0.010	<0.00010
WQR1-2m	VA24A9802-012	2024-05-05	M	<0.0050	0.00210	0.00110	<0.0030	0.0070	<0.0010	0.00184	0.0057	<0.00050	<0.00050	3.21	0.000049	273	<0.00050	<0.00150		0.000130	<0.00050	<0.010	<0.00010
WQR1-2m	L2755648-11	2024-05-08	M																				
WQR1-2m	VA24B0178-011	2024-05-08	M	0.0050	0.00122	0.00102	<0.0030	0.0224	<0.0010	0.00156	0.0065	<0.00050	<0.00050	1.63	0.000025	154	<0.00050	<0.00150		0.000074	0.00061	<0.010	<0.00010
WQR1-2m	L2755934-2	2024-05-24	M																				
WQR1-2m	VA24B1783-002	2024-05-24	M	0.0103	0.000674	0.00094	<0.0030	0.0341	<0.0010	0.00115	0.0075	<0.00050	<0.00050	1.15	<0.000020	81.3	<0.00050	<0.00150		0.000054	0.00069	0.013	<0.00010
WQR1-2m	L2755981-2	2024-05-28	M																				
WQR1-2m	VA24B2063-002	2024-05-28	M	<0.0050	0.00142	0.00097	<0.0030	0.0283	<0.0010	0.00133	0.0067	<0.00050	<0.00050	1.51	0.000028	116	<0.00050	<0.00150		<0.000050	0.00056	0.015	<0.00010
WQR1-2m	VA24B2561-006	2024-06-01	M	0.0083	0.000862	0.00100	0.0038	0.0258	<0.0010	0.00105	0.0065	<0.00050	<0.00050	1.09	0.000022	96.1	<0.00050			0.000058	0.00092	0.020	0.00096
WQR1-2m	L2756068-2	2024-06-04	M																				
WQR1-2m	VA24B2772-002	2024-06-04	M	0.0321	0.000127	0.00140	<0.0030	0.0392	<0.0010	0.00061	0.0066	<0.00050	<0.00050	<0.30	<0.000020	8.1	<0.00050	<0.00150		<0.000050	0.00069	0.021	<0.00010
WQR1-2m	VA24B3452-008	2024-06-10	M	0.0258	0.000407	0.00140	<0.0030	0.0265	<0.0010	<0.00040	0.0080	<0.00050	<0.00050	0.45	<0.000020	43.4	<0.00050	<0.00150		<0.000050	0.00065	<0.010	<0.00010
WQR1-2m	656-454600000-0	2024-06-17	M																				
WQR1-2m	VA24B5882-008	2024-07-03	M	0.0270	0.000148	0.00122	<0.0030																
WQR1-2m	VA24B6465-002	2024-07-09	M	0.0153	0.00102	0.00119	<0.0030	0.0145	<0.0010	0.00088	0.0118	<0.00050	<0.00050	0.57	<0.000020	44.7	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR1-2m	VA24B7867-002	2024-07-20	M	0.0328	0.000639	0.00164	<0.0030	0.0156	<0.0010	0.00075	0.0118	<0.00050	<0.00050	0.85	<0.000020	84.5	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR1-2m	L2757210-2	2024-08-26	M																				
WQR1-2m	VA24C2208-002	2024-08-26	M	0.0129	0.00120	0.00136	<0.0030	0.0125	<0.0010	0.00114	0.0128	<0.00050	<0.00050	1.86	0.000051	208	<0.00050	<0.00150		0.000063	<0.00050	<0.010	<0.00010
WQR1-2m	L2757680-2	2024-10-06	M																				
WQR1-2m	VA24C6685-002	2024-10-06	M	<0.0150	0.00229	<0.0250	<0.150	<0.0500	<0.00500	<0.00500	0.0120	<0.00100	<0.00250	2.86	<0.000250	268	<0.0250	<0.00150		<0.00500	<0.0100	<0.500	<0.00250
WQR1-2m	VA24C7408-002	2024-10-13	M	0.0051	0.00226	0.00118	<0.0030	<0.0050	<0.0010	0.00441	0.0123	<0.00050	<0.00050	2.89	0.000062	282	<0.00050	<0.00150		0.000058	0.00064	<0.010	<0.00010
WQR1-2m	L2757830-6	2024-10-20	M																				
WQR1-2m	VA24C8041-006	2024-10-20	M	0.0523	0.000715	0.00239	<0.0030	0.0500	<0.0010	0.00172	0.0275	<0.00050	<0.00050	0.96	0.000030	87.8	<0.00050	<0.00150		0.000166	0.00065	0.033	<0.00010
WQR1-2m	L2757872-2	2024-10-22	M																				
WQR1-2m	VA24C8330-002	2024-10-22	M	0.0553	0.000586	0.00237	0.0032	0.0357	<0.0010	0.00323	0.0176	<0.00050	<0.00050	1.79	0.000039	174	<0.00050	<0.00150		0.000101	0.00061	0.012	0.00018
WQR1-2m	L2757933-6	2024-10-28	M																				
WQR1-2m	VA24C9041-006	2024-10-28	M	0.0227	0.000410	0.00138	<0.0030	0.0442	<0.0010	<0.00120	0.0096	<0.00050	<0.00050	0.77	0.000032	79.8	<0.00050	<0.00150		0.000082	0.00146	0.023	<0.00010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2m	L2758002-3	2024-11-01	M																				
WQR1-2m	VA24C9683-003	2024-11-01	M	<0.0050	0.00132	0.00117	<0.0030	0.0234	<0.0010	0.00087	0.0113	<0.00050	<0.00050	1.88	0.000048	208	<0.00050	<0.00150		0.000154	0.00062	0.017	<0.00010
WQR1-2m	L2758353-2	2024-12-05	M																				
WQR1-2m	VA24D2842-002	2024-12-05	M	<0.0050	0.00155	0.00118	<0.0030	<0.0050	<0.0010	0.00135	0.0099	<0.00050	<0.00050	2.96	0.000069	342	<0.00050	<0.00150		0.000088	0.00066	<0.010	<0.00010
WQR1-2m	L2758617-8	2025-01-08	M																				
WQR1-2m	VA25A0392-008	2025-01-08	M	<0.0050	0.00132	0.00124	<0.0030	0.0066	<0.0010	0.00138	0.0101	<0.00050	<0.00050	2.65	0.000068	287	<0.00050	<0.00150		0.000093	<0.00050	<0.010	<0.00010
WQR1-2m	L2759040-8	2025-02-20	M																				
WQR1-2m	VA25A3677-008	2025-02-20	M	<0.0050	0.00211	0.00143	0.0049	<0.0050	<0.0010	0.00132	0.0097	<0.00050	<0.00050	3.17	0.000063	306	<0.00050	<0.00150		0.000081	<0.00050	<0.010	<0.00010
WQR1-2m	L2759227-8	2025-03-13	M																				
WQR1-2m	VA25A5556-008	2025-03-13	M	<0.0050	0.00134	0.00099	<0.0030	<0.0050	<0.0010	0.00130	0.0054	<0.00050	<0.00050	4.18	0.000060	323	<0.00050	<0.00150		0.000075	<0.00050	<0.010	<0.00010
WQR1-2m	VA25A6528-014	2025-03-25	M																				
WQR1-2m	VA25A8147-002	2025-04-11	M	<0.0050	0.00128	0.00087	<0.0030	0.0246	<0.0010	0.00077	0.0073	<0.00050	<0.00050	2.07	0.000034	196	<0.00050	<0.00150		0.000067	<0.00050	0.016	<0.00010
WQR1-2m	VA25A8148-002	2025-04-11	M																				
WQR1-2m	VA25A8281-008	2025-04-14	M	<0.0050	0.00130	0.00083	<0.0030	0.0146	<0.0010	0.00080	0.0077	<0.00050	<0.00050	2.03	0.000037	200	<0.00050	<0.00150		0.000056	<0.00050	0.014	<0.00010
WQR1-2m	VA25A8283-008	2025-04-14	M																				
WQR1-2m	VA25A9123-009	2025-04-23	M	<0.0050	0.000865	0.00061	<0.0030	0.0169	<0.0010	0.00073	0.0077	<0.00050	<0.00050	2.22	0.000037	204	<0.00050	<0.00150		0.000097	0.00058	<0.010	<0.00010
WQR1-2m	VA25A9125-009	2025-04-23	M																				
WQR1-2m	VA25B0359-008	2025-05-06	M	0.0097	0.000532	0.00082	<0.0030	0.0143	<0.0010	0.00080	0.0079	<0.00050	<0.00050	2.14	0.000034	194	<0.00050	<0.00150		0.000062	<0.00050	<0.010	<0.00010
WQR1-2m	VA25B0360-008	2025-05-06	M																				
WQR1-2m	VA25B0800-008	2025-05-09	M																				
WQR1-2m	VA25B0802-008	2025-05-09	M	<0.0050	0.00153	0.00085	<0.0030	0.0204	<0.0010	0.00088	0.0084	<0.00050	<0.00050	2.46	0.000039	213	<0.00050	<0.00150		0.000064	0.00054	<0.010	<0.00010
WQR1-3	23L1905-03	2023-12-14	M	0.00217	0.00180	<0.00400	<0.0100	0.0149	<0.000500	0.00126	0.0115	<0.000100	<0.000100	2.57	0.0000423	223	<0.00500			0.000111	<0.00100	<0.0200	<0.000500
WQR1-3	L2754366-6	2024-01-24	M																				
WQR1-3	VA24A1422-006	2024-01-24	M	<0.0050	0.00140	0.00113	<0.0030	0.0206	<0.0010	0.00095	0.0085	<0.00050	<0.00050	2.02	0.000035	193	<0.00050			0.000089	0.00050	0.036	<0.00010
WQR1-3	L2754594-3	2024-02-13	M																				
WQR1-3	VA24A2858-003	2024-02-13	M	<0.0050	0.00149	0.00114	<0.0030	0.0177	<0.0010	0.00078	0.0096	<0.00050	<0.00050	2.09	0.000035	190	<0.00050	<0.00150	<0.00150	0.000096	<0.00050	0.010	<0.00010
WQR1-3	L2755033-3	2024-03-20	M																				
WQR1-3	VA24A5955-003	2024-03-20	M	<0.0050	0.000965	0.00102	<0.0030	0.0291	<0.0010	0.00087	0.0083	<0.00050	<0.00050	1.33	0.000029	118	<0.00050	<0.00150	<0.00150	0.000074	0.00069	0.033	<0.00010
WQR1-3	L2755461-3	2024-04-23	M																				
WQR1-3	VA24A8736-003	2024-04-23	M	<0.0050	0.00170	0.00122	<0.0030	0.0068	<0.0010	0.00189	0.0073	<0.00050	<0.00050	2.62	0.000042	226	<0.00050	<0.00150	<0.00150	0.000061	<0.00050	<0.010	<0.00010
WQR1-3	L2755553-3	2024-04-30	M																				
WQR1-3	VA24A9418-003	2024-04-30	M	<0.0050	0.000720	0.00078	<0.0030	0.0371	<0.0010	0.00108	0.0066	<0.00050	<0.00050	1.14	<0.000020	96.6	<0.00050	<0.00150	<0.00150	0.000058	0.00066	0.025	<0.00010
WQR1-3	L2755641-3	2024-05-07	M																				
WQR1-3	VA24B0040-003	2024-05-07	M	0.0098	0.000965	0.00115	<0.0030	0.0264	<0.0010	0.00152	0.0066	<0.00050	<0.00050	1.43	0.000023	127	<0.00050	<0.00150	<0.00150	0.000272	0.00070	0.012	<0.00010
WQR1-3	L2755769-3	2024-05-14	M																				
WQR1-3	VA24B0738-003	2024-05-14	M	0.0363	0.000242	0.00168	<0.0030	0.0423	<0.0010	0.00077	0.0075	<0.00050	<0.00050	0.34	<0.000020	22.9	<0.00050	<0.00150	<0.00150	0.000063	0.00059	0.024	<0.00010
WQR1-3	L2755874-3	2024-05-21	M																				
WQR1-3	VA24B1351-003	2024-05-21	M	0.0249	0.000318	0.00131	<0.0030	0.0251	<0.0010	0.00065	0.0098	<0.00050	<0.00050	0.43	<0.000020	35.1	<0.00050	<0.00150	<0.00150	0.000060	0.00061	0.016	<0.00010
WQR1-3	L2756277-3	2024-06-18	M																				
WQR1-3	VA24B4257-003	2024-06-18	M	0.0226	0.000337	0.00139	0.0033	0.0233	<0.0010	0.00083	0.0084	<0.00050	<0.00050	0.50	<0.000020	37.0	<0.00050	<0.00150	<0.00150	0.000055	0.00057	0.012	<0.00010
WQR1-3	L2756678-3	2024-07-16	M																				
WQR1-3	VA24B7237-003	2024-07-16	M	0.0633	0.000210	0.00227	0.0043	0.0204	<0.0010	0.00084	0.0108	<0.00050	<0.00050	0.36	<0.000020	28.5	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	0.011	<0.00010
WQR1-3	L2757095-3	2024-08-20	M																				
WQR1-3	VA24C1101-003	2024-08-20	M	0.0263	0.000561	0.00127	<0.0030	0.0147	<0.0010	0.00052	0.0133	<0.00050	<0.00050	0.79	0.000024	72.4	<0.00050	<0.00150	<0.00150	0.000053	0.00058	<0.010	<0.00010
WQR1-3	VA24C4483-003	2024-09-17	M	0.0181	0.000968	0.00129	0.0048	0.0116	<0.0010	0.00146	0.0120	<0.00050	<0.00050	1.20	<0.000020	120	<0.00050	<0.00150	<0.00150	0.000071	<0.00050	<0.010	<0.00010
WQR1-3	VA24C8360-003	2024-10-22	M	0.0613	0.000328	0.00230	<0.0030	0.0453	<0.0010	0.00071	0.0163	<0.00050	<0.00050	0.38	<0.000020	33.9	<0.00050	<0.00150	<0.00150	0.000100	0.00076	0.026	<0.00010
WQR1-3	VA24C9197-003	2024-10-29	M	0.0130	0.000334	0.00098	<0.0030	0.0640	<0.0010	<0.00040	0.0081	<0.00050	<0.00050	0.51	<0.000020	37.3	<0.00050	<0.00150	<0.00150	0.000073	0.00103	0.039	<0.00010
WQR1-3	VA24D0009-003	2024-11-05	M	<0.0050	0.00146	0.00109	<0.0030	0.0191	<0.0010	0.00088	0.0108	<0.00050	<0.00050	1.80	0.000057	209	<0.00050	<0.00150		0.000130	<0.00050	0.016	<0.00010
WQR1-3	L2758095-3	2024-11-12	M																				
WQR1-3	VA24D0632-003	2024-11-12	M	0.0118	0.000674	0.00104	0.0032	0.0558	<0.0010	0.00056	0.0088	<0.00050	<0.00050	0.96	0.000023	95.9	<0.00050	<0.00150	<0.00150	0.000088	0.00102	0.033	<0.00010
WQR1-3	VA24D1720-003	2024-11-21	M	<0.0050	0.00124	0.00121	<0.0030	0.0239	<0.0010	0.00077	0.0116	<0.00050	<0.00050	2.12	0.000036	187	<0.00050	<0.00150	<0.00150	0.000194	<0.00050	0.033	<0.00010
WQR1-3	L2758465-3	2024-12-17	M																				
WQR1-3	VA24D3769-003	2024-12-17	M	<0.0050	0.00207	0.00141	<0.0030	0.0054	<0.0010	0.00142	0.0090	<0.00050	<0.00050	3.18	0.000064	281	<0.00050	<0.00150	<0.00150	0.000088	<0.00050	<0.010	<0.00010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-3	L2758719-3	2025-01-21	M																				
WQR1-3	VA25A1408-003	2025-01-21	M	<0.0050	0.00188	0.00127	<0.0030	<0.0050	<0.0010	0.00104	0.0103	<0.00050	<0.00050	2.55	0.000055	245	<0.00050	<0.00150	<0.00150	0.000119	<0.00050	0.012	<0.00010
WQR1-3	L2758994-3	2025-02-18	M																				
WQR1-3	VA25A3430-003	2025-02-18	M	<0.0050	0.00194	0.00120	<0.0030	<0.0050	<0.0010	0.00122	0.0104	<0.00050	<0.00050	2.72	0.000065	306	<0.00050	<0.00150	<0.00150	0.000067	<0.00050	<0.010	<0.00010
WQR1-3	VA25A6550-003	2025-03-25	M	<0.0050	0.000977	0.00067	<0.0030	0.0411	<0.0010	0.00048	0.0075	<0.00050	<0.00050	0.96	<0.000020	104	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	0.033	<0.00010
WQR1-3	VA25A8962-003	2025-04-22	M	<0.0050	0.000601	0.00064	<0.0030	0.0229	<0.0010	<0.00040	0.0075	<0.00050	<0.00050	0.99	0.000021	86.6	<0.00050	<0.00150	<0.00150	0.000061	0.00060	0.030	<0.00010
WQR1-3	VA25A9878-003	2025-04-30	M	0.0100	0.000243	0.00075	<0.0030	0.0389	<0.0010	<0.00040	0.0067	<0.00050	<0.00050	0.37	<0.000020	28.0	<0.00050	<0.00150	<0.00150	<0.000050	0.00073	0.036	<0.00010
WQR1-3	VA25B0358-003	2025-05-06	M	0.0102	0.000332	0.00077	<0.0030	0.0300	<0.0010	<0.00040	0.0066	<0.00050	<0.00050	0.59	<0.000020	40.2	<0.00050	<0.00150	<0.00150	0.000063	0.00116	0.028	<0.00010
WQR1-3	VA25B1026-003	2025-05-13	M	<0.0050	0.000620	0.00073	<0.0030	0.0319	<0.0010	<0.00040	0.0079	<0.00050	<0.00050	0.94	0.000021	77.0	<0.00050	<0.00150	<0.00150	0.000067	0.00056	0.030	<0.00010
WQR1-3	VA25B1711-003	2025-05-20	M	0.0108	0.000180	0.00073	<0.0030	0.0273	<0.0010	<0.00040	0.0065	<0.00050	<0.00050	<0.30	<0.000020	24.2	<0.00050	<0.00150	<0.00150	<0.000050	0.00078	0.035	<0.00010
WQR1-SF	L2755545-9	2024-04-30	M																				
WQR1-SF	VA24A9402-009	2024-04-30	M	<0.0050	0.00260	0.00148	0.0036	<0.0050	<0.0010	0.00309	0.0063	<0.00050	<0.00050	3.81	0.000069	348	<0.00050	<0.00150		0.000055	0.00059	<0.010	<0.00010
WQR1-SF	VA24A9802-013	2024-05-05	M	<0.0050	0.00260	0.00129	<0.0030	<0.0050	<0.0010	0.00264	0.0077	<0.00050	<0.00050	4.07	0.000072	340	<0.00050	<0.00150		0.000128	<0.00050	<0.010	<0.00010
WQR1-SF	L2755648-12	2024-05-08	M																				
WQR1-SF	VA24B0178-012	2024-05-08	M	<0.0050	0.00263	0.00144	<0.0030	<0.0050	<0.0010	0.00333	0.0092	<0.00050	<0.00050	3.88	0.000083	402	<0.00050	<0.00150		0.000078	0.00083	<0.010	<0.00010
WQR1-SF	L2755934-3	2024-05-24	M																				
WQR1-SF	VA24B1783-003	2024-05-24	M	<0.0050	0.00255	0.00137	<0.0030	<0.0050	<0.0010	0.00333	0.0093	<0.00050	<0.00050	4.39	0.000059	345	<0.00050	<0.00150		0.000066	<0.00050	<0.010	<0.00010
WQR1-SF	L2755981-3	2024-05-28	M																				
WQR1-SF	VA24B2063-003	2024-05-28	M	<0.0050	0.00255	0.00132	<0.0030	<0.0050	<0.0010	0.00360	0.0093	<0.00050	<0.00050	4.37	0.000056	348	<0.00050	<0.00150		0.000060	<0.00050	<0.010	<0.00010
WQR1-SF	L2756068-3	2024-06-04	M																				
WQR1-SF	VA24B2772-003	2024-06-04	M	<0.0050	0.00284	0.00129	<0.0030	0.0156	<0.0010	0.00255	0.0070	<0.00050	<0.00050	2.42	0.000032	234	<0.00050	<0.00150		0.000058	0.00078	<0.010	<0.00010
WQR1-SF	VA24B3452-009	2024-06-10	M	<0.0050	0.00275	0.00129	<0.0030	<0.0050	<0.0010	0.00336	0.0098	<0.00050	<0.00050	3.99	0.000075	380	<0.00050	<0.00150		0.000068	0.00068	<0.010	<0.00010
WQR1-SF	657-454600000-0	2024-06-17	M																				
WQR1-SF	VA24B5882-009	2024-07-03	M	0.0065	0.00247	0.00124	<0.0030																
WQR1-SF	VA24B6465-003	2024-07-09	M	<0.0050	0.00263	0.00138	<0.0030	0.0075	<0.0010	0.00325	0.0098	<0.00050	<0.00050	2.81	0.000050	298	<0.00050	<0.00150		0.000054	<0.00050	<0.010	<0.00010
WQR1-SF	VA24B7867-003	2024-07-20	M	<0.0050	0.00270	0.00122	<0.0030	0.0055	<0.0010	0.00325	0.0131	<0.00050	<0.00050	3.32	0.000074	362	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR1-SF	L2757210-3	2024-08-26	M																				
WQR1-SF	VA24C2208-003	2024-08-26	M	<0.0050	0.00276	0.00128	<0.0030	<0.0050	<0.0010	0.00349	0.0107	<0.00050	<0.00050	3.55	0.000076	346	<0.00050	<0.00150		0.000062	<0.00050	<0.010	<0.00010
WQR1-SF	L2757680-3	2024-10-06	M																				
WQR1-SF	VA24C6685-003	2024-10-06	M	<0.0150	0.00262	<0.0250	<0.150	<0.0500	<0.00500	<0.00500	0.0110	<0.00100	<0.00250	3.30	<0.000250	310	<0.0250	<0.00150		<0.00500	<0.0100	<0.500	<0.00250
WQR1-SF	VA24C7408-003	2024-10-13	M	<0.0050	0.00300	0.00126	<0.0030	<0.0050	<0.0010	0.00531	0.0109	<0.00050	<0.00050	3.52	0.000068	345	<0.00050	<0.00150		0.000060	0.00059	<0.010	<0.00010
WQR1-SF	L2757872-3	2024-10-22	M																				
WQR1-SF	VA24C8330-003	2024-10-22	M	<0.0050	0.00290	0.00129	<0.0030	0.0075	<0.0010	0.00595	0.0125	<0.00050	<0.00050	3.48	0.000077	365	<0.00050	<0.00150		0.000109	<0.00050	<0.010	<0.00010
WQR1-SF	L2757933-7	2024-10-28	M																				
WQR1-SF	VA24C9041-007	2024-10-28	M	<0.0050	0.00264	0.00127	<0.0030	0.0176	<0.0010	<0.00240	0.0106	<0.00050	<0.00050	2.36	0.000068	242	<0.00050	<0.00150		0.000101	0.00066	<0.010	<0.00010
WQR1-SF	L2758002-4	2024-11-01	M																				
WQR1-SF	VA24C9683-004	2024-11-01	M	<0.0050	0.00248	0.00155	<0.0030	0.0120	<0.0010	0.00140	0.0125	<0.00050	<0.00050	3.48	0.000082	403	<0.00050	<0.00150		0.000222	0.00054	<0.010	<0.00010
WQR1-SF	VA24D2498-001	2024-11-30	M																				
WQR1-SF	L2758353-3	2024-12-05	M																				
WQR1-SF	VA24D2842-003	2024-12-05	M	<0.0050	0.00234	0.00147	<0.0030	0.0053	<0.0010	0.00149	0.0095	<0.00050	<0.00050	3.40	0.000067	375	<0.00050	<0.00150		0.000106	<0.00050	<0.010	<0.00010
WQR1-SF	L2758617-9	2025-01-08	M																				
WQR1-SF	VA25A0392-009	2025-01-08	M	<0.0050	0.00204	0.00150	<0.0030	<0.0050	<0.0010	0.00142	0.0093	<0.00050	<0.00050	3.00	0.000067	352	<0.00050	<0.00150		0.000078	<0.00050	<0.010	<0.00010
WQR1-SF	L2759040-9	2025-02-20	M																				
WQR1-SF	VA25A3677-009	2025-02-20	M	<0.0050	0.00222	0.00142	<0.0030	<0.0050	<0.0010	0.00153	0.0096	<0.00050	<0.00050	3.60	0.000077	355	<0.00050	<0.00150		0.000075	<0.00050	<0.010	<0.00010
WQR1-SF	L2759227-9	2025-03-13	M																				
WQR1-SF	VA25A5556-009	2025-03-13	M	<0.0050	0.00223	0.00144	<0.0030	<0.0050	<0.0010	0.00157	0.0097	<0.00050	<0.00050	4.88	0.000078	369	<0.00050	<0.00150		0.000077	<0.00050	<0.010	<0.00010
WQR1-SF	VA25A6528-015	2025-03-25	M																				
WQR1-SF	VA25A8147-003	2025-04-11	M	<0.0050	0.00244	0.00117	<0.0030	<0.0050	<0.0010	0.00130	0.0078	<0.00050	<0.00050	3.24	0.000070	345	<0.00050	<0.00150		0.000076	<0.00050	<0.010	<0.00010
WQR1-SF	VA25A8148-003	2025-04-11	M																				
WQR1-SF	VA25A8281-009	2025-04-14	M	<0.0050	0.00229	0.00142	<0.0030	<0.0050	<0.0010	0.00158	0.0104	<0.00050	<0.00050	3.32	0.000070	385	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR1-SF	VA25A8283-009	2025-04-14	M																				
WQR1-SF	VA25A9123-010	2025-04-23	M	<0.0050	0.00242	0.00158	<0.0030	<0.0050	<0.0010	0.00147	0.0087	<0.00050	<0.00050	3.57	0.000079	354	<0.00050	<0.00150		0.000060	<0.00050	<0.010	<0.00010
WQR1-SF	VA25A9125-010	2025-04-23	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-SF	VA25B0359-007	2025-05-06	M	<0.0050	0.00233	0.00147	<0.0030	<0.0050	<0.0010	0.00174	0.0090	<0.00050	<0.00050	2.58	0.000092	368	<0.00050	<0.00150		0.000072	<0.00050	<0.010	<0.00010
WQR1-SF	VA25B0360-007	2025-05-06	M																				
WQR1-SF	VA25B0800-009	2025-05-09	M																				
WQR1-SF	VA25B0802-009	2025-05-09	M	<0.0050	0.00281	0.00171	<0.0030	<0.0050	<0.0010	0.00161	0.0087	<0.00050	<0.00050	4.08	0.000082	377	<0.00050	<0.00150		0.000067	<0.00050	<0.010	<0.00010
WQR2-0.5	L2755545-10	2024-04-30	M																				
WQR2-0.5	VA24A9402-010	2024-04-30	M	0.0056	0.000618	0.00082	<0.0030	0.0420	<0.0010	0.00069	0.0063	<0.00050	<0.00050	0.92	0.000021	79.6	<0.00050	<0.00150		0.000060	0.00065	0.030	<0.00010
WQR2-0.5	L2755648-1	2024-05-08	M																				
WQR2-0.5	VA24B0178-001	2024-05-08	M	0.0068	0.000653	0.00094	<0.0030	0.0348	<0.0010	0.00083	0.0065	<0.00050	<0.00050	0.74	<0.000020	77.1	<0.00050	<0.00150		0.000067	0.00062	0.022	<0.00010
WQR2-0.5	L2755934-10	2024-05-24	M																				
WQR2-0.5	VA24B1783-010	2024-05-24	M	0.0128	0.000372	0.00092	<0.0030	0.0294	<0.0010	0.00079	0.0073	<0.00050	<0.00050	0.73	<0.000020	48.9	<0.00050	<0.00150		0.000050	0.00065	0.010	<0.00010
WQR2-0.5	VA24B3452-010	2024-06-10	M	0.0171	0.000324	0.00102	<0.0030	0.0251	<0.0010	0.00057	0.0066	<0.00050	<0.00050	0.44	<0.000020	32.7	<0.00050	<0.00150		<0.000050	0.00055	<0.010	<0.00010
WQR2-0.5	658-454600000-0	2024-06-17	M																				
WQR2-0.5	VA24B5882-010	2024-07-03	M	0.0317	0.000113	0.00128	<0.0030																
WQR2-0.5	VA24B6465-004	2024-07-09	M	0.0359	0.000411	0.00162	<0.0030	0.0155	<0.0010	0.00089	0.0117	<0.00050	<0.00050	0.59	<0.000020	49.9	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR2-0.5	VA24B7867-004	2024-07-20	M	0.0287	0.000205	0.00136	<0.0030	0.0139	<0.0010	<0.00040	0.0117	<0.00050	<0.00050	<0.30	<0.000020	23.0	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR2-0.5	L2757210-4	2024-08-26	M																				
WQR2-0.5	VA24C2208-004	2024-08-26	M	0.0101	0.00101	0.00105	<0.0030	0.0111	<0.0010	0.00096	0.0141	<0.00050	<0.00050	1.51	0.000024	145	<0.00050	<0.00150		0.000057	0.00059	<0.010	<0.00010
WQR2-0.5	VA24C5557-001	2024-09-25	M	0.0202	0.00138	0.00129	<0.0030	0.0113	<0.0010	0.00272	0.0128	<0.00050	<0.00050	1.67	0.000034	169	<0.00050			<0.000050	<0.00050	<0.010	<0.00010
WQR2-0.5	L2757680-4	2024-10-06	M																				
WQR2-0.5	VA24C6685-004	2024-10-06	M	0.0115	0.000893	<0.00500	<0.0300	0.0306	<0.00100	<0.00100	0.0107	<0.000200	<0.000500	1.14	<0.0000500	108	<0.00500	<0.00150		<0.00100	<0.00200	<0.100	<0.000500
WQR2-0.5	VA24C7408-004	2024-10-13	M	0.0112	0.00165	0.00122	<0.0030	0.0073	<0.0010	0.00293	0.0123	<0.00050	<0.00050	2.00	0.000048	194	<0.00050	<0.00150		0.000059	0.00073	<0.010	<0.00010
WQR2-0.5	L2757830-2	2024-10-19	M																				
WQR2-0.5	VA24C8041-002	2024-10-19	M	0.0270	0.000763	0.00188	0.0085	0.0476	<0.0010	0.00177	0.0177	<0.00050	<0.00050	1.00	0.000030	93.0	<0.00050	<0.00150		0.000114	<0.00050	0.019	0.00050
WQR2-0.5	VA24C8159-004	2024-10-20	M	0.0780	0.000551	0.00321	0.0036	0.0528	<0.0010	<0.00200	0.0204	<0.00050	<0.00050	0.70	0.000024	65.6	<0.00050	<0.00150		0.000145	0.00556	0.024	0.00040
WQR2-0.5	L2757872-4	2024-10-22	M																				
WQR2-0.5	VA24C8330-004	2024-10-22	M	0.0606	0.000325	0.00252	0.0042	0.0353	<0.0010	0.00087	0.0182	<0.00050	<0.00050	0.34	<0.000020	34.9	<0.00050	<0.00150		0.000136	0.00097	0.023	<0.00010
WQR2-0.5	L2757962-5	2024-10-29	M																				
WQR2-0.5	VA24C9185-005	2024-10-29	M	0.0114	0.000284	0.00095	<0.0030	0.0553	<0.0010	<0.00040	0.0079	<0.00050	<0.00050	0.33	<0.000020	33.5	<0.00050	<0.00150		0.000080	0.00069	0.033	<0.00010
WQR2-0.5	L2758003-1	2024-11-02	M																				
WQR2-0.5	VA24C9732-001	2024-11-02	M	<0.0050	0.000908	0.00099	<0.0030	0.0310	<0.0010	0.00055	0.0119	<0.00050	<0.00050	1.24	0.000027	139	<0.00050	<0.00150		0.000149	0.00072	0.034	<0.00010
WQR2-0.5	L2758142-6	2024-11-14	M																				
WQR2-0.5	VA24D0945-006	2024-11-14	M	0.0117	0.000390	0.00110	<0.0030	0.0743	<0.0010	<0.00040	0.0081	<0.00050	<0.00050	0.46	<0.000020	47.1	<0.00050	<0.00150		0.000080	0.00084	0.037	<0.00010
WQR2-0.5	VA24D1069-006	2024-11-15	M	0.0087	0.000493	0.00098	<0.0030	0.0554	<0.0010	<0.00040	0.0082	<0.00050	<0.00050	0.72	<0.000020	63.6	<0.00050	<0.00150		0.000094	0.00082	0.042	<0.00010
WQR2-0.5	L2758203-6	2024-11-19	M																				
WQR2-0.5	VA24D1567-006	2024-11-19	M	<0.0050	0.000838	0.00085	<0.0030	0.0282	<0.0010	0.00058	0.0108	<0.00050	<0.00050	1.22	0.000035	112	<0.00050	<0.00150		0.000111	0.00053	0.049	<0.00010
WQR2-0.5	L2758354-1	2024-12-06	M																				
WQR2-0.5	VA24D3008-001	2024-12-06	M	<0.0050	0.00111	0.00099	<0.0030	0.0124	<0.0010	0.00066	0.0104	<0.00050	<0.00050	1.64	0.000026	154	<0.00050	<0.00150		0.000097	0.00059	0.017	<0.00010
WQR2-0.5	L2758634-7	2025-01-09	M																				
WQR2-0.5	VA25A0510-007	2025-01-09	M	<0.0050	0.00185	0.00139	<0.0030	0.0074	<0.0010	0.00120	0.0094	<0.00050	<0.00050	2.37	0.000067	282	<0.00050	<0.00150		0.000083	<0.00050	<0.010	<0.00010
WQR2-0.5	L2759010-7	2025-02-18	M																				
WQR2-0.5	VA25A3415-007	2025-02-18	M	<0.0050	0.00193	0.00131	<0.0030	<0.0050	<0.0010	0.00137	0.0105	<0.00050	<0.00050	2.61	0.000066	311	<0.00050	<0.00150		0.000078	<0.00050	<0.010	<0.00010
WQR2-0.5	L2759209-7	2025-03-12	M																				
WQR2-0.5	VA25A5429-007	2025-03-12	M	<0.0050	0.000490	0.00073	<0.0030	0.0419	<0.0010	<0.00040	0.0072	<0.00050	<0.00050	0.73	<0.000020	62.9	<0.00050	<0.00150		0.000065	0.00058	0.065	<0.00010
WQR2-0.5	VA25A6528-016	2025-03-25	M	<0.0050	0.00121	0.00088	<0.0030	0.0455	<0.0010	0.00055	0.0065	<0.00050	<0.00050	1.47	0.000031	125	<0.00050			0.000082	<0.00050	0.022	<0.00010
WQR2-0.5	VA25A8147-004	2025-04-11	M	<0.0050	0.000548	0.00063	<0.0030	0.0502	<0.0010	<0.00040	0.0070	<0.00050	<0.00050	0.67	<0.000020	55.3	<0.00050	<0.00150		0.000066	<0.00050	0.054	<0.00010
WQR2-0.5	VA25A8148-004	2025-04-11	M																				
WQR2-0.5	VA25A8280-007	2025-04-13	M	<0.0050	0.000479	<0.00050	<0.0030	0.0531	<0.0010	<0.00040	0.0055	<0.00050	<0.00050	0.60	<0.000020	45.5	<0.00050	<0.00150		0.000051	<0.00050	0.038	<0.00010
WQR2-0.5	VA25A8282-007	2025-04-13	M																				
WQR2-0.5	VA25A8854-007	2025-04-21	M	0.0058	0.000203	0.00065	<0.0030	0.0295	<0.0010	<0.00040	0.0068	<0.00050	<0.00050	0.36	<0.000020	26.6	<0.00050	<0.00150		0.000069	0.00062	0.048	<0.00010
WQR2-0.5	VA25A8855-007	2025-04-21	M																				
WQR2-0.5	VA25B0359-012	2025-05-06	M	0.0082	0.000742	0.00086	<0.0030	0.0257	<0.0010	<0.00040	0.0074	<0.00050	<0.00050	0.57	<0.000020	58.2	<0.00050	<0.00150		0.000056	0.00051	0.017	<0.00010
WQR2-0.5	VA25B0360-012	2025-05-06	M																				
WQR2-0.5	VA25B0499-007	2025-05-07	M	0.0079	0.000550	0.00078	<0.0030	0.0224	<0.0010	<0.00040	0.0071	<0.00050	<0.00050	0.61	<0.000020	60.3	<0.00050	<0.00150		0.000057	<0.00050	0.021	<0.00010
WQR2-0.5	VA25B0502-007	2025-05-07	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-0.5	VA25B2349-006	2025-05-27	M	0.0082	0.000320	0.00076	<0.0030	0.0362	<0.0010	<0.00040	0.0065	<0.00050	<0.00050	0.46	<0.000020	43.5	<0.00050	<0.00150		<0.000050	0.00077	0.020	<0.00010
WQR2-1	0051710-11	2020-05-20	M	<0.0100	0.00284	0.0027	<0.0080																
WQR2-1	0062209-12	2020-06-22	M	<0.0100	0.00294	<0.0020	<0.0080																
WQR2-1	0071996-11	2020-07-21	M	0.0386	0.00292	<0.0020	0.014																
WQR2-1	0082292-11	2020-08-24	M	<0.0100	0.00308	0.0028	<0.0080																
WQR2-1	0093017-11	2020-09-28	M	<0.0100	0.00296	<0.0020	0.0107																
WQR2-1	20J1961-11	2020-10-20	M	<0.0100	0.00296	0.0075	<0.0080																
WQR2-1	20J2778-11	2020-10-27	M	<0.0100	0.00293	0.0027	<0.0080																
WQR2-1	20K0360-11	2020-11-03	M	<0.0100	0.00535	0.0041	0.0081																
WQR2-1	20K1261-11	2020-11-10	M	<0.0100	0.00308	<0.0020	<0.0080																
WQR2-1	20K2100-11	2020-11-18	M	<0.0100	0.00288	<0.0020	<0.0080																
WQR2-1	20L1589-11	2020-12-14	M	<0.0100	0.00303	0.003	<0.0080																
WQR2-1	21A2590-11	2021-01-27	M	<0.0100	0.00286	<0.0020	<0.0080																
WQR2-1	21B2778-11	2021-02-25	M	<0.0100	0.00273	0.0032	<0.0080																
WQR2-1	21C3505-12	2021-03-25	M	<0.00200	0.00298	<0.00200	<0.0100																
WQR2-1	21D2478-11	2021-04-22	M	<0.00200	0.003	<0.00200	<0.0100																
WQR2-1	21E1990-11	2021-05-18	M	<0.0100	0.00299	0.0024	<0.0080																
WQR2-1	21E2917-11	2021-05-26	M	0.00419	0.00296	0.00399	<0.0100																
WQR2-1	21F0167-11	2021-06-01	M	0.00236	0.00265	0.00202	<0.0100																
WQR2-1	21F1056-11	2021-06-08	M	<0.00200	0.0029	0.00239	<0.0100																
WQR2-1	21F2014-11	2021-06-15	M	0.00332	0.00294	<0.00200	<0.0100																
WQR2-1	21G2414-11	2021-07-20	M	<0.00200	0.00258	<0.00200	<0.0100																
WQR2-1	21H3040-11	2021-08-25	M	0.00539	0.0026	0.00288	0.019																
WQR2-1	21I3814-11	2021-09-28	M	0.00353	0.00274	<0.00200	0.0742																
WQR2-1	21J3514-11	2021-10-26	M	<0.0050	0.00203	0.0011	<0.0040																
WQR2-1	21K3046-11	2021-11-23	M	<0.0100	0.00265	<0.0020	<0.0080																
WQR2-1	21L2125-11	2021-12-14	M	<0.0100	0.00268	<0.0020	<0.0080																
WQR2-1	22A2312-11	2022-01-20	M	<0.0100	0.00299	0.0034	<0.0080																
WQR2-1	22B2487-11	2022-02-17	M	<0.0100	0.00272	<0.0020	<0.0080	<0.0100	<0.00040	0.00132	<0.0100	<0.00020	<0.00020	3.8	0.000071	320	<0.00100			<0.00020	0.00281	<0.020	<0.00040
WQR2-1	22C3145-11	2022-03-22	M	<0.0100	0.00222	0.0042	<0.0080	<0.0100	<0.00040	0.00197	0.0125	<0.00020	<0.00020	3.49	0.000064	340	<0.00100			<0.00020	0.00139	0.03	<0.00040
WQR2-1	22D2212-14	2022-04-20	M	<0.0100	0.00287	<0.0100	<0.0080	<0.0100	<0.00040	0.00159	0.0115	<0.00020	<0.00020	5.22	0.000094	342	<0.00100			<0.00020	<0.00080	0.037	<0.00040
WQR2-1	22E2480-11	2022-05-17	M	<0.0500	0.00234	<0.0500	<0.0400	<0.0500	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	3.28	<0.000100	349	<0.00500			<0.00100	<0.00400	<0.100	<0.00200
WQR2-1	22F3212-11	2022-06-21	M	<0.00200	0.00243	<0.0100	<0.0100	0.0126	<0.000500	0.00163	0.0108	<0.000100	<0.000100	4.3	0.0000719	359	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	22G1763-11	2022-07-13	M	<0.00200	0.00263	<0.0100	<0.0100	<0.0100	<0.000500	0.00166	0.0102	<0.000100	<0.000100	4.47	0.0000877	333	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	22H2453-11	2022-08-16	M	0.00202	0.00239	<0.0100	<0.0100	0.0205	<0.000500	0.00154	0.0102	<0.000100	<0.000100	4.48	0.000107	395	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	22I1926-11	2022-09-14	M	<0.00200	0.00245	<0.0100	<0.0100	0.0142	<0.000500	0.00164	0.0112	<0.000100	<0.000100	4.05	0.0000815	347	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	22J1560-11	2022-10-12	M	<0.00200	0.00265	<0.00500	<0.0100	<0.0100	<0.000500	0.00161	0.0103	<0.000100	<0.000100	4.19	0.0000701	316	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	22K1453-11	2022-11-10	M	<0.00200	0.00321	<0.0100	<0.0100	<0.0100	<0.000500	0.00189	0.0120	<0.000100	<0.000100	5.29	0.000113	381	0.00108			0.000148	<0.00100	<0.0200	<0.000500
WQR2-1	22K2628-03	2022-11-22	M	<0.00200	0.00245	<0.0100	<0.0100	<0.0100	<0.000500	0.00167	0.0123	<0.000100	<0.000100	4.76	0.0000798	407	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	22K2988-03	2022-11-24	M	<0.00200	0.00267	<0.0100	<0.0100	0.0130	<0.000500	0.00196	0.0106	<0.000100	<0.000100	5.1	0.000113	397	<0.00100			0.0000573	<0.00100	<0.0200	<0.000500
WQR2-1	22K3123-03	2022-11-25	M	<0.00200	0.00284	<0.0100	<0.0100	0.0105	<0.000500	0.00193	0.0106	<0.000100	<0.000100	4.81	0.0000817	370	<0.00100			0.0000504	<0.00100	<0.0200	<0.000500
WQR2-1	22L0036-03	2022-11-30	M	<0.00200	0.00260	<0.0100	<0.0100	<0.0100	<0.000500	0.00175	0.0109	<0.000100	<0.000100	4.24	0.0000697	341	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	22L0263-03	2022-12-02	M	<0.00200	0.00249	<0.0100	<0.0100	<0.0100	<0.000500	0.00168	0.00918	<0.000100	<0.000100	4.07	0.0000753	286	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	22L0499-03	2022-12-05	M	<0.00200	0.00272	<0.0100	<0.0100	<0.0100	<0.000500	0.00201	0.0128	<0.000100	<0.000100	4.67	0.0000968	424	<0.00100			0.0000615	<0.00100	<0.0200	<0.000500
WQR2-1	22L0633-03	2022-12-06	M	<0.00200	0.00282	<0.0100	<0.0100	<0.0100	<0.000500	0.00223	0.0125	<0.000100	<0.000100	5.01	0.0000703	352	<0.00100			0.0000877	<0.00100	<0.0200	<0.000500
WQR2-1	22L0774-11	2022-12-07	M	<0.00200	0.00273	<0.0100	<0.0100	<0.0100	<0.000500	0.00215	0.0125	<0.000100	<0.000100	5.17	0.0000965	373	<0.00100			0.0000934	<0.00100	<0.0200	<0.000500
WQR2-1	22L1436-03	2022-12-13	M	<0.00200	0.00277	<0.0100	<0.0100	<0.0100	<0.000500	0.00199	0.0133	<0.000100	<0.000100	4.7	0.0000864	398	<0.00100			0.0000588	0.00163	<0.0200	<0.000500
WQR2-1	23A2847-11	2023-01-27	M	<0.00200	0.00292	<0.0100	<0.0100	<0.0100	<0.000500	0.00202	0.00965	0.000104	<0.000100	4.27	0.0000988	395	<0.00100			0.0000665	<0.00100	<0.0200	<0.000500
WQR2-1	23C0060-11	2023-02-28	M	<0.00200	0.00270	<0.0100	<0.0100	<0.0100	<0.000500	0.00172	0.00933	<0.000100	<0.000100	3.84	0.0000641	410	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	23C1797-11	2023-03-15	M	<0.00200	0.00269	<0.0100	<0.0100	<0.0100	<0.000500	0.00199	0.0107	<0.000100	<0.000100	4.3	0.0000918	340	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	23D2945-11	2023-04-26	M	<0.00200	0.00311	<0.0100	<0.0100	<0.0100	<0.000500	0.00166	0.00973	<0.000100	<0.000100	3.8	0.0000991	391	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	23E2392-11	2023-05-17	M	0.00208	0.00240	<0.0100	<0.0100	0.0136	<0.000500	0.00196	0.0110	<0.000100	<0.000100	3.51	0.0000734	372	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	23F3614-11	2023-06-27	M	<0.00200	0.00266	<0.0100	<0.0100	<0.0100	<0.000500	0.00198	0.0103	<0.000100	<0.000100	4.58	0.0000901	416	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	23G2415-11	2023-07-19	M	0.00222	0.00265	<0.0100	<0.0100	<0.0100	<0.000500	0.00197	0.0102	<0.000100	<0.000100	4.44	0.0000993	388	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	23H3309-11	2023-08-24	M	<0.00200	0.00265	<0.0100	<0.0100	0.282	<0.000500	0.00215	0.0105	<0.000100	<0.000100	4.08	0.0000738	360	<0.00500			<0.0000500	0.00107	<0.0200	<0.000500

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-1	23I2271-13	2023-09-19	M	0.00302	0.00264	<0.0100	<0.0100	<0.0100	<0.000500	0.00176	0.0109	<0.000100	<0.000100	4.31	0.000109	309	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	23J2236-13	2023-10-18	M	0.00251	0.00274	<0.00400	<0.0100	<0.0100	<0.000500	0.00181	0.0113	<0.000100	<0.000100	4.2	0.0000951	379	<0.00500			<0.0000500	0.00109	<0.0200	<0.000500
WQR2-1	23K1909-11	2023-11-15	M	<0.00200	0.00280	<0.00400	<0.0100	0.0111	<0.000500	0.00166	0.0106	<0.000100	<0.000100	4.75	0.0000775	415	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	23L2091-09	2023-12-15	M	<0.00200	0.00289	<0.00400	<0.0100	<0.0100	<0.000500	0.00201	0.00924	<0.000100	<0.000100	4.32	0.0000950	362	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-1	L2754383-7	2024-01-25	M																				
WQR2-1	VA24A1507-009	2024-01-25	M	<0.0050	0.00290	0.00164	<0.0030	<0.0050	<0.0010	0.00200	0.0085	<0.00050	<0.00050	4.10	0.000074	400	<0.00050			0.000090	<0.00050	<0.010	<0.00010
WQR2-1	L2754604-7	2024-02-14	M																				
WQR2-1	VA24A2995-009	2024-02-14	M	<0.0050	0.00250	0.00158	<0.0030	0.0051	<0.0010	0.00153	0.0086	<0.00050	<0.00050	3.92	0.000076	356	<0.00050	<0.00150	<0.00150	0.000066	<0.00050	<0.010	<0.00010
WQR2-1	L2755043-9	2024-03-21	M																				
WQR2-1	VA24A6026-009	2024-03-21	M	0.0064	0.00307	0.00175	<0.0030	<0.0050	<0.0010	0.00253	0.0090	<0.00050	<0.00050	3.52	0.000075	400	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR2-1	L2755490-7	2024-04-24	M																				
WQR2-1	VA24A8916-009	2024-04-24	M	<0.0050	0.00266	0.00151	<0.0030	<0.0050	<0.0010	0.00342	0.0095	<0.00050	<0.00050	4.01	0.000077	370	<0.00050	<0.00150	<0.00150	0.000060	<0.00050	<0.010	<0.00010
WQR2-1	L2755567-7	2024-05-01	M																				
WQR2-1	VA24A9566-009	2024-05-01	M	<0.0050	0.00274	0.00137	<0.0030	<0.0050	<0.0010	0.00388	0.0107	<0.00050	<0.00050	3.65	0.000070	391	<0.00050	<0.00150	<0.00150	0.000052	<0.00050	<0.010	<0.00010
WQR2-1	L2755666-7	2024-05-08	M																				
WQR2-1	VA24B0201-009	2024-05-08	M	<0.0050	0.00290	0.00154	<0.0030	<0.0050	<0.0010	0.00359	0.0101	<0.00050	<0.00050	3.52	0.000086	378	<0.00050	<0.00150	<0.00150	0.000106	<0.00050	<0.010	<0.00010
WQR2-1	L2755779-7	2024-05-15	M																				
WQR2-1	VA24B0901-009	2024-05-15	M	<0.0050	0.00268	0.00151	<0.0030	<0.0050	<0.0010	0.00369	0.0099	<0.00050	<0.00050	3.80	0.000076	371	<0.00050	<0.00150	<0.00150	0.000071	<0.00050	<0.010	<0.00010
WQR2-1	L2755888-7	2024-05-22	M																				
WQR2-1	VA24B1500-009	2024-05-22	M	<0.0050	0.00244	0.00140	<0.0030	<0.0050	<0.0010	0.00234	0.0101	<0.00050	<0.00050	3.87	0.000072	364	<0.00050	<0.00150	<0.00150	0.000073	<0.00050	<0.010	<0.00010
WQR2-1	L2756312-7	2024-06-19	M																				
WQR2-1	VA24B4510-009	2024-06-19	M	<0.0050	0.00291	0.00142	<0.0030	<0.0050	<0.0010	0.00346	0.0104	<0.00050	<0.00050	3.48	0.000083	370	<0.00050	<0.00150	<0.00150	0.000050	<0.00050	<0.010	<0.00010
WQR2-1	VA24B7397-009	2024-07-17	M	<0.0050	0.00302	0.00141	<0.0030	<0.0050	<0.0010	0.00367	0.0103	<0.00050	<0.00050	3.33	0.000081	387	<0.00050	<0.00150	<0.00150	0.000051	<0.00050	<0.010	<0.00010
WQR2-1	L2756689-7	2024-07-17	M																				
WQR2-1	L2757122-7	2024-08-21	M																				
WQR2-1	VA24C1337-009	2024-08-21	M	<0.0050	0.00264	0.00124	<0.0030	<0.0050	<0.0010	0.00349	0.0108	<0.00050	<0.00050	3.54	0.000070	365	<0.00050	<0.00150	<0.00150	0.000086	<0.00050	<0.010	<0.00010
WQR2-1	VA24C4683-009	2024-09-18	M	<0.0050	0.00306	0.00132	<0.0030	<0.0050	<0.0010	0.00545	0.0103	<0.00050	<0.00050	4.32	0.000077	377	<0.00050	<0.00150	<0.00150	0.000068	<0.00050	<0.010	<0.00010
WQR2-1	VA24C8569-009	2024-10-23	M	<0.0050	0.00271	0.00114	<0.0030	<0.0050	<0.0010	0.00648	0.0102	<0.00050	<0.00050	3.59	0.000075	370	<0.00050	<0.00150	<0.00150	0.000078	<0.00050	<0.010	<0.00010
WQR2-1	L2757977-9	2024-10-30	M																				
WQR2-1	VA24C9414-009	2024-10-30	M	<0.0050	0.00274	0.00161	<0.0030	0.0050	<0.0010	0.00168	0.0097	<0.00050	<0.00050	3.45	0.000069	386	<0.00050	<0.00150	<0.00150	0.000190	<0.00050	<0.010	<0.00010
WQR2-1	VA24D0180-009	2024-11-06	M	<0.0050	0.00284	0.00152	<0.0030	0.0058	<0.0010	0.00145	0.0111	<0.00050	<0.00050	3.03	0.000078	359	<0.00050	<0.00150	<0.00150	0.000206	<0.00050	<0.010	<0.00010
WQR2-1	VA24D0813-009	2024-11-13	M	<0.0050	0.00274	0.00149	<0.0030	0.0065	<0.0010	0.00166	0.0115	<0.00050	<0.00050	3.39	0.000080	384	<0.00050	<0.00150	<0.00150	0.000203	0.00054	<0.010	<0.00010
WQR2-1	L2758221-7	2024-11-22	M																				
WQR2-1	VA24D1791-009	2024-11-22	M	<0.0050	0.00242	0.00173	<0.0030	0.0062	<0.0010	0.00153	0.0114	<0.00050	<0.00050	4.34	0.000062	367	<0.00050	<0.00150	<0.00150	0.000274	<0.00050	<0.010	<0.00010
WQR2-1	L2758486-7	2024-12-18	M																				
WQR2-1	VA24D3937-009	2024-12-18	M	<0.0050	0.00236	0.00158	<0.0030	<0.0050	<0.0010	0.00180	0.0090	<0.00050	<0.00050	3.81	0.000076	338	<0.00050	<0.00150	<0.00150	0.000069	<0.00050	<0.010	<0.00010
WQR2-1	L2758770-7	2025-01-22	M																				
WQR2-1	VA25A1525-009	2025-01-22	M	0.0723	0.00272	0.00361	0.0040	<0.0050	<0.0010	0.00157	0.0087	<0.00050	<0.00050	3.70	0.000070	397	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR2-1	L2759008-7	2025-02-19	M																				
WQR2-1	VA25A3570-009	2025-02-19	M	<0.0050	0.00238	0.00159	<0.0030	<0.0050	<0.0010	0.00162	0.0095	<0.00050	<0.00050	3.43	0.000059	357	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR2-1	VA25A6679-009	2025-03-26	M	<0.0050	0.00264	0.00147	<0.0030	<0.0050	<0.0010	0.00159	0.0088	<0.00050	<0.00050	3.85	0.000084	420	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR2-1	VA25A9109-009	2025-04-23	M	<0.0050	0.00239	0.00155	<0.0030	<0.0050	<0.0010	0.00156	0.0084	<0.00050	<0.00050	3.11	0.000074	354	<0.00050	<0.00150	<0.00150	0.000051	<0.00050	<0.010	<0.00010
WQR2-1	VA25A9941-009	2025-05-01	M	<0.0050	0.00243	0.00166	<0.0030	<0.0050	<0.0010	0.00146	0.0090	<0.00050	<0.00050	3.86	0.000081	351	<0.00050	<0.00150	<0.00150	0.000050	<0.00050	<0.010	<0.00010
WQR2-1	VA25B0496-009	2025-05-07	M	<0.0050	0.00268	0.00160	<0.0030	<0.0050	<0.0010	0.00163	0.0090	<0.00050	<0.00050	4.24	0.000077	406	<0.00050	<0.00150	<0.00150	0.000065	<0.00050	<0.010	<0.00010
WQR2-1	VA25B1530-009	2025-05-16	M	<0.0050	0.00262	0.00161	<0.0030	<0.0050	<0.0010	0.00170	0.0091	<0.00050	<0.00050	3.55	0.000073	372	<0.00050	<0.00150	<0.00150	0.000073	<0.00050	<0.010	<0.00010
WQR2-1	VA25B1841-009	2025-05-21	M	<0.0050	0.00276	0.00154	<0.0030	<0.0050	<0.0010	0.00139	0.0085	<0.00050	<0.00050	3.55	0.000096	406	<0.00050	<0.00150	<0.00150	0.000064	<0.00050	<0.010	<0.00010
WQR2-2	0051710-12	2020-05-20	M	0.0181	0.00087	<0.0020	<0.0080																
WQR2-2	0062209-11	2020-06-22	M	0.0631	0.000358	0.0028	<0.0080																
WQR2-2	0071996-12	2020-07-21	M	0.0418	0.000239	<0.0020	<0.0080																
WQR2-2	0082292-12	2020-08-24	M	<0.0100	0.00162	0.0031	<0.0080																
WQR2-2	0093017-12	2020-09-28	M	0.0275	0.000464	<0.0020	0.0106																
WQR2-2	20J1961-12	2020-10-20	M	0.01	0.000537	0.0077	0.0364																
WQR2-2	20J2778-12	2020-10-27	M	<0.0100	0.00157	<0.0020	<0.0080																
WQR2-2	20K0360-12	2020-11-03	M	0.0132	0.000737	<0.0020	<0.0080																
WQR2-2	20K1261-12	2020-11-10	M	<0.0100	0.0017	<0.0020	<0.0080																

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	20K2100-12	2020-11-18	M	0.0147	0.000694	<0.0020	<0.0080																
WQR2-2	20L1589-12	2020-12-14	M	<0.0100	0.00163	<0.0020	<0.0080																
WQR2-2	21A2590-12	2021-01-27	M	<0.0100	0.00266	<0.0020	<0.0080																
WQR2-2	21B2778-12	2021-02-25	M	<0.0100	0.00227	0.0024	<0.0080																
WQR2-2	21C3505-13	2021-03-25	M	0.00201	0.00179	<0.00200	<0.0100																
WQR2-2	21D2478-12	2021-04-22	M	0.0111	0.000618	0.00085	0.0027																
WQR2-2	21E1990-12	2021-05-18	M	0.0317	0.000191	0.0027	0.0085																
WQR2-2	21E2917-12	2021-05-26	M	0.019	0.000394	0.0006	0.0017																
WQR2-2	21F0167-12	2021-06-01	M	0.0168	0.000493	0.00066	0.0015																
WQR2-2	21F1056-12	2021-06-08	M	0.052	0.000208	0.00249	0.0026																
WQR2-2	21F2014-12	2021-06-15	M	0.0823	0.000265	0.00332	0.0049																
WQR2-2	21G2414-12	2021-07-20	M	0.0199	0.000239	<0.00200	<0.0100																
WQR2-2	21H3040-12	2021-08-25	M	0.0297	0.000531	<0.00200	<0.0100																
WQR2-2	21I3814-12	2021-09-28	M	0.0328	0.000814	<0.00200	<0.0100																
WQR2-2	21J3514-12	2021-10-26	M	0.0118	0.000754	<0.0010	<0.0040																
WQR2-2	21K3046-12	2021-11-23	M	<0.0100	0.00121	<0.0020	<0.0080																
WQR2-2	21L2125-12	2021-12-14	M	<0.0100	0.002	<0.0020	<0.0080																
WQR2-2	22A2312-12	2022-01-20	M	<0.0100	0.00255	0.0033	<0.0080																
WQR2-2	22B2487-12	2022-02-17	M	<0.0100	0.00232	<0.0020	<0.0080	<0.0100	<0.00040	0.00117	<0.0100	<0.00020	<0.00020	3.35	0.000065	285	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQR2-2	22C3145-12	2022-03-22	M	<0.0100	0.00176	0.003	0.102	0.0352	<0.00040	0.00168	<0.0100	<0.00020	<0.00020	3.04	0.000087	296	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQR2-2	22D2212-15	2022-04-20	M	<0.0100	0.00201	<0.0100	<0.0080	0.0131	<0.00040	<0.00100	<0.0100	<0.00020	<0.00020	3.53	0.000035	231	<0.00100			<0.00020	<0.00080	<0.020	<0.00040
WQR2-2	22E2480-12	2022-05-17	M	<0.0500	0.000627	<0.0500	<0.0400	0.055	<0.00200	<0.00500	<0.0500	<0.00100	<0.00100	0.809	<0.000100	81.3	<0.00500			<0.00100	<0.00400	<0.100	<0.00200
WQR2-2	22F3212-12	2022-06-21	M	0.0118	0.000249	<0.0100	<0.0100	0.0534	<0.000500	<0.000500	0.00657	<0.000100	<0.000100	0.384	<0.0000200	23.5	<0.00100			<0.0000500	<0.00100	0.022	<0.000500
WQR2-2	22G1763-12	2022-07-13	M	0.0209	0.000282	<0.0100	<0.0100	0.0237	<0.000500	<0.000500	0.00897	<0.000100	<0.000100	0.456	<0.0000200	32.6	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	22H2453-12	2022-08-16	M	0.0240	0.000219	<0.0100	<0.0100	0.0254	<0.000500	<0.000500	0.0101	<0.000100	<0.000100	0.375	<0.0000200	32.4	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	22I1926-12	2022-09-14	M	0.00414	0.00167	<0.0100	<0.0100	0.0132	<0.000500	0.00104	0.0115	<0.000100	<0.000100	2.69	0.0000442	227	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	22J1560-12	2022-10-12	M	0.00603	0.00141	<0.00500	0.0104	<0.0100	<0.000500	0.000985	0.00939	<0.000100	<0.000100	2.67	0.0000483	190	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	22K1453-12	2022-11-10	M	<0.00200	0.00263	<0.0100	<0.0100	<0.0100	<0.000500	0.00158	0.0123	<0.000100	<0.000100	4.55	0.0000687	327	<0.00100			0.000117	<0.00100	<0.0200	<0.000500
WQR2-2	22K2628-04	2022-11-22	M	<0.00200	0.00231	<0.0100	<0.0100	0.0198	<0.000500	0.00170	0.0115	<0.000100	<0.000100	4.49	0.0000583	390	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	22K2988-04	2022-11-24	M	0.00212	0.00199	<0.0100	<0.0100	0.0147	<0.000500	0.00137	0.0114	<0.000100	<0.000100	3.86	0.0000780	289	<0.00100			0.0000870	<0.00100	<0.0200	<0.000500
WQR2-2	22K3123-04	2022-11-25	M	<0.00200	0.00271	<0.0100	<0.0100	0.0120	<0.000500	0.00188	0.0105	<0.000100	<0.000100	4.54	0.0000834	337	<0.00100			0.0000679	<0.00100	<0.0200	<0.000500
WQR2-2	22L0036-04	2022-11-30	M	<0.00200	0.00222	<0.0100	<0.0100	<0.0100	<0.000500	0.00168	0.00965	<0.000100	<0.000100	3.63	0.0000826	349	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	22L0263-04	2022-12-02	M	<0.00200	0.00275	<0.0100	<0.0100	<0.0100	<0.000500	0.00171	0.0103	<0.000100	<0.000100	4.09	0.0000884	292	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	22L0499-04	2022-12-05	M	<0.00200	0.00245	<0.0100	<0.0100	0.0113	<0.000500	0.00146	0.0137	<0.000100	<0.000100	4.13	0.0000961	363	<0.00100			0.0000861	<0.00100	<0.0200	<0.000500
WQR2-2	22L0633-04	2022-12-06	M	<0.00200	0.00230	<0.0100	<0.0100	0.0143	<0.000500	0.00152	0.0135	<0.000100	<0.000100	4.27	0.0000539	293	<0.00100			0.0000773	<0.00100	<0.0200	<0.000500
WQR2-2	22L0774-12	2022-12-07	M	<0.00200	0.00236	<0.0100	<0.0100	0.0117	<0.000500	0.00164	0.0123	<0.000100	<0.000100	4.58	0.0000751	324	<0.00100			0.0000687	<0.00100	<0.0200	0.00116
WQR2-2	22L1436-04	2022-12-13	M	<0.00200	0.00248	<0.0100	<0.0100	<0.0100	<0.000500	0.00153	0.0126	<0.000100	<0.000100	3.63	0.0000681	344	<0.00100			<0.0000500	0.00157	<0.0200	<0.000500
WQR2-2	23A2847-12	2023-01-27	M	<0.00200	0.00213	<0.0100	<0.0100	0.0206	<0.000500	0.00134	0.0102	<0.000100	<0.000100	3.04	0.0000683	286	0.00310			0.000135	<0.00100	<0.0200	<0.000500
WQR2-2	23C0060-12	2023-02-28	M	<0.00200	0.00235	<0.0100	<0.0100	<0.0100	<0.000500	0.00154	0.0108	<0.000100	<0.000100	3.29	0.000113	343	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	23C1797-12	2023-03-15	M	<0.00200	0.00242	<0.0100	<0.0100	<0.0100	<0.000500	0.00188	0.0105	<0.000100	<0.000100	3.71	0.0000672	303	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	23D2945-12	2023-04-26	M	<0.00200	0.00174	<0.0100	<0.0100	0.0152	<0.000500	0.00110	0.00839	<0.000100	<0.000100	2.37	0.0000363	232	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	23E2392-12	2023-05-17	M	0.0696	0.000394	<0.00500	<0.0050	0.0467	0.000053	0.000294	0.0128	<0.000010	0.000011	0.443	0.0000143	49.5	<0.00050			0.0000674	0.00084	0.0179	<0.000050
WQR2-2	23F3614-12	2023-06-27	M	0.0209	0.000340	<0.0100	<0.0100	0.0162	<0.000500	<0.000500	0.00937	<0.000100	<0.000100	0.489	<0.0000200	45.6	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	23G2415-12	2023-07-19	M	0.0102	0.00157	<0.0100	<0.0100	0.0162	<0.000500	0.00102	0.0126	<0.000100	<0.000100	2.3	0.0000324	208	<0.00100			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	23H3309-12	2023-08-24	M	<0.00200	0.00211	<0.0100	<0.0100	0.0118	<0.000500	0.00150	0.0131	<0.000100	<0.000100	3.33	0.0000420	295	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	23I2271-14	2023-09-19	M	0.00797	0.00133	<0.0100	<0.0100	0.0114	<0.000500	0.000722	0.0114	<0.000100	<0.000100	2.05	0.0000375	147	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	23J2236-14	2023-10-18	M	0.0522	0.000749	<0.00400	<0.0100	0.0391	<0.000500	0.000611	0.0149	<0.000100	<0.000100	0.985	0.0000285	85.8	<0.00500			0.0000643	<0.00100	<0.0200	<0.000500
WQR2-2	23K1909-12	2023-11-15	M	0.00205	0.00206	<0.00400	<0.0100	0.0197	<0.000500	0.00143	0.0109	<0.000100	<0.000100	3.53	0.0000575	314	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	23L2091-10	2023-12-15	M	<0.00200	0.00231	<0.00400	<0.0100	0.0115	<0.000500	0.00171	0.0100	<0.000100	<0.000100	3.8	0.0000685	312	<0.00500			<0.0000500	<0.00100	<0.0200	<0.000500
WQR2-2	L2754383-8	2024-01-25	M																				
WQR2-2	VA24A1507-010	2024-01-25	M	<0.0050	0.00258	0.00151	<0.0030	<0.0050	<0.0010	0.00187	0.0085	<0.00050	<0.00050	3.75	0.000075	354	<0.00050			0.000087	0.00050	<0.010	<0.00010
WQR2-2	L2754604-8	2024-02-14	M																				
WQR2-2	VA24A2995-010	2024-02-14	M	<0.0050	0.00218	0.00145	<0.0030	0.0082	<0.0010	0.00139	0.0093	<0.00050	<0.00050	3.75	0.000062	309	<0.00050	<0.00150	<0.00150	0.000084	<0.00050	<0.010	<0.00010
WQR2-2	L2755043-10	2024-03-21	M																				
WQR2-2	VA24A6026-010	2024-03-21	M	<0.0050	0.00190	0.00129	<0.0030	0.0141	<0.0010	0.00169	0.0090	<0.00050	<0.00050	2.42	0.000042	255	<0.00050	<0.00150	<0.00150	0.000054	0.00055	0.017	<0.00010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	L2755490-8	2024-04-24	M																				
WQR2-2	VA24A8916-010	2024-04-24	M	<0.0050	0.00200	0.00118	<0.0030	<0.0050	<0.0010	0.00240	0.0062	<0.00050	<0.00050	2.92	0.000050	263	<0.00050	<0.00150	<0.00150	0.000058	<0.00050	<0.010	<0.00010
WQR2-2	L2755567-8	2024-05-01	M																				
WQR2-2	VA24A9566-010	2024-05-01	M	<0.0050	0.00195	0.00094	<0.0030	0.0094	<0.0010	0.00280	0.0049	<0.00050	<0.00050	2.78	0.000036	281	<0.00050	<0.00150	<0.00150	0.000061	0.00055	<0.010	<0.00010
WQR2-2	L2755666-8	2024-05-08	M																				
WQR2-2	VA24B0201-010	2024-05-08	M	<0.0050	0.00124	0.00102	<0.0030	0.0202	<0.0010	0.00190	0.0069	<0.00050	<0.00050	1.61	0.000032	166	<0.00050	<0.00150	<0.00150	0.000114	0.00063	0.013	<0.00010
WQR2-2	L2755779-8	2024-05-15	M																				
WQR2-2	VA24B0901-010	2024-05-15	M	0.0072	0.00178	0.00120	<0.0030	0.0210	<0.0010	0.00258	0.0076	<0.00050	<0.00050	2.29	0.000041	220	<0.00050	<0.00150	<0.00150	0.000070	0.00053	<0.010	<0.00010
WQR2-2	L2755888-8	2024-05-22	M																				
WQR2-2	VA24B1500-010	2024-05-22	M	0.0092	0.00105	0.00100	<0.0030	0.0265	<0.0010	0.00113	0.0073	<0.00050	<0.00050	1.52	0.000025	132	<0.00050	<0.00150	<0.00150	0.000065	0.00057	<0.010	<0.00010
WQR2-2	L2756312-8	2024-06-19	M																				
WQR2-2	VA24B4510-010	2024-06-19	M	<0.0050	0.00175	0.00100	<0.0030	0.0116	<0.0010	0.00249	0.0067	<0.00050	<0.00050	2.78	0.000044	233	<0.00050	<0.00150	<0.00150	<0.000050	0.00051	<0.010	<0.00010
WQR2-2	VA24B7397-010	2024-07-17	M	0.0277	0.000755	0.00131	<0.0030	0.0164	<0.0010	0.00140	0.0113	<0.00050	<0.00050	0.98	<0.000020	93.2	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR2-2	L2756689-8	2024-07-17	M																				
WQR2-2	L2757122-8	2024-08-21	M																				
WQR2-2	VA24C1337-010	2024-08-21	M	0.0199	0.000653	0.00110	<0.0030	0.0121	<0.0010	0.00080	0.0133	<0.00050	<0.00050	0.92	<0.000020	82.9	<0.00050	<0.00150	<0.00150	0.000054	<0.00050	<0.010	<0.00010
WQR2-2	VA24C4683-010	2024-09-18	M	0.0162	0.000796	0.00122	<0.0030	0.0131	<0.0010	0.00156	0.0116	<0.00050	<0.00050	0.94	<0.000020	100	<0.00050	<0.00150	<0.00150	0.000070	<0.00050	<0.010	<0.00010
WQR2-2	VA24C8569-010	2024-10-23	M	0.0212	0.00136	0.00133	<0.0030	0.0299	<0.0010	0.00336	0.0148	<0.00050	<0.00050	1.72	0.000038	176	<0.00050	<0.00150	<0.00150	0.000079	0.00058	<0.010	<0.00010
WQR2-2	L2757977-10	2024-10-30	M																				
WQR2-2	VA24C9414-010	2024-10-30	M	<0.0050	0.00143	0.00117	<0.0030	0.0276	<0.0010	0.00093	0.0103	<0.00050	<0.00050	1.94	0.000046	202	<0.00050	<0.00150	<0.00150	0.000128	<0.00050	0.016	<0.00010
WQR2-2	VA24D0180-010	2024-11-06	M	<0.0050	0.00145	0.00114	<0.0030	0.0201	<0.0010	0.00085	0.0108	<0.00050	<0.00050	1.62	0.000050	191	<0.00050	<0.00150	<0.00150	0.000128	<0.00050	0.021	<0.00010
WQR2-2	VA24D0813-010	2024-11-13	M	0.0062	0.00110	0.00102	<0.0030	0.0419	<0.0010	0.00079	0.0090	<0.00050	<0.00050	1.44	0.000029	153	<0.00050	<0.00150	<0.00150	0.000103	0.00129	0.025	<0.00010
WQR2-2	L2758221-8	2024-11-22	M																				
WQR2-2	VA24D1791-010	2024-11-22	M	<0.0050	0.00186	0.00145	<0.0030	0.0124	<0.0010	0.00127	0.0114	<0.00050	<0.00050	3.81	0.000058	305	<0.00050	<0.00150	<0.00150	0.000220	0.00054	0.011	<0.00010
WQR2-2	L2758486-8	2024-12-18	M																				
WQR2-2	VA24D3937-010	2024-12-18	M	<0.0050	0.00167	0.00126	<0.0030	0.0205	<0.0010	0.00113	0.0087	<0.00050	<0.00050	2.75	0.000052	228	<0.00050	<0.00150	<0.00150	0.000074	<0.00050	0.013	<0.00010
WQR2-2	L2758770-8	2025-01-22	M																				
WQR2-2	VA25A1525-010	2025-01-22	M	<0.0050	0.00215	0.00132	0.0085	<0.0100	<0.0010	0.00124	0.0091	<0.00050	<0.00050	2.97	0.000059	283	<0.00050	<0.00150	<0.00150	0.000051	<0.00050	<0.010	<0.00010
WQR2-2	L2759008-8	2025-02-19	M																				
WQR2-2	VA25A3570-010	2025-02-19	M	<0.0050	0.00185	0.00142	<0.0030	<0.0050	<0.0010	0.00125	0.0108	<0.00050	<0.00050	2.71	0.000055	269	<0.00050	<0.00150	<0.00150	0.000058	<0.00050	<0.010	<0.00010
WQR2-2	VA25A6679-010	2025-03-26	M	<0.0050	0.00195	0.00119	<0.0030	<0.0050	<0.0010	0.00118	0.0081	<0.00050	<0.00050	2.91	0.000052	306	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR2-2	VA25A9109-010	2025-04-23	M	<0.0050	0.00190	<0.00050	<0.0030	<0.0050	<0.0010	0.00106	0.0080	<0.00050	<0.00050	2.58	0.000048	285	<0.00050	<0.00150	<0.00150	0.000055	<0.00050	<0.010	<0.00010
WQR2-2	VA25A9941-010	2025-05-01	M	<0.0050	0.000917	0.00067	<0.0030	0.0261	<0.0010	0.00046	0.0075	<0.00050	<0.00050	1.44	0.000021	117	<0.00050	<0.00150	<0.00150	0.000054	0.00067	0.010	<0.00010
WQR2-2	VA25B0496-010	2025-05-07	M	<0.0050	0.00179	0.00100	<0.0030	0.0154	<0.0010	0.00110	0.0088	<0.00050	<0.00050	2.96	0.000047	280	<0.00050	<0.00150	<0.00150	0.000062	0.00143	<0.010	<0.00010
WQR2-2	VA25B1530-010	2025-05-16	M	0.0074	0.000553	0.00081	<0.0030	0.0350	<0.0010	<0.00040	0.0072	<0.00050	<0.00050	0.84	<0.000020	71.5	<0.00050	<0.00150	<0.00150	0.000059	0.00059	0.018	<0.00010
WQR2-2	VA25B1841-010	2025-05-21	M	<0.0050	0.00130	0.00086	<0.0030	0.0200	<0.0010	0.00077	0.0075	<0.00050	<0.00050	2.16	0.000026	194	<0.00050	<0.00150	<0.00150	0.000055	0.00060	<0.010	<0.00010
WQR2-2m	L2755545-11	2024-04-30	M																				
WQR2-2m	VA24A9402-011	2024-04-30	M	<0.0050	0.00156	0.00102	<0.0030	0.0053	<0.0010	0.00277	0.0043	<0.00050	<0.00050	3.00	0.000038	301	<0.00050	<0.00150		0.000051	0.00063	<0.010	<0.00010
WQR2-2m	L2755648-2	2024-05-08	M																				
WQR2-2m	VA24B0178-002	2024-05-08	M	0.0092	0.000567	0.00088	<0.0030	0.0307	<0.0010	0.00095	0.0065	<0.00050	<0.00050	0.90	0.000021	82.8	<0.00050	<0.00150		0.000066	0.00070	0.019	<0.00010
WQR2-2m	L2755934-11	2024-05-24	M																				
WQR2-2m	VA24B1783-011	2024-05-24	M	0.0116	0.000527	0.00092	<0.0030	0.0297	<0.0010	0.00084	0.0072	<0.00050	<0.00050	0.88	<0.000020	63.6	<0.00050	<0.00150		0.000056	0.00063	<0.010	<0.00010
WQR2-2m	VA24B3452-011	2024-06-10	M	0.0105	0.000691	0.00093	<0.0030	0.0243	<0.0010	0.00102	0.0070	<0.00050	<0.00050	0.86	<0.000020	80.4	<0.00050	<0.00150		0.000056	0.00066	<0.010	<0.00010
WQR2-2m	659-454600000-0	2024-06-17	M																				
WQR2-2m	VA24B5882-011	2024-07-03	M	0.0318	0.000112	0.00133	<0.0030																
WQR2-2m	VA24B6465-005	2024-07-09	M	0.0210	0.000889	0.00128	<0.0030	0.0160	<0.0010	0.00110	0.0118	<0.00050	<0.00050	0.71	<0.000020	67.6	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR2-2m	VA24B7867-005	2024-07-20	M	0.0306	0.000187	0.00143	<0.0030	0.0135	<0.0010	<0.00040	0.0113	<0.00050	<0.00050	<0.30	<0.000020	20.9	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR2-2m	L2757210-5	2024-08-26	M																				
WQR2-2m	VA24C2208-005	2024-08-26	M	0.0222	0.000263	0.00131	<0.0030	0.0109	<0.0010	<0.00040	0.0118	<0.00050	<0.00050	0.37	<0.000020	38.8	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR2-2m	VA24C5557-002	2024-09-25	M	0.0060	0.00253	0.00118	<0.0030	0.0055	<0.0010	0.00486	0.0120	<0.00050	<0.00050	3.28	0.000059	312	<0.00050			<0.000050	0.00051	<0.010	<0.00010
WQR2-2m	L2757680-5	2024-10-06	M																				
WQR2-2m	VA24C6685-005	2024-10-06	M	<0.0150	0.00201	<0.0250	<0.150	0.0230	<0.00200	<0.00200	0.0106	<0.000400	<0.00100	1.54	<0.000100	144	<0.0100	<0.00150		<0.00200	<0.00400	<0.200	<0.00100
WQR2-2m	VA24C7408-005	2024-10-13	M	0.0067	0.00175	0.00117	<0.0030	0.0062	<0.0010	0.00354	0.0122	<0.00050	<0.00050	2.33	0.000065	221	<0.00050	<0.00150		0.000056	<0.00050	<0.010	<0.00010
WQR2-2m	L2757872-5	2024-10-22	M																				
WQR2-2m	VA24C8330-005	2024-10-22	M	0.0568	0.000560	0.00241	0.0031	0.0360	<0.0010	0.00166	0.0174	<0.00050	<0.00050	0.87	0.000027	87.5	<0.00050	<0.00150		0.000109	0.00088	0.019	<0.00010
WQR2-2m	VA24C9185-006	2024-10-29	M	0.0083	0.000721	0.00101	<0.0030	0.0328	<0.0010	<0.00120	0.0103	<0.00050	<0.00050	1.94	0.000041	179	<0.00050	<0.00150		0.000119	0.00063	0.015	<0.00010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2m	L2757962-6	2024-10-29	M																				
WQR2-2m	L2758003-2	2024-11-02	M																				
WQR2-2m	VA24C9732-002	2024-11-02	M	<0.0050	0.00109	0.00106	<0.0030	0.0271	<0.0010	0.00074	0.0118	<0.00050	<0.00050	1.61	0.000041	183	<0.00050	<0.00150		0.000145	0.00074	0.022	<0.00010
WQR2-2m	L2758354-2	2024-12-06	M																				
WQR2-2m	VA24D3008-002	2024-12-06	M	<0.0050	0.00159	0.00118	<0.0030	0.0064	<0.0010	0.00131	0.0100	<0.00050	<0.00050	3.26	0.000076	308	<0.00050	<0.00150		0.000098	0.00064	<0.010	<0.00010
WQR2-2m	L2758634-8	2025-01-09	M																				
WQR2-2m	VA25A0510-008	2025-01-09	M	<0.0050	0.00193	0.00141	<0.0030	<0.0050	<0.0010	0.00125	0.0090	<0.00050	<0.00050	2.54	0.000069	286	<0.00050	<0.00150		0.000084	<0.00050	<0.010	<0.00010
WQR2-2m	L2759010-8	2025-02-18	M																				
WQR2-2m	VA25A3415-008	2025-02-18	M	<0.0050	0.00232	0.00132	<0.0030	<0.0050	<0.0010	0.00147	0.0099	<0.00050	<0.00050	2.99	0.000086	361	<0.00050	<0.00150		0.000062	<0.00050	<0.010	<0.00010
WQR2-2m	L2759209-8	2025-03-12	M																				
WQR2-2m	VA25A5429-008	2025-03-12	M	<0.0050	0.00212	0.00137	<0.0030	0.0181	<0.0010	0.00096	0.0065	<0.00050	<0.00050	2.76	0.000038	238	<0.00050	<0.00150		0.000082	0.00050	0.045	<0.00010
WQR2-2m	VA25A6528-017	2025-03-25	M																				
WQR2-2m	VA25A8147-005	2025-04-11	M	<0.0050	0.000882	0.00073	<0.0030	0.0475	<0.0010	<0.00040	0.0070	<0.00050	<0.00050	0.96	0.000022	84.0	<0.00050	<0.00150		0.000063	<0.00050	0.048	<0.00010
WQR2-2m	VA25A8148-005	2025-04-11	M																				
WQR2-2m	VA25A8280-008	2025-04-13	M	<0.0050	0.000503	0.00058	<0.0030	0.0380	<0.0010	<0.00040	0.0071	<0.00050	<0.00050	0.72	<0.000020	64.3	<0.00050	<0.00150		0.000057	0.00051	0.055	<0.00010
WQR2-2m	VA25A8282-008	2025-04-13	M																				
WQR2-2m	VA25A8854-008	2025-04-21	M	<0.0050	0.000707	0.00067	<0.0030	0.0317	<0.0010	<0.00040	0.0067	<0.00050	<0.00050	<0.30	<0.000020	24.2	<0.00050	<0.00150		0.000057	0.00057	0.047	<0.00010
WQR2-2m	VA25A8855-008	2025-04-21	M																				
WQR2-2m	VA25B0359-011	2025-05-06	M	<0.0050	0.00115	0.00084	<0.0030	0.0086	<0.0010	0.00086	0.0082	<0.00050	<0.00050	2.36	0.000048	220	<0.00050	<0.00150		0.000063	<0.00050	<0.010	<0.00010
WQR2-2m	VA25B0360-011	2025-05-06	M																				
WQR2-2m	VA25B0499-008	2025-05-07	M	<0.0050	0.00116	0.00083	<0.0030	0.0172	<0.0010	0.00076	0.0077	<0.00050	<0.00050	1.34	0.000026	153	<0.00050	<0.00150		0.000067	<0.00050	<0.010	<0.00010
WQR2-2m	VA25B0502-008	2025-05-07	M																				
WQR2-3	23L2091-11	2023-12-15	M	0.00212	0.00202	<0.00400	<0.0100	0.0161	<0.000500	0.00168	0.0112	<0.000100	<0.000100	3.26	0.0000347	264	<0.00500			0.0000655	<0.00100	<0.0200	<0.000500
WQR2-3	L2754383-9	2024-01-25	M																				
WQR2-3	VA24A1507-011	2024-01-25	M	<0.0050	0.00260	0.00153	<0.0030	0.0066	<0.0010	0.00186	0.0085	<0.00050	<0.00050	3.80	0.000063	352	<0.00050			0.000086	0.00057	<0.010	<0.00010
WQR2-3	L2754604-9	2024-02-14	M																				
WQR2-3	VA24A2995-011	2024-02-14	M	<0.0050	0.00186	0.00143	<0.0030	0.0112	<0.0010	0.00131	0.0094	<0.00050	<0.00050	3.33	0.000062	273	<0.00050	<0.00150	<0.00150	0.000086	<0.00050	<0.010	<0.00010
WQR2-3	L2755043-11	2024-03-21	M																				
WQR2-3	VA24A6026-011	2024-03-21	M	<0.0050	0.000743	0.00089	<0.0030	0.0289	<0.0010	0.00090	0.0082	<0.00050	<0.00050	1.01	0.000022	97.6	<0.00050	<0.00150	<0.00150	0.000073	0.00062	0.038	<0.00010
WQR2-3	L2755490-9	2024-04-24	M																				
WQR2-3	VA24A8916-011	2024-04-24	M	<0.0050	0.000888	0.00088	<0.0030	0.0178	<0.0010	0.00062	0.0079	<0.00050	<0.00050	1.14	0.000028	108	<0.00050	<0.00150	<0.00150	0.000065	<0.00050	<0.010	<0.00010
WQR2-3	L2755567-9	2024-05-01	M																				
WQR2-3	VA24A9566-011	2024-05-01	M	<0.0050	0.000602	0.00066	<0.0030	0.0400	<0.0010	0.00110	0.0067	<0.00050	<0.00050	0.94	<0.000020	87.4	<0.00050	<0.00150	<0.00150	0.000065	0.00060	0.028	<0.00010
WQR2-3	L2755666-9	2024-05-08	M																				
WQR2-3	VA24B0201-011	2024-05-08	M	0.0072	0.00101	0.00102	<0.0030	0.0239	<0.0010	0.00156	0.0069	<0.00050	<0.00050	1.31	0.000023	130	<0.00050	<0.00150	<0.00150	0.000109	0.00061	0.017	<0.00010
WQR2-3	L2755779-9	2024-05-15	M																				
WQR2-3	VA24B0901-011	2024-05-15	M	0.0259	0.000316	0.00134	<0.0030	0.0549	<0.0010	0.00101	0.0084	<0.00050	<0.00050	0.45	<0.000020	36.2	<0.00050	<0.00150	<0.00150	0.000065	0.00069	0.042	<0.00010
WQR2-3	L2755888-9	2024-05-22	M																				
WQR2-3	VA24B1500-011	2024-05-22	M	0.0135	0.000522	0.00095	<0.0030	0.0314	<0.0010	0.00060	0.0083	<0.00050	<0.00050	0.70	<0.000020	62.2	<0.00050	<0.00150	<0.00150	0.000054	0.00058	0.010	<0.00010
WQR2-3	L2756312-9	2024-06-19	M																				
WQR2-3	VA24B4510-011	2024-06-19	M	0.0262	0.000277	0.00133	<0.0030	0.0418	<0.0010	0.00044	0.0082	<0.00050	<0.00050	0.56	<0.000020	37.0	<0.00050	<0.00150	<0.00150	0.000061	0.00071	0.021	<0.00010
WQR2-3	VA24B7397-011	2024-07-17	M	0.0373	0.000296	0.00148	<0.0030	0.0179	<0.0010	0.00078	0.0113	<0.00050	<0.00050	0.42	<0.000020	38.9	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	<0.010	<0.00010
WQR2-3	L2756689-9	2024-07-17	M																				
WQR2-3	L2757122-9	2024-08-21	M																				
WQR2-3	VA24C1337-011	2024-08-21	M	0.0186	0.000472	0.00108	<0.0030	0.0140	<0.0010	0.00062	0.0132	<0.00050	<0.00050	0.69	<0.000020	63.4	<0.00050	<0.00150	<0.00150	0.000055	<0.00050	<0.010	<0.00010
WQR2-3	VA24C4683-011	2024-09-18	M	0.0176	0.000644	0.00125	<0.0030	0.0155	<0.0010	0.00114	0.0128	<0.00050	<0.00050	0.74	<0.000020	80.2	<0.00050	<0.00150	<0.00150	0.000072	<0.00050	<0.010	<0.00010
WQR2-3	VA24C8569-011	2024-10-23	M	0.0304	0.000644	0.00152	<0.0030	0.0314	<0.0010	0.00182	0.0151	<0.00050	<0.00050	0.75	0.000023	76.1	<0.00050	<0.00150	<0.00150	0.000073	0.00061	0.019	<0.00010
WQR2-3	VA24C9414-011	2024-10-30	M	0.0086	0.000507	0.00097	<0.0030	0.0486	<0.0010	<0.00040	0.0088	<0.00050	<0.00050	0.69	0.000022	68.8	<0.00050	<0.00150	<0.00150	0.000092	0.00064	0.040	<0.00010
WQR2-3	L2757977-11	2024-10-30	M																				
WQR2-3	VA24D0180-011	2024-11-06	M	<0.0050	0.00108	0.00103	<0.0030	0.0236	<0.0010	0.00066	0.0107	<0.00050	<0.00050	1.18	0.000027	139	<0.00050	<0.00150	<0.00150	0.000115	<0.00050	0.030	<0.00010
WQR2-3	L2758221-9	2024-11-22	M																				
WQR2-3	VA24D1791-011	2024-11-22	M	<0.0050	0.00176	0.00142	<0.0030	0.0146	<0.0010	0.00118	0.0110	<0.00050	<0.00050	3.35	0.000072	277	<0.00050	<0.00150	<0.00150	0.000215	0.00054	0.012	<0.00010
WQR2-3	L2758486-9	2024-12-18	M																				
WQR2-3	VA24D3937-011	2024-12-18	M	<0.0050	0.00125	0.00093	<0.0030	0.0309	<0.0010	0.00108	0.0081	<0.00050	<0.00050	2.54	0.000049	209	<0.00050	<0.00150	<0.00150	0.000069	<0.00050	0.014	<0.00010
WQR2-3	L2758770-9	2025-01-22	M																				
WQR2-3	VA25A1525-011	2025-01-22	M	<0.0050	0.00211	0.00130	<0.0030	<0.0100	<0.0010	0.00118	0.0089	<0.00050	<0.00050	2.94	0.000069	288	<0.00050	<0.00150	<0.00150	0.000057	<0.00050	<0.010	<0.00010
WQR2-3	L2759008-9	2025-02-19	M																				

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	Dissolved Hexavalent Chromium	Dissolved Trivalent Chromium	D-Co	D-Cu	D-Fe	D-Pb
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-3	VA25A3570-011	2025-02-19	M	<0.0050	0.00186	0.00140	<0.0030	<0.0050	<0.0010	0.00115	0.0106	<0.00050	<0.00050	2.74	0.000054	271	<0.00050	<0.00150	<0.00150	0.000060	<0.00050	<0.010	<0.00010
WQR2-3	VA25A6679-011	2025-03-26	M	<0.0050	0.00122	0.00086	<0.0030	0.0205	<0.0010	0.00071	0.0069	<0.00050	<0.00050	1.81	0.000030	171	<0.00050	<0.00150	<0.00150	<0.000050	<0.00050	0.014	<0.00010
WQR2-3	VA25A9109-011	2025-04-23	M	<0.0050	0.000563	0.00059	<0.0030	0.0277	<0.0010	<0.00040	0.0072	<0.00050	<0.00050	0.77	<0.000020	75.2	<0.00050	<0.00150	<0.00150	0.000054	0.00055	0.034	<0.00010
WQR2-3	VA25A9941-011	2025-05-01	M	0.0064	0.000487	0.00067	<0.0030	0.0391	<0.0010	<0.00040	0.0062	<0.00050	<0.00050	0.71	<0.000020	64.5	<0.00050	<0.00150	<0.00150	0.000062	0.00066	0.021	<0.00010
WQR2-3	VA25B0496-011	2025-05-07	M	0.0064	0.000652	0.00075	<0.0030	0.0350	<0.0010	0.00040	0.0078	<0.00050	<0.00050	1.04	<0.000020	89.6	<0.00050	<0.00150	<0.00150	0.000061	<0.00050	0.019	0.00015
WQR2-3	VA25B1530-011	2025-05-16	M	0.0123	0.000279	0.00083	<0.0030	0.0409	<0.0010	<0.00040	0.0068	<0.00050	<0.00050	0.43	<0.000020	34.2	<0.00050	<0.00150	<0.00150	<0.000050	0.00057	0.030	<0.00010
WQR2-3	VA25B1841-011	2025-05-21	M	0.0106	0.000191	0.00074	<0.0030	0.0422	<0.0010	<0.00040	0.0063	<0.00050	<0.00050	0.30	<0.000020	27.9	<0.00050	<0.00150	<0.00150	<0.000050	0.00064	0.037	<0.00010
WQR2-SF	L2755545-12	2024-04-30	M																				
WQR2-SF	VA24A9402-012	2024-04-30	M	<0.0050	0.00256	0.00142	<0.0030	<0.0050	<0.0010	0.00320	0.0081	<0.00050	<0.00050	4.07	0.000082	367	<0.00050	<0.00150		<0.000050	0.00061	<0.010	<0.00010
WQR2-SF	L2755648-3	2024-05-08	M																				
WQR2-SF	VA24B0178-003	2024-05-08	M	<0.0050	0.00268	0.00157	<0.0030	<0.0050	<0.0010	0.00313	0.0088	<0.00050	<0.00050	3.63	0.000071	357	<0.00050	<0.00150		0.000074	0.00052	<0.010	<0.00010
WQR2-SF	L2755934-12	2024-05-24	M																				
WQR2-SF	VA24B1783-012	2024-05-24	M	<0.0050	0.00234	0.00118	<0.0030	0.0101	<0.0010	0.00364	0.0070	<0.00050	<0.00050	4.19	0.000048	330	<0.00050	<0.00150		0.000063	<0.00050	<0.010	<0.00010
WQR2-SF	VA24B3452-012	2024-06-10	M	<0.0050	0.00216	0.00115	<0.0030	0.0096	<0.0010	0.00275	0.0067	<0.00050	<0.00050	3.16	0.000054	302	<0.00050	<0.00150		0.000062	0.00057	<0.010	<0.00010
WQR2-SF	660-454600000-0	2024-06-17	M																				
WQR2-SF	VA24B5882-012	2024-07-03	M	<0.0050	0.00209	0.00098	<0.0030																
WQR2-SF	VA24B6465-006	2024-07-09	M	0.0062	0.00266	0.00134	<0.0030	0.0070	<0.0010	0.00363	0.0107	<0.00050	<0.00050	4.00	0.000060	362	<0.00050	<0.00150		0.000080	0.00053	<0.010	<0.00010
WQR2-SF	VA24B7867-006	2024-07-20	M	<0.0050	0.00262	0.00121	<0.0030	0.0060	<0.0010	0.00305	0.0112	<0.00050	<0.00050	3.09	0.000058	332	<0.00050	<0.00150		<0.000050	0.00057	<0.010	<0.00010
WQR2-SF	L2757210-6	2024-08-26	M																				
WQR2-SF	VA24C2208-006	2024-08-26	M	<0.0050	0.00267	0.00116	<0.0030	0.0072	<0.0010	0.00355	0.0124	<0.00050	<0.00050	3.54	0.000056	335	<0.00050	<0.00150		0.000070	0.00055	<0.010	<0.00010
WQR2-SF	VA24C5557-003	2024-09-25	M	<0.0050	0.00262	0.00111	<0.0030	<0.0050	<0.0010	0.00570	0.0119	<0.00050	<0.00050	3.51	0.000070	356	<0.00050			0.000056	<0.00050	<0.010	<0.00010
WQR2-SF	L2757680-6	2024-10-06	M																				
WQR2-SF	VA24C6685-006	2024-10-06	M	<0.0150	0.00256	<0.0250	<0.150	<0.0500	<0.00500	<0.00500	0.0132	<0.00100	<0.00250	3.66	<0.000250	339	<0.0250	<0.00150		<0.00500	<0.0100	<0.500	<0.00250
WQR2-SF	VA24C7408-006	2024-10-13	M	<0.0050	0.00282	0.00121	<0.0030	<0.0050	<0.0010	0.00503	0.0109	<0.00050	<0.00050	3.30	0.000081	332	<0.00050	<0.00150		0.000062	<0.00050	<0.010	<0.00010
WQR2-SF	L2757872-6	2024-10-22	M																				
WQR2-SF	VA24C8330-006	2024-10-22	M	0.0142	0.00264	0.00153	<0.0030	0.0148	<0.0010	0.00485	0.0128	<0.00050	<0.00050	3.01	0.000055	307	<0.00050	<0.00150		0.000084	0.00070	0.011	0.00033
WQR2-SF	VA24C9185-007	2024-10-29	M	<0.0050	0.00216	0.00131	<0.0030	0.0133	<0.0010	<0.00160	0.0108	<0.00050	<0.00050	2.99	0.000064	287	<0.00050	<0.00150		0.000161	<0.00050	<0.010	<0.00010
WQR2-SF	L2757962-7	2024-10-29	M																				
WQR2-SF	L2758003-3	2024-11-02	M																				
WQR2-SF	VA24C9732-003	2024-11-02	M	<0.0050	0.00194	0.00139	<0.0030	0.0106	<0.0010	0.00127	0.0115	<0.00050	<0.00050	3.14	0.000066	356	<0.00050	<0.00150		0.000190	0.00058	<0.010	<0.00010
WQR2-SF	L2758354-3	2024-12-06	M																				
WQR2-SF	VA24D3008-003	2024-12-06	M	<0.0050	0.00246	0.00151	<0.0030	<0.0050	<0.0010	0.00156	0.0096	<0.00050	<0.00050	3.66	0.000075	374	<0.00050	<0.00150		0.000095	<0.00050	<0.010	<0.00010
WQR2-SF	L2758634-9	2025-01-09	M																				
WQR2-SF	VA25A0510-009	2025-01-09	M	<0.0050	0.00224	0.00158	<0.0030	<0.0050	<0.0010	0.00154	0.0086	<0.00050	<0.00050	2.76	0.000067	337	<0.00050	<0.00150		0.000072	<0.00050	<0.010	<0.00010
WQR2-SF	L2759010-9	2025-02-18	M																				
WQR2-SF	VA25A3415-009	2025-02-18	M	<0.0050	0.00232	0.00133	<0.0030	<0.0050	<0.0010	0.00157	0.0095	<0.00050	<0.00050	3.13	0.000072	380	<0.00050	<0.00150		0.000053	<0.00050	<0.010	<0.00010
WQR2-SF	L2759209-9	2025-03-12	M																				
WQR2-SF	VA25A5429-009	2025-03-12	M	<0.0050	0.00244	0.00152	<0.0030	<0.0050	<0.0010	0.00146	0.0095	<0.00050	<0.00050	4.27	0.000071	359	<0.00050	<0.00150		0.000077	<0.00050	<0.010	<0.00010
WQR2-SF	VA25A6528-018	2025-03-25	M																				
WQR2-SF	VA25A8147-006	2025-04-11	M	<0.0050	0.00221	0.00111	<0.0030	0.0060	<0.0010	0.00122	0.0076	<0.00050	<0.00050	3.06	0.000058	302	<0.00050	<0.00150		0.000066	<0.00050	<0.010	<0.00010
WQR2-SF	VA25A8148-006	2025-04-11	M																				
WQR2-SF	VA25A8280-009	2025-04-13	M	<0.0050	0.00244	0.00141	<0.0030	<0.0050	<0.0010	0.00155	0.0090	<0.00050	<0.00050	3.18	0.000070	352	<0.00050	<0.00150		<0.000050	<0.00050	<0.010	<0.00010
WQR2-SF	VA25A8282-009	2025-04-13	M																				
WQR2-SF	VA25A8854-009	2025-04-21	M	<0.0050	0.00223	0.00190	<0.0030	<0.0050	<0.0010	0.00146	0.0090	<0.00050	<0.00050	3.47	0.000073	353	<0.00050	<0.00150		0.000061	<0.00050	<0.010	<0.00010
WQR2-SF	VA25A8855-009	2025-04-21	M																				
WQR2-SF	VA25B0359-010	2025-05-06	M	<0.0050	0.00263	0.00155	<0.0030	<0.0050	<0.0010	0.00150	0.0085	<0.00050	<0.00050	2.68	0.000082	350	<0.00050	<0.00150		0.000078	<0.00050	<0.010	<0.00010
WQR2-SF	VA25B0360-010	2025-05-06	M																				
WQR2-SF	VA25B0499-009	2025-05-07	M	<0.0050	0.00247	0.00154	<0.0030	<0.0050	<0.0010	0.00143	0.0093	<0.00050	<0.00050	2.51	0.000055	314	<0.00050	<0.00150		0.000092	<0.00050	<0.010	<0.00010
WQR2-SF	VA25B0502-009	2025-05-07	M																				

Notes:
Sample Class 'M' = monitoring sample.
'<' = result is below the indicated detection limit.

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	0051710-01	2020-05-20	M																						<0.0005
WQ1-1	0062209-01	2020-06-22	M																						<0.0005
WQ1-1	0071996-01	2020-07-21	M																						<0.0005
WQ1-1	0082292-01	2020-08-24	M																						<0.0005
WQ1-1	0093017-01	2020-09-28	M																						<0.0005
WQ1-1	20J1961-01	2020-10-20	M																						<0.0005
WQ1-1	20J2778-01	2020-10-27	M																						<0.0005
WQ1-1	20K0360-01	2020-11-03	M																						<0.0005
WQ1-1	20K1261-01	2020-11-10	M																						<0.0005
WQ1-1	20K2100-01	2020-11-18	M																						<0.0005
WQ1-1	20L1589-01	2020-12-14	M																						<0.0005
WQ1-1	21A2590-01	2021-01-27	M																						<0.0005
WQ1-1	21B2778-01	2021-02-25	M																						<0.0005
WQ1-1	21C3505-01	2021-03-25	M																						<0.0005
WQ1-1	21D2478-01	2021-04-22	M																						<0.0005
WQ1-1	21E1990-01	2021-05-18	M																						<0.0005
WQ1-1	21E2917-01	2021-05-26	M																						<0.0005
WQ1-1	21F0167-01	2021-06-01	M																						<0.0005
WQ1-1	21F1056-01	2021-06-08	M																						<0.0005
WQ1-1	21F2014-01	2021-06-15	M																						<0.0005
WQ1-1	21G2414-01	2021-07-20	M																						<0.0005
WQ1-1	21H3040-01	2021-08-25	M																						<0.0005
WQ1-1	21I3814-01	2021-09-28	M																						<0.0005
WQ1-1	21J3514-01	2021-10-26	M																						<0.0005
WQ1-1	21K3046-01	2021-11-23	M																						<0.0005
WQ1-1	21L2125-01	2021-12-14	M																						<0.0005
WQ1-1	22A2312-01	2022-01-20	M																						<0.0005
WQ1-1	22B2487-01	2022-02-17	M	0.155	1140	0.00096	<0.000010		0.00964	<0.00080	<0.100	333	<0.00100	<2.0	<0.000100	8530	6.04	793	<0.000040	<0.00040	<0.0100	0.00271	0.0039	<0.0080	<0.0005
WQ1-1	22C3145-01	2022-03-22	M	0.15	1180	0.00081	<0.000010		0.00984	<0.00080	0.108	344	<0.00100	<2.0	<0.000100	8790	6.39	796	<0.000040	<0.00040	<0.0100	0.00262	0.0046	<0.0080	<0.0005
WQ1-1	22D2212-01	2022-04-19	M	0.148	1190	0.00095	<0.000010		0.00982	<0.00080	<0.100	358	<0.00100	<2.0	<0.000100	9660	6.76	825	0.000105	<0.00040	<0.0100	0.00273	<0.0100	<0.0080	<0.0005
WQ1-1	22E2480-03	2022-05-17	M	0.117	1100	<0.00200	<0.000010		0.0103	<0.00400	<0.500	398	<0.00500	<10.0	<0.000500	9770	7.21	925	<0.000200	<0.00200	<0.0500	0.00263	<0.0500	<0.0400	<0.0005
WQ1-1	22F3212-01	2022-06-21	M	0.144	1070	0.00316	<0.000010		0.0101	<0.000400	<0.1	347	<0.00100	1.24	<0.000100	8730	7.02	866	<0.0000400	<0.000500	<0.00200	0.00256	<0.0100	<0.0100	<0.0005
WQ1-1	22G1763-01	2022-07-13	M	0.126	1150	0.00318	<0.000010		0.00990	<0.000400	0.115	351	<0.00100	1.31	<0.000100	9730	7.15	823	<0.0000400	<0.000500	<0.00200	0.00267	<0.0100	<0.0100	<0.0005
WQ1-1	22H2453-01	2022-08-16	M	0.152	1020	0.00429	<0.000010		0.00942	<0.000400	<0.100	346	<0.00100	1.35	<0.000100	8570	6.95	852	<0.0000400	<0.000500	<0.00200	0.00241	<0.0100	<0.0100	<0.0005
WQ1-1	22I1926-01	2022-09-14	M	0.148	1060	0.00215	<0.000010		0.00965	0.000710	<0.100	326	<0.00100	1.28	0.000110	8820	6.73	801	<0.0000400	<0.000500	<0.00200	0.00263	<0.0100	<0.0100	<0.0005
WQ1-1	22J1560-03	2022-10-12	M	0.149	1040	0.00221	<0.000010		0.00878	<0.000400	<0.1	295	<0.00100	1.05	<0.000100	7710	6.21	709	<0.0000400	<0.000500	<0.00200	0.00233	<0.0100	<0.0100	<0.0005
WQ1-1	22K1453-01	2022-11-10	M	0.168	1270	0.0186	<0.000010		0.0101	0.00106	0.102	374	<0.00100	2.16	<0.000100	10200	7.19	938	<0.0000400	<0.000500	<0.00200	0.00304	<0.0100	0.0261	<0.0005
WQ1-1	22L0774-01	2022-12-07	M	0.169	1200	0.0437	<0.000010		0.0105	0.000502	0.128	382	<0.00100	2.08	<0.000100	9390	6.97	933	<0.0000400	<0.000500	<0.00200	0.00299	<0.0100	<0.0100	<0.0005
WQ1-1	23A2847-01	2023-01-27	M	0.151	1200	0.00783	<0.000010		0.0103	0.000527	<0.1	364	<0.00100	1.97	<0.000100	9820	7.06	922	<0.0000400	<0.000500	<0.00200	0.00284	<0.0100	<0.0100	<0.0005
WQ1-1	23C0060-01	2023-02-28	M	0.127	1220	0.00204	<0.000010		0.00974	0.000520	<0.1	379	<0.00100	1.88	<0.000100	9850	6.91	952	<0.0000400	<0.000500	<0.00200	0.00266	<0.0100	<0.0100	<0.0005
WQ1-1	23C1797-01	2023-03-15	M	0.138	1280	0.00195	<0.000010		0.0101	<0.000400	<0.1	364	<0.00100	1.69	<0.000100	9100	6.72	885	<0.0000400	<0.000500	<0.00200	0.00276	<0.0100	<0.0100	<0.0005
WQ1-1	23D2945-01	2023-04-26	M	0.14	1170	0.00176	<0.000010		0.00965	<0.000400	0.113	378	<0.00100	1.38	<0.000100	9150	6.84	864	<0.0000400	<0.000500	<0.00200	0.00291	<0.0100	<0.0100	<0.0005
WQ1-1	23E2392-01	2023-05-17	M	0.128	1250	0.00186	<0.000010		0.0114	0.000593	0.122	384	0.00112	1.39	<0.000100	10300	7.59	958	<0.0000400	<0.000500	<0.00200	0.00296	<0.0100	<0.0100	<0.0005
WQ1-1	23F3614-01	2023-06-27	M	0.149	1100	0.00156	<0.000010		0.0105	<0.000400	<0.1	337	<0.00100	1.46	<0.000100	8600	7.14	888	<0.0000400	<0.000500	<0.00200	0.00267	<0.0100	<0.0100	<0.0005
WQ1-1	23G2415-01	2023-07-19	M	0.172	1190	0.00170	<0.000010		0.0101	<0.000400	<0.1	369	<0.00100	1.56	<0.000100	9770	7.15	947	<0.0000400	<0.000500	<0.00200	0.00275	<0.0100	<0.0100	<0.0005
WQ1-1	23H3309-03	2023-08-24	M	0.151	1110	0.00124	<0.000010		0.00971	<0.000400	<0.1	355	<0.00100	1.23	<0.000100	8970	6.84	852	<0.0000400	<0.000500	<0.00200	0.00272	<0.0100	<0.0100	<0.0005
WQ1-1	23I2271-03	2023-09-19	M	0.144	1020	0.00248	<0.000010		0.00938	0.000416	<0.1	318	<0.00100	1.25	<0.000100	6970	6.23	786	<0.0000400	<0.000500	<0.00200	0.00253	<0.0100	0.0273	<0.0005
WQ1-1	23J2236-03	2023-10-18	M	0.147	1120	0.00287	<0.000010		0.0102	<0.000400	0.296	348	<0.00100	1.43	<0.000100	8990	6.9	854	<0.0000400	<0.000500	<0.00200	0.00285	<0.00400	<0.0100	
WQ1-1	23K1909-01	2023-11-15	M	0.162	1210	0.00359	<0.000010		0.0101	0.000499	0.129	373	<0.00100	1.73	<0.000100	10300	7.58	955	<0.0000400	<0.000500	<0.00200	0.00259	<0.00400	<0.0100	<0.0005
WQ1-1	23L1905-04	2023-12-14	M	0.144	1110	0.00354	<0.000010		0.0102	<0.000400	<0.1	324	<0.00100	1.4	<0.000100	9860	6.99	714	<0.0000400	<0.000500	<0.00200	0.00281	<0.00400	<0.0100	<0.0005
WQ1-1	L2754366-7	2024-01-24	M																						
WQ1-1	VA24A1422-007	2024-01-24	M	0.164	1170	0.00178	<0.0000050		0.0100	<0.00050	0.083	358	<0.00050	1.9	<0.00010	9880	7.03	806	<0.000050	<0.0010	<0.0050	0.00282	0.00154	<0.0010	<0.00050
WQ1-1	L2754594-4	2024-02-13	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	VA24A2858-004	2024-02-13	M	0.102	577	0.0102	<0.0000050		0.00566	<0.00050	<0.050	178	<0.00050	2.9	<0.00010	4980	3.78	461	<0.000050	<0.0010	<0.0050	0.00151	0.00102	<0.0010	<0.00050
WQ1-1	L2755033-4	2024-03-20	M																						
WQ1-1	VA24A5955-004	2024-03-20	M	0.150	1120	0.00208	<0.0000050		0.00963	<0.00050	0.082	354	<0.00050	1.6	<0.00010	10000	6.56	830	<0.000050	<0.0010	<0.0050	0.00288	0.00148	0.0012	<0.00050
WQ1-1	L2755461-4	2024-04-23	M																						
WQ1-1	VA24A8736-004	2024-04-23	M	0.172	1150	0.00057	<0.0000050		0.00954	<0.00050	0.088	345	<0.00050	1.5	<0.00010	9640	6.57	836	<0.000050	<0.0010	<0.0050	0.00267	0.00142	<0.0010	<0.00050
WQ1-1	L2755553-4	2024-04-30	M																						
WQ1-1	VA24A9418-004	2024-04-30	M	0.153	1250	0.00073	<0.0000050		0.00898	<0.00050	0.098	344	<0.00050	1.5	<0.00010	8920	6.15	911	<0.000050	<0.0010	<0.0050	0.00266	0.00137	<0.0010	<0.00050
WQ1-1	L2755641-4	2024-05-07	M																						
WQ1-1	VA24B0040-004	2024-05-07	M	0.162	1020	0.00076	<0.0000050		0.0104	<0.00050	0.088	342	0.00102	2.0	<0.00010	10000	7.15	843	<0.000050	<0.0010	<0.0050	0.00271	0.00154	<0.0010	<0.00050
WQ1-1	L2755769-4	2024-05-14	M																						
WQ1-1	VA24B0738-004	2024-05-14	M	0.161	1090	0.00128	<0.0000050		0.00933	<0.00050	0.094	353	<0.00050	1.7	<0.00010	9180	6.35	755	<0.000050	<0.0010	<0.0050	0.00274	0.00148	<0.0010	<0.00050
WQ1-1	L2755874-4	2024-05-21	M																						
WQ1-1	VA24B1351-004	2024-05-21	M	0.166	1200	0.00192	<0.0000050		0.00922	<0.00050	0.089	343	0.00558	1.4	<0.00010	9390	6.74	832	<0.000050	<0.0010	<0.0050	0.00308	0.00142	<0.0010	<0.00050
WQ1-1	L2756277-4	2024-06-18	M																						
WQ1-1	VA24B4257-004	2024-06-18	M	0.145	1230	0.00398	<0.0000050		0.0102	<0.00050	0.094	349	<0.00050	1.5	<0.00010	9700	7.18	836	<0.000050	<0.0010	<0.0050	0.00300	0.00144	0.0010	<0.00050
WQ1-1	L2756678-4	2024-07-16	M																						
WQ1-1	VA24B7237-004	2024-07-16	M	0.136	1190	0.00135	<0.0000050		0.00984	<0.00050	0.091	370	<0.00050	1.4	<0.00010	9410	6.86	860	<0.000050	<0.0010	<0.0050	0.00299	0.00146	0.0016	<0.00050
WQ1-1	L2757095-4	2024-08-20	M																						
WQ1-1	VA24C1101-004	2024-08-20	M	0.164	1190	0.00280	<0.0000050		0.00898	<0.00050	0.095	363	<0.00050	1.8	<0.00010	8840	6.17	924	<0.000050	<0.0010	<0.0050	0.00302	0.00135	0.0016	<0.00050
WQ1-1	VA24C4483-004	2024-09-17	M	0.176	996	0.00273	<0.0000050		0.00910	<0.00050	0.092	305	0.00146	1.2	<0.00010	7930	6.01	859	<0.000050	<0.0010	<0.0050	0.00298	0.00118	0.0013	<0.00050
WQ1-1	VA24C8360-004	2024-10-22	M	0.118	1130	0.00461	<0.0000050		0.00861	<0.00050	0.077	333	0.00214	1.1	<0.00010	8350	5.91	737	<0.000050	<0.0010	<0.0050	0.00285	0.00107	<0.0010	<0.00050
WQ1-1	VA24C9197-004	2024-10-29	M	0.143	1030	0.00417	<0.0000050		0.00951	<0.00050	0.093	337	0.00244	1.6	<0.00010	7090	6.49	820	<0.000050	<0.0010	<0.0050	0.00264	0.00153	<0.0010	<0.00050
WQ1-1	VA24D0009-004	2024-11-05	M	0.123	1060	0.00809	<0.0000050		0.00838	<0.00050	0.079	346	<0.00050	1.4	<0.00010	8250	5.93	774	<0.000050	<0.0010	<0.0050	0.00284	0.00139	<0.0010	<0.00050
WQ1-1	VA24D0813-011	2024-11-13	M	0.148	1170	0.00889	<0.0000050		0.00892	<0.00050	0.087	350	0.00165	1.5	<0.00010	8700	6.34	831	<0.000050	<0.0010	<0.0050	0.00244	0.00138	0.0018	<0.00050
WQ1-1	VA24D1720-004	2024-11-21	M	0.168	1100	0.00939	<0.0000050		0.0101	0.00061	0.097	337	<0.00050	1.8	<0.00010	8380	6.92	971	<0.000050	<0.0010	<0.0050	0.00238	0.00159	<0.0010	<0.00050
WQ1-1	L2758465-4	2024-12-17	M																						
WQ1-1	VA24D3769-004	2024-12-17	M	0.141	930	0.00316	<0.0000050		0.0100	<0.00050	0.074	292	<0.00050	1.1	<0.00010	7010	6.33	714	<0.000050	<0.0010	<0.0050	0.00232	0.00145	<0.0010	<0.00050
WQ1-1	L2758719-4	2025-01-21	M																						
WQ1-1	VA25A1408-004	2025-01-21	M	0.128	624	0.00186	<0.0000050		0.00874	<0.00050	0.067	315	<0.00050	<1.0	<0.00010	8200	6.09	543	<0.000050	<0.0010	<0.0050	0.00216	0.00150	0.0010	<0.00050
WQ1-1	L2758994-4	2025-02-18	M																						
WQ1-1	VA25A3430-004	2025-02-18	M	0.155	1140	0.00116	<0.0000050		0.00872	<0.00050	0.077	357	<0.00050	2.4	<0.00010	9270	6.10	684	<0.000050	<0.0010	<0.0050	0.00242	0.00132	0.0013	<0.00050
WQ1-1	VA25A6550-004	2025-03-25	M	0.146	1260	0.00089	<0.0000050		0.00898	<0.00050	0.081	336	<0.00050	1.3	<0.00010	10500	6.40	744	<0.000050	<0.0010	<0.0050	0.00291	0.00141	0.0052	<0.00050
WQ1-1	VA25A8962-004	2025-04-22	M	0.141	1210	0.00100	<0.0000050		0.00869	<0.00050	0.067	305	0.00056	1.2	<0.00010	8380	6.11	736	<0.000050	<0.0010	<0.0050	0.00231	0.00134	0.0010	<0.00050
WQ1-1	VA25A9878-004	2025-04-30	M	0.140	1290	0.00091	<0.0000050		0.00869	<0.00050	0.076	309	<0.00050	1.1	<0.00010	9540	5.98	692	<0.000050	<0.0010	<0.0050	0.00211	0.00158	<0.0010	<0.00050
WQ1-1	VA25B0358-004	2025-05-06	M	0.118	1060	0.00126	<0.0000050		0.0103	<0.00050	0.070	311	<0.00050	1.1	<0.00010	7500	7.20	617	<0.000050	<0.0010	<0.0050	0.00243	0.00155	0.0014	<0.00050
WQ1-1	VA25B1026-004	2025-05-13	M	0.161	1270	0.00143	<0.0000050		0.00999	0.00052	0.094	343	<0.00050	1.6	<0.00010	10500	6.58	830	<0.000050	<0.0010	<0.0050	0.00269	0.00160	<0.0010	<0.00050
WQ1-1	VA25B1711-004	2025-05-20	M	0.142	1460	0.00132	<0.0000050		0.00924	0.00055	0.103	323	<0.00050	1.9	<0.00010	9840	6.50	659	<0.000050	<0.0010	<0.0050	0.00256	0.00152	<0.0010	<0.00050
WQ1-2	0051710-02	2020-05-20	M																						<0.0005
WQ1-2	0062209-02	2020-06-22	M																						<0.0005
WQ1-2	0071996-02	2020-07-21	M																						<0.0005
WQ1-2	0082292-02	2020-08-24	M																						<0.0005
WQ1-2	0093017-02	2020-09-28	M																						<0.0005
WQ1-2	20J1961-02	2020-10-20	M																						<0.0005
WQ1-2	20J2778-02	2020-10-27	M																						<0.0005
WQ1-2	20K0360-02	2020-11-03	M																						<0.0005
WQ1-2	20K1261-02	2020-11-10	M																						<0.0005
WQ1-2	20K2100-02	2020-11-18	M																						<0.0005
WQ1-2	20L1589-02	2020-12-14	M																						<0.0005
WQ1-2	21A2590-02	2021-01-27	M																						<0.0005
WQ1-2	21B2778-02	2021-02-25	M																						<0.0005
WQ1-2	21C3505-02	2021-03-25	M																						<0.0005
WQ1-2	21D2478-02	2021-04-22	M																						<0.0005
WQ1-2	21E1990-02	2021-05-18	M																						<0.0005

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	21E2917-02	2021-05-26	M																						<0.0005
WQ1-2	21F0167-02	2021-06-01	M																						<0.0005
WQ1-2	21F1056-02	2021-06-08	M																						<0.0005
WQ1-2	21F2014-02	2021-06-15	M																						<0.0005
WQ1-2	21G2414-02	2021-07-20	M																						<0.0005
WQ1-2	21H3040-02	2021-08-25	M																						<0.0005
WQ1-2	21I3814-02	2021-09-28	M																						<0.0005
WQ1-2	21J3514-02	2021-10-26	M																						<0.0005
WQ1-2	21K3046-02	2021-11-23	M																						<0.0005
WQ1-2	21L2125-02	2021-12-14	M																						<0.0005
WQ1-2	22A2312-02	2022-01-20	M																						<0.0005
WQ1-2	22B2487-02	2022-02-17	M	0.13	970	0.00244	<0.000010		0.00841	<0.00080	<0.100	280	0.00227	<2.0	<0.000100	7360	5.11	670	<0.000040	<0.00040	<0.0100	0.00215	0.0024	<0.0080	<0.0005
WQ1-2	22C3145-02	2022-03-22	M	0.133	1030	0.00154	<0.000010		0.0086	<0.00080	<0.100	301	<0.00100	<2.0	<0.000100	7720	5.52	699	<0.000040	<0.00040	<0.0100	0.0023	0.0028	<0.0080	<0.0005
WQ1-2	22D2212-02	2022-04-19	M	0.157	1060	0.00138	<0.000010		0.00844	<0.00080	<0.100	315	<0.00100	<2.0	<0.000100	8500	5.89	745	0.000101	<0.00040	<0.0100	0.00228	<0.0100	<0.0080	<0.0005
WQ1-2	22E2480-04	2022-05-17	M	0.0172	134	0.00642	<0.000010		0.00152	<0.00400	<0.500	47.2	<0.00500	<10.0	<0.000500	1160	0.824	106	<0.000200	<0.00200	<0.0500	0.000384	<0.0500	<0.0400	<0.0005
WQ1-2	22F3212-02	2022-06-21	M	0.0137	97.1	0.00486	<0.000010		0.00111	<0.000400	<0.1	29.9	<0.00100	1.77	<0.000100	774	0.582	74.6	<0.0000400	<0.000500	<0.00200	0.00025	<0.0100	<0.0100	<0.0005
WQ1-2	22G1763-02	2022-07-13	M	0.0268	220	0.00388	<0.000010		0.00206	<0.000400	<0.1	67.9	<0.00100	1.31	<0.000100	1820	1.28	156	<0.0000400	<0.000500	<0.00200	0.000541	<0.0100	<0.0100	<0.0005
WQ1-2	22H2453-02	2022-08-16	M	0.0137	91.6	0.00632	<0.000010		0.00115	<0.000400	<0.100	29.0	<0.00100	1.59	<0.000100	760	0.565	70.2	<0.0000400	<0.000500	<0.00200	0.000206	<0.0100	<0.0100	<0.0005
WQ1-2	22I1926-02	2022-09-14	M	0.0859	653	0.00576	<0.000010		0.00596	<0.000400	<0.100	195	<0.00100	1.37	<0.000100	5380	4.16	493	<0.0000400	<0.000500	<0.00200	0.00164	<0.0100	<0.0100	<0.0005
WQ1-2	22J1560-04	2022-10-12	M	0.113	779	0.00370	<0.000010		0.00639	<0.000400	<0.1	214	<0.00100	<1	<0.000100	5780	4.49	523	<0.0000400	<0.000500	<0.00200	0.00174	<0.0100	<0.0100	<0.0005
WQ1-2	22K1453-02	2022-11-10	M	0.141	1050	0.0172	<0.000010		0.00846	0.000669	0.103	313	<0.00100	2.42	<0.000100	8480	6.01	775	<0.0000400	<0.000500	<0.00200	0.00258	<0.0100	<0.0100	<0.0005
WQ1-2	22L0774-02	2022-12-07	M	0.158	1060	0.0278	<0.000010		0.00942	0.000438	<0.1	334	<0.00100	2.13	<0.000100	8670	6.19	806	<0.0000400	<0.000500	<0.00200	0.00269	<0.0100	<0.0100	<0.0005
WQ1-2	23A2847-02	2023-01-27	M	0.0841	627	0.0136	<0.000010		0.00540	0.000563	<0.1	192	<0.00100	3.21	<0.000100	5200	3.57	478	<0.0000400	<0.000500	<0.00200	0.00159	<0.0100	<0.0100	<0.0005
WQ1-2	23C0060-02	2023-02-28	M	0.12	1150	0.00496	<0.000010		0.00904	<0.000400	<0.1	352	<0.00100	2.2	<0.000100	9350	6.53	885	<0.0000400	<0.000500	<0.00200	0.00247	<0.0100	<0.0100	<0.0005
WQ1-2	23C1797-02	2023-03-15	M	0.136	1160	0.00366	<0.000010		0.00902	<0.000400	<0.1	319	<0.00100	1.83	<0.000100	8240	6	834	<0.0000400	<0.000500	<0.00200	0.00250	<0.0100	<0.0100	<0.0005
WQ1-2	23D2945-02	2023-04-26	M	0.0836	653	0.00371	<0.000010		0.00585	<0.000400	<0.1	220	<0.00100	1.13	<0.000100	5190	3.91	494	<0.0000400	<0.000500	<0.00200	0.00166	<0.0100	<0.0100	<0.0005
WQ1-2	23E2392-02	2023-05-17	M	0.00975	76.2	0.00529	<0.000010		0.000777	0.000123	<0.01	23.1	<0.00010	1.45	<0.000010	618	0.492	56.7	0.0000044	<0.000050	0.00030	0.000184	<0.00100	<0.0010	<0.0005
WQ1-2	23F3614-02	2023-06-27	M	0.0167	119	0.00407	<0.000010		0.00140	0.000092	<0.02	38.2	<0.00020	1.43	<0.000020	965	0.722	93.6	<0.0000080	<0.000100	<0.00040	0.000312	<0.00200	<0.0020	<0.0005
WQ1-2	23G2415-02	2023-07-19	M	0.0251	173	0.00716	<0.000010		0.00192	<0.000400	<0.1	54.1	<0.00100	1.3	<0.000100	1410	1.05	126	<0.0000400	<0.000500	<0.00200	0.000426	<0.0100	<0.0100	<0.0005
WQ1-2	23H3309-04	2023-08-24	M	0.13	944	0.00331	<0.000010		0.00825	<0.000400	<0.1	301	<0.00100	<1	<0.000100	7550	5.71	721	<0.0000400	<0.000500	<0.00200	0.00230	<0.0100	<0.0100	<0.0005
WQ1-2	23I2271-04	2023-09-19	M	0.0990	650	0.00299	<0.000010		0.00631	<0.000400	<0.1	206	<0.00100	<1	<0.000100	5570	4.09	477	<0.0000400	<0.000500	<0.00200	0.00181	<0.0100	<0.0100	<0.0005
WQ1-2	23J2236-04	2023-10-18	M	0.0336	257	0.0100	<0.000010		0.00242	<0.000400	0.173	80.2	<0.00100	1.66	<0.000100	2070	1.52	197	<0.0000400	<0.000500	<0.00200	0.000734	<0.00400	<0.0100	
WQ1-2	23K1909-02	2023-11-15	M	0.122	883	0.00450	<0.000010		0.00758	<0.000400	<0.1	268	<0.00100	1.97	<0.000100	7480	5.64	703	<0.0000400	<0.000500	<0.00200	0.00203	<0.00400	<0.0100	<0.0005
WQ1-2	23L1905-05	2023-12-14	M	0.125	1040	0.00414	<0.000010		0.00906	<0.000400	<0.1	306	<0.00100	1.58	<0.000100	8830	6.31	709	<0.0000400	<0.000500	<0.00200	0.00265	<0.00400	<0.0100	<0.0005
WQ1-2	L2754366-8	2024-01-24	M																						
WQ1-2	VA24A1422-008	2024-01-24	M	0.153	1070	0.00277	<0.0000050		0.00925	<0.00050	0.074	321	<0.00050	1.9	<0.00010	9690	6.39	748	<0.000050	<0.0010	<0.0050	0.00255	0.00143	<0.0010	<0.00050
WQ1-2	L2754594-5	2024-02-13	M																						
WQ1-2	VA24A2858-005	2024-02-13	M	0.115	650	0.00821	<0.0000050		0.00666	<0.00050	0.051	202	<0.00050	2.4	<0.00010	5780	4.41	536	<0.000050	<0.0010	<0.0050	0.00170	0.00111	<0.0010	<0.00050
WQ1-2	L2755033-5	2024-03-20	M																						
WQ1-2	VA24A5955-005	2024-03-20	M	0.097	737	0.00414	<0.0000050		0.00612	<0.00050	<0.050	224	<0.00050	1.7	<0.00010	6230	4.11	543	<0.000050	<0.0010	<0.0050	0.00188	0.00100	0.0028	<0.00050
WQ1-2	L2755461-5	2024-04-23	M																						
WQ1-2	VA24A8736-005	2024-04-23	M	0.125	842	0.00329	<0.0000050		0.00724	<0.00050	<0.050	247	<0.00050	<1.0	<0.00010	7040	4.78	590	<0.000050	<0.0010	<0.0050	0.00199	0.00107	<0.0010	<0.00050
WQ1-2	L2755553-5	2024-04-30	M																						
WQ1-2	VA24A9418-005	2024-04-30	M	0.051	400	0.00536	<0.0000050		0.00295	<0.00050	<0.050	109	<0.00050	2.2	<0.00010	2830	1.95	266	<0.000050	<0.0010	<0.0050	0.000875	0.00060	<0.0010	<0.00050
WQ1-2	L2755641-5	2024-05-07	M																						
WQ1-2	VA24B0040-005	2024-05-07	M	0.105	670	0.00319	<0.0000050		0.00682	<0.00050	<0.050	226	0.00081	<1.0	<0.00010	6510	4.61	546	<0.000050	<0.0010	<0.0050	0.00186	0.00100	<0.0010	<0.00050
WQ1-2	L2755769-5	2024-05-14	M																						
WQ1-2	VA24B0738-005	2024-05-14	M	0.039	281	0.0104	<0.0000050		0.00269	<0.00050	<0.050	86.6	<0.00050	2.0	<0.00010	2220	1.59	185	<0.000050	<0.0010	0.0113	0.000747	0.00110	<0.0010	<0.00050
WQ1-2	L2755874-5	2024-05-21	M																						
WQ1-2	VA24B1351-005	2024-05-21	M	0.113	829	0.00338	<0.0000050		0.00663	<0.00050	<0.050	235	0.00433	<1.0	<0.00010	6480	4.67	561	<0.000050	<0.0010	<0.0050	0.00206	0.00100	<0.0010	<0.00050
WQ1-2	L2756277-5	2024-06-18	M																						
WQ1-2	VA24B4257-005	2024-06-18	M	0.073	592	0.00454	<0.0000050		0.00473	<0.00050	<0.050	167	<0.00050	<1.0	<0.00010	4430	3.13	422	<0.000050	<0.0010	<0.0050	0.00140	0.00080	0.0010	<0.00050
WQ1-2	L2756678-5	2024-07-16	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	VA24B7237-005	2024-07-16	M	0.036	315	0.00488	<0.0000050		0.00271	<0.00050	<0.050	94.2	<0.00050	1.2	<0.00010	2600	1.76	233	<0.000050	<0.0010	<0.0050	0.000846	0.00059	0.0014	<0.00050
WQ1-2	L2757095-5	2024-08-20	M																						
WQ1-2	VA24C1101-005	2024-08-20	M	0.039	302	0.00514	<0.0000050		0.00230	<0.00050	<0.050	87.4	<0.00050	1.4	<0.00010	2240	1.45	224	<0.000050	<0.0010	<0.0050	0.000665	0.00054	<0.0010	<0.00050
WQ1-2	VA24C4483-005	2024-09-17	M	0.061	521	0.00761	<0.0000050		0.00408	<0.00050	<0.050	146	<0.00050	1.1	<0.00010	3830	2.76	369	<0.000050	<0.0010	<0.0050	0.00126	0.00076	0.0010	<0.00050
WQ1-2	VA24C8360-005	2024-10-22	M	0.095	903	0.00470	<0.0000050		0.00694	<0.00050	<0.050	265	0.00168	1.2	<0.00010	6510	4.67	603	<0.000050	<0.0010	<0.0050	0.00226	0.00097	<0.0010	<0.00050
WQ1-2	VA24C9197-005	2024-10-29	M	0.083	588	0.00512	<0.0000050		0.00577	<0.00050	<0.050	193	<0.00050	1.6	<0.00010	4000	3.82	485	<0.000050	<0.0010	<0.0050	0.00166	0.00111	<0.0010	<0.00050
WQ1-2	VA24D0009-005	2024-11-05	M	0.095	822	0.00441	<0.0000050		0.00669	<0.00050	0.052	271	<0.00050	1.4	<0.00010	6350	4.68	608	<0.000050	<0.0010	<0.0050	0.00227	0.00115	<0.0010	<0.00050
WQ1-2	VA24D0813-013	2024-11-13	M	0.058	456	0.00537	<0.0000050		0.00366	<0.00050	<0.050	136	0.00073	2.2	<0.00010	3390	2.38	325	<0.000050	<0.0010	<0.0050	0.00108	0.00082	<0.0010	<0.00050
WQ1-2	VA24D1720-005	2024-11-21	M	0.140	933	0.00560	<0.0000050		0.00824	0.00055	0.081	282	<0.00100	2.0	<0.00010	7140	5.61	796	<0.000050	<0.0010	<0.0050	0.00196	0.00141	<0.0010	<0.00050
WQ1-2	L2758465-5	2024-12-17	M																						
WQ1-2	VA24D3769-005	2024-12-17	M	0.128	817	0.00306	<0.0000050		0.00847	<0.00050	0.063	256	<0.00050	1.2	<0.00010	6200	5.57	618	<0.000050	<0.0010	<0.0050	0.00200	0.00124	0.0038	<0.00050
WQ1-2	L2758719-5	2025-01-21	M																						
WQ1-2	VA25A1408-005	2025-01-21	M	0.094	463	0.00775	<0.0000050		0.00674	<0.00050	<0.050	228	<0.00050	2.4	<0.00010	6250	4.50	420	<0.000050	<0.0010	<0.0050	0.00167	0.00117	0.0016	<0.00050
WQ1-2	L2758994-5	2025-02-18	M																						
WQ1-2	VA25A3430-005	2025-02-18	M	0.121	924	0.00614	<0.0000050		0.00717	<0.00050	0.053	290	<0.00050	3.1	<0.00010	7420	4.95	551	<0.000050	<0.0010	<0.0050	0.00204	0.00113	0.0012	<0.00050
WQ1-2	VA25A6550-005	2025-03-25	M	0.124	1040	0.00060	<0.0000050		0.00812	<0.00050	<0.050	284	<0.00050	<1.0	<0.00010	8780	5.53	615	<0.000050	<0.0010	<0.0050	0.00248	0.00116	0.0013	<0.00050
WQ1-2	VA25A8962-005	2025-04-22	M	0.070	612	0.00394	<0.0000050		0.00489	<0.00050	<0.050	158	<0.00050	1.1	<0.00010	4320	3.19	386	<0.000050	<0.0010	<0.0050	0.00120	<0.00050	0.0011	<0.00050
WQ1-2	VA25A9878-005	2025-04-30	M	0.022	208	0.00535	<0.0000050		0.00184	<0.00050	<0.050	53.0	<0.00050	1.7	<0.00010	1510	1.12	116	<0.000050	<0.0010	<0.0050	0.000424	<0.00050	<0.0010	<0.00050
WQ1-2	VA25B0358-005	2025-05-06	M	0.103	810	0.00294	<0.0000050		0.00834	<0.00050	<0.050	249	<0.00050	<1.0	<0.00010	5810	5.76	470	<0.000050	<0.0010	<0.0050	0.00202	0.00105	0.0026	<0.00050
WQ1-2	VA25B1026-005	2025-05-13	M	0.080	594	0.00374	<0.0000050		0.00509	<0.00050	<0.050	168	<0.00050	<1.0	<0.00010	4860	3.26	404	<0.000050	<0.0010	<0.0050	0.00139	0.00080	0.0012	<0.00050
WQ1-2	VA25B1711-005	2025-05-20	M	0.022	168	0.00362	<0.0000050		0.00171	<0.00050	<0.050	46.2	<0.00050	2.3	<0.00010	1260	0.968	105	<0.000050	<0.0010	<0.0050	0.000440	<0.00050	0.0011	<0.00050
WQ1-3	23L1905-06	2023-12-14	M	0.0933	764	0.0158	<0.000010		0.00696	<0.000400	<0.1	224	<0.00100	2.2	<0.000100	6390	4.62	499	<0.0000400	<0.000500	<0.00200	0.00197	<0.00400	<0.0100	<0.0005
WQ1-3	L2754366-9	2024-01-24	M																						
WQ1-3	VA24A1422-009	2024-01-24	M	0.075	565	0.00807	<0.0000050		0.00488	<0.00050	<0.050	166	<0.00050	3.1	<0.00010	4550	3.30	380	<0.000050	<0.0010	<0.0050	0.00137	0.00092	<0.0010	<0.00050
WQ1-3	L2754594-6	2024-02-13	M																						
WQ1-3	VA24A2858-006	2024-02-13	M	0.087	502	0.0108	<0.0000050		0.00512	<0.00050	<0.050	158	<0.00050	2.8	<0.00010	4590	3.43	416	<0.000050	<0.0010	<0.0050	0.00134	0.00095	<0.0010	<0.00050
WQ1-3	L2755033-6	2024-03-20	M																						
WQ1-3	VA24A5955-006	2024-03-20	M	0.059	442	0.00694	<0.0000050		0.00382	<0.00050	<0.050	133	<0.00050	2.4	<0.00010	3620	2.44	326	<0.000050	<0.0010	<0.0050	0.00105	0.00076	<0.0010	<0.00050
WQ1-3	L2755461-6	2024-04-23	M																						
WQ1-3	VA24A8736-006	2024-04-23	M	0.108	736	0.00407	<0.0000050		0.00598	<0.00050	<0.050	214	<0.00050	1.0	<0.00010	5960	4.05	514	<0.000050	<0.0010	<0.0050	0.00172	0.00097	<0.0010	<0.00050
WQ1-3	L2755553-6	2024-04-30	M																						
WQ1-3	VA24A9418-006	2024-04-30	M	0.085	696	0.00345	<0.0000050		0.00500	<0.00050	<0.050	190	<0.00050	1.1	<0.00010	4900	3.45	475	<0.000050	<0.0010	<0.0050	0.00154	0.00084	<0.0010	<0.00050
WQ1-3	L2755641-6	2024-05-07	M																						
WQ1-3	VA24B0040-006	2024-05-07	M	0.068	404	0.00479	<0.0000050		0.00415	<0.00050	<0.050	130	<0.00050	1.7	<0.00010	3770	2.66	328	<0.000050	<0.0010	<0.0050	0.00110	0.00071	<0.0010	<0.00050
WQ1-3	L2755769-6	2024-05-14	M																						
WQ1-3	VA24B0738-006	2024-05-14	M	<0.020	93.0	0.00654	<0.0000050		0.00099	<0.00050	<0.050	26.9	<0.00050	1.7	<0.00010	706	0.489	58.8	<0.000050	<0.0010	0.0052	0.000283	0.00059	0.0012	<0.00050
WQ1-3	L2755874-6	2024-05-21	M																						
WQ1-3	VA24B1351-006	2024-05-21	M	<0.020	76.1	0.00672	<0.0000050		0.00105	<0.00050	<0.050	22.9	<0.00050	2.1	<0.00010	672	0.478	57.4	<0.000050	<0.0010	<0.0050	0.000226	<0.00050	<0.0010	<0.00050
WQ1-3	L2756277-6	2024-06-18	M																						
WQ1-3	VA24B4257-006	2024-06-18	M	<0.020	56.0	0.00738	<0.0000050		0.00089	<0.00050	<0.050	16.1	<0.00050	2.4	<0.00010	412	0.333	38.1	<0.000050	<0.0010	<0.0050	0.000146	0.00052	<0.0010	<0.00050
WQ1-3	L2756678-6	2024-07-16	M																						
WQ1-3	VA24B7237-006	2024-07-16	M	<0.020	105	0.00518	<0.0000050		0.00110	<0.00050	<0.050	31.1	<0.00050	1.3	<0.00010	914	0.590	81.8	<0.000050	<0.0010	<0.0050	0.000285	<0.00050	<0.0010	<0.00050
WQ1-3	L2757095-6	2024-08-20	M																						
WQ1-3	VA24C1101-006	2024-08-20	M	0.030	229	0.00564	<0.0000050		0.00186	<0.00050	<0.050	64.8	<0.00050	1.2	<0.00010	1780	1.13	171	<0.000050	<0.0010	<0.0050	0.000555	<0.00050	<0.0010	<0.00050
WQ1-3	VA24C4483-006	2024-09-17	M	0.048	408	0.00868	<0.0000050		0.00320	<0.00050	<0.050	114	<0.00050	1.3	<0.00010	2940	2.11	278	<0.000050	<0.0010	<0.0050	0.000968	0.00066	0.0020	<0.00050
WQ1-3	VA24C8360-006	2024-10-22	M	0.021	178	0.00998	<0.0000050		0.00149	<0.00050	<0.050	50.3	<0.00050	1.9	<0.00010	1340	0.886	120	<0.000050	<0.0010	<0.0050	0.000490	0.00053	<0.0010	<0.00050
WQ1-3	VA24C9197-006	2024-10-29	M	<0.020	122	0.00558	<0.0000050		0.00118	<0.00050	<0.050	34.7	<0.00050	2.5	<0.00010	904	0.626	89.9	<0.000050	<0.0010	<0.0050	0.000351	0.00051	<0.0010	<0.00050
WQ1-3	VA24D0009-006	2024-11-05	M	0.048	402	0.00862	<0.0000050		0.00343	<0.00050	<0.050	124	<0.00050	2.2	<0.00010	3130	2.18	289	<0.000050	<0.0010	<0.0050	0.00111	0.00076	0.0015	<0.00050
WQ1-3	VA24D0813-014	2024-11-13	M	0.032	242	0.00536	<0.0000050		0.00220	<0.00050	<0.050	70.7	<0.00050	2.4	<0.00010	1800	1.28	172	<0.000050	<0.0010	<0.0050	0.000645	0.00065	0.0020	<0.00050
WQ1-3	VA24D1720-006	2024-11-21	M	0.088	580	0.0111	<0.0000050		0.00517	<0.00050	<0.050	173	<0.00050	2.8	<0.00010	4440	3.43	486	<0.000050	<0.0010	<0.0050	0.00131	0.00096	<0.0010	<0.00050
WQ1-3	L2758465-6	2024-12-17	M																						
WQ1-3	VA24D3769-006	2024-12-17	M	0.121	770	0.00372	<0.0000050		0.00810	<0.00050	0.061	243	<0.00050	1.3	<0.00010	5930	5.27	596	<0.000050	<0.0010	<0.0050	0.00188	0.00122	0.0034	<0.00050
WQ1-3	L2758719-6	2025-01-21	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-3	VA25A1408-006	2025-01-21	M	0.085	420	0.00956	<0.0000050		0.00591	<0.00050	<0.050	206	<0.00050	2.7	<0.00010	5640	3.96	377	<0.000050	<0.0010	<0.0050	0.00146	0.00110	0.0018	<0.00050
WQ1-3	L2758994-6	2025-02-18	M																						
WQ1-3	VA25A3430-006	2025-02-18	M	0.119	892	0.00665	<0.0000050		0.00703	<0.00050	<0.050	284	<0.00050	3.2	<0.00010	7150	4.81	545	<0.000050	<0.0010	<0.0050	0.00207	0.00110	0.0014	<0.00050
WQ1-3	VA25A6550-006	2025-03-25	M	0.071	551	0.00540	<0.0000050		0.00456	<0.00050	<0.050	153	<0.00050	1.5	<0.00010	4400	3.07	390	<0.000050	<0.0010	<0.0050	0.00147	0.00075	0.0014	<0.00050
WQ1-3	VA25A8962-006	2025-04-22	M	0.034	291	0.00538	<0.0000050		0.00260	<0.00050	<0.050	77.5	<0.00050	2.2	<0.00010	2110	1.60	192	<0.000050	<0.0010	<0.0050	0.000672	<0.00050	0.0010	<0.00050
WQ1-3	VA25A9878-006	2025-04-30	M	<0.020	168	0.00541	<0.0000050		0.00173	<0.00050	<0.050	43.0	<0.00050	1.8	<0.00010	1210	0.957	97.9	<0.000050	<0.0010	<0.0050	0.000368	<0.00050	0.0025	<0.00050
WQ1-3	VA25B0358-006	2025-05-06	M	0.026	202	0.00500	<0.0000050		0.00252	<0.00050	<0.050	65.1	<0.00050	1.3	<0.00010	1500	1.50	131	<0.000050	<0.0010	<0.0050	0.000608	0.00051	<0.0010	<0.00050
WQ1-3	VA25B1026-006	2025-05-13	M	0.039	266	0.00537	<0.0000050		0.00271	<0.00050	<0.050	80.2	<0.00050	1.8	<0.00010	2210	1.57	196	<0.000050	<0.0010	<0.0050	0.000674	0.00053	0.0021	<0.00050
WQ1-3	VA25B1711-006	2025-05-20	M	<0.020	59.8	0.00425	<0.0000050		0.00091	<0.00050	<0.050	17.7	<0.00050	2.9	<0.00010	473	0.383	41.0	<0.000050	<0.0010	<0.0050	0.000189	<0.00050	<0.0010	<0.00050
WQ2-1	0051710-03	2020-05-20	M																						<0.0005
WQ2-1	0062209-03	2020-06-22	M																						<0.0005
WQ2-1	0071996-03	2020-07-21	M																						<0.0005
WQ2-1	0082292-03	2020-08-24	M																						<0.0005
WQ2-1	0093017-03	2020-09-28	M																						<0.0005
WQ2-1	20J1961-03	2020-10-20	M																						<0.0005
WQ2-1	20J2778-03	2020-10-27	M																						<0.0005
WQ2-1	20K0360-03	2020-11-03	M																						<0.0005
WQ2-1	20K1261-03	2020-11-10	M																						<0.0005
WQ2-1	20K2100-03	2020-11-18	M																						<0.0005
WQ2-1	20L1589-03	2020-12-14	M																						<0.0005
WQ2-1	21A2590-03	2021-01-27	M																						<0.0005
WQ2-1	21B2778-03	2021-02-25	M																						<0.0005
WQ2-1	21C3505-03	2021-03-25	M																						<0.0005
WQ2-1	21D2478-03	2021-04-22	M																						<0.0005
WQ2-1	21E1990-03	2021-05-18	M																						<0.0005
WQ2-1	21E2917-03	2021-05-26	M																						<0.0005
WQ2-1	21F0167-03	2021-06-01	M																						<0.0005
WQ2-1	21F1056-03	2021-06-08	M																						<0.0005
WQ2-1	21F2014-03	2021-06-15	M																						<0.0005
WQ2-1	21G2414-03	2021-07-20	M																						<0.0005
WQ2-1	21H3040-03	2021-08-25	M																						<0.0005
WQ2-1	21I3814-03	2021-09-28	M																						<0.0005
WQ2-1	21J3514-03	2021-10-26	M																						<0.0005
WQ2-1	21K3046-03	2021-11-23	M																						<0.0005
WQ2-1	21L2125-03	2021-12-14	M																						<0.0005
WQ2-1	22A2312-03	2022-01-20	M																						<0.0005
WQ2-1	22B2487-03	2022-02-17	M	0.156	1170	0.00106	<0.000010		0.00975	<0.00080	<0.100	337	0.00201	2	<0.000100	8680	6.15	812	<0.000040	<0.00040	<0.0100	0.00265	0.0027	<0.0080	<0.0005
WQ2-1	22C3145-03	2022-03-22	M	0.151	1180	0.00065	<0.000010		0.00976	<0.00080	0.137	350	0.00101	<2.0	<0.000100	8920	6.32	774	<0.000040	<0.00040	<0.0100	0.00255	0.0027	<0.0080	<0.0005
WQ2-1	22D2212-03	2022-04-19	M	0.187	1290	0.00075	<0.000010		0.0102	<0.00080	0.107	384	<0.00100	<2.0	<0.000100	10500	7.15	895	0.000154	<0.00040	<0.0100	0.00269	<0.0100	0.0135	<0.0005
WQ2-1	22E2480-05	2022-05-17	M	0.119	1130	<0.00200	<0.000010		0.0106	<0.00400	<0.500	411	<0.00500	<10.0	<0.000500	9970	7.4	908	<0.000200	<0.00200	<0.0500	0.00268	<0.0500	<0.0400	<0.0005
WQ2-1	22F3212-03	2022-06-21	M	0.146	1100	0.00261	<0.000010		0.0101	<0.000400	<0.1	360	<0.00100	1.2	<0.000100	8990	7.13	873	<0.0000400	<0.000500	<0.00200	0.00271	<0.0100	<0.0100	<0.0005
WQ2-1	22G1763-03	2022-07-13	M	0.127	1120	0.00304	<0.000010		0.00934	<0.000400	<0.1	339	<0.00100	1.18	<0.000100	9440	6.86	825	<0.0000400	<0.000500	<0.00200	0.00252	<0.0100	<0.0100	<0.0005
WQ2-1	22H2453-03	2022-08-16	M	0.152	1030	0.00372	<0.000010		0.00916	<0.000400	<0.100	353	<0.00100	1.34	<0.000100	8690	6.94	856	<0.0000400	<0.000500	<0.00200	0.00244	<0.0100	<0.0100	<0.0005
WQ2-1	22I1926-03	2022-09-14	M	0.152	1090	0.00205	<0.000010		0.00953	0.000682	<0.100	334	<0.00100	1.37	0.000129	8890	6.90	821	<0.0000400	<0.000500	<0.00200	0.00261	<0.0100	<0.0100	<0.0005
WQ2-1	22J1560-05	2022-10-12	M	0.157	1080	0.00261	<0.000010		0.00925	<0.000400	0.104	299	<0.00100	1.11	<0.000100	8000	6.61	731	<0.0000400	<0.000500	<0.00200	0.00242	<0.0100	<0.0100	<0.0005
WQ2-1	22K1453-03	2022-11-10	M	0.172	1260	0.0155	<0.000010		0.0103	0.000597	0.134	383	<0.00100	2.05	<0.000100	10200	7.11	944	<0.0000400	<0.000500	<0.00200	0.00305	<0.0100	<0.0100	<0.0005
WQ2-1	22L0774-03	2022-12-07	M	0.18	1220	0.0410	<0.000010		0.0105	0.000577	<0.1	367	<0.00100	1.96	<0.000100	9730	6.87	885	<0.0000400	<0.000500	<0.00200	0.00297	<0.0100	<0.0100	<0.0005
WQ2-1	23A2847-03	2023-01-27	M	0.157	1220	0.00700	<0.000010		0.0103	0.000581	0.1	375	<0.00100	1.86	<0.000100	10100	7.06	929	<0.0000400	<0.000500	<0.00200	0.00291	<0.0100	<0.0100	<0.0005
WQ2-1	23C0060-03	2023-02-28	M	0.131	1250	0.00271	<0.000010		0.00954	0.000495	<0.1	391	<0.00100	1.98	<0.000100	10200	7.14	972	<0.0000400	<0.000500	<0.00200	0.00269	<0.0100	<0.0100	<0.0005
WQ2-1	23C1797-03	2023-03-15	M	0.146	1220	0.00163	<0.000010		0.00981	<0.000400	<0.1	364	<0.00100	1.7	<0.000100	9120	6.56	893	<0.0000400	<0.000500	<0.00200	0.00270	<0.0100	<0.0100	<0.0005
WQ2-1	23D2945-03	2023-04-26	M	0.143	1160	0.00184	<0.000010		0.00998	0.000490	<0.1	386	<0.00100	1.4	0.000108	9420	6.9	870	<0.0000400	<0.000500	<0.00200	0.00283	<0.0100	<0.0100	<0.0005
WQ2-1	23E2392-03	2023-05-17	M	0.124	1290	0.00152	<0.000010		0.0110	0.000580	0.118	394	0.00112	1.72	0.000115	10600	7.75	984	<0.0000400	<0.000500	<0.00200	0.00296	<0.0100	<0.0100	<0.0005
WQ2-1	23F3614-03	2023-06-27	M	0.154	1090	0.00161	<0.000010		0.0104	<0.000400	<0.1	340	<0.00100	1.39	<0.000100	8520	7.05	900	<0.0000400	<0.000500	<0.00200	0.00270	<0.0100	<0.0100	<0.0005

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-1	23G2415-03	2023-07-19	M	0.171	1160	0.00123	<0.000010		0.00978	0.000410	<0.1	366	<0.00100	1.52	<0.000100	9590	7.13	936	<0.0000400	<0.000500	<0.00200	0.00282	<0.0100	<0.0100	<0.0005
WQ2-1	23H3309-05	2023-08-24	M	0.151	1110	0.000974	<0.000010		0.00982	0.000468	<0.1	350	<0.00100	1.3	<0.000100	8930	6.77	847	<0.0000400	<0.000500	<0.00200	0.00261	<0.0100	<0.0100	<0.0005
WQ2-1	23I2271-05	2023-09-19	M	0.157	1010	0.00264	<0.000010		0.0103	<0.000400	<0.1	363	<0.00100	1.22	<0.000100	8720	6.6	759	<0.0000400	0.00594	<0.00200	0.00288	<0.0100	<0.0100	<0.0005
WQ2-1	23J2236-05	2023-10-18	M	0.144	1170	0.00428	<0.000010		0.0104	<0.000400	0.282	366	<0.00100	1.51	<0.000100	9400	7.37	899	<0.0000400	<0.000500	<0.00200	0.00301	<0.00400	<0.0100	
WQ2-1	23K1909-03	2023-11-15	M	0.164	1200	0.00353	<0.000010		0.00967	0.000588	<0.1	363	<0.00100	1.86	<0.000100	10100	7.41	963	<0.0000400	<0.000500	<0.00200	0.00255	<0.00400	<0.0100	<0.0005
WQ2-1	23L1905-07	2023-12-14	M	0.141	1250	0.00316	<0.000010		0.0101	<0.000400	<0.1	370	<0.00100	1.46	<0.000100	10600	7.06	793	<0.0000400	<0.000500	<0.00200	0.00291	<0.00400	<0.0100	<0.0005
WQ2-1	L2754383-1	2024-01-25	M																						
WQ2-1	VA24A1507-001	2024-01-25	M	0.156	1170	0.00154	<0.0000050		0.0101	<0.00050	0.082	348	<0.00050	2.0	<0.00010	9680	6.91	808	<0.000050	<0.0010	<0.0050	0.00282	0.00154	<0.0010	<0.00050
WQ2-1	L2754594-7	2024-02-13	M																						
WQ2-1	VA24A2858-007	2024-02-13	M	0.161	903	0.00177	<0.0000050		0.00941	<0.00050	0.074	296	<0.00050	1.5	<0.00010	8540	6.36	760	<0.000050	<0.0010	<0.0050	0.00242	0.00154	<0.0010	<0.00050
WQ2-1	L2755033-7	2024-03-20	M																						
WQ2-1	VA24A5955-007	2024-03-20	M	0.148	1100	0.00202	<0.0000050		0.00967	<0.00050	0.087	351	<0.00050	1.5	<0.00010	9880	6.50	870	<0.000050	<0.0010	<0.0050	0.00293	0.00150	<0.0010	<0.00050
WQ2-1	L2755461-7	2024-04-23	M																						
WQ2-1	VA24A8736-007	2024-04-23	M	0.176	1130	0.00082	<0.0000050		0.00942	<0.00050	0.087	348	<0.00050	1.6	<0.00010	9450	6.44	825	<0.000050	<0.0010	<0.0050	0.00267	0.00144	<0.0010	<0.00050
WQ2-1	L2755553-7	2024-04-30	M																						
WQ2-1	VA24A9418-007	2024-04-30	M	0.120	992	0.00189	<0.0000050		0.00727	<0.00050	<0.050	272	<0.00050	<1.0	<0.00010	6940	4.89	698	<0.000050	<0.0010	<0.0050	0.00213	0.00101	<0.0010	<0.00050
WQ2-1	L2755641-7	2024-05-07	M																						
WQ2-1	VA24B0040-007	2024-05-07	M	0.156	977	0.00063	<0.0000050		0.0102	<0.00050	0.083	335	0.00110	1.3	<0.00010	9750	6.93	806	<0.000050	<0.0010	<0.0050	0.00274	0.00148	<0.0010	<0.00050
WQ2-1	L2755769-7	2024-05-14	M																						
WQ2-1	VA24B0738-007	2024-05-14	M	0.156	1080	0.00051	<0.0000050		0.00918	<0.00050	0.094	348	<0.00050	1.5	<0.00010	9140	6.26	772	<0.000050	<0.0010	<0.0050	0.00266	0.00148	<0.0010	<0.00050
WQ2-1	L2755874-7	2024-05-21	M																						
WQ2-1	VA24B1351-007	2024-05-21	M	0.162	1170	0.00183	<0.0000050		0.00946	<0.00050	0.086	336	0.00527	1.6	<0.00010	9330	6.72	816	<0.000050	<0.0010	<0.0050	0.00276	0.00143	<0.0010	<0.00050
WQ2-1	L2756277-7	2024-06-18	M																						
WQ2-1	VA24B4257-007	2024-06-18	M	0.145	1250	0.00337	<0.0000050		0.0104	<0.00050	0.094	355	<0.00050	1.6	<0.00010	9360	7.22	844	<0.000050	<0.0010	<0.0050	0.00300	0.00151	0.0014	<0.00050
WQ2-1	L2756678-7	2024-07-16	M																						
WQ2-1	VA24B7237-007	2024-07-16	M	0.130	1110	0.00112	<0.0000050		0.00882	<0.00050	0.091	340	<0.00050	1.4	<0.00010	9500	6.08	869	<0.000050	<0.0010	<0.0050	0.00293	0.00126	0.0011	<0.00050
WQ2-1	L2757095-7	2024-08-20	M																						
WQ2-1	VA24C1101-007	2024-08-20	M	0.163	1160	0.00272	<0.0000050		0.00891	<0.00050	0.091	358	<0.00050	1.6	<0.00010	9100	6.12	916	<0.000050	<0.0010	<0.0050	0.00298	0.00139	0.0010	<0.00050
WQ2-1	VA24C4483-007	2024-09-17	M	0.174	1130	0.00262	<0.0000050		0.00873	<0.00050	0.094	320	<0.00050	1.3	<0.00010	9370	6.03	852	<0.000050	<0.0010	<0.0050	0.00308	0.00124	0.0021	<0.00050
WQ2-1	VA24C8360-007	2024-10-22	M	0.121	1170	0.00471	<0.0000050		0.00905	<0.00050	0.081	348	0.00260	1.2	<0.00010	8490	6.22	752	<0.000050	<0.0010	<0.0050	0.00282	0.00110	<0.0010	<0.00050
WQ2-1	VA24C9197-007	2024-10-29	M	0.142	1020	0.00590	<0.0000050		0.00982	0.00054	0.093	345	0.00366	1.5	<0.00010	6980	6.56	832	<0.000050	<0.0010	<0.0050	0.00287	0.00150	<0.0010	<0.00050
WQ2-1	VA24D0009-007	2024-11-05	M	0.123	1080	0.00923	<0.0000050		0.00854	<0.00050	0.081	340	<0.00050	1.4	<0.00010	8280	6.02	773	<0.000050	<0.0010	<0.0050	0.00286	0.00136	<0.0010	<0.00050
WQ2-1	L2758095-4	2024-11-12	M																						
WQ2-1	VA24D0632-004	2024-11-12	M	0.143	1160	0.00796	<0.0000050		0.00901	<0.00050	0.084	343	0.00151	1.4	<0.00010	8570	6.19	818	<0.000050	<0.0010	<0.0050	0.00266	0.00142	0.0036	<0.00050
WQ2-1	VA24D1720-007	2024-11-21	M	0.177	1130	0.0111	<0.0000050		0.0104	0.00064	0.098	339	<0.00100	1.9	<0.00010	8660	7.19	985	<0.000050	<0.0010	<0.0050	0.00243	0.00166	<0.0010	<0.00050
WQ2-1	L2758465-7	2024-12-17	M																						
WQ2-1	VA24D3769-007	2024-12-17	M	0.146	969	0.00280	<0.0000050		0.00978	<0.00050	0.073	287	<0.00050	1.1	<0.00010	7190	6.30	692	<0.000050	<0.0010	<0.0050	0.00221	0.00139	<0.0010	<0.00050
WQ2-1	L2758719-7	2025-01-21	M																						
WQ2-1	VA25A1408-007	2025-01-21	M	0.128	640	0.00178	<0.0000050		0.00876	0.00054	0.064	309	<0.00050	<1.0	<0.00010	8360	6.06	540	<0.000050	<0.0010	<0.0050	0.00211	0.00149	0.0010	<0.00050
WQ2-1	L2758994-7	2025-02-18	M																						
WQ2-1	VA25A3430-007	2025-02-18	M	0.152	1140	0.00147	<0.0000050		0.00887	<0.00050	0.081	345	<0.00050	2.2	<0.00010	9350	6.05	740	<0.000050	<0.0010	<0.0050	0.00257	0.00133	0.0017	<0.00050
WQ2-1	VA25A6550-007	2025-03-25	M	0.140	1210	0.00083	<0.0000050		0.00949	<0.00050	0.082	322	<0.00050	1.2	<0.00010	10200	6.60	721	<0.000050	<0.0010	<0.0050	0.00276	0.00137	0.0020	<0.00050
WQ2-1	VA25A8962-007	2025-04-22	M	0.148	1280	0.00076	<0.0000050		0.00913	<0.00050	0.078	319	0.00051	1.4	<0.00010	8720	6.35	774	<0.000050	<0.0010	<0.0050	0.00235	0.00146	0.0011	<0.00050
WQ2-1	VA25A9878-007	2025-04-30	M	0.139	1250	0.00124	<0.0000050		0.00947	<0.00050	0.068	298	<0.00050	<1.0	<0.00010	9220	6.58	664	<0.000050	<0.0010	<0.0050	0.00201	0.00170	0.0012	<0.00050
WQ2-1	VA25B0358-007	2025-05-06	M	0.126	1110	0.00136	<0.0000050		0.0105	<0.00050	0.070	310	<0.00050	1.1	<0.00010	7860	7.14	625	<0.000050	<0.0010	<0.0050	0.00250	0.00157	<0.0010	<0.00050
WQ2-1	VA25B1026-007	2025-05-13	M	0.156	1260	0.00152	<0.0000050		0.00975	0.00056	0.091	342	<0.00050	1.5	<0.00010	10400	6.62	809	<0.000050	<0.0010	<0.0050	0.00280	0.00160	0.0016	<0.00050
WQ2-1	VA25B1711-007	2025-05-20	M	0.134	1400	0.00153	<0.0000050		0.00922	<0.00050	0.080	311	<0.00050	1.2	<0.00010	9500	6.30	617	<0.000050	<0.0010	<0.0050	0.00240	0.00150	<0.0010	<0.00050
WQ2-2	0051710-04	2020-05-20	M																						<0.0005
WQ2-2	0062209-04	2020-06-22	M																						<0.0005
WQ2-2	0071996-04	2020-07-21	M																						<0.0005
WQ2-2	0082292-04	2020-08-24	M																						<0.0005
WQ2-2	0093017-04	2020-09-28	M																						<0.0005
WQ2-2	20J1961-04	2020-10-20	M																						<0.0005

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	20J2778-04	2020-10-27	M																						<0.0005
WQ2-2	20K0360-04	2020-11-03	M																						<0.0005
WQ2-2	20K1261-04	2020-11-10	M																						<0.0005
WQ2-2	20K2100-04	2020-11-18	M																						<0.0005
WQ2-2	20L1589-04	2020-12-14	M																						<0.0005
WQ2-2	21A2590-04	2021-01-27	M																						<0.0005
WQ2-2	21B2778-04	2021-02-25	M																						<0.0005
WQ2-2	21C3505-04	2021-03-25	M																						<0.0005
WQ2-2	21D2478-04	2021-04-22	M																						<0.0005
WQ2-2	21E1990-04	2021-05-18	M																						<0.0005
WQ2-2	21E2917-04	2021-05-26	M																						<0.0005
WQ2-2	21F0167-04	2021-06-01	M																						<0.0005
WQ2-2	21F1056-04	2021-06-08	M																						<0.0005
WQ2-2	21F2014-04	2021-06-15	M																						<0.0005
WQ2-2	21G2414-04	2021-07-20	M																						<0.0005
WQ2-2	21H3040-04	2021-08-25	M																						<0.0005
WQ2-2	21I3814-04	2021-09-28	M																						<0.0005
WQ2-2	21J3514-04	2021-10-26	M																						<0.0005
WQ2-2	21K3046-04	2021-11-23	M																						<0.0005
WQ2-2	21L2125-04	2021-12-14	M																						<0.0005
WQ2-2	22A2312-04	2022-01-20	M																						<0.0005
WQ2-2	22B2487-04	2022-02-17	M	0.137	1050	0.00129	<0.000010		0.00887	<0.00080	<0.100	303	0.00188	<2.0	<0.000100	8140	5.67	718	<0.000040	<0.00040	<0.0100	0.0024	<0.0020	<0.0080	<0.0005
WQ2-2	22C3145-04	2022-03-22	M	0.128	977	0.00162	<0.000010		0.00822	<0.00080	<0.100	284	<0.00100	<2.0	<0.000100	7340	5.27	642	<0.000040	<0.00040	<0.0100	0.0022	0.003	<0.0080	<0.0005
WQ2-2	22D2212-11	2022-04-19	M	0.135	1040	0.00148	<0.000010		0.00823	<0.00080	<0.100	308	<0.00100	<2.0	<0.000100	8300	5.57	694	0.00006	<0.00040	<0.0100	0.00217	<0.0100	<0.0080	<0.0005
WQ2-2	22E2480-06	2022-05-17	M	0.0299	264	0.00529	<0.000010		0.00275	<0.00400	<0.500	71.5	<0.00500	<10.0	<0.000500	1830	1.6	204	<0.000200	<0.00200	<0.0500	0.00067	<0.0500	<0.0400	<0.0005
WQ2-2	22F3212-04	2022-06-21	M	0.0144	89	0.00472	<0.000010		0.00105	<0.000400	<0.1	28.1	<0.00100	1.73	<0.000100	732	0.542	68.7	<0.0000400	<0.000500	<0.00200	0.000235	<0.0100	<0.0100	<0.0005
WQ2-2	22G1763-04	2022-07-13	M	0.0171	134	0.00421	<0.000010		0.00131	<0.000400	<0.1	41.6	<0.00100	1.33	<0.000100	1140	0.788	95	<0.0000400	<0.000500	<0.00200	0.000333	<0.0100	<0.0100	<0.0005
WQ2-2	22H2453-04	2022-08-16	M	0.0139	93.5	0.00582	<0.000010		0.00110	<0.000400	<0.100	29.5	<0.00100	1.59	<0.000100	767	0.569	70.0	<0.0000400	<0.000500	<0.00200	0.000221	<0.0100	<0.0100	<0.0005
WQ2-2	22I1926-04	2022-09-14	M	0.0798	672	0.00518	<0.000010		0.00607	0.000667	<0.100	201	<0.00100	1.35	<0.000100	5430	4.14	508	<0.0000400	<0.000500	<0.00200	0.00163	<0.0100	<0.0100	<0.0005
WQ2-2	22J1560-06	2022-10-12	M	0.111	747	0.00392	<0.000010		0.00643	<0.000400	<0.1	207	<0.00100	<1	<0.000100	5630	4.38	505	<0.0000400	<0.000500	<0.00200	0.00167	<0.0100	<0.0100	<0.0005
WQ2-2	22K1453-04	2022-11-10	M	0.151	1090	0.0161	<0.000010		0.00863	0.000648	0.119	331	<0.00100	2.33	<0.000100	8750	6.11	816	<0.0000400	<0.000500	<0.00200	0.00266	<0.0100	<0.0100	<0.0005
WQ2-2	22L0774-04	2022-12-07	M	0.167	1090	0.0299	<0.000010		0.00931	<0.000400	<0.1	342	<0.00100	2.18	<0.000100	8860	6.22	813	<0.0000400	<0.000500	<0.00200	0.00267	<0.0100	<0.0100	<0.0005
WQ2-2	23A2847-04	2023-01-27	M	0.0798	591	0.0152	<0.000010		0.00531	0.000529	<0.1	181	<0.00100	3.56	<0.000100	4850	3.36	448	<0.0000400	<0.000500	<0.00200	0.00144	<0.0100	<0.0100	<0.0005
WQ2-2	23C0060-04	2023-02-28	M	0.123	1130	0.00529	<0.000010		0.00888	0.000510	<0.1	356	<0.00100	2.49	<0.000100	9250	6.4	905	<0.0000400	<0.000500	<0.00200	0.00252	<0.0100	<0.0100	<0.0005
WQ2-2	23C1797-04	2023-03-15	M	0.138	1070	0.00551	<0.000010		0.00837	<0.000400	<0.1	312	<0.00100	2.12	<0.000100	7770	5.68	772	<0.0000400	<0.000500	<0.00200	0.00240	<0.0100	<0.0100	<0.0005
WQ2-2	23D2945-04	2023-04-26	M	0.0838	666	0.00730	<0.000010		0.00591	<0.000400	<0.1	215	<0.00100	1.23	<0.000100	5240	3.88	497	<0.0000400	<0.000500	<0.00200	0.00170	<0.0100	<0.0100	<0.0005
WQ2-2	23E2392-04	2023-05-17	M	0.0103	85.5	0.00498	<0.000010		0.000846	0.000138	<0.01	26	<0.00010	1.4	<0.000010	697	0.542	63.5	0.0000043	<0.000050	0.00025	0.000225	<0.00100	<0.0010	<0.0005
WQ2-2	23F3614-04	2023-06-27	M	0.0125	87.5	0.00437	<0.000010		0.00111	<0.000400	<0.1	28.2	<0.00100	1.33	<0.000100	722	0.55	63.9	<0.0000400	<0.000500	<0.00200	0.000228	<0.0100	<0.0100	<0.0005
WQ2-2	23G2415-04	2023-07-19	M	0.0232	165	0.00766	<0.000010		0.00167	<0.000400	<0.1	51.7	<0.00100	1.39	<0.000100	1350	1.02	123	<0.0000400	<0.000500	<0.00200	0.000414	<0.0100	<0.0100	<0.0005
WQ2-2	23H3309-06	2023-08-24	M	0.0551	391	0.00914	<0.000010		0.00353	<0.000400	<0.1	129	<0.00100	1.34	<0.000100	3150	2.32	305	<0.0000400	<0.000500	<0.00200	0.000974	<0.0100	<0.0100	<0.0005
WQ2-2	23I2271-06	2023-09-19	M	0.0595	438	0.00601	<0.000010		0.00383	<0.000400	<0.1	130	<0.00100	1.24	<0.000100	3550	2.49	355	<0.0000400	<0.000500	<0.00200	0.00110	<0.0100	<0.0100	<0.0005
WQ2-2	23J2236-06	2023-10-18	M	0.0181	133	0.0111	<0.000010		0.00146	<0.000400	0.142	40.1	<0.00100	1.87	<0.000100	1060	0.788	99.6	<0.0000400	<0.000500	<0.00200	0.000405	<0.00400	<0.0100	
WQ2-2	23K1909-04	2023-11-15	M	0.0752	547	0.00861	<0.000010		0.00480	0.000416	<0.1	169	<0.00100	2.68	<0.000100	4650	3.49	424	<0.0000400	<0.000500	<0.00200	0.00123	<0.00400	<0.0100	<0.0005
WQ2-2	23L1905-08	2023-12-14	M	0.149	1120	0.00602	<0.000010		0.00893	<0.000400	<0.1	326	<0.00100	1.78	<0.000100	9440	6.24	747	<0.0000400	<0.000500	<0.00200	0.00261	<0.00400	<0.0100	<0.0005
WQ2-2	L2754383-2	2024-01-25	M																						
WQ2-2	VA24A1507-002	2024-01-25	M	0.155	1100	0.00274	<0.0000050		0.00972	<0.00050	0.074	332	<0.00050	2.2	<0.00010	9530	6.53	728	<0.000050	<0.0010	<0.0050	0.00265	0.00152	<0.0010	<0.00050
WQ2-2	L2754594-8	2024-02-13	M																						
WQ2-2	VA24A2858-008	2024-02-13	M	0.117	633	0.00805	<0.0000050		0.00649	<0.00050	0.050	207	<0.00050	2.3	<0.00010	5830	4.44	539	<0.000050	<0.0010	<0.0050	0.00173	0.00111	<0.0010	<0.00050
WQ2-2	L2755033-8	2024-03-20	M																						
WQ2-2	VA24A5955-008	2024-03-20	M	0.113	864	0.00252	<0.0000050		0.00767	<0.00050	<0.050	268	<0.00050	<1.0	<0.00010	7560	5.19	651	<0.000050	<0.0010	<0.0050	0.00226	0.00118	<0.0010	<0.00050
WQ2-2	L2755461-8	2024-04-23	M																						
WQ2-2	VA24A8736-008	2024-04-23	M	0.147	983	0.00337	<0.0000050		0.00819	<0.00050	<0.050	296	<0.00050	<1.0	<0.00010	7900	5.63	710	<0.000050	<0.0010	<0.0050	0.00229	0.00120	<0.0010	<0.00050
WQ2-2	L2755553-8	2024-04-30	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	VA24A9418-008	2024-04-30	M	0.040	323	0.00594	<0.0000050		0.00246	<0.00050	<0.050	88.2	<0.00050	2.5	<0.00010	2270	1.55	222	<0.000050	<0.0010	<0.0050	0.000744	0.00051	<0.0010	<0.00050
WQ2-2	L2755641-8	2024-05-07	M																						
WQ2-2	VA24B0040-008	2024-05-07	M	0.098	606	0.00375	<0.0000050		0.00651	<0.00050	<0.050	204	0.00061	1.2	<0.00010	6080	4.38	512	<0.000050	<0.0010	<0.0050	0.00166	0.00099	<0.0010	<0.00050
WQ2-2	L2755769-8	2024-05-14	M																						
WQ2-2	VA24B0738-008	2024-05-14	M	0.060	432	0.00522	<0.0000050		0.00388	<0.00050	<0.050	137	<0.00050	1.2	<0.00010	3580	2.47	294	<0.000050	<0.0010	<0.0050	0.00114	0.00071	<0.0010	<0.00050
WQ2-2	L2755874-8	2024-05-21	M																						
WQ2-2	VA24B1351-008	2024-05-21	M	0.104	794	0.00470	<0.0000050		0.00668	<0.00050	<0.050	222	0.00150	<1.0	<0.00010	6280	4.60	555	<0.000050	<0.0010	<0.0050	0.00203	0.00101	0.0012	<0.00050
WQ2-2	L2756277-8	2024-06-18	M																						
WQ2-2	VA24B4257-008	2024-06-18	M	0.061	495	0.00972	<0.0000050		0.00373	<0.00050	<0.050	138	<0.00050	1.1	<0.00010	3610	2.45	345	<0.000050	<0.0010	<0.0050	0.00117	0.00070	<0.0010	<0.00050
WQ2-2	L2756678-8	2024-07-16	M																						
WQ2-2	VA24B7237-008	2024-07-16	M	0.053	462	0.00379	<0.0000050		0.00366	<0.00050	<0.050	137	<0.00050	1.0	<0.00010	3730	2.40	336	<0.000050	<0.0010	<0.0050	0.00122	0.00066	0.0011	<0.00050
WQ2-2	L2757095-8	2024-08-20	M																						
WQ2-2	VA24C1101-008	2024-08-20	M	0.116	854	0.00146	<0.0000050		0.00664	<0.00050	<0.050	256	<0.00050	<1.0	<0.00010	6510	4.44	647	<0.000050	<0.0010	<0.0050	0.00230	0.00111	<0.0010	<0.00050
WQ2-2	VA24C4483-008	2024-09-17	M	0.063	556	0.00976	<0.0000050		0.00420	<0.00050	<0.050	157	<0.00050	1.1	<0.00010	4010	2.81	386	<0.000050	<0.0010	<0.0050	0.00118	0.00072	0.0020	<0.00050
WQ2-2	VA24C8360-008	2024-10-22	M	0.090	855	0.00488	<0.0000050		0.00674	<0.00050	<0.050	254	0.00195	1.1	<0.00010	6160	4.53	567	<0.000050	<0.0010	<0.0050	0.00225	0.00098	0.0014	<0.00050
WQ2-2	VA24C9197-008	2024-10-29	M	0.080	614	0.00524	<0.0000050		0.00463	0.00097	<0.050	177	<0.00050	1.9	<0.00010	4640	3.03	448	<0.000050	<0.0010	<0.0050	0.00141	0.00087	<0.0010	<0.00050
WQ2-2	VA24D0009-008	2024-11-05	M	0.087	763	0.00559	<0.0000050		0.00630	<0.00050	<0.050	243	<0.00050	1.5	<0.00010	5860	4.29	551	<0.000050	<0.0010	<0.0050	0.00201	0.00112	0.0021	<0.00050
WQ2-2	L2758095-5	2024-11-12	M																						
WQ2-2	VA24D0632-005	2024-11-12	M	0.072	583	0.00502	<0.0000050		0.00460	<0.00050	<0.050	174	0.00074	1.8	<0.00010	4350	3.13	416	<0.000050	<0.0010	<0.0050	0.00130	0.00091	0.0024	<0.00050
WQ2-2	VA24D1720-008	2024-11-21	M	0.153	943	0.00652	<0.0000050		0.00806	0.00054	0.076	281	<0.00100	2.1	<0.00010	7170	5.41	781	<0.000050	<0.0010	<0.0050	0.00189	0.00134	<0.0010	<0.00050
WQ2-2	L2758465-8	2024-12-17	M																						
WQ2-2	VA24D3769-008	2024-12-17	M	0.126	814	0.00352	<0.0000050		0.00857	<0.00050	0.062	247	<0.00050	1.2	<0.00010	6250	5.66	597	<0.000050	<0.0010	<0.0050	0.00206	0.00125	0.0025	<0.00050
WQ2-2	L2758719-8	2025-01-21	M																						
WQ2-2	VA25A1408-008	2025-01-21	M	0.099	484	0.00690	<0.0000050		0.00690	<0.00050	<0.050	245	<0.00050	2.2	<0.00010	6500	4.69	419	<0.000050	<0.0010	<0.0050	0.00171	0.00122	0.0022	<0.00050
WQ2-2	L2758994-8	2025-02-18	M																						
WQ2-2	VA25A3430-008	2025-02-18	M	0.128	946	0.00660	<0.0000050		0.00747	<0.00050	0.056	286	<0.00050	3.0	<0.00010	7520	4.97	596	<0.000050	<0.0010	<0.0050	0.00221	0.00116	0.0025	<0.00050
WQ2-2	VA25A6550-008	2025-03-25	M	0.102	833	0.00250	<0.0000050		0.00704	<0.00050	<0.050	229	<0.00050	<1.0	<0.00010	7040	4.74	512	<0.000050	<0.0010	<0.0050	0.00201	0.00103	0.0020	<0.00050
WQ2-2	VA25A8962-008	2025-04-22	M	0.070	613	0.00385	<0.0000050		0.00462	<0.00050	<0.050	160	<0.00050	1.2	<0.00010	4320	3.20	378	<0.000050	<0.0010	<0.0050	0.00126	0.00052	0.0011	<0.00050
WQ2-2	VA25A9878-008	2025-04-30	M	0.036	339	0.00533	<0.0000050		0.00297	<0.00050	<0.050	83.8	<0.00050	1.4	<0.00010	2450	1.90	186	<0.000050	<0.0010	<0.0050	0.000624	<0.00050	0.0013	<0.00050
WQ2-2	VA25B0358-008	2025-05-06	M	0.101	770	0.00326	<0.0000050		0.00792	<0.00050	<0.050	235	<0.00060	<1.0	<0.00010	5510	5.42	457	<0.000050	<0.0010	<0.0050	0.00187	0.00097	<0.0010	<0.00050
WQ2-2	VA25B1026-008	2025-05-13	M	0.046	328	0.00481	<0.0000050		0.00315	<0.00050	<0.050	97.0	<0.00050	1.6	<0.00010	2740	1.91	229	<0.000050	<0.0010	<0.0050	0.000866	0.00058	0.0014	<0.00050
WQ2-2	VA25B1711-008	2025-05-20	M	0.035	272	0.00343	<0.0000050		0.00235	<0.00050	<0.050	73.8	<0.00050	1.9	<0.00010	2010	1.52	157	<0.000050	<0.0010	<0.0050	0.000635	<0.00050	<0.0010	<0.00050
WQ2-3	23L1905-09	2023-12-14	M	0.142	1110	0.00614	<0.000010		0.00918	<0.000800	<0.1	318	<0.00100	1.82	<0.000100	9250	6.23	756	<0.0000400	<0.000500	<0.00200	0.00258	<0.00400	<0.0100	<0.0005
WQ2-3	L2754383-3	2024-01-25	M																						
WQ2-3	VA24A1507-003	2024-01-25	M	0.072	547	0.00653	<0.0000050		0.00479	<0.00050	<0.050	159	<0.00050	2.9	<0.00010	4440	3.11	360	<0.000050	<0.0010	<0.0050	0.00137	0.00088	0.0012	<0.00050
WQ2-3	L2754594-9	2024-02-13	M																						
WQ2-3	VA24A2858-009	2024-02-13	M	0.087	481	0.0109	<0.0000050		0.00491	<0.00050	<0.050	153	<0.00050	2.6	<0.00010	4410	3.32	395	<0.000050	<0.0010	<0.0050	0.00133	0.00092	<0.0010	<0.00050
WQ2-3	L2755033-9	2024-03-20	M																						
WQ2-3	VA24A5955-009	2024-03-20	M	0.063	472	0.00633	<0.0000050		0.00413	<0.00050	<0.050	142	<0.00050	2.4	<0.00010	4090	2.62	350	<0.000050	<0.0010	<0.0050	0.00132	0.00076	0.0018	<0.00050
WQ2-3	L2755461-9	2024-04-23	M																						
WQ2-3	VA24A8736-009	2024-04-23	M	0.097	686	0.00507	<0.0000050		0.00540	<0.00050	<0.050	197	<0.00050	1.2	<0.00010	5350	3.61	472	<0.000050	<0.0010	<0.0050	0.00150	0.00082	<0.0010	<0.00050
WQ2-3	L2755553-9	2024-04-30	M																						
WQ2-3	VA24A9418-009	2024-04-30	M	0.038	300	0.00595	<0.0000050		0.00236	<0.00050	<0.050	81.4	<0.00050	2.5	<0.00010	2140	1.45	204	<0.000050	<0.0010	<0.0050	0.000697	0.00051	<0.0010	<0.00050
WQ2-3	L2755641-9	2024-05-07	M																						
WQ2-3	VA24B0040-009	2024-05-07	M	0.056	364	0.00591	<0.0000050		0.00392	<0.00050	<0.050	117	<0.00050	1.8	<0.00010	3420	2.46	297	<0.000050	<0.0010	<0.0050	0.00103	0.00067	<0.0010	<0.00050
WQ2-3	L2755769-9	2024-05-14	M																						
WQ2-3	VA24B0738-009	2024-05-14	M	<0.020	62.4	0.00501	<0.0000050		0.00078	<0.00050	<0.050	18.2	<0.00050	1.6	<0.00010	484	0.332	40.4	<0.000050	<0.0010	<0.0050	0.000183	<0.00050	<0.0010	<0.00050
WQ2-3	L2755874-9	2024-05-21	M																						
WQ2-3	VA24B1351-009	2024-05-21	M	<0.020	86.3	0.00606	<0.0000050		0.00109	<0.00050	<0.050	25.9	<0.00050	2.0	<0.00010	734	0.525	65.6	<0.000050	<0.0010	<0.0050	0.000249	<0.00050	<0.0010	<0.00050
WQ2-3	L2756277-9	2024-06-18	M																						
WQ2-3	VA24B4257-010	2024-06-18	M	<0.020	22.8	0.00717	<0.0000050		0.00067	<0.00050	<0.050	7.2	<0.00050	2.2	<0.00010	189	0.159	17.7	<0.000050	<0.0010	<0.0050	0.000128	<0.00050	<0.0010	<0.00050
WQ2-3	L2756678-9	2024-07-16	M																						
WQ2-3	VA24B7237-009	2024-07-16	M	<0.020	134	0.00505	<0.0000050		0.00118	<0.00050	<0.050	38.5	<0.00050	1.5	<0.00010	1080	0.688	95.5	<0.000050	<0.0010	<0.0050	0.000350	<0.00050	<0.0010	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-3	L2757095-9	2024-08-20	M																						
WQ2-3	VA24C1101-009	2024-08-20	M	0.035	265	0.00742	<0.0000050		0.00210	<0.00050	<0.050	77.3	<0.00050	1.4	<0.00010	2000	1.30	192	<0.000050	<0.0010	<0.0050	0.000608	0.00060	0.0011	<0.00050
WQ2-3	VA24C4483-009	2024-09-17	M	0.043	369	0.00888	<0.0000050		0.00291	<0.00050	<0.050	103	<0.00050	1.3	<0.00010	2670	1.89	254	<0.000050	<0.0010	<0.0050	0.000889	0.00063	0.0011	<0.00050
WQ2-3	VA24C8360-009	2024-10-22	M	<0.020	181	0.00922	<0.0000050		0.00150	<0.00050	<0.050	52.7	<0.00050	1.7	<0.00010	1330	0.886	119	<0.000050	<0.0010	<0.0050	0.000518	0.00050	<0.0010	<0.00050
WQ2-3	VA24C9197-009	2024-10-29	M	0.030	228	0.00567	<0.0000050		0.00200	<0.00050	<0.050	65.1	<0.00050	2.3	<0.00010	1690	1.12	163	<0.000050	<0.0010	<0.0050	0.000596	0.00059	0.0011	<0.00050
WQ2-3	VA24D0009-009	2024-11-05	M	0.051	416	0.00980	<0.0000050		0.00346	<0.00050	<0.050	122	<0.00050	2.4	<0.00010	3180	2.22	292	<0.000050	<0.0010	<0.0050	0.00106	0.00077	0.0010	<0.00050
WQ2-3	L2758095-6	2024-11-12	M																						
WQ2-3	VA24D0632-006	2024-11-12	M	0.028	221	0.00514	<0.0000050		0.00203	<0.00050	<0.050	63.9	<0.00050	2.2	<0.00010	1650	1.17	160	<0.000050	<0.0010	<0.0050	0.000599	0.00058	0.0020	<0.00050
WQ2-3	VA24D1720-009	2024-11-21	M	0.112	731	0.0101	<0.0000050		0.00605	<0.00050	0.053	216	<0.00100	2.5	<0.00010	5560	4.03	564	<0.000050	<0.0010	<0.0050	0.00150	0.00109	<0.0010	<0.00050
WQ2-3	L2758465-9	2024-12-17	M																						
WQ2-3	VA24D3769-009	2024-12-17	M	0.123	802	0.00375	<0.0000050		0.00809	<0.00050	0.063	244	<0.00050	1.3	<0.00010	6080	5.43	597	<0.000050	<0.0010	<0.0050	0.00199	0.00124	0.0032	<0.00050
WQ2-3	L2758719-9	2025-01-21	M																						
WQ2-3	VA25A1408-009	2025-01-21	M	0.087	427	0.00913	<0.0000050		0.00601	<0.00050	<0.050	209	<0.00050	2.6	<0.00010	5830	4.05	369	<0.000050	<0.0010	<0.0050	0.00145	0.00110	0.0024	<0.00050
WQ2-3	L2758994-9	2025-02-18	M																						
WQ2-3	VA25A3430-009	2025-02-18	M	0.118	900	0.00734	<0.0000050		0.00688	<0.00050	0.053	277	<0.00050	3.2	<0.00010	7220	4.75	570	<0.000050	<0.0010	<0.0050	0.00199	0.00108	0.0025	<0.00050
WQ2-3	VA25A6550-009	2025-03-25	M	0.077	611	0.00442	<0.0000050		0.00522	<0.00050	<0.050	171	<0.00050	<1.0	<0.00010	5120	3.56	395	<0.000050	<0.0010	<0.0050	0.00163	0.00079	<0.0010	<0.00050
WQ2-3	VA25A8962-009	2025-04-22	M	0.038	314	0.00507	<0.0000050		0.00279	<0.00050	<0.050	85.2	<0.00050	2.0	<0.00010	2280	1.69	204	<0.000050	<0.0010	<0.0050	0.000677	<0.00050	0.0016	<0.00050
WQ2-3	VA25A9878-009	2025-04-30	M	<0.020	159	0.00550	<0.0000050		0.00170	<0.00050	<0.050	40.4	<0.00050	1.7	<0.00010	1140	0.917	91.9	<0.000050	<0.0010	<0.0050	0.000360	<0.00050	0.0010	<0.00050
WQ2-3	VA25B0358-009	2025-05-06	M	0.028	230	0.00512	<0.0000050		0.00268	<0.00050	<0.050	71.3	<0.00050	1.3	<0.00010	1650	1.67	142	<0.000050	<0.0010	<0.0050	0.000627	0.00054	0.0012	<0.00050
WQ2-3	VA25B1026-009	2025-05-13	M	0.028	198	0.00500	<0.0000050		0.00219	<0.00050	<0.050	60.9	<0.00050	1.7	<0.00010	1680	1.21	150	<0.000050	<0.0010	<0.0050	0.000580	<0.00050	0.0012	<0.00050
WQ2-3	VA25B1711-009	2025-05-20	M	<0.020	63.6	0.00424	<0.0000050		0.00097	<0.00050	<0.050	19.0	<0.00050	2.9	<0.00010	510	0.408	42.3	<0.000050	<0.0010	<0.0050	0.000190	<0.00050	<0.0010	<0.00050
WQ3-1	0051710-05	2020-05-20	M																						<0.0005
WQ3-1	0062209-05	2020-06-22	M																						<0.0005
WQ3-1	0071996-05	2020-07-21	M																						<0.0005
WQ3-1	0082292-05	2020-08-24	M																						<0.0005
WQ3-1	0093017-05	2020-09-28	M																						<0.0005
WQ3-1	20J1961-05	2020-10-20	M																						<0.0005
WQ3-1	20J2778-05	2020-10-27	M																						<0.0005
WQ3-1	20K0360-05	2020-11-03	M																						<0.0005
WQ3-1	20K1261-05	2020-11-10	M																						<0.0005
WQ3-1	20K2100-05	2020-11-18	M																						<0.0005
WQ3-1	20L1589-05	2020-12-14	M																						<0.0005
WQ3-1	21A2590-05	2021-01-27	M																						<0.0005
WQ3-1	21B2778-05	2021-02-25	M																						<0.0005
WQ3-1	21C3505-05	2021-03-25	M																						<0.0005
WQ3-1	21D2478-05	2021-04-22	M																						<0.0005
WQ3-1	21E1990-05	2021-05-18	M																						<0.0005
WQ3-1	21E2917-05	2021-05-26	M																						<0.0005
WQ3-1	21F0167-05	2021-06-01	M																						<0.0005
WQ3-1	21F1056-05	2021-06-08	M																						<0.0005
WQ3-1	21F2014-05	2021-06-15	M																						<0.0005
WQ3-1	21G2414-05	2021-07-20	M																						<0.0005
WQ3-1	21H3040-05	2021-08-25	M																						<0.0005
WQ3-1	21I3814-05	2021-09-28	M																						<0.0005
WQ3-1	21J3514-05	2021-10-26	M																						<0.0005
WQ3-1	21K3046-05	2021-11-23	M																						<0.0005
WQ3-1	21L2125-05	2021-12-14	M																						<0.0005
WQ3-1	22A2312-05	2022-01-20	M																						<0.0005
WQ3-1	22B2487-05	2022-02-17	M	0.147	1130	0.00118	<0.000010		0.00949	0.00092	<0.100	327	0.00257	<2.0	<0.000100	8570	6.12	794	<0.000040	<0.00040	<0.0100	0.00255	<0.0020	0.0228	<0.0005
WQ3-1	22C3145-05	2022-03-22	M	0.148	1140	0.00171	<0.000010		0.00985	<0.00080	0.116	338	<0.00100	<2.0	<0.000100	8430	6.21	766	<0.000040	<0.00040	<0.0100	0.00261	0.0021	<0.0080	<0.0005
WQ3-1	22D2212-04	2022-04-19	M	0.18	1290	0.00067	<0.000010		0.0103	<0.00080	0.106	380	<0.00100	<2.0	0.000171	10400	7.06	875	0.000153	0.00081	<0.0100	0.00266	<0.0100	<0.0080	<0.0005
WQ3-1	22E2480-07	2022-05-17	M	0.115	1140	0.00201	<0.000010		0.0103	<0.00400	<0.500	407	<0.00500	<10.0	<0.000500	9950	7.24	900	<0.000200	<0.00200	<0.0500	0.00272	<0.0500	<0.0400	<0.0005
WQ3-1	22F3212-05	2022-06-21	M	0.149	1080	0.00363	<0.000010		0.00998	0.000516	<0.1	349	<0.00100	1.17	<0.000100	8740	7.03	882	<0.0000400	<0.000500	<0.00200	0.0026	<0.0100	<0.0100	<0.0005

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	22G1763-05	2022-07-13	M	0.128	1140	0.00324	<0.000010		0.00950	<0.000400	<0.1	341	<0.00100	1.26	<0.000100	9600	6.95	819	<0.0000400	<0.000500	<0.00200	0.00263	<0.0100	<0.0100	<0.0005
WQ3-1	22H2453-05	2022-08-16	M	0.153	1040	0.00380	<0.000010		0.00960	<0.000400	<0.100	355	<0.00100	1.40	<0.000100	8720	7.01	864	<0.0000400	<0.000500	<0.00200	0.00242	<0.0100	<0.0100	<0.0005
WQ3-1	22I1926-05	2022-09-14	M	0.147	1100	0.00227	<0.000010		0.00978	0.000823	<0.100	340	<0.00100	1.35	<0.000100	9020	6.79	840	<0.0000400	<0.000500	<0.00200	0.00265	<0.0100	<0.0100	<0.0005
WQ3-1	22J1560-07	2022-10-12	M	0.0533	342	0.00733	<0.000010		0.00304	<0.000400	<0.1	94.1	<0.00100	1.17	<0.000100	2550	1.99	229	<0.0000400	<0.000500	<0.00200	0.000792	<0.0100	<0.0100	<0.0005
WQ3-1	22K1453-05	2022-11-10	M	0.179	1300	0.0163	<0.000010		0.00996	0.000848	0.116	390	<0.00100	2.22	<0.000100	10400	7.12	968	<0.0000400	<0.000500	<0.00200	0.00302	<0.0100	<0.0100	<0.0005
WQ3-1	22L0774-05	2022-12-07	M	0.185	1210	0.0342	<0.000010		0.0103	0.000414	0.11	363	<0.00100	1.91	<0.000100	9770	6.76	897	<0.0000400	<0.000500	<0.00200	0.00297	<0.0100	<0.0100	<0.0005
WQ3-1	23A2847-05	2023-01-27	M	0.161	1220	0.00644	<0.000010		0.0100	0.000560	0.116	376	<0.00100	2	<0.000100	10000	7.08	944	<0.0000400	<0.000500	<0.00200	0.00300	<0.0100	<0.0100	<0.0005
WQ3-1	23C0060-05	2023-02-28	M	0.134	1270	0.00168	<0.000010		0.00987	<0.000400	<0.1	396	<0.00100	1.88	<0.000100	10400	7.09	966	<0.0000400	<0.000500	<0.00200	0.00267	<0.0100	<0.0100	<0.0005
WQ3-1	23C1797-05	2023-03-15	M	0.16	1220	0.00172	<0.000010		0.00956	<0.000400	<0.1	354	<0.00100	1.74	<0.000100	8850	6.5	891	<0.0000400	<0.000500	<0.00200	0.00266	<0.0100	<0.0100	<0.0005
WQ3-1	23D2945-05	2023-04-26	M	0.147	1200	0.00159	<0.000010		0.0104	<0.000400	<0.1	381	<0.00100	1.46	<0.000100	9680	6.86	884	<0.0000400	<0.000500	<0.00200	0.00306	<0.0100	<0.0100	<0.0005
WQ3-1	23E2392-05	2023-05-17	M	0.118	1220	0.00150	<0.000010		0.0103	0.000445	0.145	383	<0.00100	1.61	0.000110	10100	7.23	937	<0.0000400	<0.000500	<0.00200	0.00273	<0.0100	<0.0100	<0.0005
WQ3-1	23F3614-05	2023-06-27	M	0.154	1120	0.00283	<0.000010		0.00980	<0.000400	<0.1	368	<0.00100	1.26	<0.000100	8700	6.82	866	<0.0000400	<0.000500	<0.00200	0.00285	<0.0100	<0.0100	<0.0005
WQ3-1	23G2415-05	2023-07-19	M	0.188	1360	0.00141	<0.000010		0.0115	<0.000400	<0.1	414	<0.00100	1.69	<0.000100	11100	8.16	1100	<0.0000400	<0.000500	<0.00200	0.00321	<0.0100	<0.0100	<0.0005
WQ3-1	23H3309-07	2023-08-24	M	0.15	1100	0.00131	<0.000010		0.00909	<0.000400	<0.1	355	<0.00100	1.26	<0.000100	8960	6.84	860	<0.0000400	<0.000500	<0.00200	0.00275	<0.0100	<0.0100	<0.0005
WQ3-1	23I2271-07	2023-09-19	M	0.153	1030	0.00366	<0.000010		0.0102	<0.000400	<0.1	365	<0.00100	1.33	<0.000100	8880	6.69	916	<0.0000400	<0.000500	<0.00200	0.00289	<0.0100	<0.0100	<0.0005
WQ3-1	23J2236-07	2023-10-18	M	0.146	1120	0.00252	<0.000010		0.0104	<0.000400	0.305	350	<0.00100	1.43	<0.000100	8920	7	869	<0.0000400	<0.000500	<0.00200	0.00291	<0.00400	<0.0100	
WQ3-1	23K1909-05	2023-11-15	M	0.165	1210	0.00362	<0.000010		0.0100	0.000748	0.131	370	<0.00100	1.77	<0.000100	10300	7.57	962	<0.0000400	<0.000500	<0.00200	0.00269	<0.00400	<0.0100	<0.0005
WQ3-1	23L2091-01	2023-12-15	M	0.15	1150	0.00325	<0.000010		0.00979	<0.000400	0.105	344	<0.00100	1.48	<0.000100	9740	6.72	843	<0.0000400	<0.000500	<0.00200	0.00283	<0.00400	<0.0100	<0.0005
WQ3-1	L2754366-1	2024-01-24	M																						
WQ3-1	VA24A1422-001	2024-01-24	M	0.162	1160	0.00180	<0.0000050		0.0103	<0.00050	0.086	342	<0.00050	1.8	<0.00010	10200	7.01	821	<0.000050	<0.0010	<0.0050	0.00279	0.00159	0.0013	<0.00050
WQ3-1	L2754604-1	2024-02-14	M																						
WQ3-1	VA24A2995-001	2024-02-14	M	0.147	954	0.00201	<0.0000050		0.00936	<0.00050	0.078	299	<0.00050	1.7	<0.00010	8350	6.43	780	<0.000050	<0.0010	<0.0050	0.00266	0.00152	<0.0010	<0.00050
WQ3-1	L2755043-1	2024-03-21	M																						
WQ3-1	VA24A6026-001	2024-03-21	M	0.147	1150	0.00292	<0.0000050		0.0107	<0.00050	0.090	353	<0.00050	1.6	<0.00010	8780	7.04	912	<0.000050	<0.0010	<0.0050	0.00316	0.00165	<0.0010	<0.00050
WQ3-1	L2755490-1	2024-04-24	M																						
WQ3-1	VA24A8916-001	2024-04-24	M	0.162	1260	0.00066	<0.0000050		0.0100	<0.00050	0.090	356	<0.00050	1.7	<0.00010	9260	6.89	885	<0.000050	<0.0010	<0.0050	0.00279	0.00146	0.0016	<0.00050
WQ3-1	L2755567-1	2024-05-01	M																						
WQ3-1	VA24A9566-001	2024-05-01	M	0.140	1210	0.00090	<0.0000050		0.00973	<0.00050	0.087	339	<0.00050	1.4	<0.00010	9110	6.68	822	<0.000050	<0.0010	<0.0050	0.00259	0.00146	<0.0010	<0.00050
WQ3-1	L2755666-1	2024-05-08	M																						
WQ3-1	VA24B0201-001	2024-05-08	M	0.156	1120	0.00058	<0.0000050		0.0106	<0.00050	0.091	339	<0.00050	1.7	<0.00010	9350	7.21	850	<0.000050	<0.0010	<0.0050	0.00292	0.00153	<0.0010	<0.00050
WQ3-1	L2755779-1	2024-05-15	M																						
WQ3-1	VA24B0901-001	2024-05-15	M	0.163	1070	0.00093	<0.0000050		0.00972	<0.00050	0.092	332	<0.00050	1.8	<0.00010	8870	6.82	828	<0.000050	<0.0010	<0.0050	0.00283	0.00144	<0.0010	<0.00050
WQ3-1	L2755888-1	2024-05-22	M																						
WQ3-1	VA24B1500-001	2024-05-22	M	0.155	1140	0.00184	<0.0000050		0.00916	<0.00050	0.084	324	<0.00050	1.4	<0.00010	9080	6.64	802	<0.000050	<0.0010	<0.0050	0.00307	0.00137	<0.0010	<0.00050
WQ3-1	L2756312-1	2024-06-19	M																						
WQ3-1	VA24B4510-001	2024-06-19	M	0.136	1150	0.00248	<0.0000050		0.00789	<0.00050	0.087	341	<0.00050	1.6	<0.00010	9930	5.34	836	<0.000050	<0.0010	<0.0050	0.00311	0.00118	0.0012	<0.00050
WQ3-1	VA24B7397-001	2024-07-17	M	0.136	1170	0.00105	<0.0000050		0.00889	<0.00050	0.091	355	<0.00050	1.4	<0.00010	9130	6.19	903	<0.000050	<0.0010	<0.0050	0.00317	0.00130	0.0012	<0.00050
WQ3-1	L2756689-1	2024-07-17	M																						
WQ3-1	L2757122-1	2024-08-21	M																						
WQ3-1	VA24C1337-001	2024-08-21	M	0.152	1140	0.00243	<0.0000050		0.00833	<0.00050	0.090	346	<0.00050	1.6	<0.00010	8500	5.84	889	<0.000050	<0.0010	<0.0050	0.00279	0.00131	0.0017	<0.00050
WQ3-1	VA24C4683-001	2024-09-18	M	0.170	1020	0.00306	<0.0000050		0.00912	<0.00050	0.092	305	0.00126	1.2	<0.00010	8110	6.14	850	<0.000050	<0.0010	<0.0050	0.00283	0.00118	0.0019	<0.00050
WQ3-1	VA24C8569-001	2024-10-23	M	0.146	1230	0.00377	<0.0000050		0.00872	<0.00050	0.087	350	<0.00050	1.4	<0.00010	9280	6.16	801	<0.000050	<0.0010	<0.0050	0.00290	0.00116	<0.0010	<0.00050
WQ3-1	L2757977-1	2024-10-30	M																						
WQ3-1	VA24C9414-001	2024-10-30	M	0.140	1180	0.00345	<0.0000050		0.00977	<0.00050	0.096	339	0.00076	1.6	<0.00010	8680	6.43	811	<0.000050	<0.0010	<0.0050	0.00278	0.00148	0.0010	<0.00050
WQ3-1	VA24D0180-001	2024-11-06	M	0.134	1120	0.00699	<0.0000050		0.00888	<0.00050	0.084	340	<0.00050	1.5	<0.00010	8740	6.16	795	<0.000050	<0.0010	<0.0050	0.00283	0.00144	<0.0010	<0.00050
WQ3-1	VA24D0813-001	2024-11-13	M	0.138	1090	0.00837	<0.0000050		0.00848	<0.00050	0.086	315	0.00090	1.6	<0.00010	7840	5.76	800	<0.000050	<0.0010	<0.0050	0.00251	0.00133	0.0023	<0.00050
WQ3-1	L2758221-1	2024-11-22	M																						
WQ3-1	VA24D1791-001	2024-11-22	M	0.191	1160	0.00818	<0.0000050		0.00889	0.00056	0.097	347	<0.00050	1.8	<0.00010	8780	6.47	957	<0.000050	<0.0010	<0.0050	0.00224	0.00146	<0.0010	<0.00050
WQ3-1	L2758486-1	2024-12-18	M																						
WQ3-1	VA24D3937-001	2024-12-18	M	0.157	829	0.00258	<0.0000050		0.00925	<0.00050	0.074	303	<0.00050	1.0	<0.00010	6060	6.57	610	<0.000050	<0.0010	<0.0050	0.00204	0.00146	0.0028	<0.00050
WQ3-1	L2758770-1	2025-01-22	M																						
WQ3-1	VA25A1525-001	2025-01-22	M	0.139	934	0.00154	<0.0000050		0.00874	<0.00050	0.095	323	<0.00050	1.7	<0.00010	6960	5.92	798	<0.000050	<0.0010	<0.0050	0.00272	0.00132	0.0021	<0.00050
WQ3-1	L2759008-1	2025-02-19	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	VA25A3570-001	2025-02-19	M	0.137	1510	0.00109	<0.0000050		0.00797	<0.00050	0.078	334	<0.00050	3.6	<0.00010	10200	6.29	756	<0.000050	<0.0010	<0.0050	0.00240	0.00127	0.0029	<0.00050
WQ3-1	VA25A6679-001	2025-03-26	M	0.168	1540	0.00246	<0.0000050		0.00964	<0.00050	0.080	388	<0.00050	1.3	<0.00010	11500	6.80	734	<0.000050	<0.0010	<0.0050	0.00270	0.00142	0.0015	<0.00050
WQ3-1	VA25A9109-001	2025-04-23	M	0.152	1170	0.00100	<0.0000050		0.00934	<0.00050	0.078	299	<0.00050	1.4	<0.00010	8600	6.07	761	<0.000050	<0.0010	<0.0050	0.00234	0.00146	<0.0010	<0.00050
WQ3-1	VA25A9941-001	2025-05-01	M	0.147	1310	0.00081	<0.0000050		0.00872	<0.00050	0.073	309	<0.00050	1.2	<0.00010	9820	6.13	715	<0.000050	<0.0010	<0.0050	0.00251	0.00142	0.0010	<0.00050
WQ3-1	VA25B0496-001	2025-05-07	M	0.193	1340	0.00092	<0.0000050		0.00955	<0.00050	0.050	338	<0.00050	1.6	<0.00010	10000	6.91	803	<0.000050	<0.0010	<0.0050	0.00265	0.00157	0.0011	<0.00050
WQ3-1	VA25B1530-001	2025-05-16	M	0.151	1160	0.00124	<0.0000050		0.00935	0.00057	0.091	318	<0.00050	1.5	<0.00010	10200	6.09	781	<0.000050	<0.0010	<0.0050	0.00266	0.00154	0.0031	<0.00050
WQ3-1	VA25B1841-001	2025-05-21	M	0.150	1320	0.00146	<0.0000050		0.00939	<0.00050	0.100	357	<0.00050	1.9	<0.00010	9980	6.89	1010	<0.000050	<0.0010	<0.0050	0.00270	0.00159	0.0014	<0.00050
WQ3-2	0051710-06	2020-05-20	M																						<0.0005
WQ3-2	0062209-06	2020-06-22	M																						<0.0005
WQ3-2	0071996-06	2020-07-21	M																						<0.0005
WQ3-2	0082292-06	2020-08-24	M																						<0.0005
WQ3-2	0093017-06	2020-09-28	M																						<0.0005
WQ3-2	20J1961-06	2020-10-20	M																						<0.0005
WQ3-2	20J2778-06	2020-10-27	M																						<0.0005
WQ3-2	20K0360-06	2020-11-03	M																						<0.0005
WQ3-2	20K1261-06	2020-11-10	M																						<0.0005
WQ3-2	20K2100-06	2020-11-18	M																						<0.0005
WQ3-2	20L1589-06	2020-12-14	M																						<0.0005
WQ3-2	21A2590-06	2021-01-27	M																						<0.0005
WQ3-2	21B2778-06	2021-02-25	M																						<0.0005
WQ3-2	21C3505-06	2021-03-25	M																						<0.0005
WQ3-2	21D2478-06	2021-04-22	M																						<0.0005
WQ3-2	21E1990-06	2021-05-18	M																						<0.0005
WQ3-2	21E2917-06	2021-05-26	M																						<0.0005
WQ3-2	21F0167-06	2021-06-01	M																						<0.0005
WQ3-2	21F1056-06	2021-06-08	M																						<0.0005
WQ3-2	21F2014-06	2021-06-15	M																						<0.0005
WQ3-2	21G2414-06	2021-07-20	M																						<0.0005
WQ3-2	21H3040-06	2021-08-25	M																						<0.0005
WQ3-2	21I3814-06	2021-09-28	M																						<0.0005
WQ3-2	21J3514-06	2021-10-26	M																						<0.0005
WQ3-2	21K3046-06	2021-11-23	M																						<0.0005
WQ3-2	21L2125-06	2021-12-14	M																						<0.0005
WQ3-2	22A2312-06	2022-01-20	M																						<0.0005
WQ3-2	22B2487-06	2022-02-17	M	0.126	976	0.00376	<0.000010		0.00841	<0.00080	<0.100	282	0.0025	<2.0	<0.000100	7390	5.33	685	<0.000040	0.00057	<0.0100	0.00227	<0.0020	<0.0080	<0.0005
WQ3-2	22C3145-06	2022-03-22	M	0.125	946	0.00146	<0.000010		0.00808	<0.00080	<0.100	282	<0.00100	<2.0	<0.000100	7010	5.19	640	<0.000040	<0.00040	<0.0100	0.00218	0.0028	<0.0080	<0.0005
WQ3-2	22D2212-05	2022-04-19	M	0.15	1070	0.00161	<0.000010		0.00856	<0.00080	<0.100	316	<0.00100	<2.0	<0.000100	8610	5.82	735	0.000052	<0.00040	<0.0100	0.00222	<0.0100	<0.0080	<0.0005
WQ3-2	22E2480-08	2022-05-17	M	0.0409	361	0.00682	<0.000010		0.00226	<0.00400	<0.500	99	<0.00500	<10.0	<0.000500	2480	2.16	276	<0.000200	<0.00200	<0.0500	0.000925	<0.0500	<0.0400	<0.0005
WQ3-2	22F3212-06	2022-06-21	M	0.0157	101	0.00439	<0.000010		0.00113	<0.000400	<0.1	32	<0.00100	1.66	<0.000100	823	0.618	79.6	<0.0000400	<0.000500	<0.00200	0.000316	<0.0100	<0.0100	<0.0005
WQ3-2	22G1763-06	2022-07-13	M	0.0209	158	0.00353	<0.000010		0.00144	<0.000400	<0.1	49.2	<0.00100	1.21	<0.000100	1340	0.929	113	<0.0000400	<0.000500	<0.00200	0.000395	<0.0100	<0.0100	<0.0005
WQ3-2	22H2453-06	2022-08-16	M	0.0138	90.9	0.00562	<0.000010		0.00119	<0.000400	<0.100	28.8	<0.00100	1.61	<0.000100	751	0.550	68.5	<0.0000400	<0.000500	<0.00200	0.000224	<0.0100	<0.0100	<0.0005
WQ3-2	22I1926-06	2022-09-14	M	0.0873	679	0.00504	<0.000010		0.00600	0.000672	<0.100	204	<0.00100	1.41	<0.000100	5480	4.23	514	<0.0000400	<0.000500	<0.00200	0.00165	<0.0100	<0.0100	<0.0005
WQ3-2	22J1560-08	2022-10-12	M	0.138	953	0.00291	<0.000010		0.00803	<0.000400	<0.1	266	<0.00100	<1	<0.000100	7040	5.53	634	<0.0000400	<0.000500	<0.00200	0.00214	<0.0100	<0.0100	<0.0005
WQ3-2	22K1453-06	2022-11-10	M	0.16	1130	0.0141	<0.000010		0.00914	0.000625	<0.1	343	<0.00100	2.3	<0.000100	9000	6.18	858	<0.0000400	<0.000500	<0.00200	0.00268	<0.0100	<0.0100	<0.0005
WQ3-2	22L0774-06	2022-12-07	M	0.176	1140	0.0296	<0.000010		0.00965	<0.000400	<0.1	348	<0.00100	2.2	<0.000100	9320	6.39	831	<0.0000400	<0.000500	<0.00200	0.00269	<0.0100	<0.0100	<0.0005
WQ3-2	23A2847-06	2023-01-27	M	0.132	977	0.00821	<0.000010		0.00811	0.000969	<0.1	299	<0.00100	2.2	<0.000100	7970	5.8	747	<0.0000400	<0.000500	<0.00200	0.00238	<0.0100	<0.0100	<0.0005
WQ3-2	23C0060-06	2023-02-28	M	0.114	1080	0.00562	<0.000010		0.00885	0.000411	<0.1	334	<0.00100	2.37	<0.000100	8760	6.02	847	<0.0000400	<0.000500	<0.00200	0.00241	<0.0100	<0.0100	<0.0005
WQ3-2	23C1797-06	2023-03-15	M	0.148	1120	0.00474	<0.000010		0.00917	<0.000400	<0.1	331	<0.00100	1.91	<0.000100	8360	6.05	822	<0.0000400	<0.000500	<0.00200	0.00248	<0.0100	<0.0100	<0.0005
WQ3-2	23D2945-06	2023-04-26	M	0.0902	701	0.00335	<0.000010		0.00641	<0.000400	<0.1	230	<0.00100	1.07	0.000123	5620	4.14	526	<0.0000400	<0.000500	<0.00200	0.00187	<0.0100	<0.0100	<0.0005
WQ3-2	23E2392-06	2023-05-17	M	0.00967	81.2	0.00482	<0.000010		0.000819	0.000128	<0.01	25.3	<0.00010	1.41	<0.000010	661	0.503	60.7	0.0000046	<0.000050	0.00031	0.000254	<0.00100	<0.0010	<0.0005
WQ3-2	23F3614-06	2023-06-27	M	0.0169	117	0.00443	<0.000010		0.00128	<0.000400	<0.1	35.5	<0.00100	1.39	<0.000100	935	0.685	85.8	<0.0000400	<0.000500	<0.00200	0.000312	<0.0100	<0.0100	<0.0005
WQ3-2	23G2415-06	2023-07-19	M	0.0225	153	0.00792	<0.000010		0.00160	<0.000400	<0.1	49.3	<0.00100	1.43	<0.000100	1240	0.941	114	<0.0000400	<0.000500	<0.00200	0.000388	<0.0100	<0.0100	<0.0005
WQ3-2	23H3309-08	2023-08-24	M	0.113	828	0.00404	<0.000010		0.00721	0.000453	<0.1	269	<0.00100	<1	<0.000100	6740	5.13	643	<0.0000400	<0.000500	<0.00200	0.00201	<0.0100	<0.0100	<0.0005

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-2	23I2271-08	2023-09-19	M	0.0832	587	0.00416	<0.000010		0.00557	<0.000400	<0.1	182	<0.00100	<1	<0.000100	4800	3.56	466	<0.0000400	<0.000500	<0.00200	0.00150	<0.0100	<0.0100	<0.0005
WQ3-2	23J2236-08	2023-10-18	M	0.0425	324	0.00583	<0.000010		0.00305	<0.000400	0.15	100	<0.00100	1.42	<0.000100	2580	1.9	242	<0.0000400	<0.000500	<0.00200	0.000968	<0.00400	<0.0100	
WQ3-2	23K1909-06	2023-11-15	M	0.0566	411	0.00965	<0.000010		0.00380	<0.000400	<0.1	127	<0.00100	3.03	<0.000100	3480	2.47	325	<0.0000400	<0.000500	<0.00200	0.000965	<0.00400	<0.0100	<0.0005
WQ3-2	23L2091-02	2023-12-15	M	0.116	912	0.00871	<0.000010		0.00793	0.00169	<0.1	278	<0.00100	2	<0.000100	7700	5.24	671	<0.0000400	<0.000500	<0.00200	0.00219	<0.00400	<0.0100	<0.0005
WQ3-2	L2754366-2	2024-01-24	M																						
WQ3-2	VA24A1422-002	2024-01-24	M	0.154	1120	0.00246	<0.0000050		0.00966	<0.00050	0.077	338	<0.00050	1.9	<0.00010	9150	6.68	764	<0.000050	<0.0010	<0.0050	0.00259	0.00147	<0.0010	<0.00050
WQ3-2	L2754604-2	2024-02-14	M																						
WQ3-2	VA24A2995-002	2024-02-14	M	0.118	695	0.00765	<0.0000050		0.00670	<0.00050	0.056	216	<0.00050	2.4	<0.00010	6260	4.70	589	<0.000050	<0.0010	<0.0050	0.00187	0.00119	<0.0010	<0.00050
WQ3-2	L2755043-2	2024-03-21	M																						
WQ3-2	VA24A6026-002	2024-03-21	M	0.081	617	0.00488	<0.0000050		0.00528	<0.00050	<0.050	187	<0.00050	1.7	<0.00010	5260	3.62	465	<0.000050	<0.0010	<0.0050	0.00168	0.00096	<0.0010	<0.00050
WQ3-2	L2755490-2	2024-04-24	M																						
WQ3-2	VA24A8916-002	2024-04-24	M	0.118	913	0.00224	<0.0000050		0.00750	<0.00050	<0.050	259	<0.00050	<1.0	<0.00010	7360	5.10	676	<0.000050	<0.0010	<0.0050	0.00216	0.00106	<0.0010	<0.00050
WQ3-2	L2755567-2	2024-05-01	M																						
WQ3-2	VA24A9566-002	2024-05-01	M	0.109	906	0.00259	<0.0000050		0.00691	<0.00050	<0.050	256	<0.00050	<1.0	<0.00010	6820	4.73	615	<0.000050	<0.0010	<0.0050	0.00198	0.00103	<0.0010	<0.00050
WQ3-2	L2755666-2	2024-05-08	M																						
WQ3-2	VA24B0201-002	2024-05-08	M	0.034	232	0.00554	<0.0000050		0.00250	<0.00050	<0.050	74.4	<0.00050	1.8	<0.00010	2040	1.50	181	<0.000050	<0.0010	<0.0050	0.000650	0.00056	<0.0010	<0.00050
WQ3-2	L2755779-2	2024-05-15	M																						
WQ3-2	VA24B0901-002	2024-05-15	M	0.062	423	0.00465	<0.0000050		0.00373	<0.00050	<0.050	125	<0.00050	1.3	<0.00010	3340	2.54	319	<0.000050	<0.0010	<0.0050	0.00111	0.00070	<0.0010	<0.00050
WQ3-2	L2755888-2	2024-05-22	M																						
WQ3-2	VA24B1500-002	2024-05-22	M	0.026	193	0.00505	<0.0000050		0.00176	<0.00050	<0.050	55.2	<0.00050	2.0	<0.00010	1550	1.10	134	<0.000050	<0.0010	<0.0050	0.000478	0.00053	<0.0010	<0.00050
WQ3-2	L2756312-2	2024-06-19	M																						
WQ3-2	VA24B4510-002	2024-06-19	M	0.032	253	0.00597	<0.0000050		0.00188	<0.00050	<0.050	72.6	<0.00050	<1.0	<0.00010	<2.5	1.12	169	<0.000050	<0.0010	<0.0050	0.000621	0.00051	<0.0010	<0.00050
WQ3-2	VA24B7397-002	2024-07-17	M	0.032	259	0.00452	<0.0000050		0.00233	<0.00050	<0.050	75.6	<0.00050	1.2	<0.00010	2100	1.41	200	<0.000050	<0.0010	<0.0050	0.000663	0.00056	<0.0010	<0.00050
WQ3-2	L2756689-2	2024-07-17	M																						
WQ3-2	L2757122-2	2024-08-21	M																						
WQ3-2	VA24C1337-002	2024-08-21	M	0.033	255	0.00538	<0.0000050		0.00200	<0.00050	<0.050	73.0	<0.00050	1.2	<0.00010	1780	1.19	191	<0.000050	<0.0010	<0.0050	0.000628	0.00052	0.0011	<0.00050
WQ3-2	VA24C4683-002	2024-09-18	M	0.076	670	0.00736	<0.0000050		0.00499	<0.00050	<0.050	186	<0.00050	<1.0	<0.00010	4850	3.20	467	<0.000050	<0.0010	<0.0050	0.00151	0.00083	0.0014	<0.00050
WQ3-2	VA24C8569-002	2024-10-23	M	0.079	700	0.00646	<0.0000050		0.00504	<0.00050	<0.050	209	0.00122	1.4	<0.00010	5120	3.49	469	<0.000050	<0.0010	<0.0050	0.00169	0.00082	<0.0010	<0.00050
WQ3-2	L2757977-2	2024-10-30	M																						
WQ3-2	VA24C9414-002	2024-10-30	M	0.098	827	0.00488	<0.0000050		0.00680	<0.00050	0.057	238	0.00062	1.6	<0.00010	6070	4.48	584	<0.000050	<0.0010	<0.0050	0.00197	0.00117	0.0010	<0.00050
WQ3-2	VA24D0180-002	2024-11-06	M	0.104	880	0.00418	<0.0000050		0.00717	<0.00050	0.057	272	0.00076	1.4	<0.00010	6680	4.84	646	<0.000050	<0.0010	<0.0050	0.00224	0.00122	<0.0010	<0.00050
WQ3-2	VA24D0813-002	2024-11-13	M	0.062	485	0.00464	<0.0000050		0.00401	<0.00050	<0.050	140	0.00066	2.0	<0.00010	3550	2.55	359	<0.000050	<0.0010	<0.0050	0.00117	0.00080	0.0018	<0.00050
WQ3-2	L2758221-2	2024-11-22	M																						
WQ3-2	VA24D1791-002	2024-11-22	M	0.135	832	0.00792	<0.0000050		0.00681	<0.00050	0.066	244	<0.00050	2.4	<0.00010	6320	4.62	685	<0.000050	<0.0010	<0.0050	0.00177	0.00120	<0.0010	<0.00050
WQ3-2	L2758486-2	2024-12-18	M																						
WQ3-2	VA24D3937-002	2024-12-18	M	0.110	653	0.00440	<0.0000050		0.00690	<0.00050	0.055	231	<0.00050	1.2	<0.00010	4740	4.82	456	<0.000050	<0.0010	<0.0050	0.00166	0.00118	0.0012	<0.00050
WQ3-2	L2758770-2	2025-01-22	M																						
WQ3-2	VA25A1525-002	2025-01-22	M	0.100	640	0.00610	<0.0000050		0.00638	<0.00050	0.066	239	<0.00050	2.3	<0.00010	4640	4.49	560	<0.000050	<0.0010	<0.0050	0.00198	0.00108	0.0022	<0.00050
WQ3-2	L2759008-2	2025-02-19	M																						
WQ3-2	VA25A3570-002	2025-02-19	M	0.113	1090	0.00724	<0.0000050		0.00651	<0.00050	<0.050	251	<0.00050	4.1	<0.00010	7420	5.09	509	<0.000050	<0.0010	<0.0050	0.00184	0.00106	0.0019	<0.00050
WQ3-2	VA25A6679-002	2025-03-26	M	0.102	885	0.00292	<0.0000050		0.00642	<0.00050	<0.050	249	<0.00050	<1.0	<0.00010	6780	4.34	423	<0.000050	<0.0010	<0.0050	0.00171	0.00094	<0.0010	<0.00050
WQ3-2	VA25A9109-002	2025-04-23	M	0.114	932	0.00179	<0.0000050		0.00752	<0.00050	<0.050	240	0.00052	<1.0	<0.00010	6910	4.89	614	<0.000050	<0.0010	<0.0050	0.00196	<0.00050	<0.0010	<0.00050
WQ3-2	VA25A9941-002	2025-05-01	M	0.024	188	0.00451	<0.0000050		0.00195	<0.00050	<0.050	56.8	<0.00050	2.0	<0.00010	1580	1.13	141	<0.000050	<0.0010	<0.0050	0.000488	<0.00050	<0.0010	<0.00050
WQ3-2	VA25B0496-002	2025-05-07	M	0.060	389	0.00502	<0.0000050		0.00317	<0.00050	<0.050	103	<0.00050	1.6	<0.00010	2930	2.14	242	<0.000050	<0.0010	<0.0050	0.000926	0.00064	0.0013	<0.00050
WQ3-2	VA25B1530-002	2025-05-16	M	0.030	201	0.00402	<0.0000050		0.00230	<0.00050	<0.050	61.2	<0.00050	1.7	<0.00010	1800	1.24	154	<0.000050	<0.0010	<0.0050	0.000572	<0.00050	0.0019	<0.00050
WQ3-2	VA25B1841-002	2025-05-21	M	0.027	209	0.00408	<0.0000050		0.00206	<0.00050	<0.050	63.4	<0.00050	2.0	<0.00010	1640	1.25	184	<0.000050	<0.0010	<0.0050	0.000529	0.00051	0.0015	<0.00050
WQ3-3	23L2091-03	2023-12-15	M	0.115	878	0.00889	<0.000010		0.00785	0.000575	<0.1	268	<0.00100	1.97	<0.000100	7420	5.11	619	<0.0000400	<0.000500	<0.00200	0.00220	<0.00400	<0.0100	<0.0005
WQ3-3	L2754366-3	2024-01-24	M																						
WQ3-3	VA24A1422-003	2024-01-24	M	0.068	496	0.00718	<0.0000050		0.00421	<0.00050	<0.050	144	<0.00050	2.9	<0.00010	3970	2.83	333	<0.000050	<0.0010	<0.0050	0.00124	0.00088	<0.0010	<0.00050
WQ3-3	L2754604-3	2024-02-14	M																						
WQ3-3	VA24A2995-003	2024-02-14	M	0.109	637	0.00720	<0.0000050		0.00667	<0.00050	0.052	204	<0.00050	2.4	<0.00010	5940	4.51	545	<0.000050	<0.0010	<0.0050	0.00180	0.00114	<0.0010	<0.00050
WQ3-3	L2755043-3	2024-03-21	M																						
WQ3-3	VA24A6026-003	2024-03-21	M	0.027	204	0.00884	<0.0000050		0.00195	<0.00050	<0.050	59.2	<0.00050	2.9	<0.00010	1450	1.10	147	<0.000050	<0.0010	<0.0050	0.000542	0.00061	<0.0010	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-3	L2755490-3	2024-04-24	M																						
WQ3-3	VA24A8916-003	2024-04-24	M	0.097	761	0.00338	<0.0000050		0.00608	<0.00050	<0.050	209	<0.00050	<1.0	<0.00010	5750	4.11	548	<0.000050	<0.0010	<0.0050	0.00178	0.00093	<0.0010	<0.00050
WQ3-3	L2755567-3	2024-05-01	M																						
WQ3-3	VA24A9566-003	2024-05-01	M	0.027	212	0.00861	<0.0000050		0.00209	<0.00050	<0.050	58.0	<0.00050	2.8	<0.00010	1570	1.19	144	<0.000050	<0.0010	<0.0050	0.000493	0.00056	<0.0010	<0.00050
WQ3-3	L2755666-3	2024-05-08	M																						
WQ3-3	VA24B0201-003	2024-05-08	M	0.032	230	0.00579	<0.0000050		0.00229	<0.00050	<0.050	70.4	<0.00050	2.0	<0.00010	1840	1.38	172	<0.000050	<0.0010	<0.0050	0.000644	0.00052	<0.0010	<0.00050
WQ3-3	L2755779-3	2024-05-15	M																						
WQ3-3	VA24B0901-003	2024-05-15	M	0.040	273	0.00478	<0.0000050		0.00264	<0.00050	<0.050	81.3	<0.00050	1.5	<0.00010	2180	1.67	204	<0.000050	<0.0010	<0.0050	0.000775	0.00056	<0.0010	<0.00050
WQ3-3	L2755888-3	2024-05-22	M																						
WQ3-3	VA24B1500-003	2024-05-22	M	0.021	154	0.00480	<0.0000050		0.00176	<0.00050	<0.050	47.2	<0.00050	1.9	<0.00010	1400	0.965	120	<0.000050	<0.0010	<0.0050	0.000515	<0.00050	<0.0010	<0.00050
WQ3-3	L2756312-3	2024-06-19	M																						
WQ3-3	VA24B4510-003	2024-06-19	M	<0.020	34.1	0.00552	<0.0000050		0.00072	<0.00050	<0.050	10.4	<0.00050	1.8	<0.00010	298	0.228	25.8	<0.000050	<0.0010	<0.0050	0.000128	0.00053	0.0020	<0.00050
WQ3-3	VA24B7397-003	2024-07-17	M	<0.020	51.1	0.00448	<0.0000050		0.00062	<0.00050	<0.050	15.2	<0.00050	1.4	<0.00010	429	0.260	37.5	<0.000050	<0.0010	<0.0050	0.000180	<0.00050	0.0012	<0.00050
WQ3-3	L2756689-3	2024-07-17	M																						
WQ3-3	L2757122-3	2024-08-21	M																						
WQ3-3	VA24C1337-003	2024-08-21	M	0.026	236	0.00591	<0.0000050		0.00146	<0.00050	<0.050	66.9	<0.00050	1.4	<0.00010	1420	0.931	144	<0.000050	<0.0010	<0.0050	0.000471	<0.00050	<0.0010	<0.00050
WQ3-3	VA24C4683-003	2024-09-18	M	0.028	228	0.00965	<0.0000050		0.00186	<0.00050	<0.050	60.3	<0.00050	1.8	<0.00010	1660	1.07	154	<0.000050	<0.0010	<0.0050	0.000484	0.00058	<0.0010	<0.00050
WQ3-3	VA24C8569-003	2024-10-23	M	0.064	566	0.00733	<0.0000050		0.00431	<0.00050	<0.050	166	0.00159	1.6	<0.00010	4230	2.86	371	<0.000050	<0.0010	<0.0050	0.00135	0.00072	<0.0010	<0.00050
WQ3-3	L2757977-3	2024-10-30	M																						
WQ3-3	VA24C9414-003	2024-10-30	M	<0.020	160	0.00662	<0.0000050		0.00159	<0.00050	<0.050	47.5	<0.00050	2.5	<0.00010	1180	0.897	116	<0.000050	<0.0010	<0.0050	0.000493	0.00058	<0.0010	<0.00050
WQ3-3	VA24D0180-003	2024-11-06	M	0.040	341	0.00872	<0.0000050		0.00279	<0.00050	<0.050	107	<0.00050	2.3	<0.00010	2600	1.84	238	<0.000050	<0.0010	<0.0050	0.000966	0.00069	<0.0010	<0.00050
WQ3-3	VA24D0813-003	2024-11-13	M	0.026	197	0.00397	<0.0000050		0.00172	<0.00050	<0.050	57.0	<0.00050	2.0	<0.00010	1450	1.02	140	<0.000050	<0.0010	<0.0050	0.000578	<0.00050	0.0013	<0.00050
WQ3-3	L2758221-3	2024-11-22	M																						
WQ3-3	VA24D1791-003	2024-11-22	M	0.110	733	0.00854	<0.0000050		0.00642	<0.00050	0.060	216	<0.00050	2.5	<0.00010	5520	4.19	627	<0.000050	<0.0010	<0.0050	0.00154	0.00112	<0.0010	<0.00050
WQ3-3	L2758486-3	2024-12-18	M																						
WQ3-3	VA24D3937-003	2024-12-18	M	0.086	531	0.00472	<0.0000050		0.00467	<0.00050	<0.050	158	<0.00050	1.6	<0.00010	3670	3.22	374	<0.000050	<0.0010	<0.0050	0.00125	0.00083	0.0025	<0.00050
WQ3-3	L2758770-3	2025-01-22	M																						
WQ3-3	VA25A1525-003	2025-01-22	M	0.099	601	0.00624	<0.0000050		0.00637	<0.00050	0.063	229	0.00069	2.3	<0.00010	4570	4.37	531	<0.000050	<0.0010	<0.0050	0.00199	0.00102	0.0023	<0.00050
WQ3-3	L2759008-3	2025-02-19	M																						
WQ3-3	VA25A3570-003	2025-02-19	M	0.114	1250	0.00784	<0.0000050		0.00640	<0.00050	<0.050	280	<0.00050	4.1	<0.00010	8580	4.94	522	<0.000050	<0.0010	<0.0050	0.00186	0.00108	0.0028	<0.00050
WQ3-3	VA25A6679-003	2025-03-26	M	0.071	576	0.00455	<0.0000050		0.00432	<0.00050	<0.050	163	<0.00050	<1.0	<0.00010	4290	2.83	280	<0.000050	<0.0010	<0.0050	0.00117	0.00067	<0.0010	<0.00050
WQ3-3	VA25A9109-003	2025-04-23	M	<0.020	152	0.00514	<0.0000050		0.00162	<0.00050	<0.050	41.9	<0.00050	2.4	<0.00010	1210	0.880	111	<0.000050	<0.0010	<0.0050	0.000476	<0.00050	<0.0010	<0.00050
WQ3-3	VA25A9941-003	2025-05-01	M	0.023	177	0.00465	<0.0000050		0.00169	<0.00050	<0.050	52.8	<0.00050	2.0	<0.00010	1510	1.03	127	<0.000050	<0.0010	<0.0050	0.000501	<0.00050	<0.0010	<0.00050
WQ3-3	VA25B0496-003	2025-05-07	M	0.032	209	0.00479	<0.0000050		0.00201	<0.00050	<0.050	56.3	<0.00050	1.9	<0.00010	1570	1.19	134	<0.000050	<0.0010	<0.0050	0.000542	<0.00050	0.0022	<0.00050
WQ3-3	VA25B1530-003	2025-05-16	M	<0.020	108	0.00389	<0.0000050		0.00141	<0.00050	<0.050	34.1	<0.00050	1.8	<0.00010	990	0.711	89.2	<0.000050	<0.0010	<0.0050	0.000367	<0.00050	0.0013	<0.00050
WQ3-3	VA25B1841-003	2025-05-21	M	<0.020	56.0	0.00397	<0.0000050		0.00087	<0.00050	<0.050	16.7	<0.00050	2.7	<0.00010	445	0.351	54.5	<0.000050	<0.0010	<0.0050	0.000205	<0.00050	0.0019	<0.00050
WQ4-1	0051710-07	2020-05-20	M																						<0.0005
WQ4-1	0062209-07	2020-06-22	M																						<0.0005
WQ4-1	0071996-07	2020-07-21	M																						<0.0005
WQ4-1	0082292-07	2020-08-24	M																						<0.0005
WQ4-1	0093017-07	2020-09-28	M																						<0.0005
WQ4-1	20J1961-07	2020-10-20	M																						<0.0005
WQ4-1	20J2778-07	2020-10-27	M																						<0.0005
WQ4-1	20K0360-07	2020-11-03	M																						<0.0005
WQ4-1	20K1261-07	2020-11-10	M																						<0.0005
WQ4-1	20K2100-07	2020-11-18	M																						<0.0005
WQ4-1	20L1589-07	2020-12-14	M																						<0.0005
WQ4-1	21A2590-07	2021-01-27	M																						<0.0005
WQ4-1	21B2778-07	2021-02-25	M																						<0.0005
WQ4-1	21C3505-07	2021-03-25	M																						<0.0005
WQ4-1	21D2478-07	2021-04-22	M																						<0.0005
WQ4-1	21E1990-07	2021-05-18	M																						<0.0005
WQ4-1	21E2917-07	2021-05-26	M																						<0.0005

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	21F0167-07	2021-06-01	M																						<0.0005
WQ4-1	21F1056-07	2021-06-08	M																						<0.0005
WQ4-1	21F2014-07	2021-06-15	M																						<0.0005
WQ4-1	21G2414-07	2021-07-20	M																						<0.0005
WQ4-1	21H3040-07	2021-08-25	M																						<0.0005
WQ4-1	21I3814-07	2021-09-28	M																						<0.0005
WQ4-1	21J3514-07	2021-10-26	M																						<0.0005
WQ4-1	21K3046-07	2021-11-23	M																						<0.0005
WQ4-1	21L2125-07	2021-12-14	M																						<0.0005
WQ4-1	22A2312-07	2022-01-20	M																						<0.0005
WQ4-1	22B2487-07	2022-02-17	M	0.149	1140	0.00126	<0.000010		0.0094	<0.00080	<0.100	328	0.0029	<2.0	<0.000100	8660	6.13	789	<0.000040	<0.00040	<0.0100	0.0026	<0.0020	<0.0080	<0.0005
WQ4-1	22C3145-07	2022-03-22	M	0.144	1150	0.00105	<0.000010		0.00948	<0.00080	<0.100	334	<0.00100	<2.0	<0.000100	8430	6.26	744	<0.000040	<0.00040	<0.0100	0.00256	0.0027	<0.0080	<0.0005
WQ4-1	22D2212-12	2022-04-20	M	0.158	1200	0.0008	<0.000010		0.00967	<0.00080	0.119	364	<0.00100	<2.0	<0.000100	9730	6.6	813	0.000084	<0.00040	<0.0100	0.00251	<0.0100	<0.0080	<0.0005
WQ4-1	22E2480-09	2022-05-17	M	0.111	1110	<0.00200	<0.000010		0.0103	<0.00400	<0.500	418	<0.00500	<10.0	<0.000500	9800	7.28	906	<0.000200	<0.00200	<0.0500	0.00257	<0.0500	<0.0400	<0.0005
WQ4-1	22F3212-07	2022-06-21	M	0.146	1100	0.00294	<0.000010		0.00903	<0.000400	<0.1	318	<0.00100	<1	<0.000100	7910	6.18	797	<0.0000400	<0.000500	<0.00200	0.00258	<0.0100	<0.0100	<0.0005
WQ4-1	22G1763-07	2022-07-13	M	0.134	1160	0.00332	<0.000010		0.00974	<0.000400	<0.1	350	<0.00100	1.3	<0.000100	9670	7.05	815	<0.0000400	<0.000500	<0.00200	0.00257	<0.0100	<0.0100	<0.0005
WQ4-1	22H2453-07	2022-08-16	M	0.163	1130	0.00342	<0.000010		0.00997	<0.000400	<0.100	388	<0.00100	1.51	<0.000100	9500	7.65	944	<0.0000400	<0.000500	<0.00200	0.00263	<0.0100	<0.0100	<0.0005
WQ4-1	22I1926-07	2022-09-14	M	0.151	1080	0.00208	<0.000010		0.00945	0.000827	<0.100	326	<0.00100	1.34	<0.000100	8770	6.68	816	<0.0000400	<0.000500	<0.00200	0.00262	<0.0100	<0.0100	<0.0005
WQ4-1	22J1560-09	2022-10-12	M	0.158	1090	0.00275	<0.000010		0.00937	<0.000400	<0.1	307	<0.00100	1.13	<0.000100	8080	6.53	721	<0.0000400	<0.000500	<0.00200	0.00250	<0.0100	<0.0100	<0.0005
WQ4-1	22K1453-07	2022-11-10	M	0.185	1310	0.0149	<0.000010		0.0103	0.000677	0.121	398	<0.00100	2.21	<0.000100	10600	7.02	980	<0.0000400	<0.000500	<0.00200	0.00309	<0.0100	<0.0100	<0.0005
WQ4-1	22L0774-07	2022-12-07	M	0.161	1200	0.0311	<0.000010		0.0101	0.000472	0.123	368	<0.00100	1.91	<0.000100	9300	7.01	921	<0.0000400	<0.000500	<0.00200	0.00298	<0.0100	<0.0100	<0.0005
WQ4-1	23A2847-07	2023-01-27	M	0.152	1180	0.00885	<0.000010		0.0101	0.000865	<0.1	361	<0.00100	1.78	<0.000100	9760	7.04	899	<0.0000400	<0.000500	<0.00200	0.00290	<0.0100	<0.0100	<0.0005
WQ4-1	23C0060-07	2023-02-28	M	0.133	1290	0.00212	<0.000010		0.0102	0.000565	<0.1	404	<0.00100	1.93	<0.000100	10400	7.12	996	<0.0000400	<0.000500	<0.00200	0.00274	<0.0100	<0.0100	<0.0005
WQ4-1	23C1797-07	2023-03-15	M	0.162	1180	0.000965	<0.000010		0.00991	<0.000400	0.113	363	<0.00100	1.67	<0.000100	8600	6.71	886	<0.0000400	<0.000500	<0.00200	0.00286	<0.0100	<0.0100	<0.0005
WQ4-1	23D2945-07	2023-04-26	M	0.148	1190	0.00102	<0.000010		0.0101	0.000515	<0.1	382	<0.00100	1.44	0.000128	9610	6.93	891	<0.0000400	<0.000500	<0.00200	0.00300	<0.0100	<0.0100	<0.0005
WQ4-1	23E2392-07	2023-05-17	M	0.122	1250	0.00159	<0.000010		0.0108	0.000473	0.115	384	<0.00100	1.67	0.000115	10300	7.47	955	<0.0000400	<0.000500	<0.00200	0.00282	<0.0100	<0.0100	<0.0005
WQ4-1	23F3614-07	2023-06-27	M	0.15	1120	0.00294	<0.000010		0.0101	0.000401	<0.1	376	<0.00100	1.28	<0.000100	8720	6.98	870	<0.0000400	<0.000500	<0.00200	0.00296	<0.0100	<0.0100	<0.0005
WQ4-1	23G2415-07	2023-07-19	M	0.192	1340	0.00192	<0.000010		0.0114	<0.000400	<0.1	416	<0.00100	1.78	<0.000100	10900	8.18	1090	<0.0000400	<0.000500	<0.00200	0.00318	<0.0100	<0.0100	<0.0005
WQ4-1	23H3309-09	2023-08-24	M	0.148	1090	0.000907	<0.000010		0.00920	0.000424	<0.1	355	<0.00100	1.24	<0.000100	9010	6.87	844	<0.0000400	<0.000500	<0.00200	0.00269	<0.0100	<0.0100	<0.0005
WQ4-1	23I2271-09	2023-09-19	M	0.155	989	0.00290	<0.000010		0.00986	<0.000400	<0.1	358	<0.00100	1.26	<0.000100	8420	6.54	806	<0.0000400	<0.000500	<0.00200	0.00273	<0.0100	<0.0100	<0.0005
WQ4-1	23J2236-09	2023-10-18	M	0.146	1140	0.00237	<0.000010		0.0100	<0.000400	0.246	353	<0.00100	1.39	<0.000100	9140	7.1	860	<0.0000400	<0.000500	<0.00200	0.00284	<0.00400	<0.0100	
WQ4-1	23K1909-07	2023-11-15	M	0.166	1210	0.00285	<0.000010		0.00999	0.000578	0.129	376	<0.00100	1.77	<0.000100	10300	7.45	967	<0.0000400	<0.000500	<0.00200	0.00263	<0.00400	<0.0100	<0.0005
WQ4-1	23L2091-04	2023-12-15	M	0.153	1150	0.00305	<0.000010		0.00989	<0.000400	<0.1	343	<0.00100	1.49	<0.000100	9800	6.72	821	<0.0000400	<0.000500	<0.00200	0.00294	<0.00400	<0.0100	<0.0005
WQ4-1	L2754383-4	2024-01-25	M																						
WQ4-1	VA24A1507-004	2024-01-25	M	0.163	1140	0.00138	<0.0000050		0.0101	<0.00050	0.082	346	<0.00050	1.8	<0.00010	9750	6.74	792	<0.000050	<0.0010	<0.0050	0.00268	0.00157	<0.0010	<0.00050
WQ4-1	L2754604-4	2024-02-14	M																						
WQ4-1	VA24A2995-004	2024-02-14	M	0.153	875	0.00176	<0.0000050		0.00902	<0.00050	0.077	291	<0.00050	1.6	<0.00010	8500	6.32	778	<0.000050	<0.0010	<0.0050	0.00238	0.00149	<0.0010	<0.00050
WQ4-1	L2755043-4	2024-03-21	M																						
WQ4-1	VA24A6026-004	2024-03-21	M	0.147	1110	0.00188	<0.0000050		0.00962	<0.00050	0.088	349	<0.00050	1.6	<0.00010	8540	6.47	854	<0.000050	<0.0010	<0.0050	0.00301	0.00153	<0.0010	<0.00050
WQ4-1	L2755490-4	2024-04-24	M																						
WQ4-1	VA24A8916-004	2024-04-24	M	0.150	1150	0.00082	<0.0000050		0.00963	<0.00050	0.087	333	<0.00050	1.6	<0.00010	9800	6.64	863	<0.000050	<0.0010	<0.0050	0.00269	0.00143	0.0013	<0.00050
WQ4-1	L2755567-4	2024-05-01	M																						
WQ4-1	VA24A9566-004	2024-05-01	M	0.149	1220	0.00108	<0.0000050		0.00969	<0.00050	0.096	342	<0.00050	1.6	<0.00010	9160	6.80	834	<0.000050	<0.0010	<0.0050	0.00258	0.00142	<0.0010	<0.00050
WQ4-1	L2755666-4	2024-05-08	M																						
WQ4-1	VA24B0201-004	2024-05-08	M	0.162	1050	0.00096	<0.0000050		0.0101	<0.00050	0.089	340	0.00070	1.8	<0.00010	9440	7.04	836	<0.000050	<0.0010	<0.0050	0.00266	0.00146	<0.0010	<0.00050
WQ4-1	L2755779-4	2024-05-15	M																						
WQ4-1	VA24B0901-004	2024-05-15	M	0.171	1020	0.00066	<0.0000050		0.0102	<0.00050	0.092	332	0.00061	1.5	<0.00010	8710	7.08	834	<0.000050	<0.0010	<0.0050	0.00286	0.00147	<0.0010	<0.00050
WQ4-1	L2755888-4	2024-05-22	M																						
WQ4-1	VA24B1500-004	2024-05-22	M	0.165	1140	0.00153	<0.0000050		0.00922	<0.00050	0.078	333	0.00507	1.4	<0.00010	9250	6.57	790	<0.000050	<0.0010	<0.0050	0.00274	0.00141	<0.0010	<0.00050
WQ4-1	L2756312-4	2024-06-19	M																						
WQ4-1	VA24B4510-004	2024-06-19	M	0.155	1260	0.00224	<0.0000050		0.00789	<0.00050	0.095	366	<0.00050	1.4	<0.00010	10300	5.44	854	<0.000050	<0.0010	<0.0050	0.00306	0.00112	0.0058	<0.00050
WQ4-1	VA24B7397-004	2024-07-17	M	0.130	1140	0.00105	<0.0000050		0.00884	<0.00050	0.083	348	<0.00050	1.3	<0.00010	9460	5.95	835	<0.000050	<0.0010	<0.0050	0.00281	0.00126	0.0015	<0.00050
WQ4-1	L2756689-4	2024-07-17	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	L2757122-4	2024-08-21	M																						
WQ4-1	VA24C1337-004	2024-08-21	M	0.166	1190	0.00245	<0.0000050		0.00848	<0.00050	0.095	362	<0.00050	1.3	<0.00010	8490	5.81	939	<0.000050	<0.0010	<0.0050	0.00260	0.00133	<0.0010	<0.00050
WQ4-1	VA24C4683-004	2024-09-18	M	0.175	1020	0.00276	<0.0000050		0.00932	<0.00050	0.092	311	0.00120	1.2	<0.00010	8060	6.10	820	<0.000050	<0.0010	<0.0050	0.00294	0.00115	0.0015	<0.00050
WQ4-1	VA24C8569-004	2024-10-23	M	0.137	1210	0.00462	<0.0000050		0.00886	<0.00050	0.085	354	0.00499	1.3	<0.00010	8990	6.19	774	<0.000050	<0.0010	<0.0050	0.00282	0.00117	<0.0010	<0.00050
WQ4-1	L2757977-4	2024-10-30	M																						
WQ4-1	VA24C9414-004	2024-10-30	M	0.132	1130	0.00285	<0.0000050		0.00989	0.00062	0.098	345	0.00074	1.6	<0.00010	8360	6.49	812	<0.000050	<0.0010	<0.0050	0.00273	0.00152	0.0011	<0.00050
WQ4-1	VA24D0180-004	2024-11-06	M	0.122	1040	0.00866	<0.0000050		0.00845	<0.00050	0.073	334	0.00078	1.4	<0.00010	8190	5.93	739	<0.000050	<0.0010	<0.0050	0.00277	0.00135	<0.0010	<0.00050
WQ4-1	VA24D0813-004	2024-11-13	M	0.145	1150	0.00796	<0.0000050		0.00935	<0.00050	0.086	344	0.00147	1.5	<0.00010	8320	6.29	838	<0.000050	<0.0010	<0.0050	0.00267	0.00140	0.0032	<0.00050
WQ4-1	L2758221-4	2024-11-22	M																						
WQ4-1	VA24D1791-004	2024-11-22	M	0.198	1210	0.0105	<0.0000050		0.00949	0.00066	0.096	364	<0.00050	1.8	<0.00010	9030	6.48	956	<0.000050	<0.0010	<0.0050	0.00223	0.00149	<0.0010	<0.00050
WQ4-1	L2758486-4	2024-12-18	M																						
WQ4-1	VA24D3937-004	2024-12-18	M	0.171	972	0.00271	<0.0000050		0.00918	<0.00050	0.083	316	<0.00050	1.2	<0.00010		6.54	704	<0.000050	<0.0010	<0.0050	0.00228	0.00148	0.0016	<0.00050
WQ4-1	L2758770-4	2025-01-22	M																						
WQ4-1	VA25A1525-004	2025-01-22	M	0.127	781	0.00163	<0.0000050		0.00842	<0.00050	0.084	310	0.00101	1.4	<0.00010	5600	5.76	697	<0.000050	<0.0010	<0.0050	0.00248	0.00129	0.0015	<0.00050
WQ4-1	L2759008-4	2025-02-19	M																						
WQ4-1	VA25A3570-004	2025-02-19	M	0.141	1500	0.00092	<0.0000050		0.00782	<0.00050	0.064	327	<0.00050	3.5	<0.00010	10200	6.35	643	<0.000050	<0.0010	<0.0050	0.00228	0.00129	0.0013	<0.00050
WQ4-1	VA25A6679-004	2025-03-26	M	0.151	1280	0.00114	<0.0000050		0.00878	<0.00050	0.070	345	<0.00050	1.2	<0.00010	9940	6.20	707	<0.000050	<0.0010	<0.0050	0.00252	0.00128	<0.0010	<0.00050
WQ4-1	VA25A9109-004	2025-04-23	M	0.148	1160	0.00077	<0.0000050		0.00903	<0.00050	0.080	299	0.00068	1.5	<0.00010	8550	6.10	743	<0.000050	<0.0010	<0.0050	0.00236	0.00141	<0.0010	<0.00050
WQ4-1	VA25A9941-004	2025-05-01	M	0.144	1290	0.00083	<0.0000050		0.00888	<0.00050	0.071	305	<0.00050	1.1	<0.00010	9660	6.01	690	<0.000050	<0.0010	<0.0050	0.00245	0.00144	0.0011	<0.00050
WQ4-1	VA25B0496-004	2025-05-07	M	0.192	1320	0.00093	<0.0000050		0.00965	<0.00050	<0.050	329	<0.00050	1.6	<0.00010	9830	6.89	781	<0.000050	<0.0010	<0.0050	0.00267	0.00154	<0.0010	<0.00050
WQ4-1	VA25B1530-004	2025-05-16	M	0.145	1120	0.00116	<0.0000050		0.00930	0.00052	0.092	307	<0.00050	1.4	<0.00010	9870	6.20	799	<0.000050	<0.0010	<0.0050	0.00264	0.00154	0.0012	<0.00050
WQ4-1	VA25B1841-004	2025-05-21	M	0.137	1280	0.00148	<0.0000050		0.00936	<0.00050	0.098	348	<0.00050	1.8	<0.00010	9660	6.69	971	<0.000050	<0.0010	<0.0050	0.00267	0.00152	0.0013	<0.00050
WQ4-2	0051710-08	2020-05-20	M																						<0.0005
WQ4-2	0062209-08	2020-06-22	M																						<0.0005
WQ4-2	0071996-08	2020-07-21	M																						<0.0005
WQ4-2	0082292-08	2020-08-24	M																						<0.0005
WQ4-2	0093017-08	2020-09-28	M																						<0.0005
WQ4-2	20J1961-08	2020-10-20	M																						<0.0005
WQ4-2	20J2778-08	2020-10-27	M																						<0.0005
WQ4-2	20K0360-08	2020-11-03	M																						<0.0005
WQ4-2	20K1261-08	2020-11-10	M																						<0.0005
WQ4-2	20K2100-08	2020-11-18	M																						<0.0005
WQ4-2	20L1589-08	2020-12-14	M																						<0.0005
WQ4-2	21A2590-08	2021-01-27	M																						<0.0005
WQ4-2	21B2778-08	2021-02-25	M																						<0.0005
WQ4-2	21C3505-08	2021-03-25	M																						<0.0005
WQ4-2	21D2478-08	2021-04-22	M																						<0.0005
WQ4-2	21E1990-08	2021-05-18	M																						<0.0005
WQ4-2	21E2917-08	2021-05-26	M																						<0.0005
WQ4-2	21F0167-08	2021-06-01	M																						<0.0005
WQ4-2	21F1056-08	2021-06-08	M																						<0.0005
WQ4-2	21F2014-08	2021-06-15	M																						<0.0005
WQ4-2	21G2414-08	2021-07-20	M																						<0.0005
WQ4-2	21H3040-08	2021-08-25	M																						<0.0005
WQ4-2	21I3814-08	2021-09-28	M																						<0.0005
WQ4-2	21J3514-08	2021-10-26	M																						<0.0005
WQ4-2	21K3046-08	2021-11-23	M																						<0.0005
WQ4-2	21L2125-08	2021-12-14	M																						<0.0005
WQ4-2	22A2312-08	2022-01-20	M																						<0.0005
WQ4-2	22B2487-08	2022-02-17	M	0.13	992	0.00279	<0.000010		0.00831	<0.00080	<0.100	286	0.00469	<2.0	<0.000100	7620	5.33	691	<0.000040	<0.00040	<0.0100	0.00225	<0.0020	<0.0080	<0.0005
WQ4-2	22C3145-08	2022-03-22	M	0.131	1030	0.00148	<0.000010		0.00879	<0.00080	<0.100	310	<0.00100	<2.0	<0.000100	7730	5.65	679	<0.000040	<0.00040	<0.0100	0.00233	0.0027	<0.0080	<0.0005
WQ4-2	22D2212-13	2022-04-20	M	0.112	880	0.00334	<0.000010		0.00726	<0.00080	<0.100	261	<0.00100	<2.0	<0.000100	7080	4.74	588	0.00008	<0.00040	<0.0100	0.00186	<0.0100	<0.0080	<0.0005
WQ4-2	22E2480-10	2022-05-17	M	0.0253	228	0.00659	<0.000010		0.00241	<0.00400	<0.500	84.3	<0.00500	<10.0	<0.000500	1990	1.39	163	<0.000200	<0.00200	<0.0500	0.000548	<0.0500	<0.0400	<0.0005

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	22F3212-08	2022-06-21	M	0.0118	73.7	0.00407	<0.000010		0.000869	<0.000400	<0.1	23.2	<0.00100	1.7	<0.000100	604	0.453	59.9	<0.0000400	<0.000500	<0.00200	0.000233	<0.0100	<0.0100	<0.0005
WQ4-2	22G1763-08	2022-07-13	M	0.0130	92.4	0.00430	<0.000010		0.000981	<0.000400	<0.1	27.9	<0.00100	1.27	<0.000100	792	0.548	64.6	<0.0000400	<0.000500	<0.00200	0.000237	<0.0100	<0.0100	<0.0005
WQ4-2	22H2453-08	2022-08-16	M	0.0127	83.9	0.00509	<0.000010		0.000992	<0.000400	<0.100	26.7	<0.00100	1.60	<0.000100	689	0.512	65.5	<0.0000400	<0.000500	<0.00200	0.000193	<0.0100	<0.0100	<0.0005
WQ4-2	22I1926-08	2022-09-14	M	0.101	738	0.00464	<0.000010		0.00660	0.000715	<0.100	226	<0.00100	1.35	<0.000100	6010	4.66	558	<0.0000400	<0.000500	<0.00200	0.00173	<0.0100	<0.0100	<0.0005
WQ4-2	22J1560-10	2022-10-12	M	0.139	947	0.00294	<0.000010		0.00788	<0.000400	<0.1	264	<0.00100	<1	<0.000100	6950	5.53	625	<0.0000400	<0.000500	<0.00200	0.00208	<0.0100	<0.0100	<0.0005
WQ4-2	22K1453-08	2022-11-10	M	0.167	1160	0.0122	<0.000010		0.00910	0.000460	0.12	353	<0.00100	2.44	<0.000100	9320	6.32	891	<0.0000400	<0.000500	<0.00200	0.00272	<0.0100	<0.0100	<0.0005
WQ4-2	22L0774-08	2022-12-07	M	0.162	1120	0.0280	<0.000010		0.00961	<0.000400	0.108	342	<0.00100	2.18	<0.000100	8790	6.4	833	<0.0000400	<0.000500	<0.00200	0.00278	<0.0100	<0.0100	<0.0005
WQ4-2	23A2847-08	2023-01-27	M	0.118	884	0.00924	<0.000010		0.00739	0.000775	<0.1	275	<0.00100	2.41	<0.000100	7400	5.3	667	<0.0000400	<0.000500	<0.00200	0.00212	<0.0100	<0.0100	<0.0005
WQ4-2	23C0060-08	2023-02-28	M	0.114	1100	0.00576	<0.000010		0.00888	<0.000400	<0.1	342	<0.00100	2.37	<0.000100	8900	6.16	860	<0.0000400	<0.000500	<0.00200	0.00238	<0.0100	<0.0100	<0.0005
WQ4-2	23C1797-08	2023-03-15	M	0.124	884	0.00785	<0.000010		0.00745	<0.000400	<0.1	276	<0.00100	2.46	<0.000100	6560	5.01	637	<0.0000400	<0.000500	<0.00200	0.00209	<0.0100	<0.0100	<0.0005
WQ4-2	23D2945-08	2023-04-26	M	0.0976	746	0.00225	<0.000010		0.00694	<0.000400	<0.1	254	<0.00100	<1	0.000104	6090	4.55	556	<0.0000400	<0.000500	<0.00200	0.00177	<0.0100	<0.0100	<0.0005
WQ4-2	23E2392-08	2023-05-17	M	0.0291	239	0.00528	<0.000010		0.00303	<0.000400	<0.1	72.1	<0.00100	1.35	0.000134	1950	1.35	176	<0.0000400	<0.000500	<0.00200	0.000593	<0.0100	<0.0100	<0.0005
WQ4-2	23F3614-08	2023-06-27	M	0.0114	74.2	0.00391	<0.000010		0.000905	<0.000400	<0.1	23.5	<0.00100	1.34	<0.000100	617	0.459	55.7	<0.0000400	<0.000500	<0.00200	0.000210	<0.0100	<0.0100	<0.0005
WQ4-2	23G2415-08	2023-07-19	M	0.0708	473	0.00392	<0.000010		0.00435	<0.000400	<0.1	148	<0.00100	1.27	<0.000100	3880	3.01	383	<0.0000400	<0.000500	<0.00200	0.00118	<0.0100	<0.0100	<0.0005
WQ4-2	23H3309-10	2023-08-24	M	0.12	904	0.00431	<0.000010		0.00793	<0.000400	<0.1	289	<0.00100	<1	<0.000100	7270	5.67	694	<0.0000400	<0.000500	<0.00200	0.00224	<0.0100	<0.0100	<0.0005
WQ4-2	23I2271-11	2023-09-19	M	0.0533	382	0.00678	<0.000010		0.00350	<0.000400	<0.1	115	<0.00100	1.21	<0.000100	3080	2.26	282	<0.0000400	<0.000500	<0.00200	0.000983	<0.0100	<0.0100	<0.0005
WQ4-2	23J2236-11	2023-10-18	M	0.0485	367	0.00812	<0.000010		0.00331	<0.000400	0.183	115	<0.00100	1.56	<0.000100	2940	2.16	278	<0.0000400	<0.000500	<0.00200	0.000971	<0.00400	<0.0100	
WQ4-2	23K1909-08	2023-11-15	M	0.0583	413	0.00967	<0.000010		0.00363	<0.000400	<0.1	128	<0.00100	3.1	<0.000100	3470	2.44	327	<0.0000400	<0.000500	<0.00200	0.000967	<0.00400	<0.0100	<0.0005
WQ4-2	23L2091-05	2023-12-15	M	0.125	975	0.00685	<0.000010		0.00805	<0.000400	<0.1	292	<0.00100	1.86	<0.000100	8220	5.55	676	<0.0000400	<0.000500	<0.00200	0.00242	<0.00400	<0.0100	<0.0005
WQ4-2	L2754383-5	2024-01-25	M																						
WQ4-2	VA24A1507-005	2024-01-25	M	0.092	660	0.00541	<0.0000050		0.00582	<0.00050	<0.050	198	<0.00050	2.4	<0.00010	5400	3.87	460	<0.000050	<0.0010	<0.0050	0.00160	0.00102	0.0012	<0.00050
WQ4-2	L2754604-5	2024-02-14	M																						
WQ4-2	VA24A2995-005	2024-02-14	M	0.137	762	0.00490	<0.0000050		0.00794	<0.00050	0.066	253	<0.00050	2.0	<0.00010	7340	5.48	683	<0.000050	<0.0010	<0.0050	0.00205	0.00135	<0.0010	<0.00050
WQ4-2	L2755043-5	2024-03-21	M																						
WQ4-2	VA24A6026-005	2024-03-21	M	0.040	294	0.00799	<0.0000050		0.00264	<0.00050	<0.050	87.0	<0.00050	2.7	<0.00010	2240	1.63	218	<0.000050	<0.0010	<0.0050	0.000822	0.00070	<0.0010	<0.00050
WQ4-2	L2755490-5	2024-04-24	M																						
WQ4-2	VA24A8916-005	2024-04-24	M	0.085	664	0.00370	<0.0000050		0.00547	<0.00050	<0.050	182	<0.00050	<1.0	<0.00010	5100	3.60	479	<0.000050	<0.0010	<0.0050	0.00156	0.00081	<0.0010	<0.00050
WQ4-2	L2755567-5	2024-05-01	M																						
WQ4-2	VA24A9566-005	2024-05-01	M	0.123	1010	0.00174	<0.0000050		0.00812	<0.00050	<0.050	281	<0.00050	<1.0	<0.00010	7600	5.49	695	<0.000050	<0.0010	<0.0050	0.00217	0.00111	<0.0010	<0.00050
WQ4-2	L2755666-5	2024-05-08	M																						
WQ4-2	VA24B0201-005	2024-05-08	M	0.036	253	0.00630	<0.0000050		0.00258	<0.00050	<0.050	79.1	<0.00050	2.4	<0.00010	2220	1.59	196	<0.000050	<0.0010	<0.0050	0.000682	0.00058	<0.0010	<0.00050
WQ4-2	L2755779-5	2024-05-15	M																						
WQ4-2	VA24B0901-005	2024-05-15	M	0.066	426	0.00465	<0.0000050		0.00419	<0.00050	<0.050	132	<0.00050	1.2	<0.00010	3630	2.74	326	<0.000050	<0.0010	<0.0050	0.00118	0.00070	0.0027	<0.00050
WQ4-2	L2755888-5	2024-05-22	M																						
WQ4-2	VA24B1500-005	2024-05-22	M	0.069	506	0.00407	<0.0000050		0.00428	<0.00050	<0.050	149	0.00205	1.2	<0.00010	4140	3.01	364	<0.000050	<0.0010	<0.0050	0.00134	0.00078	<0.0010	<0.00050
WQ4-2	L2756312-5	2024-06-19	M																						
WQ4-2	VA24B4510-005	2024-06-19	M	0.062	509	0.00361	<0.0000050		0.00323	<0.00050	<0.050	144	<0.00050	1.0	<0.00010	3940	2.09	330	<0.000050	<0.0010	<0.0050	0.00124	0.00063	0.0011	<0.00050
WQ4-2	VA24B7397-005	2024-07-17	M	0.073	644	0.00267	<0.0000050		0.00495	<0.00050	<0.050	196	<0.00050	<1.0	<0.00010	5350	3.24	475	<0.000050	<0.0010	<0.0050	0.00163	0.00079	0.0015	<0.00050
WQ4-2	L2756689-5	2024-07-17	M																						
WQ4-2	L2757122-5	2024-08-21	M																						
WQ4-2	VA24C1337-005	2024-08-21	M	0.025	194	0.00628	<0.0000050		0.00146	<0.00050	<0.050	55.5	<0.00050	1.6	<0.00010	1320	0.878	135	<0.000050	<0.0010	<0.0050	0.000428	<0.00050	<0.0010	<0.00050
WQ4-2	VA24C4683-005	2024-09-18	M	0.028	240	0.0104	<0.0000050		0.00196	<0.00050	<0.050	64.7	<0.00050	1.7	<0.00010	1760	1.23	161	<0.000050	<0.0010	<0.0050	0.000503	0.00051	0.0011	<0.00050
WQ4-2	VA24C8569-005	2024-10-23	M	0.088	778	0.00646	<0.0000050		0.00591	<0.00050	<0.050	232	0.00363	1.4	<0.00010	5820	4.07	518	<0.000050	<0.0010	<0.0050	0.00185	0.00092	0.0010	<0.00050
WQ4-2	L2757977-5	2024-10-30	M																						
WQ4-2	VA24C9414-005	2024-10-30	M	0.096	796	0.00455	<0.0000050		0.00709	<0.00050	0.059	247	0.00074	1.5	<0.00010	5800	4.63	600	<0.000050	<0.0010	<0.0050	0.00203	0.00119	0.0015	<0.00050
WQ4-2	VA24D0180-005	2024-11-06	M	0.095	821	0.00410	<0.0000050		0.00661	<0.00050	0.052	265	0.00066	1.4	<0.00010	6360	4.57	599	<0.000050	<0.0010	<0.0050	0.00213	0.00115	<0.0010	<0.00050
WQ4-2	VA24D0813-005	2024-11-13	M	0.050	373	0.00410	<0.0000050		0.00314	<0.00050	<0.050	110	<0.00050	1.6	<0.00010	2770	2.04	269	<0.000050	<0.0010	<0.0050	0.00101	0.00065	0.0023	<0.00050
WQ4-2	L2758221-5	2024-11-22	M																						
WQ4-2	VA24D1791-005	2024-11-22	M	0.114	746	0.00678	<0.0000050		0.00610	<0.00050	0.059	218	<0.00050	2.2	<0.00010	5650	4.19	609	<0.000050	<0.0010	<0.0050	0.00162	0.00109	<0.0010	<0.00050
WQ4-2	L2758486-5	2024-12-18	M																						
WQ4-2	VA24D3937-005	2024-12-18	M	0.123	817	0.00399	<0.0000050		0.00737	<0.00050	0.062	249	<0.00050	1.3	<0.00010	5710	5.25	528	<0.000050	<0.0010	<0.0050	0.00185	0.00115	<0.0010	<0.00050
WQ4-2	VA25A1525-005	2025-01-22	M	0.099	616	0.00644	<0.0000050		0.00658	<0.00050	0.064	241	0.00084	2.3	<0.00010	4570	4.53	563	<0.000050	<0.0010	<0.0050	0.00199	0.00108	0.0012	<0.00050
WQ4-2	L2758770-5	2025-01-22	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	L2759008-5	2025-02-19	M																						
WQ4-2	VA25A3570-005	2025-02-19	M	0.107	1040	0.00733	<0.0000050		0.00581	<0.00050	<0.050	237	<0.00050	4.1	<0.00010	7180	4.63	468	<0.000050	<0.0010	<0.0050	0.00170	0.00097	0.0014	<0.00050
WQ4-2	VA25A6679-005	2025-03-26	M	0.076	629	0.00441	<0.0000050		0.00443	<0.00050	<0.050	173	<0.00050	<1.0	<0.00010	4660	3.04	312	<0.000050	<0.0010	<0.0050	0.00125	0.00071	<0.0010	<0.00050
WQ4-2	VA25A9109-005	2025-04-23	M	0.122	986	0.00207	<0.0000050		0.00800	<0.00050	<0.050	253	<0.00050	<1.0	<0.00010	7220	5.21	660	<0.000050	<0.0010	<0.0050	0.00217	<0.00050	<0.0010	<0.00050
WQ4-2	VA25A9941-005	2025-05-01	M	0.073	660	0.00399	<0.0000050		0.00497	<0.00050	<0.050	158	<0.00050	<1.0	<0.00010	4860	3.30	354	<0.000050	<0.0010	<0.0050	0.00140	0.00060	<0.0010	<0.00050
WQ4-2	VA25B0496-005	2025-05-07	M	0.101	685	0.00374	<0.0000050		0.00517	<0.00050	<0.050	177	<0.00050	1.0	<0.00010	5200	3.63	423	<0.000050	<0.0010	<0.0050	0.00140	0.00077	<0.0010	<0.00050
WQ4-2	VA25B1530-005	2025-05-16	M	0.043	308	0.00415	<0.0000050		0.00316	<0.00050	<0.050	91.2	<0.00050	1.3	<0.00010	2730	1.88	228	<0.000050	<0.0010	<0.0050	0.000831	0.00057	0.0011	<0.00050
WQ4-2	VA25B1841-005	2025-05-21	M	<0.020	60.5	0.00368	<0.0000050		0.00083	<0.00050	<0.050	17.9	<0.00050	2.5	<0.00010	484	0.373	58.6	<0.000050	<0.0010	<0.0050	0.000272	<0.00050	<0.0010	<0.00050
WQ4-3	23L2091-07	2023-12-15	M	0.118	857	0.0103	<0.000010		0.00693	<0.000400	0.107	261	<0.00100	2.18	<0.000100	7300	4.79	632	<0.0000400	<0.000500	<0.00200	0.00208	<0.00400	<0.0100	<0.0005
WQ4-3	L2754383-6	2024-01-25	M																						
WQ4-3	VA24A1507-006	2024-01-25	M	0.052	390	0.00572	<0.0000050		0.00341	<0.00050	<0.050	111	<0.00050	2.5	<0.00010	3000	2.27	264	<0.000050	<0.0010	<0.0050	0.00109	0.00074	<0.0010	<0.00050
WQ4-3	L2754604-6	2024-02-14	M																						
WQ4-3	VA24A2995-006	2024-02-14	M	0.110	632	0.00605	<0.0000050		0.00650	<0.00050	0.052	205	<0.00050	2.1	<0.00010	5920	4.47	547	<0.000050	<0.0010	<0.0050	0.00178	0.00111	<0.0010	<0.00050
WQ4-3	L2755043-6	2024-03-21	M																						
WQ4-3	VA24A6026-006	2024-03-21	M	<0.020	119	0.00936	<0.0000050		0.00128	<0.00050	<0.050	33.8	<0.00050	3.0	<0.00010	874	0.656	88.8	<0.000050	<0.0010	<0.0050	0.000397	0.00054	<0.0010	<0.00050
WQ4-3	L2755490-6	2024-04-24	M																						
WQ4-3	VA24A8916-006	2024-04-24	M	0.035	271	0.00853	<0.0000050		0.00269	<0.00050	<0.050	74.7	<0.00050	2.8	<0.00010	2170	1.56	213	<0.000050	<0.0010	<0.0050	0.000702	0.00055	<0.0010	<0.00050
WQ4-3	L2755567-6	2024-05-01	M																						
WQ4-3	VA24A9566-006	2024-05-01	M	0.044	347	0.00698	<0.0000050		0.00301	<0.00050	<0.050	95.9	<0.00050	2.3	<0.00010	2600	1.88	237	<0.000050	<0.0010	<0.0050	0.000810	0.00062	<0.0010	<0.00050
WQ4-3	L2755666-6	2024-05-08	M																						
WQ4-3	VA24B0201-006	2024-05-08	M	0.032	218	0.00586	<0.0000050		0.00226	<0.00050	<0.050	67.5	<0.00050	2.2	<0.00010	1920	1.35	165	<0.000050	<0.0010	<0.0050	0.000613	0.00053	<0.0010	<0.00050
WQ4-3	L2755779-6	2024-05-15	M																						
WQ4-3	VA24B0901-006	2024-05-15	M	0.023	158	0.00474	<0.0000050		0.00169	<0.00050	<0.050	46.1	<0.00050	1.7	<0.00010	1290	0.950	118	<0.000050	<0.0010	<0.0050	0.000487	<0.00050	<0.0010	<0.00050
WQ4-3	L2755888-6	2024-05-22	M																						
WQ4-3	VA24B1500-006	2024-05-22	M	0.030	230	0.00460	<0.0000050		0.00213	<0.00050	<0.050	66.7	<0.00050	1.7	<0.00010	1950	1.34	165	<0.000050	<0.0010	<0.0050	0.000539	0.00059	<0.0010	<0.00050
WQ4-3	L2756312-6	2024-06-19	M																						
WQ4-3	VA24B4510-006	2024-06-19	M	0.022	173	0.00407	<0.0000050		0.00130	<0.00050	<0.050	48.5	<0.00050	1.7	<0.00010	1340	0.727	113	<0.000050	<0.0010	<0.0050	0.000434	<0.00050	0.0016	<0.00050
WQ4-3	VA24B7397-006	2024-07-17	M	<0.020	50.4	0.00511	<0.0000050		0.00059	<0.00050	<0.050	15.0	<0.00050	1.0	<0.00010	418	0.249	37.3	<0.000050	<0.0010	<0.0050	0.000122	<0.00050	0.0016	<0.00050
WQ4-3	L2756689-6	2024-07-17	M																						
WQ4-3	L2757122-6	2024-08-21	M																						
WQ4-3	VA24C1337-006	2024-08-21	M	0.024	180	0.00648	<0.0000050		0.00136	<0.00050	<0.050	51.1	<0.00050	1.4	<0.00010	1210	0.827	127	<0.000050	<0.0010	<0.0050	0.000454	<0.00050	<0.0010	<0.00050
WQ4-3	VA24C4683-006	2024-09-18	M	0.021	176	0.00996	<0.0000050		0.00154	<0.00050	<0.050	48.0	<0.00050	1.9	<0.00010	1260	0.879	125	<0.000050	<0.0010	<0.0050	0.000404	0.00051	0.0012	<0.00050
WQ4-3	VA24C8569-006	2024-10-23	M	0.030	272	0.00874	<0.0000050		0.00209	<0.00050	<0.050	79.2	0.00073	2.0	<0.00010	2050	1.33	177	<0.000050	<0.0010	<0.0050	0.000727	0.00060	<0.0010	<0.00050
WQ4-3	L2757977-6	2024-10-30	M																						
WQ4-3	VA24C9414-006	2024-10-30	M	0.021	175	0.00633	<0.0000050		0.00193	<0.00050	<0.050	52.1	<0.00050	2.4	<0.00010	1280	1.00	131	<0.000050	<0.0010	<0.0050	0.000534	0.00059	<0.0010	<0.00050
WQ4-3	VA24D0180-006	2024-11-06	M	0.054	454	0.00859	<0.0000050		0.00369	<0.00050	<0.050	136	<0.00050	2.2	<0.00010	3480	2.41	325	<0.000050	<0.0010	<0.0050	0.00126	0.00079	<0.0010	<0.00050
WQ4-3	VA24D0813-006	2024-11-13	M	0.024	173	0.00472	<0.0000050		0.00158	<0.00050	<0.050	49.5	<0.00050	2.3	<0.00010	1280	0.929	127	<0.000050	<0.0010	<0.0050	0.000484	0.00051	0.0019	<0.00050
WQ4-3	L2758221-6	2024-11-22	M																						
WQ4-3	VA24D1791-006	2024-11-22	M	0.142	865	0.00714	<0.0000050		0.00709	<0.00050	0.070	254	<0.00050	2.3	<0.00010	6510	4.71	714	<0.000050	<0.0010	<0.0050	0.00171	0.00125	<0.0010	<0.00050
WQ4-3	L2758486-6	2024-12-18	M																						
WQ4-3	VA24D3937-006	2024-12-18	M	0.080	543	0.00408	<0.0000050		0.00496	<0.00050	<0.050	170	<0.00050	1.3	<0.00010	3890	3.57	363	<0.000050	<0.0010	<0.0050	0.00137	0.00089	0.0017	<0.00050
WQ4-3	L2758770-6	2025-01-22	M																						
WQ4-3	VA25A1525-006	2025-01-22	M	0.095	588	0.00637	<0.0000050		0.00622	<0.00050	0.061	222	0.00074	2.4	<0.00010	4250	4.29	520	<0.000050	<0.0010	<0.0050	0.00191	0.00101	0.0012	<0.00050
WQ4-3	L2759008-6	2025-02-19	M																						
WQ4-3	VA25A3570-006	2025-02-19	M	0.099	1020	0.00769	<0.0000050		0.00571	<0.00050	<0.050	234	<0.00050	4.1	<0.00010	7040	4.60	439	<0.000050	<0.0010	<0.0050	0.00162	0.00096	0.0020	<0.00050
WQ4-3	VA25A6679-006	2025-03-26	M	0.064	527	0.00398	<0.0000050		0.00387	<0.00050	<0.050	145	<0.00050	<1.0	<0.00010	3920	2.57	274	<0.000050	<0.0010	<0.0050	0.00116	0.00059	<0.0010	<0.00050
WQ4-3	VA25A9109-006	2025-04-23	M	0.022	168	0.00662	<0.0000050		0.00188	<0.00050	<0.050	47.1	<0.00050	2.7	<0.00010	1330	0.961	118	<0.000050	<0.0010	<0.0050	0.000416	<0.00050	<0.0010	<0.00050
WQ4-3	VA25A9941-006	2025-05-01	M	0.022	199	0.00471	<0.0000050		0.00180	<0.00050	<0.050	49.6	<0.00050	1.6	<0.00010	1460	1.05	112	<0.000050	<0.0010	<0.0050	0.000476	<0.00050	<0.0010	<0.00050
WQ4-3	VA25B0496-006	2025-05-07	M	0.064	444	0.00410	<0.0000050		0.00359	<0.00050	<0.050	115	<0.00050	1.5	<0.00010	3340	2.40	264	<0.000050	<0.0010	<0.0050	0.00101	0.00060	<0.0010	<0.00050
WQ4-3	VA25B1530-006	2025-05-16	M	<0.020	75.0	0.00412	<0.0000050		0.00119	<0.00050	<0.050	24.0	<0.00050	2.0	<0.00010	692	0.507	60.8	<0.000050	<0.0010	<0.0050	0.000305	<0.00050	0.0010	<0.00050
WQ4-3	VA25B1841-006	2025-05-21	M	<0.020	74.1	0.00422	<0.0000050		0.00099	<0.00050	<0.050	21.8	<0.00050	2.6	<0.00010	590	0.468	67.6	<0.000050	<0.0010	<0.0050	0.000243	<0.00050	0.0018	<0.00050
WQR1-0.5	L2755545-7	2024-04-30	M																						
WQR1-0.5	VA24A9402-007	2024-04-30	M	0.044	337	0.00588	<0.0000050	0.000000020	0.00287	<0.00050	<0.050	93.1	<0.00050	1.7	<0.00010	2570	1.82	229	<0.000050	<0.0010	<0.0050	0.000780	0.00058	0.0019	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA24A9802-011	2024-05-05	M	0.053	391	0.00566	<0.0000050		0.00328	<0.00050	<0.050	111	<0.00050	2.1	<0.00010	2950	2.09	264	<0.000050	<0.0010	<0.0050	0.000932	0.00061	0.0020	
WQR1-0.5	L2755648-10	2024-05-08	M																						
WQR1-0.5	VA24B0178-010	2024-05-08	M	0.064	412	0.00487	<0.0000050	<0.000000020	0.00389	<0.00050	<0.050	132	<0.00050	1.7	<0.00010	3620	2.62	326	<0.000050	<0.0010	<0.0050	0.000948	0.00067	<0.0010	<0.00050
WQR1-0.5	L2755934-1	2024-05-24	M																						
WQR1-0.5	VA24B1783-001	2024-05-24	M	<0.020	131	0.00529	<0.0000050	<0.000000020	0.00142	<0.00050	<0.050	35.4	<0.00050	2.2	<0.00010	1040	0.749	100	<0.000050	<0.0010	<0.0050	0.000330	<0.00050	0.0010	<0.00050
WQR1-0.5	L2755981-1	2024-05-28	M																						
WQR1-0.5	VA24B2063-001	2024-05-28	M	<0.020	134	0.00478	<0.0000050	<0.000000020	0.00141	<0.00050	<0.050	37.1	<0.00050	1.5	<0.00010	990	0.757	96.5	<0.000050	<0.0010	<0.0050	0.000368	<0.00050	<0.0010	<0.00050
WQR1-0.5	VA24B2561-005	2024-06-01	M	<0.020	105	0.00618	<0.0000050		0.00114	<0.00050	<0.050	27.4	<0.00050	2.5	<0.00010	769	0.541	77.2	<0.000050	<0.0010	<0.0050	0.000256	<0.00050	0.0016	
WQR1-0.5	L2756068-1	2024-06-04	M																						
WQR1-0.5	VA24B2772-001	2024-06-04	M	<0.020	9.8	0.00391	<0.0000050	<0.000000020	0.00044	<0.00050	<0.050	3.3	<0.00050	1.3	<0.00010	80.2	0.070	7.8	<0.000050	<0.0010	<0.0050	0.000077	<0.00050	0.0011	<0.00050
WQR1-0.5	VA24B3452-007	2024-06-10	M	<0.020	52.9	0.00441	<0.0000050	<0.000000020	0.00057	<0.00050	<0.050	14.8	<0.00050	1.5	<0.00010	370	0.254	35.2	<0.000050	<0.0010	<0.0050	0.000129	<0.00050	0.0012	<0.00050
WQR1-0.5	655-454600000-0	2024-06-17	M																						
WQR1-0.5	VA24B5880-003	2024-07-02	M																						
WQR1-0.5	VA24B5882-007	2024-07-03	M																						
WQR1-0.5	VA24B6465-001	2024-07-09	M	0.021	155	0.00504	<0.0000050	<0.000000020	0.00141	<0.00050	<0.050	44.4	<0.00050	1.2	<0.00010	1240	0.836	109	<0.000050	<0.0010	<0.0050	0.000407	<0.00050	0.0014	<0.00050
WQR1-0.5	VA24B7867-001	2024-07-20	M	<0.020	121	0.00544	<0.0000050	<0.000000020	0.00117	<0.00050	<0.050	33.8	<0.00050	1.1	<0.00010	892	0.660	86.0	<0.000050	<0.0010	<0.0050	0.000285	<0.00050	<0.0010	<0.00050
WQR1-0.5	L2757210-1	2024-08-26	M																						
WQR1-0.5	VA24C2208-001	2024-08-26	M	0.022	150	0.00741	<0.0000050	<0.000000020	0.00150	<0.00050	<0.050	46.8	<0.00050	1.4	<0.00010	1310	0.882	112	<0.000050	<0.0010	<0.0050	0.000356	<0.00050	<0.0010	<0.00050
WQR1-0.5	L2757680-1	2024-10-06	M																						
WQR1-0.5	VA24C6685-001	2024-10-06	M	0.0752	595	0.00820	<0.0000050	0.000000024	0.00513	<0.0100	<1.00	185	<0.00100	1.84	<0.000200	4740	3.47	446	<0.000200	<0.00200	<0.00600	0.00138	<0.0100	<0.0200	<0.00050
WQR1-0.5	VA24C7408-001	2024-10-13	M	0.097	695	0.0102	<0.0000050	<0.000000020	0.00557	<0.00050	<0.050	197	<0.00050	1.7	<0.00010	5390	3.77	478	<0.000050	<0.0010	<0.0050	0.00189	0.00089	<0.0010	<0.00050
WQR1-0.5	L2757830-3	2024-10-19	M																						
WQR1-0.5	VA24C8041-003	2024-10-19	M	0.056	424	0.00990	<0.0000050	0.000000034	0.00340	<0.00050	<0.050	119	<0.00050	1.9	<0.00010	3200	2.24	273	<0.000050	<0.0010	<0.0050	0.00102	0.00068	<0.0010	<0.00050
WQR1-0.5	VA24C8159-005	2024-10-20	M	0.027	204	0.0153	<0.0000050	<0.000000020	0.00181	<0.00050	<0.050	57.8	<0.00050	1.8	<0.00010	1540	1.07	139	<0.000050	<0.0010	<0.0050	0.000491	0.00052	<0.0020	<0.00050
WQR1-0.5	L2757872-1	2024-10-22	M																						
WQR1-0.5	VA24C8330-001	2024-10-22	M	0.023	178	0.0108	<0.0000050	<0.000000020	0.00148	<0.00050	<0.050	50.6	<0.00050	2.0	<0.00010	1410	0.935	122	<0.000050	<0.0010	<0.0050	0.000460	0.00056	<0.0010	<0.00050
WQR1-0.5	L2757933-5	2024-10-28	M																						
WQR1-0.5	VA24C9041-005	2024-10-28	M	<0.020	84.0	0.00626	<0.0000050	0.000000037	0.00092	<0.00050	<0.050	23.6	<0.00050	2.3	<0.00010	664	0.450	56.4	<0.000050	<0.0010	<0.0050	0.000259	<0.00050	<0.0010	<0.00050
WQR1-0.5	L2758002-1	2024-11-01	M																						
WQR1-0.5	VA24C9683-001	2024-11-01	M	0.074	540	0.00970	<0.0000050	<0.000000080	0.00469	<0.00050	<0.050	163	<0.00050	2.2	<0.00010	4360	3.00	404	<0.000050	<0.0010	<0.0050	0.00117	0.00095	<0.0010	<0.00050
WQR1-0.5	L2758142-5	2024-11-14	M																						
WQR1-0.5	VA24D0945-005	2024-11-14	M	0.022	166	0.00618	<0.0000050	0.000000031	0.00149	0.00069	<0.050	48.4	<0.00050	2.4	<0.00010	1220	0.928	114	<0.000050	<0.0010	<0.0050	0.000392	0.00051	0.0023	<0.00050
WQR1-0.5	VA24D1069-005	2024-11-15	M	0.034	267	0.00679	<0.0000050	0.000000025	0.00231	<0.00050	<0.050	72.7	<0.00050	2.8	<0.00010	2080	1.37	191	<0.000050	<0.0010	<0.0050	0.000604	0.00060	<0.0010	<0.00050
WQR1-0.5	L2758203-5	2024-11-19	M																						
WQR1-0.5	VA24D1567-005	2024-11-19	M	0.063	506	0.00897	<0.0000050	0.000000021	0.00365	<0.00050	<0.050	142	<0.00050	2.6	<0.00010	3580	2.41	361	<0.000050	<0.0010	<0.0050	0.00116	0.00077	<0.0010	<0.00050
WQR1-0.5	L2758353-1	2024-12-05	M																						
WQR1-0.5	VA24D2842-001	2024-12-05	M	0.075	551	0.0124	<0.0000050	<0.000000020	0.00454	<0.00050	<0.050	163	<0.00050	3.0	<0.00010	4550	3.10	385	<0.000050	<0.0010	<0.0050	0.00125	0.00086	<0.0010	<0.00050
WQR1-0.5	L2758617-7	2025-01-08	M																						
WQR1-0.5	VA25A0392-007	2025-01-08	M	0.095	556	0.0105	<0.0000050	<0.000000020	0.00625	<0.00050	0.054	201	<0.00050	2.4	<0.00010	4350	4.15	465	<0.000050	<0.0010	<0.0050	0.00149	0.00106	<0.0010	<0.00050
WQR1-0.5	L2759040-7	2025-02-20	M																						
WQR1-0.5	VA25A3677-007	2025-02-20	M	0.091	713	0.00750	<0.0000050	<0.000000020	0.00580	<0.00050	<0.050	214	<0.00050	3.3	<0.00010	5400	3.94	455	<0.000050	<0.0010	<0.0050	0.00158	0.00106	0.0010	<0.00050
WQR1-0.5	L2759227-7	2025-03-13	M																						
WQR1-0.5	VA25A5556-007	2025-03-13	M	0.068	456	0.00623	<0.0000050	2.56E-08	0.00407	0.00053	<0.050	138	<0.00050	2.0	<0.00010	3780	2.79	334	<0.000050	<0.0010	<0.0050	0.00119	0.00076	0.0016	<0.00050
WQR1-0.5	VA25A6528-013	2025-03-25	M	0.068	510	0.00628	<0.0000050		0.00458	0.00224	<0.050	154	<0.00050	1.6	<0.00010	4140	3.05	376	<0.000050	<0.0010	<0.0050	0.00128	0.00073	<0.0010	
WQR1-0.5	VA25A8147-001	2025-04-11	M	0.026	145	0.00536	<0.0000050	0.000000020	0.00153	<0.00050	<0.050	43.2	<0.00050	2.6	<0.00010	1300	0.877	116	<0.000050	<0.0010	<0.0050	0.000446	<0.00050	<0.0010	<0.00050
WQR1-0.5	VA25A8148-001	2025-04-11	M																						
WQR1-0.5	VA25A8281-007	2025-04-14	M	0.037	287	0.00579	<0.0000050	0.000000025	0.00273	<0.00050	<0.050	84.3	<0.00050	2.0	<0.00010	2300	1.65	214	<0.000050	<0.0010	<0.0050	0.000743	<0.00050	<0.0010	<0.00050
WQR1-0.5	VA25A8283-007	2025-04-14	M																						
WQR1-0.5	VA25A9123-008	2025-04-23	M	<0.020	126	0.00824	<0.0000050	0.000000104	0.00140	<0.00050	<0.050	34.8	<0.00050	3.0	<0.00010	959	0.723	93.5	<0.000050	<0.0010	<0.0050	0.000278	<0.00050	<0.0010	<0.00050
WQR1-0.5	VA25A9125-008	2025-04-23	M																						
WQR1-0.5	VA25B0359-009	2025-05-06	M	<0.020	95.1	0.00463	<0.0000050	<0.000000020	0.00150	<0.00050	<0.050	36.4	<0.00050	1.6	<0.00010	833	0.831	106	<0.000050	<0.0010	<0.0050	0.000365	<0.00050	<0.0010	<0.00050
WQR1-0.5	VA25B0360-009	2025-05-06	M																						
WQR1-0.5	VA25B0800-007	2025-05-09	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA25B0802-007	2025-05-09	M	0.027	178	0.00328	<0.0000050	<0.000000020	0.00184	<0.00050	<0.050	54.0	<0.00050	1.6	<0.00010	1480	1.00	132	<0.000050	<0.0010	<0.0050	0.000460	<0.00050	0.0013	<0.00050
WQR1-0.5	VA25B2349-005	2025-05-27	M	0.030	222	0.00430	<0.0000050		0.00213	<0.00050	<0.050	63.5	<0.00050	1.8	<0.00010	1740	1.23	166	<0.000050	<0.0010	<0.0050	0.000594	<0.00050	0.0015	
WQR1-1	0051710-09	2020-05-20	M																						<0.0005
WQR1-1	0062209-10	2020-06-22	M																						<0.0005
WQR1-1	0071996-09	2020-07-21	M																						<0.0005
WQR1-1	0082292-09	2020-08-24	M																						<0.0005
WQR1-1	0093017-09	2020-09-28	M																						<0.0005
WQR1-1	20J1961-09	2020-10-20	M																						<0.0005
WQR1-1	20J2778-09	2020-10-27	M																						<0.0005
WQR1-1	20K0360-09	2020-11-03	M																						<0.0005
WQR1-1	20K1261-09	2020-11-10	M																						<0.0005
WQR1-1	20K2100-09	2020-11-18	M																						<0.0005
WQR1-1	20L1589-09	2020-12-14	M																						<0.0005
WQR1-1	21A2590-09	2021-01-27	M																						<0.0005
WQR1-1	21B2778-09	2021-02-25	M																						<0.0005
WQR1-1	21C3505-10	2021-03-25	M																						<0.0005
WQR1-1	21D2478-09	2021-04-22	M																						<0.0005
WQR1-1	21E1990-09	2021-05-18	M																						<0.0005
WQR1-1	21E2917-09	2021-05-26	M																						<0.0005
WQR1-1	21F0167-09	2021-06-01	M																						<0.0005
WQR1-1	21F1056-09	2021-06-08	M																						<0.0005
WQR1-1	21F2014-09	2021-06-15	M																						<0.0005
WQR1-1	21G2414-09	2021-07-20	M																						<0.0005
WQR1-1	21H3040-09	2021-08-25	M																						<0.0005
WQR1-1	21I3814-09	2021-09-28	M																						<0.0005
WQR1-1	21J3514-09	2021-10-26	M																						<0.0005
WQR1-1	21K3046-09	2021-11-23	M																						<0.0005
WQR1-1	21L2125-09	2021-12-14	M																						<0.0005
WQR1-1	22A2312-09	2022-01-20	M																						<0.0005
WQR1-1	22B2487-09	2022-02-17	M	0.147	1110	0.00167	<0.000010		0.00978	<0.00080	<0.100	318	0.00431	<2.0	<0.000100	8730	6.24	768	<0.000040	<0.00040	<0.0100	0.00259	<0.0020	<0.0080	<0.0005
WQR1-1	22C3145-09	2022-03-22	M	0.139	1080	0.00113	<0.000010		0.00924	<0.00080	<0.100	326	<0.00100	<2.0	<0.000100	8100	5.97	732	<0.000040	<0.00040	<0.0100	0.00242	<0.0020	<0.0080	<0.0005
WQR1-1	22D2212-06	2022-04-19	M	0.18	1290	0.00083	<0.000010		0.0101	<0.00080	0.129	386	<0.00100	<2.0	<0.000100	10600	6.96	900	0.000123	<0.00040	<0.0100	0.00267	<0.0100	<0.0080	<0.0005
WQR1-1	22E2480-01	2022-05-17	M	0.123	1170	<0.00200	<0.000010		0.011	<0.00400	<0.500	421	<0.00500	<10.0	<0.000500	10400	7.59	981	<0.000200	<0.00200	<0.0500	0.00271	<0.0500	<0.0400	<0.0005
WQR1-1	22F3212-09	2022-06-21	M	0.148	1070	0.00205	<0.000010		0.00979	<0.000400	<0.1	343	<0.00100	1.24	<0.000100	8600	6.96	852	<0.0000400	<0.000500	<0.00200	0.00257	<0.0100	<0.0100	<0.0005
WQR1-1	22G1763-09	2022-07-13	M	0.133	1130	0.00279	<0.000010		0.00947	<0.000400	<0.1	339	<0.00100	1.19	<0.000100	9560	6.82	825	<0.0000400	<0.000500	<0.00200	0.00251	<0.0100	<0.0100	<0.0005
WQR1-1	22H2453-09	2022-08-16	M	0.162	1090	0.00248	<0.000010		0.00978	<0.000400	<0.100	374	<0.00100	1.41	<0.000100	9260	7.25	897	<0.0000400	<0.000500	<0.00200	0.00250	<0.0100	0.0159	<0.0005
WQR1-1	22I1926-09	2022-09-14	M	0.160	1100	0.00244	<0.000010		0.00962	0.000880	<0.100	331	<0.00100	1.38	<0.000100	8900	6.82	832	<0.0000400	<0.000500	<0.00200	0.00270	<0.0100	<0.0100	<0.0005
WQR1-1	22J1560-01	2022-10-12	M	0.148	1070	0.00230	<0.000010		0.00896	<0.000400	<0.1	306	<0.00100	1.12	<0.000100	7990	6.12	736	<0.0000400	<0.000500	<0.00200	0.00249	<0.0100	<0.0100	<0.0005
WQR1-1	22K1453-09	2022-11-10	M	0.19	1370	0.0161	<0.000010		0.0105	0.000607	0.127	412	<0.00100	2.19	<0.000100	10900	7.41	1010	<0.0000400	<0.000500	<0.00200	0.00318	<0.0100	<0.0100	<0.0005
WQR1-1	22L0774-09	2022-12-07	M	0.182	1230	0.0428	<0.000010		0.0106	0.000434	0.113	382	<0.00100	2.02	<0.000100	9940	7.04	904	<0.0000400	<0.000500	<0.00200	0.00308	<0.0100	<0.0100	<0.0005
WQR1-1	23A2847-09	2023-01-27	M	0.16	1220	0.00467	<0.000010		0.0102	0.000829	<0.1	380	<0.00100	1.92	<0.000100	10200	7.29	918	<0.0000400	<0.000500	<0.00200	0.00294	<0.0100	<0.0100	<0.0005
WQR1-1	23C0060-09	2023-02-28	M	0.126	1280	0.00236	<0.000010		0.00995	0.000410	<0.1	408	<0.00100	2.06	<0.000100	10400	7.09	1010	<0.0000400	<0.000500	<0.00200	0.00266	<0.0100	<0.0100	<0.0005
WQR1-1	23C1797-09	2023-03-15	M	0.172	1150	0.00121	<0.000010		0.00986	<0.000400	<0.1	357	<0.00100	1.69	<0.000100	8720	6.64	879	<0.0000400	<0.000500	<0.00200	0.00275	<0.0100	<0.0100	<0.0005
WQR1-1	23D2945-09	2023-04-26	M	0.143	1210	0.00183	<0.000010		0.0103	0.000411	0.108	387	<0.00100	1.38	0.000117	9760	7.01	881	<0.0000400	<0.000500	<0.00200	0.00302	<0.0100	<0.0100	<0.0005
WQR1-1	23E2392-09	2023-05-17	M	0.135	1320	0.00169	<0.000010		0.0125	<0.000400	0.159	399	0.00102	1.69	0.000110	10800	7.81	985	<0.0000400	<0.000500	<0.00200	0.00290	<0.0100	<0.0100	<0.0005
WQR1-1	23F3614-09	2023-06-27	M	0.156	1150	0.00128	<0.000010		0.00997	<0.000400	0.113	379	<0.00100	1.26	<0.000100	8870	6.92	892	<0.0000400	<0.000500	<0.00200	0.00282	<0.0100	<0.0100	<0.0005
WQR1-1	23G2415-09	2023-07-19	M	0.188	1280	0.00145	<0.000010		0.0108	0.000427	0.107	399	<0.00100	1.6	<0.000100	10400	7.85	1040	<0.0000400	<0.000500	<0.00200	0.00302	<0.0100	<0.0100	<0.0005
WQR1-1	23H3309-01	2023-08-24	M	0.15	1090	0.00176	<0.000010		0.00968	<0.000400	<0.1	351	<0.00100	1.26	<0.000100	8850	6.82	847	<0.0000400	<0.000500	<0.00200	0.00267	<0.0100	<0.0100	<0.0005
WQR1-1	23I2271-01	2023-09-19	M	0.155	1040	0.00197	<0.000010		0.0103	<0.000400	<0.1	367	<0.00100	1.3	0.000161	8950	6.62	865	<0.0000400	<0.000500	<0.00200	0.00292	<0.0100	<0.0100	<0.0005
WQR1-1	23J2236-01	2023-10-18	M	0.139	1120	0.00388	<0.000010		0.0102	<0.000400	0.235	352	<0.00100	1.44	<0.000100	9050	6.91	869	<0.0000400	<0.000500	<0.00200	0.00290	<0.00400	<0.0100	
WQR1-1	23K1909-09	2023-11-15	M	0.169	1220	0.00305	<0.000010		0.00980	0.000575	0.109	381	<0.00100	1.76	<0.000100	10300	7.53	993	<0.0000400	<0.000500	<0.00200	0.00268	<0.00400	<0.0100	<0.0005
WQR1-1	23L1905-01	2023-12-14	M	0.142	1120	0.00339	<0.000010		0.0103	<0.000800	0.108	328	<0.00100	1.47	<0.000100	9960	6.95	791	<0.0000400	<0.000500	<0.00200	0.00275	<0.00400	<0.0100	<0.0005
WQR1-1	L2754366-4	2024-01-24	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-1	VA24A1422-004	2024-01-24	M	0.170	1180	0.00169	<0.0000050		0.0102	<0.00050	0.082	351	<0.00050	1.8	<0.00010	9760	6.95	811	<0.000050	<0.0010	<0.0050	0.00271	0.00154	<0.0010	<0.00050
WQR1-1	L2754594-1	2024-02-13	M																						
WQR1-1	VA24A2858-001	2024-02-13	M	0.155	992	0.00177	<0.0000050		0.00955	<0.00050	0.077	298	<0.00050	1.6	<0.00010	8070	6.43	798	<0.000050	<0.0010	<0.0050	0.00247	0.00157	<0.0010	<0.00050
WQR1-1	L2755033-1	2024-03-20	M																						
WQR1-1	VA24A5955-001	2024-03-20	M	0.149	1170	0.00146	<0.0000050		0.00999	<0.00050	0.084	362	<0.00050	1.6	<0.00010	9990	6.98	869	<0.000050	<0.0010	<0.0050	0.00302	0.00155	<0.0010	<0.00050
WQR1-1	L2755461-1	2024-04-23	M																						
WQR1-1	VA24A8736-001	2024-04-23	M	0.164	1160	0.00074	<0.0000050		0.00961	<0.00050	0.088	349	<0.00050	1.8	<0.00010	9670	6.53	831	<0.000050	<0.0010	<0.0050	0.00269	0.00145	0.0020	<0.00050
WQR1-1	L2755553-1	2024-04-30	M																						
WQR1-1	VA24A9418-001	2024-04-30	M	0.152	1220	0.00074	<0.0000050		0.00927	<0.00050	0.094	337	<0.00050	1.7	<0.00010	8900	6.42	871	<0.000050	<0.0010	<0.0050	0.00271	0.00139	0.0017	<0.00050
WQR1-1	L2755641-1	2024-05-07	M																						
WQR1-1	VA24B0040-001	2024-05-07	M	0.156	1090	0.00038	<0.0000050		0.0104	<0.00050	0.089	332	0.00069	1.7	<0.00010	9620	7.10	842	<0.000050	<0.0010	<0.0050	0.00275	0.00147	0.0016	<0.00050
WQR1-1	L2755769-1	2024-05-14	M																						
WQR1-1	VA24B0738-001	2024-05-14	M	0.160	1020	0.00068	<0.0000050		0.00935	<0.00050	0.092	352	0.00066	1.5	<0.00010	9210	6.33	749	<0.000050	<0.0010	<0.0050	0.00268	0.00148	<0.0010	<0.00050
WQR1-1	L2755874-1	2024-05-21	M																						
WQR1-1	VA24B1351-001	2024-05-21	M	0.158	1160	0.00113	<0.0000050		0.00981	<0.00050	0.089	331	<0.00050	1.6	<0.00010	9440	6.97	830	<0.000050	<0.0010	<0.0050	0.00292	0.00145	0.0011	<0.00050
WQR1-1	L2756277-1	2024-06-18	M																						
WQR1-1	VA24B4257-001	2024-06-18	M	0.136	1200	0.00372	<0.0000050		0.00910	<0.00050	0.092	344	<0.00050	1.7	<0.00010	9410	6.39	864	<0.000050	<0.0010	<0.0050	0.00295	0.00133	0.0030	<0.00050
WQR1-1	L2756678-1	2024-07-16	M																						
WQR1-1	VA24B7237-001	2024-07-16	M	0.132	1110	0.00152	<0.0000050		0.00910	<0.00050	0.098	342	<0.00050	1.3	<0.00010	9410	6.27	853	<0.000050	<0.0010	<0.0050	0.00274	0.00134	0.0044	<0.00050
WQR1-1	L2757095-1	2024-08-20	M																						
WQR1-1	VA24C1101-001	2024-08-20	M	0.160	1170	0.00260	<0.0000050		0.00912	<0.00050	0.107	354	<0.00050	1.5	<0.00010	9160	6.21	898	<0.000050	<0.0010	<0.0050	0.00280	0.00140	0.0052	<0.00050
WQR1-1	VA24C4483-001	2024-09-17	M	0.147	1200	0.00236	<0.0000050		0.00888	<0.00050	0.085	332	<0.00050	1.2	<0.00010	8680	6.24	834	<0.000050	<0.0010	<0.0050	0.00263	0.00129	0.0013	<0.00050
WQR1-1	VA24C8360-001	2024-10-22	M	0.140	1210	0.00448	<0.0000050		0.00889	<0.00050	0.083	344	0.00053	1.3	<0.00010	8940	6.06	779	<0.000050	<0.0010	<0.0050	0.00280	0.00114	<0.0010	<0.00050
WQR1-1	VA24C9197-001	2024-10-29	M	0.146	1250	0.00492	<0.0000050		0.00948	<0.00050	0.094	347	0.00117	1.6	<0.00010	8840	6.53	855	<0.000050	<0.0010	<0.0050	0.00286	0.00145	<0.0010	<0.00050
WQR1-1	VA24D0009-001	2024-11-05	M	0.137	1140	0.00868	<0.0000050		0.00875	<0.00050	0.081	355	<0.00050	1.4	<0.00010	9180	6.22	816	<0.000050	<0.0010	<0.0050	0.00291	0.00145	<0.0010	<0.00050
WQR1-1	L2758095-1	2024-11-12	M																						
WQR1-1	VA24D0632-001	2024-11-12	M	0.151	1190	0.00856	<0.0000050		0.00904	<0.00050	0.090	344	0.00084	1.4	<0.00010	8960	6.21	822	<0.000050	<0.0010	<0.0050	0.00262	0.00138	0.0048	<0.00050
WQR1-1	VA24D1720-001	2024-11-21	M	0.183	1160	0.0100	<0.0000050		0.0101	0.00061	0.100	354	<0.00100	1.8	<0.00010	8890	6.86	969	<0.000050	<0.0010	<0.0050	0.00229	0.00157	<0.0010	<0.00050
WQR1-1	L2758465-1	2024-12-17	M																						
WQR1-1	VA24D3769-001	2024-12-17	M	0.153	1020	0.00330	<0.0000050		0.0104	<0.00050	0.085	327	<0.00050	1.4	<0.00010	7810	6.70	801	<0.000050	<0.0010	<0.0050	0.00244	0.00152	0.0041	<0.00050
WQR1-1	L2758719-1	2025-01-21	M																						
WQR1-1	VA25A1408-001	2025-01-21	M	0.124	668	0.00156	<0.0000050		0.00888	<0.00050	0.079	312	<0.00050	1.6	<0.00010	8400	6.12	626	<0.000050	<0.0010	<0.0050	0.00223	0.00151	0.0030	<0.00050
WQR1-1	L2758994-1	2025-02-18	M																						
WQR1-1	VA25A3430-001	2025-02-18	M	0.159	1140	0.00112	<0.0000050		0.00874	<0.00050	0.080	350	<0.00050	2.2	<0.00010	9400	5.99	736	<0.000050	<0.0010	<0.0050	0.00243	0.00127	0.0018	<0.00050
WQR1-1	VA25A6550-001	2025-03-25	M	0.158	1360	0.00060	<0.0000050		0.00938	<0.00050	0.088	357	<0.00050	1.4	<0.00010	11200	6.66	763	<0.000050	<0.0010	<0.0050	0.00292	0.00139	0.0015	<0.00050
WQR1-1	VA25A8962-001	2025-04-22	M	0.153	1320	0.00086	<0.0000050		0.00964	<0.00050	0.076	329	<0.00050	1.4	0.00019	9130	6.62	795	<0.000050	<0.0010	<0.0050	0.00251	0.00148	0.0034	<0.00050
WQR1-1	VA25A9878-001	2025-04-30	M	0.149	1340	0.00103	<0.0000050		0.00942	<0.00050	0.072	314	<0.00050	1.2	<0.00010	9830	6.54	713	<0.000050	<0.0010	<0.0050	0.00212	0.00158	0.0016	<0.00050
WQR1-1	VA25B0358-001	2025-05-06	M	0.128	1180	0.00113	<0.0000050		0.0114	<0.00050	0.076	341	<0.00050	1.2	<0.00010	8380	8.00	679	<0.000050	<0.0010	<0.0050	0.00274	0.00174	0.0025	<0.00050
WQR1-1	VA25B1026-001	2025-05-13	M	0.083	604	0.00402	<0.0000050		0.00513	<0.00050	<0.050	175	<0.00050	1.3	<0.00010	5010	3.36	412	<0.000050	<0.0010	<0.0050	0.00139	0.00089	0.0014	<0.00050
WQR1-1	VA25B1711-001	2025-05-20	M	0.137	1450	0.00129	<0.0000050		0.00939	<0.00050	0.096	326	<0.00050	1.7	<0.00010	9850	6.35	671	<0.000050	<0.0010	<0.0050	0.00246	0.00150	0.0017	<0.00050
WQR1-2	0051710-10	2020-05-20	M																						<0.0005
WQR1-2	0062209-09	2020-06-22	M																						<0.0005
WQR1-2	0071996-10	2020-07-21	M																						<0.0005
WQR1-2	0082292-10	2020-08-24	M																						<0.0005
WQR1-2	0093017-10	2020-09-28	M																						<0.0005
WQR1-2	20J1961-10	2020-10-20	M																						<0.0005
WQR1-2	20J2778-10	2020-10-27	M																						<0.0005
WQR1-2	20K0360-10	2020-11-03	M																						<0.0005
WQR1-2	20K1261-10	2020-11-10	M																						<0.0005
WQR1-2	20K2100-10	2020-11-18	M																						<0.0005
WQR1-2	20L1589-10	2020-12-14	M																						<0.0005
WQR1-2	21A2590-10	2021-01-27	M																						<0.0005
WQR1-2	21B2778-10	2021-02-25	M																						<0.0005

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	21C3505-11	2021-03-25	M																						<0.0005
WQR1-2	21D2478-10	2021-04-22	M																						<0.0005
WQR1-2	21E1990-10	2021-05-18	M																						<0.0005
WQR1-2	21E2917-10	2021-05-26	M																						<0.0005
WQR1-2	21F0167-10	2021-06-01	M																						<0.0005
WQR1-2	21F1056-10	2021-06-08	M																						<0.0005
WQR1-2	21F2014-10	2021-06-15	M																						<0.0005
WQR1-2	21G2414-10	2021-07-20	M																						<0.0005
WQR1-2	21H3040-10	2021-08-25	M																						<0.0005
WQR1-2	21I3814-10	2021-09-28	M																						<0.0005
WQR1-2	21J3514-10	2021-10-26	M																						<0.0005
WQR1-2	21K3046-10	2021-11-23	M																						<0.0005
WQR1-2	21L2125-10	2021-12-14	M																						<0.0005
WQR1-2	22A2312-10	2022-01-20	M																						<0.0005
WQR1-2	22B2487-10	2022-02-17	M	0.129	996	0.00272	<0.000010		0.0082	<0.00080	<0.100	281	0.00368	2.2	<0.000100	7720	5.48	693	<0.000040	<0.00040	<0.0100	0.00228	<0.0020	<0.0080	<0.0005
WQR1-2	22C3145-10	2022-03-22	M	0.127	994	0.00165	<0.000010		0.00826	<0.00080	<0.100	297	<0.00100	<2.0	<0.000100	7490	5.55	669	<0.000040	<0.00040	<0.0100	0.00226	<0.0020	<0.0080	<0.0005
WQR1-2	22D2212-07	2022-04-19	M	0.143	1050	0.00151	<0.000010		0.00828	<0.00080	<0.100	312	<0.00100	<2.0	<0.000100	8520	5.66	708	0.00005	<0.00040	<0.0100	0.00215	<0.0100	<0.0080	<0.0005
WQR1-2	22E2480-02	2022-05-17	M	0.0365	281	0.00709	<0.000010		0.00295	<0.00400	<0.500	99.3	<0.00500	<10.0	<0.000500	2420	1.71	224	<0.000200	<0.00200	<0.0500	0.000782	<0.0500	<0.0400	<0.0005
WQR1-2	22F3212-10	2022-06-21	M	0.0165	108	0.00459	<0.000010		0.00119	<0.000400	<0.1	34.4	<0.00100	1.84	<0.000100	886	0.669	85.7	<0.0000400	<0.000500	<0.00200	0.000292	<0.0100	<0.0100	<0.0005
WQR1-2	22G1763-10	2022-07-13	M	0.0261	203	0.00418	<0.000010		0.00185	<0.000400	<0.1	61	<0.00100	1.37	<0.000100	1680	1.17	143	<0.0000400	<0.000500	<0.00200	0.000487	<0.0100	<0.0100	<0.0005
WQR1-2	22H2453-10	2022-08-16	M	0.0401	271	0.00475	<0.000010		0.00263	<0.000400	<0.100	95.5	<0.00100	1.48	<0.000100	2280	1.64	220	<0.0000400	<0.000500	<0.00200	0.000639	<0.0100	<0.0100	<0.0005
WQR1-2	22I1926-10	2022-09-14	M	0.0924	650	0.00559	<0.000010		0.00595	0.000539	<0.100	192	<0.00100	1.41	<0.000100	5290	4.08	490	<0.0000400	<0.000500	<0.00200	0.00157	<0.0100	<0.0100	<0.0005
WQR1-2	22J1560-02	2022-10-12	M	0.125	858	0.00318	<0.000010		0.00726	<0.000400	<0.1	245	<0.00100	<1	<0.000100	6490	5	588	<0.0000400	<0.000500	<0.00200	0.00193	<0.0100	<0.0100	<0.0005
WQR1-2	22K1453-10	2022-11-10	M	0.159	1120	0.0160	<0.000010		0.00888	0.000436	<0.1	341	<0.00100	2.42	<0.000100	8950	6.1	849	<0.0000400	<0.000500	<0.00200	0.00259	<0.0100	<0.0100	<0.0005
WQR1-2	22L0774-10	2022-12-07	M	0.166	1120	0.0293	<0.000010		0.00914	0.000401	<0.1	335	<0.00100	2.16	<0.000100	8960	6.29	820	<0.0000400	<0.000500	<0.00200	0.00265	<0.0100	<0.0100	<0.0005
WQR1-2	23A2847-10	2023-01-27	M	0.0907	652	0.0122	<0.000010		0.00555	0.000528	<0.1	204	<0.00100	2.94	<0.000100	5440	3.72	499	<0.0000400	<0.000500	<0.00200	0.00163	<0.0100	<0.0100	<0.0005
WQR1-2	23C0060-10	2023-02-28	M	0.113	1160	0.00564	<0.000010		0.00922	0.000420	<0.1	363	<0.00100	2.44	<0.000100	9270	6.46	902	<0.0000400	<0.000500	<0.00200	0.00248	<0.0100	<0.0100	<0.0005
WQR1-2	23C1797-10	2023-03-15	M	0.161	1100	0.00368	<0.000010		0.00906	<0.000400	<0.1	336	<0.00100	1.75	<0.000100	8290	6.14	812	<0.0000400	<0.000500	<0.00200	0.00260	<0.0100	<0.0100	<0.0005
WQR1-2	23D2945-10	2023-04-26	M	0.0759	597	0.00496	<0.000010		0.00534	<0.000400	<0.1	196	<0.00100	1.45	0.000139	4910	3.58	445	<0.0000400	<0.000500	<0.00200	0.00155	<0.0100	<0.0100	<0.0005
WQR1-2	23E2392-10	2023-05-17	M	0.0119	104	0.00548	<0.000010		0.000991	0.000129	<0.01	32.3	<0.00010	1.5	<0.000010	839	0.635	77.8	0.0000047	<0.000050	0.00024	0.000249	<0.00100	<0.0010	<0.0005
WQR1-2	23F3614-10	2023-06-27	M	0.0163	107	0.00453	<0.000010		0.00126	<0.000400	<0.1	33.4	<0.00100	1.36	<0.000100	875	0.638	81.9	<0.0000400	<0.000500	<0.00200	0.000266	<0.0100	<0.0100	<0.0005
WQR1-2	23G2415-10	2023-07-19	M	0.0256	162	0.00745	<0.000010		0.00179	<0.000400	<0.1	52.3	<0.00100	1.5	<0.000100	1340	1	126	<0.0000400	<0.000500	<0.00200	0.000412	<0.0100	<0.0100	<0.0005
WQR1-2	23H3309-02	2023-08-24	M	0.111	827	0.00442	<0.000010		0.00706	0.000412	<0.1	263	<0.00100	<1	<0.000100	6600	5.09	629	<0.0000400	<0.000500	<0.00200	0.00196	<0.0100	<0.0100	<0.0005
WQR1-2	23I2271-02	2023-09-19	M	0.0984	689	0.00307	<0.000010		0.00626	<0.000400	<0.1	214	<0.00100	<1	<0.000100	5710	4.18	530	<0.0000400	<0.000500	<0.00200	0.00183	<0.0100	<0.0100	<0.0005
WQR1-2	23J2236-02	2023-10-18	M	0.106	800	0.00668	<0.000010		0.00718	<0.000400	0.187	252	<0.00100	1.1	<0.000100	6450	4.74	632	<0.0000400	<0.000500	<0.00200	0.00210	<0.00400	<0.0100	
WQR1-2	23K1909-10	2023-11-15	M	0.134	986	0.00444	<0.000010		0.00804	0.000574	<0.1	300	<0.00100	1.94	<0.000100	8310	6.19	785	<0.0000400	<0.000500	<0.00200	0.00209	<0.00400	<0.0100	<0.0005
WQR1-2	23L1905-02	2023-12-14	M	0.133	1040	0.00462	<0.000010		0.00948	<0.000800	<0.1	300	<0.00100	1.53	<0.000100	9190	6.46	684	<0.0000400	<0.000500	<0.00200	0.00258	<0.00400	<0.0100	<0.0005
WQR1-2	L2754366-5	2024-01-24	M																						
WQR1-2	VA24A1422-005	2024-01-24	M	0.154	1080	0.00263	<0.0000050		0.00938	<0.00050	0.081	323	<0.00050	1.9	<0.00010	8980	6.41	772	<0.000050	<0.0010	<0.0050	0.00256	0.00141	<0.0010	<0.00050
WQR1-2	L2754594-2	2024-02-13	M																						
WQR1-2	VA24A2858-002	2024-02-13	M	0.129	719	0.00589	<0.0000050		0.00742	<0.00050	0.058	230	<0.00050	2.1	<0.00010	6660	5.07	608	<0.000050	<0.0010	<0.0050	0.00190	0.00125	0.0011	<0.00050
WQR1-2	L2755033-2	2024-03-20	M																						
WQR1-2	VA24A5955-002	2024-03-20	M	0.121	920	0.00178	<0.0000050		0.00788	<0.00050	<0.050	293	<0.00050	<1.0	<0.00010	8490	5.45	685	<0.000050	<0.0010	<0.0050	0.00244	0.00125	<0.0010	<0.00050
WQR1-2	L2755461-2	2024-04-23	M																						
WQR1-2	VA24A8736-002	2024-04-23	M	0.123	839	0.00334	<0.0000050		0.00669	<0.00050	<0.050	247	<0.00050	<1.0	<0.00010	6660	4.58	586	<0.000050	<0.0010	<0.0050	0.00189	0.00102	<0.0010	<0.00050
WQR1-2	L2755553-2	2024-04-30	M																						
WQR1-2	VA24A9418-002	2024-04-30	M	0.121	978	0.00175	<0.0000050		0.00745	<0.00050	<0.050	270	<0.00050	<1.0	<0.00010	7250	5.07	721	<0.000050	<0.0010	<0.0050	0.00215	0.00103	<0.0010	<0.00050
WQR1-2	L2755641-2	2024-05-07	M																						
WQR1-2	VA24B0040-002	2024-05-07	M	0.087	556	0.00401	<0.0000050		0.00585	<0.00050	<0.050	183	<0.00050	1.8	<0.00010	5330	3.87	459	<0.000050	<0.0010	<0.0050	0.00142	0.00084	<0.0010	<0.00050
WQR1-2	L2755769-2	2024-05-14	M																						
WQR1-2	VA24B0738-002	2024-05-14	M	0.034	262	0.00817	<0.0000050		0.00230	<0.00050	<0.050	77.8	<0.00050	2.1	<0.00010	2080	1.37	172	<0.000050	<0.0010	0.0079	0.000644	0.00085	<0.0010	<0.00050
WQR1-2	L2755874-2	2024-05-21	M																						
WQR1-2	VA24B1351-002	2024-05-21	M	0.031	238	0.00587	<0.0000050		0.00233	<0.00050	<0.050	68.1	<0.00050	1.9	<0.00010	1980	1.42	173	<0.000050	<0.0010	<0.0050	0.000610	0.00060	<0.0010	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	L2756277-2	2024-06-18	M																						
WQR1-2	VA24B4257-002	2024-06-18	M	0.038	326	0.00508	<0.0000050		0.00264	<0.00050	<0.050	93.6	<0.00050	1.3	<0.00010	2510	1.69	226	<0.000050	<0.0010	<0.0050	0.000822	0.00062	<0.0010	<0.00050
WQR1-2	L2756678-2	2024-07-16	M																						
WQR1-2	VA24B7237-002	2024-07-16	M	0.035	296	0.00434	<0.0000050		0.00248	<0.00050	<0.050	86.0	<0.00050	1.2	<0.00010	2440	1.59	222	<0.000050	<0.0010	<0.0050	0.000748	0.00057	0.0012	<0.00050
WQR1-2	L2757095-2	2024-08-20	M																						
WQR1-2	VA24C1101-002	2024-08-20	M	0.046	344	0.00468	<0.0000050		0.00267	<0.00050	<0.050	101	<0.00050	1.3	<0.00010	2720	1.70	259	<0.000050	<0.0010	<0.0050	0.000746	0.00060	<0.0010	<0.00050
WQR1-2	VA24C4483-002	2024-09-17	M	0.046	411	0.00847	<0.0000050		0.00326	<0.00050	<0.050	116	<0.00050	1.3	<0.00010	3010	2.06	288	<0.000050	<0.0010	<0.0050	0.000929	0.00065	<0.0010	<0.00050
WQR1-2	VA24C8360-002	2024-10-22	M	0.083	760	0.00560	<0.0000050		0.00609	<0.00050	<0.050	223	0.00070	1.2	<0.00010	5620	3.95	510	<0.000050	<0.0010	<0.0050	0.00187	0.00086	<0.0010	<0.00050
WQR1-2	VA24C9197-002	2024-10-29	M	0.094	647	0.00499	<0.0000050		0.00633	<0.00050	<0.050	218	0.00316	1.4	<0.00010	4520	4.31	540	<0.000050	<0.0010	<0.0050	0.00191	0.00120	<0.0010	<0.00050
WQR1-2	VA24D0009-002	2024-11-05	M	0.092	839	0.00456	<0.0000050		0.00718	<0.00050	0.053	261	<0.00050	1.5	<0.00010	6390	4.90	626	<0.000050	<0.0010	<0.0050	0.00214	0.00126	0.0010	<0.00050
WQR1-2	L2758095-2	2024-11-12	M																						
WQR1-2	VA24D0632-002	2024-11-12	M	0.073	587	0.00508	<0.0000050		0.00459	<0.00050	<0.050	170	0.00071	1.9	<0.00010	4260	3.06	418	<0.000050	<0.0010	<0.0050	0.00129	0.00087	<0.0010	<0.00050
WQR1-2	VA24D1720-002	2024-11-21	M	0.094	621	0.0109	<0.0000050		0.00511	<0.00050	<0.050	182	<0.00050	2.7	<0.00010	4780	3.46	489	<0.000050	<0.0010	<0.0050	0.00120	0.00097	<0.0010	<0.00050
WQR1-2	L2758465-2	2024-12-17	M																						
WQR1-2	VA24D3769-002	2024-12-17	M	0.119	779	0.00376	<0.0000050		0.00829	<0.00050	0.064	239	<0.00050	1.4	<0.00010	6010	5.45	611	<0.000050	<0.0010	<0.0050	0.00198	0.00130	0.0011	<0.00050
WQR1-2	L2758719-2	2025-01-21	M																						
WQR1-2	VA25A1408-002	2025-01-21	M	0.096	468	0.00766	<0.0000050		0.00653	<0.00050	0.070	232	<0.00050	2.4	<0.00010	6250	4.48	418	<0.000050	<0.0010	<0.0050	0.00166	0.00119	0.0022	<0.00050
WQR1-2	L2758994-2	2025-02-18	M																						
WQR1-2	VA25A3430-002	2025-02-18	M	0.122	932	0.00708	<0.0000050		0.00691	<0.00050	0.056	279	<0.00050	3.2	<0.00010	7450	4.84	598	<0.000050	<0.0010	<0.0050	0.00202	0.00109	0.0021	<0.00050
WQR1-2	VA25A6550-002	2025-03-25	M	0.114	961	0.00142	<0.0000050		0.00708	0.00052	<0.050	255	<0.00050	<1.0	<0.00010	7740	4.98	614	<0.000050	<0.0010	<0.0050	0.00224	0.00103	0.0015	<0.00050
WQR1-2	VA25A8962-002	2025-04-22	M	0.061	526	0.00397	<0.0000050		0.00423	<0.00050	<0.050	137	<0.00050	1.4	<0.00010	3700	2.79	344	<0.000050	<0.0010	<0.0050	0.00111	<0.00050	<0.0010	<0.00050
WQR1-2	VA25A9878-002	2025-04-30	M	0.034	325	0.00520	<0.0000050		0.00257	<0.00050	<0.050	81.0	<0.00050	1.5	<0.00010	2330	1.71	179	<0.000050	<0.0010	<0.0050	0.000644	<0.00050	<0.0010	<0.00050
WQR1-2	VA25B0358-002	2025-05-06	M	0.066	539	0.00425	<0.0000050		0.00575	<0.00050	<0.050	164	<0.00050	<1.0	<0.00010	3870	3.84	327	<0.000050	<0.0010	<0.0050	0.00138	0.00074	<0.0010	<0.00050
WQR1-2	VA25B1026-002	2025-05-13	M	0.050	351	0.00498	<0.0000050		0.00335	<0.00050	<0.050	104	<0.00050	1.6	<0.00010	2920	2.11	256	<0.000050	<0.0010	<0.0050	0.000872	0.00064	0.0018	<0.00050
WQR1-2	VA25B1711-002	2025-05-20	M	0.048	407	0.00358	<0.0000050		0.00343	<0.00050	<0.050	106	<0.00050	1.4	<0.00010	2950	2.17	233	<0.000050	<0.0010	<0.0050	0.000935	0.00059	<0.0010	<0.00050
WQR1-2m	L2755545-8	2024-04-30	M																						
WQR1-2m	VA24A9402-008	2024-04-30	M	0.088	681	0.00375	<0.0000050	<0.000000020	0.00534	<0.00050	<0.050	189	<0.00050	<1.0	<0.00010	5080	3.74	463	<0.000050	<0.0010	<0.0050	0.00150	0.00088	<0.0010	<0.00050
WQR1-2m	VA24A9802-012	2024-05-05	M	0.120	856	0.00253	<0.0000050		0.00694	<0.00050	<0.050	253	<0.00050	<1.0	<0.00010	6770	4.71	582	<0.000050	<0.0010	<0.0050	0.00199	0.00102	<0.0010	
WQR1-2m	L2755648-11	2024-05-08	M																						
WQR1-2m	VA24B0178-011	2024-05-08	M	0.064	430	0.00480	<0.0000050	<0.000000020	0.00388	<0.00050	<0.050	134	<0.00050	1.5	<0.00010	3610	2.60	324	<0.000050	<0.0010	<0.0050	0.00104	0.00069	<0.0010	<0.00050
WQR1-2m	L2755934-2	2024-05-24	M																						
WQR1-2m	VA24B1783-002	2024-05-24	M	0.034	238	0.00543	<0.0000050	<0.000000020	0.00231	<0.00050	<0.050	68.7	<0.00050	1.9	<0.00010	1920	1.37	190	<0.000050	<0.0010	<0.0050	0.000660	0.00053	<0.0010	<0.00050
WQR1-2m	L2755981-2	2024-05-28	M																						
WQR1-2m	VA24B2063-002	2024-05-28	M	0.049	320	0.00484	<0.0000050	0.000000021	0.00317	<0.00050	<0.050	100	0.00054	1.4	<0.00010	2730	2.01	254	<0.000050	<0.0010	<0.0050	0.000896	0.00060	<0.0010	<0.00050
WQR1-2m	VA24B2561-006	2024-06-01	M	0.040	311	0.00512	<0.0000050		0.00257	<0.00050	<0.050	84.7	<0.00050	1.8	<0.00010	2240	1.57	229	<0.000050	<0.0010	<0.0050	0.000715	0.00058	0.0015	
WQR1-2m	L2756068-2	2024-06-04	M																						
WQR1-2m	VA24B2772-002	2024-06-04	M	<0.020	16.9	0.00443	<0.0000050	0.000000022	0.00045	<0.00050	<0.050	5.4	<0.00050	1.4	<0.00010	138	0.104	12.2	<0.000050	<0.0010	<0.0050	0.000087	<0.00050	<0.0010	<0.00050
WQR1-2m	VA24B3452-008	2024-06-10	M	<0.020	132	0.00484	<0.0000050	0.000000028	0.00131	<0.00050	<0.050	36.4	<0.00050	<1.0	<0.00010	6680	0.735	98.6	<0.000050	<0.0010	<0.0050	0.000362	<0.00050	0.0016	<0.00050
WQR1-2m	656-454600000-0	2024-06-17	M																						
WQR1-2m	VA24B5882-008	2024-07-03	M																						
WQR1-2m	VA24B6465-002	2024-07-09	M	<0.020	138	0.00520	<0.0000050	<0.000000020	0.00132	<0.00050	<0.050	38.6	<0.00050	1.3	<0.00010	1120	0.742	95.2	<0.000050	<0.0010	<0.0050	0.000300	<0.00050	<0.0010	<0.00050
WQR1-2m	VA24B7867-002	2024-07-20	M	0.034	260	0.00474	<0.0000050	0.000000033	0.00233	<0.00050	<0.050	74.5	<0.00050	<1.0	<0.00010	2050	1.41	179	<0.000050	<0.0010	<0.0050	0.000662	0.00062	<0.0010	<0.00050
WQR1-2m	L2757210-2	2024-08-26	M																						
WQR1-2m	VA24C2208-002	2024-08-26	M	0.078	604	0.00294	<0.0000050	<0.000000020	0.00493	<0.00050	<0.050	187	<0.00050	<1.0	<0.00010	4960	3.51	429	<0.000050	<0.0010	<0.0050	0.00134	0.00087	<0.0010	<0.00050
WQR1-2m	L2757680-2	2024-10-06	M																						
WQR1-2m	VA24C6685-002	2024-10-06	M	0.116	929	0.00765	<0.0000050	<0.000000080	0.00732	<0.0250	<2.50	286	<0.00250	<2.50	<0.000500	7330	5.10	665	<0.000500	<0.00500	<0.0150	0.00209	<0.0250	<0.0500	<0.00050
WQR1-2m	VA24C7408-002	2024-10-13	M	0.127	836	0.00673	<0.0000050	0.000000021	0.00627	<0.00050	<0.050	245	<0.00050	1.3	<0.00010	6310	4.26	556	<0.000050	<0.0010	<0.0050	0.00222	0.00089	<0.0010	<0.00050
WQR1-2m	L2757830-6	2024-10-20	M																						
WQR1-2m	VA24C8041-006	2024-10-20	M	0.038	282	0.0207	<0.0000050	0.000000036	0.00203	<0.00050	<0.050	79.3	<0.00050	1.7	<0.00010	2090	1.38	186	<0.000050	<0.0010	<0.0050	0.000710	0.00058	<0.0010	<0.00050
WQR1-2m	L2757872-2	2024-10-22	M																						
WQR1-2m	VA24C8330-002	2024-10-22	M	0.070	567	0.00803	<0.0000050	0.000000020	0.00378	<0.00050	<0.050	157	<0.00050	1.6	<0.00010	4400	2.64	359	<0.000050	<0.0010	<0.0050	0.00137	0.00073	<0.0010	<0.00050
WQR1-2m	L2757933-6	2024-10-28	M																						
WQR1-2m	VA24C9041-006	2024-10-28	M	0.031	246	0.00644	<0.0000050	<0.000000020	0.00208	<0.00050	<0.050	70.0	<0.00050	2.0	<0.00010	2010	1.32	173	<0.000050	<0.0010	<0.0050	0.000570	0.00057	<0.0010	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2m	L2758002-3	2024-11-01	M																						
WQR1-2m	VA24C9683-003	2024-11-01	M	0.083	615	0.00837	<0.0000050	<0.000000080	0.00534	<0.00050	<0.050	187	0.00064	2.2	<0.00010	4970	3.47	469	<0.000050	<0.0010	<0.0050	0.00143	0.00103	0.0015	<0.00050
WQR1-2m	L2758353-2	2024-12-05	M																						
WQR1-2m	VA24D2842-002	2024-12-05	M	0.122	828	0.00509	<0.0000050	0.000000022	0.00787	<0.00050	0.069	290	<0.00050	1.7	<0.00010	6820	5.30	647	<0.000050	<0.0010	<0.0050	0.00226	0.00138	0.0019	<0.00050
WQR1-2m	L2758617-8	2025-01-08	M																						
WQR1-2m	VA25A0392-008	2025-01-08	M	0.119	635	0.00698	<0.0000050	0.000000022	0.00724	<0.00050	0.066	243	<0.00050	2.0	<0.00010	5010	4.96	556	<0.000050	<0.0010	<0.0050	0.00175	0.00121	0.0014	<0.00050
WQR1-2m	L2759040-8	2025-02-20	M																						
WQR1-2m	VA25A3677-008	2025-02-20	M	0.112	919	0.00431	<0.0000050	<0.000000020	0.00756	<0.00050	<0.050	275	<0.00050	2.6	<0.00010	6830	5.17	580	<0.000050	<0.0010	<0.0050	0.00194	0.00124	0.0010	<0.00050
WQR1-2m	L2759227-8	2025-03-13	M																						
WQR1-2m	VA25A5556-008	2025-03-13	M	0.128	953	0.00108	<0.0000050	2.28E-08	0.00767	0.00074	<0.050	277	<0.00050	<1.0	<0.00010	7560	5.41	670	<0.000050	<0.0010	<0.0050	0.00215	0.00115	<0.0010	<0.00050
WQR1-2m	VA25A6528-014	2025-03-25	M																						
WQR1-2m	VA25A8147-002	2025-04-11	M	0.088	556	0.00305	<0.0000050	<0.000000020	0.00486	<0.00050	<0.050	154	<0.00050	1.0	<0.00010	5040	3.10	411	<0.000050	<0.0010	<0.0050	0.00151	0.00076	<0.0010	<0.00050
WQR1-2m	VA25A8148-002	2025-04-11	M																						
WQR1-2m	VA25A8281-008	2025-04-14	M	0.081	571	0.00369	<0.0000050	<0.000000020	0.00511	<0.00050	<0.050	173	<0.00050	<1.0	<0.00010	4700	3.43	418	<0.000050	<0.0010	<0.0050	0.00136	0.00068	<0.0010	<0.00050
WQR1-2m	VA25A8283-008	2025-04-14	M																						
WQR1-2m	VA25A9123-009	2025-04-23	M	0.083	618	0.00466	<0.0000050	<0.000000020	0.00544	<0.00050	<0.050	179	<0.00050	<1.0	<0.00010	4930	3.59	455	<0.000050	<0.0010	<0.0050	0.00144	0.00054	<0.0010	<0.00050
WQR1-2m	VA25A9125-009	2025-04-23	M																						
WQR1-2m	VA25B0359-008	2025-05-06	M	0.089	423	0.00360	<0.0000050	<0.000000020	0.00504	<0.00050	<0.050	167	<0.00050	<1.0	<0.00010	3310	3.40	390	<0.000050	<0.0010	<0.0050	0.00130	0.00070	<0.0010	<0.00050
WQR1-2m	VA25B0360-008	2025-05-06	M																						
WQR1-2m	VA25B0800-008	2025-05-09	M																						
WQR1-2m	VA25B0802-008	2025-05-09	M	0.093	687	0.00361	<0.0000050	<0.000000020	0.00531	<0.00050	<0.050	191	<0.00050	<1.0	<0.00010	5580	3.57	456	<0.000050	<0.0010	<0.0050	0.00145	0.00076	<0.0010	<0.00050
WQR1-3	23L1905-03	2023-12-14	M	0.0961	745	0.0159	<0.000010		0.00653	<0.000400	<0.1	217	<0.00100	2.28	<0.000100	6430	4.61	484	<0.0000400	<0.000500	<0.00200	0.00187	<0.00400	<0.0100	<0.0005
WQR1-3	L2754366-6	2024-01-24	M																						
WQR1-3	VA24A1422-006	2024-01-24	M	0.079	585	0.00830	<0.0000050		0.00496	<0.00050	<0.050	172	<0.00050	3.0	<0.00010	4480	3.26	391	<0.000050	<0.0010	<0.0050	0.00135	0.00094	<0.0010	<0.00050
WQR1-3	L2754594-3	2024-02-13	M																						
WQR1-3	VA24A2858-003	2024-02-13	M	0.090	511	0.00961	<0.0000050		0.00502	<0.00050	<0.050	156	<0.00050	2.7	<0.00010	4380	3.32	403	<0.000050	<0.0010	<0.0050	0.00130	0.00091	<0.0010	<0.00050
WQR1-3	L2755033-3	2024-03-20	M																						
WQR1-3	VA24A5955-003	2024-03-20	M	0.047	357	0.00808	<0.0000050		0.00317	<0.00050	<0.050	104	<0.00050	3.2	<0.00010	2990	1.95	255	<0.000050	<0.0010	<0.0050	0.000881	0.00068	<0.0010	<0.00050
WQR1-3	L2755461-3	2024-04-23	M																						
WQR1-3	VA24A8736-003	2024-04-23	M	0.105	715	0.00453	<0.0000050		0.00573	<0.00050	<0.050	204	<0.00050	1.2	<0.00010	5820	3.84	500	<0.000050	<0.0010	<0.0050	0.00160	0.00087	<0.0010	<0.00050
WQR1-3	L2755553-3	2024-04-30	M																						
WQR1-3	VA24A9418-003	2024-04-30	M	0.040	310	0.00599	<0.0000050		0.00247	<0.00050	<0.050	83.4	<0.00050	2.4	<0.00010	2100	1.50	212	<0.000050	<0.0010	<0.0050	0.000714	0.00052	<0.0010	<0.00050
WQR1-3	L2755641-3	2024-05-07	M																						
WQR1-3	VA24B0040-003	2024-05-07	M	0.052	354	0.00504	<0.0000050		0.00362	<0.00050	<0.050	110	<0.00050	2.0	<0.00010	3240	2.23	276	<0.000050	<0.0010	<0.0050	0.000947	0.00065	<0.0010	<0.00050
WQR1-3	L2755769-3	2024-05-14	M																						
WQR1-3	VA24B0738-003	2024-05-14	M	<0.020	63.7	0.00561	<0.0000050		0.00082	<0.00050	<0.050	19.2	<0.00050	1.8	<0.00010	485	0.348	39.7	<0.000050	<0.0010	<0.0050	0.000207	<0.00050	<0.0010	<0.00050
WQR1-3	L2755874-3	2024-05-21	M																						
WQR1-3	VA24B1351-003	2024-05-21	M	<0.020	90.0	0.00674	<0.0000050		0.00121	<0.00050	<0.050	28.2	<0.00050	2.1	<0.00010	816	0.574	71.1	<0.000050	<0.0010	<0.0050	0.000217	0.00050	<0.0010	<0.00050
WQR1-3	L2756277-3	2024-06-18	M																						
WQR1-3	VA24B4257-003	2024-06-18	M	<0.020	114	0.00649	<0.0000050		0.00118	<0.00050	<0.050	31.9	<0.00050	2.1	<0.00010	831	0.584	77.2	<0.000050	<0.0010	<0.0050	0.000284	<0.00050	0.0016	<0.00050
WQR1-3	L2756678-3	2024-07-16	M																						
WQR1-3	VA24B7237-003	2024-07-16	M	<0.020	79.8	0.00515	<0.0000050		0.00084	<0.00050	<0.050	23.2	<0.00050	1.5	<0.00010	607	0.422	56.0	<0.000050	<0.0010	<0.0050	0.000205	<0.00050	0.0022	<0.00050
WQR1-3	L2757095-3	2024-08-20	M																						
WQR1-3	VA24C1101-003	2024-08-20	M	0.030	230	0.00590	<0.0000050		0.00183	<0.00050	<0.050	65.8	<0.00050	1.4	<0.00010	1720	1.16	176	<0.000050	<0.0010	<0.0050	0.000459	0.00051	<0.0010	<0.00050
WQR1-3	VA24C4483-003	2024-09-17	M	0.047	380	0.00938	<0.0000050		0.00301	<0.00050	<0.050	106	<0.00050	1.3	<0.00010	2780	1.97	268	<0.000050	<0.0010	<0.0050	0.000898	0.00063	<0.0010	<0.00050
WQR1-3	VA24C8360-003	2024-10-22	M	<0.020	105	0.00980	<0.0000050		0.00100	<0.00050	<0.050	29.4	<0.00050	2.0	<0.00010	787	0.518	70.6	<0.000050	<0.0010	<0.0050	0.000284	<0.00050	<0.0010	<0.00050
WQR1-3	VA24C9197-003	2024-10-29	M	<0.020	104	0.00570	<0.0000050		0.00108	<0.00050	<0.050	30.4	<0.00050	2.4	<0.00010	764	0.547	75.9	<0.000050	<0.0010	<0.0050	0.000331	<0.00050	<0.0010	<0.00050
WQR1-3	VA24D0009-003	2024-11-05	M	0.070	609	0.00695	<0.0000050		0.00489	<0.00050	<0.050	193	<0.00050	1.9	<0.00010	4840	3.30	438	<0.000050	<0.0010	<0.0050	0.00159	0.00093	<0.0010	<0.00050
WQR1-3	L2758095-3	2024-11-12	M																						
WQR1-3	VA24D0632-003	2024-11-12	M	0.036	291	0.00510	<0.0000050		0.00246	<0.00050	<0.050	84.0	<0.00050	2.1	<0.00010	2200	1.53	211	<0.000050	<0.0010	<0.0050	0.000665	0.00063	0.0020	<0.00050
WQR1-3	VA24D1720-003	2024-11-21	M	0.084	579	0.0114	<0.0000050		0.00530	<0.00050	<0.050	169	<0.00100	2.8	<0.00010	4440	3.46	480	<0.000050	<0.0010	<0.0050	0.00122	0.00094	<0.0010	<0.00050
WQR1-3	L2758465-3	2024-12-17	M																						
WQR1-3	VA24D3769-003	2024-12-17	M	0.121	784	0.00331	<0.0000050		0.00809	<0.00050	0.065	253	<0.00050	1.4	<0.00010	5960	5.34	619	<0.000050	<0.0010	<0.0050	0.00195	0.00126	<0.0010	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-3	L2758719-3	2025-01-21	M																						
WQR1-3	VA25A1408-003	2025-01-21	M	0.091	436	0.00929	<0.0000050		0.00602	<0.00050	<0.050	209	<0.00050	2.7	<0.00010	5770	4.04	390	<0.000050	<0.0010	<0.0050	0.00151	0.00112	0.0012	<0.00050
WQR1-3	L2758994-3	2025-02-18	M																						
WQR1-3	VA25A3430-003	2025-02-18	M	0.118	883	0.00750	<0.0000050		0.00692	<0.00050	0.051	275	<0.00050	3.2	<0.00010	7130	4.69	550	<0.000050	<0.0010	<0.0050	0.00187	0.00107	0.0011	<0.00050
WQR1-3	VA25A6550-003	2025-03-25	M	0.042	310	0.00730	<0.0000050		0.00292	<0.00050	<0.050	87.5	<0.00050	2.3	<0.00010	2460	1.78	233	<0.000050	<0.0010	<0.0050	0.000921	0.00050	0.0011	<0.00050
WQR1-3	VA25A8962-003	2025-04-22	M	0.032	272	0.00533	<0.0000050		0.00250	<0.00050	<0.050	73.2	<0.00050	2.2	<0.00010	2010	1.49	183	<0.000050	<0.0010	<0.0050	0.000614	<0.00050	<0.0010	<0.00050
WQR1-3	VA25A9878-003	2025-04-30	M	<0.020	86.5	0.00466	<0.0000050		0.00096	<0.00050	<0.050	22.9	<0.00050	2.1	<0.00010	630	0.453	51.6	<0.000050	<0.0010	<0.0050	0.000197	<0.00050	<0.0010	<0.00050
WQR1-3	VA25B0358-003	2025-05-06	M	<0.020	106	0.00497	<0.0000050		0.00153	<0.00050	<0.050	35.0	<0.00050	1.4	<0.00010	823	0.799	65.2	<0.000050	<0.0010	<0.0050	0.000348	<0.00050	0.0010	<0.00050
WQR1-3	VA25B1026-003	2025-05-13	M	0.034	220	0.00528	<0.0000050		0.00222	<0.00050	<0.050	67.2	<0.00050	2.0	<0.00010	1880	1.29	164	<0.000050	<0.0010	<0.0050	0.000567	<0.00050	0.0011	<0.00050
WQR1-3	VA25B1711-003	2025-05-20	M	<0.020	65.0	0.00421	<0.0000050		0.00096	<0.00050	<0.050	19.4	<0.00050	2.2	<0.00010	524	0.409	43.9	<0.000050	<0.0010	<0.0050	0.000180	<0.00050	<0.0010	<0.00050
WQR1-SF	L2755545-9	2024-04-30	M																						
WQR1-SF	VA24A9402-009	2024-04-30	M	0.142	1150	0.00074	<0.0000050	<0.000000020	0.00898	<0.00050	<0.050	315	<0.00050	<1.0	<0.00010	8580	6.20	774	<0.000050	<0.0010	<0.0050	0.00241	0.00130	<0.0010	<0.00050
WQR1-SF	VA24A9802-013	2024-05-05	M	0.150	1060	0.00095	<0.0000050		0.00894	<0.00050	<0.050	316	0.00055	<1.0	<0.00010	8780	6.06	745	<0.000050	<0.0010	<0.0050	0.00256	0.00125	0.0017	
WQR1-SF	L2755648-12	2024-05-08	M																						
WQR1-SF	VA24B0178-012	2024-05-08	M	0.160	1070	0.00064	<0.0000050	<0.000000020	0.00971	<0.00050	0.086	359	0.00105	1.4	<0.00010	9490	6.85	818	<0.000050	<0.0010	<0.0050	0.00246	0.00134	<0.0010	<0.00050
WQR1-SF	L2755934-3	2024-05-24	M																						
WQR1-SF	VA24B1783-003	2024-05-24	M	0.148	1040	0.00121	<0.0000050	<0.000000020	0.00925	<0.00050	<0.050	305	0.00308	<1.0	<0.00010	8220	6.16	804	<0.000050	<0.0010	<0.0050	0.00262	0.00128	<0.0010	<0.00050
WQR1-SF	L2755981-3	2024-05-28	M																						
WQR1-SF	VA24B2063-003	2024-05-28	M	0.156	1030	0.00106	<0.0000050	<0.000000020	0.00931	<0.00050	<0.050	308	0.00065	<1.0	<0.00010	8310	6.30	778	<0.000050	<0.0010	<0.0050	0.00264	0.00125	<0.0010	<0.00050
WQR1-SF	L2756068-3	2024-06-04	M																						
WQR1-SF	VA24B2772-003	2024-06-04	M	0.092	713	0.00249	<0.0000050	<0.000000020	0.00571	<0.00050	<0.050	207	<0.00050	<1.0	<0.00010	5360	3.83	492	<0.000050	<0.0010	<0.0050	0.00181	0.00090	<0.0010	<0.00050
WQR1-SF	VA24B3452-009	2024-06-10	M	0.136	1160	0.00160	<0.0000050	0.000000020	0.00867	<0.00050	0.054	358	<0.00050	<1.0	<0.00010	8660	6.24	802	<0.000050	<0.0010	<0.0050	0.00269	0.00122	0.0011	<0.00050
WQR1-SF	657-454600000-0	2024-06-17	M																						
WQR1-SF	VA24B5882-009	2024-07-03	M																						
WQR1-SF	VA24B6465-003	2024-07-09	M	0.112	906	0.00106	<0.0000050	0.000000027	0.00761	<0.00050	<0.050	266	<0.00050	<1.0	<0.00010	7450	4.96	656	<0.000050	<0.0010	<0.0050	0.00226	0.00108	<0.0010	<0.00050
WQR1-SF	VA24B7867-003	2024-07-20	M	0.129	1100	0.00189	<0.0000050	0.000000026	0.00765	<0.00050	0.063	319	<0.00050	<1.0	<0.00010	8730	5.37	773	<0.000050	<0.0010	<0.0050	0.00268	0.00109	<0.0010	<0.00050
WQR1-SF	L2757210-3	2024-08-26	M																						
WQR1-SF	VA24C2208-003	2024-08-26	M	0.139	1100	0.00253	<0.0000050	<0.000000020	0.00846	<0.00050	0.076	321	<0.00050	<1.0	<0.00010	7530	5.95	764	<0.000050	<0.0010	<0.0050	0.00267	0.00118	<0.0010	<0.00050
WQR1-SF	L2757680-3	2024-10-06	M																						
WQR1-SF	VA24C6685-003	2024-10-06	M	0.133	1110	<0.00500	<0.0000050	<0.000000020	0.00863	<0.0250	<2.50	352	<0.00250	<2.50	<0.000500	8840	5.88	820	<0.000500	<0.00500	<0.0150	0.00235	<0.0250	<0.0500	<0.00050
WQR1-SF	VA24C7408-003	2024-10-13	M	0.162	1070	0.00515	<0.0000050	<0.000000020	0.00806	<0.00050	0.077	306	<0.00050	1.2	<0.00010	8110	5.66	753	<0.000050	<0.0010	<0.0050	0.00294	0.00103	<0.0010	<0.00050
WQR1-SF	L2757872-3	2024-10-22	M																						
WQR1-SF	VA24C8330-003	2024-10-22	M	0.140	1210	0.00784	<0.0000050	<0.000000020	0.00862	<0.00050	0.082	336	<0.00050	1.2	<0.00010	8910	6.02	768	<0.000050	<0.0010	<0.0050	0.00280	0.00109	<0.0010	<0.00050
WQR1-SF	L2757933-7	2024-10-28	M																						
WQR1-SF	VA24C9041-007	2024-10-28	M	0.094	755	0.00488	<0.0000050	<0.000000020	0.00608	<0.00050	0.050	219	0.00063	1.5	<0.00010	6250	4.08	527	<0.000050	<0.0010	<0.0050	0.00184	0.00098	<0.0010	<0.00050
WQR1-SF	L2758002-4	2024-11-01	M																						
WQR1-SF	VA24C9683-004	2024-11-01	M	0.162	1180	0.00852	<0.0000050	<0.000000080	0.00960	<0.00050	0.087	359	0.00214	1.5	<0.00010	9570	6.41	872	<0.000050	<0.0010	<0.0050	0.00256	0.00161	<0.0010	<0.00050
WQR1-SF	VA24D2498-001	2024-11-30	M																						
WQR1-SF	L2758353-3	2024-12-05	M																						
WQR1-SF	VA24D2842-003	2024-12-05	M	0.157	1100	0.00309	<0.0000050	<0.000000020	0.00905	<0.00050	0.078	332	<0.00050	1.5	<0.00010	8860	6.18	710	<0.000050	<0.0010	<0.0050	0.00243	0.00140	0.0011	<0.00050
WQR1-SF	L2758617-9	2025-01-08	M																						
WQR1-SF	VA25A0392-009	2025-01-08	M	0.138	736	0.00222	<0.0000050	<0.000000020	0.00905	<0.00050	0.084	298	<0.00050	1.4	<0.00010	5690	6.25	673	<0.000050	<0.0010	<0.0050	0.00212	0.00150	<0.0010	<0.00050
WQR1-SF	L2759040-9	2025-02-20	M																						
WQR1-SF	VA25A3677-009	2025-02-20	M	0.136	1070	0.00090	<0.0000050	<0.000000020	0.00860	<0.00050	0.058	325	<0.00050	2.6	<0.00010	7940	6.04	671	<0.000050	<0.0010	<0.0050	0.00233	0.00141	0.0012	<0.00050
WQR1-SF	L2759227-9	2025-03-13	M																						
WQR1-SF	VA25A5556-009	2025-03-13	M	0.145	1080	0.00051	<0.0000050	<0.000000020	0.00895	0.00062	0.067	318	<0.00050	1.2	<0.00010	8600	6.35	748	<0.000050	<0.0010	<0.0050	0.00235	0.00138	0.0011	<0.00050
WQR1-SF	VA25A6528-015	2025-03-25	M																						
WQR1-SF	VA25A8147-003	2025-04-11	M	0.148	1010	0.00104	<0.0000050	<0.000000020	0.00790	<0.00050	<0.050	276	<0.00050	<1.0	<0.00010	9450	5.14	688	<0.000050	<0.0010	<0.0050	0.00241	0.00115	<0.0010	<0.00050
WQR1-SF	VA25A8148-003	2025-04-11	M																						
WQR1-SF	VA25A8281-009	2025-04-14	M	0.154	1120	0.00091	<0.0000050	<0.000000020	0.00960	<0.00050	0.085	328	<0.00050	1.5	<0.00010	9070	6.64	803	<0.000050	<0.0010	<0.0050	0.00245	0.00141	<0.0010	<0.00050
WQR1-SF	VA25A8283-009	2025-04-14	M																						
WQR1-SF	VA25A9123-010	2025-04-23	M	0.146	1230	0.00146	<0.0000050	<0.000000020	0.00884	<0.00050	0.077	304	<0.00050	1.3	<0.00010	8480	6.09	764	<0.000050	<0.0010	<0.0050	0.00229	0.00146	<0.0010	<0.00050
WQR1-SF	VA25A9125-010	2025-04-23	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-SF	VA25B0359-007	2025-05-06	M	0.114	987	0.00126	<0.0000050	<0.000000020	0.0103	<0.00050	0.079	288	<0.00060	1.1	<0.00010	6860	6.60	790	<0.000050	<0.0010	<0.0050	0.00253	0.00162	<0.0010	<0.00050
WQR1-SF	VA25B0360-007	2025-05-06	M																						
WQR1-SF	VA25B0800-009	2025-05-09	M																						
WQR1-SF	VA25B0802-009	2025-05-09	M	0.152	1240	0.00073	<0.0000050	<0.000000020	0.00862	<0.00050	0.081	332	<0.00050	1.3	<0.00010	10100	5.96	771	<0.000050	<0.0010	<0.0050	0.00247	0.00146	0.0011	<0.00050
WQR2-0.5	L2755545-10	2024-04-30	M																						
WQR2-0.5	VA24A9402-010	2024-04-30	M	0.033	252	0.00644	<0.0000050	<0.000000040	0.00216	<0.00050	<0.050	69.6	<0.00050	2.0	<0.00010	1880	1.35	173	<0.000050	<0.0010	<0.0050	0.000596	0.00050	0.0014	<0.00050
WQR2-0.5	L2755648-1	2024-05-08	M																						
WQR2-0.5	VA24B0178-001	2024-05-08	M	0.032	233	0.00617	<0.0000050	<0.000000020	0.00225	<0.00050	<0.050	65.1	<0.00050	2.2	<0.00010	1980	1.42	170	<0.000050	<0.0010	<0.0050	0.000527	0.00054	<0.0010	<0.00050
WQR2-0.5	L2755934-10	2024-05-24	M																						
WQR2-0.5	VA24B1783-010	2024-05-24	M	0.020	149	0.00529	<0.0000050	<0.000000020	0.00154	<0.00050	<0.050	40.3	<0.00050	1.7	<0.00010	1220	0.833	114	<0.000050	<0.0010	<0.0050	0.000387	<0.00050	0.0012	<0.00050
WQR2-0.5	VA24B3452-010	2024-06-10	M	<0.020	98.4	0.00403	<0.0000050	0.000000034	0.00091	<0.00050	<0.050	26.8	<0.00050	1.6	<0.00010	675	0.475	61.9	<0.000050	<0.0010	<0.0050	0.000257	<0.00050	0.0014	<0.00050
WQR2-0.5	658-454600000-0	2024-06-17	M																						
WQR2-0.5	VA24B5882-010	2024-07-03	M																						
WQR2-0.5	VA24B6465-004	2024-07-09	M	0.020	155	0.00484	<0.0000050	<0.000000020	0.00142	<0.00050	<0.050	43.3	<0.00050	1.1	<0.00010	1210	0.816	106	<0.000050	<0.0010	<0.0050	0.000377	<0.00050	<0.0010	<0.00050
WQR2-0.5	VA24B7867-004	2024-07-20	M	<0.020	64.6	0.00573	<0.0000050	0.000000026	0.00074	<0.00050	<0.050	18.6	<0.00050	1.3	<0.00010	503	0.377	46.4	<0.000050	<0.0010	<0.0050	0.000161	<0.00050	0.0010	<0.00050
WQR2-0.5	L2757210-4	2024-08-26	M																						
WQR2-0.5	VA24C2208-004	2024-08-26	M	0.052	412	0.00456	<0.0000050	<0.000000020	0.00351	<0.00050	<0.050	130	<0.00050	<1.0	<0.00010	3050	2.30	279	<0.000050	<0.0010	<0.0050	0.00109	0.00063	<0.0010	<0.00050
WQR2-0.5	VA24C5557-001	2024-09-25	M	0.065	486	0.00446	<0.0000050		0.00420	<0.00050	<0.050	146	<0.00050	<1.0	<0.00010	3840	2.86	366	<0.000050	<0.0010	<0.0050	0.00133	0.00072	<0.0010	
WQR2-0.5	L2757680-4	2024-10-06	M																						
WQR2-0.5	VA24C6685-004	2024-10-06	M	0.0467	375	0.00957	<0.0000050	<0.000000020	0.00331	<0.00500	<0.500	120	<0.000500	2.40	<0.000100	2950	2.09	278	<0.000100	<0.00100	<0.00300	0.000871	<0.00500	<0.0100	<0.00050
WQR2-0.5	VA24C7408-004	2024-10-13	M	0.086	600	0.00788	<0.0000050	<0.000000080	0.00454	<0.00050	<0.050	172	<0.00050	1.7	<0.00010	4610	3.04	420	<0.000050	<0.0010	<0.0050	0.00152	0.00076	<0.0010	<0.00050
WQR2-0.5	L2757830-2	2024-10-19	M																						
WQR2-0.5	VA24C8041-002	2024-10-19	M	0.041	304	0.0103	<0.0000050	0.000000021	0.00226	<0.00050	<0.050	84.4	<0.00050	2.1	<0.00010	2240	1.48	197	<0.000050	<0.0010	<0.0050	0.000730	0.00058	<0.0010	<0.00050
WQR2-0.5	VA24C8159-004	2024-10-20	M	0.028	213	0.0147	<0.0000050	0.000000038	0.00175	0.00068	<0.050	59.7	<0.00050	1.6	<0.00010	1600	1.12	144	<0.000050	<0.0010	<0.0050	0.000524	0.00053	<0.0030	<0.00050
WQR2-0.5	L2757872-4	2024-10-22	M																						
WQR2-0.5	VA24C8330-004	2024-10-22	M	<0.020	101	0.0118	<0.0000050	<0.000000020	0.00098	<0.00050	<0.050	28.6	<0.00050	2.0	<0.00010	798	0.538	71.2	<0.000050	<0.0010	<0.0050	0.000253	0.00051	0.0013	<0.00050
WQR2-0.5	L2757962-5	2024-10-29	M																						
WQR2-0.5	VA24C9185-005	2024-10-29	M	<0.020	100	0.00618	<0.0000050	<0.000000020	0.00110	<0.00050	<0.050	26.9	<0.00050		<0.00010		0.573	71.7	<0.000050	<0.0010	<0.0050	0.000247	0.00052	<0.0020	<0.00050
WQR2-0.5	L2758003-1	2024-11-02	M																						
WQR2-0.5	VA24C9732-001	2024-11-02	M	0.054	400	0.0131	<0.0000050	0.000000024	0.00344	<0.00050	<0.050	121	<0.00050	2.6	<0.00010	3250	2.13	289	<0.000050	<0.0010	<0.0050	0.000908	0.00084	<0.0010	<0.00050
WQR2-0.5	L2758142-6	2024-11-14	M																						
WQR2-0.5	VA24D0945-006	2024-11-14	M	<0.020	146	0.00558	<0.0000050	0.000000023	0.00142	<0.00050	<0.050	41.8	<0.00050	2.5	<0.00010	1070	0.806	97.7	<0.000050	<0.0010	<0.0050	0.000350	0.00053	<0.0010	<0.00050
WQR2-0.5	VA24D1069-006	2024-11-15	M	0.026	204	0.00755	<0.0000050	0.000000041	0.00175	<0.00050	<0.050	55.5	<0.00050	2.9	<0.00010	1590	1.03	145	<0.000050	<0.0010	<0.0050	0.000495	0.00056	<0.0010	<0.00050
WQR2-0.5	L2758203-6	2024-11-19	M																						
WQR2-0.5	VA24D1567-006	2024-11-19	M	0.045	358	0.00981	<0.0000050	0.000000024	0.00269	<0.00050	<0.050	101	<0.00050	2.9	<0.00010	2530	1.74	249	<0.000050	<0.0010	<0.0050	0.000811	0.00067	<0.0010	<0.00050
WQR2-0.5	L2758354-1	2024-12-06	M																						
WQR2-0.5	VA24D3008-001	2024-12-06	M	0.063	466	0.0105	<0.0000050	<0.000000020	0.00383	<0.00050	<0.050	138	<0.00050	2.9	<0.00010	3640	2.34	329	<0.000050	<0.0010	<0.0050	0.000990	0.00076	<0.0010	<0.00050
WQR2-0.5	L2758634-7	2025-01-09	M																						
WQR2-0.5	VA25A0510-007	2025-01-09	M	0.112	647	0.00627	<0.0000050	<0.000000020	0.00728	<0.00050	0.064	240	<0.00050	1.8	<0.00010	4940	4.86	545	<0.000050	<0.0010	<0.0050	0.00168	0.00121	<0.0010	<0.00050
WQR2-0.5	L2759010-7	2025-02-18	M																						
WQR2-0.5	VA25A3415-007	2025-02-18	M	0.108	861	0.00674	<0.0000050	<0.000000020	0.00692	<0.00050	0.053	272	<0.00050	3.1	<0.00010	6910	4.79	563	<0.000050	<0.0010	<0.0050	0.00197	0.00107	0.0017	<0.00050
WQR2-0.5	L2759209-7	2025-03-12	M																						
WQR2-0.5	VA25A5429-007	2025-03-12	M	0.029	201	0.00741	<0.0000050	2.65E-08	0.00173	<0.00050	<0.050	55.1	<0.00050	2.7	<0.00010	1610	0.964	117	<0.000050	<0.0010	<0.0050	0.000464	0.00051	0.0012	<0.00050
WQR2-0.5	VA25A6528-016	2025-03-25	M	0.051	356	0.00627	<0.0000050		0.00334	<0.00050	<0.050	112	<0.00050	1.7	<0.00010	3000	2.16	269	<0.000050	<0.0010	<0.0050	0.000964	0.00054	<0.0010	
WQR2-0.5	VA25A8147-004	2025-04-11	M	0.025	142	0.00542	<0.0000050	<0.000000020	0.00155	<0.00050	<0.050	41.6	<0.00050	2.8	<0.00010	1260	0.842	112	<0.000050	<0.0010	<0.0050	0.000456	<0.00050	<0.0010	<0.00050
WQR2-0.5	VA25A8148-004	2025-04-11	M																						
WQR2-0.5	VA25A8280-007	2025-04-13	M	<0.020	122	0.00456	<0.0000050	<0.000000020	0.00141	<0.00050	<0.050	37.3	<0.00050	2.0	<0.00010	1000	0.760	101	<0.000050	<0.0010	<0.0050	0.000487	<0.00050	<0.0010	<0.00050
WQR2-0.5	VA25A8282-007	2025-04-13	M																						
WQR2-0.5	VA25A8854-007	2025-04-21	M	<0.020	68.1	0.00687	<0.0000050		0.00101	<0.00050	<0.050	20.5	<0.00050	2.3	<0.00010	552	0.421	46.2	<0.000050	<0.0010	<0.0050	0.000196	<0.00050	0.0020	<0.00050
WQR2-0.5	VA25A8855-007	2025-04-21	M																						
WQR2-0.5	VA25B0359-012	2025-05-06	M	<0.020	120	0.00473	<0.0000050	0.000000021	0.00193	<0.00050	<0.050	45.1	<0.00050	1.7	<0.00010	1030	1.03	138	<0.000050	<0.0010	<0.0050	0.000424	<0.00050	<0.0010	<0.00050
WQR2-0.5	VA25B0360-012	2025-05-06	M																						
WQR2-0.5	VA25B0499-007	2025-05-07	M	<0.020	126	0.00442	<0.0000050	<0.000000020	0.00185	<0.00050	<0.050	47.1	<0.00050	1.6	<0.00010	1010	1.07	134	<0.000050	<0.0010	<0.0050	0.000483	<0.00050	<0.0010	<0.00050
WQR2-0.5	VA25B0502-007	2025-05-07	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-0.5	VA25B2349-006	2025-05-27	M	<0.020	130	0.00408	<0.0000050		0.00136	<0.00050	<0.050	38.2	<0.00050	2.0	<0.00010	1040	0.720	96.1	<0.000050	<0.0010	<0.0050	0.000329	<0.00050	0.0010	
WQR2-1	0051710-11	2020-05-20	M																						<0.0005
WQR2-1	0062209-12	2020-06-22	M																						<0.0005
WQR2-1	0071996-11	2020-07-21	M																						<0.0005
WQR2-1	0082292-11	2020-08-24	M																						<0.0005
WQR2-1	0093017-11	2020-09-28	M																						<0.0005
WQR2-1	20J1961-11	2020-10-20	M																						<0.0005
WQR2-1	20J2778-11	2020-10-27	M																						<0.0005
WQR2-1	20K0360-11	2020-11-03	M																						<0.0005
WQR2-1	20K1261-11	2020-11-10	M																						<0.0005
WQR2-1	20K2100-11	2020-11-18	M																						<0.0005
WQR2-1	20L1589-11	2020-12-14	M																						<0.0005
WQR2-1	21A2590-11	2021-01-27	M																						<0.0005
WQR2-1	21B2778-11	2021-02-25	M																						<0.0005
WQR2-1	21C3505-12	2021-03-25	M																						<0.0005
WQR2-1	21D2478-11	2021-04-22	M																						<0.0005
WQR2-1	21E1990-11	2021-05-18	M																						<0.0005
WQR2-1	21E2917-11	2021-05-26	M																						<0.0005
WQR2-1	21F0167-11	2021-06-01	M																						<0.0005
WQR2-1	21F1056-11	2021-06-08	M																						<0.0005
WQR2-1	21F2014-11	2021-06-15	M																						<0.0005
WQR2-1	21G2414-11	2021-07-20	M																						<0.0005
WQR2-1	21H3040-11	2021-08-25	M																						<0.0005
WQR2-1	21I3814-11	2021-09-28	M																						<0.0005
WQR2-1	21J3514-11	2021-10-26	M																						<0.0005
WQR2-1	21K3046-11	2021-11-23	M																						<0.0005
WQR2-1	21L2125-11	2021-12-14	M																						<0.0005
WQR2-1	22A2312-11	2022-01-20	M																						<0.0005
WQR2-1	22B2487-11	2022-02-17	M	0.147	1170	0.00113	<0.000010		0.00934	<0.00080	<0.100	332	0.00294	2.3	<0.000100	8760	6.19	826	<0.000040	<0.00040	<0.0100	0.00263	<0.0020	<0.0080	<0.0005
WQR2-1	22C3145-11	2022-03-22	M	0.147	1160	0.00137	<0.000010		0.0101	<0.00080	<0.100	346	<0.00100	<2.0	<0.000100	8800	6.43	751	<0.000040	<0.00040	<0.0100	0.0026	<0.0020	<0.0080	<0.0005
WQR2-1	22D2212-14	2022-04-20	M	0.15	1220	0.00088	<0.000010		0.0101	<0.00080	0.102	369	<0.00100	<2.0	<0.000100	10000	6.73	830	<0.000040	<0.00040	<0.0100	0.00265	<0.0100	<0.0080	<0.0005
WQR2-1	22E2480-11	2022-05-17	M	0.11	1090	<0.00200	<0.000010		0.00998	<0.00400	<0.500	402	<0.00500	<10.0	<0.000500	9430	7.07	875	<0.000200	<0.00200	<0.0500	0.0025	<0.0500	<0.0400	<0.0005
WQR2-1	22F3212-11	2022-06-21	M	0.152	1050	0.0024	<0.000010		0.00958	<0.000400	<0.1	339	<0.00100	1.21	<0.000100	8460	6.92	860	<0.0000400	<0.000500	<0.00200	0.00254	<0.0100	<0.0100	<0.0005
WQR2-1	22G1763-11	2022-07-13	M	0.135	1160	0.00265	<0.000010		0.00946	<0.000400	0.117	336	<0.00100	1.33	<0.000100	9520	6.82	824	<0.0000400	<0.000500	<0.00200	0.00257	<0.0100	<0.0100	<0.0005
WQR2-1	22H2453-11	2022-08-16	M	0.167	1140	0.00217	<0.000010		0.0100	<0.000400	<0.100	385	<0.00100	1.47	<0.000100	9550	7.58	927	<0.0000400	<0.000500	<0.00200	0.00263	<0.0100	<0.0100	<0.0005
WQR2-1	22I1926-11	2022-09-14	M	0.162	1070	0.00136	<0.000010		0.00956	0.000811	<0.100	327	<0.00100	1.36	<0.000100	8730	6.71	824	<0.0000400	<0.000500	<0.00200	0.00264	<0.0100	<0.0100	<0.0005
WQR2-1	22J1560-11	2022-10-12	M	0.165	1120	0.00236	<0.000010		0.00934	<0.000400	<0.1	303	<0.00100	1.16	<0.000100	7950	6.68	727	<0.0000400	<0.000500	<0.00200	0.00245	<0.0100	<0.0100	<0.0005
WQR2-1	22K1453-11	2022-11-10	M	0.184	1300	0.0152	<0.000010		0.0102	0.000823	0.12	401	<0.00100	2.11	<0.000100	10500	7.03	988	<0.0000400	<0.000500	<0.00200	0.00302	<0.0100	<0.0100	<0.0005
WQR2-1	22K2628-03	2022-11-22	M	0.163	1210	0.00791	<0.000010		0.0105	0.000409	<0.1	379	<0.00100	1.96	<0.000100	9920	7.5	973	<0.0000400	<0.000500	<0.00200	0.00283	<0.0100	<0.0100	<0.0005
WQR2-1	22K2988-03	2022-11-24	M	0.144	1390	0.00413	<0.000010		0.0106	0.000645	0.112	424	<0.00100	2.24	<0.000100	11200	7.29	1070	<0.0000400	<0.000500	<0.00200	0.00305	<0.0100	<0.0100	<0.0005
WQR2-1	22K3123-03	2022-11-25	M	0.141	1310	0.00337	<0.000010		0.0102	0.000512	0.135	406	<0.00100	2.09	<0.000100	10600	6.96	1010	<0.0000400	<0.000500	<0.00200	0.00278	<0.0100	<0.0100	<0.0005
WQR2-1	22L0036-03	2022-11-30	M	0.156	1190	0.0122	<0.000010		0.0106	0.00108	<0.1	355	<0.00100	2.08	<0.000100	9620	7.46	952	<0.0000400	<0.000500	<0.00200	0.00273	<0.0100	<0.0100	<0.0005
WQR2-1	22L0263-03	2022-12-02	M	0.144	1120	0.00847	<0.000010		0.00953	0.000676	<0.1	338	<0.00100	2.12	<0.000100	9440	6.9	891	<0.0000400	<0.000500	<0.00200	0.00254	<0.0100	<0.0100	<0.0005
WQR2-1	22L0499-03	2022-12-05	M	0.172	1250	0.0411	<0.000010		0.0106	0.00111	0.124	390	<0.00100	2.51	<0.000100	10300	7.5	1010	<0.0000400	<0.000500	<0.00200	0.00277	<0.0100	<0.0100	<0.0005
WQR2-1	22L0633-03	2022-12-06	M	0.17	1110	0.0469	<0.000010		0.0102	0.000568	0.118	365	<0.00100	2	<0.000100	8750	6.72	866	<0.0000400	<0.000500	<0.00200	0.00290	<0.0100	<0.0100	<0.0005
WQR2-1	22L0774-11	2022-12-07	M	0.184	1260	0.0423	<0.000010		0.0104	<0.000400	0.104	375	<0.00100	1.97	<0.000100	9890	6.92	886	<0.0000400	<0.000500	<0.00200	0.00296	<0.0100	<0.0100	<0.0005
WQR2-1	22L1436-03	2022-12-13	M	0.165	1240	0.0248	<0.000010		0.0108	0.000679	<0.1	422	<0.00100	2.25	0.000290	10100	6.94	972	<0.0000400	<0.000500	<0.00200	0.00290	<0.0100	<0.0100	<0.0005
WQR2-1	23A2847-11	2023-01-27	M	0.163	1220	0.00408	<0.000010		0.0103	0.000674	<0.1	383	<0.00100	1.95	<0.000100	10300	7.16	940	<0.0000400	<0.000500	<0.00200	0.00301	<0.0100	<0.0100	<0.0005
WQR2-1	23C0060-11	2023-02-28	M	0.124	1310	0.00190	<0.000010		0.0102	<0.000400	<0.1	403	<0.00100	2.11	<0.000100	10400	7.07	1020	<0.0000400	<0.000500	<0.00200	0.00280	<0.0100	<0.0100	<0.0005
WQR2-1	23C1797-11	2023-03-15	M	0.18	1210	0.000837	<0.000010		0.00963	<0.000400	<0.1	369	<0.00100	1.7	<0.000100	8970	6.71	904	<0.0000400	<0.000500	<0.00200	0.00287	<0.0100	<0.0100	<0.0005
WQR2-1	23D2945-11	2023-04-26	M	0.152	1200	0.00147	<0.000010		0.00988	<0.000400	<0.1	381	<0.00100	1.4	0.000142	9760	6.83	874	<0.0000400	<0.000500	<0.00200	0.00287	<0.0100	<0.0100	<0.0005
WQR2-1	23E2392-11	2023-05-17	M	0.122	1160	0.00143	<0.000010		0.0126	0.000610	0.103	359	<0.00100	<1	0.000107	9530	6.84	892	<0.0000400	<0.000500	<0.00200	0.00265	<0.0100	<0.0100	<0.0005
WQR2-1	23F3614-11	2023-06-27	M	0.165	1280	0.00169	<0.000010		0.0104	0.000601	<0.1	388	<0.00100	1.44	<0.000100	10400	7.71	988	<0.0000400	<0.000500	<0.00200	0.00282	<0.0100	<0.0100	<0.0005
WQR2-1	23G2415-11	2023-07-19	M	0.172	1140	0.00141	<0.000010		0.00959	<0.000400	<0.1	355	<0.00100	1.5	<0.000100	9350	7.09	915	<0.0000400	<0.000500	<0.00200	0.00274	<0.0100	<0.0100	<0.0005
WQR2-1	23H3309-11	2023-08-24	M	0.15	1110	0.00118	<0.000010		0.00980	0.000493	<0.1	355	<0.00100	1.28	<0.000100	9080	6.85	880	<0.0000400	<0.000500	<0.00200	0.00270	<0.0100	<0.0100	<0.0005

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-1	23I2271-13	2023-09-19	M	0.154	998	0.00251	<0.000010		0.0103	<0.000400	<0.1	365	<0.00100	1.3	<0.000100	8330	6.55	869	<0.0000400	<0.000500	<0.00200	0.00288	<0.0100	<0.0100	<0.0005
WQR2-1	23J2236-13	2023-10-18	M	0.147	1120	0.00182	<0.000010		0.0104	<0.000400	0.272	353	<0.00100	1.4	<0.000100	9060	7.07	881	<0.0000400	<0.000500	<0.00200	0.00280	<0.00400	<0.0100	
WQR2-1	23K1909-11	2023-11-15	M	0.167	1230	0.00318	<0.000010		0.0102	0.000543	0.101	376	<0.00100	1.82	<0.000100	10400	7.59	987	<0.0000400	<0.000500	<0.00200	0.00262	<0.00400	<0.0100	<0.0005
WQR2-1	23L2091-09	2023-12-15	M	0.156	1170	0.00209	<0.000010		0.00989	0.000635	<0.1	353	<0.00100	1.5	<0.000100	10000	6.77	817	<0.0000400	<0.000500	<0.00200	0.00276	<0.00400	<0.0100	<0.0005
WQR2-1	L2754383-7	2024-01-25	M																						
WQR2-1	VA24A1507-009	2024-01-25	M	0.162	1140	0.00156	<0.0000050		0.0102	<0.00050	0.083	352	<0.00050	1.7	<0.00010	9630	6.99	806	<0.000050	<0.0010	<0.0050	0.00274	0.00156	<0.0010	<0.00050
WQR2-1	L2754604-7	2024-02-14	M																						
WQR2-1	VA24A2995-009	2024-02-14	M	0.137	926	0.00110	<0.0000050		0.00945	<0.00050	0.077	292	<0.00050	1.7	<0.00010	8660	6.55	771	<0.000050	<0.0010	<0.0050	0.00245	0.00155	<0.0010	<0.00050
WQR2-1	L2755043-9	2024-03-21	M																						
WQR2-1	VA24A6026-009	2024-03-21	M	0.145	1130	0.00129	<0.0000050		0.00981	<0.00050	0.089	354	<0.00050	1.8	<0.00010	9080	6.51	870	<0.000050	<0.0010	<0.0050	0.00294	0.00148	<0.0010	<0.00050
WQR2-1	L2755490-7	2024-04-24	M																						
WQR2-1	VA24A8916-009	2024-04-24	M	0.149	1150	0.00105	<0.0000050		0.00958	<0.00050	0.086	330	<0.00050	1.4	<0.00010	9120	6.57	858	<0.000050	<0.0010	<0.0050	0.00282	0.00143	0.0010	<0.00050
WQR2-1	L2755567-7	2024-05-01	M																						
WQR2-1	VA24A9566-009	2024-05-01	M	0.146	1230	0.00045	<0.0000050		0.00955	<0.00050	0.092	346	<0.00050	1.6	<0.00010	9080	6.64	844	<0.000050	<0.0010	<0.0050	0.00256	0.00144	0.0017	<0.00050
WQR2-1	L2755666-7	2024-05-08	M																						
WQR2-1	VA24B0201-009	2024-05-08	M	0.148	962	0.00065	<0.0000050		0.0103	<0.00050	0.089	332	0.00082	1.8	<0.00010	9460	7.26	821	<0.000050	<0.0010	<0.0050	0.00276	0.00151	<0.0010	<0.00050
WQR2-1	L2755779-7	2024-05-15	M																						
WQR2-1	VA24B0901-009	2024-05-15	M	0.172	1030	0.00080	<0.0000050		0.0101	<0.00050	0.091	331	<0.00050	1.6	<0.00010	9610	7.07	826	<0.000050	<0.0010	<0.0050	0.00280	0.00144	<0.0010	<0.00050
WQR2-1	L2755888-7	2024-05-22	M																						
WQR2-1	VA24B1500-009	2024-05-22	M	0.165	1150	0.00120	<0.0000050		0.00905	<0.00050	0.084	335	0.00524	1.4	<0.00010	9370	6.39	797	<0.000050	<0.0010	<0.0050	0.00274	0.00138	<0.0010	<0.00050
WQR2-1	L2756312-7	2024-06-19	M																						
WQR2-1	VA24B4510-009	2024-06-19	M	0.135	1160	0.00238	<0.0000050		0.00929	<0.00050	0.091	341	<0.00050	1.4	<0.00010	10500	6.36	854	<0.000050	<0.0010	<0.0050	0.00292	0.00137	0.0011	<0.00050
WQR2-1	VA24B7397-009	2024-07-17	M	0.131	1100	0.00112	<0.0000050		0.00889	<0.00050	0.088	338	<0.00050	1.4	<0.00010	9190	6.22	847	<0.000050	<0.0010	<0.0050	0.00293	0.00137	0.0013	<0.00050
WQR2-1	L2756689-7	2024-07-17	M																						
WQR2-1	L2757122-7	2024-08-21	M																						
WQR2-1	VA24C1337-009	2024-08-21	M	0.149	1150	0.00255	<0.0000050		0.00849	<0.00050	0.088	348	<0.00050	1.3	<0.00010	8240	5.88	918	<0.000050	<0.0010	<0.0050	0.00269	0.00130	<0.0010	<0.00050
WQR2-1	VA24C4683-009	2024-09-18	M	0.174	1000	0.00204	<0.0000050		0.00915	<0.00050	0.097	309	0.00098	1.2	<0.00010	8190	6.12	849	<0.000050	<0.0010	<0.0050	0.00281	0.00123	0.0028	<0.00050
WQR2-1	VA24C8569-009	2024-10-23	M	0.136	1190	0.00385	<0.0000050		0.00902	<0.00050	0.086	354	0.00587	1.3	<0.00010	8690	6.18	786	<0.000050	<0.0010	<0.0050	0.00279	0.00111	<0.0010	<0.00050
WQR2-1	L2757977-9	2024-10-30	M																						
WQR2-1	VA24C9414-009	2024-10-30	M	0.142	1180	0.00348	<0.0000050		0.00963	0.00055	0.099	338	0.00074	1.6	<0.00010	8690	6.41	845	<0.000050	<0.0010	<0.0050	0.00276	0.00147	<0.0010	<0.00050
WQR2-1	VA24D0180-009	2024-11-06	M	0.129	1090	0.00957	<0.0000050		0.00845	<0.00050	0.079	335	0.00086	1.5	<0.00010	8250	5.97	816	<0.000050	<0.0010	<0.0050	0.00277	0.00135	<0.0010	<0.00050
WQR2-1	VA24D0813-009	2024-11-13	M	0.150	1190	0.00757	<0.0000050		0.00924	<0.00050	0.091	353	0.00112	1.5	<0.00010	8760	6.33	844	<0.000050	<0.0010	<0.0050	0.00274	0.00141	0.0010	<0.00050
WQR2-1	L2758221-7	2024-11-22	M																						
WQR2-1	VA24D1791-009	2024-11-22	M	0.178	1110	0.00701	<0.0000050		0.00947	<0.00050	0.102	335	<0.00050	1.8	<0.00010	8350	6.44	967	<0.000050	<0.0010	<0.0050	0.00237	0.00147	<0.0010	<0.00050
WQR2-1	L2758486-7	2024-12-18	M																						
WQR2-1	VA24D3937-009	2024-12-18	M	0.144	882	0.00244	<0.0000050		0.00898	<0.00050	0.075	300	<0.00050	<1.0	<0.00010		6.39	611	<0.000050	<0.0010	<0.0050	0.00205	0.00142	0.0013	<0.00050
WQR2-1	L2758770-7	2025-01-22	M																						
WQR2-1	VA25A1525-009	2025-01-22	M	0.132	829	0.00148	<0.0000050		0.00862	<0.00050	0.085	321	0.00136	1.5	<0.00010	5800	5.95	712	<0.000050	<0.0010	<0.0050	0.00268	0.00139	0.0010	<0.00050
WQR2-1	L2759008-7	2025-02-19	M																						
WQR2-1	VA25A3570-009	2025-02-19	M	0.141	1430	0.00094	<0.0000050		0.00771	<0.00050	0.061	318	<0.00050	3.6	<0.00010	9690	6.10	603	<0.000050	<0.0010	<0.0050	0.00216	0.00126	<0.0010	<0.00050
WQR2-1	VA25A6679-009	2025-03-26	M	0.155	1460	0.00084	<0.0000050		0.00916	<0.00050	0.065	386	<0.00050	1.0	<0.00010	10800	6.41	632	<0.000050	<0.0010	<0.0050	0.00243	0.00137	<0.0010	<0.00050
WQR2-1	VA25A9109-009	2025-04-23	M	0.142	1110	0.00090	<0.0000050		0.00882	<0.00050	0.075	293	0.00061	1.5	<0.00010	8380	5.94	728	<0.000050	<0.0010	<0.0050	0.00227	0.00141	<0.0010	<0.00050
WQR2-1	VA25A9941-009	2025-05-01	M	0.141	1260	0.00111	<0.0000050		0.00900	<0.00050	0.071	299	<0.00050	1.1	<0.00010	9520	6.28	666	<0.000050	<0.0010	<0.0050	0.00241	0.00159	0.0014	<0.00050
WQR2-1	VA25B0496-009	2025-05-07	M	0.191	1350	0.00103	<0.0000050		0.00965	<0.00050	<0.050	339	<0.00080	1.6	<0.00010	10200	6.85	760	<0.000050	<0.0010	<0.0050	0.00259	0.00152	<0.0010	<0.00050
WQR2-1	VA25B1530-009	2025-05-16	M	0.147	1160	0.00122	<0.0000050		0.00944	0.00054	0.094	313	<0.00050	1.5	<0.00010	10000	6.06	812	<0.000050	<0.0010	<0.0050	0.00259	0.00152	0.0013	<0.00050
WQR2-1	VA25B1841-009	2025-05-21	M	0.146	1360	0.00129	<0.0000050		0.00990	<0.00050	0.077	356	<0.00050	1.4	<0.00010	9900	6.76	754	<0.000050	<0.0010	<0.0050	0.00270	0.00152	0.0012	<0.00050
WQR2-2	0051710-12	2020-05-20	M																						<0.0005
WQR2-2	0062209-11	2020-06-22	M																						<0.0005
WQR2-2	0071996-12	2020-07-21	M																						<0.0005
WQR2-2	0082292-12	2020-08-24	M																						<0.0005
WQR2-2	0093017-12	2020-09-28	M																						<0.0005
WQR2-2	20J1961-12	2020-10-20	M																						<0.0005
WQR2-2	20J2778-12	2020-10-27	M																						<0.0005
WQR2-2	20K0360-12	2020-11-03	M																						<0.0005
WQR2-2	20K1261-12	2020-11-10	M																						<0.0005

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	20K2100-12	2020-11-18	M																						<0.0005
WQR2-2	20L1589-12	2020-12-14	M																						<0.0005
WQR2-2	21A2590-12	2021-01-27	M																						<0.0005
WQR2-2	21B2778-12	2021-02-25	M																						<0.0005
WQR2-2	21C3505-13	2021-03-25	M																						<0.0005
WQR2-2	21D2478-12	2021-04-22	M																						<0.0005
WQR2-2	21E1990-12	2021-05-18	M																						<0.0005
WQR2-2	21E2917-12	2021-05-26	M																						<0.0005
WQR2-2	21F0167-12	2021-06-01	M																						<0.0005
WQR2-2	21F1056-12	2021-06-08	M																						<0.0005
WQR2-2	21F2014-12	2021-06-15	M																						<0.0005
WQR2-2	21G2414-12	2021-07-20	M																						<0.0005
WQR2-2	21H3040-12	2021-08-25	M																						<0.0005
WQR2-2	21I3814-12	2021-09-28	M																						<0.0005
WQR2-2	21J3514-12	2021-10-26	M																						<0.0005
WQR2-2	21K3046-12	2021-11-23	M																						<0.0005
WQR2-2	21L2125-12	2021-12-14	M																						<0.0005
WQR2-2	22A2312-12	2022-01-20	M																						<0.0005
WQR2-2	22B2487-12	2022-02-17	M	0.13	996	0.00224	<0.000010		0.00873	<0.00080	<0.100	286	0.00377	<2.0	<0.000100	7810	5.63	696	<0.000040	<0.00040	<0.0100	0.00237	<0.0020	<0.0080	<0.0005
WQR2-2	22C3145-12	2022-03-22	M	0.127	987	0.00179	<0.000010		0.0088	0.00127	<0.100	298	<0.00100	<2.0	<0.000100	7560	5.53	659	<0.000040	<0.00040	<0.0100	0.00226	<0.0020	<0.0080	<0.0005
WQR2-2	22D2212-15	2022-04-20	M	0.102	822	0.00336	<0.000010		0.00679	<0.00080	<0.100	249	<0.00100	<2.0	<0.000100	6660	4.51	561	0.00005	<0.00040	<0.0100	0.00178	<0.0100	<0.0080	<0.0005
WQR2-2	22E2480-12	2022-05-17	M	0.0275	237	0.00666	<0.000010		0.00246	<0.00400	<0.500	89.7	<0.00500	<10.0	<0.000500	2080	1.44	184	<0.000200	<0.00200	<0.0500	0.000624	<0.0500	<0.0400	<0.0005
WQR2-2	22F3212-12	2022-06-21	M	0.0107	69	0.0038	<0.000010		0.000824	<0.000400	<0.1	21.6	<0.00100	1.64	<0.000100	550	0.421	52.8	<0.0000400	<0.000500	<0.00200	0.000235	<0.0100	<0.0100	<0.0005
WQR2-2	22G1763-12	2022-07-13	M	0.0140	105	0.00433	<0.000010		0.000948	<0.000400	<0.1	30.6	<0.00100	1.27	<0.000100	877	0.606	73.2	<0.0000400	<0.000500	<0.00200	0.000256	<0.0100	<0.0100	<0.0005
WQR2-2	22H2453-12	2022-08-16	M	0.0140	94.9	0.00556	<0.000010		0.00108	<0.000400	<0.100	29.4	<0.00100	1.60	<0.000100	764	0.562	71.1	<0.0000400	<0.000500	<0.00200	0.000210	<0.0100	<0.0100	<0.0005
WQR2-2	22I1926-12	2022-09-14	M	0.102	709	0.00500	<0.000010		0.00627	0.000627	<0.100	216	<0.00100	1.35	<0.000100	5740	4.56	526	<0.0000400	<0.000500	<0.00200	0.00173	<0.0100	<0.0100	<0.0005
WQR2-2	22J1560-12	2022-10-12	M	0.104	669	0.00576	<0.000010		0.00568	<0.000400	<0.1	187	<0.00100	<1	<0.000100	4990	3.83	446	<0.0000400	<0.000500	<0.00200	0.00149	<0.0100	<0.0100	<0.0005
WQR2-2	22K1453-12	2022-11-10	M	0.158	1110	0.0142	<0.000010		0.00897	<0.000400	0.104	337	<0.00100	2.44	<0.000100	8980	6.09	842	<0.0000400	<0.000500	<0.00200	0.00264	<0.0100	<0.0100	<0.0005
WQR2-2	22K2628-04	2022-11-22	M	0.155	1130	0.00544	<0.000010		0.0102	0.000506	<0.1	356	<0.00100	1.96	<0.000100	9360	6.98	914	<0.0000400	<0.000500	<0.00200	0.00265	<0.0100	<0.0100	<0.0005
WQR2-2	22K2988-04	2022-11-24	M	0.11	1000	0.00989	<0.000010		0.00811	0.000418	<0.1	310	<0.00100	2.76	<0.000100	8170	5.41	766	<0.0000400	<0.000500	<0.00200	0.00220	<0.0100	<0.0100	<0.0005
WQR2-2	22K3123-04	2022-11-25	M	0.126	1220	0.00480	<0.000010		0.00956	<0.000400	<0.1	375	<0.00100	2.24	<0.000100	9780	6.47	946	<0.0000400	<0.000500	<0.00200	0.00257	<0.0100	<0.0100	<0.0005
WQR2-2	22L0036-04	2022-11-30	M	0.132	1000	0.00599	<0.000010		0.00899	0.000998	<0.1	305	<0.00100	2.27	<0.000100	8210	6.29	811	<0.0000400	<0.000500	<0.00200	0.00233	<0.0100	<0.0100	<0.0005
WQR2-2	22L0263-04	2022-12-02	M	0.145	1120	0.00855	<0.000010		0.00962	0.000685	<0.1	340	<0.00100	2.22	<0.000100	9490	6.87	933	<0.0000400	<0.000500	<0.00200	0.00254	<0.0100	<0.0100	<0.0005
WQR2-2	22L0499-04	2022-12-05	M	0.149	1090	0.0366	<0.000010		0.00954	0.000784	<0.1	333	<0.00100	2.95	<0.000100	8900	6.73	885	<0.0000400	<0.000500	<0.00200	0.00244	<0.0100	<0.0100	<0.0005
WQR2-2	22L0633-04	2022-12-06	M	0.138	893	0.0383	<0.000010		0.00856	0.000411	<0.1	312	<0.00100	2.52	<0.000100	6940	5.67	723	<0.0000400	<0.000500	<0.00200	0.00241	<0.0100	<0.0100	<0.0005
WQR2-2	22L0774-12	2022-12-07	M	0.162	1060	0.0288	<0.000010		0.00891	0.000448	<0.1	321	<0.00100	2.17	<0.000100	8520	5.95	777	<0.0000400	<0.000500	<0.00200	0.00253	<0.0100	<0.0100	<0.0005
WQR2-2	22L1436-04	2022-12-13	M	0.129	1070	0.0131	<0.000010		0.00906	0.000648	<0.1	363	<0.00100	2.4	0.000154	8650	5.95	836	<0.0000400	<0.000500	<0.00200	0.00254	<0.0100	<0.0100	<0.0005
WQR2-2	23A2847-12	2023-01-27	M	0.118	874	0.0101	<0.000010		0.00729	0.000417	<0.1	267	<0.00100	2.81	<0.000100	7170	5.19	665	<0.0000400	<0.000500	<0.00200	0.00213	<0.0100	<0.0100	<0.0005
WQR2-2	23C0060-12	2023-02-28	M	0.109	1140	0.00578	<0.000010		0.00894	0.000417	0.107	354	<0.00100	2.55	<0.000100	9030	6.24	880	<0.0000400	<0.000500	<0.00200	0.00237	<0.0100	<0.0100	<0.0005
WQR2-2	23C1797-12	2023-03-15	M	0.159	1060	0.00429	<0.000010		0.00893	0.00133	<0.1	324	<0.00100	1.87	<0.000100	8000	5.89	805	<0.0000400	<0.000500	<0.00200	0.00254	<0.0100	<0.0100	<0.0005
WQR2-2	23D2945-12	2023-04-26	M	0.0897	714	0.00303	<0.000010		0.00621	<0.000400	<0.1	228	<0.00100	1.02	0.000104	5860	4.13	530	<0.0000400	<0.000500	<0.00200	0.00186	<0.0100	<0.0100	<0.0005
WQR2-2	23E2392-12	2023-05-17	M	0.0159	155	0.00625	<0.000010		0.00134	0.000154	<0.01	47.4	<0.00010	1.51	0.000012	1240	0.916	117	0.0000042	<0.000050	0.00026	0.000332	<0.00100	<0.0010	<0.0005
WQR2-2	23F3614-12	2023-06-27	M	0.0189	138	0.00387	<0.000010		0.00142	<0.000400	<0.1	41.9	<0.00100	1.56	<0.000100	1130	0.811	94.9	<0.0000400	<0.000500	<0.00200	0.000345	<0.0100	<0.0100	<0.0005
WQR2-2	23G2415-12	2023-07-19	M	0.0930	592	0.00307	<0.000010		0.00535	<0.000400	<0.1	185	<0.00100	1.24	<0.000100	4830	3.73	473	<0.0000400	<0.000500	<0.00200	0.00148	<0.0100	<0.0100	<0.0005
WQR2-2	23H3309-12	2023-08-24	M	0.123	904	0.00362	<0.000010		0.00798	0.000564	<0.1	292	<0.00100	<1	<0.000100	7340	5.61	696	<0.0000400	<0.000500	<0.00200	0.00220	<0.0100	<0.0100	<0.0005
WQR2-2	23I2271-14	2023-09-19	M	0.0748	517	0.00467	<0.000010		0.00487	<0.000400	<0.1	160	<0.00100	1	<0.000100	4180	3.17	410	<0.0000400	<0.000500	<0.00200	0.00134	<0.0100	<0.0100	<0.0005
WQR2-2	23J2236-14	2023-10-18	M	0.0351	259	0.00942	<0.000010		0.00230	<0.000400	0.142	83.3	<0.00100	1.55	<0.000100	2070	1.52	197	<0.0000400	<0.000500	<0.00200	0.000716	<0.00400	<0.0100	
WQR2-2	23K1909-12	2023-11-15	M	0.124	907	0.00455	<0.000010		0.00772	0.000427	<0.1	274	<0.00100	2.09	<0.000100	7580	5.61	715	<0.0000400	<0.000500	<0.00200	0.00199	<0.00400	<0.0100	<0.0005
WQR2-2	23L2091-10	2023-12-15	M	0.136	983	0.00636	<0.000010		0.00807	<0.000400	<0.1	294	<0.00100	1.83	<0.000100	8500	5.71	692	<0.0000400	<0.000500	<0.00200	0.00245	<0.00400	<0.0100	<0.0005
WQR2-2	L2754383-8	2024-01-25	M																						
WQR2-2	VA24A1507-010	2024-01-25	M	0.150	1060	0.00241	<0.0000050		0.00972	<0.00050	0.080	314	<0.00050	2.0	<0.00010	8990	6.53	779	<0.000050	<0.0010	<0.0050	0.00267	0.00152	<0.0010	<0.00050
WQR2-2	L2754604-8	2024-02-14	M																						
WQR2-2	VA24A2995-010	2024-02-14	M	0.126	792	0.00476	<0.0000050		0.00815	<0.00050	0.065	251	<0.00050	1.9	<0.00010	7470	5.49	667	<0.000050	<0.0010	<0.0050	0.00210	0.00134	<0.0010	<0.00050
WQR2-2	L2755043-10	2024-03-21	M																						
WQR2-2	VA24A6026-010	2024-03-21	M	0.093	720	0.00419	<0.0000050		0.00655	<0.00050	<0.050	221	<0.00050	1.2	<0.00010	5400	4.17	550	<0.000050	<0.0010	<0.0050	0.00195	0.00110	<0.0010	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	L2755490-8	2024-04-24	M																						
WQR2-2	VA24A8916-010	2024-04-24	M	0.106	831	0.00266	<0.0000050		0.00672	<0.00050	<0.050	230	<0.00050	<1.0	<0.00010	6640	4.54	613	<0.000050	<0.0010	<0.0050	0.00197	0.00093	<0.0010	<0.00050
WQR2-2	L2755567-8	2024-05-01	M																						
WQR2-2	VA24A9566-010	2024-05-01	M	0.106	876	0.00252	<0.0000050		0.00689	<0.00050	<0.050	247	<0.00050	<1.0	<0.00010	6520	4.66	597	<0.000050	<0.0010	<0.0050	0.00189	0.00100	<0.0010	<0.00050
WQR2-2	L2755666-8	2024-05-08	M																						
WQR2-2	VA24B0201-010	2024-05-08	M	0.063	412	0.00496	<0.0000050		0.00440	<0.00050	<0.050	145	<0.00050	1.8	<0.00010	4140	2.92	349	<0.000050	<0.0010	<0.0050	0.00122	0.00077	<0.0010	<0.00050
WQR2-2	L2755779-8	2024-05-15	M																						
WQR2-2	VA24B0901-010	2024-05-15	M	0.095	604	0.00374	<0.0000050		0.00600	<0.00050	<0.050	194	<0.00050	<1.0	<0.00010	5390	4.13	476	<0.000050	<0.0010	<0.0050	0.00174	0.00092	<0.0010	<0.00050
WQR2-2	L2755888-8	2024-05-22	M																						
WQR2-2	VA24B1500-010	2024-05-22	M	0.058	414	0.00440	<0.0000050		0.00352	<0.00050	<0.050	121	0.00118	1.6	<0.00010	3360	2.31	290	<0.000050	<0.0010	<0.0050	0.00104	0.00068	0.0013	<0.00050
WQR2-2	L2756312-8	2024-06-19	M																						
WQR2-2	VA24B4510-010	2024-06-19	M	0.092	755	0.00284	<0.0000050		0.00472	<0.00050	<0.050	220	<0.00050	<1.0	<0.00010	6030	3.21	505	<0.000050	<0.0010	<0.0050	0.00182	0.00076	<0.0010	<0.00050
WQR2-2	VA24B7397-010	2024-07-17	M	0.033	270	0.00424	<0.0000050		0.00240	<0.00050	<0.050	81.9	<0.00050	1.4	<0.00010	2400	1.54	209	<0.000050	<0.0010	<0.0050	0.000744	0.00060	<0.0010	<0.00050
WQR2-2	L2756689-8	2024-07-17	M																						
WQR2-2	L2757122-8	2024-08-21	M																						
WQR2-2	VA24C1337-010	2024-08-21	M	0.034	264	0.00581	<0.0000050		0.00203	<0.00050	<0.050	75.4	<0.00050	1.4	<0.00010	1800	1.26	194	<0.000050	<0.0010	<0.0050	0.000596	0.00053	<0.0010	<0.00050
WQR2-2	VA24C4683-010	2024-09-18	M	0.037	316	0.00922	<0.0000050		0.00260	<0.00050	<0.050	87.2	<0.00050	1.5	<0.00010	2320	1.62	228	<0.000050	<0.0010	<0.0050	0.000736	0.00063	<0.0010	<0.00050
WQR2-2	VA24C8569-010	2024-10-23	M	0.062	567	0.00707	<0.0000050		0.00419	<0.00050	<0.050	165	0.00180	1.6	<0.00010	4080	2.79	361	<0.000050	<0.0010	<0.0050	0.00130	0.00072	<0.0010	<0.00050
WQR2-2	L2757977-10	2024-10-30	M																						
WQR2-2	VA24C9414-010	2024-10-30	M	0.075	619	0.00554	<0.0000050		0.00534	<0.00050	<0.050	177	<0.00050	1.9	<0.00010	4530	3.35	443	<0.000050	<0.0010	<0.0050	0.00151	0.00100	<0.0010	<0.00050
WQR2-2	VA24D0180-010	2024-11-06	M	0.067	569	0.00795	<0.0000050		0.00462	<0.00050	<0.050	174	<0.00050	2.1	<0.00010	4330	3.17	422	<0.000050	<0.0010	<0.0050	0.00150	0.00091	0.0015	<0.00050
WQR2-2	VA24D0813-010	2024-11-13	M	0.059	471	0.00494	<0.0000050		0.00378	<0.00050	<0.050	139	0.00052	2.1	<0.00010	3500	2.47	344	<0.000050	<0.0010	<0.0050	0.00107	0.00080	<0.0010	<0.00050
WQR2-2	L2758221-8	2024-11-22	M																						
WQR2-2	VA24D1791-010	2024-11-22	M	0.153	932	0.00697	<0.0000050		0.00768	0.00118	0.076	277	<0.00050	2.2	<0.00010	6980	5.10	765	<0.000050	<0.0010	<0.0050	0.00183	0.00133	<0.0010	<0.00050
WQR2-2	L2758486-8	2024-12-18	M																						
WQR2-2	VA24D3937-010	2024-12-18	M	0.091	659	0.00470	<0.0000050		0.00604	<0.00050	<0.050	202	<0.00050	1.2	<0.00010	4800	4.26	386	<0.000050	<0.0010	<0.0050	0.00150	0.00104	0.0014	<0.00050
WQR2-2	L2758770-8	2025-01-22	M																						
WQR2-2	VA25A1525-010	2025-01-22	M	0.104	642	0.00469	<0.0000050		0.00676	<0.00050	0.069	248	0.00088	2.0	<0.00010	4610	4.72	558	<0.000050	<0.0010	<0.0050	0.00209	0.00110	<0.0010	<0.00050
WQR2-2	L2759008-8	2025-02-19	M																						
WQR2-2	VA25A3570-010	2025-02-19	M	0.102	1030	0.00774	<0.0000050		0.00599	<0.00050	<0.050	235	<0.00050	4.2	<0.00010	7040	4.69	415	<0.000050	<0.0010	<0.0050	0.00171	0.00101	<0.0010	<0.00050
WQR2-2	VA25A6679-010	2025-03-26	M	0.115	1030	0.00200	<0.0000050		0.00705	<0.00050	<0.050	287	<0.00050	<1.0	<0.00010	7780	4.79	467	<0.000050	<0.0010	<0.0050	0.00189	0.00105	<0.0010	<0.00050
WQR2-2	VA25A9109-010	2025-04-23	M	0.100	866	0.00193	<0.0000050		0.00724	<0.00050	<0.050	229	0.00063	<1.0	<0.00010	6560	4.78	570	<0.000050	<0.0010	<0.0050	0.00188	<0.00050	<0.0010	<0.00050
WQR2-2	VA25A9941-010	2025-05-01	M	0.045	418	0.00443	<0.0000050		0.00328	<0.00050	<0.050	102	<0.00050	1.2	<0.00010	3060	2.14	227	<0.000050	<0.0010	<0.0050	0.000905	<0.00050	<0.0010	<0.00050
WQR2-2	VA25B0496-010	2025-05-07	M	0.136	889	0.00324	<0.0000050		0.00644	<0.00050	<0.050	229	<0.00060	<1.0	<0.00010	6750	4.56	500	<0.000050	<0.0010	<0.0050	0.00180	0.00093	<0.0010	<0.00050
WQR2-2	VA25B1530-010	2025-05-16	M	0.028	189	0.00439	<0.0000050		0.00208	<0.00050	<0.050	57.5	<0.00050	1.8	<0.00010	1670	1.18	150	<0.000050	<0.0010	<0.0050	0.000540	<0.00050	<0.0010	<0.00050
WQR2-2	VA25B1841-010	2025-05-21	M	0.070	613	0.00345	<0.0000050		0.00465	<0.00050	<0.050	163	<0.00050	<1.0	<0.00010	4460	2.99	386	<0.000050	<0.0010	<0.0050	0.00124	0.00070	<0.0010	<0.00050
WQR2-2m	L2755545-11	2024-04-30	M																						
WQR2-2m	VA24A9402-011	2024-04-30	M	0.113	962	0.00182	<0.0000050	<0.000000040	0.00727	<0.00050	<0.050	266	<0.00050	<1.0	<0.00010	7120	5.04	651	<0.000050	<0.0010	<0.0050	0.00216	0.00107	<0.0010	<0.00050
WQR2-2m	L2755648-2	2024-05-08	M																						
WQR2-2m	VA24B0178-002	2024-05-08	M	0.033	225	0.00602	<0.0000050	<0.000000020	0.00229	<0.00050	<0.050	69.8	<0.00050	1.8	<0.00010	2000	1.36	176	<0.000050	<0.0010	<0.0050	0.000568	<0.00050	<0.0010	<0.00050
WQR2-2m	L2755934-11	2024-05-24	M																						
WQR2-2m	VA24B1783-011	2024-05-24	M	0.026	192	0.00512	<0.0000050	<0.000000020	0.00181	<0.00050	<0.050	53.3	<0.00050	1.9	<0.00010	1540	1.08	150	<0.000050	<0.0010	<0.0050	0.000496	<0.00050	<0.0010	<0.00050
WQR2-2m	VA24B3452-011	2024-06-10	M	0.030	261	0.00423	<0.0000050	0.000000021	0.00205	<0.00050	<0.050	74.2	<0.00050	1.6	<0.00010	1810	1.27	167	<0.000050	<0.0010	<0.0050	0.000584	<0.00050	<0.0010	<0.00050
WQR2-2m	659-454600000-0	2024-06-17	M																						
WQR2-2m	VA24B5882-011	2024-07-03	M																						
WQR2-2m	VA24B6465-005	2024-07-09	M	0.026	212	0.00458	<0.0000050	<0.000000020	0.00190	<0.00050	<0.050	60.3	<0.00050	1.1	<0.00010	1720	1.14	150	<0.000050	<0.0010	<0.0050	0.000516	0.00052	<0.0010	<0.00050
WQR2-2m	VA24B7867-005	2024-07-20	M	<0.020	59.0	0.00564	<0.0000050	0.000000031	0.00070	<0.00050	<0.050	17.1	<0.00050	1.1	<0.00010	469	0.337	43.1	<0.000050	<0.0010	<0.0050	0.000133	<0.00050	<0.0010	<0.00050
WQR2-2m	L2757210-5	2024-08-26	M																						
WQR2-2m	VA24C2208-005	2024-08-26	M	<0.020	105	0.00766	<0.0000050	<0.000000020	0.00107	<0.00050	<0.050	33.6	<0.00050	1.5	<0.00010	894	0.613	82.4	<0.000050	<0.0010	<0.0050	0.000278	<0.00050	<0.0010	<0.00050
WQR2-2m	VA24C5557-002	2024-09-25	M	0.128	897	0.00255	<0.0000050		0.00742	<0.00050	<0.050	276	<0.00050	<1.0	<0.00010	6920	5.03	643	<0.000050	<0.0010	<0.0050	0.00230	0.00098	<0.0010	
WQR2-2m	L2757680-5	2024-10-06	M																						
WQR2-2m	VA24C6685-005	2024-10-06	M	0.0613	485	0.00896	<0.0000050	0.000000028	0.00428	<0.0100	<1.00	153	<0.00100	2.04	<0.000200	3780	2.73	354	<0.000200	<0.00200	<0.00600	0.00114	<0.0100	<0.0200	<0.00050
WQR2-2m	VA24C7408-005	2024-10-13	M	0.102	686	0.00702	<0.0000050	<0.000000080	0.00514	<0.00050	<0.050	196	<0.00050	1.6	<0.00010	5330	3.42	468	<0.000050	<0.0010	<0.0050	0.00174	0.00081	<0.0010	<0.00050
WQR2-2m	L2757872-5	2024-10-22	M																						
WQR2-2m	VA24C8330-005	2024-10-22	M	0.034	274	0.00970	<0.0000050	<0.000000020	0.00214	<0.00050	<0.050	78.1	<0.00050	1.8	<0.00010	2140	1.40	183	<0.000050	<0.0010	<0.0050	0.000654	0.00059	<0.0010	<0.00050
WQR2-2m	VA24C9185-006	2024-10-29	M	0.070	502	0.00564	<0.0000050	<0.000000020	0.00450	<0.00050	<0.050	153	<0.00050		<0.00010		3.14	394	<0.000050	<0.0010	<0.0050	0.00121	0.00094	<0.0020	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2m	L2757962-6	2024-10-29	M																						
WQR2-2m	L2758003-2	2024-11-02	M																						
WQR2-2m	VA24C9732-002	2024-11-02	M	0.071	520	0.0102	<0.0000050	<0.000000020	0.00449	<0.00050	<0.050	160	0.00120	2.4	<0.00010	4280	2.81	389	<0.000050	<0.0010	<0.0050	0.00126	0.00092	0.0014	<0.00050
WQR2-2m	L2758354-2	2024-12-06	M																						
WQR2-2m	VA24D3008-002	2024-12-06	M	0.137	956	0.00512	<0.0000050	0.000000020	0.00753	<0.00050	0.067	282	<0.00050	1.8	<0.00010	7280	4.96	673	<0.000050	<0.0010	<0.0050	0.00206	0.00117	0.0019	<0.00050
WQR2-2m	L2758634-8	2025-01-09	M																						
WQR2-2m	VA25A0510-008	2025-01-09	M	0.115	648	0.00503	<0.0000050	<0.000000020	0.00756	<0.00050	0.069	246	<0.00050	1.8	<0.00010	5350	5.07	586	<0.000050	<0.0010	<0.0050	0.00180	0.00122	0.0010	<0.00050
WQR2-2m	L2759010-8	2025-02-18	M																						
WQR2-2m	VA25A3415-008	2025-02-18	M	0.133	997	0.00312	<0.0000050	<0.000000020	0.00798	<0.00050	0.059	314	<0.00050	2.4	<0.00010	8140	5.51	655	<0.000050	<0.0010	<0.0050	0.00231	0.00118	<0.0010	<0.00050
WQR2-2m	L2759209-8	2025-03-12	M																						
WQR2-2m	VA25A5429-008	2025-03-12	M	0.107	800	0.00369	<0.0000050	2.34E-08	0.00535	<0.00050	<0.050	216	<0.00050	1.0	<0.00010	6040	3.68	464	<0.000050	<0.0010	<0.0050	0.00157	0.00098	<0.0010	<0.00050
WQR2-2m	VA25A6528-017	2025-03-25	M																						
WQR2-2m	VA25A8147-005	2025-04-11	M	0.037	218	0.00507	<0.0000050	<0.000000020	0.00219	<0.00050	<0.050	64.1	<0.00050	2.5	<0.00010	1970	1.28	177	<0.000050	<0.0010	<0.0050	0.000659	<0.00050	<0.0010	<0.00050
WQR2-2m	VA25A8148-005	2025-04-11	M																						
WQR2-2m	VA25A8280-008	2025-04-13	M	0.023	179	0.00612	<0.0000050	<0.000000020	0.00180	<0.00050	<0.050	53.5	<0.00050	2.2	<0.00010	1440	1.08	136	<0.000050	<0.0010	<0.0050	0.000485	<0.00050	<0.0010	<0.00050
WQR2-2m	VA25A8282-008	2025-04-13	M																						
WQR2-2m	VA25A8854-008	2025-04-21	M	<0.020	63.2	0.00648	<0.0000050		0.00088	<0.00050	<0.050	19.3	<0.00050	2.5	<0.00010	500	0.382	42.8	<0.000050	<0.0010	<0.0050	0.000170	<0.00050	0.0011	<0.00050
WQR2-2m	VA25A8855-008	2025-04-21	M																						
WQR2-2m	VA25B0359-011	2025-05-06	M	0.099	489	0.00339	<0.0000050	0.000000020	0.00592	<0.00050	<0.050	189	<0.00050	<1.0	<0.00010	3740	3.87	452	<0.000050	<0.0010	<0.0050	0.00148	0.00078	<0.0010	<0.00050
WQR2-2m	VA25B0360-011	2025-05-06	M																						
WQR2-2m	VA25B0499-008	2025-05-07	M	0.051	371	0.00375	<0.0000050	<0.000000020	0.00423	0.00107	<0.050	122	<0.00050	1.0	<0.00010	2770	2.72	338	<0.000050	<0.0010	<0.0050	0.00113	0.00062	<0.0010	<0.00050
WQR2-2m	VA25B0502-008	2025-05-07	M																						
WQR2-3	23L2091-11	2023-12-15	M	0.114	859	0.0119	<0.000010		0.00728	<0.000400	<0.1	254	<0.00100	2.17	<0.000100	7480	4.98	606	<0.0000400	<0.000500	<0.00200	0.00213	<0.00400	<0.0100	<0.0005
WQR2-3	L2754383-9	2024-01-25	M																						
WQR2-3	VA24A1507-011	2024-01-25	M	0.148	1050	0.00266	<0.0000050		0.00949	0.00059	0.078	316	<0.00050	2.2	<0.00010	8620	6.32	750	<0.000050	<0.0010	<0.0050	0.00254	0.00143	<0.0010	<0.00050
WQR2-3	L2754604-9	2024-02-14	M																						
WQR2-3	VA24A2995-011	2024-02-14	M	0.111	687	0.00657	<0.0000050		0.00696	<0.00050	0.057	223	<0.00050	2.2	<0.00010	6400	4.81	601	<0.000050	<0.0010	<0.0050	0.00190	0.00116	<0.0010	<0.00050
WQR2-3	L2755043-11	2024-03-21	M																						
WQR2-3	VA24A6026-011	2024-03-21	M	0.037	283	0.00764	<0.0000050		0.00263	<0.00050	<0.050	83.4	<0.00050	2.4	<0.00010	2170	1.57	208	<0.000050	<0.0010	<0.0050	0.000751	0.00064	<0.0010	<0.00050
WQR2-3	L2755490-9	2024-04-24	M																						
WQR2-3	VA24A8916-011	2024-04-24	M	0.043	338	0.00752	<0.0000050		0.00312	<0.00050	<0.050	92.1	<0.00050	2.6	<0.00010	2650	1.90	255	<0.000050	<0.0010	<0.0050	0.000848	0.00059	<0.0010	<0.00050
WQR2-3	L2755567-9	2024-05-01	M																						
WQR2-3	VA24A9566-011	2024-05-01	M	0.033	269	0.00663	<0.0000050		0.00221	<0.00050	<0.050	74.7	<0.00050	2.5	<0.00010	1970	1.38	180	<0.000050	<0.0010	<0.0050	0.000604	0.00051	<0.0010	<0.00050
WQR2-3	L2755666-9	2024-05-08	M																						
WQR2-3	VA24B0201-011	2024-05-08	M	0.050	331	0.00548	<0.0000050		0.00360	<0.00050	<0.050	114	<0.00050	2.0	<0.00010	3260	2.32	282	<0.000050	<0.0010	<0.0050	0.000979	0.00066	<0.0010	<0.00050
WQR2-3	L2755779-9	2024-05-15	M																						
WQR2-3	VA24B0901-011	2024-05-15	M	<0.020	104	0.00535	<0.0000050		0.00117	<0.00050	<0.050	29.9	<0.00050	1.9	<0.00010	884	0.629	77.7	<0.000050	<0.0010	<0.0050	0.000277	<0.00050	<0.0010	<0.00050
WQR2-3	L2755888-9	2024-05-22	M																						
WQR2-3	VA24B1500-011	2024-05-22	M	0.025	191	0.00502	<0.0000050		0.00181	<0.00050	<0.050	54.8	<0.00050	1.8	<0.00010	1510	1.05	130	<0.000050	<0.0010	<0.0050	0.000538	0.00054	<0.0010	<0.00050
WQR2-3	L2756312-9	2024-06-19	M																						
WQR2-3	VA24B4510-011	2024-06-19	M	<0.020	112	0.00591	<0.0000050		0.00126	0.00060	<0.050	31.3	<0.00050	1.4	<0.00010	884	0.629	73.8	<0.000050	<0.0010	<0.0050	0.000282	0.00053	0.0016	<0.00050
WQR2-3	VA24B7397-011	2024-07-17	M	<0.020	114	0.00500	<0.0000050		0.00106	<0.00050	<0.050	33.4	<0.00050	1.3	<0.00010	959	0.589	83.9	<0.000050	<0.0010	<0.0050	0.000256	<0.00050	0.0017	<0.00050
WQR2-3	L2756689-9	2024-07-17	M																						
WQR2-3	L2757122-9	2024-08-21	M																						
WQR2-3	VA24C1337-011	2024-08-21	M	0.026	200	0.00641	<0.0000050		0.00163	<0.00050	<0.050	56.7	<0.00050	1.4	<0.00010	1420	0.993	150	<0.000050	<0.0010	<0.0050	0.000446	<0.00050	<0.0010	<0.00050
WQR2-3	VA24C4683-011	2024-09-18	M	0.030	253	0.0102	<0.0000050		0.00217	<0.00050	<0.050	68.6	<0.00050	1.6	<0.00010	1840	1.31	171	<0.000050	<0.0010	<0.0050	0.000573	0.00058	<0.0010	<0.00050
WQR2-3	VA24C8569-011	2024-10-23	M	0.026	241	0.00885	<0.0000050		0.00193	<0.00050	<0.050	70.3	<0.00050	2.0	<0.00010	1790	1.21	156	<0.000050	<0.0010	<0.0050	0.000603	0.00058	<0.0010	<0.00050
WQR2-3	VA24C9414-011	2024-10-30	M	0.025	208	0.00714	<0.0000050		0.00203	<0.00050	<0.050	59.3	<0.00050	2.6	<0.00010	1520	1.13	151	<0.000050	<0.0010	<0.0050	0.000543	0.00060	0.0016	<0.00050
WQR2-3	L2757977-11	2024-10-30	M																						
WQR2-3	VA24D0180-011	2024-11-06	M	0.047	412	0.00961	<0.0000050		0.00343	<0.00050	<0.050	128	0.00059	2.4	<0.00010	3110	2.27	307	<0.000050	<0.0010	<0.0050	0.00116	0.00080	<0.0010	<0.00050
WQR2-3	L2758221-9	2024-11-22	M																						
WQR2-3	VA24D1791-011	2024-11-22	M	0.132	842	0.00801	<0.0000050		0.00674	<0.00050	0.068	248	<0.00050	2.4	<0.00010	6370	4.46	695	<0.000050	<0.0010	<0.0050	0.00168	0.00118	<0.0010	<0.00050
WQR2-3	L2758486-9	2024-12-18	M																						
WQR2-3	VA24D3937-011	2024-12-18	M	0.086	651	0.00445	<0.0000050		0.00566	<0.00050	<0.050	184	<0.00050	1.2	<0.00010	4820	3.86	372	<0.000050	<0.0010	<0.0050	0.00130	0.00097	<0.0010	<0.00050
WQR2-3	L2758770-9	2025-01-22	M																						
WQR2-3	VA25A1525-011	2025-01-22	M	0.108	644	0.00494	<0.0000050		0.00715	<0.00050	0.070	246	0.00092	2.0	<0.00010	4620	4.89	586	<0.000050	<0.0010	<0.0050	0.00209	0.00112	<0.0010	<0.00050
WQR2-3	L2759008-9	2025-02-19	M																						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	D-Li	D-Mg	D-Mn	D-Hg	Dissolved Methylmercury	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-S	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn	Benzene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-3	VA25A3570-011	2025-02-19	M	0.107	1020	0.00756	<0.0000050		0.00592	<0.00050	<0.050	236	<0.00050	4.2	<0.00010	7030	4.78	433	<0.000050	<0.0010	<0.0050	0.00176	0.00098	0.0011	<0.00050
WQR2-3	VA25A6679-011	2025-03-26	M	0.067	556	0.00489	<0.0000050		0.00416	<0.00050	<0.050	160	<0.00050	<1.0	<0.00010	4220	2.78	273	<0.000050	<0.0010	<0.0050	0.00110	0.00066	<0.0010	<0.00050
WQR2-3	VA25A9109-011	2025-04-23	M	0.026	210	0.00582	<0.0000050		0.00219	<0.00050	<0.050	58.2	<0.00050	2.4	<0.00010	1700	1.22	152	<0.000050	<0.0010	<0.0050	0.000539	<0.00050	<0.0010	<0.00050
WQR2-3	VA25A9941-011	2025-05-01	M	0.022	174	0.00452	<0.0000050		0.00184	<0.00050	<0.050	53.1	<0.00050	2.0	<0.00010	1480	1.05	129	<0.000050	<0.0010	<0.0050	0.000473	<0.00050	<0.0010	<0.00050
WQR2-3	VA25B0496-011	2025-05-07	M	0.040	269	0.00442	<0.0000050		0.00239	<0.00050	<0.050	73.0	<0.00050	1.9	<0.00010	2050	1.50	166	<0.000050	<0.0010	<0.0050	0.000620	0.00052	<0.0010	<0.00050
WQR2-3	VA25B1530-011	2025-05-16	M	<0.020	82.0	0.00449	<0.0000050		0.00114	<0.00050	<0.050	26.6	<0.00050	2.0	<0.00010	751	0.543	64.3	<0.000050	<0.0010	<0.0050	0.000272	<0.00050	<0.0010	<0.00050
WQR2-3	VA25B1841-011	2025-05-21	M	<0.020	74.2	0.00427	<0.0000050		0.00096	<0.00050	<0.050	22.4	<0.00050	2.6	<0.00010	588	0.459	65.4	<0.000050	<0.0010	<0.0050	0.000238	<0.00050	0.0028	<0.00050
WQR2-SF	L2755545-12	2024-04-30	M																						
WQR2-SF	VA24A9402-012	2024-04-30	M	0.149	1190	0.00051	<0.0000050	<0.000000020	0.00924	<0.00050	<0.050	326	<0.00050	<1.0	<0.00010	8650	6.50	831	<0.000050	<0.0010	<0.0050	0.00260	0.00136	0.0012	<0.00050
WQR2-SF	L2755648-3	2024-05-08	M																						
WQR2-SF	VA24B0178-003	2024-05-08	M	0.152	1030	0.00063	<0.0000050	<0.000000020	0.00930	<0.00050	0.052	318	<0.00050	<1.0	<0.00010	8940	6.62	781	<0.000050	<0.0010	<0.0050	0.00234	0.00134	<0.0010	<0.00050
WQR2-SF	L2755934-12	2024-05-24	M																						
WQR2-SF	VA24B1783-012	2024-05-24	M	0.145	989	0.00160	<0.0000050	<0.000000020	0.00894	<0.00050	<0.050	290	0.00137	<1.0	<0.00010	7760	6.19	795	<0.000050	<0.0010	<0.0050	0.00248	0.00123	<0.0010	<0.00050
WQR2-SF	VA24B3452-012	2024-06-10	M	0.110	970	0.00148	<0.0000050	<0.000000020	0.00697	<0.00050	<0.050	284	<0.00050	<1.0	<0.00010	7080	4.99	647	<0.000050	<0.0010	<0.0050	0.00222	0.00103	<0.0010	<0.00050
WQR2-SF	660-454600000-0	2024-06-17	M																						
WQR2-SF	VA24B5882-012	2024-07-03	M																						
WQR2-SF	VA24B6465-006	2024-07-09	M	0.154	1200	0.00138	<0.0000050	<0.000000020	0.00900	<0.00050	<0.050	336	<0.00050	<1.0	<0.00010	8450	6.10	781	<0.000050	<0.0010	<0.0050	0.00279	0.00121	<0.0010	<0.00050
WQR2-SF	VA24B7867-006	2024-07-20	M	0.122	1010	0.00093	<0.0000050	0.000000029	0.00737	<0.00050	<0.050	290	<0.00050	<1.0	<0.00010	8060	5.04	726	<0.000050	<0.0010	<0.0050	0.00243	0.00102	<0.0010	<0.00050
WQR2-SF	L2757210-6	2024-08-26	M																						
WQR2-SF	VA24C2208-006	2024-08-26	M	0.126	930	0.00202	<0.0000050	<0.000000020	0.00824	<0.00050	<0.050	309	<0.00050	<1.0	<0.00010	7190	5.80	720	<0.000050	<0.0010	<0.0050	0.00255	0.00115	<0.0010	<0.00050
WQR2-SF	VA24C5557-003	2024-09-25	M	0.137	994	0.00298	<0.0000050		0.00899	<0.00050	0.067	314	<0.00050	<1.0	<0.00010	7480	6.17	765	<0.000050	<0.0010	<0.0050	0.00262	0.00112	<0.0010	
WQR2-SF	L2757680-6	2024-10-06	M																						
WQR2-SF	VA24C6685-006	2024-10-06	M	0.145	1140	<0.00500	<0.0000050	<0.000000020	0.00899	<0.0250	<2.50	356	<0.00250	<2.50	<0.000500	8990	6.41	828	<0.000500	<0.00500	<0.0150	0.00250	<0.0250	<0.0500	<0.00050
WQR2-SF	VA24C7408-006	2024-10-13	M	0.153	1000	0.00626	<0.0000050	0.000000035	0.00754	<0.00050	0.072	291	<0.00050	1.2	<0.00010	7650	5.20	685	<0.000050	<0.0010	<0.0050	0.00260	0.00101	<0.0010	<0.00050
WQR2-SF	L2757872-6	2024-10-22	M																						
WQR2-SF	VA24C8330-006	2024-10-22	M	0.121	1010	0.00411	<0.0000050	0.000000020	0.00682	<0.00050	0.064	279	<0.00050	1.2	<0.00010	7720	4.78	648	<0.000050	<0.0010	<0.0050	0.00239	0.00097	<0.0010	<0.00050
WQR2-SF	VA24C9185-007	2024-10-29	M	0.107	818	0.00445	<0.0000050	<0.000000020	0.00725	<0.00050	0.059	250	<0.00050		<0.00010		5.07	652	<0.000050	<0.0010	<0.0050	0.00206	0.00125	<0.0020	<0.00050
WQR2-SF	L2757962-7	2024-10-29	M																						
WQR2-SF	L2758003-3	2024-11-02	M																						
WQR2-SF	VA24C9732-003	2024-11-02	M	0.146	1060	0.00467	<0.0000050	<0.000000020	0.00840	<0.00050	0.068	321	0.00255	1.5	<0.00010	8530	5.61	740	<0.000050	0.0011	<0.0050	0.00221	0.00148	0.0012	<0.00050
WQR2-SF	L2758354-3	2024-12-06	M																						
WQR2-SF	VA24D3008-003	2024-12-06	M	0.150	1100	0.00274	<0.0000050	<0.000000020	0.00865	0.00054	0.081	332	<0.00050	1.4	<0.00010	8320	5.80	768	<0.000050	<0.0010	<0.0050	0.00248	0.00136	0.0014	<0.00050
WQR2-SF	L2758634-9	2025-01-09	M																						
WQR2-SF	VA25A0510-009	2025-01-09	M	0.130	722	0.00243	<0.0000050	0.000000021	0.00867	<0.00050	0.081	283	<0.00050	1.3	<0.00010	5680	5.76	658	<0.000050	<0.0010	<0.0050	0.00200	0.00142	<0.0010	<0.00050
WQR2-SF	L2759010-9	2025-02-18	M																						
WQR2-SF	VA25A3415-009	2025-02-18	M	0.138	1050	0.00134	<0.0000050	<0.000000020	0.00844	<0.00050	0.071	336	<0.00050	2.3	<0.00010	8460	5.86	679	<0.000050	<0.0010	<0.0050	0.00232	0.00127	<0.0010	<0.00050
WQR2-SF	L2759209-9	2025-03-12	M																						
WQR2-SF	VA25A5429-009	2025-03-12	M	0.164	1280	0.00048	<0.0000050	<0.000000020	0.00800	<0.00050	0.067	330	<0.00050	1.2	<0.00010	9450	5.63	700	<0.000050	<0.0010	<0.0050	0.00232	0.00138	<0.0010	<0.00050
WQR2-SF	VA25A6528-018	2025-03-25	M																						
WQR2-SF	VA25A8147-006	2025-04-11	M	0.138	874	0.00118	<0.0000050	<0.000000020	0.00736	<0.00050	<0.050	242	<0.00050	<1.0	<0.00010	8070	4.70	654	<0.000050	<0.0010	<0.0050	0.00229	0.00106	<0.0010	<0.00050
WQR2-SF	VA25A8148-006	2025-04-11	M																						
WQR2-SF	VA25A8280-009	2025-04-13	M	0.145	1070	0.00087	<0.0000050	0.000000022	0.00850	<0.00050	0.080	310	<0.00050	1.3	<0.00010	8780	5.82	777	<0.000050	<0.0010	<0.0050	0.00231	0.00124	<0.0010	<0.00050
WQR2-SF	VA25A8282-009	2025-04-13	M																						
WQR2-SF	VA25A8854-009	2025-04-21	M	0.131	1180	0.00107	<0.0000050		0.00846	<0.00050	0.051	311	<0.00050	<1.0	<0.00010	8860	6.07	696	<0.000050	<0.0010	<0.0050	0.00222	0.00134	<0.0010	<0.00050
WQR2-SF	VA25A8855-009	2025-04-21	M																						
WQR2-SF	VA25B0359-010	2025-05-06	M	0.113	970	0.00118	<0.0000050	<0.000000020	0.00945	<0.00050	0.082	275	<0.00080	1.1	<0.00010	6920	6.26	823	<0.000050	<0.0010	<0.0050	0.00243	0.00149	<0.0010	<0.00050
WQR2-SF	VA25B0360-010	2025-05-06	M																						
WQR2-SF	VA25B0499-009	2025-05-07	M	0.106	874	0.00287	<0.0000050	0.000000024	0.00872	<0.00050	<0.050	250	<0.00070	<1.0	<0.00010	5800	5.80	724	<0.000050	<0.0010	<0.0050	0.00233	0.00113	<0.0010	<0.00050
WQR2-SF	VA25B0502-009	2025-05-07	M																						

Notes:
Sample Class 'M' = monitoring sample.
'<' = result is below the indicated detection limit.

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	0051710-01	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	0062209-01	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	0071996-01	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	0082292-01	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	0093017-01	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	20J1961-01	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	20J2778-01	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	20K0360-01	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	20K1261-01	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	20K2100-01	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	20L1589-01	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	21A2590-01	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	21B2778-01	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	21C3505-01	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	21D2478-01	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	21E1990-01	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	21E2917-01	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	21F0167-01	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	21F1056-01	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	21F2014-01	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	21G2414-01	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	21H3040-01	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	21I3814-01	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	21J3514-01	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	21K3046-01	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	21L2125-01	2021-12-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	22A2312-01	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	22B2487-01	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	22C3145-01	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	22D2212-01	2022-04-19	M	<0.0010	<0.0010	<0.0010	0.0005	<0.0020												
WQ1-1	22E2480-03	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	22F3212-01	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	22G1763-01	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	22H2453-01	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	22I1926-01	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	22J1560-03	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-1	22K1453-01	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	22L0774-01	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	23A2847-01	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	23C0060-01	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	23C1797-01	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	23D2945-01	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	23E2392-01	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	23F3614-01	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	23G2415-01	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	23H3309-03	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	23I2271-03	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	23J2236-03	2023-10-18	M																	
WQ1-1	23K1909-01	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-1	23L1905-04	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ1-1	L2754366-7	2024-01-24	M																	
WQ1-1	VA24A1422-007	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2754594-4	2024-02-13	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	VA24A2858-004	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2755033-4	2024-03-20	M																	
WQ1-1	VA24A5955-004	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2755461-4	2024-04-23	M																	
WQ1-1	VA24A8736-004	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2755553-4	2024-04-30	M																	
WQ1-1	VA24A9418-004	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2755641-4	2024-05-07	M																	
WQ1-1	VA24B0040-004	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2755769-4	2024-05-14	M																	
WQ1-1	VA24B0738-004	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2755874-4	2024-05-21	M																	
WQ1-1	VA24B1351-004	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2756277-4	2024-06-18	M																	
WQ1-1	VA24B4257-004	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2756678-4	2024-07-16	M																	
WQ1-1	VA24B7237-004	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2757095-4	2024-08-20	M																	
WQ1-1	VA24C1101-004	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA24C4483-004	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA24C8360-004	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA24C9197-004	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA24D0009-004	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA24D0813-011	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA24D1720-004	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2758465-4	2024-12-17	M																	
WQ1-1	VA24D3769-004	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2758719-4	2025-01-21	M																	
WQ1-1	VA25A1408-004	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	L2758994-4	2025-02-18	M																	
WQ1-1	VA25A3430-004	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA25A6550-004	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA25A8962-004	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA25A9878-004	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA25B0358-004	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA25B1026-004	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-1	VA25B1711-004	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	0051710-02	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	0062209-02	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	0071996-02	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	0082292-02	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	0093017-02	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	20J1961-02	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	20J2778-02	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	20K0360-02	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	20K1261-02	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	20K2100-02	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	20L1589-02	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	21A2590-02	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	21B2778-02	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	21C3505-02	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	21D2478-02	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	21E1990-02	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	21E2917-02	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	21F0167-02	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	21F1056-02	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	21F2014-02	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	21G2414-02	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	21H3040-02	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	21I3814-02	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	21J3514-02	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	21K3046-02	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	21L2125-02	2021-12-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	22A2312-02	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	22B2487-02	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	22C3145-02	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	22D2212-02	2022-04-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	22E2480-04	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	22F3212-02	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	22G1763-02	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	22H2453-02	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	22I1926-02	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	22J1560-04	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ1-2	22K1453-02	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	22L0774-02	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	23A2847-02	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	23C0060-02	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	23C1797-02	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	23D2945-02	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	23E2392-02	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	23F3614-02	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	23G2415-02	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	23H3309-04	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	23I2271-04	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	23J2236-04	2023-10-18	M																	
WQ1-2	23K1909-02	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ1-2	23L1905-05	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ1-2	L2754366-8	2024-01-24	M																	
WQ1-2	VA24A1422-008	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2754594-5	2024-02-13	M																	
WQ1-2	VA24A2858-005	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2755033-5	2024-03-20	M																	
WQ1-2	VA24A5955-005	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2755461-5	2024-04-23	M																	
WQ1-2	VA24A8736-005	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2755553-5	2024-04-30	M																	
WQ1-2	VA24A9418-005	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2755641-5	2024-05-07	M																	
WQ1-2	VA24B0040-005	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2755769-5	2024-05-14	M																	
WQ1-2	VA24B0738-005	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2755874-5	2024-05-21	M																	
WQ1-2	VA24B1351-005	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2756277-5	2024-06-18	M																	
WQ1-2	VA24B4257-005	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2756678-5	2024-07-16	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	VA24B7237-005	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2757095-5	2024-08-20	M																	
WQ1-2	VA24C1101-005	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA24C4483-005	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA24C8360-005	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA24C9197-005	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA24D0009-005	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA24D0813-013	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA24D1720-005	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2758465-5	2024-12-17	M																	
WQ1-2	VA24D3769-005	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2758719-5	2025-01-21	M																	
WQ1-2	VA25A1408-005	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	L2758994-5	2025-02-18	M																	
WQ1-2	VA25A3430-005	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA25A6550-005	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA25A8962-005	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA25A9878-005	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA25B0358-005	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA25B1026-005	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-2	VA25B1711-005	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	23L1905-06	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ1-3	L2754366-9	2024-01-24	M																	
WQ1-3	VA24A1422-009	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2754594-6	2024-02-13	M																	
WQ1-3	VA24A2858-006	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2755033-6	2024-03-20	M																	
WQ1-3	VA24A5955-006	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2755461-6	2024-04-23	M																	
WQ1-3	VA24A8736-006	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2755553-6	2024-04-30	M																	
WQ1-3	VA24A9418-006	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2755641-6	2024-05-07	M																	
WQ1-3	VA24B0040-006	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2755769-6	2024-05-14	M																	
WQ1-3	VA24B0738-006	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2755874-6	2024-05-21	M																	
WQ1-3	VA24B1351-006	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2756277-6	2024-06-18	M																	
WQ1-3	VA24B4257-006	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2756678-6	2024-07-16	M																	
WQ1-3	VA24B7237-006	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2757095-6	2024-08-20	M																	
WQ1-3	VA24C1101-006	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA24C4483-006	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA24C8360-006	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA24C9197-006	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA24D0009-006	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA24D0813-014	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA24D1720-006	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2758465-6	2024-12-17	M																	
WQ1-3	VA24D3769-006	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2758719-6	2025-01-21	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-3	VA25A1408-006	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	L2758994-6	2025-02-18	M																	
WQ1-3	VA25A3430-006	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA25A6550-006	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA25A8962-006	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA25A9878-006	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA25B0358-006	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA25B1026-006	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ1-3	VA25B1711-006	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	0051710-03	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	0062209-03	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	0071996-03	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	0082292-03	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	0093017-03	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	20J1961-03	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	20J2778-03	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	20K0360-03	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	20K1261-03	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	20K2100-03	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	20L1589-03	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	21A2590-03	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	21B2778-03	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	21C3505-03	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	21D2478-03	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	21E1990-03	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	21E2917-03	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	21F0167-03	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	21F1056-03	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	21F2014-03	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	21G2414-03	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	21H3040-03	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	21I3814-03	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	21J3514-03	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	21K3046-03	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	21L2125-03	2021-12-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	22A2312-03	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	22B2487-03	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	22C3145-03	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	22D2212-03	2022-04-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	22E2480-05	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	22F3212-03	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	22G1763-03	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	22H2453-03	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	22I1926-03	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	22J1560-05	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-1	22K1453-03	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	22L0774-03	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	23A2847-03	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	23C0060-03	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	23C1797-03	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	23D2945-03	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	23E2392-03	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	23F3614-03	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-1	23G2415-03	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	23H3309-05	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	23I2271-05	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	23J2236-05	2023-10-18	M																	
WQ2-1	23K1909-03	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-1	23L1905-07	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ2-1	L2754383-1	2024-01-25	M																	
WQ2-1	VA24A1507-001	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2754594-7	2024-02-13	M																	
WQ2-1	VA24A2858-007	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2755033-7	2024-03-20	M																	
WQ2-1	VA24A5955-007	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2755461-7	2024-04-23	M																	
WQ2-1	VA24A8736-007	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2755553-7	2024-04-30	M																	
WQ2-1	VA24A9418-007	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2755641-7	2024-05-07	M																	
WQ2-1	VA24B0040-007	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2755769-7	2024-05-14	M																	
WQ2-1	VA24B0738-007	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2755874-7	2024-05-21	M																	
WQ2-1	VA24B1351-007	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2756277-7	2024-06-18	M																	
WQ2-1	VA24B4257-007	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2756678-7	2024-07-16	M																	
WQ2-1	VA24B7237-007	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2757095-7	2024-08-20	M																	
WQ2-1	VA24C1101-007	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	VA24C4483-007	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	VA24C8360-007	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	VA24C9197-007	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	VA24D0009-007	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2758095-4	2024-11-12	M																	
WQ2-1	VA24D0632-004	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	VA24D1720-007	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2758465-7	2024-12-17	M																	
WQ2-1	VA24D3769-007	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2758719-7	2025-01-21	M																	
WQ2-1	VA25A1408-007	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	L2758994-7	2025-02-18	M																	
WQ2-1	VA25A3430-007	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	VA25A6550-007	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	VA25A8962-007	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	VA25A9878-007	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	VA25B0358-007	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	VA25B1026-007	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-1	VA25B1711-007	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	0051710-04	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	0062209-04	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	0071996-04	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	0082292-04	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	0093017-04	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	20J1961-04	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	20J2778-04	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	20K0360-04	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	20K1261-04	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	20K2100-04	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	20L1589-04	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	21A2590-04	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	21B2778-04	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	21C3505-04	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	21D2478-04	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	21E1990-04	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	21E2917-04	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	21F0167-04	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	21F1056-04	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	21F2014-04	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	21G2414-04	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	21H3040-04	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	21I3814-04	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	21J3514-04	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	21K3046-04	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	21L2125-04	2021-12-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	22A2312-04	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	22B2487-04	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	22C3145-04	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	22D2212-11	2022-04-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	22E2480-06	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	22F3212-04	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	22G1763-04	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	22H2453-04	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	22I1926-04	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	22J1560-06	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ2-2	22K1453-04	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	22L0774-04	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	23A2847-04	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	23C0060-04	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	23C1797-04	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	23D2945-04	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	23E2392-04	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	23F3614-04	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	23G2415-04	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	23H3309-06	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	23I2271-06	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	23J2236-06	2023-10-18	M																	
WQ2-2	23K1909-04	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ2-2	23L1905-08	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ2-2	L2754383-2	2024-01-25	M																	
WQ2-2	VA24A1507-002	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2754594-8	2024-02-13	M																	
WQ2-2	VA24A2858-008	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2755033-8	2024-03-20	M																	
WQ2-2	VA24A5955-008	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2755461-8	2024-04-23	M																	
WQ2-2	VA24A8736-008	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2755553-8	2024-04-30	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	VA24A9418-008	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2755641-8	2024-05-07	M																	
WQ2-2	VA24B0040-008	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2755769-8	2024-05-14	M																	
WQ2-2	VA24B0738-008	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2755874-8	2024-05-21	M																	
WQ2-2	VA24B1351-008	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2756277-8	2024-06-18	M																	
WQ2-2	VA24B4257-008	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2756678-8	2024-07-16	M																	
WQ2-2	VA24B7237-008	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2757095-8	2024-08-20	M																	
WQ2-2	VA24C1101-008	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	VA24C4483-008	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	VA24C8360-008	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	VA24C9197-008	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	VA24D0009-008	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2758095-5	2024-11-12	M																	
WQ2-2	VA24D0632-005	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	VA24D1720-008	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2758465-8	2024-12-17	M																	
WQ2-2	VA24D3769-008	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2758719-8	2025-01-21	M																	
WQ2-2	VA25A1408-008	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	L2758994-8	2025-02-18	M																	
WQ2-2	VA25A3430-008	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	VA25A6550-008	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	VA25A8962-008	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	VA25A9878-008	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	VA25B0358-008	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	VA25B1026-008	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-2	VA25B1711-008	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	23L1905-09	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ2-3	L2754383-3	2024-01-25	M																	
WQ2-3	VA24A1507-003	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2754594-9	2024-02-13	M																	
WQ2-3	VA24A2858-009	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2755033-9	2024-03-20	M																	
WQ2-3	VA24A5955-009	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2755461-9	2024-04-23	M																	
WQ2-3	VA24A8736-009	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2755553-9	2024-04-30	M																	
WQ2-3	VA24A9418-009	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2755641-9	2024-05-07	M																	
WQ2-3	VA24B0040-009	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2755769-9	2024-05-14	M																	
WQ2-3	VA24B0738-009	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2755874-9	2024-05-21	M																	
WQ2-3	VA24B1351-009	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2756277-9	2024-06-18	M																	
WQ2-3	VA24B4257-010	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2756678-9	2024-07-16	M																	
WQ2-3	VA24B7237-009	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-3	L2757095-9	2024-08-20	M																	
WQ2-3	VA24C1101-009	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	VA24C4483-009	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	VA24C8360-009	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	VA24C9197-009	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	VA24D0009-009	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2758095-6	2024-11-12	M																	
WQ2-3	VA24D0632-006	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	VA24D1720-009	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2758465-9	2024-12-17	M																	
WQ2-3	VA24D3769-009	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2758719-9	2025-01-21	M																	
WQ2-3	VA25A1408-009	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	L2758994-9	2025-02-18	M																	
WQ2-3	VA25A3430-009	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	VA25A6550-009	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	VA25A8962-009	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	VA25A9878-009	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	VA25B0358-009	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	VA25B1026-009	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ2-3	VA25B1711-009	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	0051710-05	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	0062209-05	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	0071996-05	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	0082292-05	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	0093017-05	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	20J1961-05	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	20J2778-05	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	20K0360-05	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	20K1261-05	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	20K2100-05	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	20L1589-05	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	21A2590-05	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	21B2778-05	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	21C3505-05	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	21D2478-05	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	21E1990-05	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	21E2917-05	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	21F0167-05	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	21F1056-05	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	21F2014-05	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	21G2414-05	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	21H3040-05	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	21I3814-05	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	21J3514-05	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	21K3046-05	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	21L2125-05	2021-12-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	22A2312-05	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	22B2487-05	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	22C3145-05	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	22D2212-04	2022-04-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	22E2480-07	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	22F3212-05	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	22G1763-05	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	22H2453-05	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	22I1926-05	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	22J1560-07	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-1	22K1453-05	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	22L0774-05	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	23A2847-05	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	23C0060-05	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	23C1797-05	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	23D2945-05	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	23E2392-05	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	23F3614-05	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	23G2415-05	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	23H3309-07	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	23I2271-07	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	23J2236-07	2023-10-18	M																	
WQ3-1	23K1909-05	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-1	23L2091-01	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ3-1	L2754366-1	2024-01-24	M																	
WQ3-1	VA24A1422-001	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2754604-1	2024-02-14	M																	
WQ3-1	VA24A2995-001	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2755043-1	2024-03-21	M																	
WQ3-1	VA24A6026-001	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2755490-1	2024-04-24	M																	
WQ3-1	VA24A8916-001	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2755567-1	2024-05-01	M																	
WQ3-1	VA24A9566-001	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2755666-1	2024-05-08	M																	
WQ3-1	VA24B0201-001	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2755779-1	2024-05-15	M																	
WQ3-1	VA24B0901-001	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2755888-1	2024-05-22	M																	
WQ3-1	VA24B1500-001	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2756312-1	2024-06-19	M																	
WQ3-1	VA24B4510-001	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	VA24B7397-001	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2756689-1	2024-07-17	M																	
WQ3-1	L2757122-1	2024-08-21	M																	
WQ3-1	VA24C1337-001	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	VA24C4683-001	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	VA24C8569-001	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2757977-1	2024-10-30	M																	
WQ3-1	VA24C9414-001	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	VA24D0180-001	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	VA24D0813-001	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2758221-1	2024-11-22	M																	
WQ3-1	VA24D1791-001	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2758486-1	2024-12-18	M																	
WQ3-1	VA24D3937-001	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2758770-1	2025-01-22	M																	
WQ3-1	VA25A1525-001	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	L2759008-1	2025-02-19	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	VA25A3570-001	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	VA25A6679-001	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	VA25A9109-001	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	VA25A9941-001	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	VA25B0496-001	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	VA25B1530-001	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-1	VA25B1841-001	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	0051710-06	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	0062209-06	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	0071996-06	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	0082292-06	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	0093017-06	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	20J1961-06	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	20J2778-06	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	20K0360-06	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	20K1261-06	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	20K2100-06	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	20L1589-06	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	21A2590-06	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	21B2778-06	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	21C3505-06	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	21D2478-06	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	21E1990-06	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	21E2917-06	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	21F0167-06	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	21F1056-06	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	21F2014-06	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	21G2414-06	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	21H3040-06	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	21I3814-06	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	21J3514-06	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	21K3046-06	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	21L2125-06	2021-12-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	22A2312-06	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	22B2487-06	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	22C3145-06	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	22D2212-05	2022-04-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	22E2480-08	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	22F3212-06	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	22G1763-06	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	22H2453-06	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	22I1926-06	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	22J1560-08	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ3-2	22K1453-06	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	22L0774-06	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	23A2847-06	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	23C0060-06	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	23C1797-06	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	23D2945-06	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	23E2392-06	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	23F3614-06	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	23G2415-06	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	23H3309-08	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-2	23I2271-08	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	23J2236-08	2023-10-18	M																	
WQ3-2	23K1909-06	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ3-2	23L2091-02	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ3-2	L2754366-2	2024-01-24	M																	
WQ3-2	VA24A1422-002	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2754604-2	2024-02-14	M																	
WQ3-2	VA24A2995-002	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2755043-2	2024-03-21	M																	
WQ3-2	VA24A6026-002	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2755490-2	2024-04-24	M																	
WQ3-2	VA24A8916-002	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2755567-2	2024-05-01	M																	
WQ3-2	VA24A9566-002	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2755666-2	2024-05-08	M																	
WQ3-2	VA24B0201-002	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2755779-2	2024-05-15	M																	
WQ3-2	VA24B0901-002	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2755888-2	2024-05-22	M																	
WQ3-2	VA24B1500-002	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2756312-2	2024-06-19	M																	
WQ3-2	VA24B4510-002	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	VA24B7397-002	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2756689-2	2024-07-17	M																	
WQ3-2	L2757122-2	2024-08-21	M																	
WQ3-2	VA24C1337-002	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	VA24C4683-002	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	VA24C8569-002	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2757977-2	2024-10-30	M																	
WQ3-2	VA24C9414-002	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	VA24D0180-002	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	VA24D0813-002	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2758221-2	2024-11-22	M																	
WQ3-2	VA24D1791-002	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2758486-2	2024-12-18	M																	
WQ3-2	VA24D3937-002	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2758770-2	2025-01-22	M																	
WQ3-2	VA25A1525-002	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	L2759008-2	2025-02-19	M																	
WQ3-2	VA25A3570-002	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	VA25A6679-002	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	VA25A9109-002	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	VA25A9941-002	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	VA25B0496-002	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	VA25B1530-002	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-2	VA25B1841-002	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	23L2091-03	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ3-3	L2754366-3	2024-01-24	M																	
WQ3-3	VA24A1422-003	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2754604-3	2024-02-14	M																	
WQ3-3	VA24A2995-003	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2755043-3	2024-03-21	M																	
WQ3-3	VA24A6026-003	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-3	L2755490-3	2024-04-24	M																	
WQ3-3	VA24A8916-003	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2755567-3	2024-05-01	M																	
WQ3-3	VA24A9566-003	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2755666-3	2024-05-08	M																	
WQ3-3	VA24B0201-003	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2755779-3	2024-05-15	M																	
WQ3-3	VA24B0901-003	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2755888-3	2024-05-22	M																	
WQ3-3	VA24B1500-003	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2756312-3	2024-06-19	M																	
WQ3-3	VA24B4510-003	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	VA24B7397-003	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2756689-3	2024-07-17	M																	
WQ3-3	L2757122-3	2024-08-21	M																	
WQ3-3	VA24C1337-003	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	VA24C4683-003	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	VA24C8569-003	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2757977-3	2024-10-30	M																	
WQ3-3	VA24C9414-003	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	VA24D0180-003	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	VA24D0813-003	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2758221-3	2024-11-22	M																	
WQ3-3	VA24D1791-003	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2758486-3	2024-12-18	M																	
WQ3-3	VA24D3937-003	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2758770-3	2025-01-22	M																	
WQ3-3	VA25A1525-003	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	L2759008-3	2025-02-19	M																	
WQ3-3	VA25A3570-003	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	VA25A6679-003	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	VA25A9109-003	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	VA25A9941-003	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	VA25B0496-003	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	VA25B1530-003	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ3-3	VA25B1841-003	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	0051710-07	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	0062209-07	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	0071996-07	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	0082292-07	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	0093017-07	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	20J1961-07	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	20J2778-07	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	20K0360-07	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	20K1261-07	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	20K2100-07	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	20L1589-07	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	21A2590-07	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	21B2778-07	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	21C3505-07	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	21D2478-07	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	21E1990-07	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	21E2917-07	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	21F0167-07	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	21F1056-07	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	21F2014-07	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	21G2414-07	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	21H3040-07	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	21I3814-07	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	21J3514-07	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	21K3046-07	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	21L2125-07	2021-12-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	22A2312-07	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	22B2487-07	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	22C3145-07	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	22D2212-12	2022-04-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	22E2480-09	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	22F3212-07	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	22G1763-07	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	22H2453-07	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	22I1926-07	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	22J1560-09	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-1	22K1453-07	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	22L0774-07	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	23A2847-07	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	23C0060-07	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	23C1797-07	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	23D2945-07	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	23E2392-07	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	23F3614-07	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	23G2415-07	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	23H3309-09	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	23I2271-09	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	23J2236-09	2023-10-18	M																	
WQ4-1	23K1909-07	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-1	23L2091-04	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ4-1	L2754383-4	2024-01-25	M																	
WQ4-1	VA24A1507-004	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2754604-4	2024-02-14	M																	
WQ4-1	VA24A2995-004	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2755043-4	2024-03-21	M																	
WQ4-1	VA24A6026-004	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2755490-4	2024-04-24	M																	
WQ4-1	VA24A8916-004	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2755567-4	2024-05-01	M																	
WQ4-1	VA24A9566-004	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2755666-4	2024-05-08	M																	
WQ4-1	VA24B0201-004	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2755779-4	2024-05-15	M																	
WQ4-1	VA24B0901-004	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2755888-4	2024-05-22	M																	
WQ4-1	VA24B1500-004	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2756312-4	2024-06-19	M																	
WQ4-1	VA24B4510-004	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	VA24B7397-004	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2756689-4	2024-07-17	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	L2757122-4	2024-08-21	M																	
WQ4-1	VA24C1337-004	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	VA24C4683-004	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	VA24C8569-004	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2757977-4	2024-10-30	M																	
WQ4-1	VA24C9414-004	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	VA24D0180-004	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	VA24D0813-004	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2758221-4	2024-11-22	M																	
WQ4-1	VA24D1791-004	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2758486-4	2024-12-18	M																	
WQ4-1	VA24D3937-004	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2758770-4	2025-01-22	M																	
WQ4-1	VA25A1525-004	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	L2759008-4	2025-02-19	M																	
WQ4-1	VA25A3570-004	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	VA25A6679-004	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	VA25A9109-004	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	VA25A9941-004	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	VA25B0496-004	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	VA25B1530-004	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-1	VA25B1841-004	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	0051710-08	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	0062209-08	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	0071996-08	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	0082292-08	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	0093017-08	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	20J1961-08	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	20J2778-08	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	20K0360-08	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	20K1261-08	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	20K2100-08	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	20L1589-08	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	21A2590-08	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	21B2778-08	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	21C3505-08	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	21D2478-08	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	21E1990-08	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	21E2917-08	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	21F0167-08	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	21F1056-08	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	21F2014-08	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	21G2414-08	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	21H3040-08	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	21I3814-08	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	21J3514-08	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	21K3046-08	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	21L2125-08	2021-12-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	22A2312-08	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	22B2487-08	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	22C3145-08	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	22D2212-13	2022-04-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	22E2480-10	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	22F3212-08	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	22G1763-08	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	22H2453-08	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	22I1926-08	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	22J1560-10	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQ4-2	22K1453-08	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	22L0774-08	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	23A2847-08	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	23C0060-08	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	23C1797-08	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	23D2945-08	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	23E2392-08	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	23F3614-08	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	23G2415-08	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	23H3309-10	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	23I2271-11	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	23J2236-11	2023-10-18	M																	
WQ4-2	23K1909-08	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQ4-2	23L2091-05	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ4-2	L2754383-5	2024-01-25	M																	
WQ4-2	VA24A1507-005	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2754604-5	2024-02-14	M																	
WQ4-2	VA24A2995-005	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2755043-5	2024-03-21	M																	
WQ4-2	VA24A6026-005	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2755490-5	2024-04-24	M																	
WQ4-2	VA24A8916-005	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2755567-5	2024-05-01	M																	
WQ4-2	VA24A9566-005	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2755666-5	2024-05-08	M																	
WQ4-2	VA24B0201-005	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2755779-5	2024-05-15	M																	
WQ4-2	VA24B0901-005	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2755888-5	2024-05-22	M																	
WQ4-2	VA24B1500-005	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2756312-5	2024-06-19	M																	
WQ4-2	VA24B4510-005	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA24B7397-005	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2756689-5	2024-07-17	M																	
WQ4-2	L2757122-5	2024-08-21	M																	
WQ4-2	VA24C1337-005	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA24C4683-005	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA24C8569-005	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2757977-5	2024-10-30	M																	
WQ4-2	VA24C9414-005	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA24D0180-005	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA24D0813-005	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2758221-5	2024-11-22	M																	
WQ4-2	VA24D1791-005	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2758486-5	2024-12-18	M																	
WQ4-2	VA24D3937-005	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA25A1525-005	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	L2758770-5	2025-01-22	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	L2759008-5	2025-02-19	M																	
WQ4-2	VA25A3570-005	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA25A6679-005	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA25A9109-005	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA25A9941-005	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA25B0496-005	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA25B1530-005	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-2	VA25B1841-005	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	23L2091-07	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQ4-3	L2754383-6	2024-01-25	M																	
WQ4-3	VA24A1507-006	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2754604-6	2024-02-14	M																	
WQ4-3	VA24A2995-006	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2755043-6	2024-03-21	M																	
WQ4-3	VA24A6026-006	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2755490-6	2024-04-24	M																	
WQ4-3	VA24A8916-006	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2755567-6	2024-05-01	M																	
WQ4-3	VA24A9566-006	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2755666-6	2024-05-08	M																	
WQ4-3	VA24B0201-006	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2755779-6	2024-05-15	M																	
WQ4-3	VA24B0901-006	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2755888-6	2024-05-22	M																	
WQ4-3	VA24B1500-006	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2756312-6	2024-06-19	M																	
WQ4-3	VA24B4510-006	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	VA24B7397-006	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2756689-6	2024-07-17	M																	
WQ4-3	L2757122-6	2024-08-21	M																	
WQ4-3	VA24C1337-006	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	VA24C4683-006	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	VA24C8569-006	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2757977-6	2024-10-30	M																	
WQ4-3	VA24C9414-006	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	VA24D0180-006	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	VA24D0813-006	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2758221-6	2024-11-22	M																	
WQ4-3	VA24D1791-006	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2758486-6	2024-12-18	M																	
WQ4-3	VA24D3937-006	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2758770-6	2025-01-22	M																	
WQ4-3	VA25A1525-006	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	L2759008-6	2025-02-19	M																	
WQ4-3	VA25A3570-006	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	VA25A6679-006	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	VA25A9109-006	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	VA25A9941-006	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	VA25B0496-006	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	VA25B1530-006	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQ4-3	VA25B1841-006	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2755545-7	2024-04-30	M																	
WQR1-0.5	VA24A9402-007	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA24A9802-011	2024-05-05	M																	
WQR1-0.5	L2755648-10	2024-05-08	M																	
WQR1-0.5	VA24B0178-010	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2755934-1	2024-05-24	M																	
WQR1-0.5	VA24B1783-001	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2755981-1	2024-05-28	M																	
WQR1-0.5	VA24B2063-001	2024-05-28	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24B2561-005	2024-06-01	M																	
WQR1-0.5	L2756068-1	2024-06-04	M																	
WQR1-0.5	VA24B2772-001	2024-06-04	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24B3452-007	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	655-454600000-0	2024-06-17	M																	
WQR1-0.5	VA24B5880-003	2024-07-02	M																	
WQR1-0.5	VA24B5882-007	2024-07-03	M																	
WQR1-0.5	VA24B6465-001	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24B7867-001	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2757210-1	2024-08-26	M																	
WQR1-0.5	VA24C2208-001	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2757680-1	2024-10-06	M																	
WQR1-0.5	VA24C6685-001	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24C7408-001	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2757830-3	2024-10-19	M																	
WQR1-0.5	VA24C8041-003	2024-10-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24C8159-005	2024-10-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2757872-1	2024-10-22	M																	
WQR1-0.5	VA24C8330-001	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2757933-5	2024-10-28	M																	
WQR1-0.5	VA24C9041-005	2024-10-28	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2758002-1	2024-11-01	M																	
WQR1-0.5	VA24C9683-001	2024-11-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2758142-5	2024-11-14	M																	
WQR1-0.5	VA24D0945-005	2024-11-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24D1069-005	2024-11-15	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2758203-5	2024-11-19	M																	
WQR1-0.5	VA24D1567-005	2024-11-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2758353-1	2024-12-05	M																	
WQR1-0.5	VA24D2842-001	2024-12-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2758617-7	2025-01-08	M																	
WQR1-0.5	VA25A0392-007	2025-01-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2759040-7	2025-02-20	M																	
WQR1-0.5	VA25A3677-007	2025-02-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2759227-7	2025-03-13	M																	
WQR1-0.5	VA25A5556-007	2025-03-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25A6528-013	2025-03-25	M																	
WQR1-0.5	VA25A8147-001	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25A8148-001	2025-04-11	M																	
WQR1-0.5	VA25A8281-007	2025-04-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25A8283-007	2025-04-14	M																	
WQR1-0.5	VA25A9123-008	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25A9125-008	2025-04-23	M																	
WQR1-0.5	VA25B0359-009	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25B0360-009	2025-05-06	M																	
WQR1-0.5	VA25B0800-007	2025-05-09	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA25B0802-007	2025-05-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25B2349-005	2025-05-27	M																	
WQR1-1	0051710-09	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	0062209-10	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	0071996-09	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	0082292-09	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	0093017-09	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	20J1961-09	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	20J2778-09	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	20K0360-09	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	20K1261-09	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	20K2100-09	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	20L1589-09	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	21A2590-09	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	21B2778-09	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	21C3505-10	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	21D2478-09	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	21E1990-09	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	21E2917-09	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	21F0167-09	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	21F1056-09	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	21F2014-09	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	21G2414-09	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	21H3040-09	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	21I3814-09	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	21J3514-09	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	21K3046-09	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	21L2125-09	2021-12-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	22A2312-09	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	22B2487-09	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	22C3145-09	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	22D2212-06	2022-04-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	22E2480-01	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	22F3212-09	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	22G1763-09	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	22H2453-09	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	22I1926-09	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	22J1560-01	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-1	22K1453-09	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	22L0774-09	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	23A2847-09	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	23C0060-09	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	23C1797-09	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	23D2945-09	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	23E2392-09	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	23F3614-09	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	23G2415-09	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	23H3309-01	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	23I2271-01	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	23J2236-01	2023-10-18	M																	
WQR1-1	23K1909-09	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-1	23L1905-01	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQR1-1	L2754366-4	2024-01-24	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-1	VA24A1422-004	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2754594-1	2024-02-13	M																	
WQR1-1	VA24A2858-001	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2755033-1	2024-03-20	M																	
WQR1-1	VA24A5955-001	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2755461-1	2024-04-23	M																	
WQR1-1	VA24A8736-001	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2755553-1	2024-04-30	M																	
WQR1-1	VA24A9418-001	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2755641-1	2024-05-07	M																	
WQR1-1	VA24B0040-001	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2755769-1	2024-05-14	M																	
WQR1-1	VA24B0738-001	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2755874-1	2024-05-21	M																	
WQR1-1	VA24B1351-001	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2756277-1	2024-06-18	M																	
WQR1-1	VA24B4257-001	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2756678-1	2024-07-16	M																	
WQR1-1	VA24B7237-001	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2757095-1	2024-08-20	M																	
WQR1-1	VA24C1101-001	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	VA24C4483-001	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	VA24C8360-001	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	VA24C9197-001	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	VA24D0009-001	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2758095-1	2024-11-12	M																	
WQR1-1	VA24D0632-001	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	VA24D1720-001	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2758465-1	2024-12-17	M																	
WQR1-1	VA24D3769-001	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2758719-1	2025-01-21	M																	
WQR1-1	VA25A1408-001	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	L2758994-1	2025-02-18	M																	
WQR1-1	VA25A3430-001	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	VA25A6550-001	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	VA25A8962-001	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	VA25A9878-001	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	VA25B0358-001	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	VA25B1026-001	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-1	VA25B1711-001	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	0051710-10	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	0062209-09	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	0071996-10	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	0082292-10	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	0093017-10	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	20J1961-10	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	20J2778-10	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	20K0360-10	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	20K1261-10	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	20K2100-10	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	20L1589-10	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	21A2590-10	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	21B2778-10	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	21C3505-11	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	21D2478-10	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	21E1990-10	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	21E2917-10	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	21F0167-10	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	21F1056-10	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	21F2014-10	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	21G2414-10	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	21H3040-10	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	21I3814-10	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	21J3514-10	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	21K3046-10	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	21L2125-10	2021-12-14	M	<0.0010	<0.0010	<0.0010	0.0007	<0.0020												
WQR1-2	22A2312-10	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	22B2487-10	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	22C3145-10	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	22D2212-07	2022-04-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	22E2480-02	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	22F3212-10	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	22G1763-10	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	22H2453-10	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	22I1926-10	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	22J1560-02	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR1-2	22K1453-10	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	22L0774-10	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	23A2847-10	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	23C0060-10	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	23C1797-10	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	23D2945-10	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	23E2392-10	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	23F3614-10	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	23G2415-10	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	23H3309-02	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	23I2271-02	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	23J2236-02	2023-10-18	M																	
WQR1-2	23K1909-10	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR1-2	23L1905-02	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQR1-2	L2754366-5	2024-01-24	M																	
WQR1-2	VA24A1422-005	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2754594-2	2024-02-13	M																	
WQR1-2	VA24A2858-002	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2755033-2	2024-03-20	M																	
WQR1-2	VA24A5955-002	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2755461-2	2024-04-23	M																	
WQR1-2	VA24A8736-002	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2755553-2	2024-04-30	M																	
WQR1-2	VA24A9418-002	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2755641-2	2024-05-07	M																	
WQR1-2	VA24B0040-002	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2755769-2	2024-05-14	M																	
WQR1-2	VA24B0738-002	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2755874-2	2024-05-21	M																	
WQR1-2	VA24B1351-002	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	L2756277-2	2024-06-18	M																	
WQR1-2	VA24B4257-002	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2756678-2	2024-07-16	M																	
WQR1-2	VA24B7237-002	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2757095-2	2024-08-20	M																	
WQR1-2	VA24C1101-002	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	VA24C4483-002	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	VA24C8360-002	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	VA24C9197-002	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	VA24D0009-002	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2758095-2	2024-11-12	M																	
WQR1-2	VA24D0632-002	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	VA24D1720-002	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2758465-2	2024-12-17	M																	
WQR1-2	VA24D3769-002	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2758719-2	2025-01-21	M																	
WQR1-2	VA25A1408-002	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	L2758994-2	2025-02-18	M																	
WQR1-2	VA25A3430-002	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	VA25A6550-002	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	VA25A8962-002	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	VA25A9878-002	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	VA25B0358-002	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	VA25B1026-002	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2	VA25B1711-002	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2755545-8	2024-04-30	M																	
WQR1-2m	VA24A9402-008	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	VA24A9802-012	2024-05-05	M																	
WQR1-2m	L2755648-11	2024-05-08	M																	
WQR1-2m	VA24B0178-011	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2755934-2	2024-05-24	M																	
WQR1-2m	VA24B1783-002	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2755981-2	2024-05-28	M																	
WQR1-2m	VA24B2063-002	2024-05-28	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	VA24B2561-006	2024-06-01	M																	
WQR1-2m	L2756068-2	2024-06-04	M																	
WQR1-2m	VA24B2772-002	2024-06-04	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	VA24B3452-008	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	656-454600000-0	2024-06-17	M																	
WQR1-2m	VA24B5882-008	2024-07-03	M																	
WQR1-2m	VA24B6465-002	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	VA24B7867-002	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2757210-2	2024-08-26	M																	
WQR1-2m	VA24C2208-002	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2757680-2	2024-10-06	M																	
WQR1-2m	VA24C6685-002	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	VA24C7408-002	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2757830-6	2024-10-20	M																	
WQR1-2m	VA24C8041-006	2024-10-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2757872-2	2024-10-22	M																	
WQR1-2m	VA24C8330-002	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2757933-6	2024-10-28	M																	
WQR1-2m	VA24C9041-006	2024-10-28	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2m	L2758002-3	2024-11-01	M																	
WQR1-2m	VA24C9683-003	2024-11-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2758353-2	2024-12-05	M																	
WQR1-2m	VA24D2842-002	2024-12-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2758617-8	2025-01-08	M																	
WQR1-2m	VA25A0392-008	2025-01-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2759040-8	2025-02-20	M																	
WQR1-2m	VA25A3677-008	2025-02-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	L2759227-8	2025-03-13	M																	
WQR1-2m	VA25A5556-008	2025-03-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	VA25A6528-014	2025-03-25	M																	
WQR1-2m	VA25A8147-002	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	VA25A8148-002	2025-04-11	M																	
WQR1-2m	VA25A8281-008	2025-04-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	VA25A8283-008	2025-04-14	M																	
WQR1-2m	VA25A9123-009	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	VA25A9125-009	2025-04-23	M																	
WQR1-2m	VA25B0359-008	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-2m	VA25B0360-008	2025-05-06	M																	
WQR1-2m	VA25B0800-008	2025-05-09	M																	
WQR1-2m	VA25B0802-008	2025-05-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	23L1905-03	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQR1-3	L2754366-6	2024-01-24	M																	
WQR1-3	VA24A1422-006	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2754594-3	2024-02-13	M																	
WQR1-3	VA24A2858-003	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2755033-3	2024-03-20	M																	
WQR1-3	VA24A5955-003	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2755461-3	2024-04-23	M																	
WQR1-3	VA24A8736-003	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2755553-3	2024-04-30	M																	
WQR1-3	VA24A9418-003	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2755641-3	2024-05-07	M																	
WQR1-3	VA24B0040-003	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2755769-3	2024-05-14	M																	
WQR1-3	VA24B0738-003	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2755874-3	2024-05-21	M																	
WQR1-3	VA24B1351-003	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2756277-3	2024-06-18	M																	
WQR1-3	VA24B4257-003	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2756678-3	2024-07-16	M																	
WQR1-3	VA24B7237-003	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2757095-3	2024-08-20	M																	
WQR1-3	VA24C1101-003	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	VA24C4483-003	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	VA24C8360-003	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	VA24C9197-003	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	VA24D0009-003	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2758095-3	2024-11-12	M																	
WQR1-3	VA24D0632-003	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	VA24D1720-003	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2758465-3	2024-12-17	M																	
WQR1-3	VA24D3769-003	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-3	L2758719-3	2025-01-21	M																	
WQR1-3	VA25A1408-003	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	L2758994-3	2025-02-18	M																	
WQR1-3	VA25A3430-003	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	VA25A6550-003	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	VA25A8962-003	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	VA25A9878-003	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	VA25B0358-003	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	VA25B1026-003	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-3	VA25B1711-003	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2755545-9	2024-04-30	M																	
WQR1-SF	VA24A9402-009	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	VA24A9802-013	2024-05-05	M																	
WQR1-SF	L2755648-12	2024-05-08	M																	
WQR1-SF	VA24B0178-012	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2755934-3	2024-05-24	M																	
WQR1-SF	VA24B1783-003	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2755981-3	2024-05-28	M																	
WQR1-SF	VA24B2063-003	2024-05-28	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2756068-3	2024-06-04	M																	
WQR1-SF	VA24B2772-003	2024-06-04	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	VA24B3452-009	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	657-454600000-0	2024-06-17	M																	
WQR1-SF	VA24B5882-009	2024-07-03	M																	
WQR1-SF	VA24B6465-003	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	VA24B7867-003	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2757210-3	2024-08-26	M																	
WQR1-SF	VA24C2208-003	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2757680-3	2024-10-06	M																	
WQR1-SF	VA24C6685-003	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	VA24C7408-003	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2757872-3	2024-10-22	M																	
WQR1-SF	VA24C8330-003	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2757933-7	2024-10-28	M																	
WQR1-SF	VA24C9041-007	2024-10-28	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2758002-4	2024-11-01	M																	
WQR1-SF	VA24C9683-004	2024-11-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	VA24D2498-001	2024-11-30	M																	
WQR1-SF	L2758353-3	2024-12-05	M																	
WQR1-SF	VA24D2842-003	2024-12-05	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2758617-9	2025-01-08	M																	
WQR1-SF	VA25A0392-009	2025-01-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2759040-9	2025-02-20	M																	
WQR1-SF	VA25A3677-009	2025-02-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	L2759227-9	2025-03-13	M																	
WQR1-SF	VA25A5556-009	2025-03-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	VA25A6528-015	2025-03-25	M																	
WQR1-SF	VA25A8147-003	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	VA25A8148-003	2025-04-11	M																	
WQR1-SF	VA25A8281-009	2025-04-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	VA25A8283-009	2025-04-14	M																	
WQR1-SF	VA25A9123-010	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	VA25A9125-010	2025-04-23	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-SF	VA25B0359-007	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR1-SF	VA25B0360-007	2025-05-06	M																	
WQR1-SF	VA25B0800-009	2025-05-09	M																	
WQR1-SF	VA25B0802-009	2025-05-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2755545-10	2024-04-30	M																	
WQR2-0.5	VA24A9402-010	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2755648-1	2024-05-08	M																	
WQR2-0.5	VA24B0178-001	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2755934-10	2024-05-24	M																	
WQR2-0.5	VA24B1783-010	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24B3452-010	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	658-454600000-0	2024-06-17	M																	
WQR2-0.5	VA24B5882-010	2024-07-03	M																	
WQR2-0.5	VA24B6465-004	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24B7867-004	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2757210-4	2024-08-26	M																	
WQR2-0.5	VA24C2208-004	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24C5557-001	2024-09-25	M																	
WQR2-0.5	L2757680-4	2024-10-06	M																	
WQR2-0.5	VA24C6685-004	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24C7408-004	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2757830-2	2024-10-19	M																	
WQR2-0.5	VA24C8041-002	2024-10-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24C8159-004	2024-10-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2757872-4	2024-10-22	M																	
WQR2-0.5	VA24C8330-004	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2757962-5	2024-10-29	M																	
WQR2-0.5	VA24C9185-005	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2758003-1	2024-11-02	M																	
WQR2-0.5	VA24C9732-001	2024-11-02	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2758142-6	2024-11-14	M																	
WQR2-0.5	VA24D0945-006	2024-11-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24D1069-006	2024-11-15	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2758203-6	2024-11-19	M																	
WQR2-0.5	VA24D1567-006	2024-11-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2758354-1	2024-12-06	M																	
WQR2-0.5	VA24D3008-001	2024-12-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2758634-7	2025-01-09	M																	
WQR2-0.5	VA25A0510-007	2025-01-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2759010-7	2025-02-18	M																	
WQR2-0.5	VA25A3415-007	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2759209-7	2025-03-12	M																	
WQR2-0.5	VA25A5429-007	2025-03-12	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25A6528-016	2025-03-25	M																	
WQR2-0.5	VA25A8147-004	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25A8148-004	2025-04-11	M																	
WQR2-0.5	VA25A8280-007	2025-04-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25A8282-007	2025-04-13	M																	
WQR2-0.5	VA25A8854-007	2025-04-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25A8855-007	2025-04-21	M																	
WQR2-0.5	VA25B0359-012	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25B0360-012	2025-05-06	M																	
WQR2-0.5	VA25B0499-007	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25B0502-007	2025-05-07	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-0.5	VA25B2349-006	2025-05-27	M																	
WQR2-1	0051710-11	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	0062209-12	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	0071996-11	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	0082292-11	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	0093017-11	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	20J1961-11	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	20J2778-11	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	20K0360-11	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	20K1261-11	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	20K2100-11	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	20L1589-11	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	21A2590-11	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	21B2778-11	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	21C3505-12	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	21D2478-11	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	21E1990-11	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	21E2917-11	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	21F0167-11	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	21F1056-11	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	21F2014-11	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	21G2414-11	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	21H3040-11	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	21I3814-11	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	21J3514-11	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	21K3046-11	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	21L2125-11	2021-12-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22A2312-11	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22B2487-11	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22C3145-11	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22D2212-14	2022-04-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22E2480-11	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22F3212-11	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22G1763-11	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22H2453-11	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22I1926-11	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22J1560-11	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-1	22K1453-11	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22K2628-03	2022-11-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22K2988-03	2022-11-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22K3123-03	2022-11-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22L0036-03	2022-11-30	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22L0263-03	2022-12-02	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22L0499-03	2022-12-05	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22L0633-03	2022-12-06	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22L0774-11	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	22L1436-03	2022-12-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	23A2847-11	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	23C0060-11	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	23C1797-11	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	23D2945-11	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	23E2392-11	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	23F3614-11	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	23G2415-11	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	23H3309-11	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-1	23I2271-13	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	23J2236-13	2023-10-18	M																	
WQR2-1	23K1909-11	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-1	23L2091-09	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQR2-1	L2754383-7	2024-01-25	M																	
WQR2-1	VA24A1507-009	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2754604-7	2024-02-14	M																	
WQR2-1	VA24A2995-009	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2755043-9	2024-03-21	M																	
WQR2-1	VA24A6026-009	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2755490-7	2024-04-24	M																	
WQR2-1	VA24A8916-009	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2755567-7	2024-05-01	M																	
WQR2-1	VA24A9566-009	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2755666-7	2024-05-08	M																	
WQR2-1	VA24B0201-009	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2755779-7	2024-05-15	M																	
WQR2-1	VA24B0901-009	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2755888-7	2024-05-22	M																	
WQR2-1	VA24B1500-009	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2756312-7	2024-06-19	M																	
WQR2-1	VA24B4510-009	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	VA24B7397-009	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2756689-7	2024-07-17	M																	
WQR2-1	L2757122-7	2024-08-21	M																	
WQR2-1	VA24C1337-009	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	VA24C4683-009	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	VA24C8569-009	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2757977-9	2024-10-30	M																	
WQR2-1	VA24C9414-009	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	VA24D0180-009	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	VA24D0813-009	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2758221-7	2024-11-22	M																	
WQR2-1	VA24D1791-009	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2758486-7	2024-12-18	M																	
WQR2-1	VA24D3937-009	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2758770-7	2025-01-22	M																	
WQR2-1	VA25A1525-009	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	L2759008-7	2025-02-19	M																	
WQR2-1	VA25A3570-009	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	VA25A6679-009	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	VA25A9109-009	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	VA25A9941-009	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	VA25B0496-009	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	VA25B1530-009	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-1	VA25B1841-009	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	0051710-12	2020-05-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	0062209-11	2020-06-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	0071996-12	2020-07-21	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	0082292-12	2020-08-24	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	0093017-12	2020-09-28	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	20J1961-12	2020-10-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	20J2778-12	2020-10-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	20K0360-12	2020-11-03	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	20K1261-12	2020-11-10	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	20K2100-12	2020-11-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	20L1589-12	2020-12-14	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	21A2590-12	2021-01-27	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	21B2778-12	2021-02-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	21C3505-13	2021-03-25	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	21D2478-12	2021-04-22	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	21E1990-12	2021-05-18	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	21E2917-12	2021-05-26	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	21F0167-12	2021-06-01	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	21F1056-12	2021-06-08	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	21F2014-12	2021-06-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	21G2414-12	2021-07-20	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	21H3040-12	2021-08-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	21I3814-12	2021-09-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	21J3514-12	2021-10-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	21K3046-12	2021-11-23	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	21L2125-12	2021-12-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22A2312-12	2022-01-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22B2487-12	2022-02-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22C3145-12	2022-03-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22D2212-15	2022-04-20	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22E2480-12	2022-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22F3212-12	2022-06-21	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22G1763-12	2022-07-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22H2453-12	2022-08-16	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22I1926-12	2022-09-14	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22J1560-12	2022-10-12	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020												
WQR2-2	22K1453-12	2022-11-10	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22K2628-04	2022-11-22	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22K2988-04	2022-11-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22K3123-04	2022-11-25	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22L0036-04	2022-11-30	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22L0263-04	2022-12-02	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22L0499-04	2022-12-05	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22L0633-04	2022-12-06	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22L0774-12	2022-12-07	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	22L1436-04	2022-12-13	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	23A2847-12	2023-01-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	23C0060-12	2023-02-28	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	23C1797-12	2023-03-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	23D2945-12	2023-04-26	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	23E2392-12	2023-05-17	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	23F3614-12	2023-06-27	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	23G2415-12	2023-07-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	23H3309-12	2023-08-24	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	23I2271-14	2023-09-19	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	23J2236-14	2023-10-18	M																	
WQR2-2	23K1909-12	2023-11-15	M	<0.0010	<0.0010	<0.0010	<0.0005	<0.0020												
WQR2-2	23L2091-10	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQR2-2	L2754383-8	2024-01-25	M																	
WQR2-2	VA24A1507-010	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2754604-8	2024-02-14	M																	
WQR2-2	VA24A2995-010	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2755043-10	2024-03-21	M																	
WQR2-2	VA24A6026-010	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	L2755490-8	2024-04-24	M																	
WQR2-2	VA24A8916-010	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2755567-8	2024-05-01	M																	
WQR2-2	VA24A9566-010	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2755666-8	2024-05-08	M																	
WQR2-2	VA24B0201-010	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2755779-8	2024-05-15	M																	
WQR2-2	VA24B0901-010	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2755888-8	2024-05-22	M																	
WQR2-2	VA24B1500-010	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2756312-8	2024-06-19	M																	
WQR2-2	VA24B4510-010	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	VA24B7397-010	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2756689-8	2024-07-17	M																	
WQR2-2	L2757122-8	2024-08-21	M																	
WQR2-2	VA24C1337-010	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	VA24C4683-010	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	VA24C8569-010	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2757977-10	2024-10-30	M																	
WQR2-2	VA24C9414-010	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	VA24D0180-010	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	VA24D0813-010	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2758221-8	2024-11-22	M																	
WQR2-2	VA24D1791-010	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2758486-8	2024-12-18	M																	
WQR2-2	VA24D3937-010	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2758770-8	2025-01-22	M																	
WQR2-2	VA25A1525-010	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	L2759008-8	2025-02-19	M																	
WQR2-2	VA25A3570-010	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	VA25A6679-010	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	VA25A9109-010	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	VA25A9941-010	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	VA25B0496-010	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	VA25B1530-010	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2	VA25B1841-010	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	L2755545-11	2024-04-30	M																	
WQR2-2m	VA24A9402-011	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	L2755648-2	2024-05-08	M																	
WQR2-2m	VA24B0178-002	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	L2755934-11	2024-05-24	M																	
WQR2-2m	VA24B1783-011	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	VA24B3452-011	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	659-454600000-0	2024-06-17	M																	
WQR2-2m	VA24B5882-011	2024-07-03	M																	
WQR2-2m	VA24B6465-005	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	VA24B7867-005	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	L2757210-5	2024-08-26	M																	
WQR2-2m	VA24C2208-005	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	VA24C5557-002	2024-09-25	M																	
WQR2-2m	L2757680-5	2024-10-06	M																	
WQR2-2m	VA24C6685-005	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	VA24C7408-005	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	L2757872-5	2024-10-22	M																	
WQR2-2m	VA24C8330-005	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	VA24C9185-006	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2m	L2757962-6	2024-10-29	M																	
WQR2-2m	L2758003-2	2024-11-02	M																	
WQR2-2m	VA24C9732-002	2024-11-02	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	L2758354-2	2024-12-06	M																	
WQR2-2m	VA24D3008-002	2024-12-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	L2758634-8	2025-01-09	M																	
WQR2-2m	VA25A0510-008	2025-01-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	L2759010-8	2025-02-18	M																	
WQR2-2m	VA25A3415-008	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	L2759209-8	2025-03-12	M																	
WQR2-2m	VA25A5429-008	2025-03-12	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25A6528-017	2025-03-25	M																	
WQR2-2m	VA25A8147-005	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25A8148-005	2025-04-11	M																	
WQR2-2m	VA25A8280-008	2025-04-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25A8282-008	2025-04-13	M																	
WQR2-2m	VA25A8854-008	2025-04-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25A8855-008	2025-04-21	M																	
WQR2-2m	VA25B0359-011	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25B0360-011	2025-05-06	M																	
WQR2-2m	VA25B0499-008	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25B0502-008	2025-05-07	M																	
WQR2-3	23L2091-11	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0005	<0.0010	<0.0020	<0.0010		<0.0005	<0.0010	<0.0010	<0.0010	<0.0010
WQR2-3	L2754383-9	2024-01-25	M																	
WQR2-3	VA24A1507-011	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2754604-9	2024-02-14	M																	
WQR2-3	VA24A2995-011	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2755043-11	2024-03-21	M																	
WQR2-3	VA24A6026-011	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2755490-9	2024-04-24	M																	
WQR2-3	VA24A8916-011	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2755567-9	2024-05-01	M																	
WQR2-3	VA24A9566-011	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2755666-9	2024-05-08	M																	
WQR2-3	VA24B0201-011	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2755779-9	2024-05-15	M																	
WQR2-3	VA24B0901-011	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2755888-9	2024-05-22	M																	
WQR2-3	VA24B1500-011	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2756312-9	2024-06-19	M																	
WQR2-3	VA24B4510-011	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	VA24B7397-011	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2756689-9	2024-07-17	M																	
WQR2-3	L2757122-9	2024-08-21	M																	
WQR2-3	VA24C1337-011	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	VA24C4683-011	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	VA24C8569-011	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	VA24C9414-011	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2757977-11	2024-10-30	M																	
WQR2-3	VA24D0180-011	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2758221-9	2024-11-22	M																	
WQR2-3	VA24D1791-011	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2758486-9	2024-12-18	M																	
WQR2-3	VA24D3937-011	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2758770-9	2025-01-22	M																	
WQR2-3	VA25A1525-011	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	L2759008-9	2025-02-19	M																	

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Ethylbenzene	Methyl-tert-butyl-ether	Styrene	Toluene	Total Xylenes	Bromodichloromethane	Bromoform	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	1,1-Dichloroethane	1,2-Dichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-3	VA25A3570-011	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	VA25A6679-011	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	VA25A9109-011	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	VA25A9941-011	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	VA25B0496-011	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	VA25B1530-011	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-3	VA25B1841-011	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	L2755545-12	2024-04-30	M																	
WQR2-SF	VA24A9402-012	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	L2755648-3	2024-05-08	M																	
WQR2-SF	VA24B0178-003	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	L2755934-12	2024-05-24	M																	
WQR2-SF	VA24B1783-012	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	VA24B3452-012	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	660-454600000-0	2024-06-17	M																	
WQR2-SF	VA24B5882-012	2024-07-03	M																	
WQR2-SF	VA24B6465-006	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	VA24B7867-006	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	L2757210-6	2024-08-26	M																	
WQR2-SF	VA24C2208-006	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	VA24C5557-003	2024-09-25	M																	
WQR2-SF	L2757680-6	2024-10-06	M																	
WQR2-SF	VA24C6685-006	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	VA24C7408-006	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	L2757872-6	2024-10-22	M																	
WQR2-SF	VA24C8330-006	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	VA24C9185-007	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	L2757962-7	2024-10-29	M																	
WQR2-SF	L2758003-3	2024-11-02	M																	
WQR2-SF	VA24C9732-003	2024-11-02	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	L2758354-3	2024-12-06	M																	
WQR2-SF	VA24D3008-003	2024-12-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	L2758634-9	2025-01-09	M																	
WQR2-SF	VA25A0510-009	2025-01-09	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	L2759010-9	2025-02-18	M																	
WQR2-SF	VA25A3415-009	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	L2759209-9	2025-03-12	M																	
WQR2-SF	VA25A5429-009	2025-03-12	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25A6528-018	2025-03-25	M																	
WQR2-SF	VA25A8147-006	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25A8148-006	2025-04-11	M																	
WQR2-SF	VA25A8280-009	2025-04-13	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25A8282-009	2025-04-13	M																	
WQR2-SF	VA25A8854-009	2025-04-21	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25A8855-009	2025-04-21	M																	
WQR2-SF	VA25B0359-010	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25B0360-010	2025-05-06	M																	
WQR2-SF	VA25B0499-009	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25B0502-009	2025-05-07	M																	

Notes:
Sample Class 'M' = monitoring sample.
'<' = result is below the indicated detection limit.

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	0051710-01	2020-05-20	M													
WQ1-1	0062209-01	2020-06-22	M													
WQ1-1	0071996-01	2020-07-21	M													
WQ1-1	0082292-01	2020-08-24	M													
WQ1-1	0093017-01	2020-09-28	M													
WQ1-1	20J1961-01	2020-10-20	M													
WQ1-1	20J2778-01	2020-10-27	M													
WQ1-1	20K0360-01	2020-11-03	M													
WQ1-1	20K1261-01	2020-11-10	M													
WQ1-1	20K2100-01	2020-11-18	M													
WQ1-1	20L1589-01	2020-12-14	M													
WQ1-1	21A2590-01	2021-01-27	M													
WQ1-1	21B2778-01	2021-02-25	M													
WQ1-1	21C3505-01	2021-03-25	M													
WQ1-1	21D2478-01	2021-04-22	M													
WQ1-1	21E1990-01	2021-05-18	M													
WQ1-1	21E2917-01	2021-05-26	M													
WQ1-1	21F0167-01	2021-06-01	M													
WQ1-1	21F1056-01	2021-06-08	M													
WQ1-1	21F2014-01	2021-06-15	M													
WQ1-1	21G2414-01	2021-07-20	M													
WQ1-1	21H3040-01	2021-08-25	M													
WQ1-1	21I3814-01	2021-09-28	M													
WQ1-1	21J3514-01	2021-10-26	M													
WQ1-1	21K3046-01	2021-11-23	M													
WQ1-1	21L2125-01	2021-12-14	M													
WQ1-1	22A2312-01	2022-01-20	M													
WQ1-1	22B2487-01	2022-02-17	M													
WQ1-1	22C3145-01	2022-03-22	M													
WQ1-1	22D2212-01	2022-04-19	M													
WQ1-1	22E2480-03	2022-05-17	M													
WQ1-1	22F3212-01	2022-06-21	M													
WQ1-1	22G1763-01	2022-07-13	M													
WQ1-1	22H2453-01	2022-08-16	M													
WQ1-1	22I1926-01	2022-09-14	M													
WQ1-1	22J1560-03	2022-10-12	M													
WQ1-1	22K1453-01	2022-11-10	M													
WQ1-1	22L0774-01	2022-12-07	M													
WQ1-1	23A2847-01	2023-01-27	M													
WQ1-1	23C0060-01	2023-02-28	M													
WQ1-1	23C1797-01	2023-03-15	M													
WQ1-1	23D2945-01	2023-04-26	M													
WQ1-1	23E2392-01	2023-05-17	M													
WQ1-1	23F3614-01	2023-06-27	M													
WQ1-1	23G2415-01	2023-07-19	M													
WQ1-1	23H3309-03	2023-08-24	M													
WQ1-1	23I2271-03	2023-09-19	M													
WQ1-1	23J2236-03	2023-10-18	M													
WQ1-1	23K1909-01	2023-11-15	M													
WQ1-1	23L1905-04	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ1-1	L2754366-7	2024-01-24	M													
WQ1-1	VA24A1422-007	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2754594-4	2024-02-13	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	VA24A2858-004	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2755033-4	2024-03-20	M													
WQ1-1	VA24A5955-004	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2755461-4	2024-04-23	M													
WQ1-1	VA24A8736-004	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2755553-4	2024-04-30	M													
WQ1-1	VA24A9418-004	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2755641-4	2024-05-07	M													
WQ1-1	VA24B0040-004	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2755769-4	2024-05-14	M													
WQ1-1	VA24B0738-004	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2755874-4	2024-05-21	M													
WQ1-1	VA24B1351-004	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2756277-4	2024-06-18	M													
WQ1-1	VA24B4257-004	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2756678-4	2024-07-16	M													
WQ1-1	VA24B7237-004	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2757095-4	2024-08-20	M													
WQ1-1	VA24C1101-004	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA24C4483-004	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA24C8360-004	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA24C9197-004	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA24D0009-004	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA24D0813-011	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA24D1720-004	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2758465-4	2024-12-17	M													
WQ1-1	VA24D3769-004	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2758719-4	2025-01-21	M													
WQ1-1	VA25A1408-004	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	L2758994-4	2025-02-18	M													
WQ1-1	VA25A3430-004	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA25A6550-004	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA25A8962-004	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA25A9878-004	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA25B0358-004	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA25B1026-004	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-1	VA25B1711-004	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	0051710-02	2020-05-20	M													
WQ1-2	0062209-02	2020-06-22	M													
WQ1-2	0071996-02	2020-07-21	M													
WQ1-2	0082292-02	2020-08-24	M													
WQ1-2	0093017-02	2020-09-28	M													
WQ1-2	20J1961-02	2020-10-20	M													
WQ1-2	20J2778-02	2020-10-27	M													
WQ1-2	20K0360-02	2020-11-03	M													
WQ1-2	20K1261-02	2020-11-10	M													
WQ1-2	20K2100-02	2020-11-18	M													
WQ1-2	20L1589-02	2020-12-14	M													
WQ1-2	21A2590-02	2021-01-27	M													
WQ1-2	21B2778-02	2021-02-25	M													
WQ1-2	21C3505-02	2021-03-25	M													
WQ1-2	21D2478-02	2021-04-22	M													
WQ1-2	21E1990-02	2021-05-18	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	21E2917-02	2021-05-26	M													
WQ1-2	21F0167-02	2021-06-01	M													
WQ1-2	21F1056-02	2021-06-08	M													
WQ1-2	21F2014-02	2021-06-15	M													
WQ1-2	21G2414-02	2021-07-20	M													
WQ1-2	21H3040-02	2021-08-25	M													
WQ1-2	21I3814-02	2021-09-28	M													
WQ1-2	21J3514-02	2021-10-26	M													
WQ1-2	21K3046-02	2021-11-23	M													
WQ1-2	21L2125-02	2021-12-14	M													
WQ1-2	22A2312-02	2022-01-20	M													
WQ1-2	22B2487-02	2022-02-17	M													
WQ1-2	22C3145-02	2022-03-22	M													
WQ1-2	22D2212-02	2022-04-19	M													
WQ1-2	22E2480-04	2022-05-17	M													
WQ1-2	22F3212-02	2022-06-21	M													
WQ1-2	22G1763-02	2022-07-13	M													
WQ1-2	22H2453-02	2022-08-16	M													
WQ1-2	22I1926-02	2022-09-14	M													
WQ1-2	22J1560-04	2022-10-12	M													
WQ1-2	22K1453-02	2022-11-10	M													
WQ1-2	22L0774-02	2022-12-07	M													
WQ1-2	23A2847-02	2023-01-27	M													
WQ1-2	23C0060-02	2023-02-28	M													
WQ1-2	23C1797-02	2023-03-15	M													
WQ1-2	23D2945-02	2023-04-26	M													
WQ1-2	23E2392-02	2023-05-17	M													
WQ1-2	23F3614-02	2023-06-27	M													
WQ1-2	23G2415-02	2023-07-19	M													
WQ1-2	23H3309-04	2023-08-24	M													
WQ1-2	23I2271-04	2023-09-19	M													
WQ1-2	23J2236-04	2023-10-18	M													
WQ1-2	23K1909-02	2023-11-15	M													
WQ1-2	23L1905-05	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ1-2	L2754366-8	2024-01-24	M													
WQ1-2	VA24A1422-008	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2754594-5	2024-02-13	M													
WQ1-2	VA24A2858-005	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2755033-5	2024-03-20	M													
WQ1-2	VA24A5955-005	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2755461-5	2024-04-23	M													
WQ1-2	VA24A8736-005	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2755553-5	2024-04-30	M													
WQ1-2	VA24A9418-005	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2755641-5	2024-05-07	M													
WQ1-2	VA24B0040-005	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2755769-5	2024-05-14	M													
WQ1-2	VA24B0738-005	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2755874-5	2024-05-21	M													
WQ1-2	VA24B1351-005	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2756277-5	2024-06-18	M													
WQ1-2	VA24B4257-005	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2756678-5	2024-07-16	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	VA24B7237-005	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2757095-5	2024-08-20	M													
WQ1-2	VA24C1101-005	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA24C4483-005	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA24C8360-005	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA24C9197-005	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA24D0009-005	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA24D0813-013	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA24D1720-005	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2758465-5	2024-12-17	M													
WQ1-2	VA24D3769-005	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2758719-5	2025-01-21	M													
WQ1-2	VA25A1408-005	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	L2758994-5	2025-02-18	M													
WQ1-2	VA25A3430-005	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA25A6550-005	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA25A8962-005	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA25A9878-005	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA25B0358-005	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA25B1026-005	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-2	VA25B1711-005	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	23L1905-06	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ1-3	L2754366-9	2024-01-24	M													
WQ1-3	VA24A1422-009	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2754594-6	2024-02-13	M													
WQ1-3	VA24A2858-006	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2755033-6	2024-03-20	M													
WQ1-3	VA24A5955-006	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2755461-6	2024-04-23	M													
WQ1-3	VA24A8736-006	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2755553-6	2024-04-30	M													
WQ1-3	VA24A9418-006	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2755641-6	2024-05-07	M													
WQ1-3	VA24B0040-006	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2755769-6	2024-05-14	M													
WQ1-3	VA24B0738-006	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2755874-6	2024-05-21	M													
WQ1-3	VA24B1351-006	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2756277-6	2024-06-18	M													
WQ1-3	VA24B4257-006	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2756678-6	2024-07-16	M													
WQ1-3	VA24B7237-006	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2757095-6	2024-08-20	M													
WQ1-3	VA24C1101-006	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA24C4483-006	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA24C8360-006	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA24C9197-006	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA24D0009-006	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA24D0813-014	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA24D1720-006	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2758465-6	2024-12-17	M													
WQ1-3	VA24D3769-006	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2758719-6	2025-01-21	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-3	VA25A1408-006	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	L2758994-6	2025-02-18	M													
WQ1-3	VA25A3430-006	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA25A6550-006	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA25A8962-006	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA25A9878-006	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA25B0358-006	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA25B1026-006	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ1-3	VA25B1711-006	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	0051710-03	2020-05-20	M													
WQ2-1	0062209-03	2020-06-22	M													
WQ2-1	0071996-03	2020-07-21	M													
WQ2-1	0082292-03	2020-08-24	M													
WQ2-1	0093017-03	2020-09-28	M													
WQ2-1	20J1961-03	2020-10-20	M													
WQ2-1	20J2778-03	2020-10-27	M													
WQ2-1	20K0360-03	2020-11-03	M													
WQ2-1	20K1261-03	2020-11-10	M													
WQ2-1	20K2100-03	2020-11-18	M													
WQ2-1	20L1589-03	2020-12-14	M													
WQ2-1	21A2590-03	2021-01-27	M													
WQ2-1	21B2778-03	2021-02-25	M													
WQ2-1	21C3505-03	2021-03-25	M													
WQ2-1	21D2478-03	2021-04-22	M													
WQ2-1	21E1990-03	2021-05-18	M													
WQ2-1	21E2917-03	2021-05-26	M													
WQ2-1	21F0167-03	2021-06-01	M													
WQ2-1	21F1056-03	2021-06-08	M													
WQ2-1	21F2014-03	2021-06-15	M													
WQ2-1	21G2414-03	2021-07-20	M													
WQ2-1	21H3040-03	2021-08-25	M													
WQ2-1	21I3814-03	2021-09-28	M													
WQ2-1	21J3514-03	2021-10-26	M													
WQ2-1	21K3046-03	2021-11-23	M													
WQ2-1	21L2125-03	2021-12-14	M													
WQ2-1	22A2312-03	2022-01-20	M													
WQ2-1	22B2487-03	2022-02-17	M													
WQ2-1	22C3145-03	2022-03-22	M													
WQ2-1	22D2212-03	2022-04-19	M													
WQ2-1	22E2480-05	2022-05-17	M													
WQ2-1	22F3212-03	2022-06-21	M													
WQ2-1	22G1763-03	2022-07-13	M													
WQ2-1	22H2453-03	2022-08-16	M													
WQ2-1	22I1926-03	2022-09-14	M													
WQ2-1	22J1560-05	2022-10-12	M													
WQ2-1	22K1453-03	2022-11-10	M													
WQ2-1	22L0774-03	2022-12-07	M													
WQ2-1	23A2847-03	2023-01-27	M													
WQ2-1	23C0060-03	2023-02-28	M													
WQ2-1	23C1797-03	2023-03-15	M													
WQ2-1	23D2945-03	2023-04-26	M													
WQ2-1	23E2392-03	2023-05-17	M													
WQ2-1	23F3614-03	2023-06-27	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-1	23G2415-03	2023-07-19	M													
WQ2-1	23H3309-05	2023-08-24	M													
WQ2-1	23I2271-05	2023-09-19	M													
WQ2-1	23J2236-05	2023-10-18	M													
WQ2-1	23K1909-03	2023-11-15	M													
WQ2-1	23L1905-07	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ2-1	L2754383-1	2024-01-25	M													
WQ2-1	VA24A1507-001	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2754594-7	2024-02-13	M													
WQ2-1	VA24A2858-007	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2755033-7	2024-03-20	M													
WQ2-1	VA24A5955-007	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2755461-7	2024-04-23	M													
WQ2-1	VA24A8736-007	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2755553-7	2024-04-30	M													
WQ2-1	VA24A9418-007	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2755641-7	2024-05-07	M													
WQ2-1	VA24B0040-007	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2755769-7	2024-05-14	M													
WQ2-1	VA24B0738-007	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.0035	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2755874-7	2024-05-21	M													
WQ2-1	VA24B1351-007	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2756277-7	2024-06-18	M													
WQ2-1	VA24B4257-007	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2756678-7	2024-07-16	M													
WQ2-1	VA24B7237-007	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2757095-7	2024-08-20	M													
WQ2-1	VA24C1101-007	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	VA24C4483-007	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	VA24C8360-007	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	VA24C9197-007	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	VA24D0009-007	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2758095-4	2024-11-12	M													
WQ2-1	VA24D0632-004	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	VA24D1720-007	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2758465-7	2024-12-17	M													
WQ2-1	VA24D3769-007	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2758719-7	2025-01-21	M													
WQ2-1	VA25A1408-007	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	L2758994-7	2025-02-18	M													
WQ2-1	VA25A3430-007	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	VA25A6550-007	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	VA25A8962-007	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	VA25A9878-007	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	VA25B0358-007	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	VA25B1026-007	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-1	VA25B1711-007	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	0051710-04	2020-05-20	M													
WQ2-2	0062209-04	2020-06-22	M													
WQ2-2	0071996-04	2020-07-21	M													
WQ2-2	0082292-04	2020-08-24	M													
WQ2-2	0093017-04	2020-09-28	M													
WQ2-2	20J1961-04	2020-10-20	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	20J2778-04	2020-10-27	M													
WQ2-2	20K0360-04	2020-11-03	M													
WQ2-2	20K1261-04	2020-11-10	M													
WQ2-2	20K2100-04	2020-11-18	M													
WQ2-2	20L1589-04	2020-12-14	M													
WQ2-2	21A2590-04	2021-01-27	M													
WQ2-2	21B2778-04	2021-02-25	M													
WQ2-2	21C3505-04	2021-03-25	M													
WQ2-2	21D2478-04	2021-04-22	M													
WQ2-2	21E1990-04	2021-05-18	M													
WQ2-2	21E2917-04	2021-05-26	M													
WQ2-2	21F0167-04	2021-06-01	M													
WQ2-2	21F1056-04	2021-06-08	M													
WQ2-2	21F2014-04	2021-06-15	M													
WQ2-2	21G2414-04	2021-07-20	M													
WQ2-2	21H3040-04	2021-08-25	M													
WQ2-2	21I3814-04	2021-09-28	M													
WQ2-2	21J3514-04	2021-10-26	M													
WQ2-2	21K3046-04	2021-11-23	M													
WQ2-2	21L2125-04	2021-12-14	M													
WQ2-2	22A2312-04	2022-01-20	M													
WQ2-2	22B2487-04	2022-02-17	M													
WQ2-2	22C3145-04	2022-03-22	M													
WQ2-2	22D2212-11	2022-04-19	M													
WQ2-2	22E2480-06	2022-05-17	M													
WQ2-2	22F3212-04	2022-06-21	M													
WQ2-2	22G1763-04	2022-07-13	M													
WQ2-2	22H2453-04	2022-08-16	M													
WQ2-2	22I1926-04	2022-09-14	M													
WQ2-2	22J1560-06	2022-10-12	M													
WQ2-2	22K1453-04	2022-11-10	M													
WQ2-2	22L0774-04	2022-12-07	M													
WQ2-2	23A2847-04	2023-01-27	M													
WQ2-2	23C0060-04	2023-02-28	M													
WQ2-2	23C1797-04	2023-03-15	M													
WQ2-2	23D2945-04	2023-04-26	M													
WQ2-2	23E2392-04	2023-05-17	M													
WQ2-2	23F3614-04	2023-06-27	M													
WQ2-2	23G2415-04	2023-07-19	M													
WQ2-2	23H3309-06	2023-08-24	M													
WQ2-2	23I2271-06	2023-09-19	M													
WQ2-2	23J2236-06	2023-10-18	M													
WQ2-2	23K1909-04	2023-11-15	M													
WQ2-2	23L1905-08	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ2-2	L2754383-2	2024-01-25	M													
WQ2-2	VA24A1507-002	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2754594-8	2024-02-13	M													
WQ2-2	VA24A2858-008	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2755033-8	2024-03-20	M													
WQ2-2	VA24A5955-008	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2755461-8	2024-04-23	M													
WQ2-2	VA24A8736-008	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2755553-8	2024-04-30	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	VA24A9418-008	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2755641-8	2024-05-07	M													
WQ2-2	VA24B0040-008	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2755769-8	2024-05-14	M													
WQ2-2	VA24B0738-008	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2755874-8	2024-05-21	M													
WQ2-2	VA24B1351-008	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2756277-8	2024-06-18	M													
WQ2-2	VA24B4257-008	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2756678-8	2024-07-16	M													
WQ2-2	VA24B7237-008	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2757095-8	2024-08-20	M													
WQ2-2	VA24C1101-008	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	VA24C4483-008	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	VA24C8360-008	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	VA24C9197-008	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	VA24D0009-008	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2758095-5	2024-11-12	M													
WQ2-2	VA24D0632-005	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	VA24D1720-008	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2758465-8	2024-12-17	M													
WQ2-2	VA24D3769-008	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2758719-8	2025-01-21	M													
WQ2-2	VA25A1408-008	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	L2758994-8	2025-02-18	M													
WQ2-2	VA25A3430-008	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	VA25A6550-008	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	VA25A8962-008	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	VA25A9878-008	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	VA25B0358-008	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	VA25B1026-008	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-2	VA25B1711-008	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	23L1905-09	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ2-3	L2754383-3	2024-01-25	M													
WQ2-3	VA24A1507-003	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2754594-9	2024-02-13	M													
WQ2-3	VA24A2858-009	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2755033-9	2024-03-20	M													
WQ2-3	VA24A5955-009	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2755461-9	2024-04-23	M													
WQ2-3	VA24A8736-009	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2755553-9	2024-04-30	M													
WQ2-3	VA24A9418-009	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2755641-9	2024-05-07	M													
WQ2-3	VA24B0040-009	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2755769-9	2024-05-14	M													
WQ2-3	VA24B0738-009	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2755874-9	2024-05-21	M													
WQ2-3	VA24B1351-009	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2756277-9	2024-06-18	M													
WQ2-3	VA24B4257-010	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2756678-9	2024-07-16	M													
WQ2-3	VA24B7237-009	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-3	L2757095-9	2024-08-20	M													
WQ2-3	VA24C1101-009	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	VA24C4483-009	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	VA24C8360-009	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	VA24C9197-009	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	VA24D0009-009	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2758095-6	2024-11-12	M													
WQ2-3	VA24D0632-006	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	VA24D1720-009	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2758465-9	2024-12-17	M													
WQ2-3	VA24D3769-009	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2758719-9	2025-01-21	M													
WQ2-3	VA25A1408-009	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	L2758994-9	2025-02-18	M													
WQ2-3	VA25A3430-009	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	VA25A6550-009	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	VA25A8962-009	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	VA25A9878-009	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	VA25B0358-009	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	VA25B1026-009	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ2-3	VA25B1711-009	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	0051710-05	2020-05-20	M													
WQ3-1	0062209-05	2020-06-22	M													
WQ3-1	0071996-05	2020-07-21	M													
WQ3-1	0082292-05	2020-08-24	M													
WQ3-1	0093017-05	2020-09-28	M													
WQ3-1	20J1961-05	2020-10-20	M													
WQ3-1	20J2778-05	2020-10-27	M													
WQ3-1	20K0360-05	2020-11-03	M													
WQ3-1	20K1261-05	2020-11-10	M													
WQ3-1	20K2100-05	2020-11-18	M													
WQ3-1	20L1589-05	2020-12-14	M													
WQ3-1	21A2590-05	2021-01-27	M													
WQ3-1	21B2778-05	2021-02-25	M													
WQ3-1	21C3505-05	2021-03-25	M													
WQ3-1	21D2478-05	2021-04-22	M													
WQ3-1	21E1990-05	2021-05-18	M													
WQ3-1	21E2917-05	2021-05-26	M													
WQ3-1	21F0167-05	2021-06-01	M													
WQ3-1	21F1056-05	2021-06-08	M													
WQ3-1	21F2014-05	2021-06-15	M													
WQ3-1	21G2414-05	2021-07-20	M													
WQ3-1	21H3040-05	2021-08-25	M													
WQ3-1	21I3814-05	2021-09-28	M													
WQ3-1	21J3514-05	2021-10-26	M													
WQ3-1	21K3046-05	2021-11-23	M													
WQ3-1	21L2125-05	2021-12-14	M													
WQ3-1	22A2312-05	2022-01-20	M													
WQ3-1	22B2487-05	2022-02-17	M													
WQ3-1	22C3145-05	2022-03-22	M													
WQ3-1	22D2212-04	2022-04-19	M													
WQ3-1	22E2480-07	2022-05-17	M													
WQ3-1	22F3212-05	2022-06-21	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	22G1763-05	2022-07-13	M													
WQ3-1	22H2453-05	2022-08-16	M													
WQ3-1	22I1926-05	2022-09-14	M													
WQ3-1	22J1560-07	2022-10-12	M													
WQ3-1	22K1453-05	2022-11-10	M													
WQ3-1	22L0774-05	2022-12-07	M													
WQ3-1	23A2847-05	2023-01-27	M													
WQ3-1	23C0060-05	2023-02-28	M													
WQ3-1	23C1797-05	2023-03-15	M													
WQ3-1	23D2945-05	2023-04-26	M													
WQ3-1	23E2392-05	2023-05-17	M													
WQ3-1	23F3614-05	2023-06-27	M													
WQ3-1	23G2415-05	2023-07-19	M													
WQ3-1	23H3309-07	2023-08-24	M													
WQ3-1	23I2271-07	2023-09-19	M													
WQ3-1	23J2236-07	2023-10-18	M													
WQ3-1	23K1909-05	2023-11-15	M													
WQ3-1	23L2091-01	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ3-1	L2754366-1	2024-01-24	M													
WQ3-1	VA24A1422-001	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2754604-1	2024-02-14	M													
WQ3-1	VA24A2995-001	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2755043-1	2024-03-21	M													
WQ3-1	VA24A6026-001	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2755490-1	2024-04-24	M													
WQ3-1	VA24A8916-001	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2755567-1	2024-05-01	M													
WQ3-1	VA24A9566-001	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2755666-1	2024-05-08	M													
WQ3-1	VA24B0201-001	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2755779-1	2024-05-15	M													
WQ3-1	VA24B0901-001	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2755888-1	2024-05-22	M													
WQ3-1	VA24B1500-001	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2756312-1	2024-06-19	M													
WQ3-1	VA24B4510-001	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	VA24B7397-001	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2756689-1	2024-07-17	M													
WQ3-1	L2757122-1	2024-08-21	M													
WQ3-1	VA24C1337-001	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	VA24C4683-001	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	VA24C8569-001	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2757977-1	2024-10-30	M													
WQ3-1	VA24C9414-001	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	VA24D0180-001	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	VA24D0813-001	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2758221-1	2024-11-22	M													
WQ3-1	VA24D1791-001	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2758486-1	2024-12-18	M													
WQ3-1	VA24D3937-001	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2758770-1	2025-01-22	M													
WQ3-1	VA25A1525-001	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	L2759008-1	2025-02-19	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	VA25A3570-001	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	VA25A6679-001	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	VA25A9109-001	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	VA25A9941-001	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	VA25B0496-001	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	VA25B1530-001	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-1	VA25B1841-001	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	0051710-06	2020-05-20	M													
WQ3-2	0062209-06	2020-06-22	M													
WQ3-2	0071996-06	2020-07-21	M													
WQ3-2	0082292-06	2020-08-24	M													
WQ3-2	0093017-06	2020-09-28	M													
WQ3-2	20J1961-06	2020-10-20	M													
WQ3-2	20J2778-06	2020-10-27	M													
WQ3-2	20K0360-06	2020-11-03	M													
WQ3-2	20K1261-06	2020-11-10	M													
WQ3-2	20K2100-06	2020-11-18	M													
WQ3-2	20L1589-06	2020-12-14	M													
WQ3-2	21A2590-06	2021-01-27	M													
WQ3-2	21B2778-06	2021-02-25	M													
WQ3-2	21C3505-06	2021-03-25	M													
WQ3-2	21D2478-06	2021-04-22	M													
WQ3-2	21E1990-06	2021-05-18	M													
WQ3-2	21E2917-06	2021-05-26	M													
WQ3-2	21F0167-06	2021-06-01	M													
WQ3-2	21F1056-06	2021-06-08	M													
WQ3-2	21F2014-06	2021-06-15	M													
WQ3-2	21G2414-06	2021-07-20	M													
WQ3-2	21H3040-06	2021-08-25	M													
WQ3-2	21I3814-06	2021-09-28	M													
WQ3-2	21J3514-06	2021-10-26	M													
WQ3-2	21K3046-06	2021-11-23	M													
WQ3-2	21L2125-06	2021-12-14	M													
WQ3-2	22A2312-06	2022-01-20	M													
WQ3-2	22B2487-06	2022-02-17	M													
WQ3-2	22C3145-06	2022-03-22	M													
WQ3-2	22D2212-05	2022-04-19	M													
WQ3-2	22E2480-08	2022-05-17	M													
WQ3-2	22F3212-06	2022-06-21	M													
WQ3-2	22G1763-06	2022-07-13	M													
WQ3-2	22H2453-06	2022-08-16	M													
WQ3-2	22I1926-06	2022-09-14	M													
WQ3-2	22J1560-08	2022-10-12	M													
WQ3-2	22K1453-06	2022-11-10	M													
WQ3-2	22L0774-06	2022-12-07	M													
WQ3-2	23A2847-06	2023-01-27	M													
WQ3-2	23C0060-06	2023-02-28	M													
WQ3-2	23C1797-06	2023-03-15	M													
WQ3-2	23D2945-06	2023-04-26	M													
WQ3-2	23E2392-06	2023-05-17	M													
WQ3-2	23F3614-06	2023-06-27	M													
WQ3-2	23G2415-06	2023-07-19	M													
WQ3-2	23H3309-08	2023-08-24	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-2	23I2271-08	2023-09-19	M													
WQ3-2	23J2236-08	2023-10-18	M													
WQ3-2	23K1909-06	2023-11-15	M													
WQ3-2	23L2091-02	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ3-2	L2754366-2	2024-01-24	M													
WQ3-2	VA24A1422-002	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2754604-2	2024-02-14	M													
WQ3-2	VA24A2995-002	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2755043-2	2024-03-21	M													
WQ3-2	VA24A6026-002	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2755490-2	2024-04-24	M													
WQ3-2	VA24A8916-002	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2755567-2	2024-05-01	M													
WQ3-2	VA24A9566-002	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2755666-2	2024-05-08	M													
WQ3-2	VA24B0201-002	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2755779-2	2024-05-15	M													
WQ3-2	VA24B0901-002	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2755888-2	2024-05-22	M													
WQ3-2	VA24B1500-002	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2756312-2	2024-06-19	M													
WQ3-2	VA24B4510-002	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	VA24B7397-002	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2756689-2	2024-07-17	M													
WQ3-2	L2757122-2	2024-08-21	M													
WQ3-2	VA24C1337-002	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	VA24C4683-002	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	VA24C8569-002	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2757977-2	2024-10-30	M													
WQ3-2	VA24C9414-002	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	VA24D0180-002	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	VA24D0813-002	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2758221-2	2024-11-22	M													
WQ3-2	VA24D1791-002	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2758486-2	2024-12-18	M													
WQ3-2	VA24D3937-002	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2758770-2	2025-01-22	M													
WQ3-2	VA25A1525-002	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	L2759008-2	2025-02-19	M													
WQ3-2	VA25A3570-002	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	VA25A6679-002	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	VA25A9109-002	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	VA25A9941-002	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	VA25B0496-002	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	VA25B1530-002	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-2	VA25B1841-002	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	23L2091-03	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ3-3	L2754366-3	2024-01-24	M													
WQ3-3	VA24A1422-003	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2754604-3	2024-02-14	M													
WQ3-3	VA24A2995-003	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2755043-3	2024-03-21	M													
WQ3-3	VA24A6026-003	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-3	L2755490-3	2024-04-24	M													
WQ3-3	VA24A8916-003	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2755567-3	2024-05-01	M													
WQ3-3	VA24A9566-003	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2755666-3	2024-05-08	M													
WQ3-3	VA24B0201-003	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2755779-3	2024-05-15	M													
WQ3-3	VA24B0901-003	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2755888-3	2024-05-22	M													
WQ3-3	VA24B1500-003	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2756312-3	2024-06-19	M													
WQ3-3	VA24B4510-003	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	VA24B7397-003	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2756689-3	2024-07-17	M													
WQ3-3	L2757122-3	2024-08-21	M													
WQ3-3	VA24C1337-003	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	VA24C4683-003	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	VA24C8569-003	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2757977-3	2024-10-30	M													
WQ3-3	VA24C9414-003	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	VA24D0180-003	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	VA24D0813-003	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2758221-3	2024-11-22	M													
WQ3-3	VA24D1791-003	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2758486-3	2024-12-18	M													
WQ3-3	VA24D3937-003	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2758770-3	2025-01-22	M													
WQ3-3	VA25A1525-003	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	L2759008-3	2025-02-19	M													
WQ3-3	VA25A3570-003	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	VA25A6679-003	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	VA25A9109-003	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	VA25A9941-003	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	VA25B0496-003	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	VA25B1530-003	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ3-3	VA25B1841-003	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	0051710-07	2020-05-20	M													
WQ4-1	0062209-07	2020-06-22	M													
WQ4-1	0071996-07	2020-07-21	M													
WQ4-1	0082292-07	2020-08-24	M													
WQ4-1	0093017-07	2020-09-28	M													
WQ4-1	20J1961-07	2020-10-20	M													
WQ4-1	20J2778-07	2020-10-27	M													
WQ4-1	20K0360-07	2020-11-03	M													
WQ4-1	20K1261-07	2020-11-10	M													
WQ4-1	20K2100-07	2020-11-18	M													
WQ4-1	20L1589-07	2020-12-14	M													
WQ4-1	21A2590-07	2021-01-27	M													
WQ4-1	21B2778-07	2021-02-25	M													
WQ4-1	21C3505-07	2021-03-25	M													
WQ4-1	21D2478-07	2021-04-22	M													
WQ4-1	21E1990-07	2021-05-18	M													
WQ4-1	21E2917-07	2021-05-26	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	21F0167-07	2021-06-01	M													
WQ4-1	21F1056-07	2021-06-08	M													
WQ4-1	21F2014-07	2021-06-15	M													
WQ4-1	21G2414-07	2021-07-20	M													
WQ4-1	21H3040-07	2021-08-25	M													
WQ4-1	21I3814-07	2021-09-28	M													
WQ4-1	21J3514-07	2021-10-26	M													
WQ4-1	21K3046-07	2021-11-23	M													
WQ4-1	21L2125-07	2021-12-14	M													
WQ4-1	22A2312-07	2022-01-20	M													
WQ4-1	22B2487-07	2022-02-17	M													
WQ4-1	22C3145-07	2022-03-22	M													
WQ4-1	22D2212-12	2022-04-20	M													
WQ4-1	22E2480-09	2022-05-17	M													
WQ4-1	22F3212-07	2022-06-21	M													
WQ4-1	22G1763-07	2022-07-13	M													
WQ4-1	22H2453-07	2022-08-16	M													
WQ4-1	22I1926-07	2022-09-14	M													
WQ4-1	22J1560-09	2022-10-12	M													
WQ4-1	22K1453-07	2022-11-10	M													
WQ4-1	22L0774-07	2022-12-07	M													
WQ4-1	23A2847-07	2023-01-27	M													
WQ4-1	23C0060-07	2023-02-28	M													
WQ4-1	23C1797-07	2023-03-15	M													
WQ4-1	23D2945-07	2023-04-26	M													
WQ4-1	23E2392-07	2023-05-17	M													
WQ4-1	23F3614-07	2023-06-27	M													
WQ4-1	23G2415-07	2023-07-19	M													
WQ4-1	23H3309-09	2023-08-24	M													
WQ4-1	23I2271-09	2023-09-19	M													
WQ4-1	23J2236-09	2023-10-18	M													
WQ4-1	23K1909-07	2023-11-15	M													
WQ4-1	23L2091-04	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ4-1	L2754383-4	2024-01-25	M													
WQ4-1	VA24A1507-004	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2754604-4	2024-02-14	M													
WQ4-1	VA24A2995-004	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2755043-4	2024-03-21	M													
WQ4-1	VA24A6026-004	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2755490-4	2024-04-24	M													
WQ4-1	VA24A8916-004	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2755567-4	2024-05-01	M													
WQ4-1	VA24A9566-004	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2755666-4	2024-05-08	M													
WQ4-1	VA24B0201-004	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2755779-4	2024-05-15	M													
WQ4-1	VA24B0901-004	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2755888-4	2024-05-22	M													
WQ4-1	VA24B1500-004	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2756312-4	2024-06-19	M													
WQ4-1	VA24B4510-004	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	VA24B7397-004	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2756689-4	2024-07-17	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	L2757122-4	2024-08-21	M													
WQ4-1	VA24C1337-004	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	VA24C4683-004	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	VA24C8569-004	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2757977-4	2024-10-30	M													
WQ4-1	VA24C9414-004	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	VA24D0180-004	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	VA24D0813-004	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2758221-4	2024-11-22	M													
WQ4-1	VA24D1791-004	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2758486-4	2024-12-18	M													
WQ4-1	VA24D3937-004	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2758770-4	2025-01-22	M													
WQ4-1	VA25A1525-004	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	L2759008-4	2025-02-19	M													
WQ4-1	VA25A3570-004	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	VA25A6679-004	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	VA25A9109-004	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	VA25A9941-004	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	VA25B0496-004	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	VA25B1530-004	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-1	VA25B1841-004	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	0051710-08	2020-05-20	M													
WQ4-2	0062209-08	2020-06-22	M													
WQ4-2	0071996-08	2020-07-21	M													
WQ4-2	0082292-08	2020-08-24	M													
WQ4-2	0093017-08	2020-09-28	M													
WQ4-2	20J1961-08	2020-10-20	M													
WQ4-2	20J2778-08	2020-10-27	M													
WQ4-2	20K0360-08	2020-11-03	M													
WQ4-2	20K1261-08	2020-11-10	M													
WQ4-2	20K2100-08	2020-11-18	M													
WQ4-2	20L1589-08	2020-12-14	M													
WQ4-2	21A2590-08	2021-01-27	M													
WQ4-2	21B2778-08	2021-02-25	M													
WQ4-2	21C3505-08	2021-03-25	M													
WQ4-2	21D2478-08	2021-04-22	M													
WQ4-2	21E1990-08	2021-05-18	M													
WQ4-2	21E2917-08	2021-05-26	M													
WQ4-2	21F0167-08	2021-06-01	M													
WQ4-2	21F1056-08	2021-06-08	M													
WQ4-2	21F2014-08	2021-06-15	M													
WQ4-2	21G2414-08	2021-07-20	M													
WQ4-2	21H3040-08	2021-08-25	M													
WQ4-2	21I3814-08	2021-09-28	M													
WQ4-2	21J3514-08	2021-10-26	M													
WQ4-2	21K3046-08	2021-11-23	M													
WQ4-2	21L2125-08	2021-12-14	M													
WQ4-2	22A2312-08	2022-01-20	M													
WQ4-2	22B2487-08	2022-02-17	M													
WQ4-2	22C3145-08	2022-03-22	M													
WQ4-2	22D2212-13	2022-04-20	M													
WQ4-2	22E2480-10	2022-05-17	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	22F3212-08	2022-06-21	M													
WQ4-2	22G1763-08	2022-07-13	M													
WQ4-2	22H2453-08	2022-08-16	M													
WQ4-2	22I1926-08	2022-09-14	M													
WQ4-2	22J1560-10	2022-10-12	M													
WQ4-2	22K1453-08	2022-11-10	M													
WQ4-2	22L0774-08	2022-12-07	M													
WQ4-2	23A2847-08	2023-01-27	M													
WQ4-2	23C0060-08	2023-02-28	M													
WQ4-2	23C1797-08	2023-03-15	M													
WQ4-2	23D2945-08	2023-04-26	M													
WQ4-2	23E2392-08	2023-05-17	M													
WQ4-2	23F3614-08	2023-06-27	M													
WQ4-2	23G2415-08	2023-07-19	M													
WQ4-2	23H3309-10	2023-08-24	M													
WQ4-2	23I2271-11	2023-09-19	M													
WQ4-2	23J2236-11	2023-10-18	M													
WQ4-2	23K1909-08	2023-11-15	M													
WQ4-2	23L2091-05	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ4-2	L2754383-5	2024-01-25	M													
WQ4-2	VA24A1507-005	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2754604-5	2024-02-14	M													
WQ4-2	VA24A2995-005	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2755043-5	2024-03-21	M													
WQ4-2	VA24A6026-005	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2755490-5	2024-04-24	M													
WQ4-2	VA24A8916-005	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2755567-5	2024-05-01	M													
WQ4-2	VA24A9566-005	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2755666-5	2024-05-08	M													
WQ4-2	VA24B0201-005	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2755779-5	2024-05-15	M													
WQ4-2	VA24B0901-005	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2755888-5	2024-05-22	M													
WQ4-2	VA24B1500-005	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2756312-5	2024-06-19	M													
WQ4-2	VA24B4510-005	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA24B7397-005	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2756689-5	2024-07-17	M													
WQ4-2	L2757122-5	2024-08-21	M													
WQ4-2	VA24C1337-005	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA24C4683-005	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA24C8569-005	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2757977-5	2024-10-30	M													
WQ4-2	VA24C9414-005	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA24D0180-005	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA24D0813-005	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2758221-5	2024-11-22	M													
WQ4-2	VA24D1791-005	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2758486-5	2024-12-18	M													
WQ4-2	VA24D3937-005	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA25A1525-005	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	L2758770-5	2025-01-22	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	L2759008-5	2025-02-19	M													
WQ4-2	VA25A3570-005	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA25A6679-005	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA25A9109-005	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA25A9941-005	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA25B0496-005	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA25B1530-005	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-2	VA25B1841-005	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	23L2091-07	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQ4-3	L2754383-6	2024-01-25	M													
WQ4-3	VA24A1507-006	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2754604-6	2024-02-14	M													
WQ4-3	VA24A2995-006	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2755043-6	2024-03-21	M													
WQ4-3	VA24A6026-006	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2755490-6	2024-04-24	M													
WQ4-3	VA24A8916-006	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2755567-6	2024-05-01	M													
WQ4-3	VA24A9566-006	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2755666-6	2024-05-08	M													
WQ4-3	VA24B0201-006	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2755779-6	2024-05-15	M													
WQ4-3	VA24B0901-006	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2755888-6	2024-05-22	M													
WQ4-3	VA24B1500-006	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2756312-6	2024-06-19	M													
WQ4-3	VA24B4510-006	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	VA24B7397-006	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2756689-6	2024-07-17	M													
WQ4-3	L2757122-6	2024-08-21	M													
WQ4-3	VA24C1337-006	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	VA24C4683-006	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	VA24C8569-006	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2757977-6	2024-10-30	M													
WQ4-3	VA24C9414-006	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	VA24D0180-006	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	VA24D0813-006	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2758221-6	2024-11-22	M													
WQ4-3	VA24D1791-006	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2758486-6	2024-12-18	M													
WQ4-3	VA24D3937-006	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2758770-6	2025-01-22	M													
WQ4-3	VA25A1525-006	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	L2759008-6	2025-02-19	M													
WQ4-3	VA25A3570-006	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	VA25A6679-006	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	VA25A9109-006	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	VA25A9941-006	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	VA25B0496-006	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	VA25B1530-006	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQ4-3	VA25B1841-006	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2755545-7	2024-04-30	M													
WQR1-0.5	VA24A9402-007	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA24A9802-011	2024-05-05	M													
WQR1-0.5	L2755648-10	2024-05-08	M													
WQR1-0.5	VA24B0178-010	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2755934-1	2024-05-24	M													
WQR1-0.5	VA24B1783-001	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2755981-1	2024-05-28	M													
WQR1-0.5	VA24B2063-001	2024-05-28	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24B2561-005	2024-06-01	M													
WQR1-0.5	L2756068-1	2024-06-04	M													
WQR1-0.5	VA24B2772-001	2024-06-04	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24B3452-007	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	655-454600000-0	2024-06-17	M													
WQR1-0.5	VA24B5880-003	2024-07-02	M													
WQR1-0.5	VA24B5882-007	2024-07-03	M													
WQR1-0.5	VA24B6465-001	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24B7867-001	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2757210-1	2024-08-26	M													
WQR1-0.5	VA24C2208-001	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2757680-1	2024-10-06	M													
WQR1-0.5	VA24C6685-001	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24C7408-001	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2757830-3	2024-10-19	M													
WQR1-0.5	VA24C8041-003	2024-10-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24C8159-005	2024-10-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2757872-1	2024-10-22	M													
WQR1-0.5	VA24C8330-001	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2757933-5	2024-10-28	M													
WQR1-0.5	VA24C9041-005	2024-10-28	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2758002-1	2024-11-01	M													
WQR1-0.5	VA24C9683-001	2024-11-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2758142-5	2024-11-14	M													
WQR1-0.5	VA24D0945-005	2024-11-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA24D1069-005	2024-11-15	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2758203-5	2024-11-19	M													
WQR1-0.5	VA24D1567-005	2024-11-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2758353-1	2024-12-05	M													
WQR1-0.5	VA24D2842-001	2024-12-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2758617-7	2025-01-08	M													
WQR1-0.5	VA25A0392-007	2025-01-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2759040-7	2025-02-20	M													
WQR1-0.5	VA25A3677-007	2025-02-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	L2759227-7	2025-03-13	M													
WQR1-0.5	VA25A5556-007	2025-03-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25A6528-013	2025-03-25	M													
WQR1-0.5	VA25A8147-001	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25A8148-001	2025-04-11	M													
WQR1-0.5	VA25A8281-007	2025-04-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25A8283-007	2025-04-14	M													
WQR1-0.5	VA25A9123-008	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25A9125-008	2025-04-23	M													
WQR1-0.5	VA25B0359-009	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25B0360-009	2025-05-06	M													
WQR1-0.5	VA25B0800-007	2025-05-09	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA25B0802-007	2025-05-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-0.5	VA25B2349-005	2025-05-27	M													
WQR1-1	0051710-09	2020-05-20	M													
WQR1-1	0062209-10	2020-06-22	M													
WQR1-1	0071996-09	2020-07-21	M													
WQR1-1	0082292-09	2020-08-24	M													
WQR1-1	0093017-09	2020-09-28	M													
WQR1-1	20J1961-09	2020-10-20	M													
WQR1-1	20J2778-09	2020-10-27	M													
WQR1-1	20K0360-09	2020-11-03	M													
WQR1-1	20K1261-09	2020-11-10	M													
WQR1-1	20K2100-09	2020-11-18	M													
WQR1-1	20L1589-09	2020-12-14	M													
WQR1-1	21A2590-09	2021-01-27	M													
WQR1-1	21B2778-09	2021-02-25	M													
WQR1-1	21C3505-10	2021-03-25	M													
WQR1-1	21D2478-09	2021-04-22	M													
WQR1-1	21E1990-09	2021-05-18	M													
WQR1-1	21E2917-09	2021-05-26	M													
WQR1-1	21F0167-09	2021-06-01	M													
WQR1-1	21F1056-09	2021-06-08	M													
WQR1-1	21F2014-09	2021-06-15	M													
WQR1-1	21G2414-09	2021-07-20	M													
WQR1-1	21H3040-09	2021-08-25	M													
WQR1-1	21I3814-09	2021-09-28	M													
WQR1-1	21J3514-09	2021-10-26	M													
WQR1-1	21K3046-09	2021-11-23	M													
WQR1-1	21L2125-09	2021-12-14	M													
WQR1-1	22A2312-09	2022-01-20	M													
WQR1-1	22B2487-09	2022-02-17	M													
WQR1-1	22C3145-09	2022-03-22	M													
WQR1-1	22D2212-06	2022-04-19	M													
WQR1-1	22E2480-01	2022-05-17	M													
WQR1-1	22F3212-09	2022-06-21	M													
WQR1-1	22G1763-09	2022-07-13	M													
WQR1-1	22H2453-09	2022-08-16	M													
WQR1-1	22I1926-09	2022-09-14	M													
WQR1-1	22J1560-01	2022-10-12	M													
WQR1-1	22K1453-09	2022-11-10	M													
WQR1-1	22L0774-09	2022-12-07	M													
WQR1-1	23A2847-09	2023-01-27	M													
WQR1-1	23C0060-09	2023-02-28	M													
WQR1-1	23C1797-09	2023-03-15	M													
WQR1-1	23D2945-09	2023-04-26	M													
WQR1-1	23E2392-09	2023-05-17	M													
WQR1-1	23F3614-09	2023-06-27	M													
WQR1-1	23G2415-09	2023-07-19	M													
WQR1-1	23H3309-01	2023-08-24	M													
WQR1-1	23I2271-01	2023-09-19	M													
WQR1-1	23J2236-01	2023-10-18	M													
WQR1-1	23K1909-09	2023-11-15	M													
WQR1-1	23L1905-01	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQR1-1	L2754366-4	2024-01-24	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-1	VA24A1422-004	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2754594-1	2024-02-13	M													
WQR1-1	VA24A2858-001	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2755033-1	2024-03-20	M													
WQR1-1	VA24A5955-001	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2755461-1	2024-04-23	M													
WQR1-1	VA24A8736-001	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2755553-1	2024-04-30	M													
WQR1-1	VA24A9418-001	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2755641-1	2024-05-07	M													
WQR1-1	VA24B0040-001	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2755769-1	2024-05-14	M													
WQR1-1	VA24B0738-001	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2755874-1	2024-05-21	M													
WQR1-1	VA24B1351-001	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2756277-1	2024-06-18	M													
WQR1-1	VA24B4257-001	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2756678-1	2024-07-16	M													
WQR1-1	VA24B7237-001	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2757095-1	2024-08-20	M													
WQR1-1	VA24C1101-001	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	VA24C4483-001	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	VA24C8360-001	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	VA24C9197-001	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	VA24D0009-001	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2758095-1	2024-11-12	M													
WQR1-1	VA24D0632-001	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	VA24D1720-001	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2758465-1	2024-12-17	M													
WQR1-1	VA24D3769-001	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2758719-1	2025-01-21	M													
WQR1-1	VA25A1408-001	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	L2758994-1	2025-02-18	M													
WQR1-1	VA25A3430-001	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	VA25A6550-001	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	VA25A8962-001	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	VA25A9878-001	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	VA25B0358-001	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	VA25B1026-001	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-1	VA25B1711-001	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	0051710-10	2020-05-20	M													
WQR1-2	0062209-09	2020-06-22	M													
WQR1-2	0071996-10	2020-07-21	M													
WQR1-2	0082292-10	2020-08-24	M													
WQR1-2	0093017-10	2020-09-28	M													
WQR1-2	20J1961-10	2020-10-20	M													
WQR1-2	20J2778-10	2020-10-27	M													
WQR1-2	20K0360-10	2020-11-03	M													
WQR1-2	20K1261-10	2020-11-10	M													
WQR1-2	20K2100-10	2020-11-18	M													
WQR1-2	20L1589-10	2020-12-14	M													
WQR1-2	21A2590-10	2021-01-27	M													
WQR1-2	21B2778-10	2021-02-25	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	21C3505-11	2021-03-25	M													
WQR1-2	21D2478-10	2021-04-22	M													
WQR1-2	21E1990-10	2021-05-18	M													
WQR1-2	21E2917-10	2021-05-26	M													
WQR1-2	21F0167-10	2021-06-01	M													
WQR1-2	21F1056-10	2021-06-08	M													
WQR1-2	21F2014-10	2021-06-15	M													
WQR1-2	21G2414-10	2021-07-20	M													
WQR1-2	21H3040-10	2021-08-25	M													
WQR1-2	21I3814-10	2021-09-28	M													
WQR1-2	21J3514-10	2021-10-26	M													
WQR1-2	21K3046-10	2021-11-23	M													
WQR1-2	21L2125-10	2021-12-14	M													
WQR1-2	22A2312-10	2022-01-20	M													
WQR1-2	22B2487-10	2022-02-17	M													
WQR1-2	22C3145-10	2022-03-22	M													
WQR1-2	22D2212-07	2022-04-19	M													
WQR1-2	22E2480-02	2022-05-17	M													
WQR1-2	22F3212-10	2022-06-21	M													
WQR1-2	22G1763-10	2022-07-13	M													
WQR1-2	22H2453-10	2022-08-16	M													
WQR1-2	22I1926-10	2022-09-14	M													
WQR1-2	22J1560-02	2022-10-12	M													
WQR1-2	22K1453-10	2022-11-10	M													
WQR1-2	22L0774-10	2022-12-07	M													
WQR1-2	23A2847-10	2023-01-27	M													
WQR1-2	23C0060-10	2023-02-28	M													
WQR1-2	23C1797-10	2023-03-15	M													
WQR1-2	23D2945-10	2023-04-26	M													
WQR1-2	23E2392-10	2023-05-17	M													
WQR1-2	23F3614-10	2023-06-27	M													
WQR1-2	23G2415-10	2023-07-19	M													
WQR1-2	23H3309-02	2023-08-24	M													
WQR1-2	23I2271-02	2023-09-19	M													
WQR1-2	23J2236-02	2023-10-18	M													
WQR1-2	23K1909-10	2023-11-15	M													
WQR1-2	23L1905-02	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQR1-2	L2754366-5	2024-01-24	M													
WQR1-2	VA24A1422-005	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2754594-2	2024-02-13	M													
WQR1-2	VA24A2858-002	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2755033-2	2024-03-20	M													
WQR1-2	VA24A5955-002	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2755461-2	2024-04-23	M													
WQR1-2	VA24A8736-002	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2755553-2	2024-04-30	M													
WQR1-2	VA24A9418-002	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2755641-2	2024-05-07	M													
WQR1-2	VA24B0040-002	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2755769-2	2024-05-14	M													
WQR1-2	VA24B0738-002	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2755874-2	2024-05-21	M													
WQR1-2	VA24B1351-002	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	L2756277-2	2024-06-18	M													
WQR1-2	VA24B4257-002	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2756678-2	2024-07-16	M													
WQR1-2	VA24B7237-002	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2757095-2	2024-08-20	M													
WQR1-2	VA24C1101-002	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	VA24C4483-002	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	VA24C8360-002	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	VA24C9197-002	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	VA24D0009-002	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2758095-2	2024-11-12	M													
WQR1-2	VA24D0632-002	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	VA24D1720-002	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2758465-2	2024-12-17	M													
WQR1-2	VA24D3769-002	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2758719-2	2025-01-21	M													
WQR1-2	VA25A1408-002	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	L2758994-2	2025-02-18	M													
WQR1-2	VA25A3430-002	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	VA25A6550-002	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	VA25A8962-002	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	VA25A9878-002	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	VA25B0358-002	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	VA25B1026-002	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2	VA25B1711-002	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2755545-8	2024-04-30	M													
WQR1-2m	VA24A9402-008	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	VA24A9802-012	2024-05-05	M													
WQR1-2m	L2755648-11	2024-05-08	M													
WQR1-2m	VA24B0178-011	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2755934-2	2024-05-24	M													
WQR1-2m	VA24B1783-002	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2755981-2	2024-05-28	M													
WQR1-2m	VA24B2063-002	2024-05-28	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	VA24B2561-006	2024-06-01	M													
WQR1-2m	L2756068-2	2024-06-04	M													
WQR1-2m	VA24B2772-002	2024-06-04	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	VA24B3452-008	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	656-454600000-0	2024-06-17	M													
WQR1-2m	VA24B5882-008	2024-07-03	M													
WQR1-2m	VA24B6465-002	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	VA24B7867-002	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2757210-2	2024-08-26	M													
WQR1-2m	VA24C2208-002	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2757680-2	2024-10-06	M													
WQR1-2m	VA24C6685-002	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	VA24C7408-002	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2757830-6	2024-10-20	M													
WQR1-2m	VA24C8041-006	2024-10-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2757872-2	2024-10-22	M													
WQR1-2m	VA24C8330-002	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2757933-6	2024-10-28	M													
WQR1-2m	VA24C9041-006	2024-10-28	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2m	L2758002-3	2024-11-01	M													
WQR1-2m	VA24C9683-003	2024-11-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2758353-2	2024-12-05	M													
WQR1-2m	VA24D2842-002	2024-12-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2758617-8	2025-01-08	M													
WQR1-2m	VA25A0392-008	2025-01-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2759040-8	2025-02-20	M													
WQR1-2m	VA25A3677-008	2025-02-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	L2759227-8	2025-03-13	M													
WQR1-2m	VA25A5556-008	2025-03-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	VA25A6528-014	2025-03-25	M													
WQR1-2m	VA25A8147-002	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	VA25A8148-002	2025-04-11	M													
WQR1-2m	VA25A8281-008	2025-04-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	VA25A8283-008	2025-04-14	M													
WQR1-2m	VA25A9123-009	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	VA25A9125-009	2025-04-23	M													
WQR1-2m	VA25B0359-008	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-2m	VA25B0360-008	2025-05-06	M													
WQR1-2m	VA25B0800-008	2025-05-09	M													
WQR1-2m	VA25B0802-008	2025-05-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	23L1905-03	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQR1-3	L2754366-6	2024-01-24	M													
WQR1-3	VA24A1422-006	2024-01-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2754594-3	2024-02-13	M													
WQR1-3	VA24A2858-003	2024-02-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2755033-3	2024-03-20	M													
WQR1-3	VA24A5955-003	2024-03-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2755461-3	2024-04-23	M													
WQR1-3	VA24A8736-003	2024-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2755553-3	2024-04-30	M													
WQR1-3	VA24A9418-003	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2755641-3	2024-05-07	M													
WQR1-3	VA24B0040-003	2024-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2755769-3	2024-05-14	M													
WQR1-3	VA24B0738-003	2024-05-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2755874-3	2024-05-21	M													
WQR1-3	VA24B1351-003	2024-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2756277-3	2024-06-18	M													
WQR1-3	VA24B4257-003	2024-06-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2756678-3	2024-07-16	M													
WQR1-3	VA24B7237-003	2024-07-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2757095-3	2024-08-20	M													
WQR1-3	VA24C1101-003	2024-08-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	VA24C4483-003	2024-09-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	VA24C8360-003	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	VA24C9197-003	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	VA24D0009-003	2024-11-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2758095-3	2024-11-12	M													
WQR1-3	VA24D0632-003	2024-11-12	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	VA24D1720-003	2024-11-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2758465-3	2024-12-17	M													
WQR1-3	VA24D3769-003	2024-12-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-3	L2758719-3	2025-01-21	M													
WQR1-3	VA25A1408-003	2025-01-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	L2758994-3	2025-02-18	M													
WQR1-3	VA25A3430-003	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	VA25A6550-003	2025-03-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	VA25A8962-003	2025-04-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	VA25A9878-003	2025-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	VA25B0358-003	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	VA25B1026-003	2025-05-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-3	VA25B1711-003	2025-05-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2755545-9	2024-04-30	M													
WQR1-SF	VA24A9402-009	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	VA24A9802-013	2024-05-05	M													
WQR1-SF	L2755648-12	2024-05-08	M													
WQR1-SF	VA24B0178-012	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2755934-3	2024-05-24	M													
WQR1-SF	VA24B1783-003	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2755981-3	2024-05-28	M													
WQR1-SF	VA24B2063-003	2024-05-28	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2756068-3	2024-06-04	M													
WQR1-SF	VA24B2772-003	2024-06-04	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	VA24B3452-009	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	657-454600000-0	2024-06-17	M													
WQR1-SF	VA24B5882-009	2024-07-03	M													
WQR1-SF	VA24B6465-003	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	VA24B7867-003	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2757210-3	2024-08-26	M													
WQR1-SF	VA24C2208-003	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2757680-3	2024-10-06	M													
WQR1-SF	VA24C6685-003	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	VA24C7408-003	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2757872-3	2024-10-22	M													
WQR1-SF	VA24C8330-003	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2757933-7	2024-10-28	M													
WQR1-SF	VA24C9041-007	2024-10-28	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2758002-4	2024-11-01	M													
WQR1-SF	VA24C9683-004	2024-11-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	VA24D2498-001	2024-11-30	M													
WQR1-SF	L2758353-3	2024-12-05	M													
WQR1-SF	VA24D2842-003	2024-12-05	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2758617-9	2025-01-08	M													
WQR1-SF	VA25A0392-009	2025-01-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2759040-9	2025-02-20	M													
WQR1-SF	VA25A3677-009	2025-02-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	L2759227-9	2025-03-13	M													
WQR1-SF	VA25A5556-009	2025-03-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	VA25A6528-015	2025-03-25	M													
WQR1-SF	VA25A8147-003	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	VA25A8148-003	2025-04-11	M													
WQR1-SF	VA25A8281-009	2025-04-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	VA25A8283-009	2025-04-14	M													
WQR1-SF	VA25A9123-010	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	VA25A9125-010	2025-04-23	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-SF	VA25B0359-007	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR1-SF	VA25B0360-007	2025-05-06	M													
WQR1-SF	VA25B0800-009	2025-05-09	M													
WQR1-SF	VA25B0802-009	2025-05-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2755545-10	2024-04-30	M													
WQR2-0.5	VA24A9402-010	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2755648-1	2024-05-08	M													
WQR2-0.5	VA24B0178-001	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2755934-10	2024-05-24	M													
WQR2-0.5	VA24B1783-010	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24B3452-010	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	658-454600000-0	2024-06-17	M													
WQR2-0.5	VA24B5882-010	2024-07-03	M													
WQR2-0.5	VA24B6465-004	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24B7867-004	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2757210-4	2024-08-26	M													
WQR2-0.5	VA24C2208-004	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24C5557-001	2024-09-25	M													
WQR2-0.5	L2757680-4	2024-10-06	M													
WQR2-0.5	VA24C6685-004	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24C7408-004	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2757830-2	2024-10-19	M													
WQR2-0.5	VA24C8041-002	2024-10-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24C8159-004	2024-10-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2757872-4	2024-10-22	M													
WQR2-0.5	VA24C8330-004	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2757962-5	2024-10-29	M													
WQR2-0.5	VA24C9185-005	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2758003-1	2024-11-02	M													
WQR2-0.5	VA24C9732-001	2024-11-02	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2758142-6	2024-11-14	M													
WQR2-0.5	VA24D0945-006	2024-11-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA24D1069-006	2024-11-15	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2758203-6	2024-11-19	M													
WQR2-0.5	VA24D1567-006	2024-11-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2758354-1	2024-12-06	M													
WQR2-0.5	VA24D3008-001	2024-12-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2758634-7	2025-01-09	M													
WQR2-0.5	VA25A0510-007	2025-01-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2759010-7	2025-02-18	M													
WQR2-0.5	VA25A3415-007	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	L2759209-7	2025-03-12	M													
WQR2-0.5	VA25A5429-007	2025-03-12	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25A6528-016	2025-03-25	M													
WQR2-0.5	VA25A8147-004	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25A8148-004	2025-04-11	M													
WQR2-0.5	VA25A8280-007	2025-04-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25A8282-007	2025-04-13	M													
WQR2-0.5	VA25A8854-007	2025-04-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25A8855-007	2025-04-21	M													
WQR2-0.5	VA25B0359-012	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25B0360-012	2025-05-06	M													
WQR2-0.5	VA25B0499-007	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-0.5	VA25B0502-007	2025-05-07	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-0.5	VA25B2349-006	2025-05-27	M													
WQR2-1	0051710-11	2020-05-20	M													
WQR2-1	0062209-12	2020-06-22	M													
WQR2-1	0071996-11	2020-07-21	M													
WQR2-1	0082292-11	2020-08-24	M													
WQR2-1	0093017-11	2020-09-28	M													
WQR2-1	20J1961-11	2020-10-20	M													
WQR2-1	20J2778-11	2020-10-27	M													
WQR2-1	20K0360-11	2020-11-03	M													
WQR2-1	20K1261-11	2020-11-10	M													
WQR2-1	20K2100-11	2020-11-18	M													
WQR2-1	20L1589-11	2020-12-14	M													
WQR2-1	21A2590-11	2021-01-27	M													
WQR2-1	21B2778-11	2021-02-25	M													
WQR2-1	21C3505-12	2021-03-25	M													
WQR2-1	21D2478-11	2021-04-22	M													
WQR2-1	21E1990-11	2021-05-18	M													
WQR2-1	21E2917-11	2021-05-26	M													
WQR2-1	21F0167-11	2021-06-01	M													
WQR2-1	21F1056-11	2021-06-08	M													
WQR2-1	21F2014-11	2021-06-15	M													
WQR2-1	21G2414-11	2021-07-20	M													
WQR2-1	21H3040-11	2021-08-25	M													
WQR2-1	21I3814-11	2021-09-28	M													
WQR2-1	21J3514-11	2021-10-26	M													
WQR2-1	21K3046-11	2021-11-23	M													
WQR2-1	21L2125-11	2021-12-14	M													
WQR2-1	22A2312-11	2022-01-20	M													
WQR2-1	22B2487-11	2022-02-17	M													
WQR2-1	22C3145-11	2022-03-22	M													
WQR2-1	22D2212-14	2022-04-20	M													
WQR2-1	22E2480-11	2022-05-17	M													
WQR2-1	22F3212-11	2022-06-21	M													
WQR2-1	22G1763-11	2022-07-13	M													
WQR2-1	22H2453-11	2022-08-16	M													
WQR2-1	22I1926-11	2022-09-14	M													
WQR2-1	22J1560-11	2022-10-12	M													
WQR2-1	22K1453-11	2022-11-10	M													
WQR2-1	22K2628-03	2022-11-22	M													
WQR2-1	22K2988-03	2022-11-24	M													
WQR2-1	22K3123-03	2022-11-25	M													
WQR2-1	22L0036-03	2022-11-30	M													
WQR2-1	22L0263-03	2022-12-02	M													
WQR2-1	22L0499-03	2022-12-05	M													
WQR2-1	22L0633-03	2022-12-06	M													
WQR2-1	22L0774-11	2022-12-07	M													
WQR2-1	22L1436-03	2022-12-13	M													
WQR2-1	23A2847-11	2023-01-27	M													
WQR2-1	23C0060-11	2023-02-28	M													
WQR2-1	23C1797-11	2023-03-15	M													
WQR2-1	23D2945-11	2023-04-26	M													
WQR2-1	23E2392-11	2023-05-17	M													
WQR2-1	23F3614-11	2023-06-27	M													
WQR2-1	23G2415-11	2023-07-19	M													
WQR2-1	23H3309-11	2023-08-24	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-1	23I2271-13	2023-09-19	M													
WQR2-1	23J2236-13	2023-10-18	M													
WQR2-1	23K1909-11	2023-11-15	M													
WQR2-1	23L2091-09	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQR2-1	L2754383-7	2024-01-25	M													
WQR2-1	VA24A1507-009	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2754604-7	2024-02-14	M													
WQR2-1	VA24A2995-009	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2755043-9	2024-03-21	M													
WQR2-1	VA24A6026-009	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2755490-7	2024-04-24	M													
WQR2-1	VA24A8916-009	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2755567-7	2024-05-01	M													
WQR2-1	VA24A9566-009	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2755666-7	2024-05-08	M													
WQR2-1	VA24B0201-009	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2755779-7	2024-05-15	M													
WQR2-1	VA24B0901-009	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2755888-7	2024-05-22	M													
WQR2-1	VA24B1500-009	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2756312-7	2024-06-19	M													
WQR2-1	VA24B4510-009	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	VA24B7397-009	2024-07-17	M	<0.00050	0.00068	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2756689-7	2024-07-17	M													
WQR2-1	L2757122-7	2024-08-21	M													
WQR2-1	VA24C1337-009	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	VA24C4683-009	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	VA24C8569-009	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2757977-9	2024-10-30	M													
WQR2-1	VA24C9414-009	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	VA24D0180-009	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	VA24D0813-009	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2758221-7	2024-11-22	M													
WQR2-1	VA24D1791-009	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2758486-7	2024-12-18	M													
WQR2-1	VA24D3937-009	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2758770-7	2025-01-22	M													
WQR2-1	VA25A1525-009	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	L2759008-7	2025-02-19	M													
WQR2-1	VA25A3570-009	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	VA25A6679-009	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	VA25A9109-009	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	VA25A9941-009	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	VA25B0496-009	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	VA25B1530-009	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-1	VA25B1841-009	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	0051710-12	2020-05-20	M													
WQR2-2	0062209-11	2020-06-22	M													
WQR2-2	0071996-12	2020-07-21	M													
WQR2-2	0082292-12	2020-08-24	M													
WQR2-2	0093017-12	2020-09-28	M													
WQR2-2	20J1961-12	2020-10-20	M													
WQR2-2	20J2778-12	2020-10-27	M													
WQR2-2	20K0360-12	2020-11-03	M													
WQR2-2	20K1261-12	2020-11-10	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	20K2100-12	2020-11-18	M													
WQR2-2	20L1589-12	2020-12-14	M													
WQR2-2	21A2590-12	2021-01-27	M													
WQR2-2	21B2778-12	2021-02-25	M													
WQR2-2	21C3505-13	2021-03-25	M													
WQR2-2	21D2478-12	2021-04-22	M													
WQR2-2	21E1990-12	2021-05-18	M													
WQR2-2	21E2917-12	2021-05-26	M													
WQR2-2	21F0167-12	2021-06-01	M													
WQR2-2	21F1056-12	2021-06-08	M													
WQR2-2	21F2014-12	2021-06-15	M													
WQR2-2	21G2414-12	2021-07-20	M													
WQR2-2	21H3040-12	2021-08-25	M													
WQR2-2	21I3814-12	2021-09-28	M													
WQR2-2	21J3514-12	2021-10-26	M													
WQR2-2	21K3046-12	2021-11-23	M													
WQR2-2	21L2125-12	2021-12-14	M													
WQR2-2	22A2312-12	2022-01-20	M													
WQR2-2	22B2487-12	2022-02-17	M													
WQR2-2	22C3145-12	2022-03-22	M													
WQR2-2	22D2212-15	2022-04-20	M													
WQR2-2	22E2480-12	2022-05-17	M													
WQR2-2	22F3212-12	2022-06-21	M													
WQR2-2	22G1763-12	2022-07-13	M													
WQR2-2	22H2453-12	2022-08-16	M													
WQR2-2	22I1926-12	2022-09-14	M													
WQR2-2	22J1560-12	2022-10-12	M													
WQR2-2	22K1453-12	2022-11-10	M													
WQR2-2	22K2628-04	2022-11-22	M													
WQR2-2	22K2988-04	2022-11-24	M													
WQR2-2	22K3123-04	2022-11-25	M													
WQR2-2	22L0036-04	2022-11-30	M													
WQR2-2	22L0263-04	2022-12-02	M													
WQR2-2	22L0499-04	2022-12-05	M													
WQR2-2	22L0633-04	2022-12-06	M													
WQR2-2	22L0774-12	2022-12-07	M													
WQR2-2	22L1436-04	2022-12-13	M													
WQR2-2	23A2847-12	2023-01-27	M													
WQR2-2	23C0060-12	2023-02-28	M													
WQR2-2	23C1797-12	2023-03-15	M													
WQR2-2	23D2945-12	2023-04-26	M													
WQR2-2	23E2392-12	2023-05-17	M													
WQR2-2	23F3614-12	2023-06-27	M													
WQR2-2	23G2415-12	2023-07-19	M													
WQR2-2	23H3309-12	2023-08-24	M													
WQR2-2	23I2271-14	2023-09-19	M													
WQR2-2	23J2236-14	2023-10-18	M													
WQR2-2	23K1909-12	2023-11-15	M													
WQR2-2	23L2091-10	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQR2-2	L2754383-8	2024-01-25	M													
WQR2-2	VA24A1507-010	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2754604-8	2024-02-14	M													
WQR2-2	VA24A2995-010	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2755043-10	2024-03-21	M													
WQR2-2	VA24A6026-010	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	L2755490-8	2024-04-24	M													
WQR2-2	VA24A8916-010	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2755567-8	2024-05-01	M													
WQR2-2	VA24A9566-010	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2755666-8	2024-05-08	M													
WQR2-2	VA24B0201-010	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2755779-8	2024-05-15	M													
WQR2-2	VA24B0901-010	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2755888-8	2024-05-22	M													
WQR2-2	VA24B1500-010	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2756312-8	2024-06-19	M													
WQR2-2	VA24B4510-010	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	VA24B7397-010	2024-07-17	M	<0.00050	0.00061	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2756689-8	2024-07-17	M													
WQR2-2	L2757122-8	2024-08-21	M													
WQR2-2	VA24C1337-010	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	VA24C4683-010	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	VA24C8569-010	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2757977-10	2024-10-30	M													
WQR2-2	VA24C9414-010	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	VA24D0180-010	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	VA24D0813-010	2024-11-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2758221-8	2024-11-22	M													
WQR2-2	VA24D1791-010	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2758486-8	2024-12-18	M													
WQR2-2	VA24D3937-010	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2758770-8	2025-01-22	M													
WQR2-2	VA25A1525-010	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	L2759008-8	2025-02-19	M													
WQR2-2	VA25A3570-010	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	VA25A6679-010	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	VA25A9109-010	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	VA25A9941-010	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	VA25B0496-010	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	VA25B1530-010	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2	VA25B1841-010	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	L2755545-11	2024-04-30	M													
WQR2-2m	VA24A9402-011	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	L2755648-2	2024-05-08	M													
WQR2-2m	VA24B0178-002	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	L2755934-11	2024-05-24	M													
WQR2-2m	VA24B1783-011	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	VA24B3452-011	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	659-454600000-0	2024-06-17	M													
WQR2-2m	VA24B5882-011	2024-07-03	M													
WQR2-2m	VA24B6465-005	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	VA24B7867-005	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	L2757210-5	2024-08-26	M													
WQR2-2m	VA24C2208-005	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	VA24C5557-002	2024-09-25	M													
WQR2-2m	L2757680-5	2024-10-06	M													
WQR2-2m	VA24C6685-005	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	VA24C7408-005	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	L2757872-5	2024-10-22	M													
WQR2-2m	VA24C8330-005	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	VA24C9185-006	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2m	L2757962-6	2024-10-29	M													
WQR2-2m	L2758003-2	2024-11-02	M													
WQR2-2m	VA24C9732-002	2024-11-02	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	L2758354-2	2024-12-06	M													
WQR2-2m	VA24D3008-002	2024-12-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	L2758634-8	2025-01-09	M													
WQR2-2m	VA25A0510-008	2025-01-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	L2759010-8	2025-02-18	M													
WQR2-2m	VA25A3415-008	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	L2759209-8	2025-03-12	M													
WQR2-2m	VA25A5429-008	2025-03-12	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25A6528-017	2025-03-25	M													
WQR2-2m	VA25A8147-005	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25A8148-005	2025-04-11	M													
WQR2-2m	VA25A8280-008	2025-04-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25A8282-008	2025-04-13	M													
WQR2-2m	VA25A8854-008	2025-04-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25A8855-008	2025-04-21	M													
WQR2-2m	VA25B0359-011	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25B0360-011	2025-05-06	M													
WQR2-2m	VA25B0499-008	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-2m	VA25B0502-008	2025-05-07	M													
WQR2-3	23L2091-11	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.0030	<0.0010	<0.0010				<0.0005	<0.0010	<0.0010	<0.0010
WQR2-3	L2754383-9	2024-01-25	M													
WQR2-3	VA24A1507-011	2024-01-25	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2754604-9	2024-02-14	M													
WQR2-3	VA24A2995-011	2024-02-14	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2755043-11	2024-03-21	M													
WQR2-3	VA24A6026-011	2024-03-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2755490-9	2024-04-24	M													
WQR2-3	VA24A8916-011	2024-04-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2755567-9	2024-05-01	M													
WQR2-3	VA24A9566-011	2024-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2755666-9	2024-05-08	M													
WQR2-3	VA24B0201-011	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2755779-9	2024-05-15	M													
WQR2-3	VA24B0901-011	2024-05-15	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2755888-9	2024-05-22	M													
WQR2-3	VA24B1500-011	2024-05-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2756312-9	2024-06-19	M													
WQR2-3	VA24B4510-011	2024-06-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	VA24B7397-011	2024-07-17	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2756689-9	2024-07-17	M													
WQR2-3	L2757122-9	2024-08-21	M													
WQR2-3	VA24C1337-011	2024-08-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	VA24C4683-011	2024-09-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	VA24C8569-011	2024-10-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	VA24C9414-011	2024-10-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2757977-11	2024-10-30	M													
WQR2-3	VA24D0180-011	2024-11-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2758221-9	2024-11-22	M													
WQR2-3	VA24D1791-011	2024-11-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2758486-9	2024-12-18	M													
WQR2-3	VA24D3937-011	2024-12-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2758770-9	2025-01-22	M													
WQR2-3	VA25A1525-011	2025-01-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	L2759008-9	2025-02-19	M													

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,1-Dichloroethylene	cis-1,2-Dichloroethylene	trans-1,2-Dichloroethylene	Dichloromethane	1,2-Dichloropropane	1,3-Dichloropropene(cis&trans)	cis-1,3-Dichloropropylene	trans-1,3-Dichloropropylene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane	Tetrachloroethylene	1,1,1-Trichloroethane	1,1,2-Trichloroethane
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-3	VA25A3570-011	2025-02-19	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	VA25A6679-011	2025-03-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	VA25A9109-011	2025-04-23	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	VA25A9941-011	2025-05-01	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	VA25B0496-011	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	VA25B1530-011	2025-05-16	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-3	VA25B1841-011	2025-05-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	L2755545-12	2024-04-30	M													
WQR2-SF	VA24A9402-012	2024-04-30	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	L2755648-3	2024-05-08	M													
WQR2-SF	VA24B0178-003	2024-05-08	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	L2755934-12	2024-05-24	M													
WQR2-SF	VA24B1783-012	2024-05-24	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	VA24B3452-012	2024-06-10	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	660-454600000-0	2024-06-17	M													
WQR2-SF	VA24B5882-012	2024-07-03	M													
WQR2-SF	VA24B6465-006	2024-07-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	VA24B7867-006	2024-07-20	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	L2757210-6	2024-08-26	M													
WQR2-SF	VA24C2208-006	2024-08-26	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	VA24C5557-003	2024-09-25	M													
WQR2-SF	L2757680-6	2024-10-06	M													
WQR2-SF	VA24C6685-006	2024-10-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	VA24C7408-006	2024-10-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	L2757872-6	2024-10-22	M													
WQR2-SF	VA24C8330-006	2024-10-22	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	VA24C9185-007	2024-10-29	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	L2757962-7	2024-10-29	M													
WQR2-SF	L2758003-3	2024-11-02	M													
WQR2-SF	VA24C9732-003	2024-11-02	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	L2758354-3	2024-12-06	M													
WQR2-SF	VA24D3008-003	2024-12-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	L2758634-9	2025-01-09	M													
WQR2-SF	VA25A0510-009	2025-01-09	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	L2759010-9	2025-02-18	M													
WQR2-SF	VA25A3415-009	2025-02-18	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	L2759209-9	2025-03-12	M													
WQR2-SF	VA25A5429-009	2025-03-12	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25A6528-018	2025-03-25	M													
WQR2-SF	VA25A8147-006	2025-04-11	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25A8148-006	2025-04-11	M													
WQR2-SF	VA25A8280-009	2025-04-13	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25A8282-009	2025-04-13	M													
WQR2-SF	VA25A8854-009	2025-04-21	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25A8855-009	2025-04-21	M													
WQR2-SF	VA25B0359-010	2025-05-06	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25B0360-010	2025-05-06	M													
WQR2-SF	VA25B0499-009	2025-05-07	M	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00075	<0.00050	<0.00050	<0.00050	<0.00020	<0.00050	<0.00050	<0.00050
WQR2-SF	VA25B0502-009	2025-05-07	M													

Notes:
Sample Class 'M' = monitoring sample.
'<' = result is below the indicated detection limit.

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	0051710-01	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	0062209-01	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	0071996-01	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	0082292-01	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	0093017-01	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	20J1961-01	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	0.000017	0.000018	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	20J2778-01	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	20K0360-01	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	20K1261-01	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	20K2100-01	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	20L1589-01	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21A2590-01	2021-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21B2778-01	2021-02-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21C3505-01	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21D2478-01	2021-04-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21E1990-01	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21E2917-01	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21F0167-01	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21F1056-01	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21F2014-01	2021-06-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21G2414-01	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21H3040-01	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21I3814-01	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21J3514-01	2021-10-26	M														
WQ1-1	21K3046-01	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	21L2125-01	2021-12-14	M				<0.000050	<0.000200	<0.000050	0.000027	<0.000010	0.000012	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	22A2312-01	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	22B2487-01	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	22C3145-01	2022-03-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	22D2212-01	2022-04-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	22E2480-03	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	22F3212-01	2022-06-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	22G1763-01	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	22H2453-01	2022-08-16	M				<0.000050	<0.000200	<0.000605	<0.000027	<0.000010	<0.000020	0.000072	<0.000050	0.000066	<0.000100	<0.000050
WQ1-1	22I1926-01	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	22J1560-03	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	22K1453-01	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	22L0774-01	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23A2847-01	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23C0060-01	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23C1797-01	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23D2945-01	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23E2392-01	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23F3614-01	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23G2415-01	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23H3309-03	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23I2271-03	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23J2236-03	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23K1909-01	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	23L1905-04	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-1	L2754366-7	2024-01-24	M														
WQ1-1	VA24A1422-007	2024-01-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2754594-4	2024-02-13	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	VA24A2858-004	2024-02-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2755033-4	2024-03-20	M														
WQ1-1	VA24A5955-004	2024-03-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2755461-4	2024-04-23	M														
WQ1-1	VA24A8736-004	2024-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2755553-4	2024-04-30	M														
WQ1-1	VA24A9418-004	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2755641-4	2024-05-07	M														
WQ1-1	VA24B0040-004	2024-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2755769-4	2024-05-14	M														
WQ1-1	VA24B0738-004	2024-05-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2755874-4	2024-05-21	M														
WQ1-1	VA24B1351-004	2024-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2756277-4	2024-06-18	M														
WQ1-1	VA24B4257-004	2024-06-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2756678-4	2024-07-16	M														
WQ1-1	VA24B7237-004	2024-07-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2757095-4	2024-08-20	M														
WQ1-1	VA24C1101-004	2024-08-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA24C4483-004	2024-09-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA24C8360-004	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA24C9197-004	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA24D0009-004	2024-11-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA24D0813-011	2024-11-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA24D1720-004	2024-11-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2758465-4	2024-12-17	M														
WQ1-1	VA24D3769-004	2024-12-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2758719-4	2025-01-21	M														
WQ1-1	VA25A1408-004	2025-01-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	L2758994-4	2025-02-18	M														
WQ1-1	VA25A3430-004	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA25A6550-004	2025-03-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA25A8962-004	2025-04-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA25A9878-004	2025-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA25B0358-004	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA25B1026-004	2025-05-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-1	VA25B1711-004	2025-05-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	0051710-02	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	0062209-02	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	0071996-02	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	0082292-02	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	0093017-02	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	20J1961-02	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	20J2778-02	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	20K0360-02	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	20K1261-02	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	20K2100-02	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	20L1589-02	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21A2590-02	2021-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21B2778-02	2021-02-25	M				<0.000050	<0.000200	0.000066	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21C3505-02	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21D2478-02	2021-04-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21E1990-02	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	21E2917-02	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21F0167-02	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21F1056-02	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21F2014-02	2021-06-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21G2414-02	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	0.000046	0.000066	0.000156	0.000106	0.000071	<0.000100	0.000056
WQ1-2	21H3040-02	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21I3814-02	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21J3514-02	2021-10-26	M														
WQ1-2	21K3046-02	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	21L2125-02	2021-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	22A2312-02	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	22B2487-02	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	22C3145-02	2022-03-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	22D2212-02	2022-04-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	22E2480-04	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	22F3212-02	2022-06-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	22G1763-02	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	22H2453-02	2022-08-16	M				<0.000050	<0.000200	<0.000461	<0.000021	<0.000010	<0.000016	<0.000050	<0.000050	0.000055	<0.000100	<0.000050
WQ1-2	22I1926-02	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	22J1560-04	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	22K1453-02	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	22L0774-02	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23A2847-02	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23C0060-02	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23C1797-02	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23D2945-02	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23E2392-02	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23F3614-02	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23G2415-02	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23H3309-04	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23I2271-04	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23J2236-04	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23K1909-02	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	23L1905-05	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-2	L2754366-8	2024-01-24	M														
WQ1-2	VA24A1422-008	2024-01-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2754594-5	2024-02-13	M														
WQ1-2	VA24A2858-005	2024-02-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2755033-5	2024-03-20	M														
WQ1-2	VA24A5955-005	2024-03-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2755461-5	2024-04-23	M														
WQ1-2	VA24A8736-005	2024-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2755553-5	2024-04-30	M														
WQ1-2	VA24A9418-005	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2755641-5	2024-05-07	M														
WQ1-2	VA24B0040-005	2024-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2755769-5	2024-05-14	M														
WQ1-2	VA24B0738-005	2024-05-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2755874-5	2024-05-21	M														
WQ1-2	VA24B1351-005	2024-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2756277-5	2024-06-18	M														
WQ1-2	VA24B4257-005	2024-06-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2756678-5	2024-07-16	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	VA24B7237-005	2024-07-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2757095-5	2024-08-20	M														
WQ1-2	VA24C1101-005	2024-08-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA24C4483-005	2024-09-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA24C8360-005	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA24C9197-005	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA24D0009-005	2024-11-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA24D0813-013	2024-11-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA24D1720-005	2024-11-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2758465-5	2024-12-17	M														
WQ1-2	VA24D3769-005	2024-12-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2758719-5	2025-01-21	M														
WQ1-2	VA25A1408-005	2025-01-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	L2758994-5	2025-02-18	M														
WQ1-2	VA25A3430-005	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA25A6550-005	2025-03-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA25A8962-005	2025-04-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA25A9878-005	2025-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA25B0358-005	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA25B1026-005	2025-05-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-2	VA25B1711-005	2025-05-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	23L1905-06	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ1-3	L2754366-9	2024-01-24	M														
WQ1-3	VA24A1422-009	2024-01-24	M	<0.00050	<0.00050	<0.00040	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2754594-6	2024-02-13	M														
WQ1-3	VA24A2858-006	2024-02-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2755033-6	2024-03-20	M														
WQ1-3	VA24A5955-006	2024-03-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2755461-6	2024-04-23	M														
WQ1-3	VA24A8736-006	2024-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2755553-6	2024-04-30	M														
WQ1-3	VA24A9418-006	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2755641-6	2024-05-07	M														
WQ1-3	VA24B0040-006	2024-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2755769-6	2024-05-14	M														
WQ1-3	VA24B0738-006	2024-05-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2755874-6	2024-05-21	M														
WQ1-3	VA24B1351-006	2024-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2756277-6	2024-06-18	M														
WQ1-3	VA24B4257-006	2024-06-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2756678-6	2024-07-16	M														
WQ1-3	VA24B7237-006	2024-07-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2757095-6	2024-08-20	M														
WQ1-3	VA24C1101-006	2024-08-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA24C4483-006	2024-09-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA24C8360-006	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA24C9197-006	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA24D0009-006	2024-11-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA24D0813-014	2024-11-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA24D1720-006	2024-11-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2758465-6	2024-12-17	M														
WQ1-3	VA24D3769-006	2024-12-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2758719-6	2025-01-21	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-3	VA25A1408-006	2025-01-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	L2758994-6	2025-02-18	M														
WQ1-3	VA25A3430-006	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA25A6550-006	2025-03-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA25A8962-006	2025-04-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA25A9878-006	2025-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA25B0358-006	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA25B1026-006	2025-05-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ1-3	VA25B1711-006	2025-05-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	0051710-03	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	0062209-03	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	0071996-03	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	0082292-03	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	0093017-03	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	20J1961-03	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	20J2778-03	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	20K0360-03	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	20K1261-03	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	20K2100-03	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	20L1589-03	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21A2590-03	2021-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21B2778-03	2021-02-25	M				<0.000050	<0.000200	0.00009	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21C3505-03	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21D2478-03	2021-04-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21E1990-03	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21E2917-03	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21F0167-03	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21F1056-03	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21F2014-03	2021-06-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21G2414-03	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21H3040-03	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21I3814-03	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21J3514-03	2021-10-26	M														
WQ2-1	21K3046-03	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	21L2125-03	2021-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22A2312-03	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22B2487-03	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22C3145-03	2022-03-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22D2212-03	2022-04-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22E2480-05	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22F3212-03	2022-06-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22G1763-03	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22H2453-03	2022-08-16	M				<0.000050	<0.000200	<0.000369	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22I1926-03	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22J1560-05	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22K1453-03	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	22L0774-03	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	23A2847-03	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	23C0060-03	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	23C1797-03	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	23D2945-03	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	23E2392-03	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	23F3614-03	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-1	23G2415-03	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	23H3309-05	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	23I2271-05	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	23J2236-05	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	23K1909-03	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	23L1905-07	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-1	L2754383-1	2024-01-25	M														
WQ2-1	VA24A1507-001	2024-01-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2754594-7	2024-02-13	M														
WQ2-1	VA24A2858-007	2024-02-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2755033-7	2024-03-20	M														
WQ2-1	VA24A5955-007	2024-03-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2755461-7	2024-04-23	M														
WQ2-1	VA24A8736-007	2024-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2755553-7	2024-04-30	M														
WQ2-1	VA24A9418-007	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2755641-7	2024-05-07	M														
WQ2-1	VA24B0040-007	2024-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2755769-7	2024-05-14	M														
WQ2-1	VA24B0738-007	2024-05-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2755874-7	2024-05-21	M														
WQ2-1	VA24B1351-007	2024-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2756277-7	2024-06-18	M														
WQ2-1	VA24B4257-007	2024-06-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2756678-7	2024-07-16	M														
WQ2-1	VA24B7237-007	2024-07-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2757095-7	2024-08-20	M														
WQ2-1	VA24C1101-007	2024-08-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	VA24C4483-007	2024-09-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	VA24C8360-007	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	VA24C9197-007	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	VA24D0009-007	2024-11-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2758095-4	2024-11-12	M														
WQ2-1	VA24D0632-004	2024-11-12	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	VA24D1720-007	2024-11-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2758465-7	2024-12-17	M														
WQ2-1	VA24D3769-007	2024-12-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2758719-7	2025-01-21	M														
WQ2-1	VA25A1408-007	2025-01-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	L2758994-7	2025-02-18	M														
WQ2-1	VA25A3430-007	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	VA25A6550-007	2025-03-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	VA25A8962-007	2025-04-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	VA25A9878-007	2025-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	VA25B0358-007	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	VA25B1026-007	2025-05-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-1	VA25B1711-007	2025-05-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	0051710-04	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	0062209-04	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	0071996-04	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	0082292-04	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	0093017-04	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	20J1961-04	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	20J2778-04	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	20K0360-04	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	20K1261-04	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	20K2100-04	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	20L1589-04	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21A2590-04	2021-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21B2778-04	2021-02-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21C3505-04	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21D2478-04	2021-04-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21E1990-04	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21E2917-04	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21F0167-04	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21F1056-04	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21F2014-04	2021-06-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21G2414-04	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21H3040-04	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21I3814-04	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21J3514-04	2021-10-26	M														
WQ2-2	21K3046-04	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	21L2125-04	2021-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22A2312-04	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22B2487-04	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22C3145-04	2022-03-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22D2212-11	2022-04-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22E2480-06	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22F3212-04	2022-06-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22G1763-04	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22H2453-04	2022-08-16	M				<0.000050	<0.000200	<0.000293	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22I1926-04	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22J1560-06	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22K1453-04	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	22L0774-04	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23A2847-04	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23C0060-04	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23C1797-04	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23D2945-04	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23E2392-04	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23F3614-04	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23G2415-04	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23H3309-06	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23I2271-06	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23J2236-06	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23K1909-04	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	23L1905-08	2023-12-14	M	<0.0010	<0.0010	<0.0010	0.000073	<0.000200	<0.000050	0.000017	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-2	L2754383-2	2024-01-25	M														
WQ2-2	VA24A1507-002	2024-01-25	M	<0.00050	<0.00050	<0.00040	0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2754594-8	2024-02-13	M														
WQ2-2	VA24A2858-008	2024-02-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2755033-8	2024-03-20	M														
WQ2-2	VA24A5955-008	2024-03-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2755461-8	2024-04-23	M														
WQ2-2	VA24A8736-008	2024-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2755553-8	2024-04-30	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	VA24A9418-008	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2755641-8	2024-05-07	M														
WQ2-2	VA24B0040-008	2024-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2755769-8	2024-05-14	M														
WQ2-2	VA24B0738-008	2024-05-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2755874-8	2024-05-21	M														
WQ2-2	VA24B1351-008	2024-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2756277-8	2024-06-18	M														
WQ2-2	VA24B4257-008	2024-06-18	M	<0.00050	<0.00050	<0.00040	0.000022	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2756678-8	2024-07-16	M														
WQ2-2	VA24B7237-008	2024-07-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2757095-8	2024-08-20	M														
WQ2-2	VA24C1101-008	2024-08-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	VA24C4483-008	2024-09-17	M	<0.00050	<0.00050	<0.00040	0.000088	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	VA24C8360-008	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	VA24C9197-008	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	VA24D0009-008	2024-11-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2758095-5	2024-11-12	M														
WQ2-2	VA24D0632-005	2024-11-12	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	VA24D1720-008	2024-11-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2758465-8	2024-12-17	M														
WQ2-2	VA24D3769-008	2024-12-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2758719-8	2025-01-21	M														
WQ2-2	VA25A1408-008	2025-01-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	L2758994-8	2025-02-18	M														
WQ2-2	VA25A3430-008	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	VA25A6550-008	2025-03-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	VA25A8962-008	2025-04-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	VA25A9878-008	2025-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	VA25B0358-008	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	VA25B1026-008	2025-05-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-2	VA25B1711-008	2025-05-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	23L1905-09	2023-12-14	M	<0.0010	<0.0010	<0.0010	0.000108	<0.000200	<0.000050	0.000028	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ2-3	L2754383-3	2024-01-25	M														
WQ2-3	VA24A1507-003	2024-01-25	M	<0.00050	<0.00050	<0.00040	0.000049	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2754594-9	2024-02-13	M														
WQ2-3	VA24A2858-009	2024-02-13	M	<0.00050	<0.00050	<0.00040	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2755033-9	2024-03-20	M														
WQ2-3	VA24A5955-009	2024-03-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2755461-9	2024-04-23	M														
WQ2-3	VA24A8736-009	2024-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2755553-9	2024-04-30	M														
WQ2-3	VA24A9418-009	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2755641-9	2024-05-07	M														
WQ2-3	VA24B0040-009	2024-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2755769-9	2024-05-14	M														
WQ2-3	VA24B0738-009	2024-05-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2755874-9	2024-05-21	M														
WQ2-3	VA24B1351-009	2024-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2756277-9	2024-06-18	M														
WQ2-3	VA24B4257-010	2024-06-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2756678-9	2024-07-16	M														
WQ2-3	VA24B7237-009	2024-07-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-3	L2757095-9	2024-08-20	M														
WQ2-3	VA24C1101-009	2024-08-20	M	<0.00050	<0.00050	<0.00040	0.000669	<0.000010	<0.000016	0.000084	0.000011	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000012
WQ2-3	VA24C4483-009	2024-09-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	VA24C8360-009	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	VA24C9197-009	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	VA24D0009-009	2024-11-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2758095-6	2024-11-12	M														
WQ2-3	VA24D0632-006	2024-11-12	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	VA24D1720-009	2024-11-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2758465-9	2024-12-17	M														
WQ2-3	VA24D3769-009	2024-12-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2758719-9	2025-01-21	M														
WQ2-3	VA25A1408-009	2025-01-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	L2758994-9	2025-02-18	M														
WQ2-3	VA25A3430-009	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	VA25A6550-009	2025-03-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	VA25A8962-009	2025-04-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	VA25A9878-009	2025-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	VA25B0358-009	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	VA25B1026-009	2025-05-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ2-3	VA25B1711-009	2025-05-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	0051710-05	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	0062209-05	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	0071996-05	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	0082292-05	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	0093017-05	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	20J1961-05	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	20J2778-05	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	0.000016	0.000065	0.000106	0.000113	0.000053	<0.000100	<0.000050
WQ3-1	20K0360-05	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	20K1261-05	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	20K2100-05	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	20L1589-05	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000018	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21A2590-05	2021-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21B2778-05	2021-02-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21C3505-05	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21D2478-05	2021-04-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21E1990-05	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21E2917-05	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21F0167-05	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21F1056-05	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21F2014-05	2021-06-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21G2414-05	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	0.000043	0.000073	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21H3040-05	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21I3814-05	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21J3514-05	2021-10-26	M														
WQ3-1	21K3046-05	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	21L2125-05	2021-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	22A2312-05	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	22B2487-05	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	22C3145-05	2022-03-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	22D2212-04	2022-04-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	22E2480-07	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	22F3212-05	2022-06-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	22G1763-05	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	22H2453-05	2022-08-16	M				<0.000050	<0.000200	<0.000244	<0.000010	<0.000010	<0.000020	<0.000050	<0.000050	0.000068	<0.000100	<0.000050
WQ3-1	22I1926-05	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	22J1560-07	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	22K1453-05	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	22L0774-05	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23A2847-05	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23C0060-05	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23C1797-05	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23D2945-05	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23E2392-05	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23F3614-05	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23G2415-05	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23H3309-07	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23I2271-07	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23J2236-07	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23K1909-05	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	23L2091-01	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-1	L2754366-1	2024-01-24	M														
WQ3-1	VA24A1422-001	2024-01-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2754604-1	2024-02-14	M														
WQ3-1	VA24A2995-001	2024-02-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2755043-1	2024-03-21	M														
WQ3-1	VA24A6026-001	2024-03-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2755490-1	2024-04-24	M														
WQ3-1	VA24A8916-001	2024-04-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2755567-1	2024-05-01	M														
WQ3-1	VA24A9566-001	2024-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2755666-1	2024-05-08	M														
WQ3-1	VA24B0201-001	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2755779-1	2024-05-15	M														
WQ3-1	VA24B0901-001	2024-05-15	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2755888-1	2024-05-22	M														
WQ3-1	VA24B1500-001	2024-05-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2756312-1	2024-06-19	M														
WQ3-1	VA24B4510-001	2024-06-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	VA24B7397-001	2024-07-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2756689-1	2024-07-17	M														
WQ3-1	L2757122-1	2024-08-21	M														
WQ3-1	VA24C1337-001	2024-08-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	VA24C4683-001	2024-09-18	M	<0.00050	<0.00050	<0.00040	0.000012	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	VA24C8569-001	2024-10-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2757977-1	2024-10-30	M														
WQ3-1	VA24C9414-001	2024-10-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	VA24D0180-001	2024-11-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	VA24D0813-001	2024-11-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2758221-1	2024-11-22	M														
WQ3-1	VA24D1791-001	2024-11-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2758486-1	2024-12-18	M														
WQ3-1	VA24D3937-001	2024-12-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2758770-1	2025-01-22	M														
WQ3-1	VA25A1525-001	2025-01-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	L2759008-1	2025-02-19	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	VA25A3570-001	2025-02-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	VA25A6679-001	2025-03-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	VA25A9109-001	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	VA25A9941-001	2025-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	VA25B0496-001	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	VA25B1530-001	2025-05-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-1	VA25B1841-001	2025-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	0051710-06	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	0062209-06	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	0.000023	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	0071996-06	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	0082292-06	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	0093017-06	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	20J1961-06	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	0.00002	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	20J2778-06	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	20K0360-06	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	20K1261-06	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	20K2100-06	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	20L1589-06	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21A2590-06	2021-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21B2778-06	2021-02-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21C3505-06	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21D2478-06	2021-04-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21E1990-06	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21E2917-06	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21F0167-06	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21F1056-06	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21F2014-06	2021-06-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21G2414-06	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000032	0.000059	0.000144	0.000095	0.000061	<0.000100	<0.000050
WQ3-2	21H3040-06	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21I3814-06	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21J3514-06	2021-10-26	M														
WQ3-2	21K3046-06	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	21L2125-06	2021-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22A2312-06	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22B2487-06	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22C3145-06	2022-03-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22D2212-05	2022-04-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22E2480-08	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22F3212-06	2022-06-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22G1763-06	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22H2453-06	2022-08-16	M				<0.000050	<0.000200	<0.000255	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22I1926-06	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22J1560-08	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22K1453-06	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	22L0774-06	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	23A2847-06	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	23C0060-06	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	23C1797-06	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	23D2945-06	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	23E2392-06	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	23F3614-06	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	23G2415-06	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	23H3309-08	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-2	23I2271-08	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	23J2236-08	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	23K1909-06	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	23L2091-02	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-2	L2754366-2	2024-01-24	M														
WQ3-2	VA24A1422-002	2024-01-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2754604-2	2024-02-14	M														
WQ3-2	VA24A2995-002	2024-02-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2755043-2	2024-03-21	M														
WQ3-2	VA24A6026-002	2024-03-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2755490-2	2024-04-24	M														
WQ3-2	VA24A8916-002	2024-04-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2755567-2	2024-05-01	M														
WQ3-2	VA24A9566-002	2024-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2755666-2	2024-05-08	M														
WQ3-2	VA24B0201-002	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2755779-2	2024-05-15	M														
WQ3-2	VA24B0901-002	2024-05-15	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2755888-2	2024-05-22	M														
WQ3-2	VA24B1500-002	2024-05-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2756312-2	2024-06-19	M														
WQ3-2	VA24B4510-002	2024-06-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	VA24B7397-002	2024-07-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2756689-2	2024-07-17	M														
WQ3-2	L2757122-2	2024-08-21	M														
WQ3-2	VA24C1337-002	2024-08-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	VA24C4683-002	2024-09-18	M	<0.00050	<0.00050	<0.00040	0.000045	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	VA24C8569-002	2024-10-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2757977-2	2024-10-30	M														
WQ3-2	VA24C9414-002	2024-10-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	VA24D0180-002	2024-11-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	VA24D0813-002	2024-11-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2758221-2	2024-11-22	M														
WQ3-2	VA24D1791-002	2024-11-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2758486-2	2024-12-18	M														
WQ3-2	VA24D3937-002	2024-12-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2758770-2	2025-01-22	M														
WQ3-2	VA25A1525-002	2025-01-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	L2759008-2	2025-02-19	M														
WQ3-2	VA25A3570-002	2025-02-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	VA25A6679-002	2025-03-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	VA25A9109-002	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	VA25A9941-002	2025-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	VA25B0496-002	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	VA25B1530-002	2025-05-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-2	VA25B1841-002	2025-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	23L2091-03	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ3-3	L2754366-3	2024-01-24	M														
WQ3-3	VA24A1422-003	2024-01-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2754604-3	2024-02-14	M														
WQ3-3	VA24A2995-003	2024-02-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2755043-3	2024-03-21	M														
WQ3-3	VA24A6026-003	2024-03-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-3	L2755490-3	2024-04-24	M														
WQ3-3	VA24A8916-003	2024-04-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2755567-3	2024-05-01	M														
WQ3-3	VA24A9566-003	2024-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2755666-3	2024-05-08	M														
WQ3-3	VA24B0201-003	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2755779-3	2024-05-15	M														
WQ3-3	VA24B0901-003	2024-05-15	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2755888-3	2024-05-22	M														
WQ3-3	VA24B1500-003	2024-05-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2756312-3	2024-06-19	M														
WQ3-3	VA24B4510-003	2024-06-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	VA24B7397-003	2024-07-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2756689-3	2024-07-17	M														
WQ3-3	L2757122-3	2024-08-21	M														
WQ3-3	VA24C1337-003	2024-08-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	VA24C4683-003	2024-09-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	VA24C8569-003	2024-10-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2757977-3	2024-10-30	M														
WQ3-3	VA24C9414-003	2024-10-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	VA24D0180-003	2024-11-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	VA24D0813-003	2024-11-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2758221-3	2024-11-22	M														
WQ3-3	VA24D1791-003	2024-11-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2758486-3	2024-12-18	M														
WQ3-3	VA24D3937-003	2024-12-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2758770-3	2025-01-22	M														
WQ3-3	VA25A1525-003	2025-01-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	L2759008-3	2025-02-19	M														
WQ3-3	VA25A3570-003	2025-02-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	VA25A6679-003	2025-03-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	VA25A9109-003	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	VA25A9941-003	2025-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	VA25B0496-003	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	VA25B1530-003	2025-05-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ3-3	VA25B1841-003	2025-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	0051710-07	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	0062209-07	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	0071996-07	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	0082292-07	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	0093017-07	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	20J1961-07	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	0.000017	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	20J2778-07	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	20K0360-07	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	20K1261-07	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	20K2100-07	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	20L1589-07	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21A2590-07	2021-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21B2778-07	2021-02-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21C3505-07	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	0.000016	0.000055	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21D2478-07	2021-04-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21E1990-07	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21E2917-07	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	21F0167-07	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21F1056-07	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21F2014-07	2021-06-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21G2414-07	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21H3040-07	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21I3814-07	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21J3514-07	2021-10-26	M														
WQ4-1	21K3046-07	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	21L2125-07	2021-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	22A2312-07	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	22B2487-07	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	22C3145-07	2022-03-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	22D2212-12	2022-04-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	22E2480-09	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	22F3212-07	2022-06-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	22G1763-07	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	22H2453-07	2022-08-16	M				<0.000050	<0.000200	<0.000289	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	0.000055	<0.000100	<0.000050
WQ4-1	22I1926-07	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	22J1560-09	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	22K1453-07	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	22L0774-07	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23A2847-07	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23C0060-07	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23C1797-07	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23D2945-07	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23E2392-07	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23F3614-07	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23G2415-07	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23H3309-09	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23I2271-09	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23J2236-09	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23K1909-07	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	23L2091-04	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-1	L2754383-4	2024-01-25	M														
WQ4-1	VA24A1507-004	2024-01-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2754604-4	2024-02-14	M														
WQ4-1	VA24A2995-004	2024-02-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2755043-4	2024-03-21	M														
WQ4-1	VA24A6026-004	2024-03-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2755490-4	2024-04-24	M														
WQ4-1	VA24A8916-004	2024-04-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2755567-4	2024-05-01	M														
WQ4-1	VA24A9566-004	2024-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2755666-4	2024-05-08	M														
WQ4-1	VA24B0201-004	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2755779-4	2024-05-15	M														
WQ4-1	VA24B0901-004	2024-05-15	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2755888-4	2024-05-22	M														
WQ4-1	VA24B1500-004	2024-05-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2756312-4	2024-06-19	M														
WQ4-1	VA24B4510-004	2024-06-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	VA24B7397-004	2024-07-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2756689-4	2024-07-17	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	L2757122-4	2024-08-21	M														
WQ4-1	VA24C1337-004	2024-08-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	VA24C4683-004	2024-09-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	VA24C8569-004	2024-10-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2757977-4	2024-10-30	M														
WQ4-1	VA24C9414-004	2024-10-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	VA24D0180-004	2024-11-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	VA24D0813-004	2024-11-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2758221-4	2024-11-22	M														
WQ4-1	VA24D1791-004	2024-11-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2758486-4	2024-12-18	M														
WQ4-1	VA24D3937-004	2024-12-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2758770-4	2025-01-22	M														
WQ4-1	VA25A1525-004	2025-01-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	L2759008-4	2025-02-19	M														
WQ4-1	VA25A3570-004	2025-02-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	VA25A6679-004	2025-03-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	VA25A9109-004	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	VA25A9941-004	2025-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	VA25B0496-004	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	VA25B1530-004	2025-05-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-1	VA25B1841-004	2025-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	0051710-08	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	0062209-08	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	0.000036	0.000032	0.000064	<0.000050	<0.000050	<0.000100	0.000066
WQ4-2	0071996-08	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	0082292-08	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	0093017-08	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	20J1961-08	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	20J2778-08	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	20K0360-08	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	20K1261-08	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	20K2100-08	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	0.000019	0.000016	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	20L1589-08	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21A2590-08	2021-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21B2778-08	2021-02-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21C3505-08	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21D2478-08	2021-04-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21E1990-08	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21E2917-08	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21F0167-08	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21F1056-08	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21F2014-08	2021-06-15	M				<0.000050	<0.000200	<0.000050	<0.000010	0.000015	0.000011	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21G2414-08	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21H3040-08	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21I3814-08	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21J3514-08	2021-10-26	M														
WQ4-2	21K3046-08	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	21L2125-08	2021-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	22A2312-08	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	22B2487-08	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	22C3145-08	2022-03-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	22D2212-13	2022-04-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	22E2480-10	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	22F3212-08	2022-06-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	22G1763-08	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	22H2453-08	2022-08-16	M				<0.000050	<0.000200	<0.000197	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	22I1926-08	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	22J1560-10	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	22K1453-08	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	22L0774-08	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23A2847-08	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23C0060-08	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23C1797-08	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23D2945-08	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23E2392-08	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23F3614-08	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23G2415-08	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23H3309-10	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23I2271-11	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23J2236-11	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23K1909-08	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	23L2091-05	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-2	L2754383-5	2024-01-25	M														
WQ4-2	VA24A1507-005	2024-01-25	M	<0.00050	<0.00050	<0.00040	0.000017	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2754604-5	2024-02-14	M														
WQ4-2	VA24A2995-005	2024-02-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2755043-5	2024-03-21	M														
WQ4-2	VA24A6026-005	2024-03-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2755490-5	2024-04-24	M														
WQ4-2	VA24A8916-005	2024-04-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2755567-5	2024-05-01	M														
WQ4-2	VA24A9566-005	2024-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2755666-5	2024-05-08	M														
WQ4-2	VA24B0201-005	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2755779-5	2024-05-15	M														
WQ4-2	VA24B0901-005	2024-05-15	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2755888-5	2024-05-22	M														
WQ4-2	VA24B1500-005	2024-05-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2756312-5	2024-06-19	M														
WQ4-2	VA24B4510-005	2024-06-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA24B7397-005	2024-07-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2756689-5	2024-07-17	M														
WQ4-2	L2757122-5	2024-08-21	M														
WQ4-2	VA24C1337-005	2024-08-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA24C4683-005	2024-09-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA24C8569-005	2024-10-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2757977-5	2024-10-30	M														
WQ4-2	VA24C9414-005	2024-10-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA24D0180-005	2024-11-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA24D0813-005	2024-11-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2758221-5	2024-11-22	M														
WQ4-2	VA24D1791-005	2024-11-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2758486-5	2024-12-18	M														
WQ4-2	VA24D3937-005	2024-12-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA25A1525-005	2025-01-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	L2758770-5	2025-01-22	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	L2759008-5	2025-02-19	M														
WQ4-2	VA25A3570-005	2025-02-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA25A6679-005	2025-03-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA25A9109-005	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA25A9941-005	2025-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA25B0496-005	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA25B1530-005	2025-05-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-2	VA25B1841-005	2025-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	23L2091-07	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQ4-3	L2754383-6	2024-01-25	M														
WQ4-3	VA24A1507-006	2024-01-25	M	<0.00050	<0.00050	<0.00040	0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2754604-6	2024-02-14	M														
WQ4-3	VA24A2995-006	2024-02-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2755043-6	2024-03-21	M														
WQ4-3	VA24A6026-006	2024-03-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2755490-6	2024-04-24	M														
WQ4-3	VA24A8916-006	2024-04-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2755567-6	2024-05-01	M														
WQ4-3	VA24A9566-006	2024-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2755666-6	2024-05-08	M														
WQ4-3	VA24B0201-006	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2755779-6	2024-05-15	M														
WQ4-3	VA24B0901-006	2024-05-15	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2755888-6	2024-05-22	M														
WQ4-3	VA24B1500-006	2024-05-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2756312-6	2024-06-19	M														
WQ4-3	VA24B4510-006	2024-06-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	VA24B7397-006	2024-07-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2756689-6	2024-07-17	M														
WQ4-3	L2757122-6	2024-08-21	M														
WQ4-3	VA24C1337-006	2024-08-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	VA24C4683-006	2024-09-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	VA24C8569-006	2024-10-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2757977-6	2024-10-30	M														
WQ4-3	VA24C9414-006	2024-10-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	VA24D0180-006	2024-11-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	VA24D0813-006	2024-11-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2758221-6	2024-11-22	M														
WQ4-3	VA24D1791-006	2024-11-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2758486-6	2024-12-18	M														
WQ4-3	VA24D3937-006	2024-12-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2758770-6	2025-01-22	M														
WQ4-3	VA25A1525-006	2025-01-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	L2759008-6	2025-02-19	M														
WQ4-3	VA25A3570-006	2025-02-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	VA25A6679-006	2025-03-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	VA25A9109-006	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	VA25A9941-006	2025-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	VA25B0496-006	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	VA25B1530-006	2025-05-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQ4-3	VA25B1841-006	2025-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2755545-7	2024-04-30	M														
WQR1-0.5	VA24A9402-007	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA24A9802-011	2024-05-05	M														
WQR1-0.5	L2755648-10	2024-05-08	M														
WQR1-0.5	VA24B0178-010	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2755934-1	2024-05-24	M														
WQR1-0.5	VA24B1783-001	2024-05-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2755981-1	2024-05-28	M														
WQR1-0.5	VA24B2063-001	2024-05-28	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA24B2561-005	2024-06-01	M														
WQR1-0.5	L2756068-1	2024-06-04	M														
WQR1-0.5	VA24B2772-001	2024-06-04	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA24B3452-007	2024-06-10	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	655-454600000-0	2024-06-17	M														
WQR1-0.5	VA24B5880-003	2024-07-02	M														
WQR1-0.5	VA24B5882-007	2024-07-03	M														
WQR1-0.5	VA24B6465-001	2024-07-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA24B7867-001	2024-07-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2757210-1	2024-08-26	M														
WQR1-0.5	VA24C2208-001	2024-08-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2757680-1	2024-10-06	M														
WQR1-0.5	VA24C6685-001	2024-10-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA24C7408-001	2024-10-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2757830-3	2024-10-19	M														
WQR1-0.5	VA24C8041-003	2024-10-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA24C8159-005	2024-10-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2757872-1	2024-10-22	M														
WQR1-0.5	VA24C8330-001	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2757933-5	2024-10-28	M														
WQR1-0.5	VA24C9041-005	2024-10-28	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2758002-1	2024-11-01	M														
WQR1-0.5	VA24C9683-001	2024-11-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2758142-5	2024-11-14	M														
WQR1-0.5	VA24D0945-005	2024-11-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA24D1069-005	2024-11-15	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2758203-5	2024-11-19	M														
WQR1-0.5	VA24D1567-005	2024-11-19	M	<0.00050	<0.00050	<0.00040	0.000023	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2758353-1	2024-12-05	M														
WQR1-0.5	VA24D2842-001	2024-12-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2758617-7	2025-01-08	M														
WQR1-0.5	VA25A0392-007	2025-01-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2759040-7	2025-02-20	M														
WQR1-0.5	VA25A3677-007	2025-02-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	L2759227-7	2025-03-13	M														
WQR1-0.5	VA25A5556-007	2025-03-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA25A6528-013	2025-03-25	M				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA25A8147-001	2025-04-11	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA25A8148-001	2025-04-11	M														
WQR1-0.5	VA25A8281-007	2025-04-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA25A8283-007	2025-04-14	M														
WQR1-0.5	VA25A9123-008	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA25A9125-008	2025-04-23	M														
WQR1-0.5	VA25B0359-009	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA25B0360-009	2025-05-06	M														
WQR1-0.5	VA25B0800-007	2025-05-09	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA25B0802-007	2025-05-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-0.5	VA25B2349-005	2025-05-27	M				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	0051710-09	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	0062209-10	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	0071996-09	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	0.000015	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	0082292-09	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	0093017-09	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	20J1961-09	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	20J2778-09	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	20K0360-09	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	20K1261-09	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	20K2100-09	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	20L1589-09	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21A2590-09	2021-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21B2778-09	2021-02-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21C3505-10	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21D2478-09	2021-04-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21E1990-09	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21E2917-09	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21F0167-09	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21F1056-09	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21F2014-09	2021-06-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21G2414-09	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21H3040-09	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21I3814-09	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21J3514-09	2021-10-26	M														
WQR1-1	21K3046-09	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	21L2125-09	2021-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	22A2312-09	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	22B2487-09	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	22C3145-09	2022-03-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	22D2212-06	2022-04-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	22E2480-01	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	22F3212-09	2022-06-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	22G1763-09	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	22H2453-09	2022-08-16	M				<0.000050	<0.000200	<0.000261	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	0.000057	<0.000100	<0.000050
WQR1-1	22I1926-09	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	22J1560-01	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	22K1453-09	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	22L0774-09	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23A2847-09	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23C0060-09	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23C1797-09	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23D2945-09	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23E2392-09	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23F3614-09	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23G2415-09	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23H3309-01	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23I2271-01	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23J2236-01	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23K1909-09	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	23L1905-01	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-1	L2754366-4	2024-01-24	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-1	VA24A1422-004	2024-01-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2754594-1	2024-02-13	M														
WQR1-1	VA24A2858-001	2024-02-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2755033-1	2024-03-20	M														
WQR1-1	VA24A5955-001	2024-03-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2755461-1	2024-04-23	M														
WQR1-1	VA24A8736-001	2024-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2755553-1	2024-04-30	M														
WQR1-1	VA24A9418-001	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2755641-1	2024-05-07	M														
WQR1-1	VA24B0040-001	2024-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2755769-1	2024-05-14	M														
WQR1-1	VA24B0738-001	2024-05-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2755874-1	2024-05-21	M														
WQR1-1	VA24B1351-001	2024-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2756277-1	2024-06-18	M														
WQR1-1	VA24B4257-001	2024-06-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2756678-1	2024-07-16	M														
WQR1-1	VA24B7237-001	2024-07-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2757095-1	2024-08-20	M														
WQR1-1	VA24C1101-001	2024-08-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	VA24C4483-001	2024-09-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	VA24C8360-001	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	VA24C9197-001	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	VA24D0009-001	2024-11-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2758095-1	2024-11-12	M														
WQR1-1	VA24D0632-001	2024-11-12	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	VA24D1720-001	2024-11-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2758465-1	2024-12-17	M														
WQR1-1	VA24D3769-001	2024-12-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2758719-1	2025-01-21	M														
WQR1-1	VA25A1408-001	2025-01-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	L2758994-1	2025-02-18	M														
WQR1-1	VA25A3430-001	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	VA25A6550-001	2025-03-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	VA25A8962-001	2025-04-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	VA25A9878-001	2025-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	VA25B0358-001	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	VA25B1026-001	2025-05-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-1	VA25B1711-001	2025-05-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	0051710-10	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	0062209-09	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	0071996-10	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	0082292-10	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	0093017-10	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	20J1961-10	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	20J2778-10	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	20K0360-10	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	20K1261-10	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	20K2100-10	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	20L1589-10	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21A2590-10	2021-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21B2778-10	2021-02-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	21C3505-11	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21D2478-10	2021-04-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21E1990-10	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21E2917-10	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21F0167-10	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21F1056-10	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21F2014-10	2021-06-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21G2414-10	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21H3040-10	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21I3814-10	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21J3514-10	2021-10-26	M														
WQR1-2	21K3046-10	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	21L2125-10	2021-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22A2312-10	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22B2487-10	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22C3145-10	2022-03-22	M				<0.000050	<0.000200	0.000051	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22D2212-07	2022-04-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22E2480-02	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22F3212-10	2022-06-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22G1763-10	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22H2453-10	2022-08-16	M				<0.000050	<0.000200	<0.000193	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22I1926-10	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22J1560-02	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22K1453-10	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	22L0774-10	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23A2847-10	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23C0060-10	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23C1797-10	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23D2945-10	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23E2392-10	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23F3614-10	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23G2415-10	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23H3309-02	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23I2271-02	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23J2236-02	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23K1909-10	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	23L1905-02	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-2	L2754366-5	2024-01-24	M														
WQR1-2	VA24A1422-005	2024-01-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2754594-2	2024-02-13	M														
WQR1-2	VA24A2858-002	2024-02-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2755033-2	2024-03-20	M														
WQR1-2	VA24A5955-002	2024-03-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2755461-2	2024-04-23	M														
WQR1-2	VA24A8736-002	2024-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2755553-2	2024-04-30	M														
WQR1-2	VA24A9418-002	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2755641-2	2024-05-07	M														
WQR1-2	VA24B0040-002	2024-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2755769-2	2024-05-14	M														
WQR1-2	VA24B0738-002	2024-05-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2755874-2	2024-05-21	M														
WQR1-2	VA24B1351-002	2024-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	L2756277-2	2024-06-18	M														
WQR1-2	VA24B4257-002	2024-06-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2756678-2	2024-07-16	M														
WQR1-2	VA24B7237-002	2024-07-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2757095-2	2024-08-20	M														
WQR1-2	VA24C1101-002	2024-08-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	VA24C4483-002	2024-09-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	VA24C8360-002	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	VA24C9197-002	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	VA24D0009-002	2024-11-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2758095-2	2024-11-12	M														
WQR1-2	VA24D0632-002	2024-11-12	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	VA24D1720-002	2024-11-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2758465-2	2024-12-17	M														
WQR1-2	VA24D3769-002	2024-12-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2758719-2	2025-01-21	M														
WQR1-2	VA25A1408-002	2025-01-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	L2758994-2	2025-02-18	M														
WQR1-2	VA25A3430-002	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	VA25A6550-002	2025-03-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	VA25A8962-002	2025-04-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	VA25A9878-002	2025-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	VA25B0358-002	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	VA25B1026-002	2025-05-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2	VA25B1711-002	2025-05-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2755545-8	2024-04-30	M														
WQR1-2m	VA24A9402-008	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	VA24A9802-012	2024-05-05	M														
WQR1-2m	L2755648-11	2024-05-08	M														
WQR1-2m	VA24B0178-011	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2755934-2	2024-05-24	M														
WQR1-2m	VA24B1783-002	2024-05-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2755981-2	2024-05-28	M														
WQR1-2m	VA24B2063-002	2024-05-28	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	VA24B2561-006	2024-06-01	M														
WQR1-2m	L2756068-2	2024-06-04	M														
WQR1-2m	VA24B2772-002	2024-06-04	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	VA24B3452-008	2024-06-10	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	656-454600000-0	2024-06-17	M														
WQR1-2m	VA24B5882-008	2024-07-03	M														
WQR1-2m	VA24B6465-002	2024-07-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	VA24B7867-002	2024-07-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2757210-2	2024-08-26	M														
WQR1-2m	VA24C2208-002	2024-08-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2757680-2	2024-10-06	M														
WQR1-2m	VA24C6685-002	2024-10-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	VA24C7408-002	2024-10-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2757830-6	2024-10-20	M														
WQR1-2m	VA24C8041-006	2024-10-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2757872-2	2024-10-22	M														
WQR1-2m	VA24C8330-002	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2757933-6	2024-10-28	M														
WQR1-2m	VA24C9041-006	2024-10-28	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2m	L2758002-3	2024-11-01	M														
WQR1-2m	VA24C9683-003	2024-11-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2758353-2	2024-12-05	M														
WQR1-2m	VA24D2842-002	2024-12-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2758617-8	2025-01-08	M														
WQR1-2m	VA25A0392-008	2025-01-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2759040-8	2025-02-20	M														
WQR1-2m	VA25A3677-008	2025-02-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	L2759227-8	2025-03-13	M														
WQR1-2m	VA25A5556-008	2025-03-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	VA25A6528-014	2025-03-25	M														
WQR1-2m	VA25A8147-002	2025-04-11	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	VA25A8148-002	2025-04-11	M														
WQR1-2m	VA25A8281-008	2025-04-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	VA25A8283-008	2025-04-14	M														
WQR1-2m	VA25A9123-009	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	VA25A9125-009	2025-04-23	M														
WQR1-2m	VA25B0359-008	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-2m	VA25B0360-008	2025-05-06	M														
WQR1-2m	VA25B0800-008	2025-05-09	M														
WQR1-2m	VA25B0802-008	2025-05-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	23L1905-03	2023-12-14	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR1-3	L2754366-6	2024-01-24	M														
WQR1-3	VA24A1422-006	2024-01-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2754594-3	2024-02-13	M														
WQR1-3	VA24A2858-003	2024-02-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2755033-3	2024-03-20	M														
WQR1-3	VA24A5955-003	2024-03-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2755461-3	2024-04-23	M														
WQR1-3	VA24A8736-003	2024-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2755553-3	2024-04-30	M														
WQR1-3	VA24A9418-003	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2755641-3	2024-05-07	M														
WQR1-3	VA24B0040-003	2024-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2755769-3	2024-05-14	M														
WQR1-3	VA24B0738-003	2024-05-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2755874-3	2024-05-21	M														
WQR1-3	VA24B1351-003	2024-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2756277-3	2024-06-18	M														
WQR1-3	VA24B4257-003	2024-06-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2756678-3	2024-07-16	M														
WQR1-3	VA24B7237-003	2024-07-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2757095-3	2024-08-20	M														
WQR1-3	VA24C1101-003	2024-08-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	VA24C4483-003	2024-09-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	VA24C8360-003	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	VA24C9197-003	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	VA24D0009-003	2024-11-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2758095-3	2024-11-12	M														
WQR1-3	VA24D0632-003	2024-11-12	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	VA24D1720-003	2024-11-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2758465-3	2024-12-17	M														
WQR1-3	VA24D3769-003	2024-12-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-3	L2758719-3	2025-01-21	M														
WQR1-3	VA25A1408-003	2025-01-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	L2758994-3	2025-02-18	M														
WQR1-3	VA25A3430-003	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	VA25A6550-003	2025-03-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	VA25A8962-003	2025-04-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	VA25A9878-003	2025-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	VA25B0358-003	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	VA25B1026-003	2025-05-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-3	VA25B1711-003	2025-05-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2755545-9	2024-04-30	M														
WQR1-SF	VA24A9402-009	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	VA24A9802-013	2024-05-05	M														
WQR1-SF	L2755648-12	2024-05-08	M														
WQR1-SF	VA24B0178-012	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2755934-3	2024-05-24	M														
WQR1-SF	VA24B1783-003	2024-05-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2755981-3	2024-05-28	M														
WQR1-SF	VA24B2063-003	2024-05-28	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2756068-3	2024-06-04	M														
WQR1-SF	VA24B2772-003	2024-06-04	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	VA24B3452-009	2024-06-10	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	657-454600000-0	2024-06-17	M														
WQR1-SF	VA24B5882-009	2024-07-03	M														
WQR1-SF	VA24B6465-003	2024-07-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	VA24B7867-003	2024-07-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2757210-3	2024-08-26	M														
WQR1-SF	VA24C2208-003	2024-08-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2757680-3	2024-10-06	M														
WQR1-SF	VA24C6685-003	2024-10-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	VA24C7408-003	2024-10-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2757872-3	2024-10-22	M														
WQR1-SF	VA24C8330-003	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2757933-7	2024-10-28	M														
WQR1-SF	VA24C9041-007	2024-10-28	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2758002-4	2024-11-01	M														
WQR1-SF	VA24C9683-004	2024-11-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	VA24D2498-001	2024-11-30	M														
WQR1-SF	L2758353-3	2024-12-05	M														
WQR1-SF	VA24D2842-003	2024-12-05	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2758617-9	2025-01-08	M														
WQR1-SF	VA25A0392-009	2025-01-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2759040-9	2025-02-20	M														
WQR1-SF	VA25A3677-009	2025-02-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	L2759227-9	2025-03-13	M														
WQR1-SF	VA25A5556-009	2025-03-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	VA25A6528-015	2025-03-25	M														
WQR1-SF	VA25A8147-003	2025-04-11	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	VA25A8148-003	2025-04-11	M														
WQR1-SF	VA25A8281-009	2025-04-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	VA25A8283-009	2025-04-14	M														
WQR1-SF	VA25A9123-010	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	VA25A9125-010	2025-04-23	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-SF	VA25B0359-007	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR1-SF	VA25B0360-007	2025-05-06	M														
WQR1-SF	VA25B0800-009	2025-05-09	M														
WQR1-SF	VA25B0802-009	2025-05-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2755545-10	2024-04-30	M														
WQR2-0.5	VA24A9402-010	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2755648-1	2024-05-08	M														
WQR2-0.5	VA24B0178-001	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2755934-10	2024-05-24	M														
WQR2-0.5	VA24B1783-010	2024-05-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA24B3452-010	2024-06-10	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	658-454600000-0	2024-06-17	M														
WQR2-0.5	VA24B5882-010	2024-07-03	M														
WQR2-0.5	VA24B6465-004	2024-07-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA24B7867-004	2024-07-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2757210-4	2024-08-26	M														
WQR2-0.5	VA24C2208-004	2024-08-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA24C5557-001	2024-09-25	M				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2757680-4	2024-10-06	M														
WQR2-0.5	VA24C6685-004	2024-10-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA24C7408-004	2024-10-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2757830-2	2024-10-19	M														
WQR2-0.5	VA24C8041-002	2024-10-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA24C8159-004	2024-10-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2757872-4	2024-10-22	M														
WQR2-0.5	VA24C8330-004	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2757962-5	2024-10-29	M														
WQR2-0.5	VA24C9185-005	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2758003-1	2024-11-02	M														
WQR2-0.5	VA24C9732-001	2024-11-02	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2758142-6	2024-11-14	M														
WQR2-0.5	VA24D0945-006	2024-11-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA24D1069-006	2024-11-15	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2758203-6	2024-11-19	M														
WQR2-0.5	VA24D1567-006	2024-11-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2758354-1	2024-12-06	M														
WQR2-0.5	VA24D3008-001	2024-12-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2758634-7	2025-01-09	M														
WQR2-0.5	VA25A0510-007	2025-01-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2759010-7	2025-02-18	M														
WQR2-0.5	VA25A3415-007	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	L2759209-7	2025-03-12	M														
WQR2-0.5	VA25A5429-007	2025-03-12	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA25A6528-016	2025-03-25	M				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA25A8147-004	2025-04-11	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA25A8148-004	2025-04-11	M														
WQR2-0.5	VA25A8280-007	2025-04-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA25A8282-007	2025-04-13	M														
WQR2-0.5	VA25A8854-007	2025-04-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA25A8855-007	2025-04-21	M														
WQR2-0.5	VA25B0359-012	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA25B0360-012	2025-05-06	M														
WQR2-0.5	VA25B0499-007	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-0.5	VA25B0502-007	2025-05-07	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-0.5	VA25B2349-006	2025-05-27	M				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	0051710-11	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	0062209-12	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	0071996-11	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	0082292-11	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	0093017-11	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	20J1961-11	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	20J2778-11	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	20K0360-11	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	20K1261-11	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	20K2100-11	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	20L1589-11	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21A2590-11	2021-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21B2778-11	2021-02-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21C3505-12	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21D2478-11	2021-04-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21E1990-11	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21E2917-11	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21F0167-11	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21F1056-11	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21F2014-11	2021-06-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21G2414-11	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21H3040-11	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21I3814-11	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21J3514-11	2021-10-26	M														
WQR2-1	21K3046-11	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	21L2125-11	2021-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22A2312-11	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22B2487-11	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22C3145-11	2022-03-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22D2212-14	2022-04-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22E2480-11	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22F3212-11	2022-06-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22G1763-11	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22H2453-11	2022-08-16	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22I1926-11	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22J1560-11	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22K1453-11	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22K2628-03	2022-11-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22K2988-03	2022-11-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22K3123-03	2022-11-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22L0036-03	2022-11-30	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22L0263-03	2022-12-02	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22L0499-03	2022-12-05	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22L0633-03	2022-12-06	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22L0774-11	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	22L1436-03	2022-12-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	23A2847-11	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	23C0060-11	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	23C1797-11	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	23D2945-11	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	23E2392-11	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	23F3614-11	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	23G2415-11	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	23H3309-11	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-1	23I2271-13	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	23J2236-13	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	23K1909-11	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	23L2091-09	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-1	L2754383-7	2024-01-25	M														
WQR2-1	VA24A1507-009	2024-01-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2754604-7	2024-02-14	M														
WQR2-1	VA24A2995-009	2024-02-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2755043-9	2024-03-21	M														
WQR2-1	VA24A6026-009	2024-03-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2755490-7	2024-04-24	M														
WQR2-1	VA24A8916-009	2024-04-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2755567-7	2024-05-01	M														
WQR2-1	VA24A9566-009	2024-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2755666-7	2024-05-08	M														
WQR2-1	VA24B0201-009	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2755779-7	2024-05-15	M														
WQR2-1	VA24B0901-009	2024-05-15	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2755888-7	2024-05-22	M														
WQR2-1	VA24B1500-009	2024-05-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2756312-7	2024-06-19	M														
WQR2-1	VA24B4510-009	2024-06-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	VA24B7397-009	2024-07-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2756689-7	2024-07-17	M														
WQR2-1	L2757122-7	2024-08-21	M														
WQR2-1	VA24C1337-009	2024-08-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	VA24C4683-009	2024-09-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	VA24C8569-009	2024-10-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2757977-9	2024-10-30	M														
WQR2-1	VA24C9414-009	2024-10-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	VA24D0180-009	2024-11-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	VA24D0813-009	2024-11-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2758221-7	2024-11-22	M														
WQR2-1	VA24D1791-009	2024-11-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2758486-7	2024-12-18	M														
WQR2-1	VA24D3937-009	2024-12-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2758770-7	2025-01-22	M														
WQR2-1	VA25A1525-009	2025-01-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	L2759008-7	2025-02-19	M														
WQR2-1	VA25A3570-009	2025-02-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	VA25A6679-009	2025-03-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	VA25A9109-009	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	VA25A9941-009	2025-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	VA25B0496-009	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	VA25B1530-009	2025-05-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-1	VA25B1841-009	2025-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	0051710-12	2020-05-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	0062209-11	2020-06-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	0071996-12	2020-07-21	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	0082292-12	2020-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	0093017-12	2020-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	0.000014	0.00005	0.000157	0.000123	0.00009	<0.000100	<0.000050
WQR2-2	20J1961-12	2020-10-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	20J2778-12	2020-10-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	20K0360-12	2020-11-03	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	20K1261-12	2020-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	20K2100-12	2020-11-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	20L1589-12	2020-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21A2590-12	2021-01-27	M				<0.000050	<0.000200	0.000069	<0.000010	<0.000010	0.000013	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21B2778-12	2021-02-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21C3505-13	2021-03-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21D2478-12	2021-04-22	M				<0.000050	<0.000200	<0.000050	0.000038	0.00004	0.00002	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21E1990-12	2021-05-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21E2917-12	2021-05-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21F0167-12	2021-06-01	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21F1056-12	2021-06-08	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21F2014-12	2021-06-15	M				<0.000050	<0.000200	0.00005	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21G2414-12	2021-07-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21H3040-12	2021-08-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21I3814-12	2021-09-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21J3514-12	2021-10-26	M														
WQR2-2	21K3046-12	2021-11-23	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	21L2125-12	2021-12-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22A2312-12	2022-01-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22B2487-12	2022-02-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22C3145-12	2022-03-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22D2212-15	2022-04-20	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22E2480-12	2022-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22F3212-12	2022-06-21	M				<0.000450	<0.00180	<0.000450	<0.000090	<0.000090	<0.000090	<0.000450	<0.000450	<0.000450	<0.000900	<0.000450
WQR2-2	22G1763-12	2022-07-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22H2453-12	2022-08-16	M				<0.000050	<0.000200	<0.000557	<0.000074	0.000038	<0.000010	0.000200	<0.000050	0.000073	<0.000100	0.000076
WQR2-2	22I1926-12	2022-09-14	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22J1560-12	2022-10-12	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22K1453-12	2022-11-10	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22K2628-04	2022-11-22	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22K2988-04	2022-11-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22K3123-04	2022-11-25	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22L0036-04	2022-11-30	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22L0263-04	2022-12-02	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22L0499-04	2022-12-05	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22L0633-04	2022-12-06	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22L0774-12	2022-12-07	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	22L1436-04	2022-12-13	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23A2847-12	2023-01-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23C0060-12	2023-02-28	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23C1797-12	2023-03-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23D2945-12	2023-04-26	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23E2392-12	2023-05-17	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23F3614-12	2023-06-27	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23G2415-12	2023-07-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23H3309-12	2023-08-24	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23I2271-14	2023-09-19	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23J2236-14	2023-10-18	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23K1909-12	2023-11-15	M				<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	23L2091-10	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-2	L2754383-8	2024-01-25	M														
WQR2-2	VA24A1507-010	2024-01-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2754604-8	2024-02-14	M														
WQR2-2	VA24A2995-010	2024-02-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2755043-10	2024-03-21	M														
WQR2-2	VA24A6026-010	2024-03-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	L2755490-8	2024-04-24	M														
WQR2-2	VA24A8916-010	2024-04-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2755567-8	2024-05-01	M														
WQR2-2	VA24A9566-010	2024-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2755666-8	2024-05-08	M														
WQR2-2	VA24B0201-010	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2755779-8	2024-05-15	M														
WQR2-2	VA24B0901-010	2024-05-15	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2755888-8	2024-05-22	M														
WQR2-2	VA24B1500-010	2024-05-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2756312-8	2024-06-19	M														
WQR2-2	VA24B4510-010	2024-06-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	VA24B7397-010	2024-07-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2756689-8	2024-07-17	M														
WQR2-2	L2757122-8	2024-08-21	M														
WQR2-2	VA24C1337-010	2024-08-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	VA24C4683-010	2024-09-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	VA24C8569-010	2024-10-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2757977-10	2024-10-30	M														
WQR2-2	VA24C9414-010	2024-10-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	VA24D0180-010	2024-11-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	VA24D0813-010	2024-11-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2758221-8	2024-11-22	M														
WQR2-2	VA24D1791-010	2024-11-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2758486-8	2024-12-18	M														
WQR2-2	VA24D3937-010	2024-12-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2758770-8	2025-01-22	M														
WQR2-2	VA25A1525-010	2025-01-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	L2759008-8	2025-02-19	M														
WQR2-2	VA25A3570-010	2025-02-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	VA25A6679-010	2025-03-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	VA25A9109-010	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	VA25A9941-010	2025-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	VA25B0496-010	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	VA25B1530-010	2025-05-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2	VA25B1841-010	2025-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	L2755545-11	2024-04-30	M														
WQR2-2m	VA24A9402-011	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	L2755648-2	2024-05-08	M														
WQR2-2m	VA24B0178-002	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	L2755934-11	2024-05-24	M														
WQR2-2m	VA24B1783-011	2024-05-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	VA24B3452-011	2024-06-10	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	659-454600000-0	2024-06-17	M														
WQR2-2m	VA24B5882-011	2024-07-03	M														
WQR2-2m	VA24B6465-005	2024-07-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	VA24B7867-005	2024-07-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	L2757210-5	2024-08-26	M														
WQR2-2m	VA24C2208-005	2024-08-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	VA24C5557-002	2024-09-25	M				0.000018	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	L2757680-5	2024-10-06	M														
WQR2-2m	VA24C6685-005	2024-10-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	VA24C7408-005	2024-10-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	L2757872-5	2024-10-22	M														
WQR2-2m	VA24C8330-005	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	VA24C9185-006	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2m	L2757962-6	2024-10-29	M														
WQR2-2m	L2758003-2	2024-11-02	M														
WQR2-2m	VA24C9732-002	2024-11-02	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	L2758354-2	2024-12-06	M														
WQR2-2m	VA24D3008-002	2024-12-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	L2758634-8	2025-01-09	M														
WQR2-2m	VA25A0510-008	2025-01-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	L2759010-8	2025-02-18	M														
WQR2-2m	VA25A3415-008	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	L2759209-8	2025-03-12	M														
WQR2-2m	VA25A5429-008	2025-03-12	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	VA25A6528-017	2025-03-25	M														
WQR2-2m	VA25A8147-005	2025-04-11	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	VA25A8148-005	2025-04-11	M														
WQR2-2m	VA25A8280-008	2025-04-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	VA25A8282-008	2025-04-13	M														
WQR2-2m	VA25A8854-008	2025-04-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	VA25A8855-008	2025-04-21	M														
WQR2-2m	VA25B0359-011	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	VA25B0360-011	2025-05-06	M														
WQR2-2m	VA25B0499-008	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-2m	VA25B0502-008	2025-05-07	M														
WQR2-3	23L2091-11	2023-12-15	M	<0.0010	<0.0010	<0.0010	<0.000050	<0.000200	<0.000050	<0.000010	<0.000010	<0.000010	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
WQR2-3	L2754383-9	2024-01-25	M														
WQR2-3	VA24A1507-011	2024-01-25	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	0.000011	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2754604-9	2024-02-14	M														
WQR2-3	VA24A2995-011	2024-02-14	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2755043-11	2024-03-21	M														
WQR2-3	VA24A6026-011	2024-03-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2755490-9	2024-04-24	M														
WQR2-3	VA24A8916-011	2024-04-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2755567-9	2024-05-01	M														
WQR2-3	VA24A9566-011	2024-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2755666-9	2024-05-08	M														
WQR2-3	VA24B0201-011	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2755779-9	2024-05-15	M														
WQR2-3	VA24B0901-011	2024-05-15	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2755888-9	2024-05-22	M														
WQR2-3	VA24B1500-011	2024-05-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2756312-9	2024-06-19	M														
WQR2-3	VA24B4510-011	2024-06-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	VA24B7397-011	2024-07-17	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2756689-9	2024-07-17	M														
WQR2-3	L2757122-9	2024-08-21	M														
WQR2-3	VA24C1337-011	2024-08-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	VA24C4683-011	2024-09-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	VA24C8569-011	2024-10-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	VA24C9414-011	2024-10-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2757977-11	2024-10-30	M														
WQR2-3	VA24D0180-011	2024-11-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2758221-9	2024-11-22	M														
WQR2-3	VA24D1791-011	2024-11-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2758486-9	2024-12-18	M														
WQR2-3	VA24D3937-011	2024-12-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2758770-9	2025-01-22	M														
WQR2-3	VA25A1525-011	2025-01-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	L2759008-9	2025-02-19	M														

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Trichloroethylene	Trichlorofluoromethane	Vinyl Chloride	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	2-Chloronaphthalene	Chrysene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-3	VA25A3570-011	2025-02-19	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	VA25A6679-011	2025-03-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	VA25A9109-011	2025-04-23	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	VA25A9941-011	2025-05-01	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	VA25B0496-011	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	VA25B1530-011	2025-05-16	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-3	VA25B1841-011	2025-05-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	L2755545-12	2024-04-30	M														
WQR2-SF	VA24A9402-012	2024-04-30	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	L2755648-3	2024-05-08	M														
WQR2-SF	VA24B0178-003	2024-05-08	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	L2755934-12	2024-05-24	M														
WQR2-SF	VA24B1783-012	2024-05-24	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	VA24B3452-012	2024-06-10	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	660-454600000-0	2024-06-17	M														
WQR2-SF	VA24B5882-012	2024-07-03	M														
WQR2-SF	VA24B6465-006	2024-07-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	VA24B7867-006	2024-07-20	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	L2757210-6	2024-08-26	M														
WQR2-SF	VA24C2208-006	2024-08-26	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	VA24C5557-003	2024-09-25	M				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	L2757680-6	2024-10-06	M														
WQR2-SF	VA24C6685-006	2024-10-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	VA24C7408-006	2024-10-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	L2757872-6	2024-10-22	M														
WQR2-SF	VA24C8330-006	2024-10-22	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	VA24C9185-007	2024-10-29	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	L2757962-7	2024-10-29	M														
WQR2-SF	L2758003-3	2024-11-02	M														
WQR2-SF	VA24C9732-003	2024-11-02	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	L2758354-3	2024-12-06	M														
WQR2-SF	VA24D3008-003	2024-12-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	L2758634-9	2025-01-09	M														
WQR2-SF	VA25A0510-009	2025-01-09	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	L2759010-9	2025-02-18	M														
WQR2-SF	VA25A3415-009	2025-02-18	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	L2759209-9	2025-03-12	M														
WQR2-SF	VA25A5429-009	2025-03-12	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	VA25A6528-018	2025-03-25	M														
WQR2-SF	VA25A8147-006	2025-04-11	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	VA25A8148-006	2025-04-11	M														
WQR2-SF	VA25A8280-009	2025-04-13	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	VA25A8282-009	2025-04-13	M														
WQR2-SF	VA25A8854-009	2025-04-21	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	VA25A8855-009	2025-04-21	M														
WQR2-SF	VA25B0359-010	2025-05-06	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	VA25B0360-010	2025-05-06	M														
WQR2-SF	VA25B0499-009	2025-05-07	M	<0.00050	<0.00050	<0.00040	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010		<0.000010
WQR2-SF	VA25B0502-009	2025-05-07	M														

Notes:
Sample Class 'M' = monitoring sample.
'<' = result is below the indicated detection limit.

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ1-1	0051710-01	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	0062209-01	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	0071996-01	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	0082292-01	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	0093017-01	2020-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	20J1961-01	2020-10-20	M	0.000037	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	20J2778-01	2020-10-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	20K0360-01	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	20K1261-01	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	20K2100-01	2020-11-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	20L1589-01	2020-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21A2590-01	2021-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21B2778-01	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21C3505-01	2021-03-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21D2478-01	2021-04-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21E1990-01	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21E2917-01	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21F0167-01	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21F1056-01	2021-06-08	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21F2014-01	2021-06-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21G2414-01	2021-07-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21H3040-01	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21I3814-01	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21J3514-01	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21K3046-01	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	21L2125-01	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	22A2312-01	2022-01-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	22B2487-01	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	22C3145-01	2022-03-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	22D2212-01	2022-04-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	22E2480-03	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	22F3212-01	2022-06-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	22G1763-01	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	22H2453-01	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000742	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	22I1926-01	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	22J1560-03	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	22K1453-01	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	22L0774-01	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	23A2847-01	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	23C0060-01	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	23C1797-01	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	23D2945-01	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	23E2392-01	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	23F3614-01	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	23G2415-01	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	23H3309-03	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	23I2271-03	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	23J2236-03	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	23K1909-01	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-1	23L1905-04	2023-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-1	L2754366-7	2024-01-24	M											<0.49	<0.65	<0.44	<0.44	<0.41	<0.55	1.6	<0.38	<0.28	<0.27
WQ1-1	VA24A1422-007	2024-01-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-1	L2754594-4	2024-02-13	M											<0.30	<0.45	<0.27	<0.27	<0.26	0.94	2.3	<0.54	<0.45	<0.50

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ1-1	VA24A2858-004	2024-02-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-1	L2755033-4	2024-03-20	M											<0.35	<0.47	<0.35	<0.34	<0.32	0.88	1.7	<0.40	0.34	<0.30
WQ1-1	VA24A5955-004	2024-03-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-1	L2755461-4	2024-04-23	M											<0.19	<0.38	<0.38	<0.36	<0.37	0.77	2.00	<0.20	0.42	0.25
WQ1-1	VA24A8736-004	2024-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-1	L2755553-4	2024-04-30	M											<0.84	<0.98	<0.71	<0.67	<0.68	<1.2	6.0	<0.74	<0.52	<0.50
WQ1-1	VA24A9418-004	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-1	L2755641-4	2024-05-07	M											<0.35	<0.34	<0.30	<0.30	<0.29	0.56	3.00	<0.36	<0.19	<0.20
WQ1-1	VA24B0040-004	2024-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-1	L2755769-4	2024-05-14	M											<0.34	<0.42	<0.39	<0.37	<0.36	<0.64	1.06	<0.45	<0.32	<0.29
WQ1-1	VA24B0738-004	2024-05-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-1	L2755874-4	2024-05-21	M											<0.46	1.10	1.50	1.30	1.50	3.00	10.2	<0.55	1.10	0.80
WQ1-1	VA24B1351-004	2024-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-1	L2756277-4	2024-06-18	M											<0.21	<0.24	<0.15	0.21	0.18	4.02	33.1	<0.20	0.80	0.13
WQ1-1	VA24B4257-004	2024-06-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-1	L2756678-4	2024-07-16	M											<0.25	<0.22	<0.23	<0.22	<0.22	0.43	1.01	<0.28	0.31	<0.18
WQ1-1	VA24B7237-004	2024-07-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-1	L2757095-4	2024-08-20	M											<0.36	<0.32	<0.40	<0.37	<0.37	0.90	8.4	<0.31	<0.43	<0.33
WQ1-1	VA24C1101-004	2024-08-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-1	VA24C4483-004	2024-09-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.75	<0.91	<0.86	<0.76	<0.79	2.06	23.6	<0.49	<0.62	<0.50
WQ1-1	VA24C8360-004	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.68	<0.65	<0.64	<0.60	<0.59	<1.3	9.3	<0.50	<0.30	<0.29
WQ1-1	VA24C9197-004	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.38	<0.36	<0.46	<0.42	<0.42	<0.69	5.2	<0.31	0.42	<0.32
WQ1-1	VA24D0009-004	2024-11-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.35	<0.48	<0.30	<0.29	<0.28	0.37	2.7	<0.33	<0.28	<0.24
WQ1-1	VA24D0813-011	2024-11-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.47	<0.46	<0.39	<0.39	<0.37	<0.74	<2.6	<0.42	<0.30	<0.25
WQ1-1	VA24D1720-004	2024-11-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0.34	<0.32	<0.26	<0.26	<0.26	<0.38	1.93	<0.24	0.43	0.20
WQ1-1	L2758465-4	2024-12-17	M											<0.54	<0.50	<0.54	<0.52	<0.52	1.7	13.0	<0.45	<0.36	<0.33
WQ1-1	VA24D3769-004	2024-12-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-1	L2758719-4	2025-01-21	M											<0.73	<0.65	<0.74	<0.69	<0.70	1.40	56.5	<0.57	<0.49	<0.43
WQ1-1	VA25A1408-004	2025-01-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-1	L2758994-4	2025-02-18	M											<0.15	<0.22	<0.13	<0.13	<0.13	0.45	6.36	<0.13	0.45	0.22
WQ1-1	VA25A3430-004	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-1	VA25A6550-004	2025-03-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	3.06	0	0.349	0
WQ1-1	VA25A8962-004	2025-04-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-1	VA25A9878-004	2025-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.33	<0.19	<0.29	<0.29	<0.28	<0.55	<2.4	<0.25	0.415	<0.19
WQ1-1	VA25B0358-004	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.27	<0.32	<0.25	<0.24	<0.24	<0.33	<2.0	<0.34	<0.22	<0.19
WQ1-1	VA25B1026-004	2025-05-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.19	<0.14	<0.22	<0.22	<0.21	<0.27	<3.4	<0.15	<0.14	<0.14
WQ1-1	VA25B1711-004	2025-05-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.53	<0.48	<0.38	<0.36	<0.36	<0.53	<2.2	<0.46	<0.67	<0.58
WQ1-2	0051710-02	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	0062209-02	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	0071996-02	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	0082292-02	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	0093017-02	2020-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	20J1961-02	2020-10-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	20J2778-02	2020-10-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000057	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	20K0360-02	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	20K1261-02	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	20K2100-02	2020-11-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	20L1589-02	2020-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21A2590-02	2021-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21B2778-02	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21C3505-02	2021-03-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21D2478-02	2021-04-22	M	<0.000015	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000130	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21E1990-02	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ1-2	21E2917-02	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21F0167-02	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21F1056-02	2021-06-08	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21F2014-02	2021-06-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21G2414-02	2021-07-20	M	0.000094	<0.000030	<0.000050	0.000094	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21H3040-02	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21I3814-02	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21J3514-02	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21K3046-02	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	21L2125-02	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	22A2312-02	2022-01-20	M	<0.000010	<0.000065	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	0.000052	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	22B2487-02	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	22C3145-02	2022-03-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	22D2212-02	2022-04-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	22E2480-04	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	22F3212-02	2022-06-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	22G1763-02	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	22H2453-02	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000623	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	22I1926-02	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	22J1560-04	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	22K1453-02	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	22L0774-02	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	23A2847-02	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	23C0060-02	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	23C1797-02	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	23D2945-02	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	23E2392-02	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	23F3614-02	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	23G2415-02	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	23H3309-04	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	23I2271-04	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	23J2236-04	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	23K1909-02	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ1-2	23L1905-05	2023-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-2	L2754366-8	2024-01-24	M											<0.46	<0.69	<0.42	<0.42	<0.40	<0.48	1.30	<0.40	<0.26	<0.26
WQ1-2	VA24A1422-008	2024-01-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-2	L2754594-5	2024-02-13	M											<0.36	<0.48	<0.34	<0.32	<0.31	<0.77	2.10	<0.41	0.38	<0.35
WQ1-2	VA24A2858-005	2024-02-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-2	L2755033-5	2024-03-20	M											<0.26	<0.28	<0.22	<0.23	<0.21	0.94	1.96	<0.27	0.39	<0.23
WQ1-2	VA24A5955-005	2024-03-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-2	L2755461-5	2024-04-23	M											<0.23	<0.33	<0.28	<0.26	<0.27	0.52	2.33	<0.23	0.50	<0.18
WQ1-2	VA24A8736-005	2024-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-2	L2755553-5	2024-04-30	M											<0.91	<0.98	<1.1	<1.1	<1.1	1.30	4.0	<0.64	<0.53	<0.51
WQ1-2	VA24A9418-005	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-2	L2755641-5	2024-05-07	M											<0.36	<0.40	<0.29	<0.28	<0.28	<0.47	2.70	<0.43	0.48	<0.22
WQ1-2	VA24B0040-005	2024-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-2	L2755769-5	2024-05-14	M											<0.33	<0.33	<0.40	<0.40	<0.39	<0.28	1.00	<0.40	<0.36	<0.30
WQ1-2	VA24B0738-005	2024-05-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-2	L2755874-5	2024-05-21	M											<0.38	<0.36	<0.59	<0.57	<0.57	0.39	3.4	<0.55	0.43	<0.35
WQ1-2	VA24B1351-005	2024-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-2	L2756277-5	2024-06-18	M											<0.21	<0.18	<0.16	<0.16	0.17	0.55	3.60	<0.22	0.45	<0.11
WQ1-2	VA24B4257-005	2024-06-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-2	L2756678-5	2024-07-16	M											<0.21	<0.15	<0.15	<0.16	<0.15	0.37	1.00	<0.21	0.21	<0.11

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ1-2	VA24B7237-005	2024-07-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-2	L2757095-5	2024-08-20	M											<0.93	<0.35	<0.41	<0.39	<0.39	0.90	11.0	<0.36	0.47	<0.21
WQ1-2	VA24C1101-005	2024-08-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-2	VA24C4483-005	2024-09-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.58	<0.49	<0.39	<0.37	<0.37	1.19	15.4	<0.34	0.45	<0.23
WQ1-2	VA24C8360-005	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.78	<0.75	<1.3	<1.3	<1.2	0.96	4.8	<0.60	0.44	<0.34
WQ1-2	VA24C9197-005	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.21	<0.34	<0.46	<0.45	<0.43	<1.4	3.6	<0.33	<0.33	<0.28
WQ1-2	VA24D0009-005	2024-11-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.36	<0.35	<0.25	<0.23	<0.23	0.41	1.40	<0.26	0.48	<0.27
WQ1-2	VA24D0813-013	2024-11-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.52	<0.71	<0.56	<0.54	<0.52	<0.75	2.6	<0.37	<0.38	<0.33
WQ1-2	VA24D1720-005	2024-11-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.23	<0.49	0.19	0.30	0.21	0.51	3.43	<0.25	0.33	<0.22
WQ1-2	L2758465-5	2024-12-17	M											<0.74	<0.84	<0.79	<0.78	<0.77	1.24	7.2	<0.68	<0.53	<0.45
WQ1-2	VA24D3769-005	2024-12-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-2	L2758719-5	2025-01-21	M											<0.52	<0.49	<0.35	<0.35	<0.34	<0.67	3.8	<0.42	<0.32	<0.29
WQ1-2	VA25A1408-005	2025-01-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-2	L2758994-5	2025-02-18	M											<0.28	<0.32	<0.26	<0.27	<0.25	0.82	19.5	<0.30	0.52	<0.28
WQ1-2	VA25A3430-005	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-2	VA25A6550-005	2025-03-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	0	0	0	0
WQ1-2	VA25A8962-005	2025-04-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-2	VA25A9878-005	2025-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.22	<0.45	<0.27	<0.26	<0.26	<0.52	1.67	<0.19	<0.31	<0.17
WQ1-2	VA25B0358-005	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.39	<0.31	<0.32	<0.32	<0.31	<0.55	2.96	<0.51	<0.45	<0.39
WQ1-2	VA25B1026-005	2025-05-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.61	<0.68	<0.16	<0.15	<0.15	<0.22	<1.2	<0.24	<0.17	<0.13
WQ1-2	VA25B1711-005	2025-05-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.31	<0.44	<0.29	<0.28	<0.28	<0.60	<1.8	<0.46	<0.37	<0.33
WQ1-3	23L1905-06	2023-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ1-3	L2754366-9	2024-01-24	M											<1.0	<0.95	<0.70	<0.68	<0.65	<0.79	2.6	4.37	<0.42	<0.43
WQ1-3	VA24A1422-009	2024-01-24	M	<0.0000050	0.000021	0.000012	<0.000010	<0.000010	0.000010	<0.000050	0.000033	0.000013											
WQ1-3	L2754594-6	2024-02-13	M											<0.62	<0.40	<0.45	<0.44	<0.42	<0.55	2.3	<0.35	0.51	<0.36
WQ1-3	VA24A2858-006	2024-02-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-3	L2755033-6	2024-03-20	M											<0.24	<0.32	<0.28	<0.28	<0.26	0.44	1.20	<0.26	0.38	<0.18
WQ1-3	VA24A5955-006	2024-03-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-3	L2755461-6	2024-04-23	M											<0.19	<0.27	0.26	<0.25	0.29	1.40	16.6	<0.21	0.44	<0.31
WQ1-3	VA24A8736-006	2024-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-3	L2755553-6	2024-04-30	M											<0.80	<0.77	<1.2	<1.2	<1.2	<1.3	5.0	<0.64	<0.53	<0.50
WQ1-3	VA24A9418-006	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-3	L2755641-6	2024-05-07	M											<0.41	<0.34	<0.38	<0.38	<0.37	0.70	4.60	<0.44	<0.29	<0.30
WQ1-3	VA24B0040-006	2024-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-3	L2755769-6	2024-05-14	M											<0.37	<0.54	<0.35	<0.35	<0.34	<0.47	<0.80	<0.47	<0.42	<0.35
WQ1-3	VA24B0738-006	2024-05-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-3	L2755874-6	2024-05-21	M											<0.47	<0.48	<0.37	<0.37	<0.36	0.61	5.5	<0.58	0.48	<0.34
WQ1-3	VA24B1351-006	2024-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-3	L2756277-6	2024-06-18	M											<0.18	0.15	<0.12	<0.12	0.21	0.41	2.49	<0.17	0.50	<0.11
WQ1-3	VA24B4257-006	2024-06-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-3	L2756678-6	2024-07-16	M											<0.22	0.30	<0.25	<0.24	<0.24	0.52	1.56	<0.19	0.75	0.24
WQ1-3	VA24B7237-006	2024-07-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ1-3	L2757095-6	2024-08-20	M											<0.44	<0.28	<0.51	<0.49	<0.49	<0.52	6.6	<0.20	0.36	<0.20
WQ1-3	VA24C1101-006	2024-08-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-3	VA24C4483-006	2024-09-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.96	<0.36	<0.43	<0.42	<0.41	2.18	13.0	<0.65	<0.36	<0.28
WQ1-3	VA24C8360-006	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.53	<0.83	<0.74	<0.71	<0.69	<1.4	23.2	<0.83	<0.55	<0.52
WQ1-3	VA24C9197-006	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.18	<0.36	<0.50	<0.49	<0.48	<0.51	3.5	<0.38	0.32	<0.23
WQ1-3	VA24D0009-006	2024-11-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0.38	<0.28	<0.21	<0.20	<0.19	0.43	2.11	<0.26	<0.17	<0.16
WQ1-3	VA24D0813-014	2024-11-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000050	<0.000020	<0.000010	<0.000050	<0.50	<0.58	<0.78	<0.72	<0.72	<0.88	5.3	<0.52	<0.37	<0.34
WQ1-3	VA24D1720-006	2024-11-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.23	<0.21	<0.12	<0.12	0.27	0.54	2.80	<0.20	0.68	<0.16
WQ1-3	L2758465-6	2024-12-17	M											<0.66	<0.58	<0.44	<0.41	<0.42	1.1	7.3	<0.60	<0.34	<0.28
WQ1-3	VA24D3769-006	2024-12-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-3	L2758719-6	2025-01-21	M											<0.63	<0.47	<0.72	<0.68	<0.69	<1.3	4.6	<0.55	<0.41	<0.36

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ1-3	VA25A1408-006	2025-01-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-3	L2758994-6	2025-02-18	M											<0.16	<0.27	<0.15	<0.16	<0.15	0.69	6.66	<0.17	0.37	<0.16
WQ1-3	VA25A3430-006	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-3	VA25A6550-006	2025-03-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	0	0	0	0
WQ1-3	VA25A8962-006	2025-04-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ1-3	VA25A9878-006	2025-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.25	<0.23	<0.30	<0.30	<0.29	<0.58	<3.1	<0.22	<0.36	<0.19
WQ1-3	VA25B0358-006	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.26	<0.39	<0.22	<0.22	<0.21	0.544	<2.2	<0.50	<0.35	<0.29
WQ1-3	VA25B1026-006	2025-05-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.21	<0.33	<0.14	<0.14	<0.13	<0.36	2.42	<0.16	<0.27	<0.24
WQ1-3	VA25B1711-006	2025-05-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.55	<0.45	<0.36	<0.35	<0.34	<0.47	<1.3	<0.44	<0.43	<0.36
WQ2-1	0051710-03	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	0062209-03	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	0071996-03	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	0082292-03	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	0093017-03	2020-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	20J1961-03	2020-10-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	20J2778-03	2020-10-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	20K0360-03	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	20K1261-03	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	20K2100-03	2020-11-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	20L1589-03	2020-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21A2590-03	2021-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21B2778-03	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21C3505-03	2021-03-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21D2478-03	2021-04-22	M	<0.000015	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000100	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21E1990-03	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21E2917-03	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21F0167-03	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21F1056-03	2021-06-08	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21F2014-03	2021-06-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21G2414-03	2021-07-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21H3040-03	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21I3814-03	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21J3514-03	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21K3046-03	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	21L2125-03	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	22A2312-03	2022-01-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	0.000033	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	22B2487-03	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	22C3145-03	2022-03-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	22D2212-03	2022-04-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	22E2480-05	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	22F3212-03	2022-06-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	22G1763-03	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	22H2453-03	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000425	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	22I1926-03	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	22J1560-05	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	22K1453-03	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	22L0774-03	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	23A2847-03	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	23C0060-03	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	23C1797-03	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	23D2945-03	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	23E2392-03	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	23F3614-03	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ2-1	23G2415-03	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	23H3309-05	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	23I2271-05	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	23J2236-05	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	23K1909-03	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-1	23L1905-07	2023-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-1	L2754383-1	2024-01-25	M											<0.20	<0.39	<0.17	<0.15	0.20	<0.66	3.01	<0.37	0.50	<0.27
WQ2-1	VA24A1507-001	2024-01-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-1	L2754594-7	2024-02-13	M											<0.36	<0.36	<0.41	<0.41	<0.39	<0.90	0.93	<0.35	<0.38	<0.39
WQ2-1	VA24A2858-007	2024-02-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-1	L2755033-7	2024-03-20	M											<0.28	<0.32	<0.35	<0.33	<0.32	0.37	1.50	<0.33	0.43	<0.21
WQ2-1	VA24A5955-007	2024-03-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-1	L2755461-7	2024-04-23	M											<0.24	<0.38	<0.37	<0.35	<0.36	0.52	2.90	<0.25	0.42	<0.26
WQ2-1	VA24A8736-007	2024-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-1	L2755553-7	2024-04-30	M											<0.76	<1.9	<0.86	<0.84	<0.83	<1.8	4.1	<0.77	<0.62	<0.62
WQ2-1	VA24A9418-007	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-1	L2755641-7	2024-05-07	M											<0.34	<0.34	<0.49	<0.51	<0.48	<0.27	2.56	<0.41	0.54	<0.22
WQ2-1	VA24B0040-007	2024-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-1	L2755769-7	2024-05-14	M											<0.45	<0.32	<0.27	<0.27	<0.26	<0.32	1.10	<0.44	<0.35	<0.29
WQ2-1	VA24B0738-007	2024-05-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-1	L2755874-7	2024-05-21	M											<0.69	1.10	0.99	2.01	1.70	3.00	9.5	<0.71	1.70	0.91
WQ2-1	VA24B1351-007	2024-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-1	L2756277-7	2024-06-18	M											<0.22	0.32	<0.18	<0.18	0.24	0.56	2.19	<0.26	0.40	<0.15
WQ2-1	VA24B4257-007	2024-06-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-1	L2756678-7	2024-07-16	M											<0.25	0.25	<0.15	<0.15	<0.14	0.34	1.32	<0.25	0.39	<0.14
WQ2-1	VA24B7237-007	2024-07-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-1	L2757095-7	2024-08-20	M											<0.46	<0.27	<0.37	<0.35	<0.35	0.80	8.30	<0.43	<0.23	<0.18
WQ2-1	VA24C1101-007	2024-08-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-1	VA24C4483-007	2024-09-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.56	<0.50	<0.60	<0.57	<0.57	2.10	23.8	<0.49	<0.30	<0.23
WQ2-1	VA24C8360-007	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.51	<0.54	<0.92	<0.91	<0.87	<1.5	9.0	<0.65	0.58	<0.34
WQ2-1	VA24C9197-007	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.32	<0.42	<0.32	<0.32	<0.31	<0.71	1.6	<0.43	0.57	<0.33
WQ2-1	VA24D0009-007	2024-11-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.33	<0.36	<0.30	<0.30	<0.29	0.70	2.60	<0.25	0.35	<0.21
WQ2-1	L2758095-4	2024-11-12	M											<0.44	<0.48	<0.36	<0.35	<0.33	<0.71	2.7	<0.41	<0.36	<0.37
WQ2-1	VA24D0632-004	2024-11-12	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-1	VA24D1720-007	2024-11-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.40	<0.32	<0.26	<0.27	0.45	0.59	4.0	<0.26	0.63	<0.33
WQ2-1	L2758465-7	2024-12-17	M											<0.66	<0.62	<1.0	<1.1	<1.0	<0.86	12.2	<0.59	0.51	<0.29
WQ2-1	VA24D3769-007	2024-12-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-1	L2758719-7	2025-01-21	M											<0.63	<0.85	<0.56	<0.57	<0.56	<0.84	3.5	<0.63	<0.47	<0.43
WQ2-1	VA25A1408-007	2025-01-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-1	L2758994-7	2025-02-18	M											<0.20	0.31	<0.24	<0.25	<0.23	0.90	10.3	<0.24	<0.18	<0.18
WQ2-1	VA25A3430-007	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-1	VA25A6550-007	2025-03-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	2.69	0	0	0
WQ2-1	VA25A8962-007	2025-04-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-1	VA25A9878-007	2025-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.30	<0.28	<0.35	<0.34	<0.34	0.613	2.69	<0.20	<0.22	<0.19
WQ2-1	VA25B0358-007	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.27	<0.38	<0.37	<0.37	<0.36	0.768	<4.6	<0.43	<0.48	<0.25
WQ2-1	VA25B1026-007	2025-05-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.33	<0.42	<0.53	<0.51	<0.50	<0.44	<1.1	<0.40	<0.56	<0.48
WQ2-1	VA25B1711-007	2025-05-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.29	<0.39	<0.34	<0.34	<0.33	<0.48	<1.9	<0.44	<0.43	<0.38
WQ2-2	0051710-04	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	0062209-04	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	0071996-04	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	0082292-04	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	0093017-04	2020-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	20J1961-04	2020-10-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ2-2	20J2778-04	2020-10-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000047	<0.000050	<1	<2	<2	<2	<2	<3	16	<1	<2	<2
WQ2-2	20K0360-04	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	20K1261-04	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	20K2100-04	2020-11-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	20L1589-04	2020-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21A2590-04	2021-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21B2778-04	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21C3505-04	2021-03-25	M	<0.000010	<0.000040	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	0.000024	0.000054	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21D2478-04	2021-04-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000150	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21E1990-04	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21E2917-04	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21F0167-04	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21F1056-04	2021-06-08	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21F2014-04	2021-06-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21G2414-04	2021-07-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21H3040-04	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21I3814-04	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21J3514-04	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21K3046-04	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	21L2125-04	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	22A2312-04	2022-01-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	22B2487-04	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	22C3145-04	2022-03-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	22D2212-11	2022-04-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	22E2480-06	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	22F3212-04	2022-06-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	22G1763-04	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	22H2453-04	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000346	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	22I1926-04	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	22J1560-06	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	22K1453-04	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	22L0774-04	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	23A2847-04	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	23C0060-04	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	23C1797-04	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	23D2945-04	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	23E2392-04	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	23F3614-04	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	23G2415-04	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	23H3309-06	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	23I2271-06	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	23J2236-06	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ2-2	23K1909-04	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ2-2	23L1905-08	2023-12-14	M	<0.000010	0.000054	0.000061	<0.000050	<0.000100	<0.000100	<0.000200	0.000167	0.000029	<0.000050										
WQ2-2	L2754383-2	2024-01-25	M											<0.16	<0.24	<0.19	0.40	<0.18	0.75	1.90	1.36	0.40	<0.17
WQ2-2	VA24A1507-002	2024-01-25	M	<0.0000050	0.000023	0.000016	<0.000010	0.000011	0.000016	0.000054	0.000041	0.000013											
WQ2-2	L2754594-8	2024-02-13	M											<0.33	<0.44	<0.32	<0.31	<0.30	<0.43	1.20	<0.31	0.33	<0.32
WQ2-2	VA24A2858-008	2024-02-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-2	L2755033-8	2024-03-20	M											<0.29	<0.36	<0.33	<0.34	<0.31	<0.35	1.00	<0.24	0.28	<0.19
WQ2-2	VA24A5955-008	2024-03-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-2	L2755461-8	2024-04-23	M											<0.21	<0.26	<0.23	<0.22	<0.23	0.52	1.70	0.22	0.74	<0.19
WQ2-2	VA24A8736-008	2024-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-2	L2755553-8	2024-04-30	M											<0.94	<0.95	<1.3	<1.2	<1.2	<1.4	5.8	<0.77	<0.61	<0.63

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ2-2	VA24A9418-008	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-2	L2755641-8	2024-05-07	M											<0.37	<0.37	<0.27	<0.27	<0.27	0.47	2.46	<0.43	0.38	<0.32
WQ2-2	VA24B0040-008	2024-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-2	L2755769-8	2024-05-14	M											<0.48	<0.32	<0.29	<0.28	<0.28	<0.43	<0.95	<0.53	<0.41	<0.35
WQ2-2	VA24B0738-008	2024-05-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-2	L2755874-8	2024-05-21	M											<0.44	<0.47	<0.56	<0.53	<0.53	<0.54	3.1	<0.50	<0.43	<0.38
WQ2-2	VA24B1351-008	2024-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-2	L2756277-8	2024-06-18	M											<0.23	0.32	<0.16	<0.17	0.21	0.48	2.54	<0.16	0.48	<0.13
WQ2-2	VA24B4257-008	2024-06-18	M	<0.0000050	0.000011	0.000011	<0.000010	0.000011	<0.000010	0.000062	<0.000020	<0.000010											
WQ2-2	L2756678-8	2024-07-16	M											<0.19	<0.15	<0.19	<0.19	<0.18	0.34	1.33	<0.26	0.43	<0.14
WQ2-2	VA24B7237-008	2024-07-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-2	L2757095-8	2024-08-20	M											<0.54	<0.49	<0.33	<0.30	<0.30	0.81	10.0	<0.99	0.29	<0.19
WQ2-2	VA24C1101-008	2024-08-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-2	VA24C4483-008	2024-09-17	M	<0.0000050	0.000076	0.000104	<0.000010	0.000054	0.000050	0.000164	0.000144	0.000039	<0.000050	<0.58	<0.55	<0.33	<0.31	<0.31	1.60	12.5	<0.45	<0.29	<0.23
WQ2-2	VA24C8360-008	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.57	<1.0	<0.82	<0.77	<0.76	<1.5	3.8	<0.82	<0.49	<0.45
WQ2-2	VA24C9197-008	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.27	<0.40	<0.35	<0.33	<0.33	<0.87	4.8	<0.32	0.43	<0.23
WQ2-2	VA24D0009-008	2024-11-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.41	<0.44	<0.29	<0.27	<0.27	0.65	2.40	<0.28	<0.28	<0.25
WQ2-2	L2758095-5	2024-11-12	M											<0.58	<0.57	<0.52	<0.52	<0.50	<0.94	2.9	<0.46	<0.40	<0.39
WQ2-2	VA24D0632-005	2024-11-12	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-2	VA24D1720-008	2024-11-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0.36	<0.23	<0.14	<0.15	0.23	0.40	3.08	<0.21	<0.21	<0.18
WQ2-2	L2758465-8	2024-12-17	M											<0.51	<0.54	<0.65	<0.67	<0.65	1.0	8.4	<0.43	0.44	<0.29
WQ2-2	VA24D3769-008	2024-12-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-2	L2758719-8	2025-01-21	M											<0.52	<0.67	<0.62	<0.65	<0.62	<0.81	3.9	<0.51	<0.38	<0.35
WQ2-2	VA25A1408-008	2025-01-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-2	L2758994-8	2025-02-18	M											<0.17	<0.26	<0.19	<0.19	0.24	0.39	4.70	<0.15	0.43	<0.14
WQ2-2	VA25A3430-008	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-2	VA25A6550-008	2025-03-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	1.88	0	0.284	0
WQ2-2	VA25A8962-008	2025-04-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-2	VA25A9878-008	2025-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.34	<0.34	<0.28	<0.30	<0.39	<0.50	<0.85	<0.43	<0.40	<0.25
WQ2-2	VA25B0358-008	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.30	<0.48	<0.28	<0.28	<0.28	<0.79	<4.5	<0.48	<0.48	<0.34
WQ2-2	VA25B1026-008	2025-05-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.34	<0.29	<0.31	<0.32	<0.31	<0.47	<1.5	<0.35	<0.37	<0.30
WQ2-2	VA25B1711-008	2025-05-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.36	<0.53	<0.32	<0.31	<0.30	<0.39	<1.3	<0.42	<0.31	<0.27
WQ2-3	23L1905-09	2023-12-14	M	<0.000010	0.000118	0.000080	<0.000050	<0.000100	<0.000100	0.000292	0.000228	0.000069	<0.000050										
WQ2-3	L2754383-3	2024-01-25	M											<0.44	<0.30	<0.34	<0.37	<0.34	1.08	2.01	0.84	0.50	<0.27
WQ2-3	VA24A1507-003	2024-01-25	M	<0.0000050	0.000032	0.000040	<0.000010	0.000029	0.000043	0.000144	0.000086	0.000018											
WQ2-3	L2754594-9	2024-02-13	M											<0.41	<0.36	<0.43	<0.43	<0.41	0.43	1.80	<0.40	1.41	<0.43
WQ2-3	VA24A2858-009	2024-02-13	M	<0.0000050	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-3	L2755033-9	2024-03-20	M											<0.57	<0.54	<0.57	<0.56	<0.52	<0.47	2.4	<0.71	<0.61	<0.53
WQ2-3	VA24A5955-009	2024-03-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-3	L2755461-9	2024-04-23	M											<0.24	<0.26	<0.25	<0.23	<0.24	0.53	1.30	<0.24	0.24	<0.24
WQ2-3	VA24A8736-009	2024-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-3	L2755553-9	2024-04-30	M											<0.82	<1.1	<1.1	<1.1	<1.1	1.6	<3.2	<0.80	<0.67	<0.70
WQ2-3	VA24A9418-009	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-3	L2755641-9	2024-05-07	M											<0.28	<0.23	0.64	<0.27	<0.26	0.44	2.41	<0.31	<0.21	<0.22
WQ2-3	VA24B0040-009	2024-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-3	L2755769-9	2024-05-14	M											<0.37	<0.28	<0.38	<0.36	<0.36	<0.38	<0.78	<0.35	<0.32	<0.29
WQ2-3	VA24B0738-009	2024-05-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-3	L2755874-9	2024-05-21	M											<0.58	<0.36	<0.47	<0.46	<0.45	<0.65	3.50	<0.66	0.41	<0.32
WQ2-3	VA24B1351-009	2024-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-3	L2756277-9	2024-06-18	M											<0.17	<0.20	<0.13	<0.12	0.15	0.48	1.70	<0.17	0.46	<0.15
WQ2-3	VA24B4257-010	2024-06-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ2-3	L2756678-9	2024-07-16	M											<0.20	0.24	<0.24	<0.24	<0.23	0.49	1.90	<0.27	0.32	<0.13
WQ2-3	VA24B7237-009	2024-07-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ2-3	L2757095-9	2024-08-20	M											<0.45	<0.61	<0.29	5.04	2.80	2.30	15.3	17.0	1.32	0.87
WQ2-3	VA24C1101-009	2024-08-20	M	<0.0000050	0.000266	0.000596	<0.000010	0.000382	0.000438	0.00182	0.000960	0.000126	<0.000050										
WQ2-3	VA24C4483-009	2024-09-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.78	<0.77	<0.36	<0.34	<0.34	1.90	22.7	<0.63	<0.60	<0.53
WQ2-3	VA24C8360-009	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.76	<0.72	<0.91	<0.82	<0.82	<1.5	5.7	<0.74	<0.48	<0.43
WQ2-3	VA24C9197-009	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.35	<0.42	<0.63	<0.60	<0.59	<0.66	4.0	<0.29	0.41	<0.27
WQ2-3	VA24D0009-009	2024-11-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.30	<0.39	<0.32	<0.30	<0.30	0.36	2.38	<0.26	0.46	<0.29
WQ2-3	L2758095-6	2024-11-12	M											<0.48	<0.57	<0.45	<0.44	<0.43	1.10	3.3	<0.44	0.67	<0.37
WQ2-3	VA24D0632-006	2024-11-12	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-3	VA24D1720-009	2024-11-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.29	<0.25	<0.20	<0.20	<0.20	0.75	2.8	<0.36	<0.25	<0.24
WQ2-3	L2758465-9	2024-12-17	M											<0.59	<0.60	<0.55	<0.53	<0.53	0.86	12.7	<0.52	<0.35	0.47
WQ2-3	VA24D3769-009	2024-12-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-3	L2758719-9	2025-01-21	M											<0.58	<0.70	<0.58	<0.57	<0.56	<0.77	4.3	<0.64	<0.41	<0.37
WQ2-3	VA25A1408-009	2025-01-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-3	L2758994-9	2025-02-18	M											<0.18	<0.32	<0.21	<0.20	<0.20	<0.36	5.17	<0.17	0.23	<0.14
WQ2-3	VA25A3430-009	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-3	VA25A6550-009	2025-03-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0.679	0	0	0	0
WQ2-3	VA25A8962-009	2025-04-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ2-3	VA25A9878-009	2025-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.25	<0.27	<0.27	<0.28	<0.27	<0.28	1.34	<0.36	0.490	<0.24
WQ2-3	VA25B0358-009	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.32	<0.27	<0.25	<0.27	<0.25	<0.38	3.35	<0.35	<0.52	<0.26
WQ2-3	VA25B1026-009	2025-05-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.39	<0.39	<0.35	<0.37	<0.35	<0.42	<1.6	<0.46	<0.37	<0.30
WQ2-3	VA25B1711-009	2025-05-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.19	<0.18	<0.30	<0.29	<0.28	0.291	<5.3	<0.23	<0.22	<0.21
WQ3-1	0051710-05	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	0062209-05	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	2	<2
WQ3-1	0071996-05	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	0082292-05	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	0093017-05	2020-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	20J1961-05	2020-10-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	20J2778-05	2020-10-27	M	0.000105	<0.000030	<0.000050	0.000104	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	20K0360-05	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	20K1261-05	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	20K2100-05	2020-11-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	20L1589-05	2020-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21A2590-05	2021-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21B2778-05	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21C3505-05	2021-03-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21D2478-05	2021-04-22	M	<0.000015	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000100	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21E1990-05	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21E2917-05	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21F0167-05	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21F1056-05	2021-06-08	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21F2014-05	2021-06-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21G2414-05	2021-07-20	M	<0.000143	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21H3040-05	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21I3814-05	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21J3514-05	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21K3046-05	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	21L2125-05	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	22A2312-05	2022-01-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	22B2487-05	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	22C3145-05	2022-03-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	22D2212-04	2022-04-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	22E2480-07	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	22F3212-05	2022-06-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ3-1	22G1763-05	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	22H2453-05	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000249	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	22I1926-05	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	22J1560-07	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	22K1453-05	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	22L0774-05	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	23A2847-05	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	23C0060-05	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	23C1797-05	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	23D2945-05	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	23E2392-05	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	23F3614-05	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	23G2415-05	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	23H3309-07	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	23I2271-07	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	23J2236-07	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	23K1909-05	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-1	23L2091-01	2023-12-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-1	L2754366-1	2024-01-24	M											<0.13	<0.17	<0.16	<0.15	<0.15	0.54	1.40	0.17	0.26	<0.15
WQ3-1	VA24A1422-001	2024-01-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-1	L2754604-1	2024-02-14	M											<0.34	<0.44	<0.35	0.39	<0.34	0.68	2.4	<0.33	<0.29	<0.33
WQ3-1	VA24A2995-001	2024-02-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-1	L2755043-1	2024-03-21	M											<0.26	<0.73	<0.32	<0.29	<0.29	0.41	<1.6	<0.68	0.44	<0.34
WQ3-1	VA24A6026-001	2024-03-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-1	L2755490-1	2024-04-24	M											<0.24	<0.54	<0.38	<0.40	<0.40	0.89	2.1	<0.30	0.67	<0.29
WQ3-1	VA24A8916-001	2024-04-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-1	L2755567-1	2024-05-01	M											<0.41	<0.46	<0.47	<0.45	<0.44	1.00	4.8	<0.50	<0.43	<0.42
WQ3-1	VA24A9566-001	2024-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-1	L2755666-1	2024-05-08	M											<0.51	<0.45	<0.43	<0.41	<0.41	<0.70	1.40	<0.61	<0.40	<0.39
WQ3-1	VA24B0201-001	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-1	L2755779-1	2024-05-15	M											<0.54	1.50	<0.60	<0.60	<0.57	0.84	5.4	<1.3	<0.45	<0.39
WQ3-1	VA24B0901-001	2024-05-15	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-1	L2755888-1	2024-05-22	M											<0.64	<0.63	<0.89	<0.83	<0.82	<0.72	4.0	<0.42	<0.59	<0.51
WQ3-1	VA24B1500-001	2024-05-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-1	L2756312-1	2024-06-19	M											<0.29	<0.35	<0.24	<0.23	0.42	0.40	1.43	<0.52	0.59	<0.21
WQ3-1	VA24B4510-001	2024-06-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-1	VA24B7397-001	2024-07-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-1	L2756689-1	2024-07-17	M											<0.33	<0.32	<0.34	<0.36	<0.34	<0.61	2.6	<0.28	0.36	<0.27
WQ3-1	L2757122-1	2024-08-21	M											<0.55	<0.45	<0.76	<0.75	<0.74	1.2	10.0	<0.23	0.65	<0.25
WQ3-1	VA24C1337-001	2024-08-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-1	VA24C4683-001	2024-09-18	M	<0.0000050	0.000031	0.000014	<0.000010	<0.000010	<0.000010	<0.000050	0.000032	0.000017	<0.000050	<0.62	<0.85	<0.69	<0.71	<0.68	<1.4	5.1	<0.80	0.75	<0.48
WQ3-1	VA24C8569-001	2024-10-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.43	<0.47	<0.83	<0.83	<0.79	1.05	3.0	<0.44	0.75	<0.43
WQ3-1	L2757977-1	2024-10-30	M											<1.3	<1.1	<1.1	<1.1	<1.1	<1.8	8.0	<1.5	<1.4	<1.2
WQ3-1	VA24C9414-001	2024-10-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-1	VA24D0180-001	2024-11-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.31	<0.33	<0.32	<0.31	<0.30	0.60	3.01	<0.16	0.58	<0.20
WQ3-1	VA24D0813-001	2024-11-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.91	<0.53	<0.63	<0.63	<0.60	<1.0	3.1	<0.68	<0.32	<0.28
WQ3-1	L2758221-1	2024-11-22	M											<0.36	<0.29	<0.50	<0.49	<0.49	<0.81	7.9	<0.38	<0.41	<0.36
WQ3-1	VA24D1791-001	2024-11-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-1	L2758486-1	2024-12-18	M											<0.21	<0.25	<0.23	<0.23	<0.22	<0.34	3.70	<0.18	0.40	<0.17
WQ3-1	VA24D3937-001	2024-12-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-1	L2758770-1	2025-01-22	M											<0.38	<0.41	<0.44	<0.43	<0.42	<0.50	1.9	<0.36	0.76	<0.28
WQ3-1	VA25A1525-001	2025-01-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-1	L2759008-1	2025-02-19	M											<0.44	<0.63	<0.56	<0.53	<0.54	<0.63	<1.3	<0.55	<0.39	<0.36

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ3-1	VA25A3570-001	2025-02-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-1	VA25A6679-001	2025-03-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	0	0	0	0
WQ3-1	VA25A9109-001	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.27	<0.24	<0.28	<0.27	<0.27	0.506	<2.6	<0.27	<0.20	<0.17
WQ3-1	VA25A9941-001	2025-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.26	<0.24	<0.30	<0.28	<0.29	0.450	<1.6	<0.25	<0.21	<0.15
WQ3-1	VA25B0496-001	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.23	<0.25	<0.23	<0.22	<0.22	0.588	2.50	<0.31	0.310	<0.26
WQ3-1	VA25B1530-001	2025-05-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.28	<0.25	<0.20	<0.19	<0.19	<0.49	<1.7	<0.31	<0.31	<0.16
WQ3-1	VA25B1841-001	2025-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.20	<0.21	<0.27	<0.24	<0.24	0.397	6.66	<0.32	0.366	<0.14
WQ3-2	0051710-06	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	0062209-06	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	0071996-06	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	0082292-06	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	0093017-06	2020-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	20J1961-06	2020-10-20	M	0.000036	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	20J2778-06	2020-10-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	20K0360-06	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	20K1261-06	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	20K2100-06	2020-11-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	20L1589-06	2020-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21A2590-06	2021-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21B2778-06	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21C3505-06	2021-03-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21D2478-06	2021-04-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000100	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21E1990-06	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21E2917-06	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21F0167-06	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21F1056-06	2021-06-08	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21F2014-06	2021-06-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21G2414-06	2021-07-20	M	0.000084	<0.000030	<0.000050	0.000083	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21H3040-06	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21I3814-06	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21J3514-06	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21K3046-06	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	21L2125-06	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	22A2312-06	2022-01-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	22B2487-06	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	22C3145-06	2022-03-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	22D2212-05	2022-04-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	22E2480-08	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	22F3212-06	2022-06-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	22G1763-06	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	22H2453-06	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000402	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	22I1926-06	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	22J1560-08	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	22K1453-06	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	22L0774-06	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	23A2847-06	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	23C0060-06	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	23C1797-06	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	23D2945-06	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	23E2392-06	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	23F3614-06	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	23G2415-06	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	23H3309-08	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ3-2	23I2271-08	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	23J2236-08	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	23K1909-06	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ3-2	23L2091-02	2023-12-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-2	L2754366-2	2024-01-24	M											<0.19	<0.27	<0.19	<0.18	<0.18	0.57	1.50	<0.10	0.31	<0.15
WQ3-2	VA24A1422-002	2024-01-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-2	L2754604-2	2024-02-14	M											<0.30	<0.53	<0.32	<0.33	<0.31	<0.41	<1.2	<0.23	<0.31	<0.34
WQ3-2	VA24A2995-002	2024-02-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-2	L2755043-2	2024-03-21	M											<0.34	<0.30	<0.22	<0.23	<0.22	0.61	2.10	<0.29	<0.21	0.24
WQ3-2	VA24A6026-002	2024-03-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-2	L2755490-2	2024-04-24	M											<0.22	<0.39	<0.34	<0.35	<0.35	1.58	26.5	<0.25	0.29	<0.21
WQ3-2	VA24A8916-002	2024-04-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-2	L2755567-2	2024-05-01	M											<0.37	<0.50	<0.57	<0.59	<0.56	0.57	2.40	<0.56	<0.34	<0.35
WQ3-2	VA24A9566-002	2024-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-2	L2755666-2	2024-05-08	M											<0.38	<0.30	<0.44	<0.42	<0.41	<0.46	20.0	<0.36	<0.38	<0.39
WQ3-2	VA24B0201-002	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-2	L2755779-2	2024-05-15	M											<0.54	<0.64	<0.41	<0.40	<0.39	<1.1	4.3	<0.48	0.42	0.30
WQ3-2	VA24B0901-002	2024-05-15	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-2	L2755888-2	2024-05-22	M											<0.62	<0.70	<0.72	<0.77	<0.71	0.50	<2.5	<0.51	<0.44	<0.38
WQ3-2	VA24B1500-002	2024-05-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-2	L2756312-2	2024-06-19	M											<0.40	<0.43	<0.37	<0.40	<0.37	0.45	1.70	<0.31	0.84	<0.23
WQ3-2	VA24B4510-002	2024-06-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-2	VA24B7397-002	2024-07-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-2	L2756689-2	2024-07-17	M											<0.23	<0.18	<0.14	<0.14	0.18	0.49	1.30	<0.23	0.44	<0.11
WQ3-2	L2757122-2	2024-08-21	M											<0.42	<0.39	<0.48	<0.46	<0.46	0.72	7.49	<0.35	0.27	<0.23
WQ3-2	VA24C1337-002	2024-08-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-2	VA24C4683-002	2024-09-18	M	<0.0000050	0.000092	0.000079	<0.000010	0.000033	0.000032	0.000083	0.000124	0.000056	<0.000050	<0.59	<0.40	<0.57	<0.58	<0.56	1.90	14.9	<0.60	1.00	<0.27
WQ3-2	VA24C8569-002	2024-10-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.33	<0.40	<0.48	<0.46	<0.45	<0.76	3.6	<0.39	<0.29	<0.26
WQ3-2	L2757977-2	2024-10-30	M											<1.3	<0.88	<1.0	<1.2	<1.1	<2.1	7.7	<1.3	<0.94	<0.74
WQ3-2	VA24C9414-002	2024-10-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-2	VA24D0180-002	2024-11-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.36	<0.36	<0.22	<0.21	<0.21	0.48	3.53	<0.26	0.33	<0.20
WQ3-2	VA24D0813-002	2024-11-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.56	<0.45	<0.33	<0.31	<0.30	0.85	3.2	0.73	0.63	<0.36
WQ3-2	L2758221-2	2024-11-22	M											<0.38	<0.31	<0.25	<0.27	<0.26	0.35	8.1	<0.34	<0.34	<0.31
WQ3-2	VA24D1791-002	2024-11-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-2	L2758486-2	2024-12-18	M											<0.21	<0.30	<0.26	<0.25	<0.25	0.60	4.6	<0.16	<0.22	<0.20
WQ3-2	VA24D3937-002	2024-12-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-2	L2758770-2	2025-01-22	M											<0.40	<0.42	<0.44	<0.44	<0.43	<0.58	1.9	<0.49	0.43	<0.31
WQ3-2	VA25A1525-002	2025-01-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-2	L2759008-2	2025-02-19	M											<0.58	<0.54	<0.72	<0.70	<0.70	<0.70	1.8	<0.44	<0.43	<0.39
WQ3-2	VA25A3570-002	2025-02-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-2	VA25A6679-002	2025-03-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0.740	3.05	0	0.277	0
WQ3-2	VA25A9109-002	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.24	<0.26	<0.22	<0.22	<0.22	<0.35	2.20	<0.26	<0.39	<0.16
WQ3-2	VA25A9941-002	2025-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.32	<0.22	<0.29	<0.28	<0.28	<0.55	<1.8	<0.39	<0.24	<0.21
WQ3-2	VA25B0496-002	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.39	<0.38	<0.26	<0.28	<0.25	<1.1	<5.1	<0.47	<0.58	<0.61
WQ3-2	VA25B1530-002	2025-05-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	0.000017	0.000025	<0.000050	<0.000020	<0.000010	<0.000050	<0.75	<0.76	<0.29	<0.28	<0.27	<0.87	<12	<0.25	<0.21	<0.13
WQ3-2	VA25B1841-002	2025-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.33	<0.24	<0.22	<0.21	<0.20	<0.44	3.21	<0.16	<0.26	<0.17
WQ3-3	23L2091-03	2023-12-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ3-3	L2754366-3	2024-01-24	M											<0.30	<0.21	<0.18	<0.18	<0.17	0.47	2.50	<0.27	0.42	<0.20
WQ3-3	VA24A1422-003	2024-01-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	<0.000050	<0.000020	<0.000010											
WQ3-3	L2754604-3	2024-02-14	M											<0.27	<0.57	<0.63	<0.63	<0.60	0.52	1.50	<0.29	0.36	<0.39
WQ3-3	VA24A2995-003	2024-02-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-3	L2755043-3	2024-03-21	M											<0.43	<0.25	<0.39	<0.42	<0.39	0.60	1.50	<0.39	<0.31	<0.32
WQ3-3	VA24A6026-003	2024-03-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ3-3	L2755490-3	2024-04-24	M											<0.21	<0.29	<0.23	<0.24	<0.24	<0.40	2.71	<0.25	0.25	<0.19
WQ3-3	VA24A8916-003	2024-04-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-3	L2755567-3	2024-05-01	M											<0.59	<0.57	<0.34	<0.35	<0.33	<0.46	1.90	<0.66	0.42	<0.37
WQ3-3	VA24A9566-003	2024-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-3	L2755666-3	2024-05-08	M											<0.50	<0.63	<0.79	<0.81	<0.78	<0.58	1.2	<0.60	<0.41	<0.41
WQ3-3	VA24B0201-003	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-3	L2755779-3	2024-05-15	M											<0.63	<0.73	<0.32	<0.32	<0.31	<1.1	3.0	<0.67	<0.46	<0.40
WQ3-3	VA24B0901-003	2024-05-15	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-3	L2755888-3	2024-05-22	M											<0.93	<0.48	<0.52	<0.54	<0.50	<0.90	2.8	<0.95	<0.33	<0.31
WQ3-3	VA24B1500-003	2024-05-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-3	L2756312-3	2024-06-19	M											<0.30	<0.38	<0.47	<0.45	<0.45	<0.52	0.97	<0.46	0.43	<0.18
WQ3-3	VA24B4510-003	2024-06-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-3	VA24B7397-003	2024-07-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ3-3	L2756689-3	2024-07-17	M											<0.26	<0.19	<0.17	<0.17	<0.17	0.57	2.02	<0.25	<0.24	<0.19
WQ3-3	L2757122-3	2024-08-21	M											<0.50	<0.35	<0.17	<0.16	<0.16	1.24	13.6	<0.42	<0.41	<0.32
WQ3-3	VA24C1337-003	2024-08-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-3	VA24C4683-003	2024-09-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.43	<0.45	<0.51	<0.48	<0.49	<0.59	2.80	<0.46	0.38	<0.23
WQ3-3	VA24C8569-003	2024-10-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.46	<0.54	<0.56	<0.54	<0.52	<0.63	3.7	<0.43	<0.34	<0.32
WQ3-3	L2757977-3	2024-10-30	M											<1.8	<1.5	<1.5	<1.5	<1.5	<3.1	11.1	<2.3	<1.6	<1.2
WQ3-3	VA24C9414-003	2024-10-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-3	VA24D0180-003	2024-11-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.33	<0.36	<0.31	<0.30	<0.29	0.50	4.0	<0.31	<0.26	<0.21
WQ3-3	VA24D0813-003	2024-11-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.51	<0.38	<0.47	<0.46	<0.44	0.91	3.2	<0.60	0.43	<0.29
WQ3-3	L2758221-3	2024-11-22	M											<0.29	<0.35	<0.28	<0.29	<0.28	0.30	4.20	<0.28	0.36	<0.23
WQ3-3	VA24D1791-003	2024-11-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-3	L2758486-3	2024-12-18	M											<0.18	<0.23	<0.13	<0.13	<0.13	0.67	4.54	<0.15	0.38	<0.13
WQ3-3	VA24D3937-003	2024-12-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-3	L2758770-3	2025-01-22	M											<0.38	<0.48	<0.38	<0.37	<0.37	<0.54	2.0	<0.34	<0.30	<0.27
WQ3-3	VA25A1525-003	2025-01-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-3	L2759008-3	2025-02-19	M											<0.56	<0.68	<0.35	<0.37	<0.35	<0.61	<1.3	<0.44	<0.49	<0.48
WQ3-3	VA25A3570-003	2025-02-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ3-3	VA25A6679-003	2025-03-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	2.82	0	0	0
WQ3-3	VA25A9109-003	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.36	<0.28	<0.30	<0.29	<0.29	<0.58	2.54	<0.24	<0.38	<0.20
WQ3-3	VA25A9941-003	2025-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.34	<0.30	<0.34	<0.34	<0.33	<0.48	<1.4	<0.23	0.284	<0.14
WQ3-3	VA25B0496-003	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.31	<0.54	<0.22	<0.22	<0.24	<0.59	2.39	<0.34	<0.43	<0.24
WQ3-3	VA25B1530-003	2025-05-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	0.000016	0.000026	<0.000050	<0.000020	<0.000010	<0.000050	<0.36	<0.75	<0.37	<0.40	<0.37	<1.5	<3.4	<0.30	<0.28	<0.27
WQ3-3	VA25B1841-003	2025-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.25	<0.20	<0.27	<0.26	<0.25	<0.79	<5.7	<0.24	<0.40	<0.29
WQ4-1	0051710-07	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	0062209-07	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	0071996-07	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	0082292-07	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	0093017-07	2020-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	20J1961-07	2020-10-20	M	0.000058	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	4	<1	<2	<2
WQ4-1	20J2778-07	2020-10-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	20K0360-07	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	20K1261-07	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	20K2100-07	2020-11-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	20L1589-07	2020-12-14	M	0.000017	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21A2590-07	2021-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21B2778-07	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21C3505-07	2021-03-25	M	0.000024	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21D2478-07	2021-04-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21E1990-07	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21E2917-07	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ4-1	21F0167-07	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21F1056-07	2021-06-08	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21F2014-07	2021-06-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21G2414-07	2021-07-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21H3040-07	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21I3814-07	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21J3514-07	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21K3046-07	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	21L2125-07	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	22A2312-07	2022-01-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	22B2487-07	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	22C3145-07	2022-03-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	22D2212-12	2022-04-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	22E2480-09	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	22F3212-07	2022-06-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	22G1763-07	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	22H2453-07	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000330	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	22I1926-07	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	22J1560-09	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	22K1453-07	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	22L0774-07	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	23A2847-07	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	23C0060-07	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	23C1797-07	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	23D2945-07	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	23E2392-07	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	23F3614-07	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	23G2415-07	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	23H3309-09	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	23I2271-09	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	23J2236-09	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	23K1909-07	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-1	23L2091-04	2023-12-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-1	L2754383-4	2024-01-25	M											<0.17	<0.26	<0.34	<0.33	<0.32	0.43	1.50	<0.22	0.49	<0.24
WQ4-1	VA24A1507-004	2024-01-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-1	L2754604-4	2024-02-14	M											<0.35	<0.50	<0.46	<0.45	<0.43	0.86	1.70	<0.24	0.37	<0.25
WQ4-1	VA24A2995-004	2024-02-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-1	L2755043-4	2024-03-21	M											<0.23	<0.26	<0.23	<0.23	<0.22	<0.34	<1.1	<0.37	0.24	<0.18
WQ4-1	VA24A6026-004	2024-03-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-1	L2755490-4	2024-04-24	M											<0.22	<0.25	<0.24	<0.24	<0.25	0.42	<1.0	<0.21	0.61	<0.21
WQ4-1	VA24A8916-004	2024-04-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-1	L2755567-4	2024-05-01	M											<0.46	<0.53	<0.49	<0.52	<0.49	<0.81	2.0	<0.52	<0.26	<0.26
WQ4-1	VA24A9566-004	2024-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-1	L2755666-4	2024-05-08	M											<0.35	<0.40	<0.45	<0.44	<0.43	<0.59	1.10	<0.46	<0.30	<0.29
WQ4-1	VA24B0201-004	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-1	L2755779-4	2024-05-15	M											<1.0	<0.93	<0.68	<0.73	<0.67	<1.1	3.8	<0.57	<0.47	<0.40
WQ4-1	VA24B0901-004	2024-05-15	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-1	L2755888-4	2024-05-22	M											<0.61	<1.1	<0.72	<0.71	<0.68	<0.58	2.4	<0.82	0.64	<0.27
WQ4-1	VA24B1500-004	2024-05-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-1	L2756312-4	2024-06-19	M											<0.29	<0.87	<0.30	<0.28	<0.28	<0.53	0.86	<0.18	<0.36	<0.30
WQ4-1	VA24B4510-004	2024-06-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-1	VA24B7397-004	2024-07-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-1	L2756689-4	2024-07-17	M											<0.25	<0.22	<0.13	<0.13	<0.13	0.31	1.30	<0.30	0.28	<0.20

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ4-1	L2757122-4	2024-08-21	M											<0.57	<0.39	<0.70	<0.67	<0.67	<1.8	5.0	<0.53	<0.47	<0.37
WQ4-1	VA24C1337-004	2024-08-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-1	VA24C4683-004	2024-09-18	M	<0.0000050	0.000024	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	0.000021	0.000013	<0.000050	<0.42	<0.33	<0.34	<0.36	<0.34	<0.49	5.1	<0.74	0.43	<0.27
WQ4-1	VA24C8569-004	2024-10-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.38	<0.40	<0.46	<0.45	<0.43	<0.69	6.3	<0.47	0.68	<0.28
WQ4-1	L2757977-4	2024-10-30	M											<1.4	<1.0	<1.2	<1.1	<1.1	<2.8	6.4	<1.6	<1.5	<1.1
WQ4-1	VA24C9414-004	2024-10-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-1	VA24D0180-004	2024-11-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.84	<0.83	<0.80	<0.75	<0.74	0.63	5.6	<0.51	<0.46	<0.39
WQ4-1	VA24D0813-004	2024-11-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.51	<0.63	<0.61	<0.60	<0.57	<0.66	2.1	<0.68	0.48	<0.39
WQ4-1	L2758221-4	2024-11-22	M											<1.5	<1.2	<0.95	<0.97	<0.95	3.5	45.9	<0.83	1.3	<0.96
WQ4-1	VA24D1791-004	2024-11-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-1	L2758486-4	2024-12-18	M											<0.20	<0.22	<0.18	<0.18	<0.17	<0.25	2.31	<0.14	0.20	<0.14
WQ4-1	VA24D3937-004	2024-12-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-1	L2758770-4	2025-01-22	M											<0.50	<0.46	<0.46	<0.45	<0.45	<0.62	2.2	<0.41	<0.40	<0.36
WQ4-1	VA25A1525-004	2025-01-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-1	L2759008-4	2025-02-19	M											<0.57	<0.62	<0.68	<0.70	<0.68	<0.76	<1.7	<0.56	<0.48	<0.47
WQ4-1	VA25A3570-004	2025-02-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-1	VA25A6679-004	2025-03-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0.464	0	0	0	0	0	0
WQ4-1	VA25A9109-004	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.21	<0.25	<0.28	<0.27	<0.27	0.684	<1.7	<0.21	<0.20	<0.17
WQ4-1	VA25A9941-004	2025-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.25	<0.18	<0.24	<0.22	<0.23	<0.64	2.40	<0.20	<0.33	<0.21
WQ4-1	VA25B0496-004	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.33	<0.33	<0.25	<0.24	<0.23	<0.58	2.66	<0.35	<0.49	<0.27
WQ4-1	VA25B1530-004	2025-05-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.46	<0.33	<0.54	<0.58	<0.53	<0.75	<7.8	<0.19	<0.24	<0.16
WQ4-1	VA25B1841-004	2025-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.24	<0.23	<0.30	<0.28	<0.27	0.432	<3.9	<0.18	<0.30	<0.19
WQ4-2	0051710-08	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	0062209-08	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	0071996-08	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	0082292-08	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	0.000384	0.000437	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	0093017-08	2020-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	20J1961-08	2020-10-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	20J2778-08	2020-10-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	20K0360-08	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	20K1261-08	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	20K2100-08	2020-11-18	M	0.000017	0.000031	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	0.000034	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	20L1589-08	2020-12-14	M	0.000018	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21A2590-08	2021-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21B2778-08	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21C3505-08	2021-03-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21D2478-08	2021-04-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21E1990-08	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21E2917-08	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21F0167-08	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21F1056-08	2021-06-08	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21F2014-08	2021-06-15	M	0.000017	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21G2414-08	2021-07-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21H3040-08	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21I3814-08	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21J3514-08	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21K3046-08	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	21L2125-08	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	22A2312-08	2022-01-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	22B2487-08	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	22C3145-08	2022-03-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	22D2212-13	2022-04-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	22E2480-10	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ4-2	22F3212-08	2022-06-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	22G1763-08	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	22H2453-08	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000312	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	22I1926-08	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	22J1560-10	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	22K1453-08	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	22L0774-08	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	23A2847-08	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	23C0060-08	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	23C1797-08	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	23D2945-08	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	23E2392-08	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	23F3614-08	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	23G2415-08	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	23H3309-10	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	23I2271-11	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	23J2236-11	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	23K1909-08	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQ4-2	23L2091-05	2023-12-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-2	L2754383-5	2024-01-25	M											<0.16	<0.34	<0.22	<0.22	<0.21	0.47	3.36	0.74	0.47	<0.13
WQ4-2	VA24A1507-005	2024-01-25	M	<0.0000050	0.000019	0.000012	<0.000010	<0.000010	0.000013	<0.000050	0.000033	0.000011											
WQ4-2	L2754604-5	2024-02-14	M											<0.49	<0.98	<0.47	<0.47	<0.44	<0.43	2.3	<0.58	<0.35	<0.34
WQ4-2	VA24A2995-005	2024-02-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-2	L2755043-5	2024-03-21	M											<0.35	<0.37	<0.24	<0.26	0.28	0.36	2.05	<0.17	0.50	<0.32
WQ4-2	VA24A6026-005	2024-03-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-2	L2755490-5	2024-04-24	M											<0.19	<0.29	<0.22	<0.22	<0.23	0.46	1.30	<0.19	0.36	<0.17
WQ4-2	VA24A8916-005	2024-04-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-2	L2755567-5	2024-05-01	M											<0.45	<0.41	<0.40	<0.38	<0.38	<0.38	2.00	<0.55	0.47	<0.23
WQ4-2	VA24A9566-005	2024-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-2	L2755666-5	2024-05-08	M											<0.37	<0.29	<0.35	<0.36	<0.35	<0.38	1.4	<0.47	<0.40	<0.41
WQ4-2	VA24B0201-005	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-2	L2755779-5	2024-05-15	M											<2.0	<1.6	<0.83	<0.86	<0.81	<1.3	6.5	<0.72	0.50	<0.40
WQ4-2	VA24B0901-005	2024-05-15	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-2	L2755888-5	2024-05-22	M											<0.63	<0.65	<0.47	<0.47	<0.45	<1.0	2.00	<0.48	0.57	<0.35
WQ4-2	VA24B1500-005	2024-05-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-2	L2756312-5	2024-06-19	M											<0.28	<0.56	<0.17	<0.16	<0.16	0.43	1.10	<0.31	0.59	<0.24
WQ4-2	VA24B4510-005	2024-06-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-2	VA24B7397-005	2024-07-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-2	L2756689-5	2024-07-17	M											0.34	0.34	<0.25	<0.25	<0.24	0.72	2.57	<0.24	0.58	<0.17
WQ4-2	L2757122-5	2024-08-21	M											<0.38	<0.65	<0.34	<0.35	<0.33	<0.63	5.6	<0.37	0.34	0.19
WQ4-2	VA24C1337-005	2024-08-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-2	VA24C4683-005	2024-09-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.43	<0.53	<0.39	<0.37	<0.37	<0.42	4.7	<0.54	<0.41	<0.33
WQ4-2	VA24C8569-005	2024-10-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.44	<0.70	<0.53	<0.53	<0.51	<0.91	11.2	<0.52	<0.43	<0.41
WQ4-2	L2757977-5	2024-10-30	M											<1.5	<0.93	<1.5	<1.6	<1.4	<3.0	<4.7	<1.6	<1.2	<1.1
WQ4-2	VA24C9414-005	2024-10-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-2	VA24D0180-005	2024-11-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.24	<0.31	<0.31	<0.28	<0.28	0.51	3.9	<0.19	0.28	0.18
WQ4-2	VA24D0813-005	2024-11-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.55	<0.49	<0.54	<0.53	<0.51	<0.75	7.0	<0.56	<0.35	<0.31
WQ4-2	L2758221-5	2024-11-22	M											<0.63	<0.44	<0.61	<0.66	<0.63	<0.50	9.53	<0.38	0.34	<0.27
WQ4-2	VA24D1791-005	2024-11-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-2	L2758486-5	2024-12-18	M											<0.17	<0.24	<0.20	<0.20	<0.19	0.65	4.11	<0.16	0.31	<0.15
WQ4-2	VA24D3937-005	2024-12-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-2	VA25A1525-005	2025-01-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-2	L2758770-5	2025-01-22	M											<0.51	<0.37	<0.38	<0.37	<0.37	<0.45	<1.7	<0.43	<0.39	<0.35

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQ4-2	L2759008-5	2025-02-19	M											<0.59	<0.65	<0.47	<0.47	<0.46	<0.74	<1.6	<0.52	<0.50	<0.45
WQ4-2	VA25A3570-005	2025-02-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-2	VA25A6679-005	2025-03-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	3.15	0	0.260	0
WQ4-2	VA25A9109-005	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.26	<0.26	<0.29	<0.29	<0.28	<0.28	<0.92	<0.18	<0.25	<0.24
WQ4-2	VA25A9941-005	2025-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.36	<0.21	<0.23	<0.23	<0.23	<0.55	3.49	<0.30	<0.37	<0.19
WQ4-2	VA25B0496-005	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.36	<0.66	<0.27	<0.27	<0.26	<1.2	10.1	<0.32	<0.37	<0.15
WQ4-2	VA25B1530-005	2025-05-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.43	<0.31	<0.83	<0.84	<0.80	<0.48	<6.2	<0.25	<0.25	<0.19
WQ4-2	VA25B1841-005	2025-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.29	<0.20	<0.18	<0.18	<0.17	0.539	<3.2	<0.19	<0.27	<0.14
WQ4-3	23L2091-07	2023-12-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQ4-3	L2754383-6	2024-01-25	M											<0.34	<0.35	<0.27	<0.27	<0.26	0.45	1.90	<0.43	<0.29	<0.34
WQ4-3	VA24A1507-006	2024-01-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	<0.000050	0.000020	<0.000010											
WQ4-3	L2754604-6	2024-02-14	M											<0.37	<0.43	<0.42	<0.43	<0.40	1.28	6.8	<0.27	<0.35	<0.41
WQ4-3	VA24A2995-006	2024-02-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-3	L2755043-6	2024-03-21	M											<0.22	<0.47	<0.66	<0.65	<0.63	0.61	1.40	<0.35	<0.30	<0.32
WQ4-3	VA24A6026-006	2024-03-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-3	L2755490-6	2024-04-24	M											<0.17	<0.27	<0.20	<0.20	<0.20	0.55	1.70	<0.19	0.42	<0.17
WQ4-3	VA24A8916-006	2024-04-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-3	L2755567-6	2024-05-01	M											<0.56	<0.43	<0.41	<0.39	<0.39	<0.46	1.6	<0.52	0.43	<0.37
WQ4-3	VA24A9566-006	2024-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-3	L2755666-6	2024-05-08	M											<0.38	<0.39	<0.51	<0.49	<0.48	<0.40	1.2	<0.47	0.47	<0.41
WQ4-3	VA24B0201-006	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-3	L2755779-6	2024-05-15	M											<0.96	<0.77	<0.33	<0.35	<0.33	<0.93	5.4	<0.60	<0.54	<0.46
WQ4-3	VA24B0901-006	2024-05-15	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-3	L2755888-6	2024-05-22	M											<1.4	<1.6	<0.39	<0.37	<0.36	0.79	<1.9	<0.47	<0.39	<0.33
WQ4-3	VA24B1500-006	2024-05-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-3	L2756312-6	2024-06-19	M											<0.38	<0.25	<0.86	<0.79	<0.80	<0.35	1.01	<0.33	0.40	<0.18
WQ4-3	VA24B4510-006	2024-06-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-3	VA24B7397-006	2024-07-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQ4-3	L2756689-6	2024-07-17	M											<0.25	<0.22	<0.12	<0.12	<0.11	0.42	1.77	<0.25	0.43	<0.14
WQ4-3	L2757122-6	2024-08-21	M											<0.42	<0.38	<0.32	<0.32	<0.31	<0.48	9.1	<0.33	0.30	<0.23
WQ4-3	VA24C1337-006	2024-08-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-3	VA24C4683-006	2024-09-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.36	<0.51	<0.76	<0.76	<0.74	6.68	<0.96	<0.46	<0.41	<0.34
WQ4-3	VA24C8569-006	2024-10-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.44	<0.38	<0.65	<0.62	<0.60	1.09	7.3	<0.53	<0.32	<0.29
WQ4-3	L2757977-6	2024-10-30	M											<1.3	<1.4	<1.7	<1.7	<1.6	<2.8	8.3	<1.3	<1.2	<0.93
WQ4-3	VA24C9414-006	2024-10-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-3	VA24D0180-006	2024-11-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.28	<0.28	<0.27	<0.25	<0.25	0.80	4.14	<0.21	0.41	<0.15
WQ4-3	VA24D0813-006	2024-11-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.50	<0.65	<0.59	<0.56	<0.54	<0.74	3.9	<0.50	<0.52	<0.44
WQ4-3	L2758221-6	2024-11-22	M											<0.22	<0.40	<0.24	<0.25	<0.24	0.47	3.66	<0.30	<0.22	<0.22
WQ4-3	VA24D1791-006	2024-11-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-3	L2758486-6	2024-12-18	M											<0.20	<0.25	<0.17	<0.18	<0.17	0.36	3.95	<0.20	0.24	<0.17
WQ4-3	VA24D3937-006	2024-12-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-3	L2758770-6	2025-01-22	M											<0.42	<0.44	<0.52	<0.52	<0.51	<0.56	1.5	<0.39	<0.28	<0.26
WQ4-3	VA25A1525-006	2025-01-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-3	L2759008-6	2025-02-19	M											<0.49	<0.58	<0.84	<0.82	<0.81	0.96	1.8	<0.38	<0.39	<0.33
WQ4-3	VA25A3570-006	2025-02-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQ4-3	VA25A6679-006	2025-03-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	0	0	0	0
WQ4-3	VA25A9109-006	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.47	<0.22	<0.34	<0.33	<0.33	<0.59	<1.4	<0.22	<0.30	<0.26
WQ4-3	VA25A9941-006	2025-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.28	<0.21	<0.27	<0.26	<0.26	<0.50	<1.6	<0.21	<0.29	<0.16
WQ4-3	VA25B0496-006	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.37	<0.42	<0.39	<0.37	<0.36	<0.50	33.5	<0.25	<0.25	<0.19
WQ4-3	VA25B1530-006	2025-05-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.66	<0.22	<0.18	<0.20	<0.18	<0.84	13.2	<0.22	<0.29	<0.28
WQ4-3	VA25B1841-006	2025-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.19	<0.19	<0.22	<0.23	<0.21	<0.58	6.04	<0.22	0.373	<0.13
WQR1-0.5	L2755545-7	2024-04-30	M											0.33	0.61	0.35	0.46	<0.31	0.53	1.6	<0.49	1.25	0.75
WQR1-0.5	VA24A9402-007	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR1-0.5	VA24A9802-011	2024-05-05	M																				
WQR1-0.5	L2755648-10	2024-05-08	M											<0.29	<0.29	<0.25	<0.25	<0.25	0.38	1.20	<0.29	<0.23	<0.25
WQR1-0.5	VA24B0178-010	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-0.5	L2755934-1	2024-05-24	M											<0.27	0.43	<0.36	<0.40	<0.37	0.66	4.78	<0.32	<0.35	<0.27
WQR1-0.5	VA24B1783-001	2024-05-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-0.5	L2755981-1	2024-05-28	M											<0.46	<0.54	<0.33	<0.33	<0.32	0.57	3.4	<0.46	<0.35	<0.27
WQR1-0.5	VA24B2063-001	2024-05-28	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-0.5	VA24B2561-005	2024-06-01	M																				
WQR1-0.5	L2756068-1	2024-06-04	M											<0.65	<0.44	<0.34	<0.33	<0.33	<0.39	1.80	<0.73	<0.60	<0.47
WQR1-0.5	VA24B2772-001	2024-06-04	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-0.5	VA24B3452-007	2024-06-10	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-0.5	655-454600000-0	2024-06-17	M																				
WQR1-0.5	VA24B5880-003	2024-07-02	M																				
WQR1-0.5	VA24B5882-007	2024-07-03	M																				
WQR1-0.5	VA24B6465-001	2024-07-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-0.5	VA24B7867-001	2024-07-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-0.5	L2757210-1	2024-08-26	M											<0.25	<0.31	<0.35	<0.36	<0.33	0.81	6.7	<0.37	0.36	<0.19
WQR1-0.5	VA24C2208-001	2024-08-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	L2757680-1	2024-10-06	M											<0.43	<0.68	<0.37	<0.37	<0.36	<0.45	3.3	<0.42	<0.34	<0.31
WQR1-0.5	VA24C6685-001	2024-10-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	VA24C7408-001	2024-10-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	L2757830-3	2024-10-19	M											<0.25	<0.27	<0.29	<0.27	<0.27	<0.54	4.4	<0.30	<0.19	<0.18
WQR1-0.5	VA24C8041-003	2024-10-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	VA24C8159-005	2024-10-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	L2757872-1	2024-10-22	M											<0.79	<1.1	<0.98	<1.0	<0.98	<1.1	4.3	<0.98	<0.77	<0.70
WQR1-0.5	VA24C8330-001	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	L2757933-5	2024-10-28	M											<0.34	<0.47	<0.47	<0.45	<0.44	<0.61	2.79	<0.30	<0.50	<0.41
WQR1-0.5	VA24C9041-005	2024-10-28	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	L2758002-1	2024-11-01	M											<0.31	<0.29	<0.36	<0.34	<0.33	<0.42	1.70	<0.22	0.33	<0.20
WQR1-0.5	VA24C9683-001	2024-11-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	L2758142-5	2024-11-14	M											<0.36	<0.39	<0.35	<0.34	<0.32	0.54	4.8	<0.29	0.31	<0.24
WQR1-0.5	VA24D0945-005	2024-11-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	VA24D1069-005	2024-11-15	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	L2758203-5	2024-11-19	M											<0.23	<0.20	<0.15	<0.14	<0.14	0.68	1.50	<0.17	<0.18	<0.15
WQR1-0.5	VA24D1567-005	2024-11-19	M	<0.0000050	0.000016	0.000018	<0.000010	<0.000010	0.000016	<0.000050	0.000037	0.000010	<0.000050										
WQR1-0.5	L2758353-1	2024-12-05	M											<0.36	<0.32	<0.29	<0.30	0.29	0.51	2.32	<0.38	<0.28	<0.26
WQR1-0.5	VA24D2842-001	2024-12-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	L2758617-7	2025-01-08	M											<0.25	<0.22	<0.35	<0.35	<0.34	<0.79	1.7	<0.26	<0.21	<0.19
WQR1-0.5	VA25A0392-007	2025-01-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	L2759040-7	2025-02-20	M											<0.59	<0.63	<0.63	<0.63	<0.62	<0.71	<1.5	<0.51	<0.35	<0.32
WQR1-0.5	VA25A3677-007	2025-02-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	L2759227-7	2025-03-13	M											<0.50	<0.37	<0.37	<0.38	<0.37	0.57	4.2	<0.52	<0.31	<0.29
WQR1-0.5	VA25A5556-007	2025-03-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	VA25A6528-013	2025-03-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	VA25A8147-001	2025-04-11	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	VA25A8148-001	2025-04-11	M											<0.66	0.589	<0.37	<0.39	<0.37	<0.62	2.43	<0.79	<0.38	<0.34
WQR1-0.5	VA25A8281-007	2025-04-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	VA25A8283-007	2025-04-14	M											<0.29	<0.22	<0.26	<0.26	<0.25	0.756	<2.6	<0.22	<0.18	<0.17
WQR1-0.5	VA25A9123-008	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	VA25A9125-008	2025-04-23	M											<0.35	<0.35	<0.40	<0.42	<0.40	<0.71	<1.5	<0.41	<0.32	<0.29
WQR1-0.5	VA25B0359-009	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	VA25B0360-009	2025-05-06	M											<0.23	<0.23	<0.20	<0.19	<0.19	0.406	<1.7	<0.29	<0.36	<0.23
WQR1-0.5	VA25B0800-007	2025-05-09	M											<0.35	<0.14	<0.17	<0.17	0.181	<0.62	<4.5	<0.27	<0.38	<0.34

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR1-0.5	VA25B0802-007	2025-05-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-0.5	VA25B2349-005	2025-05-27	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-1	0051710-09	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	0062209-10	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	7	<1	<2	<2
WQR1-1	0071996-09	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	0082292-09	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	0093017-09	2020-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	20J1961-09	2020-10-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	9	<1	<2	<2
WQR1-1	20J2778-09	2020-10-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	0.000057	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	20K0360-09	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	20K1261-09	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	20K2100-09	2020-11-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	5	<1	<2	<2
WQR1-1	20L1589-09	2020-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21A2590-09	2021-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21B2778-09	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21C3505-10	2021-03-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21D2478-09	2021-04-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21E1990-09	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21E2917-09	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21F0167-09	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21F1056-09	2021-06-08	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21F2014-09	2021-06-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21G2414-09	2021-07-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21H3040-09	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21I3814-09	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21J3514-09	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21K3046-09	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	21L2125-09	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	22A2312-09	2022-01-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	22B2487-09	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	22C3145-09	2022-03-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	22D2212-06	2022-04-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	22E2480-01	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	22F3212-09	2022-06-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	22G1763-09	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	22H2453-09	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000237	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	22I1926-09	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	22J1560-01	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	22K1453-09	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	22L0774-09	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	23A2847-09	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	23C0060-09	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	23C1797-09	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	23D2945-09	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	23E2392-09	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	23F3614-09	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	23G2415-09	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	23H3309-01	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	23I2271-01	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	23J2236-01	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	23K1909-09	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-1	23L1905-01	2023-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-1	L2754366-4	2024-01-24	M											<0.23	<0.21	<0.26	<0.27	<0.26	0.32	1.30	<0.15	0.20	<0.15

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR1-1	VA24A1422-004	2024-01-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-1	L2754594-1	2024-02-13	M											<0.37	<0.32	<0.30	<0.28	<0.27	0.82	2.60	<0.34	0.57	<0.34
WQR1-1	VA24A2858-001	2024-02-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-1	L2755033-1	2024-03-20	M											<0.34	<0.41	<0.29	<0.29	<0.27	0.89	1.70	<0.34	0.65	<0.29
WQR1-1	VA24A5955-001	2024-03-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-1	L2755461-1	2024-04-23	M											<0.21	<0.57	<0.28	<0.28	0.41	0.73	3.3	<0.29	0.66	<0.30
WQR1-1	VA24A8736-001	2024-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-1	L2755553-1	2024-04-30	M											<0.30	<0.45	<0.40	<0.40	<0.39	1.10	4.2	<0.33	0.50	0.27
WQR1-1	VA24A9418-001	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-1	L2755641-1	2024-05-07	M											<0.47	<0.41	<0.25	<0.25	<0.24	0.47	1.90	<0.45	<0.26	<0.26
WQR1-1	VA24B0040-001	2024-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-1	L2755769-1	2024-05-14	M											<0.37	<0.48	<0.33	<0.32	<0.32	<0.46	<0.68	<0.47	0.47	<0.32
WQR1-1	VA24B0738-001	2024-05-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-1	L2755874-1	2024-05-21	M											<0.45	<0.42	<0.54	<0.52	<0.51	<0.60	4.3	<0.52	0.71	<0.35
WQR1-1	VA24B1351-001	2024-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-1	L2756277-1	2024-06-18	M											<0.21	0.32	0.27	0.27	0.31	0.49	3.11	<0.21	0.35	<0.12
WQR1-1	VA24B4257-001	2024-06-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-1	L2756678-1	2024-07-16	M											<0.19	<0.20	<0.18	<0.19	<0.18	0.46	1.78	<0.19	0.34	<0.12
WQR1-1	VA24B7237-001	2024-07-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-1	L2757095-1	2024-08-20	M											<0.52	<0.32	<0.22	<0.22	<0.22	1.36	9.9	<0.25	<0.41	<0.34
WQR1-1	VA24C1101-001	2024-08-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-1	VA24C4483-001	2024-09-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.38	<0.69	<0.47	<0.43	<0.44	1.50	18.7	<0.34	<0.34	<0.25
WQR1-1	VA24C8360-001	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.60	<0.78	<0.86	<0.76	<0.77	<1.2	<3.6	<0.49	<0.38	<0.34
WQR1-1	VA24C9197-001	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.40	<0.59	<0.83	<0.79	<0.78	<0.78	5.5	<0.46	0.73	<0.27
WQR1-1	VA24D0009-001	2024-11-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.39	<0.36	<0.23	<0.22	<0.22	0.65	1.4	<0.26	0.39	<0.18
WQR1-1	L2758095-1	2024-11-12	M											<0.52	<0.72	<0.54	<0.51	<0.50	<0.75	3.4	0.54	<0.46	<0.39
WQR1-1	VA24D0632-001	2024-11-12	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-1	VA24D1720-001	2024-11-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0.44	0.32	<0.20	<0.20	0.38	<0.45	2.60	<0.20	0.65	<0.24
WQR1-1	L2758465-1	2024-12-17	M											<0.63	<0.74	<0.92	<0.88	<0.88	<1.1	7.7	<0.62	0.59	<0.31
WQR1-1	VA24D3769-001	2024-12-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-1	L2758719-1	2025-01-21	M											<0.65	<0.53	<0.69	<0.70	<0.69	<0.95	6.3	<0.65	0.63	<0.50
WQR1-1	VA25A1408-001	2025-01-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-1	L2758994-1	2025-02-18	M											<0.18	<0.19	<0.18	<0.18	<0.17	0.55	6.27	<0.15	0.29	<0.12
WQR1-1	VA25A3430-001	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-1	VA25A6550-001	2025-03-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	1.80	0	0	0
WQR1-1	VA25A8962-001	2025-04-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-1	VA25A9878-001	2025-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.22	<0.20	<0.42	<0.39	<0.40	0.549	<0.99	<0.25	<0.21	<0.19
WQR1-1	VA25B0358-001	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.51	<0.37	<0.52	<0.50	<0.49	<0.66	6.52	<0.57	<0.68	<0.57
WQR1-1	VA25B1026-001	2025-05-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.22	<0.19	<0.18	<0.18	<0.17	<0.32	<2.2	<0.30	<0.17	<0.11
WQR1-1	VA25B1711-001	2025-05-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.47	<0.41	<0.36	<0.36	<0.36	<0.48	<1.7	<0.45	<0.49	<0.35
WQR1-2	0051710-10	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	0062209-09	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	0071996-10	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	0082292-10	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	0093017-10	2020-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	20J1961-10	2020-10-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	13	<1	<2	<2
WQR1-2	20J2778-10	2020-10-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	20K0360-10	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	20K1261-10	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	20K2100-10	2020-11-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	20L1589-10	2020-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21A2590-10	2021-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21B2778-10	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR1-2	21C3505-11	2021-03-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21D2478-10	2021-04-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21E1990-10	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21E2917-10	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21F0167-10	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21F1056-10	2021-06-08	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21F2014-10	2021-06-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21G2414-10	2021-07-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21H3040-10	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21I3814-10	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21J3514-10	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21K3046-10	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	21L2125-10	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	22A2312-10	2022-01-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	22B2487-10	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	22C3145-10	2022-03-22	M	0.000013	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	22D2212-07	2022-04-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	22E2480-02	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	22F3212-10	2022-06-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	22G1763-10	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	22H2453-10	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000220	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	22I1926-10	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	22J1560-02	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	22K1453-10	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	22L0774-10	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	23A2847-10	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	23C0060-10	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	23C1797-10	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	23D2945-10	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	23E2392-10	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	15	<1	<2	6
WQR1-2	23F3614-10	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	23G2415-10	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	23H3309-02	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	23I2271-02	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	23J2236-02	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	23K1909-10	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR1-2	23L1905-02	2023-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-2	L2754366-5	2024-01-24	M											<0.28	<0.15	<0.32	<0.32	<0.30	0.28	1.49	<0.17	0.52	<0.12
WQR1-2	VA24A1422-005	2024-01-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2	L2754594-2	2024-02-13	M											<0.31	<0.49	<0.49	<0.49	<0.46	<0.29	1.5	<0.29	<0.30	<0.30
WQR1-2	VA24A2858-002	2024-02-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2	L2755033-2	2024-03-20	M											<0.26	<0.36	<0.69	<0.70	<0.65	0.65	1.50	<0.25	<0.30	<0.29
WQR1-2	VA24A5955-002	2024-03-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2	L2755461-2	2024-04-23	M											<0.20	0.50	<0.27	<0.26	0.30	0.55	2.33	<0.27	0.58	<0.21
WQR1-2	VA24A8736-002	2024-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2	L2755553-2	2024-04-30	M											<0.28	<0.35	<0.39	<0.37	<0.37	0.94	3.4	<0.36	0.65	<0.26
WQR1-2	VA24A9418-002	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2	L2755641-2	2024-05-07	M											<0.41	<0.43	<0.34	<0.33	<0.32	<0.38	2.40	<0.40	<0.38	<0.39
WQR1-2	VA24B0040-002	2024-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2	L2755769-2	2024-05-14	M											<0.38	<0.35	<0.35	<0.34	<0.33	0.40	1.23	<0.53	0.60	<0.27
WQR1-2	VA24B0738-002	2024-05-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2	L2755874-2	2024-05-21	M											<0.69	<0.86	<0.74	<0.78	<0.74	<1.0	4.4	<0.86	0.68	<0.55
WQR1-2	VA24B1351-002	2024-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR1-2	L2756277-2	2024-06-18	M											<0.19	0.26	<0.17	<0.18	0.26	0.44	2.66	<0.23	0.29	<0.11
WQR1-2	VA24B4257-002	2024-06-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2	L2756678-2	2024-07-16	M											<0.19	<0.16	<0.17	<0.16	<0.16	0.52	1.57	<0.25	0.26	<0.15
WQR1-2	VA24B7237-002	2024-07-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2	L2757095-2	2024-08-20	M											<0.51	<0.22	<0.29	<0.29	<0.28	1.40	27.0	<0.44	<0.34	<0.28
WQR1-2	VA24C1101-002	2024-08-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2	VA24C4483-002	2024-09-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.95	<0.38	<0.54	<0.53	<0.52	1.29	18.4	<0.51	<0.26	<0.26
WQR1-2	VA24C8360-002	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.48	<0.68	<0.69	<0.64	<0.63	<0.82	3.8	<0.37	<0.42	<0.40
WQR1-2	VA24C9197-002	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.46	<0.46	<0.57	<0.52	<0.52	<1.2	5.9	<0.38	<0.38	<0.35
WQR1-2	VA24D0009-002	2024-11-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.27	<0.40	<0.25	<0.24	<0.24	<0.50	1.30	<0.30	<0.22	<0.20
WQR1-2	L2758095-2	2024-11-12	M											<1.0	<1.0	<1.1	<1.0	1.78	<1.4	<5.6	<0.76	<0.67	<0.56
WQR1-2	VA24D0632-002	2024-11-12	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2	VA24D1720-002	2024-11-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.27	<0.29	0.22	<0.22	0.36	0.54	2.63	<0.23	0.47	<0.16
WQR1-2	L2758465-2	2024-12-17	M											<0.53	<0.60	<0.45	<0.45	<0.45	<0.82	4.9	<0.41	<0.37	<0.34
WQR1-2	VA24D3769-002	2024-12-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2	L2758719-2	2025-01-21	M											<0.77	<0.69	<0.71	<0.74	<0.71	<0.90	4.4	<0.51	<0.51	<0.47
WQR1-2	VA25A1408-002	2025-01-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2	L2758994-2	2025-02-18	M											<0.15	<0.26	<0.20	<0.21	<0.20	0.49	4.86	<0.15	0.21	<0.19
WQR1-2	VA25A3430-002	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2	VA25A6550-002	2025-03-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	1.86	0	0	0
WQR1-2	VA25A8962-002	2025-04-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2	VA25A9878-002	2025-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.26	<0.32	<0.25	<0.25	<0.24	0.793	<3.1	<0.28	<0.20	<0.17
WQR1-2	VA25B0358-002	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.36	<0.42	<0.45	<0.43	<0.43	0.711	<3.0	<0.71	0.639	<0.33
WQR1-2	VA25B1026-002	2025-05-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.23	<0.38	<0.39	<0.39	<0.37	<0.26	<2.4	<0.13	<0.33	<0.31
WQR1-2	VA25B1711-002	2025-05-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.31	<0.39	<0.29	<0.29	<0.28	<0.51	<1.7	<0.47	<0.41	<0.31
WQR1-2m	L2755545-8	2024-04-30	M											<0.75	<0.46	<0.26	<0.25	<0.24	<0.46	0.85	<0.29	<0.32	<0.32
WQR1-2m	VA24A9402-008	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2m	VA24A9802-012	2024-05-05	M																				
WQR1-2m	L2755648-11	2024-05-08	M											<0.29	<0.36	<0.36	<0.35	<0.35	<0.37	1.10	<0.38	0.60	<0.27
WQR1-2m	VA24B0178-011	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2m	L2755934-2	2024-05-24	M											<0.33	0.39	0.37	<0.23	0.46	0.85	6.79	<0.32	0.93	<0.32
WQR1-2m	VA24B1783-002	2024-05-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2m	L2755981-2	2024-05-28	M											<0.37	<0.39	<0.56	<0.58	<0.55	0.64	3.08	<0.37	<0.33	<0.26
WQR1-2m	VA24B2063-002	2024-05-28	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2m	VA24B2561-006	2024-06-01	M																				
WQR1-2m	L2756068-2	2024-06-04	M											<0.41	<0.32	<0.32	<0.31	0.46	1.1	2.10	<0.91	0.53	<0.24
WQR1-2m	VA24B2772-002	2024-06-04	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2m	VA24B3452-008	2024-06-10	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2m	656-454600000-0	2024-06-17	M																				
WQR1-2m	VA24B5882-008	2024-07-03	M																				
WQR1-2m	VA24B6465-002	2024-07-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2m	VA24B7867-002	2024-07-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-2m	L2757210-2	2024-08-26	M											<0.31	<0.26	<0.35	<0.35	<0.32	<0.60	6.3	<0.34	0.46	<0.22
WQR1-2m	VA24C2208-002	2024-08-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	L2757680-2	2024-10-06	M											<0.40	<0.43	<0.46	<0.46	<0.45	<0.85	2.5	<0.37	<0.23	<0.22
WQR1-2m	VA24C6685-002	2024-10-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	VA24C7408-002	2024-10-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	L2757830-6	2024-10-20	M											<0.28	<0.35	<0.30	<0.27	<0.27	<0.59	4.7	<0.27	<0.20	<0.18
WQR1-2m	VA24C8041-006	2024-10-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	L2757872-2	2024-10-22	M											<0.27	<0.37	<0.26	<0.26	0.30	<0.34	2.30	<0.28	0.54	<0.38
WQR1-2m	VA24C8330-002	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	L2757933-6	2024-10-28	M											<0.34	<0.41	<0.45	<0.44	<0.42	<0.75	2.9	<0.29	<0.54	<0.55
WQR1-2m	VA24C9041-006	2024-10-28	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR1-2m	L2758002-3	2024-11-01	M											<0.28	<0.40	<0.28	<0.26	<0.26	0.96	3.3	<0.21	0.29	<0.17
WQR1-2m	VA24C9683-003	2024-11-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	L2758353-2	2024-12-05	M											<0.35	<0.35	<0.31	<0.31	<0.30	0.80	<0.84	<0.42	<0.28	<0.24
WQR1-2m	VA24D2842-002	2024-12-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	L2758617-8	2025-01-08	M											<0.50	<0.44	<0.43	<0.43	<0.41	<1.1	4.3	<0.32	<0.27	<0.27
WQR1-2m	VA25A0392-008	2025-01-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	L2759040-8	2025-02-20	M											<0.49	<0.40	<0.50	<0.48	<0.48	<0.55	1.3	<0.49	<0.34	<0.29
WQR1-2m	VA25A3677-008	2025-02-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	L2759227-8	2025-03-13	M											<0.44	<0.35	<0.40	<0.38	<0.38	0.78	6.25	<0.49	<0.25	<0.22
WQR1-2m	VA25A5556-008	2025-03-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	VA25A6528-014	2025-03-25	M																				
WQR1-2m	VA25A8147-002	2025-04-11	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	VA25A8148-002	2025-04-11	M											<0.46	<0.29	<0.48	<0.48	<0.47	0.702	<2.5	<0.67	<0.35	<0.31
WQR1-2m	VA25A8281-008	2025-04-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	VA25A8283-008	2025-04-14	M											<0.32	<0.23	<0.29	<0.27	<0.28	<0.68	<2.4	<0.22	<0.32	<0.21
WQR1-2m	VA25A9123-009	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	VA25A9125-009	2025-04-23	M											<0.28	<0.32	<0.29	<0.28	<0.28	<0.60	<2.0	<0.26	<0.34	<0.25
WQR1-2m	VA25B0359-008	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-2m	VA25B0360-008	2025-05-06	M											<0.26	<0.22	<0.21	<0.22	<0.21	<0.50	1.85	<0.39	0.429	<0.20
WQR1-2m	VA25B0800-008	2025-05-09	M											<0.29	<0.29	<0.14	<0.15	<0.14	<0.26	3.48	<0.14	0.331	<0.21
WQR1-2m	VA25B0802-008	2025-05-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-3	23L1905-03	2023-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR1-3	L2754366-6	2024-01-24	M											<0.47	<0.37	<0.41	<0.40	<0.38	<0.48	<0.76	<0.37	<0.26	<0.27
WQR1-3	VA24A1422-006	2024-01-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-3	L2754594-3	2024-02-13	M											<0.38	<0.51	<0.59	<0.55	<0.54	0.49	2.1	<0.25	<0.43	<0.38
WQR1-3	VA24A2858-003	2024-02-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-3	L2755033-3	2024-03-20	M											<0.29	<0.38	<0.28	<0.27	<0.26	0.36	<0.95	<0.25	<0.20	<0.22
WQR1-3	VA24A5955-003	2024-03-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-3	L2755461-3	2024-04-23	M											<0.22	<0.38	<0.35	<0.34	<0.35	0.72	1.40	<0.30	<0.27	0.30
WQR1-3	VA24A8736-003	2024-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-3	L2755553-3	2024-04-30	M											<0.28	<0.41	<0.33	<0.31	<0.31	<0.53	4.6	<0.26	0.61	<0.23
WQR1-3	VA24A9418-003	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-3	L2755641-3	2024-05-07	M											<0.34	<0.37	<0.32	<0.32	<0.31	<0.31	1.90	<0.36	<0.24	<0.26
WQR1-3	VA24B0040-003	2024-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-3	L2755769-3	2024-05-14	M											<0.33	<0.34	<0.34	<0.34	<0.33	<0.31	0.97	<0.39	<0.33	<0.28
WQR1-3	VA24B0738-003	2024-05-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-3	L2755874-3	2024-05-21	M											<0.67	1.00	0.89	1.60	1.30	2.73	9.2	<0.58	1.30	0.75
WQR1-3	VA24B1351-003	2024-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-3	L2756277-3	2024-06-18	M											<0.24	0.27	<0.18	0.29	0.28	0.84	2.42	<0.21	0.53	<0.14
WQR1-3	VA24B4257-003	2024-06-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-3	L2756678-3	2024-07-16	M											<0.20	<0.15	<0.14	<0.15	<0.14	0.34	1.52	<0.26	0.30	<0.12
WQR1-3	VA24B7237-003	2024-07-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-3	L2757095-3	2024-08-20	M											<0.47	<0.51	<0.62	<0.58	<0.58	<0.91	12.5	<0.32	<0.32	<0.27
WQR1-3	VA24C1101-003	2024-08-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-3	VA24C4483-003	2024-09-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<1.1	<0.45	<0.48	<0.46	<0.46	2.90	21.6	<0.27	<0.73	<0.54
WQR1-3	VA24C8360-003	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.61	<0.64	<1.1	<1.1	<1.0	<1.6	3.9	<0.55	0.67	<0.41
WQR1-3	VA24C9197-003	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0.1	<0.46	<0.95	<0.90	<0.88	<1.4	8.1	<0.46	<0.36	<0.32
WQR1-3	VA24D0009-003	2024-11-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.48	<0.41	<0.33	<0.31	<0.31	<0.40	<1.3	<0.37	0.42	<0.20
WQR1-3	L2758095-3	2024-11-12	M											<0.87	<0.79	<0.94	<0.88	<0.87	<1.1	<2.7	<0.59	<0.73	<0.62
WQR1-3	VA24D0632-003	2024-11-12	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-3	VA24D1720-003	2024-11-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.28	<0.23	0.27	<0.22	<0.22	0.46	2.57	<0.27	0.45	<0.21
WQR1-3	L2758465-3	2024-12-17	M											<0.51	<0.50	<0.63	<0.64	<0.62	<1.2	7.9	<0.52	0.49	<0.27
WQR1-3	VA24D3769-003	2024-12-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR1-3	L2758719-3	2025-01-21	M											<0.61	<0.72	<0.49	<0.51	<0.49	<0.75	3.4	<0.49	<0.40	<0.37
WQR1-3	VA25A1408-003	2025-01-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-3	L2758994-3	2025-02-18	M											<0.18	<0.14	<0.17	<0.17	<0.16	0.43	6.60	<0.19	0.32	<0.18
WQR1-3	VA25A3430-003	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-3	VA25A6550-003	2025-03-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0.622	2.25	0	0	0
WQR1-3	VA25A8962-003	2025-04-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-3	VA25A9878-003	2025-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.35	<0.32	<0.24	<0.23	<0.23	<0.56	2.76	<0.29	<0.37	<0.21
WQR1-3	VA25B0358-003	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0.317	<0.27	<0.33	<0.32	<0.32	<0.44	2.09	<0.42	<0.66	<0.27
WQR1-3	VA25B1026-003	2025-05-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.21	<0.22	<0.16	<0.16	<0.15	<0.29	<2.3	<0.21	<0.36	<0.11
WQR1-3	VA25B1711-003	2025-05-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.29	<0.34	<0.24	<0.26	<0.24	<0.54	2.53	<0.46	<0.47	<0.39
WQR1-SF	L2755545-9	2024-04-30	M											<0.22	0.35	<0.28	<0.27	<0.27	0.95	4.0	<0.23	<0.24	<0.24
WQR1-SF	VA24A9402-009	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-SF	VA24A9802-013	2024-05-05	M																				
WQR1-SF	L2755648-12	2024-05-08	M											<0.39	<0.27	<0.30	<0.29	<0.29	<0.25	0.85	<0.33	0.44	<0.19
WQR1-SF	VA24B0178-012	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-SF	L2755934-3	2024-05-24	M											<0.22	0.31	<0.35	<0.35	<0.34	0.89	6.85	<0.31	0.36	<0.22
WQR1-SF	VA24B1783-003	2024-05-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-SF	L2755981-3	2024-05-28	M											<0.39	<0.44	<0.42	<0.43	<0.42	0.33	2.3	<0.49	<0.40	<0.31
WQR1-SF	VA24B2063-003	2024-05-28	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-SF	L2756068-3	2024-06-04	M											<0.54	<0.70	<0.43	0.55	0.45	0.69	2.00	<0.61	<0.37	<0.26
WQR1-SF	VA24B2772-003	2024-06-04	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-SF	VA24B3452-009	2024-06-10	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-SF	657-454600000-0	2024-06-17	M																				
WQR1-SF	VA24B5882-009	2024-07-03	M																				
WQR1-SF	VA24B6465-003	2024-07-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-SF	VA24B7867-003	2024-07-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR1-SF	L2757210-3	2024-08-26	M											<0.32	<0.25	<0.33	<0.33	<0.31	<0.91	11.0	<0.39	<0.28	<0.23
WQR1-SF	VA24C2208-003	2024-08-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	L2757680-3	2024-10-06	M											<0.44	<0.42	<0.56	<0.53	<0.54	<0.45	<1.0	<0.37	0.42	<0.25
WQR1-SF	VA24C6685-003	2024-10-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	VA24C7408-003	2024-10-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	L2757872-3	2024-10-22	M											<0.44	<0.60	<0.34	<0.31	<0.32	<0.93	2.16	<0.45	0.38	<0.23
WQR1-SF	VA24C8330-003	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	L2757933-7	2024-10-28	M											<0.30	0.65	<0.32	<0.29	<0.29	<0.47	<0.97	<0.24	<0.37	<0.34
WQR1-SF	VA24C9041-007	2024-10-28	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	L2758002-4	2024-11-01	M											<0.26	<0.33	<0.20	<0.19	<0.19	0.60	1.90	<0.20	<0.20	<0.18
WQR1-SF	VA24C9683-004	2024-11-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	VA24D2498-001	2024-11-30	M																				
WQR1-SF	L2758353-3	2024-12-05	M											<0.58	<0.56	<0.34	<0.34	<0.34	0.53	2.50	<0.38	<0.31	<0.27
WQR1-SF	VA24D2842-003	2024-12-05	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	L2758617-9	2025-01-08	M											<0.28	<0.37	<0.29	<0.27	<0.27	<0.57	2.2	<0.25	0.42	<0.22
WQR1-SF	VA25A0392-009	2025-01-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	L2759040-9	2025-02-20	M											<0.46	<0.55	<0.34	<0.32	<0.33	<0.47	0.96	<0.36	<0.29	<0.26
WQR1-SF	VA25A3677-009	2025-02-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	L2759227-9	2025-03-13	M											<0.48	0.40	<0.39	<0.38	<0.38	0.90	6.90	<0.53	0.63	<0.36
WQR1-SF	VA25A5556-009	2025-03-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	VA25A6528-015	2025-03-25	M																				
WQR1-SF	VA25A8147-003	2025-04-11	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	VA25A8148-003	2025-04-11	M											<0.44	<0.40	<0.53	<0.52	<0.52	<0.68	<2.4	<0.73	<0.38	<0.33
WQR1-SF	VA25A8281-009	2025-04-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	VA25A8283-009	2025-04-14	M											<0.25	<0.23	<0.20	<0.20	<0.20	<0.46	2.15	<0.23	<0.23	<0.19
WQR1-SF	VA25A9123-010	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	VA25A9125-010	2025-04-23	M											<0.33	<0.27	<0.34	<0.32	<0.32	<0.78	<1.8	<0.26	<0.35	<0.20

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR1-SF	VA25B0359-007	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR1-SF	VA25B0360-007	2025-05-06	M											<0.20	<0.28	<0.31	<0.33	<0.31	<0.33	2.89	<0.30	0.329	<0.20
WQR1-SF	VA25B0800-009	2025-05-09	M											<0.46	<0.21	<0.52	<0.52	<0.50	<0.35	4.38	<0.25	<0.21	<0.19
WQR1-SF	VA25B0802-009	2025-05-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2755545-10	2024-04-30	M											<0.26	<0.28	<0.30	<0.28	<0.28	1.08	3.88	<0.24	0.36	<0.21
WQR2-0.5	VA24A9402-010	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-0.5	L2755648-1	2024-05-08	M											<0.26	<0.33	<0.31	<0.30	<0.30	<0.45	2.40	<0.32	<0.21	<0.21
WQR2-0.5	VA24B0178-001	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-0.5	L2755934-10	2024-05-24	M											<0.32	<0.28	<0.31	<0.33	<0.32	0.88	4.07	<0.39	<0.32	<0.26
WQR2-0.5	VA24B1783-010	2024-05-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-0.5	VA24B3452-010	2024-06-10	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-0.5	658-454600000-0	2024-06-17	M																				
WQR2-0.5	VA24B5882-010	2024-07-03	M																				
WQR2-0.5	VA24B6465-004	2024-07-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-0.5	VA24B7867-004	2024-07-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	0.000017	<0.000050	<0.000020	<0.000010											
WQR2-0.5	L2757210-4	2024-08-26	M											<0.28	<0.33	<0.33	<0.33	<0.31	<0.64	6.0	<0.31	<0.24	<0.19
WQR2-0.5	VA24C2208-004	2024-08-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	VA24C5557-001	2024-09-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2757680-4	2024-10-06	M											<0.42	<0.33	<0.32	<0.30	<0.31	<0.34	<0.79	<0.36	0.32	<0.22
WQR2-0.5	VA24C6685-004	2024-10-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	VA24C7408-004	2024-10-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2757830-2	2024-10-19	M											<0.27	<0.30	<0.28	<0.28	<0.27	<0.51	7.5	<0.31	0.33	<0.20
WQR2-0.5	VA24C8041-002	2024-10-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	VA24C8159-004	2024-10-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2757872-4	2024-10-22	M											<0.30	<0.50	<0.32	<0.32	<0.31	<0.41	1.57	0.24	0.32	0.21
WQR2-0.5	VA24C8330-004	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2757962-5	2024-10-29	M											<0.19	<0.30	<0.21	<0.22	<0.21	<0.51	8.04	<0.32	0.24	<0.14
WQR2-0.5	VA24C9185-005	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2758003-1	2024-11-02	M											<0.25	<0.15	<0.24	<0.23	<0.23	0.34	2.30	<0.17	<0.18	<0.14
WQR2-0.5	VA24C9732-001	2024-11-02	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2758142-6	2024-11-14	M											<0.25	<0.28	<0.38	<0.37	<0.36	0.61	4.8	<0.24	0.42	<0.16
WQR2-0.5	VA24D0945-006	2024-11-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	VA24D1069-006	2024-11-15	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2758203-6	2024-11-19	M											<0.29	<0.25	<0.34	<0.33	<0.33	<0.40	2.07	<0.24	0.32	<0.21
WQR2-0.5	VA24D1567-006	2024-11-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2758354-1	2024-12-06	M											<0.34	<0.32	<0.41	<0.41	<0.40	<0.65	3.04	<0.43	<0.29	<0.27
WQR2-0.5	VA24D3008-001	2024-12-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2758634-7	2025-01-09	M											<0.45	<0.45	<0.82	<0.85	<0.80	<0.50	4.3	<0.38	<0.35	<0.30
WQR2-0.5	VA25A0510-007	2025-01-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	0.000015	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2759010-7	2025-02-18	M											<0.38	<0.39	<0.37	<0.38	<0.37	<0.58	<1.1	<0.34	0.34	<0.22
WQR2-0.5	VA25A3415-007	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	L2759209-7	2025-03-12	M											<0.16	<0.20	<0.18	<0.17	<0.17	0.55	13.5	<0.15	0.27	<0.11
WQR2-0.5	VA25A5429-007	2025-03-12	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	VA25A6528-016	2025-03-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	VA25A8147-004	2025-04-11	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	VA25A8148-004	2025-04-11	M											<0.51	<0.45	<0.39	<0.39	<0.48	1.01	2.67	<0.62	<0.34	<0.29
WQR2-0.5	VA25A8280-007	2025-04-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	VA25A8282-007	2025-04-13	M											<0.30	<0.27	<0.29	<0.29	<0.28	<0.57	4.25	<0.22	<0.24	<0.22
WQR2-0.5	VA25A8854-007	2025-04-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	VA25A8855-007	2025-04-21	M											<0.53	<0.37	<0.47	<0.49	<0.47	<1.1	2.23	<0.75	<0.33	<0.30
WQR2-0.5	VA25B0359-012	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	0.000014	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	VA25B0360-012	2025-05-06	M											<0.25	<0.23	<0.28	<0.28	<0.27	<0.46	2.34	<0.29	0.333	<0.18
WQR2-0.5	VA25B0499-007	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-0.5	VA25B0502-007	2025-05-07	M											<0.44	<0.25	<0.18	<0.18	<0.17	<0.51	<3.2	<0.36	<0.27	<0.26

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR2-0.5	VA25B2349-006	2025-05-27	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-1	0051710-11	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	0062209-12	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	0071996-11	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	0082292-11	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	0093017-11	2020-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	20J1961-11	2020-10-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	20J2778-11	2020-10-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	20K0360-11	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	20K1261-11	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	20K2100-11	2020-11-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	20L1589-11	2020-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21A2590-11	2021-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21B2778-11	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21C3505-12	2021-03-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21D2478-11	2021-04-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21E1990-11	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21E2917-11	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21F0167-11	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21F1056-11	2021-06-08	M	0.000027	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21F2014-11	2021-06-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21G2414-11	2021-07-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21H3040-11	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21I3814-11	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21J3514-11	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21K3046-11	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	21L2125-11	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22A2312-11	2022-01-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22B2487-11	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	22C3145-11	2022-03-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	22D2212-14	2022-04-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	22E2480-11	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22F3212-11	2022-06-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	22G1763-11	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	22H2453-11	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22I1926-11	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	22J1560-11	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	22K1453-11	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22K2628-03	2022-11-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22K2988-03	2022-11-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22K3123-03	2022-11-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22L0036-03	2022-11-30	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22L0263-03	2022-12-02	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22L0499-03	2022-12-05	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22L0633-03	2022-12-06	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	22L0774-11	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	22L1436-03	2022-12-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	23A2847-11	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	23C0060-11	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	23C1797-11	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	23D2945-11	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	23E2392-11	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	23F3614-11	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	23G2415-11	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	23H3309-11	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR2-1	23I2271-13	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	23J2236-13	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	23K1909-11	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-1	23L2091-09	2023-12-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-1	L2754383-7	2024-01-25	M											<0.19	<0.24	<0.28	<0.26	<0.26	0.23	1.01	<0.11	0.29	<0.11
WQR2-1	VA24A1507-009	2024-01-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-1	L2754604-7	2024-02-14	M											<0.26	<0.58	<0.33	0.60	0.42	1.16	2.40	0.24	0.43	<0.16
WQR2-1	VA24A2995-009	2024-02-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-1	L2755043-9	2024-03-21	M											<0.42	<0.18	<0.31	<0.33	<0.31	<0.31	<1.6	<0.22	0.30	0.19
WQR2-1	VA24A6026-009	2024-03-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-1	L2755490-7	2024-04-24	M											<0.22	<0.29	<0.19	<0.19	<0.19	<0.33	0.98	<0.19	<0.17	<0.17
WQR2-1	VA24A8916-009	2024-04-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-1	L2755567-7	2024-05-01	M											<0.80	<0.79	<0.56	<0.51	<0.52	<0.74	2.6	<1.1	<0.46	<0.46
WQR2-1	VA24A9566-009	2024-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-1	L2755666-7	2024-05-08	M											<0.43	<0.41	<0.43	<0.42	<0.41	<0.68	<1.0	<0.53	<0.32	<0.33
WQR2-1	VA24B0201-009	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-1	L2755779-7	2024-05-15	M											<0.58	<0.44	<0.46	<0.44	<0.43	0.76	8.6	<0.64	<1.1	<0.94
WQR2-1	VA24B0901-009	2024-05-15	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-1	L2755888-7	2024-05-22	M											<0.90	<0.75	<0.50	<0.49	<0.47	<1.1	4.8	<0.50	<0.42	<0.35
WQR2-1	VA24B1500-009	2024-05-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-1	L2756312-7	2024-06-19	M											<0.59	<0.38	<0.21	<0.20	<0.20	<0.49	0.67	<0.68	<0.30	<0.25
WQR2-1	VA24B4510-009	2024-06-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-1	VA24B7397-009	2024-07-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-1	L2756689-7	2024-07-17	M											<0.25	<0.21	<0.14	<0.14	<0.13	0.39	1.80	<0.24	0.63	<0.14
WQR2-1	L2757122-7	2024-08-21	M											<0.35	<0.75	<0.48	<0.44	<0.45	<0.76	6.98	<0.46	0.48	<0.26
WQR2-1	VA24C1337-009	2024-08-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-1	VA24C4683-009	2024-09-18	M	<0.0000050	0.000014	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.43	<0.39	<0.51	<0.51	<0.50	<0.55	3.5	<0.40	<0.46	<0.39
WQR2-1	VA24C8569-009	2024-10-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.49	<0.43	<0.44	<0.44	<0.42	<1.2	5.0	<0.47	<0.34	<0.32
WQR2-1	L2757977-9	2024-10-30	M											<1.5	<1.5	<1.7	<1.6	<1.6	<2.8	8.8	<1.9	<1.3	<1.1
WQR2-1	VA24C9414-009	2024-10-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-1	VA24D0180-009	2024-11-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.41	<0.38	<0.20	<0.19	<0.19	0.34	3.46	<0.21	0.55	<0.18
WQR2-1	VA24D0813-009	2024-11-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.55	<0.72	<0.47	<0.43	<0.43	<0.65	<2.1	<0.47	0.46	<0.32
WQR2-1	L2758221-7	2024-11-22	M											<0.58	<0.40	<0.34	<0.34	<0.34	<0.30	4.80	<0.41	0.40	<0.15
WQR2-1	VA24D1791-009	2024-11-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-1	L2758486-7	2024-12-18	M											<0.17	<0.23	<0.18	<0.18	<0.17	0.32	2.6	<0.14	0.26	<0.16
WQR2-1	VA24D3937-009	2024-12-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-1	L2758770-7	2025-01-22	M											<0.39	<0.58	<0.29	<0.27	<0.28	<0.58	1.40	<0.37	0.82	<0.27
WQR2-1	VA25A1525-009	2025-01-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-1	L2759008-7	2025-02-19	M											<0.65	<0.76	<0.53	<0.54	<0.52	<0.82	2.3	<0.61	0.83	<0.45
WQR2-1	VA25A3570-009	2025-02-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-1	VA25A6679-009	2025-03-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	0	0	0	0
WQR2-1	VA25A9109-009	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.31	<0.26	<0.42	<0.42	<0.41	<0.34	<1.6	<0.23	<0.19	<0.19
WQR2-1	VA25A9941-009	2025-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.16	<0.23	<0.15	<0.16	<0.15	<0.27	1.27	<0.19	<0.15	<0.12
WQR2-1	VA25B0496-009	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.47	<0.71	<1.2	<1.2	<1.1	<1.4	<12	<0.30	<0.28	<0.26
WQR2-1	VA25B1530-009	2025-05-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.63	<0.29	<0.23	<0.23	<0.22	<0.66	3.83	<0.31	<0.22	<0.18
WQR2-1	VA25B1841-009	2025-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.21	<0.19	<0.13	<0.13	<0.12	<0.62	3.87	<0.20	<0.24	<0.14
WQR2-2	0051710-12	2020-05-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	0062209-11	2020-06-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	0071996-12	2020-07-21	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	0082292-12	2020-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	0093017-12	2020-09-28	M	0.000082	<0.000030	<0.000050	0.000084	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	20J1961-12	2020-10-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	20J2778-12	2020-10-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	22	<1	<2	<2
WQR2-2	20K0360-12	2020-11-03	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	20K1261-12	2020-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR2-2	20K2100-12	2020-11-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	20L1589-12	2020-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	5	<1	<2	<2
WQR2-2	21A2590-12	2021-01-27	M	0.000035	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21B2778-12	2021-02-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21C3505-13	2021-03-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21D2478-12	2021-04-22	M	<0.000017	0.000063	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000100	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21E1990-12	2021-05-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21E2917-12	2021-05-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21F0167-12	2021-06-01	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21F1056-12	2021-06-08	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21F2014-12	2021-06-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21G2414-12	2021-07-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21H3040-12	2021-08-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21I3814-12	2021-09-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21J3514-12	2021-10-26	M											<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21K3046-12	2021-11-23	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	21L2125-12	2021-12-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22A2312-12	2022-01-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22B2487-12	2022-02-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	22C3145-12	2022-03-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	22D2212-15	2022-04-20	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	22E2480-12	2022-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22F3212-12	2022-06-21	M	<0.000090	<0.000270	<0.000450	<0.000450	<0.000900	<0.000900	<0.00180	<0.000900	<0.000180	<0.000450										
WQR2-2	22G1763-12	2022-07-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	22H2453-12	2022-08-16	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000930	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22I1926-12	2022-09-14	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	22J1560-12	2022-10-12	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	22K1453-12	2022-11-10	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22K2628-04	2022-11-22	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22K2988-04	2022-11-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22K3123-04	2022-11-25	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22L0036-04	2022-11-30	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22L0263-04	2022-12-02	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22L0499-04	2022-12-05	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22L0633-04	2022-12-06	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	22L0774-12	2022-12-07	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	22L1436-04	2022-12-13	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	23A2847-12	2023-01-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	23C0060-12	2023-02-28	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	23C1797-12	2023-03-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	23D2945-12	2023-04-26	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	23E2392-12	2023-05-17	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	23F3614-12	2023-06-27	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	23G2415-12	2023-07-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	23H3309-12	2023-08-24	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	23I2271-14	2023-09-19	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	23J2236-14	2023-10-18	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	23K1909-12	2023-11-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050	<1	<2	<2	<2	<2	<3	<4	<1	<2	<2
WQR2-2	23L2091-10	2023-12-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-2	L2754383-8	2024-01-25	M											<0.27	<0.20	<0.19	<0.20	0.21	0.43	1.00	0.79	0.46	<0.16
WQR2-2	VA24A1507-010	2024-01-25	M	<0.0000050	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	0.000023	<0.000010											
WQR2-2	L2754604-8	2024-02-14	M											<0.33	<0.22	<0.30	<0.30	<0.28	0.45	1.10	<0.16	0.44	<0.18
WQR2-2	VA24A2995-010	2024-02-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2	L2755043-10	2024-03-21	M											<0.30	<0.20	<0.41	<0.44	<0.40	<0.28	1.15	<0.45	0.39	<0.22
WQR2-2	VA24A6026-010	2024-03-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR2-2	L2755490-8	2024-04-24	M											<0.24	<0.27	<0.23	<0.22	<0.23	<0.35	1.5	<0.23	<0.20	<0.20
WQR2-2	VA24A8916-010	2024-04-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2	L2755567-8	2024-05-01	M											<0.45	<0.39	<0.40	<0.42	<0.40	<0.63	1.8	<0.48	<0.33	<0.37
WQR2-2	VA24A9566-010	2024-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2	L2755666-8	2024-05-08	M											<0.37	<0.38	<0.45	<0.44	<0.43	<0.49	<1.5	<0.47	<0.33	<0.31
WQR2-2	VA24B0201-010	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2	L2755779-8	2024-05-15	M											<0.53	<0.46	<0.62	<0.65	<0.61	0.62	3.9	<0.91	<0.28	<0.25
WQR2-2	VA24B0901-010	2024-05-15	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2	L2755888-8	2024-05-22	M											<0.49	<0.59	<0.39	<0.38	<0.37	<0.73	2.7	<0.47	<0.41	<0.33
WQR2-2	VA24B1500-010	2024-05-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2	L2756312-8	2024-06-19	M											<0.27	<0.33	<0.27	<0.26	<0.26	<0.49	0.82	<0.44	0.33	<0.22
WQR2-2	VA24B4510-010	2024-06-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2	VA24B7397-010	2024-07-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2	L2756689-8	2024-07-17	M											<0.24	<0.28	<0.16	<0.16	<0.15	0.40	1.50	<0.21	0.28	<0.15
WQR2-2	L2757122-8	2024-08-21	M											<0.39	<0.28	<0.21	<0.19	<0.20	0.84	6.8	<0.33	<0.31	<0.29
WQR2-2	VA24C1337-010	2024-08-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2	VA24C4683-010	2024-09-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.44	<0.74	<0.62	<0.61	<0.60	0.53	<1.5	<0.54	<0.41	<0.32
WQR2-2	VA24C8569-010	2024-10-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.43	<0.33	<0.71	<0.67	<0.66	<0.84	5.8	<0.43	<0.33	<0.30
WQR2-2	L2757977-10	2024-10-30	M											<1.9	<2.0	<1.8	<1.9	<1.7	<3.8	10.0	<2.0	<2.2	<1.8
WQR2-2	VA24C9414-010	2024-10-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2	VA24D0180-010	2024-11-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.28	<0.28	<0.25	<0.24	0.37	<0.42	3.80	<0.23	0.39	<0.14
WQR2-2	VA24D0813-010	2024-11-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.67	<0.50	<0.54	<0.55	<0.52	<1.0	3.1	<0.55	<0.33	<0.28
WQR2-2	L2758221-8	2024-11-22	M											<0.39	<0.35	<0.23	<0.23	<0.23	<0.46	8.9	<0.32	0.74	<0.29
WQR2-2	VA24D1791-010	2024-11-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2	L2758486-8	2024-12-18	M											<0.19	<0.24	<0.25	<0.26	<0.25	<0.33	3.38	<0.16	<0.18	<0.15
WQR2-2	VA24D3937-010	2024-12-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2	L2758770-8	2025-01-22	M											<0.33	<0.38	<0.47	<0.46	<0.46	<0.31	2.0	<0.40	0.48	<0.37
WQR2-2	VA25A1525-010	2025-01-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2	L2759008-8	2025-02-19	M											<0.40	<0.57	<0.43	<0.43	<0.42	<0.84	<1.2	<0.41	<0.44	<0.40
WQR2-2	VA25A3570-010	2025-02-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2	VA25A6679-010	2025-03-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0	0	0	0	0
WQR2-2	VA25A9109-010	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.41	<0.22	<0.30	<0.30	<0.29	<0.61	<0.82	<0.33	<0.23	<0.22
WQR2-2	VA25A9941-010	2025-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.25	<0.16	<0.24	<0.23	<0.23	<0.48	<1.5	<0.23	0.297	<0.17
WQR2-2	VA25B0496-010	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.58	<0.40	<0.39	<0.42	<0.39	<0.79	<30	<0.40	<0.29	<0.26
WQR2-2	VA25B1530-010	2025-05-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.34	<0.30	<0.52	<0.51	<0.49	<0.72	<4.5	<0.24	<0.28	<0.26
WQR2-2	VA25B1841-010	2025-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.23	<0.21	<0.43	<0.41	<0.40	0.522	<5.8	<0.27	<0.22	<0.17
WQR2-2m	L2755545-11	2024-04-30	M											<0.24	<0.24	<0.27	<0.28	0.38	0.96	4.97	<0.21	0.70	0.28
WQR2-2m	VA24A9402-011	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2m	L2755648-2	2024-05-08	M											<0.39	<0.36	<0.38	<0.36	<0.36	0.32	1.40	<0.38	<0.27	<0.26
WQR2-2m	VA24B0178-002	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2m	L2755934-11	2024-05-24	M											<0.21	<0.17	<0.22	<0.23	0.24	0.33	2.39	<0.27	0.31	<0.18
WQR2-2m	VA24B1783-011	2024-05-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2m	VA24B3452-011	2024-06-10	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2m	659-454600000-0	2024-06-17	M																				
WQR2-2m	VA24B5882-011	2024-07-03	M																				
WQR2-2m	VA24B6465-005	2024-07-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2m	VA24B7867-005	2024-07-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-2m	L2757210-5	2024-08-26	M											<0.28	<0.23	<0.37	<0.36	<0.34	0.75	11.0	<0.29	<0.33	<0.28
WQR2-2m	VA24C2208-005	2024-08-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	VA24C5557-002	2024-09-25	M	<0.0000050	0.000014	0.000019	<0.000010	0.000012	0.000017	<0.000050	0.000031	<0.000010	<0.000050										
WQR2-2m	L2757680-5	2024-10-06	M											<0.46	<0.53	<0.41	<0.39	<0.39	<0.54	<0.96	<0.45	<0.27	<0.23
WQR2-2m	VA24C6685-005	2024-10-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	VA24C7408-005	2024-10-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	L2757872-5	2024-10-22	M											<0.30	<0.43	<0.39	<0.39	<0.38	<0.69	1.40	<0.23	<0.29	<0.26
WQR2-2m	VA24C8330-005	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	VA24C9185-006	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR2-2m	L2757962-6	2024-10-29	M											<0.30	<0.25	<0.18	<0.18	<0.18	<0.41	3.27	<0.18	<0.33	<0.28
WQR2-2m	L2758003-2	2024-11-02	M											<0.43	<0.21	<0.24	<0.23	<0.23	<0.43	2.79	<0.28	<0.21	<0.17
WQR2-2m	VA24C9732-002	2024-11-02	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	L2758354-2	2024-12-06	M											<0.42	0.83	<0.46	<0.45	<0.45	<0.33	5.6	<0.46	0.38	<0.30
WQR2-2m	VA24D3008-002	2024-12-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	L2758634-8	2025-01-09	M											<0.22	<0.26	<0.36	<0.36	<0.35	<0.41	2.5	<0.25	<0.19	<0.17
WQR2-2m	VA25A0510-008	2025-01-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	L2759010-8	2025-02-18	M											<0.43	0.44	<0.35	<0.37	<0.35	<0.43	1.10	<0.29	0.25	<0.23
WQR2-2m	VA25A3415-008	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	L2759209-8	2025-03-12	M											<0.18	<0.18	<0.32	<0.32	<0.31	0.53	16.8	<0.17	0.30	<0.12
WQR2-2m	VA25A5429-008	2025-03-12	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	VA25A6528-017	2025-03-25	M																				
WQR2-2m	VA25A8147-005	2025-04-11	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	VA25A8148-005	2025-04-11	M											<0.45	<0.38	<0.46	<0.43	<0.44	<0.65	<2.0	<0.74	<0.37	<0.28
WQR2-2m	VA25A8280-008	2025-04-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	VA25A8282-008	2025-04-13	M											<0.41	<0.28	<0.31	<0.31	<0.30	<0.51	5.37	<0.28	<0.26	<0.20
WQR2-2m	VA25A8854-008	2025-04-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	VA25A8855-008	2025-04-21	M											<0.44	<0.41	<0.49	<0.48	<0.48	<0.64	<1.7	<0.67	<0.47	<0.40
WQR2-2m	VA25B0359-011	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	VA25B0360-011	2025-05-06	M											<0.22	<0.27	<0.22	<0.21	<0.21	<0.37	2.88	<0.27	<0.43	<0.17
WQR2-2m	VA25B0499-008	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-2m	VA25B0502-008	2025-05-07	M											<0.29	<0.31	<0.18	<0.19	<0.18	<0.82	3.40	<0.29	0.520	<0.12
WQR2-3	23L2091-11	2023-12-15	M	<0.000010	<0.000030	<0.000050	<0.000050	<0.000100	<0.000100	<0.000200	<0.000100	<0.000020	<0.000050										
WQR2-3	L2754383-9	2024-01-25	M											<0.11	<0.35	<0.16	0.18	<0.15	<0.44	1.50	0.45	0.48	<0.20
WQR2-3	VA24A1507-011	2024-01-25	M	<0.0000050	0.000015	0.000012	<0.000010	<0.000010	<0.000010	<0.000050	0.000045	<0.000010											
WQR2-3	L2754604-9	2024-02-14	M											<0.23	<0.32	<0.33	<0.32	<0.31	0.92	2.0	<0.22	<0.25	<0.26
WQR2-3	VA24A2995-011	2024-02-14	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-3	L2755043-11	2024-03-21	M											<0.24	<0.29	<0.29	<0.31	<0.29	<0.28	<0.95	<0.27	0.17	<0.16
WQR2-3	VA24A6026-011	2024-03-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-3	L2755490-9	2024-04-24	M											<0.17	<0.34	<0.24	<0.24	<0.25	0.52	<0.84	<0.26	0.49	<0.32
WQR2-3	VA24A8916-011	2024-04-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-3	L2755567-9	2024-05-01	M											<0.47	<0.51	<0.47	<0.47	<0.46	<0.46	1.6	<0.55	<0.29	<0.31
WQR2-3	VA24A9566-011	2024-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-3	L2755666-9	2024-05-08	M											<0.49	<0.41	<0.49	<0.47	<0.46	<0.46	<0.81	<0.52	<0.30	<0.29
WQR2-3	VA24B0201-011	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-3	L2755779-9	2024-05-15	M											<0.62	<0.79	<0.68	<0.66	<0.64	<0.85	7.9	<1.2	0.69	<0.40
WQR2-3	VA24B0901-011	2024-05-15	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-3	L2755888-9	2024-05-22	M											<0.52	<1.5	<0.76	<0.74	<0.72	<0.63	<2.0	<0.48	<0.67	<0.59
WQR2-3	VA24B1500-011	2024-05-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-3	L2756312-9	2024-06-19	M											<0.49	<0.31	<0.16	<0.15	<0.15	0.35	0.80	<0.44	0.29	<0.20
WQR2-3	VA24B4510-011	2024-06-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-3	VA24B7397-011	2024-07-17	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-3	L2756689-9	2024-07-17	M											<0.28	<0.18	<0.12	<0.12	<0.12	0.56	1.45	<0.21	0.42	<0.15
WQR2-3	L2757122-9	2024-08-21	M											<0.45	<0.32	<0.32	<0.33	<0.32	0.72	7.52	<0.53	0.36	<0.19
WQR2-3	VA24C1337-011	2024-08-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-3	VA24C4683-011	2024-09-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.57	<0.44	<0.38	<0.37	<0.37	0.72	<1.1	<0.65	<0.39	<0.30
WQR2-3	VA24C8569-011	2024-10-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.36	<0.46	<0.45	<0.43	<0.42	<0.73	5.0	<0.50	<0.37	<0.34
WQR2-3	VA24C9414-011	2024-10-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-3	L2757977-11	2024-10-30	M											<1.7	<1.6	<1.5	<1.5	<1.4	<2.9	<9.3	<1.8	<1.7	<1.4
WQR2-3	VA24D0180-011	2024-11-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.31	<0.31	<0.31	<0.29	<0.29	0.89	5.93	<0.25	0.37	<0.17
WQR2-3	L2758221-9	2024-11-22	M											<0.39	<0.26	<0.22	<0.21	<0.21	0.29	2.8	<0.32	<0.38	<0.35
WQR2-3	VA24D1791-011	2024-11-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-3	L2758486-9	2024-12-18	M											<0.15	<0.19	<0.14	<0.15	<0.14	0.30	2.50	<0.14	0.27	<0.17
WQR2-3	VA24D3937-011	2024-12-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-3	L2758770-9	2025-01-22	M											<0.31	<0.36	<0.34	<0.35	<0.34	<0.38	1.90	<0.34	<0.37	<0.34
WQR2-3	VA25A1525-011	2025-01-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-3	L2759008-9	2025-02-19	M											<0.59	<0.72	<0.72	<0.73	<0.71	0.71	<1.6	<0.43	0.42	<0.37

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-methylnaphthalene	2-methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L
WQR2-3	VA25A3570-011	2025-02-19	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-3	VA25A6679-011	2025-03-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0	0	0	0	0	0.365	0	0	0	0
WQR2-3	VA25A9109-011	2025-04-23	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.24	<0.32	<0.19	<0.18	<0.18	<0.31	1.53	<0.30	<0.26	<0.15
WQR2-3	VA25A9941-011	2025-05-01	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	0.348	<0.28	<0.16	<0.16	<0.16	<0.82	2.59	<0.22	<0.34	0.195
WQR2-3	VA25B0496-011	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.49	<0.26	<0.39	<0.39	<0.37	<0.64	<8.7	<0.28	<0.26	<0.23
WQR2-3	VA25B1530-011	2025-05-16	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.49	<0.22	<0.29	<0.28	<0.27	<0.37	<2.7	<0.26	<0.21	<0.19
WQR2-3	VA25B1841-011	2025-05-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.27	<0.27	<0.20	<0.19	<0.19	<0.53	4.07	<0.18	<0.27	<0.24
WQR2-SF	L2755545-12	2024-04-30	M											<0.27	<0.28	<0.37	<0.35	<0.35	1.22	4.00	<0.36	0.58	0.24
WQR2-SF	VA24A9402-012	2024-04-30	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-SF	L2755648-3	2024-05-08	M											<0.31	<0.34	<0.47	<0.47	<0.46	0.41	1.60	<0.37	<0.27	<0.26
WQR2-SF	VA24B0178-003	2024-05-08	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-SF	L2755934-12	2024-05-24	M											<0.27	0.42	<0.22	<0.23	<0.22	0.50	4.29	<0.30	0.35	<0.24
WQR2-SF	VA24B1783-012	2024-05-24	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-SF	VA24B3452-012	2024-06-10	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-SF	660-454600000-0	2024-06-17	M																				
WQR2-SF	VA24B5882-012	2024-07-03	M																				
WQR2-SF	VA24B6465-006	2024-07-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-SF	VA24B7867-006	2024-07-20	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010											
WQR2-SF	L2757210-6	2024-08-26	M											<0.29	<0.35	<0.38	<0.40	<0.36	<0.82	6.4	<0.37	<0.26	<0.22
WQR2-SF	VA24C2208-006	2024-08-26	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	VA24C5557-003	2024-09-25	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	L2757680-6	2024-10-06	M											<0.55	<0.38	<0.58	<0.54	<0.55	<0.46	2.5	<0.39	0.41	<0.22
WQR2-SF	VA24C6685-006	2024-10-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	VA24C7408-006	2024-10-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	L2757872-6	2024-10-22	M											0.35	<0.55	<0.46	<0.44	<0.44	0.53	2.74	<0.27	<0.23	<0.21
WQR2-SF	VA24C8330-006	2024-10-22	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	VA24C9185-007	2024-10-29	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	L2757962-7	2024-10-29	M											<0.29	<0.19	<0.38	<0.39	<0.38	0.38	3.9	<0.24	<0.23	<0.19
WQR2-SF	L2758003-3	2024-11-02	M											<0.49	<0.38	<0.17	<0.17	<0.17	<0.21	2.55	<0.12	<0.16	<0.16
WQR2-SF	VA24C9732-003	2024-11-02	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	L2758354-3	2024-12-06	M											<0.31	<0.35	<0.24	<0.25	<0.24	0.69	2.64	<0.46	<0.26	<0.24
WQR2-SF	VA24D3008-003	2024-12-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	L2758634-9	2025-01-09	M											<0.44	<0.48	<0.34	<0.32	<0.31	<0.84	<2.0	<0.30	<0.30	<0.30
WQR2-SF	VA25A0510-009	2025-01-09	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	L2759010-9	2025-02-18	M											<0.45	<0.52	<0.45	<0.47	<0.45	0.81	3.6	<0.29	<0.31	<0.32
WQR2-SF	VA25A3415-009	2025-02-18	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	L2759209-9	2025-03-12	M											<0.14	<0.17	<0.20	<0.19	<0.18	0.78	19.5	<0.11	0.27	<0.13
WQR2-SF	VA25A5429-009	2025-03-12	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	VA25A6528-018	2025-03-25	M																				
WQR2-SF	VA25A8147-006	2025-04-11	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	VA25A8148-006	2025-04-11	M											<0.47	<0.31	<0.44	<0.43	<0.42	<1.2	2.15	<0.67	<0.49	0.553
WQR2-SF	VA25A8280-009	2025-04-13	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	VA25A8282-009	2025-04-13	M											<0.32	<0.27	<0.31	<0.30	<0.30	<0.51	5.06	<0.26	<0.21	<0.19
WQR2-SF	VA25A8854-009	2025-04-21	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	VA25A8855-009	2025-04-21	M											<0.48	<0.44	<0.46	<0.46	<0.45	<0.57	<1.9	<0.72	<0.28	<0.25
WQR2-SF	VA25B0359-010	2025-05-06	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	VA25B0360-010	2025-05-06	M											<0.26	<0.39	<0.18	<0.18	0.190	<0.60	<2.9	<0.35	<0.35	<0.21
WQR2-SF	VA25B0499-009	2025-05-07	M	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050										
WQR2-SF	VA25B0502-009	2025-05-07	M											<0.35	<0.23	<0.21	<0.23	<0.21	<0.98	5.95	<0.36	<0.40	<0.62

Notes:
Sample Class 'M' = monitoring sample.
'<' = result is below the indicated detection limit.

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	0051710-01	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	0062209-01	2020-06-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	0071996-01	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	0082292-01	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	0093017-01	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	20J1961-01	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	20J2778-01	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	20K0360-01	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	20K1261-01	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	20K2100-01	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	20L1589-01	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21A2590-01	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21B2778-01	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21C3505-01	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21D2478-01	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21E1990-01	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21E2917-01	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21F0167-01	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21F1056-01	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21F2014-01	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21G2414-01	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21H3040-01	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21I3814-01	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21J3514-01	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21K3046-01	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	21L2125-01	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	22A2312-01	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	22B2487-01	2022-02-17	M																
WQ1-1	22C3145-01	2022-03-22	M																
WQ1-1	22D2212-01	2022-04-19	M																
WQ1-1	22E2480-03	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	22F3212-01	2022-06-21	M																
WQ1-1	22G1763-01	2022-07-13	M																
WQ1-1	22H2453-01	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	22I1926-01	2022-09-14	M																
WQ1-1	22J1560-03	2022-10-12	M																
WQ1-1	22K1453-01	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	22L0774-01	2022-12-07	M																
WQ1-1	23A2847-01	2023-01-27	M	<2	<2	<2	<2	7	<3	14	0.074	2.7	5.3						
WQ1-1	23C0060-01	2023-02-28	M																
WQ1-1	23C1797-01	2023-03-15	M																
WQ1-1	23D2945-01	2023-04-26	M																
WQ1-1	23E2392-01	2023-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	23F3614-01	2023-06-27	M																
WQ1-1	23G2415-01	2023-07-19	M																
WQ1-1	23H3309-03	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	23I2271-03	2023-09-19	M																
WQ1-1	23J2236-03	2023-10-18	M																
WQ1-1	23K1909-01	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-1	23L1905-04	2023-12-14	M											<0.1	<0.1				
WQ1-1	L2754366-7	2024-01-24	M	<0.21	<0.20	<0.28	<0.21	<0.27	<0.33	<0.55	0	0.750	1.50						
WQ1-1	VA24A1422-007	2024-01-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2754594-4	2024-02-13	M	<0.22	<0.24	<0.28	<0.22	<0.60	<0.73	<1.6	0.00942	0.589	1.17						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-1	VA24A2858-004	2024-02-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2755033-4	2024-03-20	M	<0.24	<0.24	<0.32	<0.24	0.37	<0.36	<1.3	0.00881	0.603	1.18						
WQ1-1	VA24A5955-004	2024-03-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2755461-4	2024-04-23	M	<0.14	0.18	0.34	0.30	0.28	0.41	0.57	0.0417	0.542	0.900						
WQ1-1	VA24A8736-004	2024-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2755553-4	2024-04-30	M	<0.50	0.65	<0.63	<0.49	<0.80	<1.1	2.8	0	1.30	2.53						
WQ1-1	VA24A9418-004	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2755641-4	2024-05-07	M	<0.17	<0.17	<0.22	<0.17	<0.26	<0.31	<0.54	0	0.486	0.966						
WQ1-1	VA24B0040-004	2024-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2755769-4	2024-05-14	M	<0.22	<0.22	<0.29	<0.20	<0.22	<0.33	<0.50	0.000318	0.560	1.12						
WQ1-1	VA24B0738-004	2024-05-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2755874-4	2024-05-21	M	1.30	1.80	1.20	1.00	2.87	3.44	10.5	0.249	2.69	2.95						
WQ1-1	VA24B1351-004	2024-05-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2756277-4	2024-06-18	M	<0.14	<0.14	<0.18	0.16	5.34	0.26	2.55	0.125	0.490	0.756						
WQ1-1	VA24B4257-004	2024-06-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2756678-4	2024-07-16	M	<0.17	<0.15	<0.21	<0.16	<0.18	<0.25	0.40	0.000303	0.360	0.706						
WQ1-1	VA24B7237-004	2024-07-16	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2757095-4	2024-08-20	M	<0.36	<0.36	<0.45	<0.34	<0.32	<0.42	<0.83	0	0.559	1.11						
WQ1-1	VA24C1101-004	2024-08-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA24C4483-004	2024-09-17	M	<0.12	<0.14	<0.17	<0.14	<0.38	<0.57	3.10	0.0286	1.12	2.21	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA24C8360-004	2024-10-22	M	<0.54	<0.57	<0.86	<0.61	1.20	<0.82	<1.9	0.00280	0.984	1.95	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA24C9197-004	2024-10-29	M	<0.21	<0.19	<0.30	<0.21	<0.42	<0.61	<1.6	0.00156	0.567	1.12	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA24D0009-004	2024-11-05	M	0.16	<0.14	<0.18	<0.15	<0.20	<0.25	<0.71	0.000822	0.562	1.10	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA24D0813-011	2024-11-13	M	0.30	<0.27	<0.35	<0.26	<0.38	<0.52	12.7	0.00381	0.672	1.31	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA24D1720-004	2024-11-21	M	0.26	0.25	<0.17	0.18	<0.40	<0.54	<0.51	0.396	0.707	0.934	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2758465-4	2024-12-17	M	<0.35	<0.34	<0.50	<0.37	0.42	<0.52	<2.5	0.0205	0.782	1.54						
WQ1-1	VA24D3769-004	2024-12-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2758719-4	2025-01-21	M	<0.32	<0.31	<0.41	<0.31	<0.59	<0.79	4.7	0.0184	1.00	1.97						
WQ1-1	VA25A1408-004	2025-01-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	L2758994-4	2025-02-18	M	0.15	0.14	0.19	<0.13	0.22	<0.26	0.88	0.103	0.356	0.575						
WQ1-1	VA25A3430-004	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA25A6550-004	2025-03-25	M	0	0	0.197	0	0	0	0	0.0311	0.378	0.673	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA25A8962-004	2025-04-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA25A9878-004	2025-04-30	M	<0.18	<0.16	<0.23	<0.19	<0.30	<0.35	0.950	0.0127	0.401	0.789	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA25B0358-004	2025-05-06	M	<0.23	<0.14	0.264	<0.17	0.480	<0.34	<1.2	0.0312	0.456	0.853	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA25B1026-004	2025-05-13	M	<0.10	<0.096	<0.13	<0.10	<0.60	<0.60	<0.94	0	0.259	0.515	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-1	VA25B1711-004	2025-05-20	M	<0.26	<0.25	<0.31	<0.29	<0.38	<0.37	<1.0	0	0.742	1.48	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	0051710-02	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	0062209-02	2020-06-22	M	3	<2	<2	<2	<3	<3	<4	0.30	2.8	5.4						
WQ1-2	0071996-02	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	0082292-02	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	0093017-02	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	20J1961-02	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	20J2778-02	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	20K0360-02	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	20K1261-02	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	20K2100-02	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	20L1589-02	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21A2590-02	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21B2778-02	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21C3505-02	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21D2478-02	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21E1990-02	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	21E2917-02	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21F0167-02	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21F1056-02	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21F2014-02	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21G2414-02	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21H3040-02	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21I3814-02	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21J3514-02	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21K3046-02	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	21L2125-02	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	22A2312-02	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	22B2487-02	2022-02-17	M																
WQ1-2	22C3145-02	2022-03-22	M																
WQ1-2	22D2212-02	2022-04-19	M																
WQ1-2	22E2480-04	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	22F3212-02	2022-06-21	M																
WQ1-2	22G1763-02	2022-07-13	M																
WQ1-2	22H2453-02	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	22I1926-02	2022-09-14	M																
WQ1-2	22J1560-04	2022-10-12	M																
WQ1-2	22K1453-02	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	22L0774-02	2022-12-07	M																
WQ1-2	23A2847-02	2023-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	23C0060-02	2023-02-28	M																
WQ1-2	23C1797-02	2023-03-15	M																
WQ1-2	23D2945-02	2023-04-26	M																
WQ1-2	23E2392-02	2023-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	23F3614-02	2023-06-27	M																
WQ1-2	23G2415-02	2023-07-19	M																
WQ1-2	23H3309-04	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	23I2271-04	2023-09-19	M																
WQ1-2	23J2236-04	2023-10-18	M																
WQ1-2	23K1909-02	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ1-2	23L1905-05	2023-12-14	M											<0.1	<0.1				
WQ1-2	L2754366-8	2024-01-24	M	<0.18	<0.17	<0.23	<0.18	<0.28	<0.34	<0.66	0	0.744	1.49						
WQ1-2	VA24A1422-008	2024-01-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2754594-5	2024-02-13	M	<0.25	<0.25	<0.32	<0.26	0.49	<0.38	<0.92	0	0.618	1.22						
WQ1-2	VA24A2858-005	2024-02-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2755033-5	2024-03-20	M	<0.16	<0.16	<0.20	<0.16	<0.25	<0.30	<0.65	0.00996	0.410	0.797						
WQ1-2	VA24A5955-005	2024-03-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2755461-5	2024-04-23	M	0.17	0.17	<0.19	0.24	0.39	0.24	0.71	0.0181	0.454	0.823						
WQ1-2	VA24A8736-005	2024-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2755553-5	2024-04-30	M	<0.59	<0.54	<0.77	<0.57	0.93	<0.85	2.6	0	1.38	2.73						
WQ1-2	VA24A9418-005	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2755641-5	2024-05-07	M	<0.20	<0.20	<0.25	<0.18	<0.24	<0.28	<0.43	0	0.539	1.06						
WQ1-2	VA24B0040-005	2024-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2755769-5	2024-05-14	M	<0.25	<0.26	<0.37	<0.26	<0.26	<0.39	<0.65	0.000300	0.522	1.04						
WQ1-2	VA24B0738-005	2024-05-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2755874-5	2024-05-21	M	<0.18	<0.17	<0.24	0.19	<0.31	<0.48	1.21	0.00138	0.616	1.18						
WQ1-2	VA24B1351-005	2024-05-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2756277-5	2024-06-18	M	<0.097	0.160	0.17	0.130	0.40	0.36	2.42	0.00536	0.335	0.578						
WQ1-2	VA24B4257-005	2024-06-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2756678-5	2024-07-16	M	<0.12	<0.13	<0.16	<0.13	0.27	<0.19	0.44	0.00675	0.271	0.529						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-2	VA24B7237-005	2024-07-16	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2757095-5	2024-08-20	M	<0.30	<0.31	<0.44	<0.30	<0.22	<0.32	<1.3	0.0140	0.846	1.67						
WQ1-2	VA24C1101-005	2024-08-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA24C4483-005	2024-09-17	M	<0.27	<0.30	<0.38	<0.29	<0.65	<0.98	3.2	0.0310	0.744	1.46	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA24C8360-005	2024-10-22	M	<0.31	<0.33	<0.48	<0.33	<0.55	<0.85	<2.5	0.00143	1.14	2.26	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA24C9197-005	2024-10-29	M	<0.27	<0.25	<0.39	<0.26	<0.35	<0.50	<1.1	0	0.476	0.952	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA24D0009-005	2024-11-05	M	<0.16	<0.16	0.35	<0.17	<0.19	<0.23	1.43	0.0498	0.525	0.996	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA24D0813-013	2024-11-13	M	<0.26	<0.24	<0.36	<0.26	<0.53	<0.68	3.5	0	0.837	1.67	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA24D1720-005	2024-11-21	M	0.29	0.21	0.51	<0.16	<0.23	<0.32	<0.48	0.0224	0.604	1.02	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2758465-5	2024-12-17	M	<0.39	<0.36	<0.54	<0.41	<0.53	<0.74	3.0	0.0124	1.12	2.23						
WQ1-2	VA24D3769-005	2024-12-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2758719-5	2025-01-21	M	<0.38	<0.37	<0.47	<0.39	<0.53	<0.73	<0.87	0.00115	0.718	1.43						
WQ1-2	VA25A1408-005	2025-01-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	L2758994-5	2025-02-18	M	<0.22	<0.20	<0.27	<0.19	0.88	0.60	2.2	0.0153	0.485	0.925						
WQ1-2	VA25A3430-005	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA25A6550-005	2025-03-25	M	0	0	0	0	0	0	0	0	0.338	0.598	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA25A8962-005	2025-04-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA25A9878-005	2025-04-30	M	<0.14	<0.12	<0.17	<0.14	<0.25	<0.30	<0.50	0.000501	0.456	0.897	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA25B0358-005	2025-05-06	M	<0.19	<0.18	<0.23	<0.20	<0.43	<0.28	1.89	0.00146	0.541	1.07	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA25B1026-005	2025-05-13	M	<0.11	<0.10	<0.13	<0.11	<0.41	<0.41	<0.77	0	0.733	1.46	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-2	VA25B1711-005	2025-05-20	M	<0.25	<0.22	<0.32	<0.28	<0.33	<0.34	<0.97	0	0.556	1.11	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	23L1905-06	2023-12-14	M											<0.1	<0.1				
WQ1-3	L2754366-9	2024-01-24	M	<0.32	<0.30	<0.39	<0.30	<0.62	<0.74	<0.81	0.438	1.66	2.89						
WQ1-3	VA24A1422-009	2024-01-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2754594-6	2024-02-13	M	<0.36	<0.38	<0.46	<0.38	<0.73	<0.88	<0.75	0.000678	0.753	1.49						
WQ1-3	VA24A2858-006	2024-02-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2755033-6	2024-03-20	M	<0.16	<0.14	<0.18	<0.15	0.17	<0.19	0.62	0.000185	0.411	0.805						
WQ1-3	VA24A5955-006	2024-03-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2755461-6	2024-04-23	M	0.25	0.21	0.38	0.44	0.72	0.63	2.60	0.0552	0.529	0.828						
WQ1-3	VA24A8736-006	2024-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2755553-6	2024-04-30	M	<0.67	<0.58	<0.85	<0.64	<1.4	<2.0	<2.8	0	1.24	2.48						
WQ1-3	VA24A9418-006	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2755641-6	2024-05-07	M	<0.21	<0.22	<0.27	<0.21	<0.35	<0.42	0.84	0	0.561	1.11						
WQ1-3	VA24B0040-006	2024-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2755769-6	2024-05-14	M	<0.24	<0.24	<0.33	<0.23	<0.29	<0.44	<0.51	0	0.647	1.29						
WQ1-3	VA24B0738-006	2024-05-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2755874-6	2024-05-21	M	<0.18	<0.19	<0.27	<0.17	<0.37	<0.54	<0.70	0.00770	0.677	1.33						
WQ1-3	VA24B1351-006	2024-05-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2756277-6	2024-06-18	M	<0.11	0.12	0.20	<0.11	0.19	0.19	0.79	0.000984	0.381	0.503						
WQ1-3	VA24B4257-006	2024-06-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2756678-6	2024-07-16	M	0.18	0.24	0.38	<0.14	0.31	<0.22	0.72	0.0182	0.647	0.811						
WQ1-3	VA24B7237-006	2024-07-16	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2757095-6	2024-08-20	M	<0.099	<0.099	<0.12	<0.098	<0.38	<0.49	<0.56	0.00198	0.515	1.02						
WQ1-3	VA24C1101-006	2024-08-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA24C4483-006	2024-09-17	M	<0.28	<0.30	<0.41	<0.31	0.43	<0.60	2.20	0.0300	0.902	1.77	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA24C8360-006	2024-10-22	M	<0.43	<0.43	<0.63	<0.44	<0.52	<0.78	<1.7	0.00696	1.03	2.06	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA24C9197-006	2024-10-29	M	<0.26	<0.25	<0.38	<0.27	<0.49	<0.75	<0.94	0	0.475	0.938	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA24D0009-006	2024-11-05	M	<0.12	<0.12	<0.15	<0.12	<0.18	<0.22	<0.44	0.000633	0.622	0.859	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA24D0813-014	2024-11-13	M	<0.30	<0.28	0.49	<0.29	<0.40	<0.55	<1.6	0.0503	0.837	1.62	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA24D1720-006	2024-11-21	M	0.20	<0.15	0.43	<0.15	0.37	<0.31	<0.46	0.0205	0.403	0.686	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2758465-6	2024-12-17	M	<0.24	<0.23	<0.32	<0.24	<0.54	<0.76	<2.7	0	0.832	1.65						
WQ1-3	VA24D3769-006	2024-12-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2758719-6	2025-01-21	M	<0.29	<0.28	<0.37	<0.29	<0.43	<0.59	<1.1	0	0.817	1.63						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ1-3	VA25A1408-006	2025-01-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	L2758994-6	2025-02-18	M	<0.081	<0.073	0.16	<0.084	0.26	0.16	1.43	0.0134	0.323	0.605						
WQ1-3	VA25A3430-006	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA25A6550-006	2025-03-25	M	0	0	0	0	0	0	0	0	0.319	0.625	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA25A8962-006	2025-04-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA25A9878-006	2025-04-30	M	<0.14	<0.13	<0.27	<0.15	1.31	<0.41	2.02	0.0137	0.405	0.752	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA25B0358-006	2025-05-06	M	<0.14	<0.14	<0.22	<0.16	<0.34	<0.30	<1.4	0.00544	0.490	0.941	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA25B1026-006	2025-05-13	M	<0.19	<0.17	<0.25	<0.20	<0.14	<0.14	<1.1	0.000726	0.383	0.766	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ1-3	VA25B1711-006	2025-05-20	M	<0.20	<0.17	<0.24	<0.21	<0.21	<0.21	<0.86	0	0.681	1.36	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	0051710-03	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	0062209-03	2020-06-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	0071996-03	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	0082292-03	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	0093017-03	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	20J1961-03	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	20J2778-03	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	20K0360-03	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	20K1261-03	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	20K2100-03	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	20L1589-03	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21A2590-03	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21B2778-03	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21C3505-03	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21D2478-03	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21E1990-03	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21E2917-03	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21F0167-03	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21F1056-03	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21F2014-03	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21G2414-03	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21H3040-03	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21I3814-03	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21J3514-03	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21K3046-03	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	21L2125-03	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	22A2312-03	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	22B2487-03	2022-02-17	M																
WQ2-1	22C3145-03	2022-03-22	M																
WQ2-1	22D2212-03	2022-04-19	M																
WQ2-1	22E2480-05	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	22F3212-03	2022-06-21	M																
WQ2-1	22G1763-03	2022-07-13	M																
WQ2-1	22H2453-03	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	22I1926-03	2022-09-14	M																
WQ2-1	22J1560-05	2022-10-12	M																
WQ2-1	22K1453-03	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	22L0774-03	2022-12-07	M																
WQ2-1	23A2847-03	2023-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	23C0060-03	2023-02-28	M																
WQ2-1	23C1797-03	2023-03-15	M																
WQ2-1	23D2945-03	2023-04-26	M																
WQ2-1	23E2392-03	2023-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	23F3614-03	2023-06-27	M																

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-1	23G2415-03	2023-07-19	M																
WQ2-1	23H3309-05	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	23I2271-05	2023-09-19	M																
WQ2-1	23J2236-05	2023-10-18	M																
WQ2-1	23K1909-03	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-1	23L1905-07	2023-12-14	M											<0.1	<0.1				
WQ2-1	L2754383-1	2024-01-25	M	<0.25	<0.26	<0.36	<0.26	0.46	<0.51	0.89	0.00553	0.473	0.906						
WQ2-1	VA24A1507-001	2024-01-25	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2754594-7	2024-02-13	M	<0.32	<0.32	<0.42	<0.31	<0.40	<0.46	0.79	0.000237	0.580	1.16						
WQ2-1	VA24A2858-007	2024-02-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2755033-7	2024-03-20	M	<0.14	<0.13	0.20	<0.13	0.22	<0.22	<0.57	0.0201	0.459	0.878						
WQ2-1	VA24A5955-007	2024-03-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2755461-7	2024-04-23	M	<0.16	<0.16	<0.22	0.28	0.67	<0.32	0.66	0	0.498	0.942						
WQ2-1	VA24A8736-007	2024-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2755553-7	2024-04-30	M	<0.44	<0.40	<0.58	<0.43	<0.87	<1.2	<2.2	0	1.71	3.42						
WQ2-1	VA24A9418-007	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2755641-7	2024-05-07	M	<0.17	<0.18	<0.21	<0.17	<0.28	<0.34	0.87	0.00103	0.526	1.03						
WQ2-1	VA24B0040-007	2024-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2755769-7	2024-05-14	M	<0.17	<0.17	<0.23	<0.16	<0.24	<0.38	<0.65	0	0.537	1.07						
WQ2-1	VA24B0738-007	2024-05-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2755874-7	2024-05-21	M	1.90	2.31	2.79	1.30	3.93	5.74	15.5	0.815	3.24	3.62						
WQ2-1	VA24B1351-007	2024-05-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2756277-7	2024-06-18	M	<0.18	<0.18	0.33	0.21	0.31	0.29	0.99	0.0899	0.603	0.785						
WQ2-1	VA24B4257-007	2024-06-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2756678-7	2024-07-16	M	<0.13	<0.13	<0.17	<0.13	<0.21	<0.30	<0.24	0.258	0.472	0.684						
WQ2-1	VA24B7237-007	2024-07-16	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2757095-7	2024-08-20	M	<0.11	<0.12	<0.15	<0.12	<0.55	<0.81	<0.77	0	0.513	1.02						
WQ2-1	VA24C1101-007	2024-08-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	VA24C4483-007	2024-09-17	M	<0.19	<0.23	<0.28	<0.22	0.74	<0.38	7.1	0.00926	0.766	1.49	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	VA24C8360-007	2024-10-22	M	<0.44	<0.43	<0.65	<0.45	4.70	<0.98	25.1	0.0720	0.929	1.78	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	VA24C9197-007	2024-10-29	M	<0.33	<0.32	<0.48	<0.32	<0.35	<0.52	<1.1	0	0.587	1.16	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	VA24D0009-007	2024-11-05	M	<0.23	<0.23	<0.30	<0.24	<0.23	<0.29	<0.77	0	0.504	0.991	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2758095-4	2024-11-12	M	<0.21	<0.17	<0.26	<0.21	<0.31	<0.43	3.1	0	0.645	1.29						
WQ2-1	VA24D0632-004	2024-11-12	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	VA24D1720-007	2024-11-21	M	0.39	0.28	0.49	0.28	<0.54	<0.78	3.40	0.107	0.671	1.13	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2758465-7	2024-12-17	M	<0.32	0.35	<0.45	<0.33	<0.51	<0.72	2.6	0.0392	0.988	1.92						
WQ2-1	VA24D3769-007	2024-12-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2758719-7	2025-01-21	M	<0.42	<0.41	<0.54	<0.41	<0.48	<0.69	<0.96	0	1.03	2.05						
WQ2-1	VA25A1408-007	2025-01-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	L2758994-7	2025-02-18	M	<0.11	<0.10	<0.15	<0.12	0.23	<0.16	1.37	0.0125	0.527	0.730						
WQ2-1	VA25A3430-007	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	VA25A6550-007	2025-03-25	M	0	0	0	0	0	0	0.891	0.00107	0.371	0.674	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	VA25A8962-007	2025-04-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	VA25A9878-007	2025-04-30	M	<0.15	<0.13	<0.20	<0.15	<0.36	<0.44	1.13	0.00728	0.436	0.845	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	VA25B0358-007	2025-05-06	M	<0.24	<0.23	<0.30	<0.26	0.750	<0.38	<3.1	0.0152	0.526	1.02	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	VA25B1026-007	2025-05-13	M	<0.26	<0.24	<0.33	<0.27	<0.39	<0.41	<1.5	0	0.616	1.23	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-1	VA25B1711-007	2025-05-20	M	<0.24	<0.20	<0.28	<0.25	<0.47	<0.44	<1.3	0	0.532	1.06	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	0051710-04	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	0062209-04	2020-06-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	0071996-04	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	0082292-04	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	0093017-04	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	20J1961-04	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	20J2778-04	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0.0048	2.6	5.3						
WQ2-2	20K0360-04	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	20K1261-04	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	20K2100-04	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	20L1589-04	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21A2590-04	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21B2778-04	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21C3505-04	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21D2478-04	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21E1990-04	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21E2917-04	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21F0167-04	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21F1056-04	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21F2014-04	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21G2414-04	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21H3040-04	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21I3814-04	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21J3514-04	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21K3046-04	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	21L2125-04	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	22A2312-04	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	22B2487-04	2022-02-17	M																
WQ2-2	22C3145-04	2022-03-22	M																
WQ2-2	22D2212-11	2022-04-19	M																
WQ2-2	22E2480-06	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	22F3212-04	2022-06-21	M																
WQ2-2	22G1763-04	2022-07-13	M																
WQ2-2	22H2453-04	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	22I1926-04	2022-09-14	M																
WQ2-2	22J1560-06	2022-10-12	M																
WQ2-2	22K1453-04	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	22L0774-04	2022-12-07	M																
WQ2-2	23A2847-04	2023-01-27	M	<2	<2	<2	<2	25	<3	36	0.26	2.9	5.5						
WQ2-2	23C0060-04	2023-02-28	M																
WQ2-2	23C1797-04	2023-03-15	M																
WQ2-2	23D2945-04	2023-04-26	M																
WQ2-2	23E2392-04	2023-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	23F3614-04	2023-06-27	M																
WQ2-2	23G2415-04	2023-07-19	M																
WQ2-2	23H3309-06	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	23I2271-06	2023-09-19	M																
WQ2-2	23J2236-06	2023-10-18	M																
WQ2-2	23K1909-04	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ2-2	23L1905-08	2023-12-14	M											<0.1	<0.1				
WQ2-2	L2754383-2	2024-01-25	M	0.14	<0.12	<0.17	0.14	0.34	<0.26	0.60	0.187	0.487	0.747						
WQ2-2	VA24A1507-002	2024-01-25	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2754594-8	2024-02-13	M	<0.19	<0.20	<0.24	<0.19	<0.26	<0.31	<1.3	0.00999	0.552	1.09						
WQ2-2	VA24A2858-008	2024-02-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2755033-8	2024-03-20	M	<0.19	<0.17	<0.23	<0.18	<0.19	<0.22	<0.57	0	0.466	0.922						
WQ2-2	VA24A5955-008	2024-03-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2755461-8	2024-04-23	M	<0.11	<0.10	<0.15	0.31	0.49	<0.29	<0.55	0.0271	0.403	0.720						
WQ2-2	VA24A8736-008	2024-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2755553-8	2024-04-30	M	<0.66	<0.60	<0.82	<0.63	<0.93	<1.1	<2.5	0.00174	1.43	2.85						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-2	VA24A9418-008	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2755641-8	2024-05-07	M	<0.17	<0.17	<0.21	<0.17	<0.22	<0.25	<0.43	0.0120	0.535	1.05						
WQ2-2	VA24B0040-008	2024-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2755769-8	2024-05-14	M	<0.15	<0.15	0.24	<0.14	<0.31	<0.47	<0.66	0	0.580	1.14						
WQ2-2	VA24B0738-008	2024-05-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2755874-8	2024-05-21	M	<0.25	<0.24	<0.35	<0.23	<0.29	<0.45	1.10	0.000933	0.686	1.37						
WQ2-2	VA24B1351-008	2024-05-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2756277-8	2024-06-18	M	0.19	0.14	0.26	<0.12	0.190	<0.090	0.58	0.0339	0.587	0.753						
WQ2-2	VA24B4257-008	2024-06-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2756678-8	2024-07-16	M	<0.15	<0.14	0.24	<0.14	<0.16	<0.23	<0.21	0.000399	0.296	0.552						
WQ2-2	VA24B7237-008	2024-07-16	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2757095-8	2024-08-20	M	<0.16	<0.16	<0.20	<0.16	0.30	<0.32	0.69	0.00300	0.698	1.37						
WQ2-2	VA24C1101-008	2024-08-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	VA24C4483-008	2024-09-17	M	<0.27	<0.29	<0.38	<0.29	<0.38	<0.49	0.67	0.00375	0.760	1.50	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	VA24C8360-008	2024-10-22	M	<0.39	<0.39	<0.57	<0.40	<0.53	<0.69	<2.4	0	1.12	2.24	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	VA24C9197-008	2024-10-29	M	<0.24	<0.22	<0.34	<0.23	<0.30	<0.46	3.1	0.000936	0.511	1.01	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	VA24D0009-008	2024-11-05	M	<0.13	<0.13	<0.17	<0.13	<0.28	<0.34	<0.61	0	0.561	1.11	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2758095-5	2024-11-12	M	<0.32	<0.27	0.76	<0.33	<0.37	<0.49	7.4	0	0.874	1.67						
WQ2-2	VA24D0632-005	2024-11-12	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	VA24D1720-008	2024-11-21	M	0.24	<0.17	<0.24	<0.18	<0.23	<0.31	0.52	0.387	0.617	0.819	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2758465-8	2024-12-17	M	<0.24	<0.23	<0.33	<0.25	0.42	<0.56	<1.7	0.0129	0.774	1.52						
WQ2-2	VA24D3769-008	2024-12-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2758719-8	2025-01-21	M	<0.28	<0.27	<0.36	<0.29	<0.49	<0.67	<1.0	0.00117	0.844	1.69						
WQ2-2	VA25A1408-008	2025-01-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	L2758994-8	2025-02-18	M	<0.11	<0.097	<0.14	<0.12	0.21	<0.17	<0.38	0.0239	0.331	0.618						
WQ2-2	VA25A3430-008	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	VA25A6550-008	2025-03-25	M	0	0	0	0	0	0	0	0.00908	0.322	0.605	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	VA25A8962-008	2025-04-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	VA25A9878-008	2025-04-30	M	<0.20	<0.28	<0.20	<0.17	<0.45	<0.26	<0.58	0	0.557	1.00	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	VA25B0358-008	2025-05-06	M	<0.18	<0.28	<0.30	<0.18	0.527	<0.32	2.73	0.00609	0.614	1.14	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	VA25B1026-008	2025-05-13	M	<0.29	<0.27	<0.35	<0.29	<0.36	<0.35	<1.2	0	0.497	0.993	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-2	VA25B1711-008	2025-05-20	M	<0.26	<0.20	<0.32	<0.28	<0.30	<0.30	<0.91	0	0.616	1.23	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	23L1905-09	2023-12-14	M											<0.1	<0.1				
WQ2-3	L2754383-3	2024-01-25	M	<0.18	<0.19	<0.26	<0.20	<0.17	<0.22	<0.58	0.110	0.617	1.12						
WQ2-3	VA24A1507-003	2024-01-25	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2754594-9	2024-02-13	M	<0.25	<0.25	<0.31	<0.24	<0.37	<0.45	<0.62	0.0423	0.637	1.23						
WQ2-3	VA24A2858-009	2024-02-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2755033-9	2024-03-20	M	<0.25	<0.24	<0.31	<0.24	0.62	<0.37	2.88	0.000864	0.826	1.64						
WQ2-3	VA24A5955-009	2024-03-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2755461-9	2024-04-23	M	<0.16	<0.16	<0.21	<0.16	0.41	<0.27	0.60	0.00944	0.387	0.757						
WQ2-3	VA24A8736-009	2024-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2755553-9	2024-04-30	M	0.84	<0.49	<0.64	0.83	<1.1	<1.4	<2.4	0.0991	1.53	2.88						
WQ2-3	VA24A9418-009	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2755641-9	2024-05-07	M	<0.13	<0.13	<0.16	<0.12	<0.24	<0.29	<0.46	0.000723	0.432	0.795						
WQ2-3	VA24B0040-009	2024-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2755769-9	2024-05-14	M	<0.14	<0.14	0.21	<0.13	<0.25	<0.36	<0.52	0	0.492	0.964						
WQ2-3	VA24B0738-009	2024-05-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2755874-9	2024-05-21	M	<0.18	<0.20	<0.26	<0.17	<0.25	<0.39	<0.82	0	0.680	1.35						
WQ2-3	VA24B1351-009	2024-05-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2756277-9	2024-06-18	M	<0.099	<0.092	0.16	0.190	0.200	0.23	0.66	0.0140	0.312	0.550						
WQ2-3	VA24B4257-010	2024-06-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2756678-9	2024-07-16	M	<0.13	<0.13	<0.17	<0.13	0.20	<0.25	0.35	0.243	0.458	0.656						
WQ2-3	VA24B7237-009	2024-07-16	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ2-3	L2757095-9	2024-08-20	M	0.38	<0.20	<0.28	<0.20	3.48	<1.1	1.03	1.12	3.47	4.05						
WQ2-3	VA24C1101-009	2024-08-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	VA24C4483-009	2024-09-17	M	<0.20	<0.22	<0.29	<0.22	<0.41	<0.63	1.7	0.00681	1.03	2.02	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	VA24C8360-009	2024-10-22	M	<0.35	<0.36	<0.52	<0.36	<0.69	<0.94	<2.2	0.00170	1.07	2.15	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	VA24C9197-009	2024-10-29	M	<0.29	<0.28	<0.40	<0.29	<0.39	<0.58	<1.2	0	0.616	1.22	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	VA24D0009-009	2024-11-05	M	0.20	0.20	0.25	<0.14	0.33	<0.25	<0.60	0.0178	0.542	0.998	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2758095-6	2024-11-12	M	<0.29	<0.24	<0.38	<0.28	<0.26	<0.35	1.08	0.0213	0.763	1.49						
WQ2-3	VA24D0632-006	2024-11-12	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	VA24D1720-009	2024-11-21	M	<0.20	<0.17	0.44	<0.20	<0.37	<0.50	<0.39	0.00748	0.443	0.834	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2758465-9	2024-12-17	M	<0.32	<0.29	<0.43	<0.32	<0.62	<0.89	<2.1	0.145	0.936	1.72						
WQ2-3	VA24D3769-009	2024-12-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2758719-9	2025-01-21	M	<0.32	<0.32	<0.40	<0.31	<0.53	<0.68	<1.1	0	0.898	1.79						
WQ2-3	VA25A1408-009	2025-01-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	L2758994-9	2025-02-18	M	0.11	0.105	0.15	<0.11	0.27	0.29	1.30	0.0124	0.368	0.686						
WQ2-3	VA25A3430-009	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	VA25A6550-009	2025-03-25	M	0	0	0	0	0	0	2.03	0.00740	0.379	0.634	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	VA25A8962-009	2025-04-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	VA25A9878-009	2025-04-30	M	<0.17	<0.16	<0.20	<0.17	<0.18	<0.22	0.769	0.0153	0.409	0.802	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	VA25B0358-009	2025-05-06	M	<0.20	<0.18	<0.24	<0.21	<0.30	<0.28	<1.4	0.00101	0.453	0.890	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	VA25B1026-009	2025-05-13	M	<0.28	<0.24	<0.32	<0.29	<0.29	<0.30	<1.2	0	0.579	1.16	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ2-3	VA25B1711-009	2025-05-20	M	<0.10	<0.10	<0.13	<0.11	<0.29	<0.28	<0.79	0.00291	0.304	0.604	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	0051710-05	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	0062209-05	2020-06-22	M	<2	<2	<2	<2	<3	<3	<4	0.060	2.7	5.3						
WQ3-1	0071996-05	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	0082292-05	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	0093017-05	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	20J1961-05	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	20J2778-05	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	20K0360-05	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	20K1261-05	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	20K2100-05	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	20L1589-05	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21A2590-05	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21B2778-05	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21C3505-05	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21D2478-05	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21E1990-05	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21E2917-05	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21F0167-05	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21F1056-05	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21F2014-05	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21G2414-05	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21H3040-05	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21I3814-05	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21J3514-05	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21K3046-05	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	21L2125-05	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	22A2312-05	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	22B2487-05	2022-02-17	M																
WQ3-1	22C3145-05	2022-03-22	M																
WQ3-1	22D2212-04	2022-04-19	M																
WQ3-1	22E2480-07	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	22F3212-05	2022-06-21	M																

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	22G1763-05	2022-07-13	M																
WQ3-1	22H2453-05	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	22I1926-05	2022-09-14	M																
WQ3-1	22J1560-07	2022-10-12	M																
WQ3-1	22K1453-05	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	22L0774-05	2022-12-07	M																
WQ3-1	23A2847-05	2023-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	23C0060-05	2023-02-28	M																
WQ3-1	23C1797-05	2023-03-15	M																
WQ3-1	23D2945-05	2023-04-26	M																
WQ3-1	23E2392-05	2023-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	23F3614-05	2023-06-27	M																
WQ3-1	23G2415-05	2023-07-19	M																
WQ3-1	23H3309-07	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	23I2271-07	2023-09-19	M																
WQ3-1	23J2236-07	2023-10-18	M																
WQ3-1	23K1909-05	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-1	23L2091-01	2023-12-15	M											<0.1	<0.1				
WQ3-1	L2754366-1	2024-01-24	M	<0.13	<0.15	<0.20	<0.15	<0.22	<0.33	0.29	0.0000861	0.260	0.490						
WQ3-1	VA24A1422-001	2024-01-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2754604-1	2024-02-14	M	<0.22	0.35	<0.27	0.33	<0.36	0.87	2.37	0.108	0.645	1.17						
WQ3-1	VA24A2995-001	2024-02-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2755043-1	2024-03-21	M	<0.20	<0.18	<0.27	<0.20	<0.25	<0.32	<1.2	0.0132	0.688	1.36						
WQ3-1	VA24A6026-001	2024-03-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2755490-1	2024-04-24	M	<0.17	<0.17	<0.23	<0.17	<0.32	<0.43	<0.88	0.0202	0.578	1.13						
WQ3-1	VA24A8916-001	2024-04-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2755567-1	2024-05-01	M	<0.31	<0.29	<0.39	<0.28	<0.39	<0.49	1.55	0.0119	0.677	1.34						
WQ3-1	VA24A9566-001	2024-05-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2755666-1	2024-05-08	M	<0.24	<0.23	<0.33	<0.22	<0.23	<0.30	<0.71	0	0.695	1.39						
WQ3-1	VA24B0201-001	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2755779-1	2024-05-15	M	<0.28	<0.29	<0.41	<0.26	<0.65	<0.97	<0.91	0.0100	2.07	2.63						
WQ3-1	VA24B0901-001	2024-05-15	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2755888-1	2024-05-22	M	<0.17	<0.18	<0.27	<0.18	<0.51	<0.75	<1.0	0	0.920	1.84						
WQ3-1	VA24B1500-001	2024-05-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2756312-1	2024-06-19	M	<0.17	<0.17	0.26	<0.17	<0.14	<0.21	<0.87	0.0424	0.519	0.947						
WQ3-1	VA24B4510-001	2024-06-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	VA24B7397-001	2024-07-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2756689-1	2024-07-17	M	<0.27	<0.24	<0.36	<0.27	<0.28	<0.45	1.30	0	0.507	1.00						
WQ3-1	L2757122-1	2024-08-21	M	<0.32	<0.32	<0.48	<0.32	<0.62	<0.99	<1.5	0.0150	0.776	1.52						
WQ3-1	VA24C1337-001	2024-08-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	VA24C4683-001	2024-09-18	M	<0.38	<0.41	<0.52	<0.39	<0.48	<0.67	<1.1	0.0242	1.07	2.12	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	VA24C8569-001	2024-10-23	M	<0.30	<0.31	<0.40	<0.31	<0.33	<0.45	<1.2	0.0331	0.763	1.49	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2757977-1	2024-10-30	M	<0.70	<0.68	<0.88	<0.68	<0.87	<1.5	<3.2	0	1.81	3.62						
WQ3-1	VA24C9414-001	2024-10-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	VA24D0180-001	2024-11-06	M	<0.096	0.170	<0.12	<0.095	<0.18	<0.22	0.73	0.0182	0.464	0.886	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	VA24D0813-001	2024-11-13	M	<0.29	<0.29	<0.39	<0.29	0.51	<0.44	5.3	0	0.972	1.94	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2758221-1	2024-11-22	M	<0.20	<0.18	<0.24	<0.19	<0.56	<0.72	<0.94	0.00237	0.532	1.06						
WQ3-1	VA24D1791-001	2024-11-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2758486-1	2024-12-18	M	<0.12	<0.12	<0.17	<0.13	<0.28	<0.37	0.70	0	0.344	0.674						
WQ3-1	VA24D3937-001	2024-12-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2758770-1	2025-01-22	M	<0.26	<0.25	<0.34	<0.25	<0.32	<0.45	<0.90	0.0228	0.604	1.19						
WQ3-1	VA25A1525-001	2025-01-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	L2759008-1	2025-02-19	M	<0.29	<0.28	<0.42	<0.32	<0.45	<0.64	1.2	0.000363	0.779	1.56						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-1	VA25A3570-001	2025-02-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	VA25A6679-001	2025-03-26	M	0	0	0	0	0.393	0	0	0.00393	0.311	0.599	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	VA25A9109-001	2025-04-23	M	<0.13	<0.13	<0.17	<0.14	<0.28	<0.34	<0.78	0.00506	0.376	0.745	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	VA25A9941-001	2025-05-01	M	<0.16	<0.15	<0.21	<0.17	<0.24	<0.32	1.04	0.00481	0.377	0.743	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	VA25B0496-001	2025-05-07	M	<0.18	<0.18	<0.24	<0.20	0.411	<0.20	<0.88	0.0200	0.389	0.758	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	VA25B1530-001	2025-05-16	M	<0.14	<0.14	<0.18	<0.15	<0.33	<0.35	<1.2	0	0.382	0.750	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-1	VA25B1841-001	2025-05-21	M	<0.14	<0.14	<0.24	<0.15	<0.31	<0.22	<2.4	0.0169	0.347	0.649	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	0051710-06	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	0062209-06	2020-06-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	0071996-06	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	0082292-06	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	0093017-06	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	20J1961-06	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	20J2778-06	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	20K0360-06	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	20K1261-06	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	20K2100-06	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	20L1589-06	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21A2590-06	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21B2778-06	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21C3505-06	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21D2478-06	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21E1990-06	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21E2917-06	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21F0167-06	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21F1056-06	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21F2014-06	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21G2414-06	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21H3040-06	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21I3814-06	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21J3514-06	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21K3046-06	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	21L2125-06	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	22A2312-06	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	22B2487-06	2022-02-17	M																
WQ3-2	22C3145-06	2022-03-22	M																
WQ3-2	22D2212-05	2022-04-19	M																
WQ3-2	22E2480-08	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	22F3212-06	2022-06-21	M																
WQ3-2	22G1763-06	2022-07-13	M																
WQ3-2	22H2453-06	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	22I1926-06	2022-09-14	M																
WQ3-2	22J1560-08	2022-10-12	M																
WQ3-2	22K1453-06	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	22L0774-06	2022-12-07	M																
WQ3-2	23A2847-06	2023-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	23C0060-06	2023-02-28	M																
WQ3-2	23C1797-06	2023-03-15	M																
WQ3-2	23D2945-06	2023-04-26	M																
WQ3-2	23E2392-06	2023-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	23F3614-06	2023-06-27	M																
WQ3-2	23G2415-06	2023-07-19	M																
WQ3-2	23H3309-08	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-2	23I2271-08	2023-09-19	M																
WQ3-2	23J2236-08	2023-10-18	M																
WQ3-2	23K1909-06	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ3-2	23L2091-02	2023-12-15	M											<0.1	<0.1				
WQ3-2	L2754366-2	2024-01-24	M	<0.20	<0.21	<0.28	<0.20	<0.14	<0.19	<0.48	0.00572	0.347	0.678						
WQ3-2	VA24A1422-002	2024-01-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2754604-2	2024-02-14	M	<0.33	<0.32	<0.43	<0.35	<0.29	<0.36	<0.57	0	0.607	1.21						
WQ3-2	VA24A2995-002	2024-02-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2755043-2	2024-03-21	M	<0.25	<0.24	<0.31	<0.24	<0.19	<0.24	<0.34	0.00606	0.504	0.929						
WQ3-2	VA24A6026-002	2024-03-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2755490-2	2024-04-24	M	0.21	<0.18	0.33	0.23	0.62	<0.34	0.96	0.0299	0.528	0.939						
WQ3-2	VA24A8916-002	2024-04-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2755567-2	2024-05-01	M	<0.18	<0.19	<0.26	<0.18	<0.35	<0.49	<0.76	0.00570	0.658	1.31						
WQ3-2	VA24A9566-002	2024-05-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2755666-2	2024-05-08	M	<0.16	<0.15	<0.22	<0.15	<0.21	<0.29	3.42	0.00103	0.537	1.06						
WQ3-2	VA24B0201-002	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2755779-2	2024-05-15	M	<0.34	<0.37	<0.51	<0.33	<0.56	<0.86	<0.53	0.00128	0.868	1.63						
WQ3-2	VA24B0901-002	2024-05-15	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2755888-2	2024-05-22	M	<0.33	<0.34	<0.47	<0.32	<0.30	<0.42	<1.4	0	0.941	1.88						
WQ3-2	VA24B1500-002	2024-05-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2756312-2	2024-06-19	M	<0.16	<0.16	0.21	<0.16	<0.52	<0.77	0.74	0.0252	0.604	1.16						
WQ3-2	VA24B4510-002	2024-06-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	VA24B7397-002	2024-07-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2756689-2	2024-07-17	M	<0.16	<0.16	<0.19	<0.15	<0.16	<0.24	0.36	0.000107	0.326	0.601						
WQ3-2	L2757122-2	2024-08-21	M	<0.25	<0.27	<0.36	<0.26	<0.41	<0.61	<0.73	0.00943	0.607	1.20						
WQ3-2	VA24C1337-002	2024-08-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	VA24C4683-002	2024-09-18	M	<0.32	<0.36	<0.53	<0.38	<0.26	0.42	1.04	0.00478	0.790	1.52	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	VA24C8569-002	2024-10-23	M	<0.20	<0.21	<0.29	0.32	<0.60	<0.81	1.7	0.0338	0.577	1.12	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2757977-2	2024-10-30	M	<0.75	<0.74	<0.96	<0.75	<1.1	<1.8	<4.3	0.00231	1.63	3.26						
WQ3-2	VA24C9414-002	2024-10-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	VA24D0180-002	2024-11-06	M	<0.16	0.16	<0.20	<0.16	<0.25	<0.33	0.81	0.00106	0.496	0.960	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	VA24D0813-002	2024-11-13	M	<0.27	<0.24	0.38	<0.26	<0.30	0.56	<1.1	0.119	0.790	1.44	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2758221-2	2024-11-22	M	<0.12	<0.12	<0.15	<0.12	<0.29	<0.33	<1.2	0.00244	0.487	0.969						
WQ3-2	VA24D1791-002	2024-11-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2758486-2	2024-12-18	M	<0.14	<0.14	<0.18	<0.14	<0.21	<0.27	0.79	0	0.374	0.741						
WQ3-2	VA24D3937-002	2024-12-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2758770-2	2025-01-22	M	<0.20	<0.20	<0.27	<0.20	<0.24	<0.33	<0.87	0.0134	0.609	1.21						
WQ3-2	VA25A1525-002	2025-01-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	L2759008-2	2025-02-19	M	<0.29	<0.28	<0.38	<0.31	<0.48	<0.66	<0.84	0.000540	0.826	1.65						
WQ3-2	VA25A3570-002	2025-02-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	VA25A6679-002	2025-03-26	M	0	0	0	0	0	0	0.960	0.0169	0.266	0.501	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	VA25A9109-002	2025-04-23	M	<0.13	<0.13	<0.18	<0.15	<0.38	<0.46	<0.54	0.000660	0.368	0.723	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	VA25A9941-002	2025-05-01	M	<0.18	<0.17	<0.31	<0.20	<0.49	<0.47	<1.0	0	0.440	0.836	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	VA25B0496-002	2025-05-07	M	<0.94	1.06	0.502	0.863	8.73	<0.38	<5.2	0.330	1.10	1.54	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	VA25B1530-002	2025-05-16	M	<0.18	<0.18	<0.28	<0.21	<0.47	<0.63	<4.5	0	0.890	1.77	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-2	VA25B1841-002	2025-05-21	M	<0.16	<0.16	<0.22	<0.17	<0.23	<0.24	<1.2	0.000963	0.401	0.789	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	23L2091-03	2023-12-15	M											<0.1	<0.1				
WQ3-3	L2754366-3	2024-01-24	M	<0.14	<0.15	<0.20	<0.15	<0.21	<0.31	0.29	0	0.378	0.737						
WQ3-3	VA24A1422-003	2024-01-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2754604-3	2024-02-14	M	<0.29	<0.27	<0.35	<0.28	<0.39	<0.48	<1.1	0.000450	0.666	1.32						
WQ3-3	VA24A2995-003	2024-02-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2755043-3	2024-03-21	M	<0.28	<0.27	<0.38	<0.28	<0.48	<0.62	<0.53	0	0.545	1.08						
WQ3-3	VA24A6026-003	2024-03-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ3-3	L2755490-3	2024-04-24	M	0.14	<0.14	0.19	0.19	<0.20	<0.27	<0.67	0.000813	0.398	0.736						
WQ3-3	VA24A8916-003	2024-04-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2755567-3	2024-05-01	M	<0.34	<0.36	<0.48	<0.35	<0.43	<0.55	1.10	0	0.817	1.62						
WQ3-3	VA24A9566-003	2024-05-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2755666-3	2024-05-08	M	<0.30	<0.31	<0.43	<0.30	<0.34	<0.46	<0.78	0	0.856	1.71						
WQ3-3	VA24B0201-003	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2755779-3	2024-05-15	M	<0.24	<0.26	<0.38	<0.26	<0.30	<0.47	<0.65	0	0.895	1.79						
WQ3-3	VA24B0901-003	2024-05-15	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2755888-3	2024-05-22	M	<0.30	<0.34	<0.48	<0.30	<1.0	<1.6	<1.6	0	0.972	1.94						
WQ3-3	VA24B1500-003	2024-05-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2756312-3	2024-06-19	M	<0.12	0.13	<0.15	<0.13	<0.15	<0.21	0.37	0	0.509	0.992						
WQ3-3	VA24B4510-003	2024-06-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	VA24B7397-003	2024-07-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2756689-3	2024-07-17	M	<0.11	<0.11	<0.14	<0.11	<0.15	<0.21	0.65	0.00628	0.327	0.647						
WQ3-3	L2757122-3	2024-08-21	M	<0.13	<0.14	<0.19	<0.14	0.28	<0.30	<1.1	0.0165	0.576	1.13						
WQ3-3	VA24C1337-003	2024-08-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	VA24C4683-003	2024-09-18	M	<0.22	<0.25	<0.32	<0.26	<0.28	<0.38	0.69	0.000208	0.643	1.27	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	VA24C8569-003	2024-10-23	M	0.22	<0.24	<0.32	<0.24	<0.25	<0.32	1.2	0.0221	0.725	1.43	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2757977-3	2024-10-30	M	<1.2	<0.95	<1.5	<1.1	<2.0	<3.2	<6.5	0.00333	2.48	4.95						
WQ3-3	VA24C9414-003	2024-10-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	VA24D0180-003	2024-11-06	M	0.14	0.26	<0.17	0.17	<0.20	<0.25	0.89	0.0271	0.515	0.967	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	VA24D0813-003	2024-11-13	M	<0.29	0.29	<0.37	<0.29	<0.33	<0.41	1.24	0.0384	0.690	1.33	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2758221-3	2024-11-22	M	<0.39	<0.36	<0.48	<0.38	<0.29	<0.36	<0.69	0.00126	0.510	1.00						
WQ3-3	VA24D1791-003	2024-11-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2758486-3	2024-12-18	M	<0.11	<0.12	<0.14	<0.11	<0.12	<0.16	<0.49	0.00801	0.296	0.573						
WQ3-3	VA24D3937-003	2024-12-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2758770-3	2025-01-22	M	<0.29	<0.27	<0.37	<0.28	<0.22	<0.32	<0.89	0.000600	0.615	1.23						
WQ3-3	VA25A1525-003	2025-01-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	L2759008-3	2025-02-19	M	<0.34	<0.34	<0.47	<0.39	<0.42	<0.58	<1.1	0	0.860	1.72						
WQ3-3	VA25A3570-003	2025-02-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	VA25A6679-003	2025-03-26	M	0	0	0	0	0	0	0	0.000846	0.435	0.864	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	VA25A9109-003	2025-04-23	M	<0.20	<0.18	<0.25	<0.21	<0.29	<0.35	<0.46	0.000762	0.466	0.921	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	VA25A9941-003	2025-05-01	M	<0.15	<0.15	<0.20	<0.16	0.491	<0.41	0.902	0.0137	0.457	0.895	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	VA25B0496-003	2025-05-07	M	<0.21	<0.21	<0.27	<0.23	<0.37	<0.24	<0.97	0.000717	0.595	1.14	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	VA25B1530-003	2025-05-16	M	<0.094	<0.091	<0.14	<0.11	<0.65	<0.83	<4.4	0	0.710	1.42	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ3-3	VA25B1841-003	2025-05-21	M	0.730	0.578	<0.32	0.671	<5.5	<0.44	2.40	0.199	0.656	0.951	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	0051710-07	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	0062209-07	2020-06-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	0071996-07	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	0082292-07	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	0093017-07	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	20J1961-07	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0.0012	2.6	5.3						
WQ4-1	20J2778-07	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	20K0360-07	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	20K1261-07	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	20K2100-07	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	20L1589-07	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21A2590-07	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21B2778-07	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21C3505-07	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21D2478-07	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21E1990-07	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21E2917-07	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	21F0167-07	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21F1056-07	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21F2014-07	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21G2414-07	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21H3040-07	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21I3814-07	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21J3514-07	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21K3046-07	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	21L2125-07	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	22A2312-07	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	22B2487-07	2022-02-17	M																
WQ4-1	22C3145-07	2022-03-22	M																
WQ4-1	22D2212-12	2022-04-20	M																
WQ4-1	22E2480-09	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	22F3212-07	2022-06-21	M																
WQ4-1	22G1763-07	2022-07-13	M																
WQ4-1	22H2453-07	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	22I1926-07	2022-09-14	M																
WQ4-1	22J1560-09	2022-10-12	M																
WQ4-1	22K1453-07	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	22L0774-07	2022-12-07	M																
WQ4-1	23A2847-07	2023-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	23C0060-07	2023-02-28	M																
WQ4-1	23C1797-07	2023-03-15	M																
WQ4-1	23D2945-07	2023-04-26	M																
WQ4-1	23E2392-07	2023-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	23F3614-07	2023-06-27	M																
WQ4-1	23G2415-07	2023-07-19	M																
WQ4-1	23H3309-09	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	23I2271-09	2023-09-19	M																
WQ4-1	23J2236-09	2023-10-18	M																
WQ4-1	23K1909-07	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-1	23L2091-04	2023-12-15	M											<0.1	<0.1				
WQ4-1	L2754383-4	2024-01-25	M	<0.57	<0.62	<0.79	<0.58	<0.44	<0.61	<0.35	0.00427	0.464	0.909						
WQ4-1	VA24A1507-004	2024-01-25	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2754604-4	2024-02-14	M	<0.34	<0.36	<0.46	<0.36	<0.35	<0.38	0.77	0.00863	0.642	1.26						
WQ4-1	VA24A2995-004	2024-02-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2755043-4	2024-03-21	M	<0.24	<0.24	<0.31	<0.24	<0.46	<0.56	2.2	0	0.391	0.774						
WQ4-1	VA24A6026-004	2024-03-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2755490-4	2024-04-24	M	<0.18	<0.18	<0.24	0.35	0.45	<0.21	<0.72	0.0398	0.407	0.752						
WQ4-1	VA24A8916-004	2024-04-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2755567-4	2024-05-01	M	<0.25	<0.26	<0.34	<0.23	<0.44	<0.58	<0.74	0	0.703	1.40						
WQ4-1	VA24A9566-004	2024-05-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2755666-4	2024-05-08	M	<0.21	<0.21	<0.29	<0.21	<0.34	<0.46	<0.54	0	0.565	1.13						
WQ4-1	VA24B0201-004	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2755779-4	2024-05-15	M	<0.45	<0.48	<0.66	<0.46	<0.83	<1.3	<1.9	0.00115	1.28	2.57						
WQ4-1	VA24B0901-004	2024-05-15	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2755888-4	2024-05-22	M	<0.37	<0.39	<0.55	<0.38	<0.44	<0.63	<0.98	0	1.15	2.29						
WQ4-1	VA24B1500-004	2024-05-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2756312-4	2024-06-19	M	0.13	<0.089	0.19	0.160	<0.25	<0.38	<0.48	0	0.741	1.43						
WQ4-1	VA24B4510-004	2024-06-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	VA24B7397-004	2024-07-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2756689-4	2024-07-17	M	<0.13	<0.14	<0.17	<0.13	<0.080	<0.11	0.35	0	0.341	0.670						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-1	L2757122-4	2024-08-21	M	<0.27	<0.27	<0.39	<0.27	<0.67	<1.1	<0.65	0	0.750	1.50						
WQ4-1	VA24C1337-004	2024-08-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	VA24C4683-004	2024-09-18	M	<0.16	<0.18	<0.24	<0.18	<0.23	<0.31	<0.75	0.00152	0.562	1.11	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	VA24C8569-004	2024-10-23	M	<0.21	0.24	<0.30	<0.23	<0.43	<0.53	1.8	0.0245	0.615	1.18	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2757977-4	2024-10-30	M	<0.82	<0.80	<1.1	<0.74	<0.93	<1.5	<3.6	0.00192	1.84	3.68						
WQ4-1	VA24C9414-004	2024-10-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	VA24D0180-004	2024-11-06	M	<0.27	0.31	<0.36	<0.29	<0.32	<0.37	1.5	0.0395	1.13	2.22	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	VA24D0813-004	2024-11-13	M	<0.28	<0.42	<0.37	<0.25	<0.50	<0.64	<1.4	0	0.842	1.67	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2758221-4	2024-11-22	M	<1.3	<1.3	<1.6	<1.1	<2.2	<2.0	5.9	0.0503	2.05	4.02						
WQ4-1	VA24D1791-004	2024-11-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2758486-4	2024-12-18	M	<0.11	<0.10	<0.14	<0.11	<0.11	<0.15	<0.62	0.000693	0.297	0.587						
WQ4-1	VA24D3937-004	2024-12-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2758770-4	2025-01-22	M	<0.22	<0.21	<0.27	<0.20	<0.41	<0.62	0.91	0.000272	0.683	1.36						
WQ4-1	VA25A1525-004	2025-01-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	L2759008-4	2025-02-19	M	<0.31	<0.29	<0.38	<0.33	<0.37	<0.53	<0.99	0	0.878	1.76						
WQ4-1	VA25A3570-004	2025-02-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	VA25A6679-004	2025-03-26	M	0	0	0	0	0	0	0	0.0464	0.367	0.682	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	VA25A9109-004	2025-04-23	M	<0.15	<0.15	<0.19	<0.15	<0.29	<0.35	<0.83	0.00684	0.353	0.698	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	VA25A9941-004	2025-05-01	M	<0.11	<0.10	<0.14	<0.12	<0.34	<0.34	<0.67	0.000720	0.342	0.653	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	VA25B0496-004	2025-05-07	M	<0.22	<0.22	<0.26	<0.22	<0.42	<0.60	<1.3	0.000798	0.577	0.972	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	VA25B1530-004	2025-05-16	M	<0.14	<0.14	<0.22	<0.16	<0.60	<0.77	<2.7	0	0.587	1.12	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-1	VA25B1841-004	2025-05-21	M	<0.15	<0.15	<0.21	<0.16	0.386	<0.17	<1.1	0.00818	0.368	0.717	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	0051710-08	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	0062209-08	2020-06-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	0071996-08	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	0082292-08	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	0093017-08	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	20J1961-08	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	20J2778-08	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	20K0360-08	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	20K1261-08	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	20K2100-08	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	20L1589-08	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21A2590-08	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21B2778-08	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21C3505-08	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21D2478-08	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21E1990-08	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21E2917-08	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21F0167-08	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21F1056-08	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21F2014-08	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21G2414-08	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21H3040-08	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21I3814-08	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21J3514-08	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21K3046-08	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	21L2125-08	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	22A2312-08	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	22B2487-08	2022-02-17	M																
WQ4-2	22C3145-08	2022-03-22	M																
WQ4-2	22D2212-13	2022-04-20	M																
WQ4-2	22E2480-10	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	22F3212-08	2022-06-21	M																
WQ4-2	22G1763-08	2022-07-13	M																
WQ4-2	22H2453-08	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	22I1926-08	2022-09-14	M																
WQ4-2	22J1560-10	2022-10-12	M																
WQ4-2	22K1453-08	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	22L0774-08	2022-12-07	M																
WQ4-2	23A2847-08	2023-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	23C0060-08	2023-02-28	M																
WQ4-2	23C1797-08	2023-03-15	M																
WQ4-2	23D2945-08	2023-04-26	M																
WQ4-2	23E2392-08	2023-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	23F3614-08	2023-06-27	M																
WQ4-2	23G2415-08	2023-07-19	M																
WQ4-2	23H3309-10	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	23I2271-11	2023-09-19	M																
WQ4-2	23J2236-11	2023-10-18	M																
WQ4-2	23K1909-08	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQ4-2	23L2091-05	2023-12-15	M											<0.1	<0.1				
WQ4-2	L2754383-5	2024-01-25	M	0.18	<0.13	0.23	<0.14	<0.44	<0.57	0.51	0.113	0.456	0.776						
WQ4-2	VA24A1507-005	2024-01-25	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2754604-5	2024-02-14	M	<0.24	<0.23	<0.34	<0.23	<0.36	<0.41	<0.96	0	0.948	1.90						
WQ4-2	VA24A2995-005	2024-02-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2755043-5	2024-03-21	M	<0.18	<0.18	<0.23	<0.17	0.35	<0.24	1.60	0.0529	0.540	1.01						
WQ4-2	VA24A6026-005	2024-03-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2755490-5	2024-04-24	M	<0.17	<0.17	<0.23	<0.17	<0.19	<0.26	<0.54	0.00460	0.364	0.711						
WQ4-2	VA24A8916-005	2024-04-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2755567-5	2024-05-01	M	<0.21	<0.20	<0.29	<0.20	<0.32	<0.41	<0.74	0	0.615	1.22						
WQ4-2	VA24A9566-005	2024-05-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2755666-5	2024-05-08	M	<0.18	<0.19	<0.26	<0.18	<0.31	<0.42	<0.65	0.000411	0.521	1.04						
WQ4-2	VA24B0201-005	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2755779-5	2024-05-15	M	<0.34	<0.35	<0.50	<0.34	<0.83	<1.3	<1.5	0.00196	2.13	4.25						
WQ4-2	VA24B0901-005	2024-05-15	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2755888-5	2024-05-22	M	<0.21	<0.22	<0.34	<0.22	<1.1	<1.7	<2.2	0	0.873	1.73						
WQ4-2	VA24B1500-005	2024-05-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2756312-5	2024-06-19	M	<0.18	<0.16	0.31	<0.17	<0.32	<0.45	<0.30	0.0308	0.587	1.10						
WQ4-2	VA24B4510-005	2024-06-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA24B7397-005	2024-07-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2756689-5	2024-07-17	M	<0.20	<0.20	<0.25	<0.20	0.16	0.26	0.91	0.0184	0.827	0.944						
WQ4-2	L2757122-5	2024-08-21	M	<0.25	<0.25	<0.36	<0.25	<0.46	<0.67	<0.75	0.0599	0.719	1.37						
WQ4-2	VA24C1337-005	2024-08-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA24C4683-005	2024-09-18	M	<0.31	<0.34	<0.43	<0.33	<0.22	<0.31	<0.88	0.00142	0.696	1.39	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA24C8569-005	2024-10-23	M	<0.38	<0.39	<0.52	<0.40	0.77	<0.75	<1.5	0.00336	0.847	1.68	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2757977-5	2024-10-30	M	<0.70	<0.71	<1.0	<0.75	<1.1	<1.9	<3.8	0	1.89	3.78						
WQ4-2	VA24C9414-005	2024-10-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA24D0180-005	2024-11-06	M	<0.094	<0.093	0.16	<0.095	<0.25	<0.32	0.69	0.00852	0.430	0.775	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA24D0813-005	2024-11-13	M	<0.25	<0.25	0.38	<0.27	<0.45	<0.61	1.20	0.00209	0.767	1.49	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2758221-5	2024-11-22	M	<0.43	<0.43	<0.57	<0.44	<0.51	<0.64	<0.70	0.00286	0.804	1.60						
WQ4-2	VA24D1791-005	2024-11-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2758486-5	2024-12-18	M	<0.10	<0.10	<0.13	<0.11	<0.22	<0.30	<0.50	0.0170	0.307	0.596						
WQ4-2	VA24D3937-005	2024-12-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA25A1525-005	2025-01-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	L2758770-5	2025-01-22	M	<0.20	<0.20	<0.28	<0.21	<0.34	<0.49	<0.89	0	0.627	1.25						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQ4-2	L2759008-5	2025-02-19	M	<0.36	<0.35	<0.48	<0.37	<0.47	<0.62	1.9	0.000555	0.879	1.76						
WQ4-2	VA25A3570-005	2025-02-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA25A6679-005	2025-03-26	M	0	0.0978	0	0	0	0	0	0.0185	0.344	0.613	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA25A9109-005	2025-04-23	M	<0.17	<0.16	<0.31	<0.17	<0.26	<0.33	<0.46	0	0.412	0.794	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA25A9941-005	2025-05-01	M	<0.24	<0.21	<0.30	<0.25	<0.38	<0.46	<1.4	0.00105	0.434	0.852	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA25B0496-005	2025-05-07	M	<0.24	<0.23	<0.35	<0.26	<0.50	<0.21	<3.1	0.00303	0.669	1.32	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA25B1530-005	2025-05-16	M	<0.12	<0.13	<0.18	<0.14	<0.25	<0.31	<1.6	0	0.577	1.15	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-2	VA25B1841-005	2025-05-21	M	<0.35	<0.33	<0.48	<0.36	<0.25	<0.28	<1.2	0.00539	0.395	0.776	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	23L2091-07	2023-12-15	M											<0.1	<0.1				
WQ4-3	L2754383-6	2024-01-25	M	<0.16	<0.16	<0.23	<0.17	<0.34	<0.45	0.38	0	0.507	1.01						
WQ4-3	VA24A1507-006	2024-01-25	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2754604-6	2024-02-14	M	<0.23	<0.24	0.64	0.33	<0.42	0.75	1.40	0.0864	0.688	1.26						
WQ4-3	VA24A2995-006	2024-02-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2755043-6	2024-03-21	M	<0.31	<0.30	<0.41	<0.31	<0.44	<0.53	<0.51	0.00608	0.590	1.17						
WQ4-3	VA24A6026-006	2024-03-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2755490-6	2024-04-24	M	<0.10	0.18	<0.14	0.14	0.53	<0.30	<0.52	0.00553	0.355	0.653						
WQ4-3	VA24A8916-006	2024-04-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2755567-6	2024-05-01	M	<0.18	<0.18	<0.26	<0.18	<0.44	<0.55	<0.60	0	0.697	1.38						
WQ4-3	VA24A9566-006	2024-05-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2755666-6	2024-05-08	M	<0.23	<0.24	<0.34	<0.23	<0.29	<0.40	<0.59	0.000369	0.616	1.22						
WQ4-3	VA24B0201-006	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2755779-6	2024-05-15	M	<0.71	<0.75	<1.0	<0.70	<0.66	<0.99	<1.4	0.00162	1.20	2.39						
WQ4-3	VA24B0901-006	2024-05-15	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2755888-6	2024-05-22	M	<0.16	<0.17	<0.27	<0.17	<0.47	<0.76	<1.1	0	1.69	3.37						
WQ4-3	VA24B1500-006	2024-05-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2756312-6	2024-06-19	M	<0.25	<0.24	<0.31	<0.25	<0.20	<0.31	<0.66	0.000303	0.550	1.09						
WQ4-3	VA24B4510-006	2024-06-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	VA24B7397-006	2024-07-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2756689-6	2024-07-17	M	<0.15	<0.16	<0.19	<0.15	<0.17	<0.26	0.74	0.0179	0.339	0.659						
WQ4-3	L2757122-6	2024-08-21	M	<0.16	<0.17	<0.21	<0.16	<0.36	<0.57	<1.4	0	0.552	1.09						
WQ4-3	VA24C1337-006	2024-08-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	VA24C4683-006	2024-09-18	M	<0.18	<0.22	<0.30	<0.22	1.39	<1.2	5.7	0.0807	0.763	1.44	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	VA24C8569-006	2024-10-23	M	<0.22	<0.24	<0.33	<0.24	<0.39	<0.47	1.7	0.0136	0.648	1.28	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2757977-6	2024-10-30	M	<0.86	<0.92	<1.3	<0.97	<1.0	<1.8	<3.8	0	2.06	4.11						
WQ4-3	VA24C9414-006	2024-10-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	VA24D0180-006	2024-11-06	M	<0.11	<0.10	0.22	0.16	<0.17	<0.22	<0.51	0.0309	0.423	0.787	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	VA24D0813-006	2024-11-13	M	<0.29	<0.29	<0.41	<0.30	0.59	<0.52	1.3	0.00624	0.837	1.67	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2758221-6	2024-11-22	M	<0.26	<0.24	<0.33	<0.24	<0.21	<0.26	<0.74	0.00110	0.460	0.913						
WQ4-3	VA24D1791-006	2024-11-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2758486-6	2024-12-18	M	<0.11	<0.098	<0.14	<0.10	<0.20	<0.25	<0.55	0.00119	0.323	0.634						
WQ4-3	VA24D3937-006	2024-12-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2758770-6	2025-01-22	M	<0.27	<0.27	<0.36	<0.28	<0.45	<0.64	<0.75	0	0.638	1.28						
WQ4-3	VA25A1525-006	2025-01-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	L2759008-6	2025-02-19	M	0.50	<0.28	0.49	<0.29	0.72	0.51	3.3	0.0501	0.884	1.65						
WQ4-3	VA25A3570-006	2025-02-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	VA25A6679-006	2025-03-26	M	0	0	0	0.173	0.664	0	1.03	0.0242	0.352	0.676	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	VA25A9109-006	2025-04-23	M	<0.14	<0.13	<0.18	<0.14	<0.35	<0.45	<0.86	0	0.487	0.973	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	VA25A9941-006	2025-05-01	M	<0.13	<0.12	<0.17	<0.14	<0.44	<0.38	1.22	0.000366	0.365	0.717	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	VA25B0496-006	2025-05-07	M	<0.13	<0.13	<0.21	<0.15	<0.26	<0.28	<2.3	0.0101	0.546	1.07	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	VA25B1530-006	2025-05-16	M	<0.20	<0.19	<0.30	<0.23	<0.47	<0.58	<2.6	0.00396	0.585	1.17	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQ4-3	VA25B1841-006	2025-05-21	M	<0.090	<0.086	<0.14	<0.10	<0.24	<0.25	<2.6	0.0130	0.308	0.573	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2755545-7	2024-04-30	M	0.25	0.41	<0.28	0.25	<0.32	<0.40	<0.25	0.941	1.44	1.50						
WQR1-0.5	VA24A9402-007	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA24A9802-011	2024-05-05	M																
WQR1-0.5	L2755648-10	2024-05-08	M	<0.19	<0.20	<0.25	<0.18	<0.19	<0.23	<0.45	0	0.430	0.856						
WQR1-0.5	VA24B0178-010	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2755934-1	2024-05-24	M	<0.24	<0.26	0.38	0.30	<0.24	0.40	1.25	0.0315	0.790	1.07						
WQR1-0.5	VA24B1783-001	2024-05-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2755981-1	2024-05-28	M	<0.20	0.22	<0.24	<0.20	<0.25	<0.35	<0.55	0.0228	0.681	1.33						
WQR1-0.5	VA24B2063-001	2024-05-28	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA24B2561-005	2024-06-01	M																
WQR1-0.5	L2756068-1	2024-06-04	M	<0.28	<0.28	<0.36	<0.28	<0.32	<0.49	<0.94	0	0.778	1.55						
WQR1-0.5	VA24B2772-001	2024-06-04	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA24B3452-007	2024-06-10	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	655-454600000-0	2024-06-17	M																
WQR1-0.5	VA24B5880-003	2024-07-02	M																
WQR1-0.5	VA24B5882-007	2024-07-03	M																
WQR1-0.5	VA24B6465-001	2024-07-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA24B7867-001	2024-07-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2757210-1	2024-08-26	M	<0.22	<0.22	<0.29	<0.22	<0.41	<0.52	1.20	0.00810	0.452	0.884						
WQR1-0.5	VA24C2208-001	2024-08-26	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2757680-1	2024-10-06	M	<0.24	<0.24	<0.32	<0.24	<0.23	<0.28	<0.57	0.000981	0.740	1.48						
WQR1-0.5	VA24C6685-001	2024-10-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA24C7408-001	2024-10-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2757830-3	2024-10-19	M	<0.19	<0.19	<0.28	<0.20	<0.26	<0.40	<1.5	0	0.397	0.792						
WQR1-0.5	VA24C8041-003	2024-10-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA24C8159-005	2024-10-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2757872-1	2024-10-22	M	0.62	0.79	<0.80	<0.61	<0.48	<0.67	<1.4	0.0793	1.48	2.82						
WQR1-0.5	VA24C8330-001	2024-10-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2757933-5	2024-10-28	M	<0.30	<0.25	<0.37	<0.30	<0.26	<0.26	<0.62	0.000837	0.625	1.25						
WQR1-0.5	VA24C9041-005	2024-10-28	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2758002-1	2024-11-01	M	<0.15	0.17	0.40	<0.15	<0.21	<0.27	1.08	0.0406	0.480	0.892						
WQR1-0.5	VA24C9683-001	2024-11-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2758142-5	2024-11-14	M	<0.21	<0.19	<0.28	<0.21	<0.35	<0.44	<1.7	0.00687	0.541	1.07						
WQR1-0.5	VA24D0945-005	2024-11-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA24D1069-005	2024-11-15	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2758203-5	2024-11-19	M	<0.11	<0.11	<0.13	<0.11	<0.15	<0.18	<0.44	0.00680	0.302	0.597						
WQR1-0.5	VA24D1567-005	2024-11-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2758353-1	2024-12-05	M	<0.25	0.29	<0.31	<0.25	<0.20	<0.26	2.50	0.0300	0.539	1.01						
WQR1-0.5	VA24D2842-001	2024-12-05	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2758617-7	2025-01-08	M	<0.15	<0.14	<0.21	<0.15	<0.31	<0.41	<1.3	0	0.372	0.744						
WQR1-0.5	VA25A0392-007	2025-01-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2759040-7	2025-02-20	M	<0.26	<0.24	<0.34	<0.27	<0.42	<0.58	<0.88	0	0.847	1.69						
WQR1-0.5	VA25A3677-007	2025-02-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	L2759227-7	2025-03-13	M	<0.21	<0.18	<0.26	<0.21	0.42	<0.32	0.82	0.00545	0.621	1.23						
WQR1-0.5	VA25A5556-007	2025-03-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA25A6528-013	2025-03-25	M													<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA25A8147-001	2025-04-11	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA25A8148-001	2025-04-11	M	<0.29	<0.31	<0.38	<0.40	<0.27	<0.52	<1.1	0.590	1.19	1.71						
WQR1-0.5	VA25A8281-007	2025-04-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA25A8283-007	2025-04-14	M	<0.16	<0.15	<0.20	<0.16	<0.39	<0.48	1.38	0.00797	0.379	0.750						
WQR1-0.5	VA25A9123-008	2025-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA25A9125-008	2025-04-23	M	<0.24	<0.22	<0.34	<0.25	<0.40	<0.48	<0.73	0	0.541	1.08						
WQR1-0.5	VA25B0359-009	2025-05-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA25B0360-009	2025-05-06	M	<0.18	<0.18	<0.23	<0.19	<0.27	<0.17	<0.94	0.00406	0.366	0.714						
WQR1-0.5	VA25B0800-007	2025-05-09	M	<0.31	<0.24	<0.35	<0.28	<2.3	<0.77	<1.8	0.0181	0.634	0.839						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-0.5	VA25B0802-007	2025-05-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-0.5	VA25B2349-005	2025-05-27	M													<0.25	<0.25	<0.25	<0.25
WQR1-1	0051710-09	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	0062209-10	2020-06-22	M	<2	<2	<2	<2	<3	<3	6	0.0039	2.6	5.3						
WQR1-1	0071996-09	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	0082292-09	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	0093017-09	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	20J1961-09	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0.0027	2.6	5.3						
WQR1-1	20J2778-09	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	20K0360-09	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	20K1261-09	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	20K2100-09	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0.0015	2.6	5.3						
WQR1-1	20L1589-09	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21A2590-09	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21B2778-09	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21C3505-10	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21D2478-09	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21E1990-09	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21E2917-09	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21F0167-09	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21F1056-09	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21F2014-09	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21G2414-09	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21H3040-09	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21I3814-09	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21J3514-09	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21K3046-09	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	21L2125-09	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	22A2312-09	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	22B2487-09	2022-02-17	M																
WQR1-1	22C3145-09	2022-03-22	M																
WQR1-1	22D2212-06	2022-04-19	M																
WQR1-1	22E2480-01	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	22F3212-09	2022-06-21	M																
WQR1-1	22G1763-09	2022-07-13	M																
WQR1-1	22H2453-09	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	22I1926-09	2022-09-14	M																
WQR1-1	22J1560-01	2022-10-12	M																
WQR1-1	22K1453-09	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	22L0774-09	2022-12-07	M																
WQR1-1	23A2847-09	2023-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	23C0060-09	2023-02-28	M																
WQR1-1	23C1797-09	2023-03-15	M																
WQR1-1	23D2945-09	2023-04-26	M																
WQR1-1	23E2392-09	2023-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	23F3614-09	2023-06-27	M																
WQR1-1	23G2415-09	2023-07-19	M																
WQR1-1	23H3309-01	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	23I2271-01	2023-09-19	M																
WQR1-1	23J2236-01	2023-10-18	M																
WQR1-1	23K1909-09	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-1	23L1905-01	2023-12-14	M											<0.1	<0.1				
WQR1-1	L2754366-4	2024-01-24	M	<0.14	<0.15	<0.21	<0.15	<0.14	<0.20	0.52	0.000155	0.333	0.657						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-1	VA24A1422-004	2024-01-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2754594-1	2024-02-13	M	<0.27	<0.25	<0.32	<0.25	<0.41	<0.46	1.40	0.0175	0.541	1.06						
WQR1-1	VA24A2858-001	2024-02-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2755033-1	2024-03-20	M	<0.18	<0.18	<0.23	<0.18	<0.21	<0.25	1.63	0.0200	0.548	1.07						
WQR1-1	VA24A5955-001	2024-03-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2755461-1	2024-04-23	M	0.32	0.29	0.38	0.61	0.77	<0.35	<0.80	0.103	0.716	1.20						
WQR1-1	VA24A8736-001	2024-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2755553-1	2024-04-30	M	<0.23	<0.24	<0.32	0.29	0.89	<0.36	1.9	0.0240	0.639	1.13						
WQR1-1	VA24A9418-001	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2755641-1	2024-05-07	M	<0.18	<0.17	<0.21	<0.17	<0.30	<0.34	0.61	0.00541	0.588	1.17						
WQR1-1	VA24B0040-001	2024-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2755769-1	2024-05-14	M	<0.30	<0.30	<0.39	<0.26	<0.30	<0.44	<0.60	0	0.628	1.24						
WQR1-1	VA24B0738-001	2024-05-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2755874-1	2024-05-21	M	<0.22	<0.22	<0.30	<0.21	<0.35	<0.51	1.20	0.0227	0.670	1.32						
WQR1-1	VA24B1351-001	2024-05-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2756277-1	2024-06-18	M	<0.14	<0.14	0.28	0.16	0.28	<0.16	1.41	0.0829	0.616	0.765						
WQR1-1	VA24B4257-001	2024-06-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2756678-1	2024-07-16	M	<0.14	<0.14	<0.18	<0.14	<0.086	<0.12	0.61	0.000718	0.297	0.578						
WQR1-1	VA24B7237-001	2024-07-16	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2757095-1	2024-08-20	M	<0.24	<0.26	<0.34	<0.24	<0.28	<0.36	<0.50	0.0136	0.596	1.18						
WQR1-1	VA24C1101-001	2024-08-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	VA24C4483-001	2024-09-17	M	<0.36	<0.42	<0.53	<0.41	0.61	<0.78	<1.1	0.00561	0.778	1.53	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	VA24C8360-001	2024-10-22	M	<0.44	<0.43	<0.66	<0.45	0.78	<0.91	<2.0	0	1.01	2.01	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	VA24C9197-001	2024-10-29	M	<0.22	0.23	<0.34	<0.22	<0.36	<0.52	<1.3	0.00165	0.773	1.50	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	VA24D0009-001	2024-11-05	M	<0.16	0.16	0.30	<0.16	<0.26	<0.34	0.77	0.0459	0.532	0.999	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2758095-1	2024-11-12	M	<0.27	0.33	<0.37	<0.27	<0.46	<0.63	7.5	0.0577	0.908	1.73						
WQR1-1	VA24D0632-001	2024-11-12	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	VA24D1720-001	2024-11-21	M	<0.16	0.39	0.44	<0.16	<0.29	<0.40	<0.52	0.0818	0.989	1.08	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2758465-1	2024-12-17	M	<0.36	<0.34	<0.48	<0.38	<0.59	<0.86	<3.0	0	1.01	2.00						
WQR1-1	VA24D3769-001	2024-12-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2758719-1	2025-01-21	M	<0.27	<0.27	<0.36	<0.27	<0.48	<0.70	<1.1	0.0207	0.891	1.76						
WQR1-1	VA25A1408-001	2025-01-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	L2758994-1	2025-02-18	M	<0.13	<0.12	<0.17	<0.14	0.39	<0.15	1.06	0.0117	0.286	0.552						
WQR1-1	VA25A3430-001	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	VA25A6550-001	2025-03-25	M	0	0	0	0	0	0	1.05	0.000855	0.336	0.642	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	VA25A8962-001	2025-04-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	VA25A9878-001	2025-04-30	M	<0.18	<0.16	<0.23	<0.19	<0.32	<0.40	<0.53	0.00549	0.362	0.718	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	VA25B0358-001	2025-05-06	M	<0.41	<0.40	<0.49	<0.41	<1.1	<0.46	2.75	0.00278	0.745	1.48	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	VA25B1026-001	2025-05-13	M	<0.10	<0.10	<0.14	<0.11	<0.16	<0.14	<1.0	0	0.311	0.583	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-1	VA25B1711-001	2025-05-20	M	<0.29	<0.28	<0.36	<0.31	<0.35	<0.35	<1.7	0	0.655	1.29	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	0051710-10	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	0062209-09	2020-06-22	M	<2	<2	<2	4	<3	<3	<4	0.40	2.9	5.5						
WQR1-2	0071996-10	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	0082292-10	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	0093017-10	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	20J1961-10	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0.0039	2.6	5.3						
WQR1-2	20J2778-10	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	20K0360-10	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	20K1261-10	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	20K2100-10	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	20L1589-10	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21A2590-10	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21B2778-10	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	21C3505-11	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21D2478-10	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21E1990-10	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21E2917-10	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21F0167-10	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21F1056-10	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21F2014-10	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21G2414-10	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21H3040-10	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21I3814-10	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21J3514-10	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21K3046-10	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	21L2125-10	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	22A2312-10	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	22B2487-10	2022-02-17	M																
WQR1-2	22C3145-10	2022-03-22	M																
WQR1-2	22D2212-07	2022-04-19	M																
WQR1-2	22E2480-02	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	22F3212-10	2022-06-21	M																
WQR1-2	22G1763-10	2022-07-13	M																
WQR1-2	22H2453-10	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	22I1926-10	2022-09-14	M																
WQR1-2	22J1560-02	2022-10-12	M																
WQR1-2	22K1453-10	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	22L0774-10	2022-12-07	M																
WQR1-2	23A2847-10	2023-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	23C0060-10	2023-02-28	M																
WQR1-2	23C1797-10	2023-03-15	M																
WQR1-2	23D2945-10	2023-04-26	M																
WQR1-2	23E2392-10	2023-05-17	M	<2	<2	8	<2	3	<3	25	2.6	4.9	7.1						
WQR1-2	23F3614-10	2023-06-27	M																
WQR1-2	23G2415-10	2023-07-19	M																
WQR1-2	23H3309-02	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	23I2271-02	2023-09-19	M																
WQR1-2	23J2236-02	2023-10-18	M																
WQR1-2	23K1909-10	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR1-2	23L1905-02	2023-12-14	M											<0.1	<0.1				
WQR1-2	L2754366-5	2024-01-24	M	<0.15	<0.14	<0.20	<0.15	<0.22	<0.31	0.41	0.0161	0.342	0.665						
WQR1-2	VA24A1422-005	2024-01-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2754594-2	2024-02-13	M	<0.20	<0.19	<0.25	<0.19	<0.36	<0.41	<0.74	0.000435	0.583	1.17						
WQR1-2	VA24A2858-002	2024-02-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2755033-2	2024-03-20	M	<0.15	<0.16	0.21	<0.15	0.49	<0.26	<0.60	0.00648	0.530	1.03						
WQR1-2	VA24A5955-002	2024-03-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2755461-2	2024-04-23	M	<0.15	0.26	<0.19	0.35	0.72	0.35	4.38	0.0267	0.815	1.00						
WQR1-2	VA24A8736-002	2024-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2755553-2	2024-04-30	M	<0.22	0.21	<0.29	0.41	<0.31	<0.42	<0.99	0.0289	0.550	1.01						
WQR1-2	VA24A9418-002	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2755641-2	2024-05-07	M	<0.20	<0.21	<0.25	<0.20	<0.33	<0.36	<0.51	0	0.603	1.20						
WQR1-2	VA24B0040-002	2024-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2755769-2	2024-05-14	M	<0.20	<0.20	<0.28	<0.19	<0.24	<0.34	<0.76	0.000369	0.552	1.08						
WQR1-2	VA24B0738-002	2024-05-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2755874-2	2024-05-21	M	<0.42	<0.45	<0.60	<0.42	<0.59	<0.90	<1.7	0.0205	1.14	2.26						
WQR1-2	VA24B1351-002	2024-05-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2	L2756277-2	2024-06-18	M	<0.15	<0.14	0.22	0.16	0.310	<0.11	0.89	0.278	0.492	0.647						
WQR1-2	VA24B4257-002	2024-06-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2756678-2	2024-07-16	M	<0.12	<0.12	<0.15	<0.12	<0.099	<0.14	0.63	0.00586	0.275	0.536						
WQR1-2	VA24B7237-002	2024-07-16	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2757095-2	2024-08-20	M	<0.20	<0.20	<0.25	<0.20	<0.43	<0.57	1.30	0.00810	0.547	1.07						
WQR1-2	VA24C1101-002	2024-08-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	VA24C4483-002	2024-09-17	M	<0.21	<0.23	<0.29	<0.21	<0.40	<0.50	3.0	0.0193	0.884	1.75	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	VA24C8360-002	2024-10-22	M	<0.23	<0.24	<0.37	<0.25	<0.47	<0.67	<3.3	0	0.829	1.66	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	VA24C9197-002	2024-10-29	M	<0.34	<0.31	<0.50	<0.34	<0.42	<0.67	<2.1	0.00177	0.706	1.41	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	VA24D0009-002	2024-11-05	M	<0.23	<0.22	<0.30	<0.24	<0.27	<0.33	0.89	0	0.475	0.950	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2758095-2	2024-11-12	M	0.54	<0.47	<0.70	<0.51	<0.61	<0.81	<3.6	0.178	1.57	2.91						
WQR1-2	VA24D0632-002	2024-11-12	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	VA24D1720-002	2024-11-21	M	<0.24	0.35	<0.31	0.39	<0.37	<0.49	0.63	0.0233	0.511	0.869	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2758465-2	2024-12-17	M	<0.25	<0.23	<0.36	<0.26	<0.53	<0.77	<3.1	0.00147	0.777	1.55						
WQR1-2	VA24D3769-002	2024-12-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2758719-2	2025-01-21	M	<0.31	<0.30	<0.40	<0.30	<0.44	<0.61	<1.1	0.00131	1.02	2.04						
WQR1-2	VA25A1408-002	2025-01-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	L2758994-2	2025-02-18	M	<0.15	<0.13	<0.19	<0.15	<0.17	<0.22	0.60	0.00640	0.317	0.622						
WQR1-2	VA25A3430-002	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	VA25A6550-002	2025-03-25	M	0	0	0	0	0	0	0	0.000558	0.274	0.538	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	VA25A8962-002	2025-04-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	VA25A9878-002	2025-04-30	M	<0.15	<0.14	<0.19	<0.16	<0.40	<0.49	1.32	0.00833	0.415	0.821	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	VA25B0358-002	2025-05-06	M	0.240	<0.22	<0.28	<0.25	<0.29	<0.24	3.29	0.0513	0.633	1.21	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	VA25B1026-002	2025-05-13	M	<0.16	<0.16	<0.21	<0.17	<0.34	<0.34	1.11	0.000333	0.461	0.921	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2	VA25B1711-002	2025-05-20	M	<0.23	<0.22	<0.29	<0.26	<0.41	<0.43	<1.3	0	0.533	1.05	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2755545-8	2024-04-30	M	<0.15	<0.15	<0.21	<0.15	<0.53	<0.67	<0.63	0	0.751	1.50						
WQR1-2m	VA24A9402-008	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	VA24A9802-012	2024-05-05	M																
WQR1-2m	L2755648-11	2024-05-08	M	<0.19	<0.19	<0.25	<0.19	<0.25	<0.29	0.73	0.0179	0.501	0.984						
WQR1-2m	VA24B0178-011	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2755934-2	2024-05-24	M	0.42	0.43	0.49	0.48	0.67	<0.44	2.28	0.157	0.944	1.19						
WQR1-2m	VA24B1783-002	2024-05-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2755981-2	2024-05-28	M	<0.23	<0.20	<0.29	<0.23	<0.30	<0.45	<0.62	0.000924	0.586	1.16						
WQR1-2m	VA24B2063-002	2024-05-28	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	VA24B2561-006	2024-06-01	M																
WQR1-2m	L2756068-2	2024-06-04	M	<0.21	<0.22	<0.27	<0.21	0.33	<0.37	0.47	0.0113	0.602	1.13						
WQR1-2m	VA24B2772-002	2024-06-04	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	VA24B3452-008	2024-06-10	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	656-454600000-0	2024-06-17	M																
WQR1-2m	VA24B5882-008	2024-07-03	M																
WQR1-2m	VA24B6465-002	2024-07-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	VA24B7867-002	2024-07-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2757210-2	2024-08-26	M	<0.25	<0.22	<0.34	<0.25	<0.47	<0.62	<0.80	0.0158	0.463	0.911						
WQR1-2m	VA24C2208-002	2024-08-26	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2757680-2	2024-10-06	M	<0.23	<0.24	<0.31	<0.26	<0.24	<0.31	<0.83	0.000735	0.598	1.20						
WQR1-2m	VA24C6685-002	2024-10-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	VA24C7408-002	2024-10-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2757830-6	2024-10-20	M	<0.24	<0.22	<0.32	<0.24	0.40	<0.44	5.82	0.00314	0.464	0.920						
WQR1-2m	VA24C8041-006	2024-10-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2757872-2	2024-10-22	M	<0.20	<0.20	0.30	<0.22	0.44	0.33	<0.49	0.0161	0.534	0.984						
WQR1-2m	VA24C8330-002	2024-10-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2757933-6	2024-10-28	M	<0.29	<0.21	<0.36	<0.28	<0.39	<0.40	<0.95	0.000870	0.611	1.22						
WQR1-2m	VA24C9041-006	2024-10-28	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-2m	L2758002-3	2024-11-01	M	<0.16	0.24	<0.21	<0.16	<0.17	<0.21	0.79	0.0349	0.488	0.933						
WQR1-2m	VA24C9683-003	2024-11-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2758353-2	2024-12-05	M	0.22	<0.17	<0.22	<0.18	<0.24	<0.30	<0.88	0.0215	0.518	1.01						
WQR1-2m	VA24D2842-002	2024-12-05	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2758617-8	2025-01-08	M	<0.24	<0.24	<0.33	<0.26	<0.34	<0.48	<2.1	0.00128	0.659	1.32						
WQR1-2m	VA25A0392-008	2025-01-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2759040-8	2025-02-20	M	<0.18	<0.17	<0.25	<0.20	<0.28	<0.38	<0.73	0.000402	0.638	1.27						
WQR1-2m	VA25A3677-008	2025-02-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	L2759227-8	2025-03-13	M	<0.20	<0.19	<0.24	<0.21	0.23	<0.20	1.11	0.00221	0.570	1.13						
WQR1-2m	VA25A5556-008	2025-03-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	VA25A6528-014	2025-03-25	M																
WQR1-2m	VA25A8147-002	2025-04-11	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	VA25A8148-002	2025-04-11	M	<0.27	<0.27	<0.38	<0.30	<0.37	<0.39	<1.5	0.00702	0.609	1.20						
WQR1-2m	VA25A8281-008	2025-04-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	VA25A8283-008	2025-04-14	M	<0.16	<0.14	<0.20	<0.16	<0.43	<0.51	<0.53	0	0.414	0.812						
WQR1-2m	VA25A9123-009	2025-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	VA25A9125-009	2025-04-23	M	<0.12	<0.11	<0.16	<0.12	<0.33	<0.42	<0.80	0	0.439	0.862						
WQR1-2m	VA25B0359-008	2025-05-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-2m	VA25B0360-008	2025-05-06	M	<0.14	<0.17	<0.18	<0.15	0.366	<0.27	1.26	0.0175	0.386	0.732						
WQR1-2m	VA25B0800-008	2025-05-09	M	<0.095	<0.099	<0.13	<0.11	<0.40	<0.39	<1.6	0.0110	0.388	0.765						
WQR1-2m	VA25B0802-008	2025-05-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	23L1905-03	2023-12-14	M											<0.1	<0.1				
WQR1-3	L2754366-6	2024-01-24	M	<0.23	<0.20	<0.28	<0.21	<0.30	<0.37	<0.55	0	0.594	1.19						
WQR1-3	VA24A1422-006	2024-01-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2754594-3	2024-02-13	M	<0.23	<0.22	<0.29	<0.22	<0.44	<0.58	<0.57	0.00556	0.664	1.32						
WQR1-3	VA24A2858-003	2024-02-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2755033-3	2024-03-20	M	<0.13	<0.12	<0.17	0.16	0.25	<0.17	<0.73	0	0.468	0.914						
WQR1-3	VA24A5955-003	2024-03-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2755461-3	2024-04-23	M	0.21	0.20	<0.22	0.26	0.77	<0.24	0.62	0	0.556	0.939						
WQR1-3	VA24A8736-003	2024-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2755553-3	2024-04-30	M	0.27	<0.17	<0.25	0.30	0.59	<0.42	1.50	0.0503	0.549	1.01						
WQR1-3	VA24A9418-003	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2755641-3	2024-05-07	M	<0.21	<0.21	<0.26	<0.20	<0.33	<0.37	<0.56	0	0.513	1.03						
WQR1-3	VA24B0040-003	2024-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2755769-3	2024-05-14	M	<0.16	<0.16	0.33	0.18	<0.23	<0.35	<0.64	0.0329	0.523	0.996						
WQR1-3	VA24B0738-003	2024-05-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2755874-3	2024-05-21	M	1.40	1.70	2.22	1.40	2.82	3.19	<0.98	0.534	2.77	3.13						
WQR1-3	VA24B1351-003	2024-05-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2756277-3	2024-06-18	M	<0.088	0.150	0.19	0.140	<0.14	0.36	0.91	0.297	0.566	0.732						
WQR1-3	VA24B4257-003	2024-06-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2756678-3	2024-07-16	M	<0.12	<0.12	<0.16	<0.13	<0.14	<0.20	0.42	0.00390	0.269	0.524						
WQR1-3	VA24B7237-003	2024-07-16	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2757095-3	2024-08-20	M	<0.16	<0.17	<0.21	<0.17	<0.20	<0.26	<0.60	0.00375	0.686	1.37						
WQR1-3	VA24C1101-003	2024-08-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	VA24C4483-003	2024-09-17	M	<0.43	<0.48	<0.60	<0.47	0.66	<0.77	3.2	0.0355	1.10	2.15	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	VA24C8360-003	2024-10-22	M	<0.48	<0.45	<0.68	<0.51	<0.51	<0.77	<2.5	0.00116	1.02	2.01	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	VA24C9197-003	2024-10-29	M	<0.25	<0.24	<0.37	<0.26	<0.75	<1.1	<2.7	0.00244	0.588	1.10	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	VA24D0009-003	2024-11-05	M	<0.14	<0.14	0.22	<0.14	<0.34	<0.42	0.85	0.0225	0.603	1.17	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2758095-3	2024-11-12	M	<0.53	<0.48	<0.68	<0.50	<0.66	<0.86	<2.2	0	1.22	2.44						
WQR1-3	VA24D0632-003	2024-11-12	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	VA24D1720-003	2024-11-21	M	0.25	0.41	<0.19	0.25	0.29	<0.34	<0.49	0.0659	0.472	0.805	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2758465-3	2024-12-17	M	<0.26	<0.25	<0.35	<0.26	<0.40	<0.57	<2.5	0	0.750	1.48						
WQR1-3	VA24D3769-003	2024-12-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-3	L2758719-3	2025-01-21	M	<0.34	<0.34	<0.45	<0.34	<0.41	<0.53	1.2	0.000369	0.909	1.82						
WQR1-3	VA25A1408-003	2025-01-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	L2758994-3	2025-02-18	M	<0.13	<0.12	<0.16	<0.13	0.35	<0.18	1.11	0.000333	0.269	0.519						
WQR1-3	VA25A3430-003	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	VA25A6550-003	2025-03-25	M	0.126	0	0	0	0	0	0	0.0195	0.352	0.676	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	VA25A8962-003	2025-04-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	VA25A9878-003	2025-04-30	M	<0.18	<0.16	<0.23	<0.19	<0.35	<0.41	<0.52	0.000828	0.473	0.933	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	VA25B0358-003	2025-05-06	M	<0.18	0.244	<0.25	<0.20	<0.29	<0.27	<1.3	0.342	0.699	0.925	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	VA25B1026-003	2025-05-13	M	<0.12	<0.12	<0.16	<0.13	<0.36	<0.36	<0.87	0	0.309	0.606	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-3	VA25B1711-003	2025-05-20	M	<0.35	<0.31	<0.41	<0.36	<0.21	<0.20	<1.1	0.000759	0.520	1.03	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2755545-9	2024-04-30	M	<0.17	<0.17	0.33	0.24	0.39	<0.37	<0.95	0.00388	0.643	0.864						
WQR1-SF	VA24A9402-009	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	VA24A9802-013	2024-05-05	M																
WQR1-SF	L2755648-12	2024-05-08	M	<0.14	0.16	<0.18	<0.14	<0.21	<0.27	<0.58	0.0156	0.475	0.921						
WQR1-SF	VA24B0178-012	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2755934-3	2024-05-24	M	<0.25	0.30	0.34	<0.24	<0.35	<0.51	1.60	0.0410	0.636	0.875						
WQR1-SF	VA24B1783-003	2024-05-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2755981-3	2024-05-28	M	<0.16	<0.15	<0.20	<0.16	<0.24	<0.35	<0.64	0.000690	0.596	1.19						
WQR1-SF	VA24B2063-003	2024-05-28	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2756068-3	2024-06-04	M	0.32	0.57	0.31	0.34	<0.31	0.70	<0.54	0.144	0.992	1.71						
WQR1-SF	VA24B2772-003	2024-06-04	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	VA24B3452-009	2024-06-10	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	657-454600000-0	2024-06-17	M																
WQR1-SF	VA24B5882-009	2024-07-03	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	VA24B6465-003	2024-07-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	VA24B7867-003	2024-07-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2757210-3	2024-08-26	M	<0.27	<0.26	<0.37	<0.26	<0.40	<0.54	1.5	0.00375	0.463	0.922						
WQR1-SF	VA24C2208-003	2024-08-26	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2757680-3	2024-10-06	M	<0.21	<0.22	<0.29	<0.23	<0.26	<0.33	0.67	0.000201	0.633	1.25						
WQR1-SF	VA24C6685-003	2024-10-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	VA24C7408-003	2024-10-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2757872-3	2024-10-22	M	<0.25	<0.25	<0.32	0.38	<0.29	0.39	1.06	0.0423	0.726	1.40						
WQR1-SF	VA24C8330-003	2024-10-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2757933-7	2024-10-28	M	<0.29	<0.19	<0.35	<0.27	<0.22	<0.22	<0.82	0	0.973	1.30						
WQR1-SF	VA24C9041-007	2024-10-28	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2758002-4	2024-11-01	M	<0.18	0.22	0.26	<0.17	<0.24	<0.31	0.93	0.0263	0.439	0.823						
WQR1-SF	VA24C9683-004	2024-11-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	VA24D2498-001	2024-11-30	M																
WQR1-SF	L2758353-3	2024-12-05	M	<0.21	<0.21	<0.27	<0.22	<0.27	<0.36	<0.89	0	0.740	1.47						
WQR1-SF	VA24D2842-003	2024-12-05	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2758617-9	2025-01-08	M	<0.16	<0.15	<0.22	<0.17	0.37	<0.44	<0.95	0	0.469	0.921						
WQR1-SF	VA25A0392-009	2025-01-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2759040-9	2025-02-20	M	<0.22	<0.22	<0.31	<0.24	<0.24	<0.32	<0.54	0.000287	0.671	1.34						
WQR1-SF	VA25A3677-009	2025-02-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	L2759227-9	2025-03-13	M	0.26	0.27	0.48	0.36	<0.22	<0.28	1.23	0.0933	0.948	1.33						
WQR1-SF	VA25A5556-009	2025-03-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	VA25A6528-015	2025-03-25	M																
WQR1-SF	VA25A8147-003	2025-04-11	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	VA25A8148-003	2025-04-11	M	<0.32	<0.27	<0.43	<0.35	<0.62	<0.35	1.23	0.000369	0.671	1.33						
WQR1-SF	VA25A8281-009	2025-04-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	VA25A8283-009	2025-04-14	M	<0.19	<0.17	<0.24	<0.20	<0.36	<0.44	<0.51	0.000645	0.366	0.720						
WQR1-SF	VA25A9123-010	2025-04-23	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	VA25A9125-010	2025-04-23	M	<0.18	<0.15	<0.22	<0.18	<0.37	<0.49	<0.95	0	0.452	0.885						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR1-SF	VA25B0359-007	2025-05-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR1-SF	VA25B0360-007	2025-05-06	M	<0.12	<0.11	<0.32	<0.13	<0.21	<0.19	<0.74	0.0107	0.397	0.751						
WQR1-SF	VA25B0800-009	2025-05-09	M	<0.084	<0.10	<0.11	<0.094	<0.17	<0.17	<0.81	0.00131	0.485	0.960						
WQR1-SF	VA25B0802-009	2025-05-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2755545-10	2024-04-30	M	<0.18	<0.17	0.33	0.27	0.72	<0.33	<0.91	0.0518	0.465	0.841						
WQR2-0.5	VA24A9402-010	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2755648-1	2024-05-08	M	0.19	<0.16	0.27	<0.16	<0.24	<0.51	<0.51	0.0278	0.460	0.873						
WQR2-0.5	VA24B0178-001	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2755934-10	2024-05-24	M	<0.17	<0.18	<0.21	<0.17	<0.30	<0.48	1.10	0.00122	0.471	0.914						
WQR2-0.5	VA24B1783-010	2024-05-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA24B3452-010	2024-06-10	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	658-454600000-0	2024-06-17	M																
WQR2-0.5	VA24B5882-010	2024-07-03	M																
WQR2-0.5	VA24B6465-004	2024-07-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA24B7867-004	2024-07-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2757210-4	2024-08-26	M	<0.26	<0.25	<0.34	<0.26	<0.39	<0.52	1.20	0	0.467	0.931						
WQR2-0.5	VA24C2208-004	2024-08-26	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA24C5557-001	2024-09-25	M													<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2757680-4	2024-10-06	M	<0.12	<0.13	<0.17	<0.14	<0.27	<0.35	<0.48	0	0.515	1.02						
WQR2-0.5	VA24C6685-004	2024-10-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA24C7408-004	2024-10-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2757830-2	2024-10-19	M	0.51	<0.21	<0.31	<0.23	3.90	0.68	32.1	0.0577	0.531	0.943						
WQR2-0.5	VA24C8041-002	2024-10-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA24C8159-004	2024-10-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2757872-4	2024-10-22	M	<0.21	<0.21	<0.28	<0.22	<0.29	<0.41	<0.43	0.0246	0.596	1.10						
WQR2-0.5	VA24C8330-004	2024-10-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2757962-5	2024-10-29	M	<0.13	<0.13	<0.19	<0.14	<0.23	<0.31	<0.49	0.00241	0.358	0.707						
WQR2-0.5	VA24C9185-005	2024-10-29	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2758003-1	2024-11-02	M	<0.14	<0.14	<0.18	<0.14	<0.31	<0.39	<0.54	0.000690	0.305	0.606						
WQR2-0.5	VA24C9732-001	2024-11-02	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2758142-6	2024-11-14	M	0.20	0.18	<0.19	0.15	0.31	<0.34	<1.6	0.0488	0.444	0.812						
WQR2-0.5	VA24D0945-006	2024-11-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA24D1069-006	2024-11-15	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2758203-6	2024-11-19	M	<0.18	<0.16	<0.22	<0.18	<0.21	<0.27	<0.60	0.000621	0.415	0.820						
WQR2-0.5	VA24D1567-006	2024-11-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2758354-1	2024-12-06	M	<0.17	<0.17	0.24	0.18	<0.20	<0.27	1.60	0.0250	0.523	1.00						
WQR2-0.5	VA24D3008-001	2024-12-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2758634-7	2025-01-09	M	<0.18	<0.16	<0.25	<0.18	<0.30	<0.40	<1.4	0.00130	0.689	1.38						
WQR2-0.5	VA25A0510-007	2025-01-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2759010-7	2025-02-18	M	<0.25	<0.24	<0.34	<0.27	<0.28	<0.38	<0.86	0	0.563	1.12						
WQR2-0.5	VA25A3415-007	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	L2759209-7	2025-03-12	M	<0.10	<0.089	<0.15	<0.11	<0.16	<0.24	<0.63	0.00950	0.272	0.527						
WQR2-0.5	VA25A5429-007	2025-03-12	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA25A6528-016	2025-03-25	M													<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA25A8147-004	2025-04-11	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA25A8148-004	2025-04-11	M	<0.28	<0.28	<0.39	<0.30	<0.39	<0.39	1.44	0.0113	0.746	1.39						
WQR2-0.5	VA25A8280-007	2025-04-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA25A8282-007	2025-04-13	M	<0.25	<0.23	<0.34	<0.26	<0.45	<0.56	2.37	0.00199	0.439	0.877						
WQR2-0.5	VA25A8854-007	2025-04-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA25A8855-007	2025-04-21	M	<0.27	<0.24	<0.35	<0.27	<0.81	<0.74	<1.9	0.000669	0.684	1.36						
WQR2-0.5	VA25B0359-012	2025-05-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA25B0360-012	2025-05-06	M	<0.14	<0.14	<0.18	0.171	0.466	<0.31	<1.0	0.0325	0.390	0.732						
WQR2-0.5	VA25B0499-007	2025-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-0.5	VA25B0502-007	2025-05-07	M	<0.36	<0.32	<0.44	<0.38	<0.13	<0.12	<1.3	0	0.513	1.02						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-0.5	VA25B2349-006	2025-05-27	M													<0.25	<0.25	<0.25	<0.25
WQR2-1	0051710-11	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	0062209-12	2020-06-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	0071996-11	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	0082292-11	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	0093017-11	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	20J1961-11	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	20J2778-11	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	20K0360-11	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	20K1261-11	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	20K2100-11	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	20L1589-11	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21A2590-11	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21B2778-11	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21C3505-12	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21D2478-11	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21E1990-11	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21E2917-11	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21F0167-11	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21F1056-11	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21F2014-11	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21G2414-11	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21H3040-11	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21I3814-11	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21J3514-11	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21K3046-11	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	21L2125-11	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22A2312-11	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22B2487-11	2022-02-17	M																
WQR2-1	22C3145-11	2022-03-22	M																
WQR2-1	22D2212-14	2022-04-20	M																
WQR2-1	22E2480-11	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22F3212-11	2022-06-21	M																
WQR2-1	22G1763-11	2022-07-13	M																
WQR2-1	22H2453-11	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22I1926-11	2022-09-14	M																
WQR2-1	22J1560-11	2022-10-12	M																
WQR2-1	22K1453-11	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22K2628-03	2022-11-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22K2988-03	2022-11-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22K3123-03	2022-11-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22L0036-03	2022-11-30	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22L0263-03	2022-12-02	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22L0499-03	2022-12-05	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22L0633-03	2022-12-06	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	22L0774-11	2022-12-07	M																
WQR2-1	22L1436-03	2022-12-13	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	23A2847-11	2023-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	23C0060-11	2023-02-28	M																
WQR2-1	23C1797-11	2023-03-15	M																
WQR2-1	23D2945-11	2023-04-26	M																
WQR2-1	23E2392-11	2023-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	23F3614-11	2023-06-27	M																
WQR2-1	23G2415-11	2023-07-19	M																
WQR2-1	23H3309-11	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-1	23I2271-13	2023-09-19	M																
WQR2-1	23J2236-13	2023-10-18	M																
WQR2-1	23K1909-11	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-1	23L2091-09	2023-12-15	M											<0.1	<0.1				
WQR2-1	L2754383-7	2024-01-25	M	<0.096	0.15	<0.13	<0.10	<0.17	<0.22	0.40	0.0148	0.321	0.616						
WQR2-1	VA24A1507-009	2024-01-25	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2754604-7	2024-02-14	M	0.35	0.32	0.55	0.43	0.66	0.56	1.77	0.177	0.789	1.25						
WQR2-1	VA24A2995-009	2024-02-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2755043-9	2024-03-21	M	<0.30	<0.27	<0.36	<0.28	0.45	<0.40	<0.24	0.00447	0.493	0.916						
WQR2-1	VA24A6026-009	2024-03-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2755490-7	2024-04-24	M	<0.11	<0.11	<0.15	<0.12	<0.15	<0.21	<0.59	0	0.355	0.698						
WQR2-1	VA24A8916-009	2024-04-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2755567-7	2024-05-01	M	<0.34	<0.32	<0.45	<0.31	<0.50	<0.62	<0.93	0.000765	1.09	2.17						
WQR2-1	VA24A9566-009	2024-05-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2755666-7	2024-05-08	M	<0.20	<0.20	<0.28	<0.20	<0.32	<0.43	<0.79	0	0.615	1.23						
WQR2-1	VA24B0201-009	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2755779-7	2024-05-15	M	<0.24	<0.26	<0.35	<0.24	<0.52	<0.80	<1.2	0.0101	0.837	1.66						
WQR2-1	VA24B0901-009	2024-05-15	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2755888-7	2024-05-22	M	<1.1	<1.1	<1.7	<1.1	<0.41	<0.57	<1.1	0.00143	1.24	2.49						
WQR2-1	VA24B1500-009	2024-05-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2756312-7	2024-06-19	M	<0.16	<0.15	<0.20	<0.15	<0.22	<0.33	<0.55	0	0.630	1.26						
WQR2-1	VA24B4510-009	2024-06-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	VA24B7397-009	2024-07-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2756689-7	2024-07-17	M	<0.13	<0.13	<0.16	<0.13	<0.15	<0.21	0.55	0.0189	0.336	0.649						
WQR2-1	L2757122-7	2024-08-21	M	<0.19	<0.21	<0.30	<0.20	<0.45	<0.73	<0.64	0.0164	0.752	1.49						
WQR2-1	VA24C1337-009	2024-08-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	VA24C4683-009	2024-09-18	M	<0.34	<0.37	<0.47	<0.36	<0.52	<0.73	0.70	0	0.659	1.32	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	VA24C8569-009	2024-10-23	M	<0.31	<0.32	<0.42	<0.32	<0.45	<0.57	<1.1	0	0.683	1.36	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2757977-9	2024-10-30	M	<1.0	<0.91	<1.3	<0.95	<2.0	<3.2	<4.1	0.00265	2.28	4.55						
WQR2-1	VA24C9414-009	2024-10-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	VA24D0180-009	2024-11-06	M	0.18	0.21	<0.19	<0.15	<0.20	<0.24	0.98	0.0177	0.541	1.02	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	VA24D0813-009	2024-11-13	M	<0.28	<0.26	<0.39	<0.28	0.54	<0.42	<1.6	0.00540	0.859	1.70	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2758221-7	2024-11-22	M	<0.19	<0.18	<0.25	<0.21	<0.73	<0.83	0.38	0	0.648	1.28						
WQR2-1	VA24D1791-009	2024-11-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2758486-7	2024-12-18	M	<0.12	<0.11	<0.15	<0.12	<0.15	<0.20	<0.62	0.000771	0.296	0.580						
WQR2-1	VA24D3937-009	2024-12-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2758770-7	2025-01-22	M	<0.23	<0.22	<0.30	<0.22	<0.30	<0.42	<0.76	0.0245	0.666	1.31						
WQR2-1	VA25A1525-009	2025-01-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	L2759008-7	2025-02-19	M	<0.36	<0.35	<0.46	<0.37	<0.40	<0.60	<1.0	0.0249	0.994	1.96						
WQR2-1	VA25A3570-009	2025-02-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	VA25A6679-009	2025-03-26	M	0	0	0	0	0	0	0.923	0.000277	0.348	0.656	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	VA25A9109-009	2025-04-23	M	<0.12	<0.12	<0.25	<0.14	<0.37	<0.43	1.32	0.000396	0.441	0.856	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	VA25A9941-009	2025-05-01	M	<0.16	<0.15	<0.20	<0.16	<0.43	<0.37	<0.46	0.000381	0.292	0.574	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	VA25B0496-009	2025-05-07	M	<0.23	<0.23	<0.34	<0.25	<0.49	<0.57	<2.8	0	0.892	1.78	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	VA25B1530-009	2025-05-16	M	<0.23	<0.23	<0.35	<0.26	<0.47	<0.61	<2.7	0.00115	0.607	1.21	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-1	VA25B1841-009	2025-05-21	M	<0.12	<0.12	<0.17	<0.14	<0.30	<0.32	<1.8	0.00116	0.295	0.576	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	0051710-12	2020-05-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	0062209-11	2020-06-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	0071996-12	2020-07-21	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	0082292-12	2020-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	0093017-12	2020-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	20J1961-12	2020-10-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	20J2778-12	2020-10-27	M	<2	<2	<2	<2	<3	<3	<4	0.0066	2.6	5.3						
WQR2-2	20K0360-12	2020-11-03	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	20K1261-12	2020-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	20K2100-12	2020-11-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	20L1589-12	2020-12-14	M	<2	<2	<2	<2	<3	<3	<4	0.0015	2.6	5.3						
WQR2-2	21A2590-12	2021-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21B2778-12	2021-02-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21C3505-13	2021-03-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21D2478-12	2021-04-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21E1990-12	2021-05-18	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21E2917-12	2021-05-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21F0167-12	2021-06-01	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21F1056-12	2021-06-08	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21F2014-12	2021-06-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21G2414-12	2021-07-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21H3040-12	2021-08-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21I3814-12	2021-09-28	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21J3514-12	2021-10-26	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21K3046-12	2021-11-23	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	21L2125-12	2021-12-14	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22A2312-12	2022-01-20	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22B2487-12	2022-02-17	M																
WQR2-2	22C3145-12	2022-03-22	M																
WQR2-2	22D2212-15	2022-04-20	M																
WQR2-2	22E2480-12	2022-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22F3212-12	2022-06-21	M																
WQR2-2	22G1763-12	2022-07-13	M																
WQR2-2	22H2453-12	2022-08-16	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22I1926-12	2022-09-14	M																
WQR2-2	22J1560-12	2022-10-12	M																
WQR2-2	22K1453-12	2022-11-10	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22K2628-04	2022-11-22	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22K2988-04	2022-11-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22K3123-04	2022-11-25	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22L0036-04	2022-11-30	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22L0263-04	2022-12-02	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22L0499-04	2022-12-05	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22L0633-04	2022-12-06	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	22L0774-12	2022-12-07	M																
WQR2-2	22L1436-04	2022-12-13	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	23A2847-12	2023-01-27	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	23C0060-12	2023-02-28	M																
WQR2-2	23C1797-12	2023-03-15	M																
WQR2-2	23D2945-12	2023-04-26	M																
WQR2-2	23E2392-12	2023-05-17	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	23F3614-12	2023-06-27	M																
WQR2-2	23G2415-12	2023-07-19	M																
WQR2-2	23H3309-12	2023-08-24	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	23I2271-14	2023-09-19	M																
WQR2-2	23J2236-14	2023-10-18	M																
WQR2-2	23K1909-12	2023-11-15	M	<2	<2	<2	<2	<3	<3	<4	0	2.6	5.3						
WQR2-2	23L2091-10	2023-12-15	M											<0.1	<0.1				
WQR2-2	L2754383-8	2024-01-25	M	<0.11	<0.11	<0.16	<0.12	<0.096	<0.12	0.28	0.114	0.424	0.728						
WQR2-2	VA24A1507-010	2024-01-25	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2754604-8	2024-02-14	M	<0.14	<0.14	<0.19	<0.14	<0.24	<0.25	<0.67	0.00484	0.405	0.792						
WQR2-2	VA24A2995-010	2024-02-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2755043-10	2024-03-21	M	<0.19	<0.19	<0.24	<0.18	<0.66	<0.81	<0.49	0.000345	0.429	0.846						
WQR2-2	VA24A6026-010	2024-03-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2	L2755490-8	2024-04-24	M	<0.15	<0.14	<0.19	<0.15	<0.22	<0.30	<0.58	0	0.370	0.739						
WQR2-2	VA24A8916-010	2024-04-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2755567-8	2024-05-01	M	<0.23	<0.22	<0.32	<0.22	<0.34	<0.45	<0.75	0	0.623	1.24						
WQR2-2	VA24A9566-010	2024-05-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2755666-8	2024-05-08	M	<0.20	<0.19	<0.27	<0.20	<0.33	<0.44	<0.79	0	0.566	1.13						
WQR2-2	VA24B0201-010	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2755779-8	2024-05-15	M	<0.46	<0.47	<0.67	<0.44	<0.64	<0.99	<0.84	0	0.794	1.58						
WQR2-2	VA24B0901-010	2024-05-15	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2755888-8	2024-05-22	M	<0.14	<0.15	<0.21	<0.14	<0.44	<0.64	<1.3	0.000801	0.718	1.44						
WQR2-2	VA24B1500-010	2024-05-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2756312-8	2024-06-19	M	<0.17	<0.16	<0.21	<0.17	<0.30	<0.42	10.4	0.00312	0.449	0.885						
WQR2-2	VA24B4510-010	2024-06-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	VA24B7397-010	2024-07-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2756689-8	2024-07-17	M	<0.13	<0.13	<0.16	<0.13	0.260	<0.11	0.49	0.00415	0.360	0.705						
WQR2-2	L2757122-8	2024-08-21	M	<0.17	<0.18	<0.25	<0.18	<0.68	<1.1	<1.4	0.00838	0.488	0.966						
WQR2-2	VA24C1337-010	2024-08-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	VA24C4683-010	2024-09-18	M	<0.20	<0.21	<0.27	<0.21	<0.33	<0.46	<0.76	0	0.817	1.63	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	VA24C8569-010	2024-10-23	M	<0.20	<0.24	<0.33	<0.25	<0.36	<0.47	<1.2	0.00173	0.615	1.23	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2757977-10	2024-10-30	M	<0.70	<0.69	<1.0	<0.69	<2.3	<3.4	<4.6	0	2.83	5.65						
WQR2-2	VA24C9414-010	2024-10-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	VA24D0180-010	2024-11-06	M	0.21	0.18	<0.22	<0.17	0.24	<0.20	0.85	0.0193	0.451	0.811	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	VA24D0813-010	2024-11-13	M	<0.29	<0.28	0.40	<0.29	<0.36	<0.49	<1.5	0.0408	0.833	1.63	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2758221-8	2024-11-22	M	<0.20	<0.18	<0.25	<0.20	<0.60	<0.73	<0.54	0.00267	0.539	1.05						
WQR2-2	VA24D1791-010	2024-11-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2758486-8	2024-12-18	M	<0.10	<0.095	<0.13	<0.10	<0.19	<0.25	<0.48	0.00101	0.312	0.624						
WQR2-2	VA24D3937-010	2024-12-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2758770-8	2025-01-22	M	<0.18	<0.18	0.24	<0.17	0.39	<0.36	<0.80	0	0.573	1.10						
WQR2-2	VA25A1525-010	2025-01-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	L2759008-8	2025-02-19	M	<0.24	<0.23	<0.32	<0.25	<0.38	<0.53	<0.98	0	0.697	1.39						
WQR2-2	VA25A3570-010	2025-02-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	VA25A6679-010	2025-03-26	M	0	0	0	0	0	0	0	0	0.390	0.774	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	VA25A9109-010	2025-04-23	M	<0.16	<0.16	<0.23	<0.18	<0.34	<0.41	<0.55	0	0.468	0.912	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	VA25A9941-010	2025-05-01	M	0.123	0.245	<0.14	<0.11	0.479	<0.27	<1.0	0.0505	0.347	0.638	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	VA25B0496-010	2025-05-07	M	<0.63	<0.50	<0.97	<0.66	<0.84	<0.92	<4.5	0	0.778	1.54	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	VA25B1530-010	2025-05-16	M	<0.37	<0.35	<0.53	<0.42	<2.6	<0.70	<3.6	0	0.569	1.11	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2	VA25B1841-010	2025-05-21	M	<0.13	<0.12	<0.17	<0.14	<0.26	<0.29	<0.90	0.00522	0.365	0.717	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	L2755545-11	2024-04-30	M	0.26	<0.12	0.44	0.57	0.53	0.54	1.80	0.105	0.576	0.860						
WQR2-2m	VA24A9402-011	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	L2755648-2	2024-05-08	M	<0.15	<0.15	<0.19	<0.15	<0.20	<0.23	<0.42	0	0.530	1.06						
WQR2-2m	VA24B0178-002	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	L2755934-11	2024-05-24	M	<0.11	0.13	0.18	0.18	<0.19	<0.29	0.44	0.00990	0.347	0.608						
WQR2-2m	VA24B1783-011	2024-05-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	VA24B3452-011	2024-06-10	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	659-454600000-0	2024-06-17	M																
WQR2-2m	VA24B5882-011	2024-07-03	M																
WQR2-2m	VA24B6465-005	2024-07-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	VA24B7867-005	2024-07-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	L2757210-5	2024-08-26	M	<0.26	<0.25	<0.36	<0.26	<0.50	<0.65	1.5	0	0.443	0.876						
WQR2-2m	VA24C2208-005	2024-08-26	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	VA24C5557-002	2024-09-25	M													<0.25	<0.25	<0.25	<0.25
WQR2-2m	L2757680-5	2024-10-06	M	<0.20	<0.22	<0.27	<0.22	<0.25	<0.32	<0.82	0	0.667	1.33						
WQR2-2m	VA24C6685-005	2024-10-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	VA24C7408-005	2024-10-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	L2757872-5	2024-10-22	M	<0.23	<0.25	<0.34	<0.26	<0.23	<0.31	1.20	0	0.539	1.08						
WQR2-2m	VA24C8330-005	2024-10-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	VA24C9185-006	2024-10-29	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-2m	L2757962-6	2024-10-29	M	<0.11	<0.11	<0.16	<0.12	<0.42	<0.60	<0.67	0.000981	0.391	0.781						
WQR2-2m	L2758003-2	2024-11-02	M	<0.17	<0.16	<0.23	<0.18	0.120	<0.12	<0.37	0.000837	0.439	0.877						
WQR2-2m	VA24C9732-002	2024-11-02	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	L2758354-2	2024-12-06	M	<0.20	0.26	0.31	<0.20	<0.39	<0.53	1.96	0.00227	1.27	1.65						
WQR2-2m	VA24D3008-002	2024-12-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	L2758634-8	2025-01-09	M	<0.14	<0.12	<0.18	<0.14	<0.21	<0.27	<0.88	0	0.369	0.737						
WQR2-2m	VA25A0510-008	2025-01-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	L2759010-8	2025-02-18	M	<0.21	<0.19	<0.27	<0.22	<0.24	<0.32	<0.76	0	0.815	1.18						
WQR2-2m	VA25A3415-008	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	L2759209-8	2025-03-12	M	<0.089	<0.082	<0.13	<0.097	<0.17	<0.24	<0.41	0.00504	0.295	0.571						
WQR2-2m	VA25A5429-008	2025-03-12	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	VA25A6528-017	2025-03-25	M																
WQR2-2m	VA25A8147-005	2025-04-11	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	VA25A8148-005	2025-04-11	M	<0.28	<0.24	<0.35	<0.28	<0.57	<0.62	1.78	0.000534	0.645	1.27						
WQR2-2m	VA25A8280-008	2025-04-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	VA25A8282-008	2025-04-13	M	<0.21	<0.20	<0.27	<0.22	<0.48	<0.59	1.92	0.00219	0.498	0.986						
WQR2-2m	VA25A8854-008	2025-04-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	VA25A8855-008	2025-04-21	M	<0.32	<0.31	<0.43	<0.34	<0.39	<0.45	<1.3	0	0.678	1.35						
WQR2-2m	VA25B0359-011	2025-05-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	VA25B0360-011	2025-05-06	M	<0.18	<0.18	<0.23	<0.19	<0.26	<0.21	<0.92	0.000864	0.376	0.732						
WQR2-2m	VA25B0499-008	2025-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-2m	VA25B0502-008	2025-05-07	M	<0.17	<0.15	<0.21	<0.19	<0.21	<0.20	<0.98	0.0166	0.419	0.821						
WQR2-3	23L2091-11	2023-12-15	M											<0.1	<0.1				
WQR2-3	L2754383-9	2024-01-25	M	<0.13	<0.14	<0.18	<0.15	0.27	<0.26	0.30	0	0.390	0.699						
WQR2-3	VA24A1507-011	2024-01-25	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2754604-9	2024-02-14	M	<0.25	<0.24	<0.31	<0.24	<0.44	<0.50	0.82	0.00980	0.444	0.877						
WQR2-3	VA24A2995-011	2024-02-14	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2755043-11	2024-03-21	M	<0.16	<0.15	<0.22	<0.15	<0.42	<0.53	<0.47	0	0.394	0.780						
WQR2-3	VA24A6026-011	2024-03-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2755490-9	2024-04-24	M	<0.18	<0.17	<0.23	<0.17	<0.22	<0.30	<0.52	0	0.413	0.806						
WQR2-3	VA24A8916-011	2024-04-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2755567-9	2024-05-01	M	<0.18	<0.17	<0.25	<0.17	<0.30	<0.39	<0.52	0	0.683	1.37						
WQR2-3	VA24A9566-011	2024-05-01	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2755666-9	2024-05-08	M	<0.21	<0.21	<0.28	<0.20	<0.31	<0.40	<0.51	0	0.646	1.29						
WQR2-3	VA24B0201-011	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2755779-9	2024-05-15	M	0.45	0.49	<0.29	<0.20	<0.76	<1.2	<1.0	0.0473	1.08	2.04						
WQR2-3	VA24B0901-011	2024-05-15	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2755888-9	2024-05-22	M	<0.25	<0.27	<0.43	<0.26	<0.39	<0.65	<3.0	0	1.31	2.63						
WQR2-3	VA24B1500-011	2024-05-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2756312-9	2024-06-19	M	<0.093	0.100	<0.12	0.100	<0.44	<0.62	<0.54	0.00354	0.524	1.01						
WQR2-3	VA24B4510-011	2024-06-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	VA24B7397-011	2024-07-17	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2756689-9	2024-07-17	M	<0.14	<0.14	<0.17	<0.14	<0.084	<0.12	<0.24	0.00602	0.330	0.642						
WQR2-3	L2757122-9	2024-08-21	M	<0.15	<0.17	<0.22	<0.16	<0.42	<0.64	<0.44	0.00226	0.549	1.08						
WQR2-3	VA24C1337-011	2024-08-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	VA24C4683-011	2024-09-18	M	<0.34	<0.35	<0.44	<0.35	<0.46	<0.68	1.50	0	0.732	1.46	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	VA24C8569-011	2024-10-23	M	<0.24	<0.25	<0.33	<0.26	<0.30	<0.39	<1.3	0	0.619	1.24	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	VA24C9414-011	2024-10-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2757977-11	2024-10-30	M	<0.91	<1.0	<1.4	<0.98	<1.1	<2.0	<4.7	0	2.44	4.88						
WQR2-3	VA24D0180-011	2024-11-06	M	<0.15	<0.15	<0.19	0.16	0.23	<0.28	1.09	0.0110	0.459	0.877	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2758221-9	2024-11-22	M	<0.24	<0.20	<0.28	<0.22	<0.43	<0.50	<0.97	0.000852	0.487	0.970						
WQR2-3	VA24D1791-011	2024-11-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2758486-9	2024-12-18	M	<0.10	<0.096	<0.13	<0.10	<0.13	<0.18	<0.45	0	0.259	0.506						
WQR2-3	VA24D3937-011	2024-12-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2758770-9	2025-01-22	M	<0.17	<0.17	<0.24	<0.18	<0.30	<0.43	<0.53	0	0.504	1.01						
WQR2-3	VA25A1525-011	2025-01-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	L2759008-9	2025-02-19	M	<0.31	<0.30	<0.41	<0.32	<0.36	<0.53	<0.94	0	0.932	1.84						

Appendix 3.9-1: Marine Water Quality Results

Station ID	Sample No.	Sample Date	Sample Class	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Lower Bound PCDD/F TEQ	Mid Point PCDD/F TEQ	Upper Bound PCDD/F TEQ	VH(C6-C10)	VPH(C6-C10)	EPH(C10-19)	EPH(C19-C32)	LEPH	HEPH
				pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	pg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WQR2-3	VA25A3570-011	2025-02-19	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	VA25A6679-011	2025-03-26	M	0	0	0	0	0	0	0	0.00365	0.293	0.574	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	VA25A9109-011	2025-04-23	M	<0.14	<0.13	<0.18	<0.15	<0.21	<0.26	<0.48	0.000459	0.387	0.766	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	VA25A9941-011	2025-05-01	M	<0.16	<0.15	<0.22	<0.17	<0.48	<0.26	<0.47	0.407	0.638	0.853	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	VA25B0496-011	2025-05-07	M	<0.18	<0.17	<0.28	<0.20	<0.39	<0.41	<4.6	0	0.537	1.07	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	VA25B1530-011	2025-05-16	M	<0.20	<0.19	<0.29	<0.22	<0.82	<1.0	<2.0	0	0.498	0.997	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-3	VA25B1841-011	2025-05-21	M	<0.087	<0.085	<0.12	<0.094	<0.33	<0.33	<1.2	0.00122	0.379	0.748	<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	L2755545-12	2024-04-30	M	0.32	<0.14	0.40	0.26	0.60	0.63	2.4	0.0598	0.567	0.921						
WQR2-SF	VA24A9402-012	2024-04-30	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	L2755648-3	2024-05-08	M	<0.16	<0.15	<0.20	<0.15	<0.26	<0.32	0.78	0.00413	0.497	0.990						
WQR2-SF	VA24B0178-003	2024-05-08	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	L2755934-12	2024-05-24	M	<0.18	<0.19	<0.22	<0.17	<0.23	<0.34	0.66	0.423	0.699	0.960						
WQR2-SF	VA24B1783-012	2024-05-24	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	VA24B3452-012	2024-06-10	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	660-454600000-0	2024-06-17	M																
WQR2-SF	VA24B5882-012	2024-07-03	M																
WQR2-SF	VA24B6465-006	2024-07-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	VA24B7867-006	2024-07-20	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	L2757210-6	2024-08-26	M	<0.28	<0.26	<0.38	<0.29	<0.40	<0.58	<1.5	0	0.504	1.01						
WQR2-SF	VA24C2208-006	2024-08-26	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	VA24C5557-003	2024-09-25	M													<0.25	<0.25	<0.25	<0.25
WQR2-SF	L2757680-6	2024-10-06	M	<0.24	<0.25	<0.33	<0.26	<0.47	<0.61	<0.92	0.0124	0.676	1.34						
WQR2-SF	VA24C6685-006	2024-10-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	VA24C7408-006	2024-10-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	L2757872-6	2024-10-22	M	<0.19	<0.20	<0.26	<0.21	0.35	<0.32	0.81	0.00455	0.795	1.23						
WQR2-SF	VA24C8330-006	2024-10-22	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	VA24C9185-007	2024-10-29	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	L2757962-7	2024-10-29	M	<0.18	<0.17	<0.26	<0.19	<0.22	<0.30	<0.46	0.00118	0.389	0.773						
WQR2-SF	L2758003-3	2024-11-02	M	<0.14	<0.13	<0.18	<0.14	<0.30	<0.38	0.49	0.000765	0.528	1.05						
WQR2-SF	VA24C9732-003	2024-11-02	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	L2758354-3	2024-12-06	M	0.22	<0.18	<0.23	<0.18	<0.34	<0.45	0.62	0.00791	0.493	0.956						
WQR2-SF	VA24D3008-003	2024-12-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	L2758634-9	2025-01-09	M	<0.21	<0.19	<0.28	<0.22	<0.35	<0.48	<1.5	0	0.627	1.25						
WQR2-SF	VA25A0510-009	2025-01-09	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	L2759010-9	2025-02-18	M	<0.22	<0.21	<0.30	<0.24	<0.28	<0.38	0.97	0.00107	0.682	1.35						
WQR2-SF	VA25A3415-009	2025-02-18	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	L2759209-9	2025-03-12	M	<0.13	<0.10	<0.19	<0.15	<0.13	<0.20	<0.39	0.0139	0.260	0.499						
WQR2-SF	VA25A5429-009	2025-03-12	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	VA25A6528-018	2025-03-25	M																
WQR2-SF	VA25A8147-006	2025-04-11	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	VA25A8148-006	2025-04-11	M	<0.77	0.760	<0.47	0.835	<3.6	0.883	1.99	0.335	0.987	1.50						
WQR2-SF	VA25A8280-009	2025-04-13	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	VA25A8282-009	2025-04-13	M	<0.17	<0.15	<0.23	<0.19	<0.37	<0.45	2.95	0.00240	0.431	0.860						
WQR2-SF	VA25A8854-009	2025-04-21	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	VA25A8855-009	2025-04-21	M	<0.21	<0.18	<0.28	<0.22	<0.34	<0.46	<1.4	0	0.659	1.32						
WQR2-SF	VA25B0359-010	2025-05-06	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	VA25B0360-010	2025-05-06	M	<0.17	<0.17	<0.25	<0.18	<0.50	<0.37	<1.2	0.0190	0.487	0.906						
WQR2-SF	VA25B0499-009	2025-05-07	M											<0.1	<0.1	<0.25	<0.25	<0.25	<0.25
WQR2-SF	VA25B0502-009	2025-05-07	M	0.734	<0.49	<0.38	<0.69	<2.6	0.481	<2.0	0.0800	0.792	1.15						

Notes:
Sample Class 'M' = monitoring sample.
'<' = result is below the indicated detection limit.

Appendix 4.1: Operations Phase Stormwater Drainage Management

4.1-1: Operations Stormwater Drainage Management Program (Permit PE-11393)

Operations Stormwater Drainage Management Program (Permit PE-113093)

Woodfibre LNG Project

October 16, 2026

Prepared By:
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WLNG-W0001-RE-PL-00034

Woodfibre LNG

Preamble

The Woodfibre Liquified Natural Gas Project (the Project) is a liquefied natural gas export facility being constructed on the former Woodfibre Pulp and Paper Mill site in Nexwnéwu7ts Átlk̲’a7tsem (Howe Sound), approximately seven kilometres south of Skwxwú7mesh (Squamish). The Project is on the historical location of a Sk̲wx̲wú7mesh Úxwumixw (Squamish Nation) village known as Swiy̓át. Swiy̓át and Nexwnéwu7ts Átlk̲’a7tsem (Howe Sound) are tied to the cultural well-being of Sk̲wx̲wú7mesh Úxwumixw (Squamish Nation) members, their ancestors, and their descendants, and to other Indigenous Groups as defined in the Project's Environmental Assessment Certificates. Woodfibre LNG General Partner Inc. recognizes the importance of these areas to the Skwxwú7mesh stélmexw (Squamish People), and other Indigenous Groups. Woodfibre LNG General Partner Inc seeks to construct and operate the Project in a manner that is respectful of Indigenous values. This Operations Stormwater Drainage Management Plan is primarily written in English with important place names, species, phrases, and passages provided in the Sk̲wx̲wú7mesh Sníchim (Squamish language).

Temíxwiy̓ik̲w chet wa naantem chet ti temíxw Swiy̓át

Chet wa sméṅhemswit kwis ns7éyx̲nitas chet ti temíxw

We7ú chet kwis t’íchimwit iy íẇas chet ek̲’ I tti.

Our ancient ancestors named this place Swiy̓át

We, as their descendants safeguard these lands

We will continue to swim and fish in these clear waters.

Document Revision History

	PREPARED BY	REVIEWED BY	APPROVED BY
Name:	Janine Forrest	Ashleigh Crompton	Marnie Yohemas
Position:	Permitting Specialist	Permitting Lead	Director of Regulatory, Compliance and Environment
Date: (YYYY-MM-DD)	2026-10-16	2026-10-16	2026-10-16
Signature			

REVISION HISTORY			
Version	Revision Date	Pages Revised	Revision Description
A	2026-04-14	-	Issued for Review
B	2026-08-25	Added in Figures, updated exclusions list, updated First Flush design information, added the chlorinated service/fire water, and added references to the TAR.	Issued for Review
C	2026-10-16	Reattached clearer Figures and updated header	Issued in WDA Permit Application

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Squamish-English Translation

Squamish	English
General Terms	
Ínexwantas	Monitoring
Sḵwx̱wú7mesh Sníchim	Squamish language
Sḵwx̱wú7mesh Úxwumixw	Squamish Nation
Sḵwx̱wú7mesh stélmexw	Squamish people
Staḵw	Water, river
Locations	
Nexwnéwu7ts Átlḵ’a7tsem	Howe Sound
Sḵwx̱wú7mesh	Squamish

Abbreviations

°C	Degrees Celsius
AGRU	Acid Gas Removal Unit
BC	British Columbia
BCER	BC Energy Regulator[1]
CPI	Corrugated Plate Interceptor
DCS	Distributed Control System
DGIR	Dangerous Goods Incident Report
EMCR	Ministry of Emergency Management and Climate Readiness
EPH	Extractable Petroleum Hydrocarbon
FST	Floating Storage Tank
ha	hectares
HDPE	High density polyethylene
hr	hour
HSE	Health, Safety and Environment
IE	Invert Elevations
km	kilometres
LNG	Liquefied Natural Gas
m	metres
m^3	cubic metres
mm	millimetres
MOF	Material offloading facility
OP	Operating procedures
OUT-	Outfall
OWTS	Oily Water Treatment System
Project	Woodfibre LNG Project
QP	Qualified Professional
SWDMP	Stormwater Drainage Management Program
SWE	Snow Water Equivalent
UCP	Unit Control Panel
WDA	Waste Discharge Authorization
Woodfibre LNG	Woodfibre LNG General Partner Inc

1.0 INTRODUCTION

Woodfibre LNG General Partner Inc. (Woodfibre LNG) will operate the Woodfibre Liquefied Natural Gas Project (the Project). The Project has the capacity to liquefy up to 2.1 million tonnes per year of natural gas and a storage capacity of 250,000 cubic metres (m^3) and will export the liquefied natural gas (LNG) via LNG carriers.

1.1 PURPOSE

The purpose of this Operations Stormwater Drainage Management Program (SWDMP) is to outline the plans for managing the stormwater drainage system during Operations.

The SWDMP was developed to support the waste discharge authorisation (WDA) permit application to the BC Energy Regulator (BCER) under the BC *Environmental Management Act* for the discharge of effluent from the stormwater drainage systems to the environment.

1.2 SCOPE

The following elements are provided herein to support the WDA permit application:

- **Stormwater Drainage Management**: Describes the stormwater drainage management system and procedures implemented during normal operations prior to the discharge into Howe Sound.
- **Oily Water Treatment System (OWTS) Management**: References the operations and maintenance manual and describes the plan for managing treatment residuals.
- **Contingency Plan**: Describes the plan for managing the stormwater drainage system if the water quality does not meet the permit requirements, and/or if there is an interruption to normal operations of the OWTS (also referred to as the “Oily Water Treatment Package”).
- **Episode Management Plan**: Describes the approach for managing natural and environmental events that may impact the stormwater drainage system.
- **Trigger and Response Plan**: Describes the monitoring triggers and responses in the event that environmental benchmarks are exceeded.
- **Adaptive Management Plan:** Describes the adaptive management process and addresses outstanding key uncertainties of potential effects of the discharge following a cyclical process.

1.3 PROJECT LOCATION

The Project area (the site) is located approximately seven kilometres (km) southwest of Sḵwx̱wú7mesh (Squamish), British Columbia (BC) on the northwestern shoreline of Nexwnéwu7ts Átlk’a7tsem (Howe Sound). The site is within the Traditional Territory of the Skwxwú7mesh Úxwumixw (Squamish Nation) at the historical site of Swiẏát, a Skwxwú7mesh Úxwumixw (Squamish Nation) village.

The site comprises of fee simple, industrially zoned, brownfield temíxw (land), along with existing stak̓w (water) lots (refer to Figure 1-1). The site previously operated as a pulp mill facility from 1912 until 2006.

The site is mostly at sea level, surrounded by steep, mountainous terrain with no temíxw (land) or road access. All personnel, equipment and supplies are brought in by vessel via Nexwnéwu7ts Átlk'a7tsem (Howe Sound).

The site is located within portions of three watersheds, Woodfibre Creek, Mill Creek and East Creek.

1.4 ROLES AND RESPONSIBILITIES

The Plant Manager will be accountable for the LNG facility, including the stormwater drainage management system; and will be supported by various Managers who are responsible for leading different divisions (e.g., Operations Manager, Maintenance Manager, Engineering Manager, Environment Manager). Supervisors (who report to the Managers) will be responsible for directing operators to execute the day-to-day activities including water quality assessments prior to discharge to the environment.

In the event of a potential regulatory non-compliance, the operator will notify a Health, Safety and Environment (HSE) specialist (or project approved designate) who will subsequently notify the BCER and/or applicable regulatory agency.

1.5 EXCLUSIONS

This SWDMP does not contain the following:

- Stormwater management during Construction
- Commissioning of the permanent stormwater management system. Refer to the "Technical Assessment Report for Stormwater Effluent from the Woodfibre LNG Facility" (WLNG-W0001-RE-RP-00287) for details on the transition from the temporary stormwater drainage system (supporting construction activities) to the permanent stormwater drainage system.
- Operating procedures (OPs) that will be used to execute the program. Rather these are referred to herein only and are available to operators as part of the broader WLNG management system.
- Stormwater monitoring and reporting program. The requirements will be defined in the WDA PE-113093.

1.6 REVIEW AND UPDATE

The Environment Manager (or project approved designate) shall review this SWDMP annually and in response to a WDA permit non-compliance to determine if updates are required to this program to support the effective management of the stormwater drainage system.

1.7 REFERENCES

This document was developed based on the Project documents listed in Table 1-1.

Table 1-1: Project Document References

Document Number	Document Name
350106-000-CM-MA-00018	Effluent and Wastewater Treatment System Operating Manual – Unit 64
350106-000-CS-PH-00001	Storm Water Drainage Philosophy
350106-000-PR-RP-00021	Oily Water Treatment Package Best Achievable Technology Assessment (BATA)
350106-0000-64-EV-GEN-PDB-0001	Unit 64 Effluent and Wastewater System – Process Design Basis
350106-1101-00-CV-DWG-K22-0002	Civil Final Grading and Paving Plan (*for area north of M09, M01 and M02)*
350106-1101-00-CV-DWG-K22-0005	Civil Final Grading and Paving Plan (*for OUT-06 Area)*
350106-1101-00-CV-DWG-K22-0007	Civil Final Grading and Paving Plan (*for OTWP and FFS Area)*
350106-1101-00-CV-DWG-K22-0008	Civil Final Grading and Paving Plan (*for OUT-10, -11, and -12 Area)*
350106-1101-00-CV-DWG-K22-0012	Civil Final Grading and Paving Plan (*for OUT-04 Area)*
350106-1101-00-CV-DWG-K22-0013	Civil Final Grading and Paving Plan (*for Refrigerant Unloading / MOF Area)*
350106-1101-00-CV-DWG-K22-0014	Civil Final Grading and Paving Plan (*for Shoreline East of the Refrigerant Unloading / MOF Area)*
350106-1101-00-CV-DWG-K22-0016	Civil Final Grading and Paving Plan (*for OUT-01 and -02 Area)*
350106-1200-64-PR-DWG-UFD-0001	Effluent and Wastewater Treatment System – Oily Water Collection and Treatment System
350106-1200-64-PR-DWG-UFD-0002	Effluent and Wastewater Treatment System – Oily Water Collection System
350106-1200-64-PR-DWG-UFD-0004	Effluent and Wastewater Treatment System – Jetty Area Impoundment Sump and Clean Stormwater System
350106-1200-64-PR-DWG-UFD-0005	Effluent and Wastewater Treatment System – Process Area Impoundment Sump and Clean Stormwater System
350106-4100-00-CV-DWG-K11-0024	Civil Final Rough Grade Plan (*for OUT-10, -11, and -12 Area)*
350106-4100-00-CV-DWG-K11-0025	Civil Final Rough Grade Plan (*for OUT-06 Area)*

Document Number	Document Name
350106-4100-00-CV-DWG-K11-0026	Civil Final Rough Grade Plan (*for OUT-04 Area)*
350106-4100-00-CV-DWG-K11-0029	Civil Final Rough Grade Plan (*for OUT-01 and -02 Area)*
350106-4100-00-CV-DWG-K11-0057	Civil Final Rough Grade Plan (*for FST 1 Area)*
350106-4102-00-CV-DWG-P40-0001	Stormwater Underground Drainage Industrial Area Plan
350106-4102-00-CV-DWG-P40-0006	Stormceptor Details Plan and Section
350106-4200-64-PR-DWG-PID-0031	Piping and Instrumentation Diagram Effluent and Wastewater Treatment HVAC Condensate Drains
350106-PO-11417-02-SD-000012	Oily Water Treatment Package Data Sheet 01-A-6417
350106-PO-11417-02-SD-000034	Control Philosophy and Logic Diagram
350106-PO-11417-02-SD-000082	Operating and Maintenance Manual
350106-SC-EN-013-SD-000124	Operations Phase Stormwater Drainage Hydrology Hydraulics Model
WLNG-S0003-EV-EDG-0003	Environmental Design Guidelines for Water
WLNG-W0001-RE-RP-00287	Technical Assessment Report for Stormwater Effluent from the Woodfibre LNG Facility



LEGEND

- Certified Project Area
- Highway
- Watercourse

DATE SAVED:	Apr 21, 2026
DRAWN BY:	DM
REVIEWED:	PM
VERSION:	1

Coordinate System: NAD 1983 UTM Zone 10N
Projection: Transverse Mercator
Datum: North American 1983
Units: Metres

1:300,000

0 2 4 6 km

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Geographic Location of the Project Site

PROJECT #: A825-1

FIGURE: 1-1

P:\@202506\Woodfibre\Drafting Figures\APRX\Regional Maps\Project Location\Project Location.aprx Figure 1-1_Location Map Printed by: DesMacDonald

2.0 STORMWATER DRAINAGE MANAGEMENT

The stormwater drainage system was designed to protect the LNG facility from design storm events based on applicable codes, standards and regulations.

2.1 CLIMATE

The monthly estimates for temperature and precipitation are provided in Table 2-1.

Table 2-1: Monthly Temperature and Precipitation Estimates for Lower Elevations of Mill Creek, Woodfibre Creek and East Creek

Month	Temperature (°C)			Precipitation (mm)		
	Daily Average	Daily Maximum	Daily Minimum	Rainfall	Snowfall (SWE)	Total Precipitation
Jan	2.7	5.6	-0.3	300.2	25.9	326.1
Feb	4.6	8.7	0.4	179.7	13.1	192.8
Mar	6.7	11.3	2.1	198.4	8.1	206.5
Apr	9.9	15.1	4.6	152.5	0.1	152.6
May	12.9	18.1	7.6	115.7	0	115.7
Jun	15.5	20.5	10.4	82.6	0	82.6
Jul	17.8	23.1	12.4	59.3	0	59.3
Aug	17.8	23.3	12.2	66.2	0	66.2
Sep	15	20.7	9.2	82.6	0	82.6
Oct	10.3	14.6	5.9	255.5	0	255.5
Nov	5.5	8.7	2.3	382.2	9.2	391.3
Dec	2.5	5.2	-0.2	268.4	30.6	299.0
Annual	**10.1**	**14.6**	**5.5**	**2,143**	**87**	**2,230**

Notes:
These estimates (particularly precipitation estimates) are most applicable to the lower elevations of the study area.
Data Source: ECCC's 1981-2000 Climate Normals
[Table Source: Document WLNG-S0003-EV-EDG-0003]

As further described in Section 2.3, the stormwater drainage systems are designed to convey runoff from either the 10-year or 100-year return period. The rainfall intensity-duration frequency curves for these durations are provided in Table 2-2.

Table 2-2: Intensity-Duration-Frequency for Mill Creek, Woodfibre Creek and East Creek with Climate Change Considerations[1] (mm)

Duration	Return Period	
	10-year	100-year
5 min	6.5	15.4
10 min	8.3	17.8
15 min	9.1	17.8
30 min	11.6	18.7
1 hour	18.5	29.1
2 hour	28.8	41.3
6 hour	66.8	99.5
12 hour	112.2	148.5
24 hour	187.1	257.8
24 hour (rain on snow)[2]	221.6	297.2

Notes:

1. For climate change considerations, for each duration and return period, the maximum of the following two precipitations depths were used in the table:
    a. Precipitation depth estimated by the UWO (2020) tool for the Squamish Airport with the ensemble of global climate models for climate change until 2100 under the moderate intensity scenario (RCP 4.5)
    b. Precipitation depth based on the historical IDF curve for the Squamish Airport, plus 10% for climate change, consistent with the EGBC (2018) guidelines.
2. Rain-driven snowmelt rates based on Coulson (1991) were added to the 24-hr rain events to calculate the total rain-on-snow events.

[Table Source: Document 350106-000-CS-PH-00001; WLNG-S0003-EV-EDG-0003]

References:

- Coulson. 1991. Manual of Operational Hydrology in British Columbia. Ministry of Environment, Water Management Division, Hydrology Section.
- Engineers and Geoscientist British Columbia (EGBC). 2018. Legislated Flood Assessments in a Changing Climate in BC. Professional Practice Guidelines, Version 2.1, August 28, 2018.
- University of Western Ontario (UWO). 2020. Computerized Tool for Development of IDF Curves Under a Changing Climate – Version 4.0. www.idf-cc-uwo.ca, accessed on October 20, 2020.

2.2 CATEGORIZATION

Surface water runoff from the site is classified into the categories outlined in Table 2-3.

Table 2-3: Stormwater Runoff Categories

Classification	Description
Non-Contact Water	Water generated from outside the footprint of the LNG facility which does not come into contact with any part of the facility before entering the receiving environment. This also includes water originating from undeveloped / non-developable periphery areas of the site located along the creeks and Howe Sound shoreline which drain directly to those water bodies.
Contact Water	Water generated from within the facility footprint either naturally or from facility operations. Contact water is further divided into three classifications as outlined below.
Contaminated Contact Water	Water originating from operational process areas, such as amine unit, hydrocarbon loading/unloading stations, hydrocarbon storage areas, and any other areas surface runoff from oily equipment base plates, lubrication skids, and piping drains.
Potentially Contaminated Contact Water	Water which potentially comes into contact with the LNG process and other process areas. This water is collected in the paved areas beneath the process modules and equipment.
Non-Contaminated Contact Water	Water originating from within the facility that does not come into contact with any potential contaminant sources.

2.3 DRAINAGE SYSTEM

Figure 2-1 illustrates the routing of non-contact and contact water around the site to the eight discharge outfalls; there are seven stormwater drainage outfalls into Howe Sound (OUT-01, -02, -04, -10, -11, -12 and -13) and one stormwater drainage outfall into Mill Creek that subsequently flows into Howe Sound (OUT-06). Further breakdown of the discharge via each outfall is provided in Section 2.3.5. Figure 2-2 illustrates the management approach for the various elements of the stormwater drainage system.

The process flow diagrams associated with these systems have been submitted to the BCER as part of the Facility Permit/*LNG Facility Regulations*, which are:

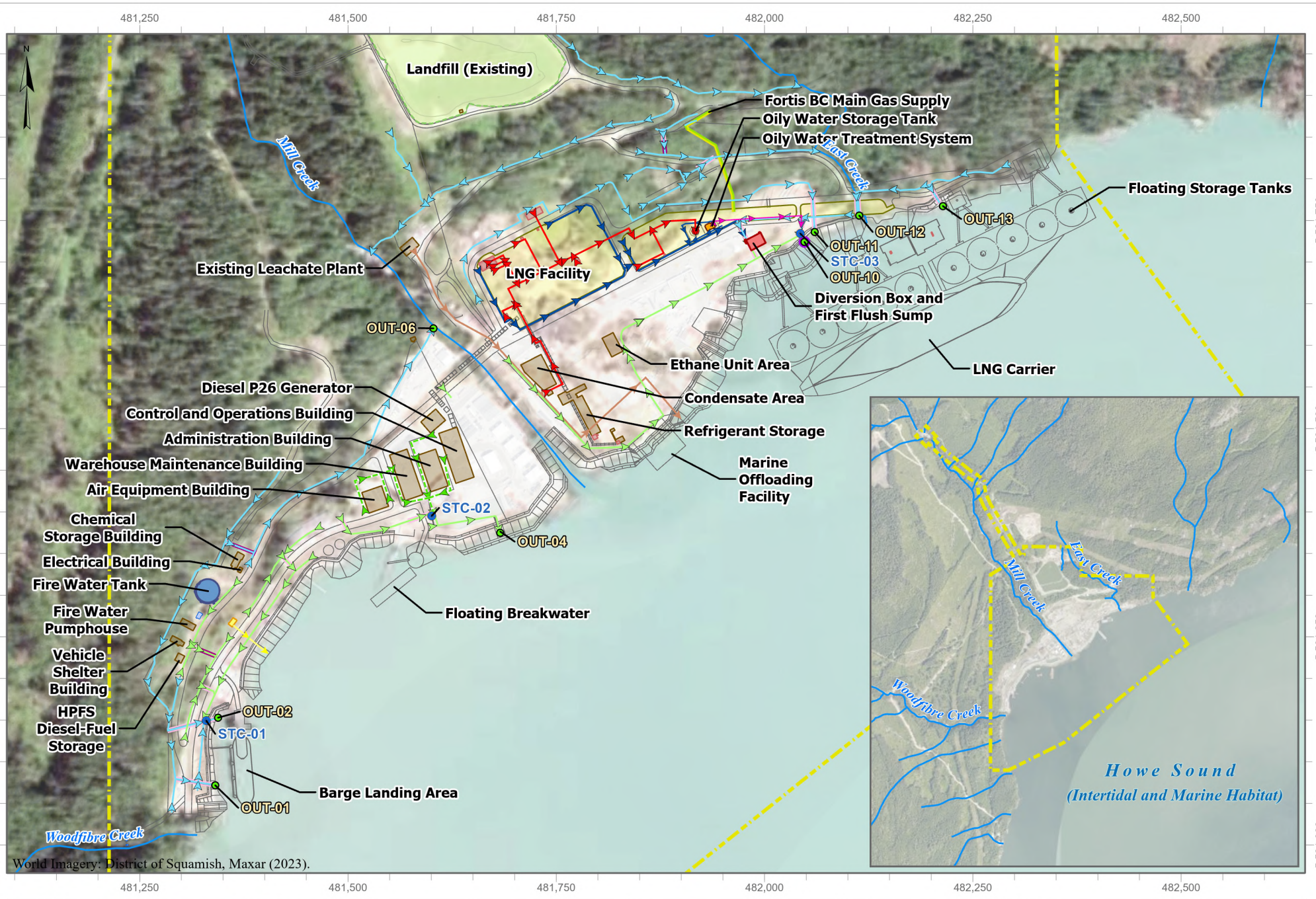
- 350106-1200-64-PR-DWG-UFD-0001 – Utility Flow Diagram Unit 64 Effluent and Wastewater Treatment Oily Water Collection and Treatment System

- 350106-1200-64-PR-DWG-UFD-0002 – Utility Flow Diagram Unit 64 Effluent and Wastewater Treatment Oily Water Collection System
- 350106-1200-64-PR-DWG-UFD-0004 – Utility Flow Diagram Unit 64 Effluent and Wastewater Treatment Jetty Area Impoundment Sump and Clean Stormwater System
- 350106-1200-64-PR-DWG-UFD-0005 – Utility Flow Diagram Unit 64 Effluent and Wastewater Treatment Process Area Impoundment Sump and Clean Stormwater System

There will be a mixture of site surface coverings, including:

- Paving (asphalt or concrete) for the operational process areas, containment areas, buildings, and primary access roads
- Granular base for non operating areas near the material offloading facility (MOF)
- Rip rap for shoreline protection and on the north side of the process / operating areas
- Forested hillslopes

For the predicted water quality in these drainage systems, refer to the “Technical Assessment Report for Stormwater Effluent from the Woodfibre LNG Facility” (WLNG-W0001-RE-RP-00287).



LEGEND

- Stormceptor
- Outfall
- Outfall Compliance Point
- Site Linework (Reduced)
- Site Buildings
- LNG Facility
- Fire Water Tank
- Raw Water Intake / Filter
- Sewage Treatment Plant
- Sump
- Oily Water Storage Tank
- Oily Water Treatment System
- Landfill (Existing)
- Certified Project Area
- Culvert
- RipRap Apron
- Fortis BC Main Gas Supply Pipeline
- Non-Contact Water Ditch
- Non-Contaminated Contact Water Storm Sewer
- Non-Contaminated Contact Water Ditch
- Contaminated Contact Water Pipeline
- Potentially Contaminated Contact Water Trench
- Treated Contact Water Pipeline
- Treated Leachate Underground Pipeline
- Sewage Treatment Plant Outfall
- Watercourse

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VERSION:	1

Coordinate System: NAD 1983 UTM Zone 10N
Projection: Transverse Mercator
Datum: North American 1983
Units: Metre

1:6,000

0 100 200 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Location of Woodfibre LNG Facilities within the Project Site

PROJECT #: A825-1

FIGURE: 2-1

P:\@202506\Woodfibre\Drafting Figures\APRX\TAR - Operations Phase\TAR - Operations Phase\TAR - Operations Phase.aprx Figure 2-1 Project Area and Facilities

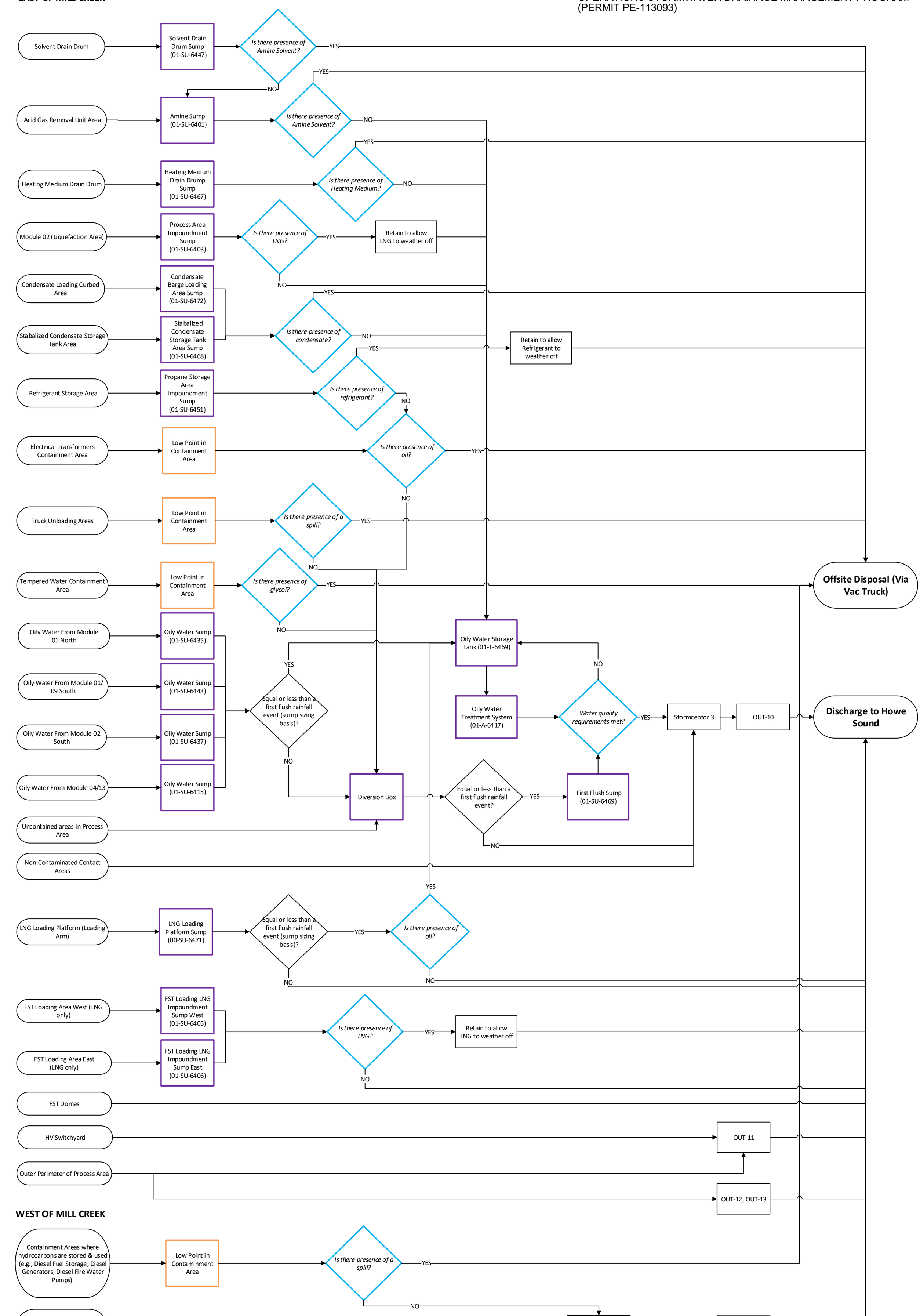


Figure 2 2: Schematic of the Management Approach for the Stormwater Drainage System

2.3.1 Non-Contact Water

Non-Contact Water that drains directly to the local creeks or Howe Sound (outside of the Project) will continue to drain via their existing natural patterns.

Diversion ditches along the outer perimeters of the site will intercept the upstream stormwater and divert this non-contact water to various culvert outfalls (OUT-01, OUT-02, OUT-06, OUT-11, OUT-12, and OUT-13) which discharge directly to Howe Sound or Mill Creek (refer to Figure 2-1).

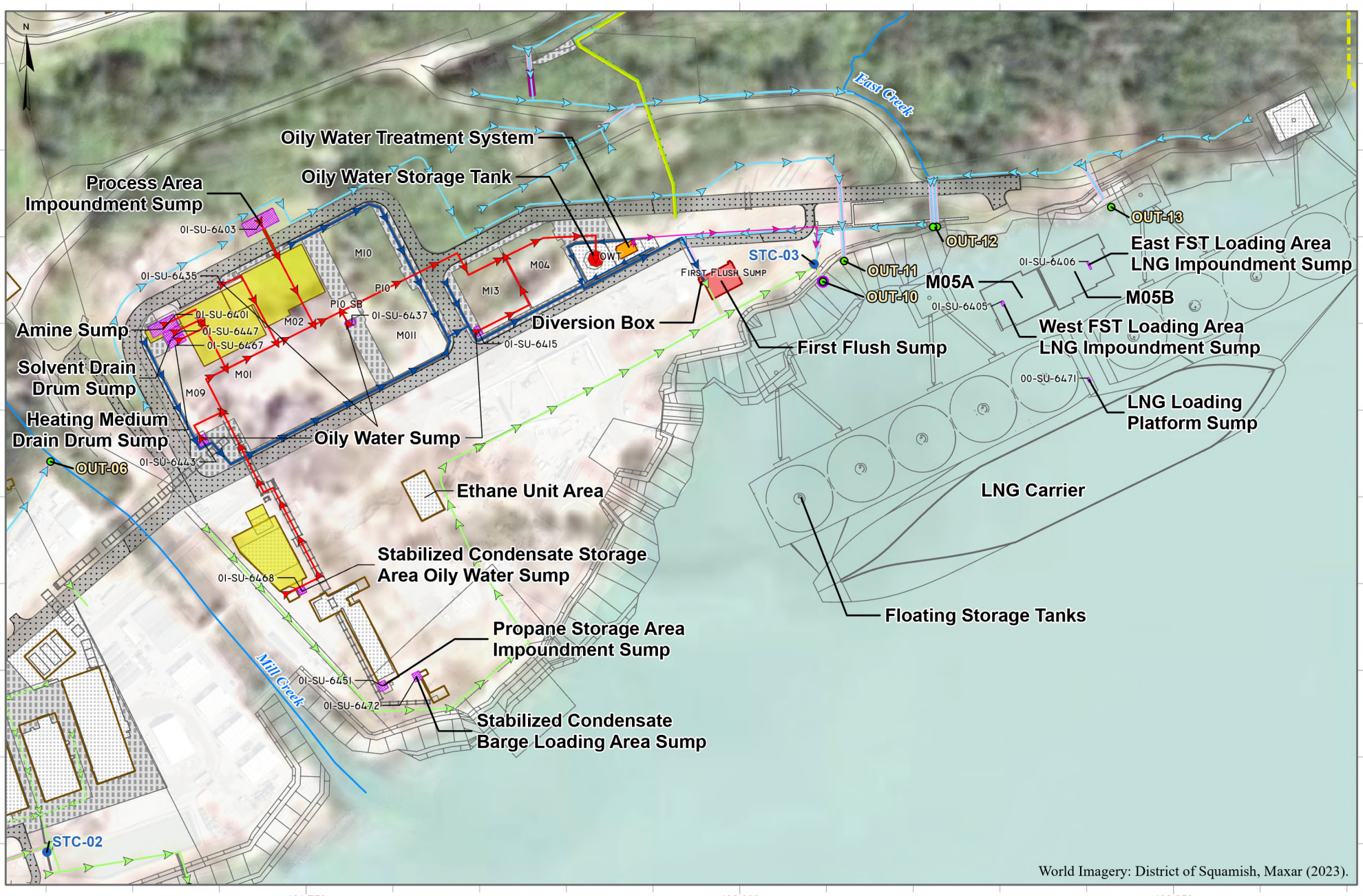
Stormwater from within the vegetated Green Zone along Mill Creek will also flow directly into Mill Creek or Howe Sound.

2.3.2 Contaminated Contact Water

As noted in Table 2-3, Contaminated Contact Water is sourced from operational process areas where there is equipment that contains hydrocarbons and other potential sources of contaminants that will interface with surface water runoff. This is commonly referred to as the “oily water system” given the oily water system collects, conveys and treats oily water from equipment and piping drains.

The Contaminated Contact Water will be contained within paved curbed areas that discharge into in-ground, closed concrete oily water sumps (inner walls have an epoxy coating) that are vented to safe locations. Figure 2-1, Figure 2-2, Figure 2-3 and Table 2-4 outlined where the Contaminated Contact Water will be collected within the LNG facility. There are two sumps that have an alternative design:

- **Amine Sump:** There are additional protections in place in the Acid Gas Removal Unit (AGRU) where amine will be used. The AGRU area has a dedicated containment area with an in-ground reinforced concrete sump with the inner walls compatible with the amine solvent. The amine truck unloading areas also drain to this sump.
- **Process Area Impoundment Sump:** It is an in-ground basin, constructed of insulating perlite concrete and filled with a layer of Foamglas cubes to suppress vapor dispersion and pool fires in the event of a spill.



LEGEND

- Stormceptor
- Outfall
- Outfall Compliance Point
- Site Linework (Reduced)
- Site Buildings
- Paved Road
- Ashphalt Paving
- Concrete Paving
- Sump
- Sump Containment Area
- Oily Water Storage Tank
- Oily Water Treatment System
- Diversion Box and First Flush Sump
- Culvert
- RipRap Apron
- Fortis BC Main Gas Supply
- Non-Contact Water
- Non-Contaminated Contact Water Storm Sewer
- Non-Contaminated Contact Water
- Contaminated Storm Water
- Potentially Contaminated Contact Water
- Treated Contact Water
- Watercourse

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Coordinate System: NAD 1983 UTM Zone 10N
Projection: Transverse Mercator
Datum: North American 1983
Units: Metre

1:3,000

0 50 100 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Water Management System Layout East of Mill Creek

PROJECT #: A825-1

FIGURE: 4-4

P:\@202506\Woodfibre\Drafting Figures\APRX\TAR - Operations Phase\TAR - Operations Phase\TAR - Operations Phase.aprx Figure 4-04 Water Mgmt System East of Mill Creek

Figure 2-3 in SWDMP

Table 2-4: Contaminated Contact Water Collection Systems

Location	Collection System[1]
Oily Water Collection System	
Module 01 North (excluding the AGRU area)	Oily Water Sump (01-SU-6435) + Pump (01-P-6436)
Module 01/09 South	Oily Water Sump (01-SU-6443) + Pump (01-P-6444)
Module 02 South	Oily Water Sump (01-SU-6437) + Pump (01-P-6438)
Module 04/13	Oily Water Sump (01-SU-6415) + Pump (01-P-6416)
Amine + Oily Water Collection System	
Module 01 – Surface Runoff from under Amine Equipment (AGRU area)	Amine Sump (01-SU-6401) + Pump (01-P-6425)
Solvent Drain Drum (north of Module 09)[2]	Solvent Drain Drum Sump (01-SU-6447) + Pump (01-P-6448)
Heating Medium + Oily Water Collection System	
Heating Medium Drain Drum (north of Module 09)[3]	Heating Medium Drain Drum Sump (01-SU-6467) + Pump (01-P-6468)
LNG + Oily Water Collection System	
Module 02 North	Process Area Impoundment Sump (01-SU-6403) (drain via an open trench system) + Pump (01-P-6404-A/B)
Condensate + Oily Water Collection System	
Stabilized Condensate Storage Tank Area	Stabilized Condensate Storage Tank Area Sump (01-SU-6468) + Pump (01-P-6483)

Notes:

1. There is the ability to hook up a temporary pump for each pump, plus a truck out connection.
2. All amine containing equipment and piping drains will be collected by a closed drain system that shall gravity drain to a Solvent Drain Drum. Material collected in the Solvent Drain Drum will be returned to the AGRU for reuse. The Solvent Drain Drum is located within the Solvent Drain Drum Sump.
3. The heating medium equipment and piping drains will be collected by a closed drain system that shall gravity drain to a Heating Medium Drain Drum. The system loss due to leakage or maintenance losses in the Heating Medium system will be made up by using Heating Medium stored in the Heating Medium Drain Drum. The Heating Medium Drain Drum is located within the Heating Medium Drain Drum Sump.

As the equipment and piping drains, such as feed gas and fuel gas knockout drums, pumps, compressors and hydrocarbon containing equipment, will be controlled operations, the oily water drain lines are sized for the peak surface runoff flow rate from the paved and curbed area. The oily water sumps are sized to accommodate the first 25 mm of runoff within the potentially contaminated area, which exceeds the first 15 minutes of a 10-year hourly design rainfall event (9.1mm) and the 10-year, 60-minute rainfall event (18.5mm) (refer to Table 2-2). The sumps have an under-weir to keep oily water in the sump as in the event of a larger rainfall, the excess stormwater will be routed by the overflow line into a potentially contaminated contact water trench (refer to Section 2.3.3). The following two sumps have an alternative design:

- **Amine Sump:** The curbed area in the AGRU area and sump will contain the 100-year, 24-hour storm event to ensure that no amine solvent is inadvertently released to the OWTS.
- **Process Area Impoundment Sump:** Capacity to handle 10-year, 24-hour rain event prior to overflow to the potentially contaminated stormwater system.

Most of the oily water sumps will contain pneumatic sump pumps with a design flow of 5 m^3/hr that will pump the sump contents to the Oily Water Storage Tank and subsequently the OWTS (refer to Section 3.1). The Amine Sump, Process Area Improvement Sump and Stabilized Condensate Storage Tank Area Sump will have electric motor driven pumps with a design flow of 30 m^3/hr. The pumps have a manual start and manual/auto stop control as regulated by the liquid level in the sump and can be initiated/stopped by an operator from the control room. If the sump reaches high level after a rainstorm, the operator will be able to manually start the oily water sump pump remotely by a hand switch (to open the air supply valve) to send the oily water to the Oily Water Storage Tank via the oily water collection header. These sumps have a low-low level which indicates the minimal level requirement of the water seal. In case of this low-low level, the operator may need to add service water to the sump to maintain the minimum water seal level. Each sump pump type will be supplied with common warehouse spares. The following sumps have alternative / additional procedures:

- **Heating Medium Drain Drum Sump:** If the contents of the sump reach a defined high level after a rainstorm, the operator will inspect the sump to ensure that there is no heating medium present from leaks or spills. If no heating medium is observed, the operator will manually start the sump pump, which will pump the water to the Oily Water Storage Tank via the oily water collection header. If heating medium is observed, the contents of the sump will be removed using a hydro-vac truck for offsite disposal.
- **Solvent Drain Drum Sump:** If the contents of the sump reach a defined high level after a rainstorm, the operator will inspect the sump to ensure that there is no solvent present from leaks or spills. If no solvent is present, the operator will manually start the sump pump, which will pump the water to the Amine Sump. If solvent is observed, the contents of the sump will be removed using a hydro-vac truck for offsite disposal.
- **Amine Sump:** The operators will monitor the level in the amine sump and there is also a high level alarm. The operator will inspect the sump to ensure that there is no amine present from leaks or spills. If the water is free of amine, then the contents of the sump will be pumped to the Oily Water Storage Tank via the oily water collection header (the pump will automatically stop on low level). If amine solvents are identified, the contents of the sump will be removed using a hydro-vac truck for

offsite disposal. The Amine Sump Pump is sized to empty the full sump storm water volume in about 12 hours.

- **Process Area Impoundment Sump:** After each rain event, the Process Area Impoundment Sump contents will be manually inspected and tested for contaminants of concern before the contents are pumped to the Oily Water Storage Tank via the oily water collection header. In case of LNG leaks or spills, the fluid will be retained for slow weather off before discharged to the Oily Water Storage Tank via the oily water collection header. The Process Area Impoundment Sump contains a level indicator, and an automatic low temperature and flammable gas detection interlock system to prevent pump operation when exposed to low LNG temperature (below zero degrees Celsius (°C)) to avoid LNG from being pumped to the oily water system.
- **Stabilized Condensate Storage Tank Area:** If sump reaches high level after a rainstorm, the operator will inspect the sump to ensure that there is no stabilized condensate present from leaks or spills (which would include small amounts of the BTEX that was in the natural gas feed). If no condensate is present, the operator will manually start the sump pump, which will pump the water to the Oily Water Storage Tank via the oily water collection header. If stabilized condensate is observed, the contents of the sump will be removed using a hydro-vac truck for offsite disposal.

2.3.3 Potentially Contaminated Contact Water

Potentially Contaminated Contact Water is sourced from several areas of the site and routed to sumps/curbed areas where operator action is required to manage the discharge based on the quality of the surface water runoff (refer to Figure 2-1 to Figure 2-4 and Table 2-5).

Typically, when the high level alarm in the sump is triggered, the operator will be required to inspect the contents of the sump to determine if the water will be either removed offsite for disposal, routed to the Oily Water Storage Tank, routed to the First Flush Sump, routed to the Non-Contaminated Contact Water trench system, or directly discharged into Howe Sound (pending the location and contents, as outlined in Table 2-5).

The First Flush Sump (01-SU-6469) has a capacity of 500 m^3 and is sized to accommodate the initial 25mm of surface water runoff (i.e., the first flush volume) within a potentially contaminated area.

When the contents of the second chamber of the First Flush sump reaches a high level (set lower than the overflow line to the stormwater system), an alarm is triggered, and the operator will inspect the contents. If there is oily water collected in the sump, the operator will manually start the First Flush Oily Water Sump Pump (01-P-6484) and send the oily water to the Oily Water Storage Tank via the oily water collection header. Otherwise, the operator will manually start the Clean Stormwater Sump Pump (01-P-6485) to pump the clean storm water to discharge to the Non-Contaminated Contact Water system for discharge into Howe Sound. Both these pumps will be electric motor driven with a design flow of 30 m^3/hr therefore there will be common warehouse spares available if required.



LEGEND

- Stormceptor
- Outfall
- Outfall Complaince Point
- Site Linework (Reduced)
- Site Buildings
- Fire Water Tank
- Paved Road
- Ashphalt Paving
- Concrete Paving
- Sump
- Sump Containment Area
- Culvert
- RipRap Apron
- Non-Contact Water
- Non-Contaminated Contact Water Storm Sewer
- Non-Contaminated Contact Water
- Contaminated Storm Water
- Potentially Contaminated Contact Water
- Watercourse

DATE SAVED:	Jun 30, 2026
DRAWN BY:	DM
REVIEWED:	PM
VERSION:	1

Coordinate System: NAD 1983 UTM Zone 10N
Projection: Transverse Mercator
Datum: North American 1983
Units: Metres

1:3,000

0 25 50 Metres

CLIENT: Woodfibre LNG

LORAX ENVIRONMENTAL

PROJECT: **Woodfibre LNG Facility**

TITLE: Water Management System Layout West of Mill Creek

PROJECT #: A825-1

FIGURE: 4-5

P:\@202506\Woodfibre\Drafting Figures\APRX\TAR - Operations Phase\TAR - Operations Phase\TAR - Operations Phase.aprx Figure 4-05 Water Mgmt System West of Mill Creek Printed by: DesMacDonald

Figure 2-4 in SWDMP

Table 2-5: Potentially Contaminated Contact Water Collection Systems

Location	Water Management
Overall LNG Process Module Areas	Any surface runoff from within these areas that is not contained within the contaminated contact water collection system or in the tempered water area, will drain into a concrete trench system. This includes the HVAC condensate drains from each module. A concrete trench system with catch basins is aligned around the outside of the process modules (i.e. west side of Module 09, south side of Module 01, 02, 11, 13 and 04; north side of Module 10, and east side of Module 10 and 11) and to the south of the OWTS area; excluding the north side of Module 01 and 02 which are part of the contaminated contact water collection system. The surface water runoff will gravity drain to the First Flush Sump.
Refrigerant Storage Area	This area is contained by curbs, sized to contain the volume of 110% largest fuel storage plus runoff volume of a 25-year, 24-hour storm event that will collect in the Propane Storage Area Impoundment Sump (01-SU-6451). The Propane Storage Area Impoundment Sump contains a level indicator and has a high level alarm. This sump has the same design as the Process Area Impoundment Sump, constructed of insulating perlite concrete and filled with a layer of Foamglas cubes to suppress vapor dispersion and pool fires in the event of a spill, with a low temperature indicator that will alarm in the event of a refrigerant spill. If the sump reaches high level after a rainstorm, the operator will use a vacuum truck to empty the sump after manual inspection. If refrigerant is observed, the water will be retained to allow the refrigerant to vaporize and disperse to the atmosphere prior to removal by a hydro-vac truck for offsite disposal. If there is only oil observed, the water will be pumped to the Oily Water Storage Tank via a hydro-vac truck, otherwise the water will be routed to the Non-Contaminated Contact Water trench system for discharge to Howe Sound. Stormwater overflow will be discharged to the local stormwater trench.
Condensate Loading Area	This area is contained by curbs, sized to contain the volume of 110% largest fuel storage plus runoff volume of a 25-year, 24-hour storm event that will collect in the Condensate Barge Loading Area Sump (01-SU-6472). If the contents of the sump reach the high level, the high-level alarm will be triggered. The contents of the sump will be removed using a hydro-vac truck; the operator will manually inspect the sump liquid for leaks or spills; if condensate is observed, the contents of the sump will be sent for offsite disposal; otherwise will be discharged into the Oily Water Storage Tank. This sump does not have an overflow to the stormwater system.

Location	Water Management
Tempered Water Storage (Module 09)	The area under the Tempered Water Header Tank, Filter and Pump in the Tempered Water System will be paved and curbed to contain any glycol (triethylene glycol) spills or leaks. The secondary containment areas are provided with low point corner sumps/area and drain lines with normally closed isolation valves connecting to the stormwater drainage system. The contents will be inspected and/or tested for potential contaminants of concern (e.g., glycol); if detected above applicable regulatory requirements[1], the water will be removed by a hydro-vac truck for offsite disposal; otherwise the water will be routed to the Non-Contaminated Contact Water trench system for discharge to Howe Sound.
Electrical Transformers	Electrical transformers will be located in curbed containment areas sloping to a common trench to drain and collect runoff away from the equipment. The secondary containment areas will be provided with low point corner sumps/area and drain lines with normally closed isolation valves connecting to the stormwater drainage system. The secondary containment will be sized to contain 110% of the contents of the largest transformer. The contents will be inspected and/or tested for potential contaminants of concern; pending the outcome, the water will either be released to the nearest clean storm water drainage ditch, oily water system via the manual valve, or the contents of the low point corner sumps removed by hydro-vac for offsite disposal or may discharge at the Oily Water Storage Tank (alternative).
LNG Loading Platform (Loading Arm)	For the LNG Loading Platform, the LNG will slowly weather off in the containment area. Due to the potential contamination from biodegradable hydraulic fluid used in the LNG Loading Arms, the first inch of potentially contaminated stormwater that contacts the area with hydraulic fluid will be contained in the metallic LNG Loading Platform Sump (00-SU-6471) that has an underflow-weir and overflow with additional water seal for clean stormwater to discharge to Howe Sound. If the contents of the sump reach the high level, the high-level alarm will be triggered for operation intervention. The operator will be required to clean out any potential clog of the overflow line in case of a high level in the sump. At the high level alarm, if oily water is observed, it will be pumped out for discharge at the Oily Water Storage Tank; otherwise it will discharge to Howe Sound.

[1] BC has Working Water Quality Guidelines for ethylene glycol for freshwater aquatic life only, based on the Canadian Council of Ministers of the Environment (CCME). There is no recommended guideline for marine aquatic life (CCME, 1999). In the absence of a regulatory limit, the Project will define this limit.

Location	Water Management
Truck Unloading Areas	The truck unloading areas for amine, heating medium and tempered water will be paved and sloped to the centre to a catch basin or curbed area for secondary containment. The catch basin will be provided with grated cover and a drain line with an isolation valve to the clean stormwater system for heating medium/tempered water catch basin and to the amine sump for amine/heating medium catch basin. The valve will be open during normal operations. During truck unloading operations, the valve will be closed to contain any spills. Spilled liquid will be collected and removed for appropriate offsite waste management or discharged at the Oily Water Storage Tank for treatment (alternative). The Diesel Fuel loading area will also be contained in a curbed area. Spilled liquid will be collected for off-site disposal or discharged at the Oily Water Storage Tank for treatment.
West of Mill Creek where hydrocarbons are stored / used	There will be containment areas around the firewater pumps, diesel generators, diesel storage area, and any other areas identified to have a high probability of exposure of stormwater to hydrocarbons. Each containment curbed area is sized to contain volume of 110% largest fuel storage plus runoff volume of 25-year, 24-hour storm event; contaminated water is removed by hydro-vac truck for off-site disposal or discharged at the Oily Water Storage Tank for treatment if accidental leakage occurred.

2.3.4 Non-Contaminated Contact Water

There will be Non-Contaminated Contact Water in several areas of the site that does not require operator intervention to manage the discharge (refer to Figure 2-1 to Figure 2-4 and Table 2-6).

The drainage ditches are sized for the 1 in 100 year rainfall event, are trapezoidal in shape with slopes of 2 to 1 (or flatter) and will be lined with rip rap to provide erosion protection and sediment control. There are also vertical-wall concrete trenches with grating covers in areas where space constraints prevent accommodation of a trapezoidal ditch with 2:1 side slope.

The Non-Contaminated Contact Water will be routed through stormceptors prior to discharge into Howe Sound. Stormceptors are equipped with oil/grit separators, intended to remove sediments and surficial oil from smaller but more frequent rainfall events. During larger events, flow in excess of the Stormceptor capacity will be bypassed and will discharge through the outfall to Howe Sound through an overflow weir structure (refer to Figure 2-5). The Stormceptors will have an inside diameter of approximately 3.7 metres, with a depth of 3.8 m below the outlet pipe invert and 3.0 m below the drop pipe. Stormwater will enter the Stormceptor upper chamber through the inlet pipe; a specially designed insert reduces the influent velocity by creating a pond upstream of the insert's weir. Sediment particles will immediately begin to settle; swirling flow will sweep water, sediment, and floatables across the sloped surface of the insert to

the inlet opening of the drop pipe, where a strong vortex will draw water, sediment, oil, and debris down the drop pipe cone. Free oils and other floatables will rise up and be trapped beneath the insert, while sediment will settle. Treated effluent will enter the outlet riser, move upward, and discharge to the top side of the insert downstream of the weir, where it will flow out the outlet pipe.

Table 2-6: Non-Contaminated Contact Water Collection Systems

Location	Water Management
East of Mill Creek	Surface runoff from uncontained paved and unpaved areas with no risk of surface contamination will sheet flow to open drainage ditches. This area is south of the First Flush Sump, and east of the Refrigerant Storage Area. The water will discharge through Stormceptor 3 (01-U-6403) prior to discharging to Howe Sound via an outfall (OUT-10). This may also include chlorinated service water and fire water (if discharged). Chlorination is carried out as a batch operation by Operations, as required, to prevent algae growth in the Fire Water tank. During these periodic treatments, chlorine tablets are added and the tank contents are recirculated to ensure adequate mixing.
West of Mill Creek	Surface runoff from uncontained paved and unpaved areas, including building areas, with no risk of surface contamination will sheet flow to concrete trenches or line riprap ditches, and catch basins with underground pipes. The collected water will drain through Stormceptor 1 (01-U-6401) or Stormceptor 2 (01-U-6402), and ultimately discharge through an outfall (OUT-02 or OUT-04) to Howe Sound. HVAC condensate drains are routed to this stormwater system. This may also include chlorinated service water and fire water (if discharged).
Floating Storage Tank (FST) Loading Area (East and West)	As the FST Loading LNG Impoundment Sump West (01-SU-6405) and FST Loading LNG Impoundment Sump East (01-SU-6406) would only contained LNG (that will slowly vaporize and disperse to the atmosphere), the stormwater is considered non-contaminated contact water and discharged directly into Howe Sound. These sumps are steel tanks, filled with a layer of Foamglas cubes to suppress vapor dispersion and pool fires in the event of an LNG spill, with a low temperature indicator that will alarm in the event of a LNG spill. There are drain lines that connect to the FST domes, and local HVAC condensate systems to facilitate drainage into Howe Sound.

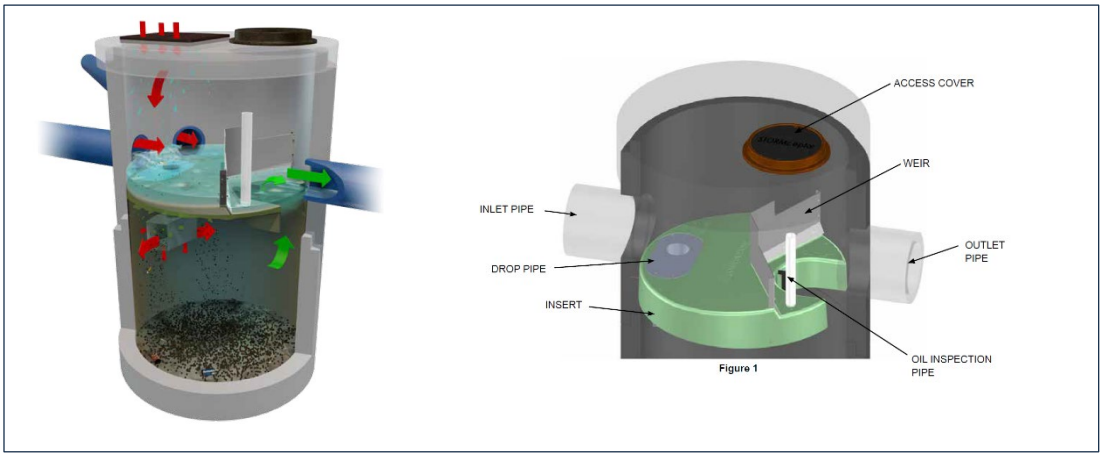


Figure 2-5: Stormceptor Process

2.3.5 Outfall Summary

Table 2-7 contains a summary of the drainage systems that will connect to each outfall on site (refer to Figure 2-1). The minimum invert elevations (IE) of all proposed culverts are set at 2.0 metres (m), which is slightly higher than the Higher High-Water Level – Large Tide in the Squamish area (1.95 m, measured using Geodetic Datum). This approach is intended to reduce the potential for marine water to reach the infrastructure and reduce the capacities of the drainage system during high tide periods and to make the culverts inaccessible to fish and other marine fauna at tide levels below 2.0 m.

Table 2-7: Drainage Outfall Summary

Outfall #	Culvert Design & Invert Elevation	Discharge	Water Management
West of Mill Creek			
OUT-01	900mm diameter corrugated high density polyethylene (HDPE) pipe with headwall IE: 2.00m	Howe Sound	Non-Contact Water from the area adjacent to Woodfibre Creek. There is approximately 31 hectares (ha) of forested hillslope catchment that will discharge via this outfall.
OUT-02	900mm diameter corrugated HDPE pipe with headwall IE: 2.00m	Howe Sound	Non-Contact Water from the area upstream of the fire water tank, diesel fuel and chemical storage area. Stormceptor 1 is located upstream of the outfall. There is approximately 22.5 ha of predominately forested hillslope catchment that will discharge via this outfall.
OUT-04	900mm diameter corrugated HDPE pipe with headwall IE: 2.03m	Howe Sound	Non-Contaminated Contact Water from approximately 2.4 ha of developed areas including roadways and buildings (which are served by a dedicated stormwater drainage network). Stormceptor 2 is located downstream of the developed area which then discharges into a ditch that routes the drainage to the outfall.
OUT-06	1000mm diameter; flap gate mounted on the flood wall IE: N/A	Mill Creek	Non-Contact Water from the area upstream of the utilities area (e.g., fire water tank) is routed in a diversion trapezoidal ditch. There is approximately 9 ha of prominently forested hillslope catchment that will discharge via this outfall.

Outfall #	Culvert Design & Invert Elevation	Discharge	Water Management
East of Mill Creek			
OUT-10	900mm pipe with headwall IE: 2.02m	Howe Sound	Contaminated Contact Water (downstream of the OWTS): - Underground piping from the OWTS to the catch basin upstream of Stormceptor 3. Potentially Contaminated Contact Water (downstream of the First Flush Sump): - Approximately 20 m of 600mm diameter corrugated HDPE pipe with precast headwall that discharges into the Non-Contaminated Contact Water trapezoidal ditch. Non-Contaminated Contact Water: - From the area south of the First Flush Sump: 600mm riprap lined trapezoidal ditch that discharges into Stormceptor 3 (with approximately 30 m of 600 mm diameter corrugated HDPE pipe under the paved access road to the FST). - From area south of the LNG Loading Line piperacks; with concrete trench and culverts connecting into Stormceptor 3. The discharge from Stormceptor 3 is routed to this outfall.
OUT-11	900mm diameter corrugated HDPE pipe with headwall IE: 3.50m	Howe Sound	Non-Contact Water from upstream of the LNG loading lines, including the access road. There is approximately 4.7 ha of prominently forested hillslope catchment that will discharge via this outfall.

Outfall #	Culvert Design & Invert Elevation	Discharge	Water Management
OUT-12	2 x 1200mm diameter corrugated HDPE pipe IE: 6.23m	Howe Sound	Potentially Contaminated Contact Water from the elevated Switchyard area (graveled), and Non-Contact Water from upstream of the LNG loading lines (East Creek), including the access road. There is approximately 62 ha of prominently forested hillslope catchment that will discharge via this outfall.
OUT-13	900mm diameter corrugated HDPE pipe with headwall IE: 3.08m	Howe Sound	Non-Contact Water from the access roadway near FST 1 Moorings Structure 3 and 4. There is approximately 2.7 ha of predominately forested hillslope catchment that will discharge via this outfall.

Note

- There are additional outfalls on site associated with the leachate from the landfill and sewage treatment system. These outfalls are not included herein as they are already permitted for use under the *Environmental Management Act*.

2.3.6 Operations and Maintenance Activity Summary

In general, the oily water system does not have a set startup procedure. Once the required preparation and checking of the sump and sump pumps is completed, the sumps will be ready to receive drainage from their corresponding containment area or curbing.

Figure 2-2 contains an overview of key decisions to be made by operators to inform the discharge approach of each stream. There will be OPs that address aspects of the stormwater drainage system that require an activity and/or decision by an operator. The OPs will include activities such as:

- Actions to take for the alarms at every location.
- Water quality sampling/observations required for each applicable sump to determine discharge approach, including the project approved testing methodology. If testing equipment requires calibration, then the OPs will reference the applicable requirements.

There will be potential leak points of effluent and wastewater, including flanges, pump seals, and manually operated vacuum trucks. These locations will be monitored regularly to identify any leaks and take necessary corrective actions to prevent contamination of the curbed or surrounding areas.

Scheduled checklists will be used to support routine inspections and maintenance activities. For example, the process/checklist to inspect the Stormceptors will outline that sediment depth inspections are performed through the outfall riser, oil presence is determined through the oil inspection pipe, with sediment to be regularly removed by a vac truck for offsite disposal.

The preventative and predictive maintenance program will support the planning and execution of routine maintenance activities at defined frequencies appropriate to the activity and associated risk. Where unscheduled maintenance is required, a work order will be generated and managed through the enterprise resource planning system, with prioritization determined in accordance with the WLNG risk matrix. All maintenance activities and records will be documented and retained within the enterprise resource planning system.

Operations and maintenance activities will be executed by fully trained and competent personnel, with training and competency records maintained. Supporting documentation, including OPs, maintenance procedures, guidelines, and original equipment manufacturer requirements will be controlled, centrally stored and reviewed periodically to ensure ongoing accuracy and applicability.

Refer to Section 3.2 for further specific information related to the operation and maintenance of the OWTS.

3.0 OILY WATER TREATMENT SYSTEM MANAGEMENT

3.1 DESIGN

3.1.1 Oily Water Storage Tank

The Oily Water Storage Tank (01-T-6469) is an above ground tank with an atmospheric vent (to a safe location) and working capacity of approximately 450 m^3. This tank will hold the incoming flow from various sources on site (refer to Section 2.3), allowing the downstream OWTS to operate in a stable condition. The Oily Water Storage Tank has a skimming facility to skim-off oil (refer to Table 3-1 for the management of the treatment residue).

The Oily Water Storage Tank has heating coils to maintain temperature with low and high temperature alarms that will start/stop the heading medium supply to the tank heating coils. There is a process shutdown isolation valve on the heating medium supply that will be triggered in process upset conditions.

If the contents of the Oily Water Storage Tank reach the high level or high-high level, the alarm will be provided for operation intervention.

The contents of the Oily Water Storage Tank will be pumped to the downstream skid mounted OWTS (01-A-6417) by a 30 m^3/hr inlet feed pump when initiated by the operator (refer to Section 3.1.2 for further details). When the contents of the Oily Water Storage Tank reach the low level, the inlet feed pump will be stopped for pump protection.

There is a sampling point on the piping between the Oily Water Storage Tank and the inlet feed pumps; samples will be analysed to determine the composition of the oily water feed into the OWTS for comparison against the treated effluent from the OWTS to verify treatment efficiency.

3.1.2 Oily Water Treatment System

The purpose of the OWTS is to remove free and dispersed oil, and settleable and suspended solids from the oily water received from the Oily Water Storage Tank.

The OWTS will undertake 12-hour batch operations, which will be operator initiated by the unit control panel (UCP) that is connected to the DCS. The operator will plan the start of the batch operation with consideration to the weather forecast and the level of contents in the Oily Water Storage Tank. Typically, the OWTS will be started when the Oily Water Storage Tank level reaches around 70% to prevent overwhelming the Oily Water Storage Tank especially if there is an anticipated rain event.

The OWTS comprises of (refer to Figure 3-1):

- Two 30 m^3/hr inlet feed pumps (01-P-6417-21A/B) (one pump operating, one in standby)
- Corrugated Plate Interceptor (CPI) Separator (01-H-6417-41)
- Two treated water forwarding pumps (01-P-6417-22A/B) (one pump operating, one in standby)
- Piping, wiring, instrumentation and controls

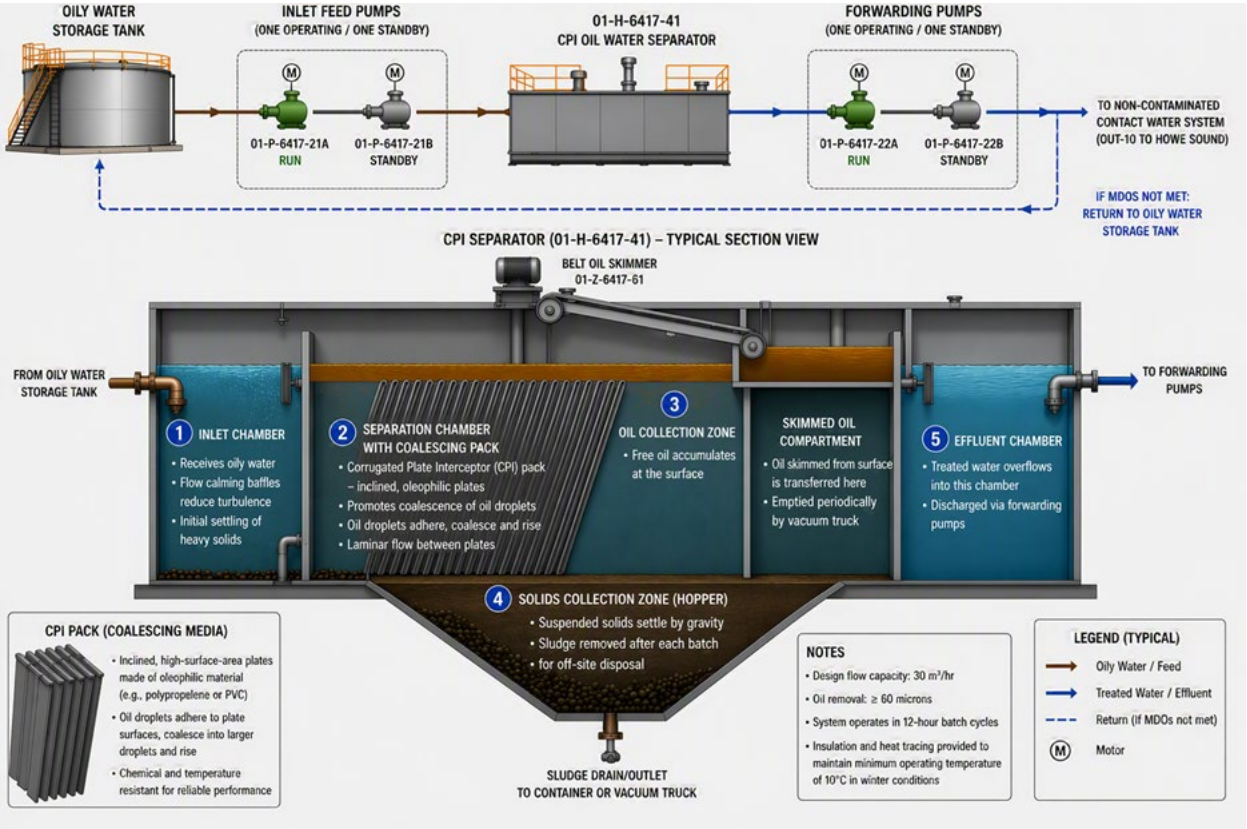


Figure 3-1: Conceptual Schematic of an OWTS (*for illustrative purposes only)*

The CPI Separator is designed to separate oil with droplet size of 60 microns and bigger at a maximum flowrate of 30 m^3/hr (inlet feed pump capacity). There is a high-high level indicator in the CPI separator; once triggered, the inlet feed pump will stop.

When the oily water flows through the CPI packs (multiple parallel plates), the oil will rise to the liquid surface while the suspended solids settle to the bottom of the separator (hopper). The oil skimmer (01-Z-6417-61) will automatically start when the OWTS starts and will operate continuously, collecting oil on the surface and depositing it to the skimmed oil compartment (which is part of CPI separator) (refer to Table 3-1 for the management of the treatment residues).

The treated water from the separator will overflow the weir directly into the treated water compartment. The treated water compartment will be emptied using a Treated Water Forwarding Pump that is started/stopped using the guided wave radar level transmitter. When the contents of the treated water compartment reaches the low level, the pump will be stopped for pump protection.

The discharge line of the Treated Water Forwarding Pump will be equipped with two oil-in-water analyzers. When the water meets the specification (which will be at or below the WDA permit discharge limit for Extractable Petroleum Hydrocarbon (EPH)), the appropriate valve will open to route the water via underground piping to Stormceptor 3, upstream of OUT-10, for discharge to Howe Sound. If the treated water does not meet the specification, the appropriate valve will open to route the water back to the Oily Water Storage Tank.

There is a sampling port on the piping before the valves that direct the treated water to either Howe Sound or the Oily Water Storage Tank to facilitate periodic grab sampling activities to verify the effectiveness of the treatment system.

The process variables and alarms will be displayed on the UCP, as part of the standard configuration. Instruments with process variable alarms include (but not limited to):

- CPI Separator (including the different compartments):
  - Temperature: Low-Low, Low, High and High-High (which automatically start or stop the electric heater; the system has electrical heat tracing and insulation to maintain a minimum operating temperature of 10°C; and a maximum temperature of 38°C).
  - Level: Low-Low, Low, High and High-High (which automatically start or stop various pumps).
  - Timers: Sludge and oil removal.
- Treated water forwarding pump discharge line:
  - High and low oil concentration of oil.

The OWTS can be operated in Automatic or Manual mode or can be put in off-line mode (via the UCP).

- Automatic mode: All unit operations/equipment (pumps, skimmers heaters etc.) are controlled started/stopped by the UCP; this is the normal mode operation.
- Manual mode: The operator controls all equipment operations (start/stop the pumps, skimmer and electrical heaters) regardless of set point. In case any set point is reached, the pumps, skimmer and electrical heaters will not automatically start/stop. The operator must take action to start/stop or energize the equipment to ensure proper operation of the unit. Manual mode is provided only for flexibility and maintenance purposes.

At the end of the 12-hour batch operation or when the operation timer expires, the system will automatically stop all the equipment in the OWTS. The operator will assess the contents level in the Oily Water Storage Tank level to plan for batch operation. The operator will also confirm that the treated effluent valve that allows the clean water discharge to Howe Sound has been automatically closed.

3.2 OPERATIONS AND MAINTENANCE SUMMARY

The vendor who supplied the OWTS provided an Operating and Maintenance Manual (350106-PO-11417-02-SD-000082) that compiles the:

- Design drawings and datasheets.
- Installation procedures and commissioning instructions.
- Operating information (control philosophy and logic diagram, cause and effect charts, modbus list and operating training and qualifications).
- Maintenance information (inventory of spares; and lube oil and operating fluids schedule).
- Detailed installation, operating and maintenance manuals from vendors' equipment suppliers, including pumps, pump motors, temperature/flow/level transmitters, analyzers, valves, pressure gauges, heaters, skimmers, UCP, insulation and heat tracing.

The vendor provided Operating and Maintenance Manual contains the vendor's commitment to three days of training of up to ten of WLNG's technical personnel. Operator training enables operators to

acquire the skills needed to handle the package safely and efficiently. The primary goal is to prepare operators to handle real-world situations, including emergency situations, without putting the plant or personnel at risk. The training consists of theoretical lessons (with the help of explanatory slides) and practical lessons (with simulation of operation in UCP) provided by the vendor qualified site supervisor.

The Operating Manual (350106-000-CM-MA-00018) contains further details related operations of the OWTS, including the initial startup and shut down procedures, and normal operations and maintenance requirements. Due to batch operation of the OWTS, maintenance can be scheduled and performed to address emergent issues without affecting environmental aspects.

A normal shutdown can be either a scheduled shutdown such as for an annual turn-around, or one that is made in an orderly manner for reasons other than emergencies or process trips. The actions to be taken prior to a shutdown are dependent upon which equipment items are being taken out of service and the expected duration. A normal shutdown should be done in coordination with all the other units as the corresponding downstream process units will be unable to function with the shutdown of the OWTS. The oily water systems are required to be operational during rain events (plus the stormwater drainage systems) therefore only small sections should be shut down for short periods of time.

As noted in Section 2.3.6, operations and maintenance activities will be performed by fully trained workers and records will be retained.

3.3 TREATMENT RESIDUAL WASTES

Table 3-1 provides an overview of the sources of treatment residual waste and the approach for disposal. The waste will be transported by truck and barges to an off-site third party waste facility that is licensed to accept the material based on the quality. There are several provincially licensed waste facilities in the BC Lower Mainland that can receive treatment system residuals, including GFL in Squamish, Secure Energy in Richmond, Sumas Environmental in Burnaby, and Clean Harbours in Delta. The frequency of waste shipments will vary based on the season with the highest frequencies expected during the high rainfall months.

Wastes will be managed in accordance with the Operations Waste Management Plan, developed in accordance with the Environmental Assessment Certificate.

Table 3-1: Treatment Residual Waste Overview

Source	Waste Type	Management Action
Oily Water Storage Tank	Skimmed oil	Skimmed oil from the tank will be routed from the skimmer to temporary containment via piping; and then sent offsite for disposal.

Source	Waste Type	Management Action
OWTS	Skimmed oil	The recovered oil (concentration 70%) stored in the skimmed oil compartment will be emptied after approximately ten 12-hour batch operations by a vacuum truck equipped with vacuum suction pump and sent offsite for disposal. The level in skimmed oil compartment will be monitored by level transmitter and is equipped with a sight glass for local indication. A high level alarm will indicate when the skimmed oil compartment is to be emptied; and a low level alarm will indicate that the operator can stop emptying the skimmed oil compartment. The skimmed oil compartment is provided with a safety margin to allow five additional 12-hour batch operations before overflow.
OWTS	Sludge (suspended solids that settle)	The sludge holding capacity in the CPI tank is 3 m^3. The hopper will be emptied of sludge after every single 12 hour batch operation by vacuum truck and transferred into suitable containers for temporary storage onsite prior to offsite disposal. The sludge stored in the hopper will be at 1% concentration and therefore cannot be detected with a level transmitter; the hopper is equipped with a sight glass for local indication. There is a timer that triggers every 12 hours to alarm the operator. The hopper has a safety margin to allow an additional 6 hours before overflow; after this time in operation, sludge dragging in the treated effluent could occur. Grab samples of the sludge will be analyzed for the parameters required by the disposal receiving facility.
Stormceptor	Sludge	The stormceptors will be emptied by vacuum truck and transferred into suitable containers for temporary storage onsite prior to offsite disposal. Grab samples of the sludge will be analyzed for the parameters required by the disposal receiving facility.

Reporting will adhere to relevant requirements outlined in the WDA Permit, and will typically include:

- Description of residuals generated, including quantities.
- Summary of any sampling performed, including the laboratory results.
- How/where the residuals were disposed.

4.0 CONTINGENCY PLAN

In the event of a facility emergency scenario, the Emergency Response Plan will be implemented which is shared separately with the BCER in accordance with the *LNG Facility Regulation* and *Emergency Management Regulation.*

The purpose of this Contingency Plan is to outline the plan for managing the stormwater drainage system when it is unable to be operated or if the proposed discharge fails to meet the regulated quality requirements. There are several scenarios that may trigger implementation of the Contingency Plan, which are provided in Table 4-1.

There are no automated emergency shut down actions for the stormwater drainage systems. There is an emergency stop button on the on the power distribution board for the OWTS; if pressed, the whole OWTS will go into off-line mode. The OWTS has a process discharge isolation valve (Tag 01-XV-64098) that is triggered due to process upset conditions and two overpressure protection valves (Tag 01-PRV-64222; 01-PRV-64223) that are sized on the basis of a blocked outlet.

Woodfibre LNG will comply with the notification and reporting requirements in the WDA permit.

Table 4-1: Contingency Plan – Management Actions

Line #	Scenario	Management Actions
Contaminated Contact Water System		
1	Failure of the OWTS (due to equipment failure, power failure, blockages, unable to maintain minimal operating temperature, failure of flow meter etc.), therefore unable to remove the free and dispersed oil and settleable and suspended solids in the stormwater drainage effluent collected in the Oily Water Storage Tank.	• The discharge from the Oily Water Storage Tank to the OWTS will be stopped. • The effluent within the OWTS will either remain within the system (pending the type of failure) or be pumped back to the Oily Water Storage Tank if there is capacity. • When nearing the capacity of the Oily Water Storage Tank, the water will be pumped into temporary storage containers and either temporarily stored on site and/or sent offsite for disposal.
2	Failure of both oil in water analyzers in the OWTS therefore unable to verify if the discharge water meets the specification.	• Effluent will be recirculated back to the Oily Water Storage Tank, on the basis that if the water quality can not be verified, the effluent is deemed as not meeting the discharge specification.
3	Influent from the Oily Water Storage Tank exceeds the design specification for total suspended solids and/or free and dispersed oil.	• Treatment process will continue; the effluent will be recirculated back to the Oily Water Storage Tank if it does not meet the discharge specification.
4	Failure of both inlet feed pumps (i.e. the one in service and the spare failures) preventing discharge into the OWTS.	• Repair one of the two inlet feed pumps if possible, pending the failure. • Temporary pump solutions will be evaluated to pump the oily water from the Oily Water Storage Tank to the OWTS if one inlet feed pump cannot be brought back online in the timeframe needed to manage the water level within the Oily Water Storage Tank.

Line #	Scenario	Management Actions
5	Oily Water Storage Tank overfills; resulting in the loss of containment and release of oily water to the contained area around the Oily Water Storage Tank.	• The released oily water would flow to the low spot within the containment area. • Internal incident event process will be triggered to manage the spill and undertake the required actions for reporting and cleanup.
6	Failure of a sump pump / level indicator in the contaminated contact water, resulting in the stormwater drainage being unable to be pumped to the Oily Water Storage Tank.	• The failed pump will be replaced by a spare pump (common warehouse spares are available for the 5 and 30 m^3/hr pumps). • Any excess oily water will remain within the containment area and subsequently be removed using the spare pump. • If required, the operator will use a vacuum truck to transfer the oily water from the sump to the Oily Water Storage Tank or offsite for disposal (pending quality).
7	Errors in the management of the amine sump, resulting in amine solvents being pumped to the Oily Water Storage Tank.	• Oily Water Storage Tank will be emptied using a vacuum truck and the contents disposed offsite at an approved facility after sampling has been completed.
Potentially Contaminated Contact Water System		
8	Failure in the First Flush Oily Water Sump Pump at the First Flush Sump, preventing the routing of the stormwater back to the Oily Water Storage Tank.	• The failed pump will be replaced by a spare pump (common warehouse spares are available for the 30 m^3/hr pumps). • If required, the operator will use a vacuum truck to transfer the oily water from the sump to the Oily Water Storage Tank or offsite for disposal (pending quality).
9	Errors in the management of the Tempered Cooling Water secondary containment area, resulting in glycol being pumped to the First Flush Sump.	• Effected chamber(s) of the First Flush Sump will be emptied using a vacuum truck and the contents disposed off site at an approved facility after sampling has been completed.

5.0 EPISODE MANAGEMENT PLAN

The purpose of this Episode Management Plan is to outline the plan for managing environmental episodes that may occur (e.g., spills, nuisance, litter, odour, fire, and flooding) in the context of operating the stormwater drainage system.

5.1 SPILL RESPONSE PLAN

The Contaminated Contact Water system and Potentially Contaminated Contact Water systems are designed to contain spills and leaks of hydrocarbons from equipment and truck unloading areas.

As noted in Section 2.3.6, the preventative and predictive maintenance program will be implemented, along with routine inspections of equipment to identify any leaks and take necessary corrective actions to prevent contamination of the curbed or surrounding areas.

The general spill response procedure is as follows:

- **Assess the Situation** – Immediately cease work, assess the hazards and safety risk, determine the source and type of material spilled, and secure the area. If there is immediate danger of explosion, the emergency response plan would be activated (refer to Section 5.2).
- **Stop the Source** – If safe to do so, stop the source of the spill. This will be undertaken in accordance with the relevant OP.
- **Notify** – Immediately notify the applicable Supervisor and/or Manager and HSE representative of the spill.
- **Contain the Spill** – Contain the spill in an appropriate manner based on the location. This may include using absorbent products (e.g., spill pads, socks, booms), drip trays and/or containment berms. For spills to water that cannot managed and contained internally, Woodfibre LNG may engage the Western Canada Marine Response Corporation (WCMRC) to support (who may have already been triggered through the emergency response plan or regulatory reporting activities).
- **Clean-up and Dispose Impacted Materials** – Approach is dependent on the released material and location of the spill (e.g., oil within a sump/containment area may be routed to the OTWS or removed using a hydro-vac truck for offsite disposal based on the OPs). Woodfibre LNG may also engage a third party to support clean-up activities. Impacted material (e.g., soil) will be cleaned up; and absorbent products and impacted material may be temporarily stored on site prior to disposal offsite in accordance with applicable regulations.
- **Report –** All spills are reportable to the environmental representative, regardless of size. Refer to the below for further information on regulatory reporting requirements.
- **Restock the Spill Kit** – Replace any absorbent materials that were used during clean-up.

If there is a spill to water or ground (regardless of if it is within secondary containment) of a prescribed substance in a reportable quantity under the *BC Spill Reporting Regulation,* Woodfibre LNG will report it by calling 1-800-663-3456 (Ministry of Emergency Management and Climate Readiness (EMCR)) and obtain the Dangerous Goods Incident Report (DGIR) number that will be used in all future

correspondence with regulatory agencies. Based on the information provided to EMCR, EMCR will determine which other provincial and federal regulatory agencies need to be informed.

Further reporting may be required as follows (but not limited to):

- If the spill occurs within BCER jurisdiction, then Woodfibre LNG will report it to the BCER after contacting EMCR. Minor incidents must be reported to the BCER within 24 hours, while level 1-3 incidents must be reported to the BCER immediately (within one hour) and local First Nations as soon as possible, after having taken any immediate actions necessary for public safety or to minimize immediate environmental impacts[2].
- If a spill occurs in the marine environment (e.g., pollution from a vessel), the Canadian Coast Guard will be contacted by calling 1-800-889-8852 (Western Region) or via VHF radio (Marine Communications and Traffic Services centre on channel 16), after contacting EMCR.
- If there is a risk of fish mortality or potential HADD (harmful alteration, disruption or destruction), the Fisheries and Oceans Canada (DFO) Observe, Record and Report (ORR) hot line will also be contacted (1-800-465-4336) or emailed (DFO.ORR-ONS.MPO@dfo-mpo.gc.ca) after contacting EMCR.

Any spill/release that threatens to enter, or enters, the terrestrial, fresh water and/or marine environment must be reported directly to the appropriate First Nations representative.

5.2 FIRE AND FLOOD RESPONSE PLAN

There will be an Emergency Response Program prepared and maintained for this site; which will be shared with the BCER and implemented in the event of an emergency in accordance with the *LNG Facility Regulation*.

A fire or flood in the vicinity of the OWTS would trigger this Emergency Response Program given the potential risk to the integrity of the operating LNG facility and operating personnel.

5.3 LITTER RESPONSE PLAN

Woodfibre LNG will implement waste management practices that includes a waste collection system that segregates waste streams for offsite reuse, recycling or disposal. As noted in Section 3.3, wastes will be managed in accordance with the Operations Waste Management Plan, developed in accordance with the Environmental Assessment Certificate.

Woodfibre LNG will educate the workforce about the importance of waste management and the waste segregation system being implemented on site. If litter is observed, it will be addressed and disposed of appropriately.

5.4 ODOUR AND NUISANCE RESPONSE PLAN

A nuisance can be defined as light and/or noise pollution affecting nearby communities. The town of Squamish, BC and the unincorporated community of Britannia Beach, BC are located approximately 7 km west/southwest and approximately 5 km southeast, respectively from the site; and there are no other

[2] Source: https://www.bc-er.ca/data-reports/data-narratives/incidents/

nearby communities. Due to the relative geographical isolation of the site, any odour, noise or light associated with the stormwater drainage system would not be deemed a nuisance to the local community therefore no additional odour and nuisance response plan is required.

6.0 TRIGGER AND RESPONSE PLAN

The WDA permit will identify the authorized discharge limit for several parameters and point(s) of compliance. The environmental monitoring program will be based on the WDA permit which will include the:

- Location(s) of monitoring stations
- Indicators being monitored and associated analysis methodology
- Frequency of monitoring and sampling

“Triggers” are thresholds that proactively trigger a course of action (response) to investigate the changing conditions and to implement change to prevent a WDA permit exceedance/harm to people and/or the environment. The framework for the trigger action level responses is provided in Table 6-1.

If there are changes to the discharge limits in the WDA permit, the Trigger and Response Plan will be updated accordingly.

The monitoring results will be reviewed in a timely manner to determine if a trigger action level is to be activated.

Woodfibre LNG will comply with the reporting requirements in the WDA permit.

Table 6-1: Framework Action Level Response

Action Response Level	Basis	Management Action	
		Notify	Action
OUT-10: Field Sampling - Turbidity – Based on Regression Curve of Turbidity to TSS			
Level 1	Turbidity equivalent of 80% of the TSS Permit Limit	Environment Manager (or approved designate)	• Repeat field measurement to verify value • Investigate the potential source(s) contributing to the elevated measurement (e.g., review of the monitoring data from outlet of the OWTS and undertake further monitoring at the First Flush Sump if warranted) • Identify and implement mitigation actions if there is potential for the concentration of the parameter to continue to increase • Increase the monitoring frequency at OUT-10 until exceedance of WDA limits are no longer a concern (to be defined based on the potential source(s) and mitigation measures being implemented)
Level 2	Turbidity equivalent of 95% of the TSS Permit Limit	Environment Manager and Operations Manager	• Level 1 activities • Implement contingency planning (where applicable) to cease or minimize discharge to Howe Sounds until there is a reduction in turbidity levels

Action Response Level	Basis	Management Action	
		Notify	Action
OUT-10: Laboratory Analysis - EPH and TSS			
Level 1	80% permit limit	Environment Manager (or approved designate)	• Review laboratory certificate Quality Assurance/Quality Control (QA/QC) reports. Validate original result, or re-run sample within 24 hours if a laboratory error was identified • Undertake confirmatory monitoring / sampling • Investigate the potential source(s) contributing to the elevated parameters (e.g., review the turbidity measurements, assess the OTWP) • Identify and implement mitigation actions if there is potential for the concentration of the parameter to continue to increase • Increase the monitoring frequency at OUT-10 until exceedance of WDA limits are no longer a concern (to be defined based on the potential source(s) and mitigation measures being implemented).
Level 2	95% permit limit	Environment Manager and Operations Manager	• Level 1 activity • Implement contingency planning (where applicable) to cease or minimize discharge to Howe Sounds until verification that the mitigation measures are addressing the elevated parameter concentrations. • If the event has potential to exceed permit limits, engage with a qualified professional (QP) for the evaluation of potential effects to aquatic resources, which will support non-compliance notifications to the BCER (if triggered).

7.0 ADAPTIVE MANAGEMENT PLAN

This section describes the general approach for development and implementation of adaptive management, which is used to address uncertainties of potential effects of the discharge following a cyclical process.

Adaptive management is a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs (ENV 2025). There are six stages of the adaptive management cycle (ENV 2022) as described below:

- **Stage 1 & 2 – Assess & Design:** The stormwater drainage system has been designed to achieve the design objectives and permit limits defined by the WDA permit. The monitoring program has been designed to monitor the potential contaminants of concern associated with the stormwater drainage system during operations.
- **Stage 3 – Implement:** The management actions (i.e. OPs) and mitigation measures will be implemented, with deviations recorded as part of management of change. This includes the implementation of the Trigger and Response Plan, as outlined in Section 6.0.
- **Stage 4 – Monitor:** The effectiveness of the design / management actions and mitigation measures will be monitored by undertaking inspections and point of compliance / receiving environment monitoring programs (with scope and frequency defined under the WDA permit).
- **Stage 5 & 6 – Evaluate & Adjust:** The monitoring results will be compared to the predictions and permit limits, which will determine if adaptive measures are necessary. This is a key aspect in early operations, given the monitoring results in the first year(s) will either verify that the design and planned implementation activities are adequate to address the potential effects of the discharge, or if additional measures need to be identified and implemented. This evaluation is typically undertaken on an annual basis however adaptive management may also be triggered for any other potential noncompliance's under the WDA permit. Unexpected outcomes are investigated and learnings identified, which may result in adjustments to the design, implementation or monitoring programs to better achieve the objectives.

Woodfibre LNG will engage with a QP to support the implementation of adaptive management depending on the event. The implementation of adaptive management associated with non compliances to the WDA permit will be noted in reports submitted to the BCER.

8.0 REFERENCES

Canadian Council of Ministers of the Environment (CCME). 1999. Canadian water quality guidelines for the protection of aquatic life: Glycols—Ethylene glycol, propylene glycol, and diethylene glycol, Winnipeg.

Ministry of Environment and Parks (ENV) 2022, Technical Guidance MIN-20, Development and Use of Adaptive Management Plans, Version 3.0, June

ENV 2025, Adaptive Management, Accessible at: https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/land-based-investment/forests-for-tomorrow/adaptive-management

4.1-2: Operations Phase Stormwater Drainage Hydrology and Hydraulics Model

SUPPLIER DOCUMENT COVER SHEET

MCDERMOTT

Woodfibre LNG

350106 Woodfibre LNG Project

Supplier Name:	**Stantec Consulting Ltd.**
Purchase Order Title:	**SC-EN-013**
Equipment / Tag Number(s):	**N/A**
Supplier Document Number	**N/A**
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Rev	Date	Issue State	By	Checked	Approved
0	2026.01.26	Issued for Use	RI	FK	WL
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350106	**SC-EN-013**	**-**	**SD**	**-**	**000124**	**0**

Document Title: Operations Phase Stormwater Drainage Hydrology and Hydraulics Model

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This document consists of this front sheet plus **31** number of pages.

Stantec

Memo

To:	Wael Dessouky McDermott, Houston	From:	Faruk Kharadi Stantec Consulting Ltd., Edmonton
Project/File:	123221907	Date:	January 26, 2026

Reference: Operations Phase Stormwater Drainage Hydrology and Hydraulics Model

1 Introduction

CB&I LLC (McDermott) is in the process of constructing the Woodfibre LNG (WLNG) Project ("the Project") for Woodfibre LNG Limited in Squamish, British Columbia and has retained Stantec Consulting Ltd. (Stantec) to update an existing hydrologic and hydraulic model prepared for the Construction Stormwater Management Environmental Protection Plan (SWMEPP, Stantec February 2024).

The SWMEPP for the Construction Phase of the LNG Facility is primarily focused on the removal of total suspended solids (TSS) from non-contaminated onsite stormwater runoff and required construction of two temporary sedimentation ponds, one on each side of Mill Creek. For potentially contaminated onsite stormwater runoff water, treatment facilities are provided for the removal of the contaminant. A Waste Discharge Authorization (WDA), pursuant to Section 14 of the BC Environmental Management Act (SBC 2003, c. 53), has been acquired for the discharge of the stormwater runoff and treated effluent into Howe Sound for the Construction Phase.

The Operations Phase will follow the Construction Phase for the LNG Facility, which is expected to be completed in late 2027. The Operations Phase is expected to last at least 25 years. During the Operations Phase, the LNG facility is not expected to generate any significant amount of sediment from the site due to the permanent infrastructure surfaces such as concrete, asphalt, compacted gravel and grassed/landscaped areas which will limit sediment generation; hence, the sedimentation ponds constructed for construction will not be required and will be removed prior to the Operations Phase beginning. The stormwater management and discharge water quality approach for the Operations Phase is discussed in the *Storm Water Drainage Philosophy* document prepared by McDermott (June 2024). It is understood that a regulatory approval for stormwater and effluent discharge for the Operations Phase will be required and addressed separately by WLNG.

The purpose of this technical memorandum is to summarize the update of the existing stormwater model for the Operations Phase incorporating various changes to the site design, grading, and surface finishes to identify any stormwater conveyance system deficiencies and recommend mitigations. Note, FST drainage will be treated as a secondary containment as part of the offshore scope of work. All surface runoff will be collected in a common sump/tank for treatment/disposal.

2 Information Gathering and Review

The following sources of data and other information were collected and reviewed prior to updating the hydrologic and hydraulic model for the Operations Phase:

- Storm Water Drainage Philosophy – Woodfibre LNG (350106-000-CS-PH-00001), McDermott, June 20, 2024

- Construction Stormwater Management Environmental Protection Plan (350106-SC-EN-013-SD-000018), Stantec, February 9, 2024
- Unit 64 – Effluent and Wastewater Treatment System – Process Design Basis (350106-0000-64-EV-GEN-PDB-0001), McDermott, March 20, 2024
- Basis of Design for Impoundment Sumps (350106-000-SE-BD-00001), McDermott, July 18, 2024
- Woodfibre LNG Operations Phase Waste Discharge Authorization – Review of Similar ENV/OGC Authorizations and Recommendations for Application, Stantec, February 15, 2023
- District of Squamish Subdivision and Development Control Bylaw No. 2649 (Section 4 - Stormwater Management), 2018 (updated October 2022)
- Land Development Guidelines for the Protection of Aquatic Habitat, Fisheries and Oceans, 1993
- BC Supplement to TAC Geometric Design Guide, BC Ministry of Transportation and Infrastructure, 2019
- Stormwater Planning – A Guidebook for British Columbia, Ministry of Water, Land and Air Protection, 2002
- Best Achievable Technology Assessment (BATA) to Support the Construction Effluent Waste Discharge Authorization (350106-SC-EN-013-SD-000048), Stantec, 2022
- Draft Hydrometeorology Data Analysis for Flood Assessment – Woodfibre LNG Project – Draft Memorandum, Stantec, 2020
- Woodfibre Hydrometeorology Baseline Report – Mill Creek, Woodfibre Creek and East Creek Draft Report, Stantec, 2020
- Environmental Design Guidelines for Water (WLNG-S0003-EV-EDG-0003), Stantec, 2021

The following sets of design drawings for the Project were also reviewed:

- Georeferenced Imagery 20cm Resolution
- Light detection and ranging (LiDAR) data (2017) 1.0 m resolution
- Overall Plot Plan (350106-0000-00-PI-DWG-P0A-0002, Rev. 6 – Issued for Construction August 16, 2024)
- Roads Plan/Profiles/Sections
- Rough and Final Grading Plans/Sections

The following drawings were provided by McDermott for the development of the hydrologic and hydraulic model:

- 350106-1104-00-CV-DWG-C26-0190, Concrete Precast Trenches Plan East Side, Issued for Construction Drawing, McDermott, June 14, 2024
- 350106-4102-00-CV-DWG-P40-0001, Stormwater Underground Drainage Industrial Area Plan, Issued for Construction Drawing, McDermott, June 21, 2024
- 350106-4102-00-CV-DWG-P40-0002, Stormwater Underground Drainage Industrial Area Details, Issued for Construction Drawing, McDermott, Sept 20, 2024
- 350106-4104-00-CV-DWG-C26-0009, Concrete Precast Trenches Plan West Side, Issued for Construction Drawing, McDermott, Jan 05, 2024
- 350106-4304-00-CV-DWG-C26-0029, Concrete Precast Trenches Switch Yard Area Plan, Issued for Construction Drawing, McDermott, Jan 05, 2024

Reference: Operations Phase Stormwater Drainage Hydrology Hydraulics Model

- 350106-1104-00-CV-DWG-C26-0195, Concrete First Flush Sump (01-SU-6469), Plan, Issued for Construction, McDermott, February 17, 2025
- 350106-1104-00-CV-DWG-C26-0196, Concrete First Flush Sump (01-SU-6469), Sections and Details, Issued for Construction, McDermott, February 17, 2025
- 350106-1104-00-CV-DWG-C26-0191, Concrete Precast Trenches Details East Side, Issued for Construction Drawing, McDermott, Feb 16, 2024
- 350106-1104-00-CV-DWG-C26-0192, Concrete Precast Catch Basin CB-01/CB-02/ CB-03, Issued for Construction Drawing, McDermott, Sep 20, 2023
- 350106-4100-00-CV-DWG-K11-0017, Civil Final Rough Grade Key Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-4100-00-CV-DWG-K11-0018, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-4100-00-CV-DWG-K11-0019, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-4100-00-CV-DWG-K11-0020, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-4100-00-CV-DWG-K11-0021, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-4100-00-CV-DWG-K11-0022, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-4100-00-CV-DWG-K11-0023, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-4100-00-CV-DWG-K11-0024, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, Jan 04, 2024
- 350106-4100-00-CV-DWG-K11-0025, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-4100-00-CV-DWG-K11-0026, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-4100-00-CV-DWG-K11-0027, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-4100-00-CV-DWG-K11-0028, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-4100-00-CV-DWG-K11-0029, Civil Final Rough Grade Plan, Issued for Construction Drawing, McDermott, July 17, 2023
- 350106-1200-64-PR-DWG-UFD-0001, Utility Flow Diagram Unit 64, Effluent and Wastewater Treatment, Oily Water Collection and Treatment System, Issued for Design, McDermott, Jan 29, 2024
- 350106-1200-64-PR-DWG-UFD-0002, Effluent and Wastewater Treatment, Oily Water Collection and Treatment System, Issued for Design, McDermott, Jan 29, 2024
- 350106-1200-64-PR-DWG-UFD-0003, Effluent and Wastewater Treatment, Oily Water Collection and Treatment System, Issued for Design, McDermott, July 18, 2023
- 350106-1200-64-PR-DWG-UFD-0004, Effluent and Wastewater Treatment, Oily Water Collection and Treatment System, Issued for Design, McDermott, Jan 29, 2024

- 350106-1200-64-PR-DWG-UFD-0005, Effluent and Wastewater Treatment, Oily Water Collection and Treatment System, Issued for Design, McDermott, Jan 29, 2024

Stantec also held meetings and corresponded with the McDermott civil design team member to verify proposed stormwater drainage system design and assumptions for hydrologic and hydraulic model development.

3 Operations Phase Design Basis

The Operations Phase stormwater drainage system design basis is intended to identify requirements for the design of major conveyance, storage, and treatment system components for use during operation of the LNG Facility.

3.1 Design Requirements

A summary of the key stormwater drainage system design requirements, established based on various regulatory and previously prepared documents, are as follows:

- All stormwater drainage system components will be sized using the rain-on-snow design rainfall event data provided in Appendix 1 of the "Storm Water Drainage Philosophy" (350106-000-CS-PH-00001).
- The District of Squamish Bylaw No. 2649 (Schedule B Design Criteria, Section 4.0 – Stormwater Management) requires that minor systems of a storm water management system (i.e., underground conduits and appurtenances) must be capable of conveying runoff from the 10-year return period storm and major systems of the stormwater management plan (surface flow paths within roadways and walkways, and open channels) will be capable of storing and/or conveying that portion of the runoff from the 100-year return period storm over and above the capacity of the minor system. For the Project site, permanent conveyance system components will be sized in compliance with the District's Bylaw:
    - Minor system including concrete trenches, underground stormwater pipes, catch basins and Stormceptors
    - Major system including sheet flow within roadways and walkways, diversion ditches and open channels, and culverts
- All onsite and diversion ditches will be trapezoidal in shape with a minimum bottom width of 0.5 m, side slopes of 2H:1V (or flatter) and a minimum longitudinal slope of 0.5%. However, for ditches along shorelines where topography is very flat and 0.5% slope is not achievable, minimum longitudinal slope can be reduced to 0.2%.
- The maximum longitudinal slope will be 6% for channels where energy dissipation structures are not installed. Longitudinal slopes of diversion ditches will be governed by topography and may exceed 10% in some places. For the steep-sloped ditches, erosion control measures such as rock lining will be required.
- Vertical-wall concrete trenches with grating covers may also be used in areas where space constraints prevent accommodation of a trapezoidal ditch with 2:1 side slope.
- The minimum depth of ditches will be 1.0 m at the downstream end and 0.5 m depth at the upstream end.
- A minimum diameter of 450 mm will be used for culverts to reduce the risk of blockage and facilitate ease of maintenance.

- The freeboard for open channels and culverts will be estimated based on the predicted hydraulic flow conditions of the conveyance structure; typical minimum values reported in literature include 0.3 m or 20% of the flow depth.
- Runoff from the first 25 mm of rainfall in the Process Module Area (contaminated contact water) will be collected in oily water sumps and then will be pumped to the Oily Water Treatment Package for treatment. Excess runoff will be conveyed to the First Flush Sump through a gravity trench drain system. The oily water drainage and treatment system is being designed by McDermott. Piping and instrumentation diagram (P&ID) drawings were provided by McDermott. Detailed description of oily water sumps is provided in "Unit 64 – Effluent and Wastewater Treatment System – Process Design Basis" (50106-0000-64-EV-GEN-PDB-0001).
- Runoff from potentially contaminated contact water (due to accidental spills) will be temporarily stored in impoundment sumps, i.e. secondary containment system. In general, the impoundment sumps will be sized for 110% of largest fuel storage plus runoff volume of 25-year 24-hour storm event, facilitating with sumps where contaminated water is removed by hydro-vac truck for disposal if accidental leakage has occurred. Detailed description of the impoundment sumps is available in "Basis of Design for Impoundment Sumps" (350106-000-SE-BD-00001).
- For TSS management from non-contact runoff, Stormceptors (i.e. an oil-and-grit separator or OGS product) will be provided before the concerned outfalls. Stormceptors will retain TSS from the smaller intensity rainfall events while larger rainfalls will be allowed to directly discharge to Howe Sound through an overflow weir structure. The sizing of the Stormceptors were determined by the Stormceptor manufacturer in coordination with McDermott and are provided in Appendix A. The OGS devices are sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the TSS load for a specific particle size distribution.
- The minimum invert elevations of all proposed onsite ditches and culverts are set at 2.0 m, which is slightly higher than the Higher High-Water Level – Large Tide in the Squamish area (i.e. 1.95 m measured using Geodetic Datum). This approach is intended to reduce the potential for marine water to reach the infrastructure and reduce the capacities of the onsite drainage system during high tide periods and to make the culverts inaccessible to fish and other marine fauna at tide levels below 2.0 m.
- Materials not affected by salinity-induced corrosion will be used for all outlet culverts, control manholes and accessories (i.e., control gates) that will be installed at or below 2.0 m elevation.

The most applicable guideline criteria are used to assess the model results for the proposed drainage system design by McDermott.

3.2 Water Quality Design Criteria & Components

For stormwater discharge water quality to Howe Sound, the "Woodfibre LNG Operations Phase Waste Discharge Authorization – Review of Similar ENV/OGC Authorizations and Recommendations for Application" by Stantec dated February 15, 2023 establishes regulatory framework for Woodfibre LNG effluent discharges. The findings of this are summarized in "Regulatory Framework Guidance for the Woodfibre LNG Effluent Discharge Memo" (350106-SC-EN-013-SD-000061), dated May 13, 2022. The BATA (350106-SC-EN-013-SD-000048) defines minimum discharge objectives (MDOs) for the Construction Phase of the Woodfibre LNG Project based on federal and provincial water quality guidelines (WQGs). For Operations Phase the MDOs similar to Construction Phase will be established based on the Operations Phase effluent Waste Discharge Authorization (WDA).

To address the water quality requirements, the stormwater drainage design incorporates the following system components:

- **Impoundment Sumps** (Secondary Containments): Designed to store accidental spill of hydrocarbon from storage tanks and handling facilities to reduce the potential damage to other adjacent facilities and waterways. Spill sump or impoundment area is required for each spill source area. Each sump is sized to contain the maximum spill volume without overfilling. During rainfall events, the secondary containment areas trap stormwater which needs to be checked for water quality prior to being released through stormwater outfalls.
- **Oily Water Sumps:** The first-flush stormwater runoff from potentially contaminated areas due to lubrication or hydrocarbon service, within paved process and utility areas will be collected in Oily Water Sumps for containment and treatment prior to discharge to Howe Sound. Oily Water Sumps will be sized to contain the first-flush water volume for their respective contributing areas. Industry best practices consider the first-flush water to be defined as the greater of the runoff volume from the first 15 minutes of a 10-year storm event across a contained area, and the runoff volume from 25 mm of stormwater across a contained area. Section 5e of BC Reg. 168/94 of the EMA (for Petroleum Storage and Distribution Facilities) dictates that oil-separator systems be sized for a 10-year, 60-minute rain event. Hence, the Oily Water Sumps are sized for a first-flush of 25 mm of runoff, as this exceeds the 15-minute precipitation depths from the 10-year (9.1 mm) as well as the 10-year, 60-minute depths stated in the regulations (18.5 mm). Stormwater runoff from potentially contaminated areas will be collected and tested to check that water quality specifications are met prior to discharge to stormwater outfalls.
- **Oily Water Treatment**: Stormwater runoff from contaminated areas due to lubrication or hydrocarbon service will be treated by an oil water separator which abides by regulations and industry best practices, prior to discharge to the environment.
- **Offsite Area Drainage**: Stormwater runoff generated from areas outside of the LNG Facility such as hillslope catchment areas are considered non-contact and non-contaminated water. Stormwater runoff from these areas is diverted to receiving waters untreated via periphery ditches to the creeks and Howe Sound.

Runoff is considered to fall into one of four categories for the purposes of this design:

- **Non-Contact Water**: Runoff water originating from undeveloped / non-developable periphery areas of the Site located along the creeks and Howe Sound shoreline which drains directly to those water bodies. Note some additional areas of the previous industrial facility, such as the Green Zone around Mill Creek, will be restored to a native or vegetated condition. After the restoration is completed, stormwater runoff from these areas will be considered non-contact water and will be allowed to drain directly to the creeks or Howe Sound. Also, non-contact water which currently drains directly to the creeks or Howe Sound will continue to drain to the existing receiving waterbodies.
- **Contaminated Contact Water:**
    - **East of Mill Creek**: Water containment areas are provided within process/utility curbed areas based on likelihood of exposure. For acid gas removal unit, amine solvent containment area is provided where all amine-containing equipment and piping will be contained within a curbed area and all surface runoff in this area with volume of 100-year 24-hour event will be collected in the sump. The contents of the sump will be tested for the presence of amine solvents. If the water is free of solvent, it will be pumped to the oily water treatment unit. If amine solvents are identified in the sump, the water will be treated as per amine-specific spill response procedure or will be taken away for offsite treatment and disposal.

      For all other containment areas contact water contaminated by operational and maintenance fluids, and lube oils, hydrocarbon services, or other oil contaminant sources will be collected in curbed areas. Contaminated runoff in the curbed area will be directed to an oily water sump and will be pumped to the oily water treatment unit.

- **West of Mill Creek**: No process equipment is located west of Mill Creek and as a result, contaminated contact water system is not required. Note, secondary containment will be provided for the pumps, diesel storage tanks and equipment that will be located in the west of Mill Creek area.

- **Potentially Contaminated Contact Water:**
  - **East of Mill Creek**: Potentially contaminated contact water systems are as follows:

    Refrigerant Storage Area and Condensate Loading Area: the containment curbed area is sized to contain volume of 110% largest fuel storage plus runoff volume of 25-year 24-hour storm event, facilitating with sump where oily water is removed by hydro-vac truck for disposal if accidental leakage has occurred.

    LNG Process Area: the water contained in the LNG sump will be checked for contamination or sheen prior to being pumped to the oily water treatment unit. The runoff volume in excess of the 10-year 24-hour storm event will be conveyed though overflow pipe by gravity to the concrete trench.

    All other areas except water for amine solvent containment and the specific oily water in the curbed areas described above, runoff collected from ISBL modules and equipment areas will drain on surface pavement to concrete trenches at the outside edges of these areas.
  - The runoff of first-flush from the ISBL module and equipment areas in trenches will flow to the common first-flush sump via the diversion box with under-weir overflow configuration. Runoff in excess of first-flush runoff is deemed as noncontaminated contact water and will drain through the above noted diversion box and will discharge through a proposed outfall (OUT-10) to Howe Sound.
  - Following each storm event, the operator will test the collected water in the first-flush sump for compliance with the discharge limits. If it is compliant with the discharge limits, the collected water will be pumped to the non-contaminated contact water system. If it is noncompliant, the water will be pumped to the oily water treatment unit for treatment.
  - **West of Mill Creek**: water containment areas will be constructed around the firewater pumps, diesel generators, diesel storage area, and any other areas identified to have a high probability of exposure of stormwater to hydrocarbons. Each containment curbed area will be sized to contain a volume of 110% of the largest fuel storage plus the runoff volume from a 25-year24-hour storm event. Any contaminated water will be removed by hydro-vac truck for disposal if accidental leakage has occurred.
  - **Marine Terminal:** Areas with hydraulic systems containing oil will include double-wall containment and will utilize biodegradable oil. Any accidental oil contaminated water will be contained in the sump and pumped to the oily water treatment unit for treatment.

- **Non-Contaminated Contact Water**: Runoff water originating from within the facility area which does not come into contact with any potential contaminant sources.
  - **East of Mill Creek**: Surface runoff from uncontained paved and unpaved areas with no risk of surface contamination will flow by gravity sheet flow to open drainage ditches. The water will discharge through a Stormceptor prior to discharging to Howe Sound via a proposed outfall (OUT-10).
  - **West of Mill Creek**: Surface runoff from uncontained paved and unpaved areas, including building areas, with no risk of surface contamination will be routed by gravity sheet flow to concrete trenches or ditches, and catch basins with underground pipes. The collected water will drain through a Stormceptor, and prior to discharging to Howe Sound through outfalls (OUT-02 or OUT-04).

- **Marine Terminal:** Surface runoff from the marine terminal modules & Floating Storage Tank (FST) surfaces has no risk of surface contamination and is considered non-contaminated contact water. The rainfall is not required to be collected or contained and will be allowed to discharge directly to Howe Sound without any treatment.

4 Hydrology and Hydraulic Model Update

The hydrology and hydraulic model developed for the Construction Phase of the project was updated to incorporate the latest changes to the site and detailed design of the drainage system components. The existing model was developed using Personal Computer Storm Water Management Model (PCSWMM) (version 7.4) software; this version was also used for the Operations Phase model update. The PCSWMM software is a Geographic Information System (GIS) enabled modelling package that allows hydrology, hydraulics, groundwater and surface water quality modelling to be run on the same platform. PCSWMM utilizes the Environmental Protection Agency Storm Water Management Model (EPA SWMM) engine for modeling calculations and its integrated GIS tools help to automatically delineate catchments and create cross-sections of a creek/channel from an attached surface (i.e., digital elevation model).

For hydrologic computations, the 'Kinematic Model' was used to apply rainfall data to a catchment and then apply infiltration and evaporation losses. The excess rainfall, after infiltration and evaporation losses, generates runoff using the Kinematic equation. Computed runoff depends on assigned hydrologic parameters i.e., catchment geometry, slope, surface roughness and other factors. Ditches, culverts, and underground pipes were incorporated based on the latest design drawings provided by McDermott in the hydraulic module of PCSWMM, which solves the Saint-Venant equations to route hydrographs generated by the hydrologic model through the system components.

Catchments for diversion ditches were previously delineated using LiDAR data in PCSWMM using GIS tools. Operations Phase flow patterns on the Site were determined using the latest grading plan provided by McDermott. Operations Phase catchments for the Site were manually delineated in PCSWMM based on the site development layout and grading plans.

Intensity-Duration-Frequency (IDF) curves presented in the Woodfibre Hydrometeorology Baseline Report (Stantec, 2020) were applied to generate design rainfall event hyetographs. These IDF curves considered climate change and orographic effects. Three different rainfall distributions and durations were considered: (1) Soil Conservation Service (SCS; now NRCS) Type 1A distribution with 24-hour duration, (2) Atmospheric Environmental Service (AES) distribution with 1-hour duration, and (3) AES distribution with 2-hour duration. The types of rainfall distribution were selected based on the City of Vancouver Engineering Design Manual (2019) and are considered typical design storm events for the Project area. It was found that the SCS/NRCS Type 1A distribution with 24-hour duration provided the maximum flow rate and was therefore utilized in sizing the conveyance system and sedimentation ponds. The rain-on-snow IDF curve was utilized given that larger storm (rainfall) events occur in winter along with snowfall in the Squamish region. The IDF curves and design rainfalls with distributions are presented in Appendix B.

Ground infiltration for the post-development conditions was modelled using the US Natural Resources Conservation Service (NRCS)'s Curve Number method. Curve Number is a parameter of soil infiltration properties that considers the effect of both land use/cover and soil type, there are NRCS developed Curve Numbers for 49 different land uses, each divided into four different soil types. The selected Curve Numbers for different land covers and soil types and the derived runoff coefficient for the 1-in-100 year 24-hour rainfall event are presented in **Table 1**. The selected Curve Numbers are based off "Estimating Runoff Volume and Peak Discharge, Part 650 Engineering Field Handbook" published by NRCS (2021).

Table 1 Land Use/Cover and Hydrologic Parameters

Land Use	Soil Types	Curve Number	Imperviousness (%)	Surface Roughness	Derived Runoff Coefficient[1]
Forest (hillslope catchments)	Silty Clay	70	0	0.40	0.70
Graveled Road and Yard Areas	Compacted Gravel	85	5	0.024	0.85
Landfill (capped and vegetated)	Topsoil over Clay Cap	74	5	0.24	0.75
Asphalt, Buildings	N/A	N/A	100	0.013	1.00

[1] Runoff coefficients are computed by dividing the runoff volume by the total precipitation volume for the 1 in 100-year 24-hour duration rain-on-snow event (total precipitation depth = 297.2 mm).

In discussions with McDermott, it was decided not to model the impoundment (containment) and oily water sump storages in the hydraulic model due to insufficient operation details at the time of the model development. Exclusion of these storage components is expected to result in slightly conservative design of the major conveyance system components.

5 Stormwater Drainage System Analysis Results

This section provides a summary of stormwater drainage system model simulation analysis for the Operations Phase of the facility. The proposed drainage arrangement is shown schematically in Figure 1.

The stormwater management for marine Floating Storage Tanks (FSTs) is not covered in this study scope. However, it is understood that runoff generated from FSTs is not at risk of contamination and will not be contained. However, LNG leaks in the FST platforms will be collected in impoundment sumps where the spilled LNG will be vaporized naturally.

5.1 Offsite Area Flow Diversion

Under pre-development conditions, runoff from some hillslope catchments discharge through the Site to Howe Sound via a combination of overland and underground sewer systems. Runoff from these hillslope catchments will be diverted to Howe Sound through diversion ditches and culverts, which will be installed during the Construction Phase. Timing for installation of the diversion ditches and culverts will be determined based on the construction sequencing requirements.

Approximately 8.95 ha of hillslope catchment west of Mill Creek will continue to discharge at OUT-06 into Mill Creek via an upgraded ditch and culvert with flap gate mounted on the Flood Wall as shown on Figure 1. Another approximately 22.45 ha of hillslope catchment west of Mill Creek, that primarily drained through the Site under the existing condition, will be diverted to an existing culvert (OUT-02) discharging to Howe Sound. The catchment areas (30.97 ha) of an existing culvert (OUT-01) located beside Woodfibre Creek and discharging to Howe Sound will remain primarily unchanged. The culverts at OUT-01 and OUT-02 will be replaced with new materials, but the outfall locations will remain unchanged.

East of Mill Creek, runoff from approximately 4.69 ha of hillslope catchment, shown on Figure 1, will be diverted to Howe Sound through a proposed diversion ditch system. Under the existing development condition, this catchment discharges to Howe Sound through the Site. Note that the approximately 0.42 ha

Switch Yard area located above the rock cut will be used for transformer installation and a crane pad during construction. This area will discharge through an existing channel to East Creek (OUT-12).

Runoff from offsite areas on the east side of Mill Creek will be routed through a diversion ditch system to discharge directly to Howe Sound through a new culvert (OUT-11).

The proposed offsite drainage plan is shown on Figure 1. Appropriately sized diversion ditches for a 1-in-100 year rainfall event will be constructed, at approximately the locations depicted on Figure 1, along with outlets to the respective watercourses. These ditches will be lined appropriately to provide erosion protection and sediment control.

The undeveloped/non-developable periphery areas of the Site located along the creeks and Howe Sound shoreline will continue to drain as per existing conditions. Surface runoff from these areas is also considered non-contact water. To reduce shoreline erosion potential, shoreline restoration work will also be completed as shown on Figure 1. At few locations along the shoreline, onshore anchoring structures will be constructed to support operation of the proposed facilities. Runoff from these anchoring structures will discharge directly to Howe Sound.

5.2 East Plant Site

5.2.1 Conveyance System

The east plant conveyance system includes trench drains, culverts, ditches, a first-flush sump with a pump and a diversion structure, Stormceptor and outfalls, as shown in **Figure 1**.

The diversion ditches located north of the Site are designed to intercept offsite runoff and runoff from approximately half of the center crowned road around the main Process Module area and direct the runoff towards a proposed outfall (OUT-11).

Runoff from the main Process Module area, including the truck loading zone and half of the center crowned road sections is collected by trench drains. This water is then directed to the first-flush sump for initial quality assessment via culverts before being released through a pump with a rated capacity of 35 m^3/hr to a proposed outfall (OUT-10). The first-flush system will allow contaminants in the first runoff to be treated or stored before being discharged, enhancing water quality control.

A diversion structure is installed at the first-flush sump location to handle significant rainfall events. During larger rainfall event, this structure redirects excess water to a ditch located south of the main Process Module area, which ultimately discharges into a proposed outfall (OUT-10) through a Stormceptor system. The Stormceptor provides additional treatment to remove sediment and pollutants before discharging to Howe Sound, ensuring compliance with environmental standards.

The switch yard area drains to its trench drains, which then convey runoff southward through two culverts in series. The runoff eventually flows into the diversion ditch system, which then conveys runoff towards the proposed outfall (OUT-11).

The west MOF gravel area located south of the main Process Module area is designed to drain south and will be collected via ditch along the shore which will convey the flow to a Stormceptor before discharging to Howe Sound through a proposed outfall (OUT-10). The runoff from the east MOF gravel area located south of the main Process Module area is intercepted by a south ditch, which also directs runoff to the Stormceptor before discharging to Howe Sound through a proposed outfall (OUT-10).

The condensate and refrigerant storage area located on the west MOF gravel area is designed to be self-contained with any runoff or spillages being collected and removed by truck vacuum systems, preventing direct discharge to the ocean.

The pipe rack area located east of the main Process Module is managed by a drainage swale, which directs water into a catch basin before it is routed to a Stormceptor and then discharged to Howe Sound via an outfall (OUT-10).

Lastly, the area east of East Creek consisting a portion of the access road and offsite forested areas will drain through a culvert (OUT-13) under the access road directly to Howe Sound.

5.3 West Plant Site

5.3.1 Conveyance System

The west plant conveyance system includes trench drains, culverts, ditches, underground pipe network, a Stormceptor and outfalls, as shown in Figure 1.

The offsite area can be divided into three distinct segments based on the drainage patterns:

1. Northeast Offsite Area: Runoff from this area of 8.95 ha is captured by a diversion ditch, which directs runoff eastward towards Mill Creek via an existing outfall (OUT-06), as shown on Figure 1.

2. Northwest Offsite Area: This area of 30.97 ha is drained by roadside ditches located south of the Fire Water and Generator area. The runoff is conveyed through these ditches and directed to Howe Sound via a 900mm culvert (OUT-01) to the south of the Site, as shown on Figure 1.

3. Central Offsite Area: Runoff from this section is intercepted by a perimeter trench drain located northwest of the Fire Water and Generator area. The runoff is directed southwest to a ditch and then flows into a 900mm culvert (OUT-02). After passing through a Stormceptor for treatment, the runoff is discharged into Howe Sound. The total catchment area of OUT-02 is 25.22 ha including offsite and onsite contributing areas as shown on Figure 1.

Runoff from the Fire Water and Generator area is collected by a trench drain located southeast of the area, then conveyed through a 450 mm culvert leading to a ditch located north of the shoreline road. The runoff is then directed to a swale located immediately north of the shoreline via another trench drain system and continues to the swale before being treated in a Stormceptor and discharged to Howe Sound via a 900 mm culvert (OUT-02).

The swale system immediately north of the shoreline collects runoff from half of the center-crowned road and discharges to an outfall (OUT-02) through a Stormceptor. In a larger rainfall event, runoff from this swale may also seep to Howe Sound through the riprap shore protection works.

The Utility and Administration Building areas located west of Mill Creek are serviced by a dedicated stormwater drainage network. This network directs runoff into a series of storm pipes that conveys the runoff to a Stormceptor for treatment. From there, the runoff flows further east to a drainage ditch, which ultimately discharges to Howe Sound through a proposed outfall (OUT-04).

5.4 Stormceptors

A total of three Stormceptors are proposed to be installed upstream of OUT-02, OUT-04, and OUT 10. The Stormceptors are intended to remove sediments and surficial oil from smaller but more frequent rainfall events. During larger events, flow in excess of the Stormceptor treatment capacity will be bypassed and will be discharged through the outfall.

The sizing of the Stormceptors were determined by the Stormceptor manufacturer in coordination with McDermott and are provided in Appendix A. The OGS devices are sized to provide stormwater quality

treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the TSS load for a specific particle size distribution.

5.5 Outfalls

The simulated service areas and discharge rates for the 10- and 100-year 24-hour rainfall events are summarized in **Table 2**.

Table 2 Summary of Outfall Service Areas and Simulated Discharge Rates

Description	Stormwater Outlets							
	OUT-01	**OUT-02**	**OUT-04**	**OUT-06**	**OUT-10**	**OUT-11**	**OUT-12**	**OUT-13**
Total Catchment Area (ha)	30.97	25.22	2.37	8.95	7.36	4.69	62.10	2.68
Forested Area (ha)	30.76	22.45	-	8.05	-	3.66	55.87	2.61
Graveled Area (ha)	0.14	1.59	0.93	0.66	4.36	0.58	5.00	
Impervious Area (ha)	0.07	1.18	1.44	0.24	3.00	0.45	1.24	0.07
Discharge Location	Howe Sound	Howe Sound	Howe Sound	Mill Creek	Howe Sound	Howe Sound	Howe Sound	Howe Sound
Catchment Characteristics	Offsite Forested Catchments	Offsite Forested Catchments, Plant Area	Plant Area	Diverted Hillslope Catchments	Plant Area	Offsite Forested Area, Access Road	Offsite Forested Area, Gravelled Road	Offsite Forested Areas, Access Road
Peak Flow Rate at 1 in 10-Year 24-Hour Event (m^3/s)	1.08	0.93	0.15	0.31	0.44	0.21	2.30	0.10
Maximum Velocity during 1 in 10-Year 24-Hour Event (m/s)	1.41	1.91	1.14	1.15	1.26	1.12	1.57	0.99
Peak Flow Rate at 1 in 100-Year 24-Hour Event (m^3/s)	1.70	1.40	0.20	0.49	0.61	0.32	3.66	0.16
Maximum Velocity during 1 in 100-Year 24-Hour Event (m/s)	1.65	2.65	1.17	1.31	1.39	1.23	1.86	1.11

5.6 Oily Water Treatment Package Design

The Oily Water Treatment Package (01-A-6417) will be provided to remove free and dispersed oil, and settleable and suspended solids from contaminated contact water. The package will consist of a retention buffer vessel, and an oil-water separator. The retention buffer vessel will be designed with adequate retention time to remove settleable and suspended solids. The oil-water separator will be of the enhanced gravity separation type, such as a compact floatation unit, complete with coalesce pack and associated instrumentation and controls to remove oil droplets.

The treatment package will be installed above ground, with effluent gravity-draining to the outfall at Howe Sound. The oil-water separator will be provided with an integrated compartment to contain the separated oil and oil transfer pump. The separated oil will be removed periodically by the oil transfer pump into suitable containers or vacuum trucks for off-site disposal to a licensed waste facility, such as GFL in Squamish, Secure Energy in Richmond, Sumas Environmental in Burnaby, or Clean Harbours in Delta, BC. The oil transfer pump will be sized for 1 m^3/hour to empty the recovered oil compartment in 15 minutes. Sludge accumulated in the treatment package will also be transferred into suitable containers or vacuum trucks for off-site disposal.

The treated effluent from the Oily Water Treatment Package will meet the regulatory discharge specifications of 15 mg/L of total extractable hydrocarbon. The influent and effluent lines of the treatment package will be provided with access ports for periodic grab sampling, as well as an in-line analyzer downstream of the package. If the effluent does not meet the specifications, the effluent will be re-routed back to the buffer vessel for additional treatment, until regulatory specs are met.

6 Closure

This memorandum summarizes the updated hydrologic and hydraulic model development and analysis for the Operations Phase. The hydrologic and hydraulic model excludes various containment and oily water collection system components as they make up relatively minor portions of the overall site area. Some system performance deficiencies were identified and reviewed with the McDermott civil design team and were addressed through the design update. Consequently, the final hydrologic and hydraulic analysis results indicate that the overall stormwater conveyance system components are adequately sized.

Reference: Operations Phase Stormwater Drainage Hydrology Hydraulics Model

In order to confirm the operation phase stormwater management plan, appropriate approval process from various regulatory agencies including Waste Discharge Authorization (WDA) should be initiated.

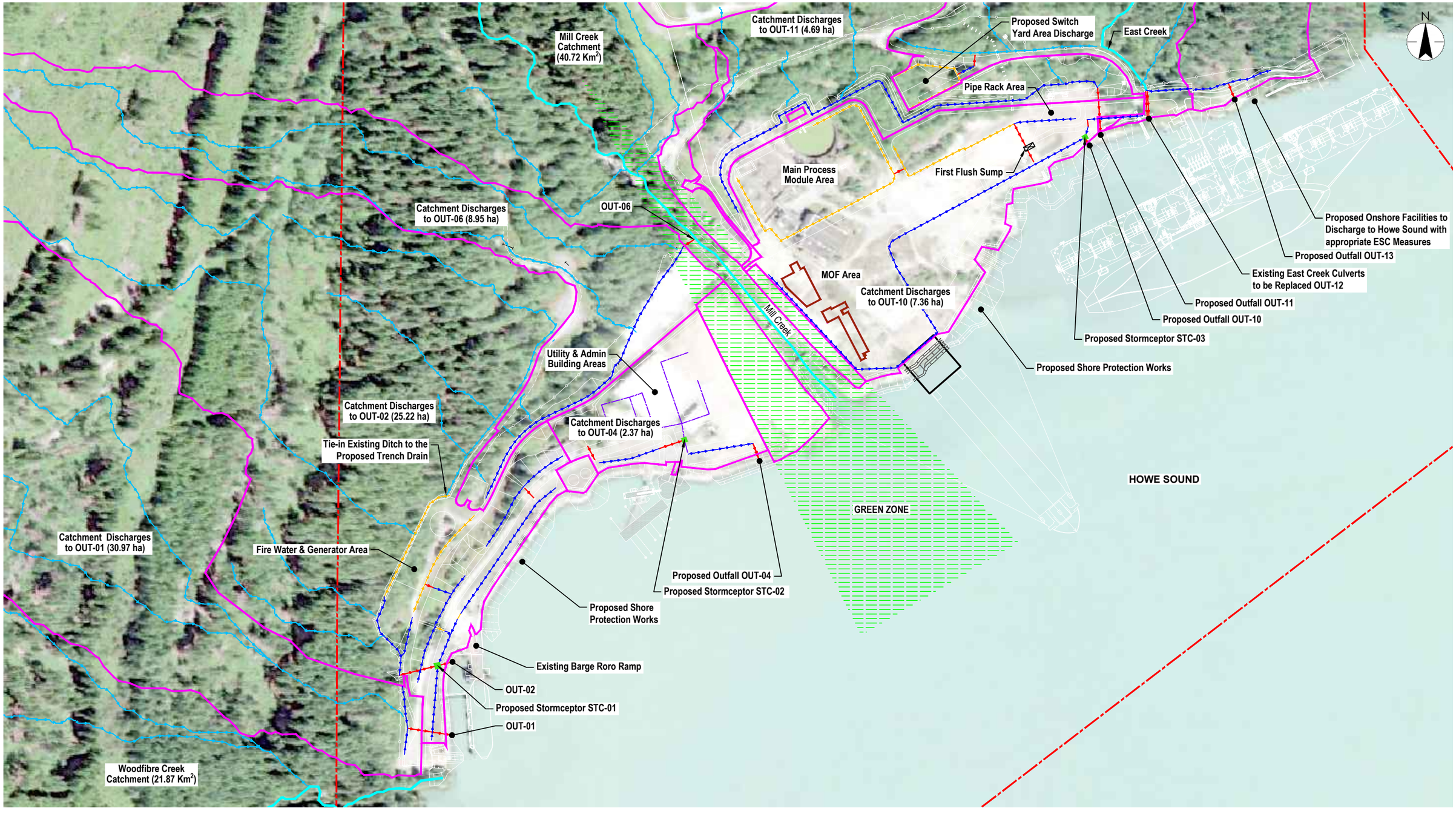
Respectfully,

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Attachment: PCSWMM H&H Model (Digital File)
Figure 1 Stormwater Management Plan
Appendix A – Stormceptor Design Calculations
Appendix B – Design Storm Data



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Stantec

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Legend

- Project Boundary
- Catchment Boundary
- Creek
- Existing Flow Path/Ditch
- Proposed Ditch
- Proposed Trench Drain
- Proposed Culvert/ Outfall
- Proposed Impoundment Area
- Proposed Stormceptor
- Proposed Storm Sewer

Notes

1. All existing culverts are not shown.

Scale

1:4000

0 40 120 200m

Client/Project

McDermott
Energy Solutions (Canada) Ltd.

Construction Stormwater Management Plan for
Woodfibre LNG Project

Project No.
123221907

Title

Stormwater Management Overall Site Plan

Revision	Date
FINAL	2025.01.14

Reference Sheet

Figure No.
1

Appendix A

Appendix A - Stormceptor Design Calculations

Stormceptor®

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

03/30/2024

Province:	British Columbia
City:	squamish
Nearest Rainfall Station:	N VANCOUVER SONORA DR
Climate Station Id:	110N6FF
Years of Rainfall Data:	20

Site Name:	

Drainage Area (ha):	10
% Imperviousness:	85.00

Runoff Coefficient 'c': 0.81

Particle Size Distribution:	OK-110
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	136.66
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	150
Estimated Average Annual Sediment Load (kg/yr):	21595
Estimated Average Annual Sediment Volume (L/yr):	17557

Project Name:	LNG
Project Number:	none
Designer Name:	Ruidong Zhang
Designer Company:	CB&I
Designer Email:	ruidong.zhang@mcdermott.com
Designer Phone:	281-588-5879
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO3	10
EFO4	20
EFO6	38
EFO8	57
EFO10	71
EFO12	82

Recommended Stormceptor EFO Model: EFO12

Estimated Net Annual Sediment (TSS) Load Reduction (%): 82

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

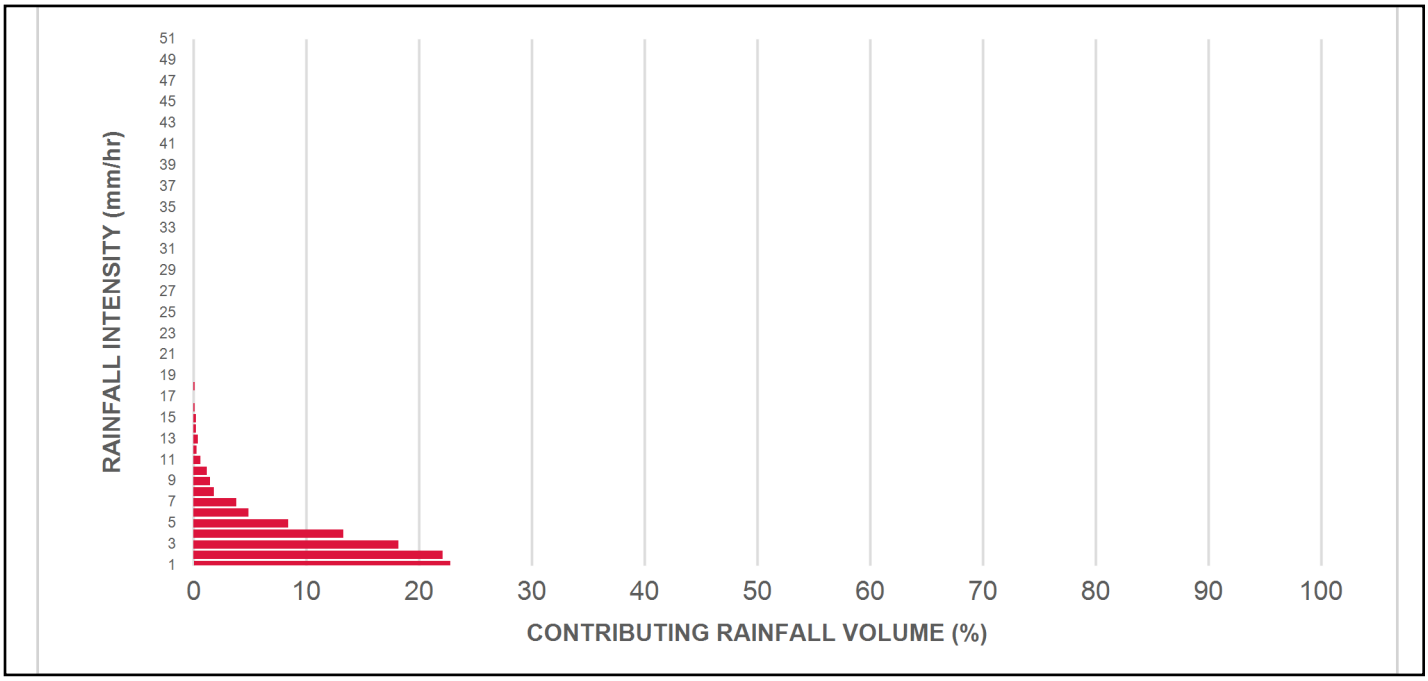
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

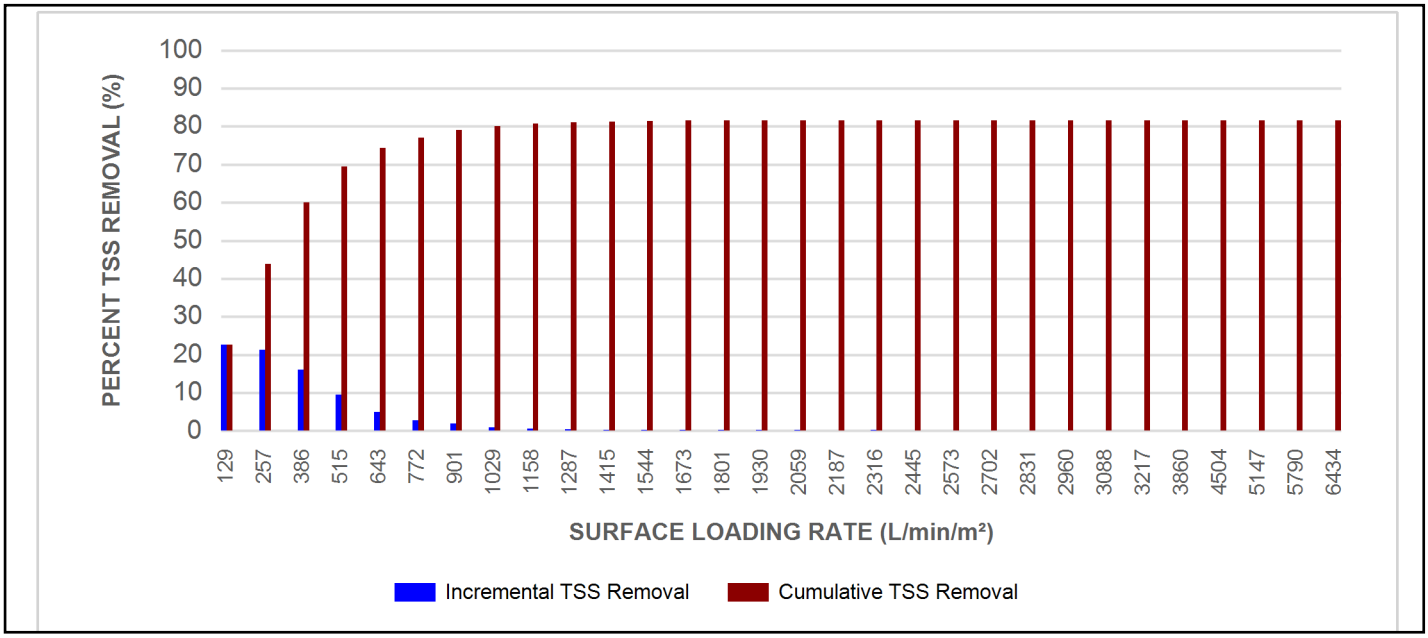
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1.00	22.8	22.8	22.52	1351.0	129.0	100	22.7	22.7
2.00	22.1	44.9	45.04	2702.0	257.0	96	21.2	43.9
3.00	18.2	63.1	67.55	4053.0	386.0	88	16.0	60.0
4.00	13.3	76.4	90.07	5404.0	515.0	72	9.5	69.5
5.00	8.4	84.8	112.59	6755.0	643.0	58	4.9	74.4
6.00	4.9	89.7	135.11	8106.0	772.0	55	2.7	77.1
7.00	3.8	93.5	157.63	9458.0	901.0	52	2.0	79.1
8.00	1.8	95.4	180.14	10809.0	1029.0	49	0.9	80.0
9.00	1.5	96.9	202.66	12160.0	1158.0	43	0.6	80.7
10.00	1.2	98.1	225.18	13511.0	1287.0	37	0.4	81.1
11.00	0.6	98.7	247.70	14862.0	1415.0	31	0.2	81.3
12.00	0.3	99.1	270.22	16213.0	1544.0	28	0.1	81.4
13.00	0.4	99.4	292.73	17564.0	1673.0	26	0.1	81.5
14.00	0.2	99.6	315.25	18915.0	1801.0	24	0.0	81.5
15.00	0.2	99.9	337.77	20266.0	1930.0	22	0.1	81.6
16.00	0.1	99.9	360.29	21617.0	2059.0	21	0.0	81.6
17.00	0.0	99.9	382.81	22968.0	2187.0	20	0.0	81.6
18.00	0.1	100.0	405.32	24319.0	2316.0	19	0.0	81.6
19.00	0.0	100.0	427.84	25671.0	2445.0	18	0.0	81.6
20.00	0.0	100.0	450.36	27022.0	2573.0	17	0.0	81.6
21.00	0.0	100.0	472.88	28373.0	2702.0	16	0.0	81.6
22.00	0.0	100.0	495.40	29724.0	2831.0	16	0.0	81.6
23.00	0.0	100.0	517.91	31075.0	2960.0	15	0.0	81.6
24.00	0.0	100.0	540.43	32426.0	3088.0	14	0.0	81.6
25.00	0.0	100.0	562.95	33777.0	3217.0	14	0.0	81.6
30.00	0.0	100.0	675.54	40532.0	3860.0	11	0.0	81.6
35.00	0.0	100.0	788.13	47288.0	4504.0	10	0.0	81.6
40.00	0.0	100.0	900.72	54043.0	5147.0	9	0.0	81.6
45.00	0.0	100.0	1013.31	60799.0	5790.0	8	0.0	81.6
50.00	0.0	100.0	1125.90	67554.0	6434.0	7	0.0	81.6
Estimated Net Annual Sediment (TSS) Load Reduction =								**82 %**

Climate Station ID: 110N6FF *Years of Rainfall Data*: 20

RAINFALL DATA FROM N VANCOUVER SONORA DR RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF3 / EFO3	0.9	3	90	457	18	457	18	340	12
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

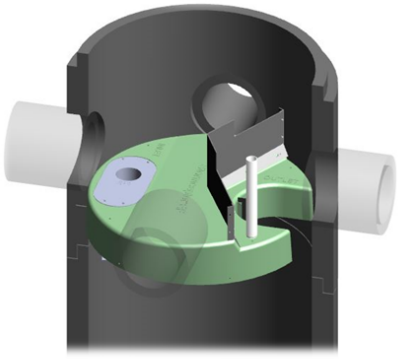
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

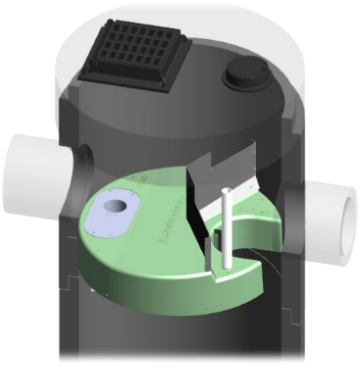
DESIGN FLEXIBILITY

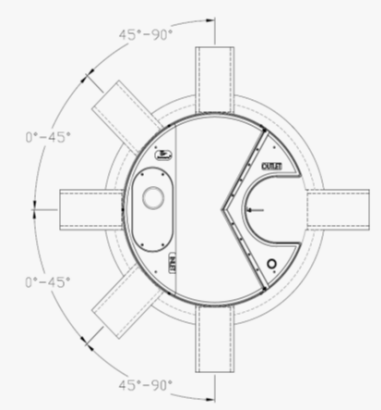
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF3 / EFO3	0.9	3	1.22	4.0	170	45	203	8	700	25	1120	3125
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit** S**eparators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to

assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Appendix B

Appendix B - Design Storm Data

Table A.1a: IDF Curve as provided in "Woodfibre Hydrometeorology Baseline Report" submitted by Stantec in 2020.

Duration	Return Period						
	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	200 Year
5 min	2.9	5.1	6.5	8.6	11.5	15.4	16.3
10 min	4.1	6.7	8.3	10.9	14.1	17.8	19.5
15 min	5.1	7.5	9.1	11.7	14.5	17.8	20
30 min	7.8	10.1	11.6	13.9	16.1	18.7	21
1 hour	13.2	16.4	18.5	21.6	24.9	29.1	30.7
2 hour	21.3	25.7	28.8	33.3	37.2	41.3	44.1
6 hour	47.1	58.7	66.8	78.6	88.7	99.5	107
12 hour	78.1	98.5	112.2	126.6	136.9	148.5	160
24 hour	126.8	165.2	187.1	214	236	257.8	279.5
24 hour*	157.0	198.2	221.6	250.4	273.9	297.2	320.5
48 hour**	200.9	245.3	270.0	300.6	326.0	351.2	378.7
72 hour**	246.2	301.8	332.9	371.4	403.3	434.8	468.9

*Rain-on-snow considered
**Prorated Station ID 10476F0 (Table A.1b) data based on 24 hour data with rain-on-snow

Table A.1b: 1 to 30-day rain IDF curves for the Squamish Airport (Station ID: 10476F0) ECCC Meteorological Station in mm of rain with a 50% confidence limits

Duration (days)	Return Period					
	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
1	107.74 +/- 3.26	133.64 +/- 5.48	150.78 +/- 7.41	172.45 +/- 9.99	188.52 +/-11.95	204.47 +/-13.92
2	146.15 +/- 4.40	181.15 +/- 7.41	204.32 +/-10.01	233.60 +/-13.50	255.33 +/-16.15	276.89 +/-18.81
3	179.07 +/- 5.51	222.89 +/- 9.28	251.91 +/-12.53	288.57 +/-16.90	315.77 +/-20.22	342.76 +/-23.56
4	213.12 +/- 6.01	260.95 +/-10.13	292.62 +/-13.68	332.63 +/-18.44	362.31 +/-22.07	391.77 +/-25.71
5	236.37 +/- 7.23	293.90 +/-12.18	331.99 +/-16.45	380.12 +/-22.19	415.83 +/-26.55	451.27 +/-30.93
6	254.77 +/- 7.46	314.14 +/-12.57	353.45 +/-16.98	403.12 +/-22.90	439.97 +/-27.40	476.55 +/-31.91
7	272.36 +/- 7.57	332.55 +/-12.75	372.40 +/-17.21	422.75 +/-23.21	460.11 +/-27.77	497.18 +/-32.35
8	290.38 +/- 8.10	354.79 +/-13.64	397.44 +/-18.42	451.32 +/-24.84	491.30 +/-29.72	530.98 +/-34.62
9	303.60 +/- 8.59	371.93 +/-14.47	417.18 +/-19.54	474.34 +/-26.35	516.75 +/-31.53	558.84 +/-36.73
10	317.88 +/- 8.87	388.43 +/-14.94	435.14 +/-20.18	494.16 +/-27.21	537.94 +/-32.55	581.40 +/-37.92
15	394.87 +/-13.81	504.70 +/-23.26	577.43 +/-31.41	669.31 +/-42.36	737.47 +/-50.68	805.14 +/-59.04
20	459.73 +/-15.12	580.01 +/-25.47	659.64 +/-34.40	760.26 +/-46.38	834.90 +/-55.50	909.00 +/-64.65
25	522.13 +/-17.20	658.98 +/-28.98	749.58 +/-39.14	864.06 +/-52.77	948.98 +/-63.14	1033.28 +/-73.56
30	577.02 +/-18.80	726.56 +/-31.66	825.56 +/-42.77	950.65 +/-57.66	1043.45 +/-69.00	1135.57 +/-80.38

Note: Does not consider climate change and rain-on-snow

Table A.2: 5-year, 10-year, 100-year and 200-year Rain-on-Snow with 24-hour duration and SCS Type-1A Distribution

Time (hh:mm)	5-yr Rainfall (mm/hr)	Time (hh:mm)	10-yr Rainfall (mm/hr)	Time (hh:mm)	100-yr Rainfall (mm/hr)	Time (hh:mm)	200-yr Rainfall (mm/hr)
0:00	0.000	0:00	0.00	0:00	0.00	0:00	0.00
0:20	4.162	0:20	4.65	0:20	6.23	0:20	6.72
0:40	4.162	0:40	4.65	0:40	6.23	0:40	6.72
1:00	4.162	1:00	4.65	1:00	6.23	1:00	6.72
1:20	4.757	1:20	5.31	1:20	7.12	1:20	7.68
1:40	4.757	1:40	5.31	1:40	7.12	1:40	7.68
2:00	4.757	2:00	5.31	2:00	7.12	2:00	7.68
2:20	5.946	2:20	6.64	2:20	8.90	2:20	9.60
2:40	5.946	2:40	6.64	2:40	8.90	2:40	9.60
3:00	5.946	3:00	6.64	3:00	8.90	3:00	9.60
3:20	7.135	3:20	7.96	3:20	10.68	3:20	11.52
3:40	7.135	3:40	7.96	3:40	10.68	3:40	11.52
4:00	7.135	4:00	7.96	4:00	10.68	4:00	11.52
4:20	8.919	4:20	9.95	4:20	13.35	4:20	14.40
4:40	8.919	4:40	9.95	4:40	13.35	4:40	14.40
5:00	8.919	5:00	9.95	5:00	13.35	5:00	14.40
5:20	11.892	5:20	13.27	5:20	17.80	5:20	19.19
5:40	11.892	5:40	13.27	5:40	17.80	5:40	19.19
6:00	11.892	6:00	13.27	6:00	17.80	6:00	19.19
6:20	16.649	6:20	18.58	6:20	24.91	6:20	26.87
6:40	16.649	6:40	18.58	6:40	24.91	6:40	26.87
7:00	16.649	7:00	18.58	7:00	24.91	7:00	26.87
7:20	20.811	7:20	23.23	7:20	31.14	7:20	33.59
7:40	20.811	7:40	23.23	7:40	31.14	7:40	33.59
8:00	20.811	8:00	23.23	8:00	31.14	8:00	33.59
8:20	16.054	8:20	17.92	8:20	24.02	8:20	25.91
8:40	16.054	8:40	17.92	8:40	24.02	8:40	25.91
9:00	16.054	9:00	17.92	9:00	24.02	9:00	25.91
9:20	13.081	9:20	14.60	9:20	19.58	9:20	21.11
9:40	13.081	9:40	14.60	9:40	19.58	9:40	21.11
10:00	13.081	10:00	14.60	10:00	19.58	10:00	21.11
10:20	11.892	10:20	13.27	10:20	17.80	10:20	19.19
10:40	11.892	10:40	13.27	10:40	17.80	10:40	19.19
11:00	11.892	11:00	13.27	11:00	17.80	11:00	19.19
11:20	10.108	11:20	11.28	11:20	15.13	11:20	16.31
11:40	10.108	11:40	11.28	11:40	15.13	11:40	16.31
12:00	10.108	12:00	11.28	12:00	15.13	12:00	16.31
12:20	7.730	12:20	8.63	12:20	11.57	12:20	12.48
12:40	7.730	12:40	8.63	12:40	11.57	12:40	12.48
13:00	7.730	13:00	8.63	13:00	11.57	13:00	12.48
13:20	8.919	13:20	9.95	13:20	13.35	13:20	14.40
13:40	8.919	13:40	9.95	13:40	13.35	13:40	14.40
14:00	8.919	14:00	9.95	14:00	13.35	14:00	14.40
14:20	5.946	14:20	6.64	14:20	8.90	14:20	9.60
14:40	5.946	14:40	6.64	14:40	8.90	14:40	9.60
15:00	5.946	15:00	6.64	15:00	8.90	15:00	9.60
15:20	7.730	15:20	8.63	15:20	11.57	15:20	12.48
15:40	7.730	15:40	8.63	15:40	11.57	15:40	12.48

Table A.2: 5-year, 10-year, 100-year and 200-year Rain-on-Snow with 24-hour duration and SCS Type-1A Distribution

Time (hh:mm)	5-yr Rainfall (mm/hr)	Time (hh:mm)	10-yr Rainfall (mm/hr)	Time (hh:mm)	100-yr Rainfall (mm/hr)	Time (hh:mm)	200-yr Rainfall (mm/hr)
16:00	7.730	16:00	8.63	16:00	11.57	16:00	12.48
16:20	5.946	16:20	6.64	16:20	8.90	16:20	9.60
16:40	5.946	16:40	6.64	16:40	8.90	16:40	9.60
17:00	5.946	17:00	6.64	17:00	8.90	17:00	9.60
17:20	4.757	17:20	5.31	17:20	7.12	17:20	7.68
17:40	4.757	17:40	5.31	17:40	7.12	17:40	7.68
18:00	4.757	18:00	5.31	18:00	7.12	18:00	7.68
18:20	4.162	18:20	4.65	18:20	6.23	18:20	6.72
18:40	4.162	18:40	4.65	18:40	6.23	18:40	6.72
19:00	4.162	19:00	4.65	19:00	6.23	19:00	6.72
19:20	4.757	19:20	5.31	19:20	7.12	19:20	7.68
19:40	4.757	19:40	5.31	19:40	7.12	19:40	7.68
20:00	4.757	20:00	5.31	20:00	7.12	20:00	7.68
20:20	4.162	20:20	4.65	20:20	6.23	20:20	6.72
20:40	4.162	20:40	4.65	20:40	6.23	20:40	6.72
21:00	4.162	21:00	4.65	21:00	6.23	21:00	6.72
21:20	4.162	21:20	4.65	21:20	6.23	21:20	6.72
21:40	4.162	21:40	4.65	21:40	6.23	21:40	6.72
22:00	4.162	22:00	4.65	22:00	6.23	22:00	6.72
22:20	4.757	22:20	5.31	22:20	7.12	22:20	7.68
22:40	4.757	22:40	5.31	22:40	7.12	22:40	7.68
23:00	4.757	23:00	5.31	23:00	7.12	23:00	7.68
23:20	4.162	23:20	4.65	23:20	6.23	23:20	6.72
23:40	4.162	23:40	4.65	23:40	6.23	23:40	6.72
24:00	4.162	24:00	4.65	24:00	6.23	24:00	6.72

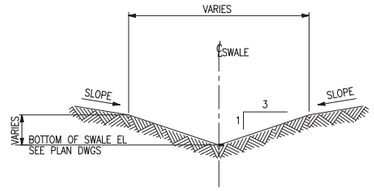
Table A.3: 10-year, 100-year and 200-year Rainfalls with 1-hour duration and AES Distribution

Time (hh:mm)	10-yr Rainfall (mm/hr)	Time (hh:mm)	100-yr Rainfall (mm/hr)	Time (hh:mm)	200-yr Rainfall (mm/hr)
0:05	7.92	0:05	17.46	0:05	18.42
0:10	9.50	0:10	20.95	0:10	22.10
0:15	14.26	0:15	31.43	0:15	33.16
0:20	14.26	0:20	31.43	0:20	33.16
0:25	15.84	0:25	34.92	0:25	36.84
0:30	17.42	0:30	38.41	0:30	40.52
0:35	22.18	0:35	48.89	0:35	51.58
0:40	17.42	0:40	38.41	0:40	40.52
0:45	12.67	0:45	27.94	0:45	29.47
0:50	11.09	0:50	24.44	0:50	25.79
0:55	9.50	0:55	20.95	0:55	22.10
1:00	6.34	1:00	13.97	1:00	14.74

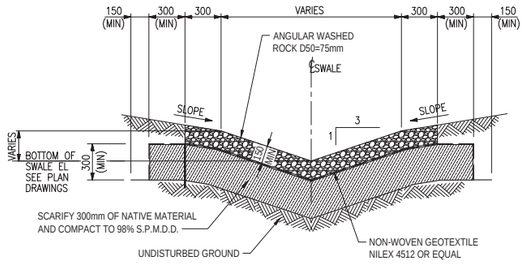
Table A.4: 10-year, 100-year and 200-year Rainfalls with 2-hour duration and AES Distribution

Time (hh:mm)	10-yr Rainfall (mm/hr)	Time (hh:mm)	100-yr Rainfall (mm/hr)	Time (hh:mm)	200-yr Rainfall (mm/hr)
0:00	0.00	0:00	0.00	0:00	0.00
0:05	5.21	0:05	10.11	0:05	10.80
0:10	5.21	0:10	10.11	0:10	10.80
0:15	7.81	0:15	15.16	0:15	16.21
0:20	7.81	0:20	15.16	0:20	16.21
0:25	10.42	0:25	20.22	0:25	21.61
0:30	10.42	0:30	20.22	0:30	21.61
0:35	10.42	0:35	20.22	0:35	21.61
0:40	10.42	0:40	20.22	0:40	21.61
0:45	13.02	0:45	25.27	0:45	27.01
0:50	13.02	0:50	25.27	0:50	27.01
0:55	15.63	0:55	30.32	0:55	32.41
1:00	15.63	1:00	30.32	1:00	32.41
1:05	18.23	1:05	35.38	1:05	37.82
1:10	18.23	1:10	35.38	1:10	37.82
1:15	15.63	1:15	30.32	1:15	32.41
1:20	15.63	1:20	30.32	1:20	32.41
1:25	10.42	1:25	20.22	1:25	21.61
1:30	10.42	1:30	20.22	1:30	21.61
1:35	7.81	1:35	15.16	1:35	16.21
1:40	7.81	1:40	15.16	1:40	16.21
1:45	7.81	1:45	15.16	1:45	16.21
1:50	7.81	1:50	15.16	1:50	16.21
1:55	5.21	1:55	10.11	1:55	10.80
2:00	5.21	2:00	10.11	2:00	10.80

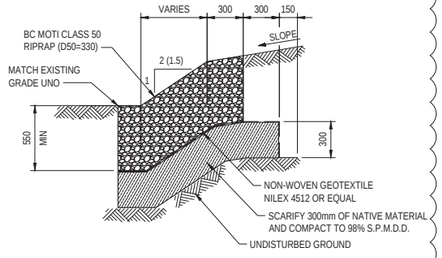
4.1-3: DRAWINGS



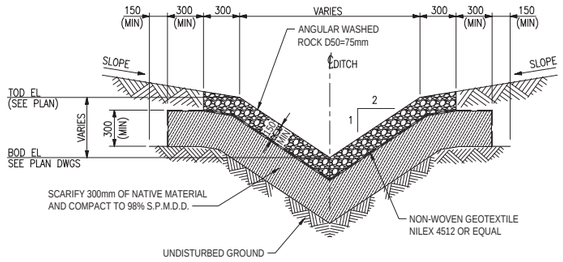
TYPICAL SWALE



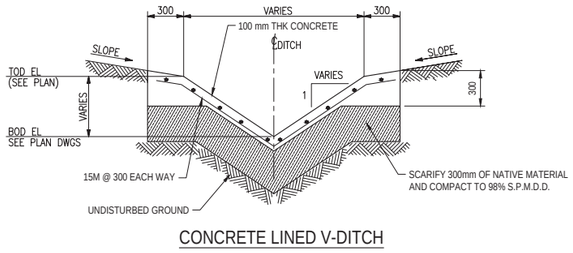
TYPICAL RIPRAP LINED SWALE



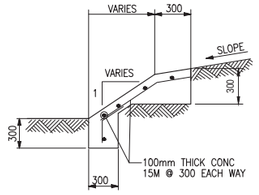
RIPRAP LINED SLOPE



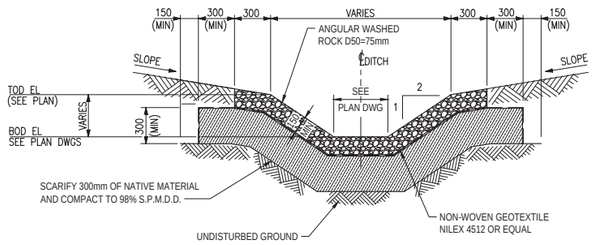
RIPRAP LINED V-DITCH



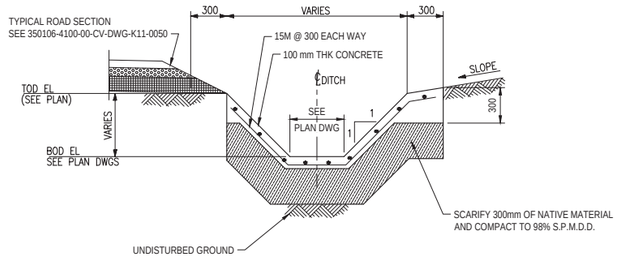
CONCRETE LINED V-DITCH



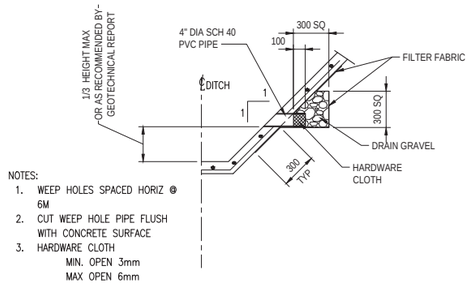
CONCRETE LINED SLOPE



RIPRAP LINED TRAPEZOIDAL DITCH

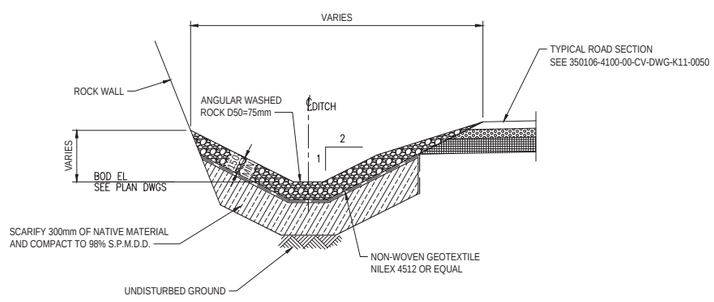


CONCRETE LINED TRAPEZOIDAL DITCH

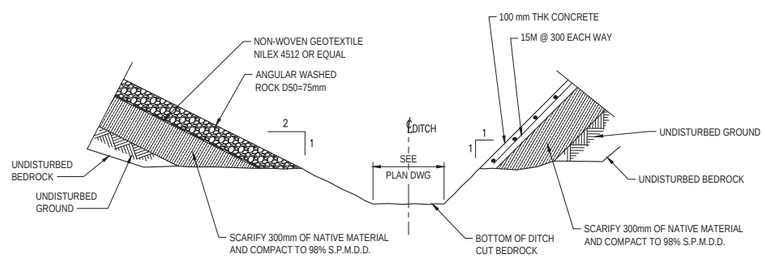


NOTES:
1. WEEP HOLES SPACED HORIZ @ 6M
2. CUT WEEP HOLE PIPE FLUSH WITH CONCRETE SURFACE
3. HARDWARE CLOTH
   MIN. OPEN 3mm
   MAX OPEN 6mm

WEEP HOLE FOR CONCRETE LINED DITCH & SLOPE



RIPRAP LINED DITCH @ ROAD



RIPRAP AND CONCRETE @ BEDROCK CUT DITCH

NOTES

1. FOR GENERAL NOTES SEE DWG 350106-000-CV-01-000001.
2. FOR CONCRETE GENERAL NOTES, SEE DWG NO. 350106-000-CV-01-000002.0001 & 000002.0002.
3. FOR CONTROL OR EXPANSION JOINT DETAILS, SEE DRAWING NO.350106-000-CV-01-000014. TYPE A FILL NOT REQ'D.
4. SEE SPECIFICATION 350106-000-CV-SP-00002 "FOR SITE PREPARATION, EXCAVATION & BACKFILL" FOR ADDITIONAL INFORMATION

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — # 44986 — 9 December 2024

SEAL / STAMP

PERMIT TO PRACTICE
CB&I LLC
Signature : _____
Date:
PERMIT NUMBER: P 1002575
The Association of Professional Engineers and Geoscientist of British Columbia

NO.	REVISION	DRWN	CK'D	APPD	DATE
4	ISSUED FOR CONSTRUCTION	TDS	RZ	RP	09 DEC 2024
3	ISSUED FOR CONSTRUCTION	TDS	PS	RZ	05 JAN 2024
2	ISSUED FOR CONSTRUCTION	TDS	PS	RZ	28 JUL 2023
1	ISSUED FOR CONSTRUCTION	TDS	RP	LL	9 DEC 2021
0	ISSUED FOR CONSTRUCTION	NR	HLP	LL	10 MAR 2020

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Drawn By	Drwn Date	Chkd By	Chkd Date	Aprvd By	Aprvd Date	Scale
NR	28 OCT 2019	DL	28 OCT 2019	LL	28 OCT 2019	NTS

Woodfibre LNG

Woodfibre LNG Project

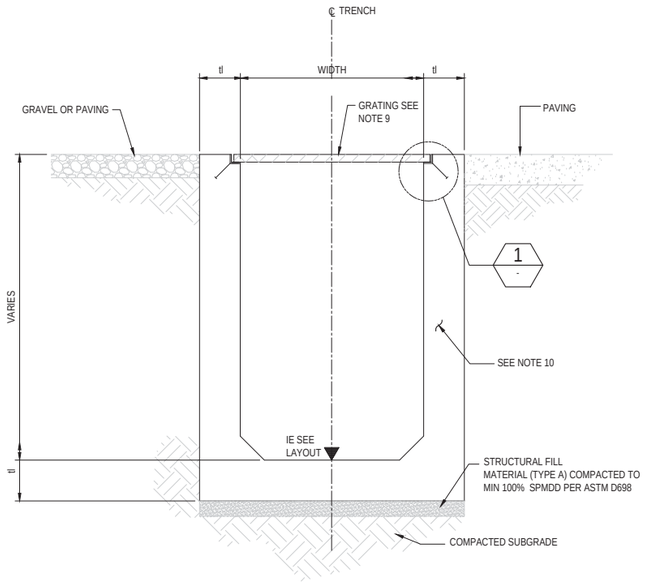
CLIENT DWG NO:

CIVIL STANDARDS TYPICAL DRAINAGE DETAILS

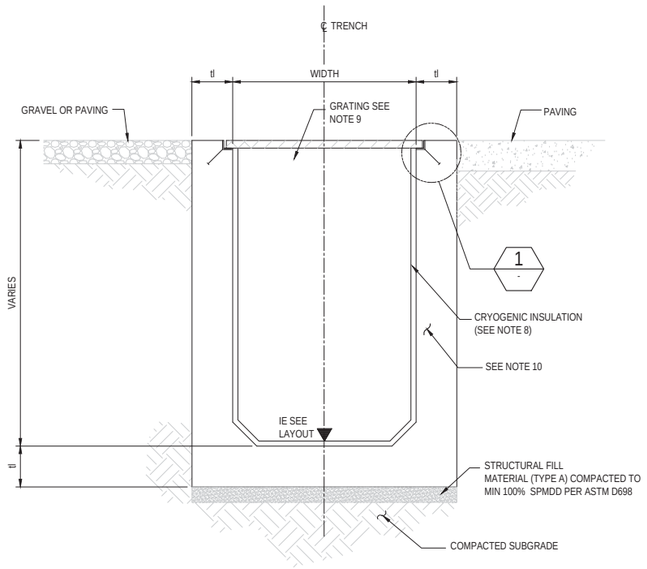
FOR: Woodfibre LNG Limited

PROJ. NO:	DWG NO:	REV:
350106	350106-000-CV-01-000010	4

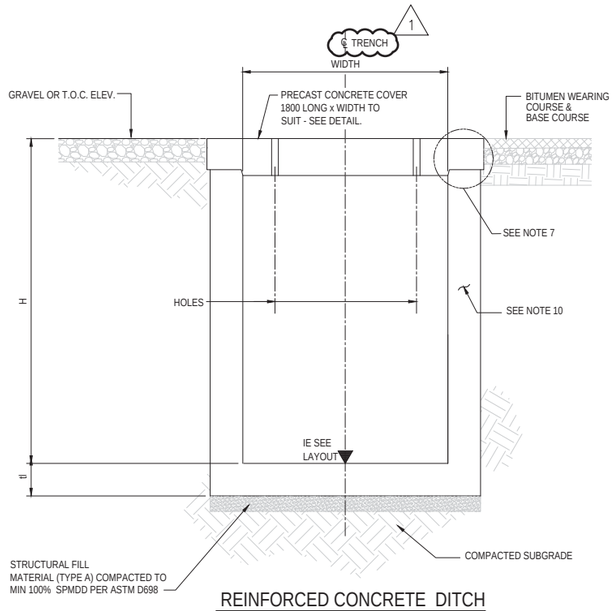
THIS DOCUMENT SUPERSEDES 239348-000-CV-01-000010



REINFORCED CONCRETE
STORM WATER TRENCH

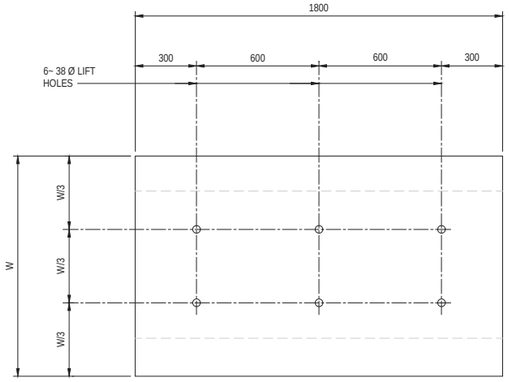


REINFOCRED CONCRETE
LNG TRENCH



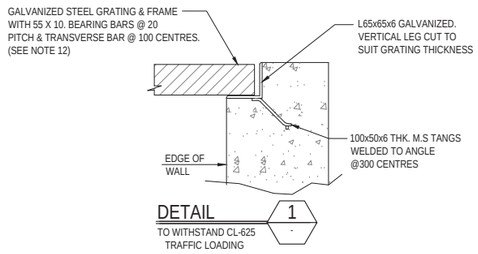
REINFORCED CONCRETE DITCH
OPEN STORM WATER CHANNEL
W/ ACCESS ROAD CROSSING

NOTE: L=LINER



PLAN
PRECAST REINFORCED CONCRETE COVER

(SEE NOTE 11 FOR DESIGN LOAD)



DETAIL 1

TO WITHSTAND CL-625 TRAFFIC LOADING

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. FOR CIVIL GENERAL NOTES & REFERENCE DWGS. SEE DWG. 350106-000-CV-01-000001.
3. FOR CONCRETE GENERAL NOTES SEE DWG. 350106-000-CV-01-000002.0001 & 000002.0002.
4. PRECAST REINFORCED CONCRETE SHALL MEET ASTM C-1433.
5. CONCRETE SHALL BE 40 MPa, 28 DAY STRENGTH.
6. REINFORCING STEEL TO CONFORM TO CSA G30.18.
7. PRECAST TRENCHES / CHANNELS TO BE LAP JOINT TYPE.
8. REFER TO SPECIFICATION FOR LOW DENSITY PERLITE INSULATION CONCRETE 350106-000-CV-SP-00007. THICKNESS TO BE DETERMINED BY VENDOR.
9. GRATING SHALL BE FLUSH WITH PAVING.
10. TRENCH REBAR ARRANGEMENT AND CONCRETE WALL THICKNESS BY VENDOR.
11. CONCRETE COVER SHALL BE DESIGNED TO CL-625 TRAFFIC LOADS.
12. GRATING SIZE TO BE CONFIRMED BY VENDOR BASED ON TRENCH SIZE.
13. FOR PRECAST CONCRETE TRENCH DESIGN AND MANUFACTURING, REFER TO SPECIFICATION FOR PRECAST CONCRETE LNG/STORM WATER TRENCH/DUCT BANKS 350106-000-CV-SP-00028.0001.

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CB&I LLC
Signature : _____
Date: _____
PERMIT NUMBER: P 1002575
The Association of Professional Engineers and Geoscientist of British Columbia

NO.	REVISION	DRWN	CK'D	APPD	DATE
1	ISSUED FOR CONSTRUCTION	TDS	PS	RZ	28 JUL 2023
0	ISSUED FOR CONSTRUCTION	EVT	HLP	LL	18 FEB 2020

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Drawn By	Drwn Date	Chkd By	Chkd Date	Aprvd By	Aprvd Date	Scale
EVT	21 NOV 2019	HLP	21 NOV 2019	LL	21 NOV 2019	NTS

Woodfibre LNG

Woodfibre LNG Project

CLIENT DWG NO:

CIVIL STANDARDS
TYPICAL TRENCHES AND COVERS
DETAILS

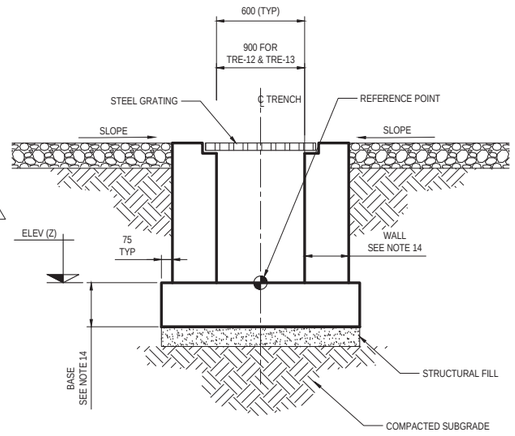
FOR: Woodfibre LNG Limited

PROJ. NO:	DWG NO:	REV:
350106	350106-000-CV-01-000011	1

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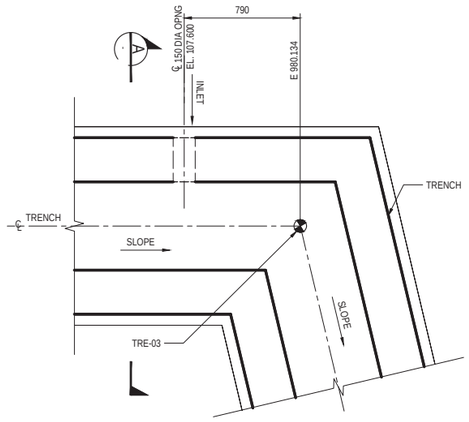
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TRENCHES LOCATION EAST SIDE			
REFERENCE POINT	COORDINATE (M)		
	EAST (X)	NORTH (Y)	ELEV (Z) M
TRE-01	972.400	1263.019	107.700
TRE-02	972.400	1194.550	107.500
TRE-03	980.134	1194.550	107.480
TRE-04	983.942	1178.500	107.420
TRE-05	1123.500	1178.500	107.100
TRE-06	1128.700	1183.700	107.080
TRE-07	1128.700	1184.980	107.070
TRE-08	1128.700	1187.580	106.930
TRE-09	1128.700	1270.400	107.180
TRE-10	1123.875	1275.225	107.200
TRE-11	1074.000	1275.225	107.350
TRE-12	1063.274	1290.900	107.945
TRE-13	1063.274	1274.500	108.025
TRE-14	1142.375	1186.280	106.538
TRE-15	1142.375	1177.171	106.532
TRE-16	1143.396	1176.150	106.506
TRE-17	1211.500	1176.150	106.302
TRE-18	1211.500	1174.321	106.301
TRE-19	1275.430	1174.321	106.108
TRE-20	1142.375	1214.125	106.650



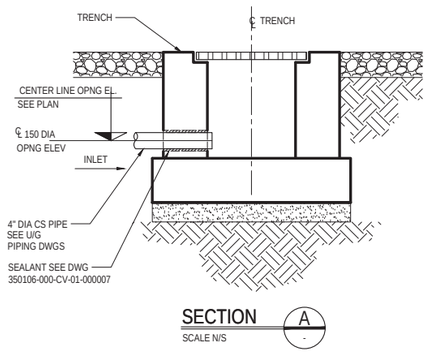
TYPICAL SECTION OF PRECAST TRENCH

SCALE N/S



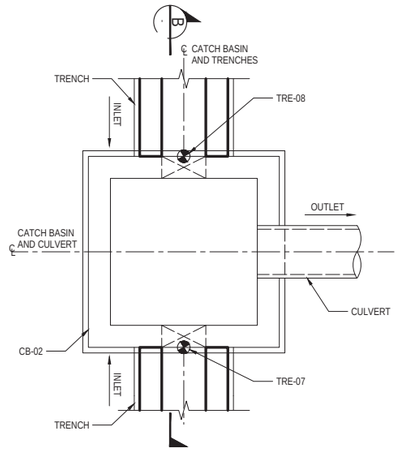
TRE-03

PLAN VIEW CV-C26-0190
SCALE N/S



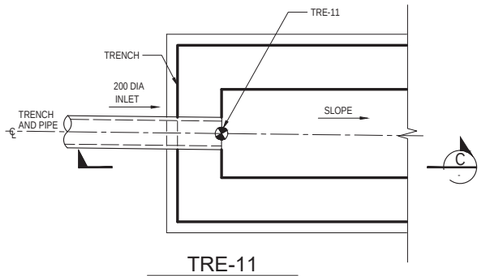
SECTION A

SCALE N/S



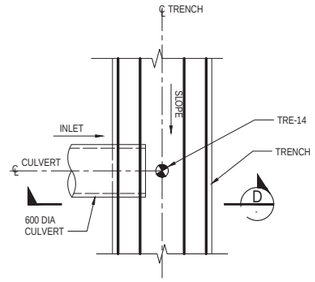
TRE-07 AND TRE-08

PLAN VIEW CV-C26-0190
SCALE N/S



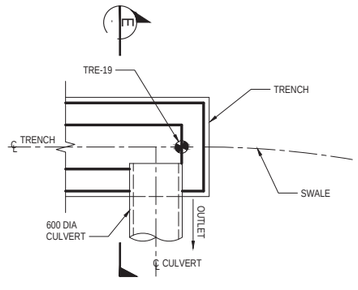
TRE-11

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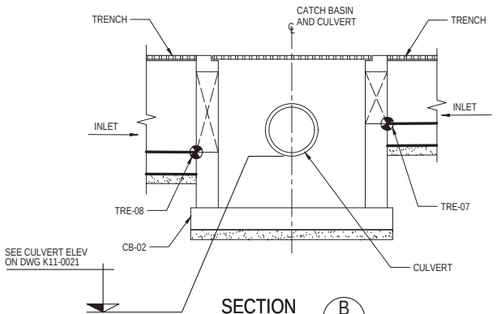
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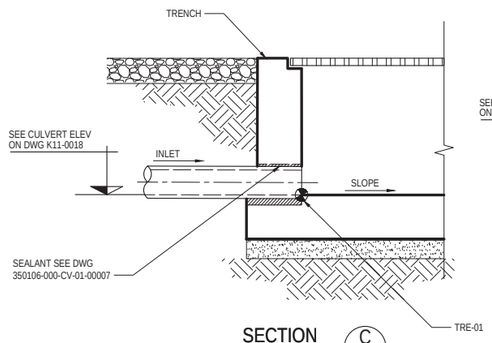
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TRE-19
TOP OF END WALL &
INLET SWALE ELEV +108.070



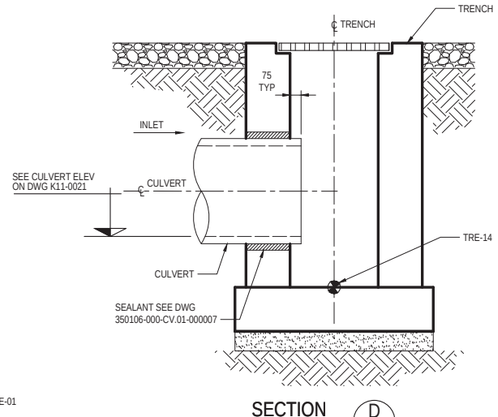
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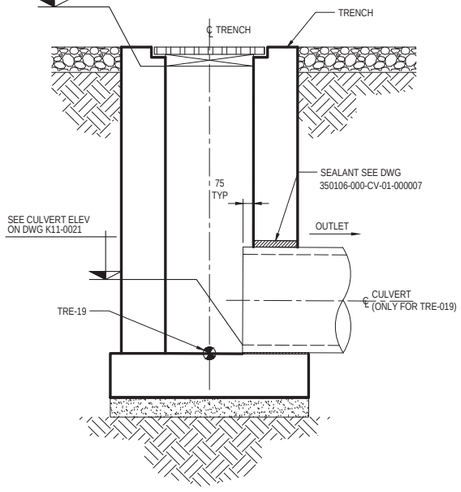
SECTION C

SCALE N/S



SECTION D

SCALE N/S



SECTION E

SCALE N/S

NOTE:
PRECAST FABRICATOR TO PROVIDE
CONNECTION DETAILS BETWEEN
TRENCHES AND CATCH BASIN AS REQD

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. WORK THIS DWG WITH DWG 350106-1104-CV-DWG-C26-0190.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA R. Zhang # 44986

5 February 2025
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3	ISSUED FOR CONSTRUCTION	PRA	IC	RP	05 FEB 2025
2	ISSUED FOR CONSTRUCTION	JMG	IC	RP	27 NOV 2024
1	ISSUED FOR CONSTRUCTION	JMG	IC	RP	16 FEB 2024
0	ISSUED FOR CONSTRUCTION	JMG	IC	RP	09 JAN 2024

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JMG	23 AUG 2023	IC	23 AUG 2023	RP	23 AUG 2023	NTS

Woodfibre LNG

Woodfibre LNG Project

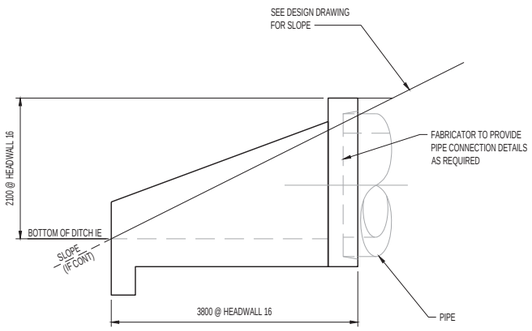
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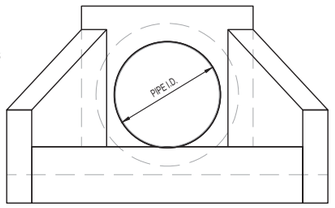
FOR:
Woodfibre LNG Limited

PROJ. NO:	DWG NO:	REV:
350106	350106-1104-00-CV-DWG-C26-0191	3

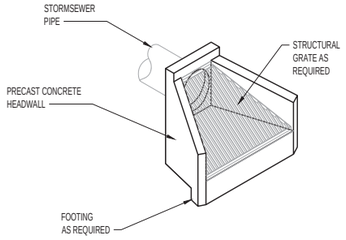
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SIDE VIEW



FRONT VIEW



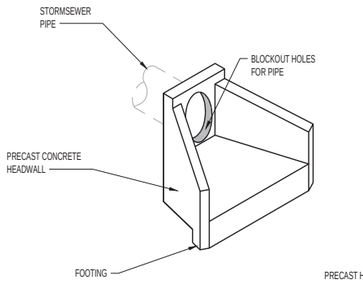
PRECAST HEADWALL WITH DRAINAGE EXIT STRUCTURE
HWDS

HEADWALL SCHEDULE

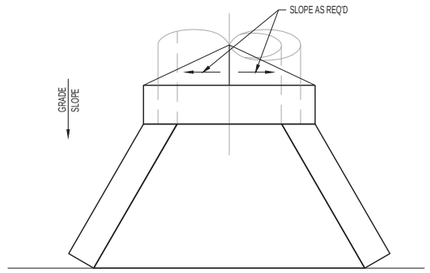
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3	450	HW	2H:1V	K11-0027
4	450	HW	2H:1V	K11-0027
5	450	HW	2H:1V	K11-0027
6	450	HW	2H:1V	K11-0027
7	900	HW	2H:1V	K11-0029
8	900	SWDS	2H:1V	K11-0029
9	900	HW	2H:1V	K11-0029
10	900	SWDS	2H:1V	K11-0029
11	900	HW	2H:1V	K11-0024
12	900	SWDS	2H:1V	K11-0024
13	600	SW	1.5H:1V	K11-0024
14	600	SW	1.5H:1V	K11-0021 / K22-0007
15	900	SWDS	2H:1V	K11-0026
16	900	HWDS	2H:1V	K11-0024
17	900	HW	1.5H:1V	K11-0057
18	900	HWDS	1.5H:1V	K11-0057
19	600	SW	1.5H:1V	K11-0019
20	600	SW	1.5H:1V	K11-0019
21	600	SW	1.5H:1V	K11-0027
22	1000	SWDS	2H:1V	K22-0005

4

NOTE:
HEADWALL 16 OUTFALL SET BY PERMIT EXTEND.
HEADWALL AS NOTED OR CAST IN PLACE AS REQUIRED.
REWORK RIPRAP AS REQUIRED.



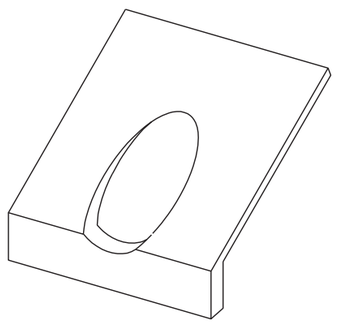
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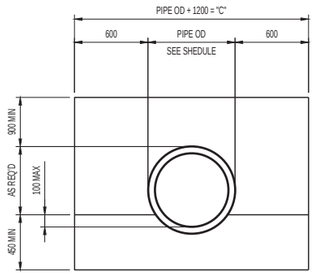
PRECAST HEADWALL DIMENSIONS BY FABRICATOR

TOP VIEW

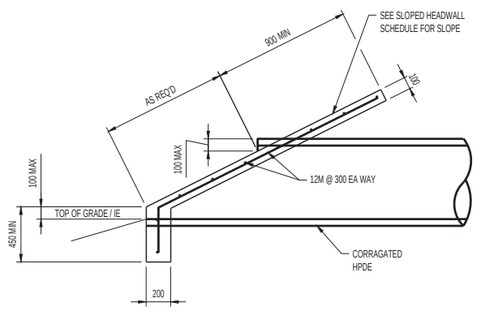
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HW



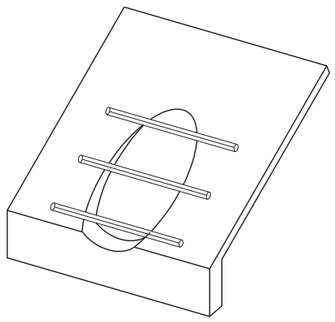
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SW



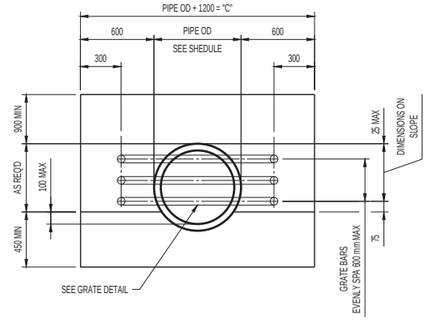
CONCRETE SLOPE HEADWALL
FRONT VIEW



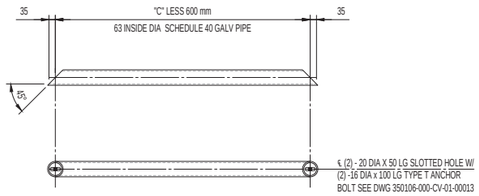
CONCRETE SLOPE HEADWALL
SIDE VIEW



CAST IN PLACE SLOPING HEADWALL W/ GRATES
SWDS



CONCRETE SLOPE HEADWALL W/ GRATES
FRONT VIEW



GRATE DETAIL

NOTES

1. FOR GENERAL NOTES SEE DWG 350106-000-CV-01-000001.
2. FOR CONCRETE GENERAL NOTES, SEE DWG NO. 350106-000-CV-01-000002.0001 & 000002.0002.

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — R. ZHANG — # 44086

6 March 2026

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4	ISSUED FOR CONSTRUCTION	TDS	RZ	RP	06 MAR 2026
3	ISSUED FOR CONSTRUCTION	JMG	PS	RZ	16 DEC 2024
2	ISSUED FOR CONSTRUCTION	JMG	PS	RZ	05 JAN 2023
1	ISSUED FOR CONSTRUCTION	JMG	PS	RZ	20 NOV 2023
0	ISSUED FOR CONSTRUCTION	TDS	PS	RZ	20 SEPT 2023

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Drawn By	Drwn Date	Chkd By	Chkd Date	Aprvd By	Aprvd Date	Scale
TDS	28 JUN 2023	PS	28 JUN 2023	LL	28 JUN 2023	NTS

Woodfibre LNG

Woodfibre LNG Project

CLIENT DWG NO: 4

CIVIL STANDARDS
HEADWALL
DETAILS

FOR:
Woodfibre LNG Limited

PROJ. NO:	DWG NO:	REV:
350106	350106-000-CV-01-000022	4

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Appendix 4.2: Oily Water Treatment System

APPENDIX 4.2-1: BEST ACHIEVABLE TECHNOLOGY ASSESSMENT (BATA)

McDermott (MDR)

Woodfibre LNG (WLNG)

Document Title: **Operations Phase Best Achievable Technology Assessment (BATA)**

Document No: **350106-000-PR-RP-00021**

MDR Project Number: **350106**

iDocs Folder Number: **19.20**

Revision Descriptions	Rev	Date	Originator	Checker	Approver
Internal Review	A	14-Mar-2025	JH / JW	CAS	CAS
Issued for Information	0	30-Oct-2025	JH	CAS/HG	CAS
Issued for Information	1	4-Dec-2025	JW	CAS/HG	CAS
Issued for Information	2	15-Dec-2025	JW	CAS/HG	CAS
Issued for Information	3	28-Sep-2026	JW	CAS/HG	CAS

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Document Title:	Document No.	Rev:
Operations Phase Best Achievable Technology Assessment (BATA)	350106-000-PR-RP-00021	3

Revision Notes and Holds History

Revision	Description of Changes and Notes
A	Initial Issue
0	Comments incorporated to most sections
1	Addition of Section 3.1.2
2	Clarification to Section 3.1
3	Minor clarifications to Section 3.1

Holds	Description of Holds	Rev Date

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ABBREVIATIONS:

BATA	Best Achievable Technology Assessment
BMP	Best Management Practice
CCME	Canadian Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Act
CEPA	Canadian Environmental Protection Act
COC(s)	Contaminant(s) of Concern
CWQG	Canadian Water Quality Guideline
DFO	Fisheries and Oceans Canada
EAC	Environmental Assessment Certificate
EAO	Environmental Assessment Office
ECCC	Environment and Climate Change Canada
EMA	Environmental Management Act
ENV	Ministry of Environment and Climate Change Strategy
EPC	Engineering, Procurement and Construction
EPH	Extractable Petroleum Hydrocarbons
GAC	Granular Activated Carbon
km	Kilometer
LNG	Liquefied Natural Gas
m^3	Cubic Meter
masl	Meters Above Sea Level
MAL	Marine Aquatic Life
MDMER	Metal and Diamond Mining Effluent Regulations
MDO	Minimum Discharge Objective
mg/L	Milligram per Liter
PCOC(s)	Potential Contaminant(s) of Concern
ppmv	Parts per Million by Volume
QA/QC	Quality Assurance / Quality Control
SNEAA	Squamish Nation Environmental Assessment Agreement
TIC	Total Installed Cost
TSS	Total Suspended Solids
USD	United States Dollars
WDA	Waste Discharge Authorization
WQG	Water Quality Guideline
WLNG	Woodfibre LNG Limited
WSER	Wastewater Systems Effluent Regulations
WWTP	Wastewater Treatment Plant

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1.0 INTRODUCTION

Woodfibre LNG Limited (WLNG) is in the process of planning and designing the Woodfibre LNG Project (the "Project"), a liquefied natural gas (LNG) export facility on the west side of Nexwnnewu7ts atll'a7tsem (Howe Sound) at the former Woodfibre Pulp Mill property in Skwxwu7mesh (Squamish), British Columbia (the "Site"). The Project is on the historical location of a Skwxwú7mesh Úxwumixw (Squamish Nation) village known as Swĺyat. CB&I LLC, a subsidiary of McDermott International, Ltd. (McDermott) is the Project's Engineering, Procurement and Construction (EPC) contractor. The Project will require a Waste Discharge Authorization (WDA) pursuant to Section 14 of the BC *Environmental Management Act* (EMA) to discharge effluent into Howe Sound.

Stormwater runoff will require Oil-Water Separation for discharge to Howe Sound or capture for offsite disposal. The contaminated waste runoff is a result of local precipitation washing plant concrete pads and surfaces. Typically, it includes accidental spillage of lube oils from rotating equipment which are placed in contained area. The selected lube oil is heavy hydrocarbon-containing, with no volatile components.

This assessment evaluates various readily available treatment technologies deemed capable of removing Contaminants of Concern (COCs) prior to discharge offsite or to Howe Sound. The facility produces no oily water from the process units which would contain dissolved hydrocarbon and stormwater runoff is expected to contain very little hydrocarbon, hence, dissolved hydrocarbon treatment is not required.

The purpose of the Best Achievable Technology Assessment (BATA) is to review readily available technologies to address potentially contaminated water that is generated through precipitation and washdown. The chosen technologies have been shown to be effective in similar applications. This BATA will select the best treatment approach considering feasibility, reliability, control and cost, to meet the requirements to discharge into Howe Sound.

The BC Ministry of Environment and Climate Change Strategy (ENV) provides guidance on completing a BATA in their document titled "Best Achievable Technology Assessment to Inform Waste Discharge Standards Handout" (ENV, October 2021), which outlines the following steps:

Step 1: Identification of information to be gathered for the BATA

Step 2: Identify all potential technologies or options

Step 3: Screening for feasible options

Step 4: Describe and compare the reliability of each option

Step 5: Describe and compare the control effectiveness of each option

Step 6: Describe and compare the cost effectiveness of each option

Step 7: Select the Best Achievable Technology

This BATA has been completed following the guidance provided by BC ENV (2021).

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2.0 BACKGROUND

2.1 Project Description

The Site is being redeveloped into an LNG export facility at the former Woodfibre Pulp Mill location, seven kilometers (7 km) southwest of Squamish, on the foreshore of Howe Sound. The Site consists of five legal lots (measuring approximately 94 hectares) and three water lots. It is situated at the base of the Mill Creek, Woodfibre Creek, and East Creek watersheds, which drain into Howe Sound (see Figure 1).

The Project underwent an environmental assessment process between 2013 and 2015, receiving an environmental assessment certificate (EAC) under EMA (BCEAA; EAC #E15-02) in 2015, an environmental assessment approval from Skwxwú7mesh Úxwumixw (Squamish Nation) through the Squamish Nation Environmental Assessment Agreement (SNEAA) in 2015, and a positive federal Decision Statement under the Canadian Environmental Assessment Act, 2012 (CEAA 2012) in 2016. The provincial, Squamish Nation and federal environmental assessment processes have all yielded conditions of approval.

Two EAC amendments have been granted by the BC Environmental Assessment Office (EAO) in 2017 (Amendment #1) and 2019 (Amendment #2), and the federal Decision Statement was reissued in 2018 in response to changes to the Designated Project. In October 2020, Woodfibre LNG received an extension of the EAC under Section 31 of BCEAA, extending the date by which the Project must be substantially started to October 26, 2025. The Project's Construction-phase WDA was granted in February 2024.

The facility is planned to liquefy up to 2.1 million tonnes per year of natural gas and have an LNG storage capacity of 250,000 cubic meters (m^3).

2.2 Meteorology and Climate

The Site is located within portions of three watersheds, Woodfibre Creek, Mill Creek and East Creek. The majority of the Site is within the Mill Creek watershed within the southern subzone of the Coast Mountains hydrologic zone (Zone 27 and boundary of Zone 26), which is characterized by steep sloped mountains. The highest peak in the Mill Creek watershed is Mount Sedgewick at 2,078 meters above sea level (masl). The climate of the lower elevations of Howe Sound is characterized as mild, generally warm, and temperate.

The prevailing westerly storm track across the North Pacific, combined with orographic lift from the Coast Mountains, produces high annual precipitation amounts throughout the region. There is substantial rainfall throughout the year in Squamish. The average annual precipitation between 1981 to 2010 was 2,230 millimeters (mm), with the greatest amount of precipitation on average occurring in November (391 mm), and the least amount of precipitation on average occurring in July (59.3 mm) (ECCC 2025).

See the following table for details on precipitation estimates for lower elevations of Mill Creek, Woodfibre Creek, and East Creek from Squamish STP Central Climate Station (ID 1047671).

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Table 1: Precipitation Estimates for Lower Elevations of Mill Creek, Woodfibre Creek, and East Creek

Month	Precipitation (mm)		
	Rainfall	Snowfall (SWE)	Total Precipitation
Jan	300.2	25.9	326.1
Feb	179.7	13.1	192.8
Mar	198.4	8.1	206.5
Apr	152.5	0.1	152.6
May	115.7	0	115.7
Jun	82.6	0	82.6
Jul	59.3	0	59.3
Aug	66.2	0	66.2
Sep	82.6	0	82.6
Oct	255.5	0	255.5
Nov	382.2	9.2	391.3
Dec	268.4	30.6	299.0
Annual	2,143	87	2,230

NOTE: These estimates are most applicable to the lower elevations of the study area.

SOURCE: ECCC's 1981-2000 Climate Normals
[Table Source: Document WLNG-S0003-EV-EDG-0003]

2.3 Oceanography

The Site is located immediately adjacent to Howe Sound, which is a coastal fjord located in the Strait of Georgia between West Vancouver and the Sunshine Coast. Howe Sound extends 42 km from the mouth of the Squamish River to its connection to the Strait of Georgia. The area supports steep rocky walls that descend to a maximum water depth of approximately 280 meters (m). At an approximate depth of 70 m, there is a sill near Anvil Island, about 11 km southwest of the Site. This sill restricts the mixing of deeper water, although tidal exchange occurs above. As such, water columns experience infrequent flow renewals with exchanges occurring approximately once every three to four years. Tides in the area are defined as mixed semi-diurnal with a mean range of 3.2 m and mode range of 5 m (Golder 2014).

In general, the combination of freshwater inputs and shallow sill dictate the trends observed in temperature, salinity, and dissolved oxygen in the water columns of Howe Sound. Temperatures near the surface vary seasonally with highs during the summer months and lows during the winter months; however, temperatures in the deeper water remain consistently cold year-round. Thermoclines are most pronounced in the spring and summer months and disappear in the fall and winter when mixing occurs. A second thermocline can occur during spring freshet when Howe Sound receives extensive freshwater input from the Squamish River which has an annual mean discharge of 300 m^3/second (s), as well as from many other watercourses in the area. Peaks of freshwater inputs occur in the summer due to ice and snow melt runoff and in the fall due to higher precipitation levels (Golder, 2014). Salinity varies widely (4.5 parts per thousand (‰) to 28.3‰) in the surface waters of Howe Sound and corresponds to the timing of freshwater inputs. As such, salinity near the surface is lowest during spring freshet and increases when freshwater runoff is reduced. Dissolved oxygen varies with freshwater inputs in surface waters, whereas deep water dissolved oxygen ranges from 0 to 4.5 milligram (mg) / liter (L) with water becoming hypoxic between mixing events.

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2.4 Baseline Marine Water Quality

Baseline water quality studies in Howe Sound were completed in 2013 and 2014 (Golder, 2014), which identified exceedances of the BC WQG for protection of marine life for total metals, including boron, cadmium, copper, and zinc. Additional baseline studies were completed by Keystone in 2020 and 2021, which identified exceedances of the BC WQG and/or CCME WQG for pH; nitrate; total metals, including cadmium, chromium, copper, lead, mercury, and zinc; and benzo(a)pyrene (Lorax, 2022).

Baseline marine water quality monitoring conducted by Keystone in 2022 showed conditions generally consistent with previous years (2020 and 2021). Most parameters met BC and Federal WQGs for marine life, though exceedances were observed for pH, dissolved oxygen, and boron, which are commonly influenced by natural stratification and oceanic conditions in Howe Sound. Occasional exceedances were also noted for metals (cadmium, copper, lead, nickel, selenium) and hydrocarbons (benzo[a]pyrene, chrysene, naphthalene), often linked to detection limits exceeding guideline thresholds. Overall, water quality remained stable and comparable across stations (Lorax, 2023).

2.5 Stormwater Management System

The stormwater management system will collect contaminated water from process equipment and pads and remove the COCs through: a) off-site disposal in an approved facility, or b) the selected BAT treatment system, prior to discharge to Howe Sound.

The stormwater collection system consists of curbed areas to collect contaminated water from equipment and piping drains, in addition to potentially-contaminated surface runoff and open hub collection headers, that will drain to a series of sumps. The water will be conveyed from the sumps to a storage tank upstream of the selected BAT treatment system to provide storage capacity that will allow for stable operation of the treatment system.

Stormwater originating from the mountain north of the site is intercepted by perimeter diversion ditches. These ditches route the water around the LNG facility, minimizing contact with operational areas and reducing the volume of contact water. The diverted stormwater is discharged directly to outfalls into Howe Sound.

Within the facility, non-contaminated contact water, including clear rainwater from parking areas, building roofs, and paved surfaces, will be collected through a dedicated drainage system. This water will be conveyed through stormceptors, which are equipped with oil/grit separators designed to remove trace amounts of oil and suspended solids. The water will then be discharged to Howe Sound via designated outfalls.

2.6 Existing Discharge Permits for the Site

The following existing discharge permits have been issued under the EMA for the Site:

1. Discharge Permit E1239 – Authorizes the discharge of treated leachate from the former pulp mill refuse Site. The permit was issued on July 31, 1975 and has been amended four times. The most recent amendment was issued on July 17, 2019.
2. Discharge Permit PE-2334 – Authorizes the discharge of effluent water from the sewage treatment plant within the former pulp mill. The permit was issued on July 24, 1975 and was amended twice. The most recent amendment was on February 26, 2015.
3. Discharge Permit PR-07332 – Authorized landfill discharge of refuse material. The permit was issued on March 30, 2005.
4. Effluent Permit PE-111578 – Construction Phase Waste Discharge Authorization (WDA). The permit was issued February 9th, 2024.

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3.0 BEST ACHIEVABLE TECHNOLOGY ASSESSMENT

The BC Ministry of Environment and Climate Change Strategy (ENV) provides guidance on completing a BATA in their document titled "Best Achievable Technology Assessment to Inform Waste Discharge Standards Handout" (ENV, October 2021), which outlines the following steps:

Step 1: Identification of information to be gathered for the BATA (Section 3.1);

Step 2: Identify all potential technologies or options (Section 3.2);

Step 3: Screening for feasible options (Section 3.3);

Step 4: Describe and compare the reliability of each option (Section 3.4);

Step 5: Describe and compare the control effectiveness of each option (Section 3.5);

Step 6: Describe and compare the cost effectiveness of each option (Section 3.6); and

Step 7: Select the Best Achievable Technology (Section 3.7).

3.1 Step 1: Identification of Information to be Gathered for the BATA

The purpose of Step 1 is to identify the relevant information necessary to complete the BATA. This includes identifying Potential Contaminants of Concern (PCOCs), Contaminants of Concern (COCs), Minimum Discharge Objectives (MDOs), and sources of contamination.

3.1.1. Professional Qualifications of Best Achievable Technology Assessors

This BATA was prepared and reviewed by the following individuals:

Main Author: Mr. John Herring

Mr. Herring received a B.Eng. in Mechanical Engineering from the Vanderbilt University. Mr. Herring received his M.Sc. in Environmental Engineering from the University of Houston. He has over 40 years of experience in water and wastewater design and environmental support in markets such as Municipal, LNG, Power, Petrochemical, Refining and Offshore. While he was with KBR in Houston (15+ years), Mr. Herring was the Company's water and wastewater Subject Matter Expert (SME), supporting process definition, design, and execution for foreign and domestic projects.

Main Reviewer: Mr. Clint Strittmatter

Mr. Strittmatter received a B.Sc. in Chemical Engineering with a minor in Environmental Engineering from the Pennsylvania State University with distinction. He has over 24 years of experience with increasing levels of responsibility in process plant design across various industries, such as, LNG, Gas Processing, and Refining including wastewater treatment design and permitting support associated with those facilities. Mr. Strittmatter is also recognized as a speaker at prominent industry conferences such as LNG2023 and GasTech.

Secondary Reviewer: Dr. Hemraj Gaidhani

Dr. Gaidhani is a seasoned engineering and LNG professional with over two decades of experience in sectors including oil & gas, energy infrastructure, and project development. He has held leadership and technical roles across multiple major companies—from serving as a Senior Principal Process Engineer with offshore responsibilities to taking on roles such as Head of Engineering & Operations, and more recently as Process and Safety Lead for LNG at Woodfibre

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LNG, where he also functions as Risk Manager. He holds a PhD in Chemical Engineering from Heriot-Watt University, UK and is a Chartered Engineer, underscoring both his academic excellence and professional credibility. Dr. Gaidhani is also recognized as a speaker at prominent industry conferences, such as the EPC Show 2026, where he shares insights on enhancing the capacity of production facilities through small capital projects—highlighting his deep expertise in project execution from concept to delivery.

3.1.2. Identify Potential Contaminants of Concern (PCOCs)

The table below outlines typical Potential Contaminants of Concern (PCOCs) associated with LNG facilities and indicates their relevance to the Woodfibre LNG Facility. Site-specific applicability was determined based on the planned use of chemical products during the Operations phase, as outlined in the List of Catalysts and Chemicals (Appendix A).

Table 2: Potential Contaminants of Concern (PCOCs)

PCOC	Potential Impact on Marine Environment	Regulatory Concern	WLNG Applicable Yes or No
Extractable Petroleum Hydrocarbons (EPH), including Diesel and Heating Medium (Dowtherm Q)	Toxic to fish	MARPOL Annex I, Canadian Oil Pollution Prevention Regulations	Yes.
Polycyclic Aromatic Hydrocarbons (PAHs)	Persistent, carcinogenic, highly toxic to fish and benthic life	CEPA toxic substance list	Yes.
Heavy Metals (e.g., mercury, lead, cadmium, arsenic, zinc)	Bioaccumulation, toxic to aquatic life and humans	Fisheries Act, CEPA	Yes. Metals may be bound to TSS in stormwater
Phenols	Toxic to fish and affect reproduction	Controlled under CEPA and wastewater effluent regulations	No. None expected on-site.
Surfactants and Detergents	Can reduce oxygen transfer, toxic to aquatic organisms	May be regulated under site-specific permits	Yes.
BTEX (Benzene, Toluene, Ethylbenzene, Xylene)	Toxic and volatile, impact fish sensory systems and spawning	CEPA Schedule 1 substances	Yes.
Aliphatic Amine	Deleterious substance for fish	CEPA toxic substance list	Yes.
Un-ionized Ammonia	Deleterious substance as defined in Fisheries Act	Fisheries Act Section 36	No. Not planned for use on-site.
Sulfides	Reduce oxygen availability, toxic in high concentrations	Regulated as part of effluent quality	No. Not planned for use on-site.
Total Suspended Solids (TSS)	Smother benthic habitats, carry adsorbed pollutants	Covered under MMER and effluent limits in *Fisheries Act*	Yes
Chlorides / Salinity Changes	Alters habitat, affects osmoregulation in marine species	Relevant in brine/oily discharge situations	No. Not planned for use on-site.

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PCOC	Potential Impact on Marine Environment	Regulatory Concern	WLNG Applicable Yes or No
Glycol (ethylene glycol)	Reduce oxygen availability	Section 53 of the CEPA	Yes.
pH	May be deleterious to fish.	Fisheries Act, WSER	Yes, low pH is a natural background condition.
BOD/COD	Reduce oxygen availability	Regulated as part of effluent quality	No
Volatile Petroleum Hydrocarbons (VPHs)	Toxic to fish and aquatic invertebrates	Fisheries Act, CEPA	Yes
Chlorine	Toxic to fish and aquatic organisms	Fisheries Act, WSER	Yes, a chlorinator is used on site.
Canadian Regulations to Note:			
1. Fisheries Act (Section 36) – Prohibits deposit of deleterious substances in water frequented by fish.			
2. MARPOL Annex I (via Canada Shipping Act, 2001) – Limits on oily water discharge from ships (15 ppm max).			
3. Wastewater Systems Effluent Regulations (WSER) – Relevant for onshore facilities with discharges.			
4. Metal and Diamond Mining Effluent Regulations (MDMER) – If applicable.			
5. Canadian Environmental Protection Act (CEPA) – Controls on toxic substances like PAHs, BTEX, phenols.			
6. B.C. Regulation 177/2023			

3.1.3. Identify Contaminants of Concern (COCs)

The applicable PCOCs were then analyzed for mitigation methods to determine the Contaminants of Concern (COCs) that will be carried forward in this assessment.

Mitigation for PCOCs

1. BTEX Mitigation
   It is anticipated that the natural gas feed to the facility will contain a small amount of BTEX. That BTEX will be present in the condensate product which is a closed system. The facility areas where condensate will be present will be fully curbed. Spills will be contained and cleaned as needed. Stormwater collected from these areas will be inspected for visible sheen prior to pumping to on-site treatment. If a visible sheen is found, the contaminated water will be collected by hydrovac truck and shipped offsite for treatment.
2. Amine Mitigation
   Amine used in the acid gas removal unit is contained in a closed system with dedicated curb and amine sump for accidental spills. The water collected in the dedicated amine sump will be tested prior to pumping the water to the stormwater management system. If the collected water is found to be contaminated with amine, it will be collected by hydrovac truck and shipped offsite for treatment.
3. Glycol Mitigation
   Glycol (ethylene glycol) is used as a cooling medium and is contained in a closed system with curb and sump for accidental spills. The water collected in the sump will be tested prior to pumping the water to the stormwater management system. If collected the water is found to be contaminated with glycol, it will be collected by hydrovac truck and shipped offsite for treatment.

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4. Surfactants and Detergents
   Expected surfactants and detergents will be biodegradable and concentrations in effluent water are expected to be extremely low. Soapy water from sinks/showers will be processed in the sanitary sewer system.

   Vehicle wash water will be in a bunded area that will be routed to the BAT treatment system for removal of oil and suspended solids. Quick-break (i.e. self de-emulsifying) detergents shall be used for cleaning upstream of the BAT treatment system.
5. Heavy Metals Mitigation
   Heavy metals are not generated by Project operations; rather, they are associated with TSS in stormwater runoff. As metals are particulate-bound and TSS is carried forward as a COC for treatment, no additional metals-specific treatment is required.
6. Polycyclic Aromatic Hydrocarbons Mitigation
   Similar to metals, PAHs may be associated with TSS in stormwater runoff. With TSS carried forward as a COC, PAH-specific treatment is not required. Diesel used on site (e.g., for vehicles and generators) contains PAHs and will be managed separately, with any potentially contaminated water transported off-site for appropriate disposal.
7. Volatile Petroleum Hydrocarbons
   Volatile petroleum hydrocarbons are present within the LNG facility. These PCOCs will be managed through secondary containment and dispersed via evaporation or off-site disposal.
8. Chlorine Mitigation
   Chlorine tablets are used periodically at dosages consistent with industry best practices to prevent algae growth in the Raw Water/Fire Water Storage Tank.
9. pH Mitigation
   Stormwater runoff may reflect the naturally low background pH conditions in the Project area. As Project operations do not alter the pH of discharge waters, pH is not carried forward as a COC.

Identified Contaminants of Concern (COCs)

The Contaminants of Concern (COCs) consist of the unmitigated PCOCs, which are identified as:

1. Extractable Petroleum Hydrocarbons (EPH); and
2. Total Suspended Solids (TSS).

Water management at the Site is an integral component to the Project. After the construction phase, water will be generated onsite through precipitation runoff and may encounter potentially contaminated areas. This run-off may consist of free-phase oils and solids. Contaminated water originating as surface runoff from operational process areas, such as hydrocarbon loading/unloading stations, hydrocarbon storage areas, oily equipment base plates, and lubrication skids, will be collected in curbed areas.

3.1.4. Estimated Influent Volumes and Water Quality

The influent sources for the selected BAT system consist of contaminated and potentially contaminated contact water generated within the facility. Estimated influent volumes reporting to the BAT system were derived from historical precipitation data for Squamish STP Central Climate Station (ID 1047671). As noted in Section 2.2, the highest average monthly precipitation

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occurs in November (391 mm) (ECCC, 2025). Accordingly, November's average precipitation was adopted as a conservative design basis. In addition, the potentially contaminated process area (approximately 20,000 m²) was assumed as a conservative scenario, recognizing that not all precipitation on this area will require treatment. To ensure adequate treatment capacity during peak rainfall and allow for routine maintenance without impacting performance, the target utilization of the BAT system is set at 50%. Incorporating a 10% uncertainty margin, the minimum required design flow rate for the BAT system is approximately 24 m³/h.

Contaminated runoff in the curbed areas will be directed to sumps and then either taken offsite for disposal or conveyed to a storage tank upstream of the selected BAT treatment system. Due to the residence time in the tank, the expected Extractable Petroleum Hydrocarbons (EPH) are expected to be approximately 50 ppmv (50 mg/L). The selected treatment package will be specified with an inlet of 200 ppmv (200 mg/L) EPH to provide a conservative operating envelope.

Along with entraining oil, precipitation will also scour concrete surfaces of lose particulate, although since the areas are mostly paved, the amount of solids is expected to be low. These solids will enter drains and sumps before being pumped into the pre-treatment storage tank. Due to the residence time in the tank, the expected Total Suspended Solids (TSS) is expected to be approximately 100 ppm (100 mg/L). If applicable, the selected treatment package will be specified with an inlet of 200 ppmv (200 mg/L) TSS to provide a conservative operating envelope.

The minimum discharge objectives for the COCs are addressed in the following section.

3.1.5. Minimum Discharge Objectives

In the Province of British Columbia, all discharges to the environment are subject to EMA, and therefore this BATA considers the recommended guidelines for discharge of suspended solids and oils.

Discharge specifications are available in LNG Facility regulations for Extractable Petroleum Hydrocarbons (EPH) (i.e. no free oil) in water. The typical world-wide industrial free oil in water discharge specification is 29 ppmv (29 mg/L) or 30mg/L, as referenced in Table 3. However, the conservative approach of 15 ppmv (15 mg/L) EPH was selected, based on EPH limits provided in B.C. Reg. 177/2023.

Table 3: Typical Industrial EPH in Water Discharge Specifications

Jurisdiction	Regulatory Body	Typical EPH Discharge Limit	Key Requirements / Notes
United States	EPA / NPDES	29 mg/L daily max, 42 mg/L monthly avg (for EPH in produced water)	Additional limits on TSS, pH, temperature; stricter limits near sensitive zones
Canada	Fisheries Act, CEPA, Offshore Waste Treatment Guidelines	≤30 mg/L max 30-day average for water discharged to sea, ≤15 mg/L for deck, bilge, ballast water	Applies to offshore platforms and coastal facilities; zero visible sheen
Canada	B.C. Reg. 177/2023	≤15 mg/L (extractable hydrocarbon)	Total extractable hydrocarbon in the effluent at any time does not exceed 15 mg/L

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Jurisdiction	Regulatory Body	Typical EPH Discharge Limit	Key Requirements / Notes
EU (e.g., UK, Norway)	OSPAR / BEIS / NPD	≤30 mg/L (produced water oil-in-water); North Sea: target ≤20 mg/L	Norway uses strict controls with reinjection targets
International Waters (Offshore O&G)	MARPOL Annex I (IMO)	≤15 ppm (15 mg/L) (oil content)	Applies to offshore platforms; must use OWS & OCM; no visible sheen allowed

For Total Suspended Solids (TSS), the Canadian Wastewater Systems Effluent Regulations set a limit of a monthly average TSS of less than or equal to 25 mg/L in the final discharge point.

A summary of the Minimum Discharge Objective (MDO) framework is provided below in Table 4.

Table 4: Minimum Discharge Objectives for COCs

COC	MDO	Rationale for Application
Extractable Petroleum Hydrocarbons (EPH)	≤15 mg/L	Suggested water quality guideline based on B.C. Reg. 177/2023, and most conservative discharge specification identified in Table 3 above.
Total Suspended Solids (TSS)	Monthly average of ≤25 mg/L	Suggested water quality guideline for the protection of marine aquatic life based on the *Fisheries Act* (Wastewater Systems Effluent Regulations).

3.2 Step 2: Identify All Potential Technologies or Options

The section identifies technologies or options that may be applied for the management of contaminants associated with oil-water sources. The best management practices (BMPs) for managing contaminated runoff from concrete pads and foundations areas are outlined below.

3.2.1. Hydrovac Removal and Offsite Disposal

Since contaminated water is directed to drains and collected in sumps, the water can be captured and tested. If found to be contaminated, it can be vacuumed out of the sumps and transported to the mainland and transferred to a licensed waste facility, such as GFL in Squamish, Secure Energy in Richmond, Sumas Environmental in Burnaby, or Clean Harbours in Delta, BC.

3.2.2. Filtration/Adsorption

Contaminants can also be removed through conventional filtration (solids) and adsorption (oils) by media such as activated carbon.

Treatment system components would include mechanical filtration using fine screens, cartridge filters, sand filters or bag filters; potential agglomeration (de-emulsification) of oil using a polymer additive; and adsorption using activated carbon or specialty media.

Media would periodically be replaced due to loss of adsorption capacities. Treated water would be tested, either manually or inline by using specialty oil water instruments. Water exceeding

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MDOs would be returned for subsequent retreatment.

3.2.3. Biological Treatment

Biological Treatment involves the use of microorganisms for contaminant removal. Potentially oil contaminated water is directed to a contained system which maintains a sustainable colony of microorganisms. The system uses aeration to keep the organism viable.

The microorganisms utilize the oils (hydrocarbons) as a food source, multiply, and ultimately die. The dead organisms settle and are collected and removed (hydrovac) for offsite disposal.

This settling produces an effluent low in solids and oils. Such a system most likely requires enhancements such as bioaugmentation (adding organisms) or bio stimulation (adding organism nutrients). Treated water would be tested, either manually or inline using specialty oil water instruments. Water exceeding MDOs would be returned for subsequent retreatment.

3.2.4. Oil-Water Solids Separation System

An oil-water separation system is designed to utilize gravity and buoyance to remove contaminants.

A treatment system designed to remediate co-mingled oils and solids would require a coalescing tank, which would allow free phase oil to separate and solids to settle. Separated oil would then be skimmed off the water interface, collected for disposal offsite in a licensed disposal facility. Likewise, settleable solids would be collected, vacuumed out, and properly disposed.

Treated water would be tested, either manually or inline using specialty oil water instruments. Water exceeding Canadian Water Quality Guidelines would be return for subsequent retreatment. There are several types of oil/water separators including gravity separators and coalescing separators and floatation units.

3.3 Step 3: Screening for Feasible Options

The screening of all treatment options for oil water runoff as identified in Section 3.2 is provided in the following section. Screening is based on the following criteria:

- Ability of the process to achieve MDOs;
- Technologies are proven and accepted by regulators and stakeholders;
- Deleterious by-products and/or waste are not generated because of the treatment option;
- Technologies are directly compatible with treatment requirements; and
- Consideration as to the remote location of the Site.

The purpose of this BATA is to identify effective treatment options, and screen for evaluation the most effective treatment option. All the options identified have been used successfully in removing solids and oil from a broad range of facilities. Table 5 summarizes the Management Option Feasibility Screening.

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Table 5: Management Option Feasibility Screening

Source	Management Option	Feasibility	Comments
Oily Water Runoff	Capture and Removal for Offsite Disposal	Yes	Effective treatment option, carry forward
	Filtration and/or Adsorption	Yes	Effective treatment option, carry forward
	Biological Treatment	Yes	Effective treatment option, carry forward
	Oil/Water Separators	Yes	Effective treatment option, carry forward

3.4 Step 4: Describe and Compare the Reliability of Each Option

The following section provides a comparison of the reliability of all treatment options carried forward from Section 3.3. A summary of the comparison results is provided in Section 3.7.

Four options to treat potentially contaminated runoff from facility pad and foundations were identified: the capture, testing and removal by hydrovac/water trucks with offsite disposal, an onsite filtration and/or adsorption system, biological treatment, and oil water separation.

3.4.1. Hydrovac Removal and Offsite Disposal

The capture testing and removal option would rely on third party transport from the Site and across Howe Sound to licensed treatment facilities in the Lower Mainland. This option is reliable for the capture of solids and oil and subsequent testing.

If contaminated, it requires close coordination with third parties and results in large volumes being transported for offsite disposal (i.e., boat across Howe Sound). The coordination and weather introduce operational complexity and uncertainty, making this option less reliable than the onsite water treatment options.

3.4.2. Filtration/Adsorption

The filtration/adsorption option has been used extensively for the removal of hydrocarbons from liquid streams. This option utilizes conventional cartridge filtration (or similar technology) for removal of suspended solids to acceptable limits. Filtration is followed by the stream passing through a vessel containing granulated activated carbon (GAC). The GAC adsorbs the hydrocarbons to levels suitable for discharge to Howe Sound. The cartridge filters and GAC adsorbent must be periodically switched-out to maintain effectiveness. This option is considered reliable if maintained properly. The overall operational complexity is considered low, since filter change outs and GAC replacement are considered routine tasks.

3.4.3. Biological Treatment

Biological processes for oil removal are well studied and can be very effective under the right conditions. However, biological treatment typically is not used when there is a wide variability of hydrocarbons in the supply stream (i.e., high concentration of free oil to low/zero concentration of free oil). During low levels, additional food and nutrients are required to maintain a suitable microorganism population.

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Additionally, biological treatment requires close monitoring by qualified personnel and a long detention time to achieve the required discharge parameters. The operational complexity for this option is therefore considered high.

The variability of flow and oil content combined with the high operational complexity result in a lower reliability of biological processes when compared with simpler processes for oil water separation/removal.

3.4.4. Oil-Water Solids Separation System

Physical removal by oil-water separation is commonly used to treat contaminated streams. This option uses physical forces - gravity and buoyance - to separate suspended solids and oil in the contaminated stream. The stream enters a vessel which allows the suspended solids to settle (gravity) and the oil droplets to rise (buoyancy). The contaminants, solids and free-oil, are collected for transport to an offsite disposal facility. Low-shear type feed pumps prevent oil droplets from being divided into smaller droplets sizing and forming an immiscible solution.

Properly designed oil-water separators are sufficient for removing oil and solids to meet discharge requirements. The operational complexity is low for oil-water separators that rely on physical forces. The simple design and operation combined with low maintenance requirements due to relatively few moving parts make this treatment option very reliable.

3.5 Step 5: Describe and Compare the Control-Effectiveness of Each Option

The following section provides a comparison of the control-effectiveness of all treatment options carried forward from Section 3.3. A summary of the comparison results is provided in Section 3.7. Four options to treat potentially contaminated stormwater were identified: the capture, testing and removal by hydrovac/water trucks with offsite disposal, an onsite filtration and /or adsorption plant, biological treatment and oil water separation. Energy requirements are negligible for all options and not considered a differentiator.

3.5.1. Hydrovac Removal and Offsite Disposal

There is limited space on Site to capture stormwater runoff. During high/multiple rain events, there is the possibility of overflowing the basins, resulting in oil contamination outside the collection area.

Due to numerous potential collection areas, there is also an increased possibility of testing delays, resulting in less control of the contaminants. Finally, the transportation requirement for this option is high as it involves transportation over land and water, and the carrying capacity of hydrovac and water trucks is limited. This requires a high number of trucks (if available) or trips during high rain events, minimizing control. As such, the control-effectiveness this option is considered low.

3.5.2. Filtration/Adsorption

Filtration and/or adsorption system breakthroughs can occur with the depletion of treatment media. Sediment build-up on filters can cause filter failure and/or preferential pathways that allow larger particles to pass through. Adsorption surface area being used up on granular activated carbon (GAC) beds limit their effectiveness. This can result in a treatment system allowing higher concentrations of particles or oil to pass into the effluent and potentially exceed discharge limits. Treatment systems can be installed with specific instruments to monitor and control the treatment

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systems so breakthrough potential and system performance can be actively monitored, with the combination of real-time monitoring and manual sampling checks to maintain compliance.

As such, the control-effectiveness of a filtration and adsorption water treatment system is considered high if properly monitored and maintained.

3.5.3. Biological Treatment

Biological treatment needs a consistent food source to operate reliably. Run-off frequency from pads will vary based on climate conditions and food source (oils) would be uncertain and variable.

This can be minimized with the installation of equalization basins or tanks which can concentrate food sources. However, these increase plot space and would be subject to overflow (loss of control) during high rain events. During low food periods (minimal runoff), food and nutrients need to be introduced to maintain biological treatment. This requires additional operator interaction. Unreliable flow and food source combined with the required evaluation and intervention by qualified personnel make biological treatment a complicated option.

Therefore, the control-effectiveness for the biological treatment option is considered low.

3.5.4. Oil-Water Solids Separation System

Oil-water separators are highly effective at removing free-phase hydrocarbons and settleable solids in wastewater applications. This technology is common in most industrial facilities.

These units rely on physical forces - gravity and buoyance - to remove solids and free phase oil rather than operator interaction. Treatment systems can be installed with specific instruments to monitor and control the units. Therefore, breakthrough potential and system performance can be actively monitored with the combination of real-time monitoring and compliance testing.

Since oil-water separators are permanent fixtures with low maintenance requirements, control effectiveness for this option is considered high.

3.6 Step 6: Describe and Compare the Cost-Effectiveness of Each Option

The following section provides a comparison of the estimated probable cost in USD of all treatment options carried forward from Section 3.3. The costs provided herein are conservative and do not account for efficiencies realized from combined treatment system trains that treat multiple sources. The costs shown are provided for relative comparison purposes and do not represent detailed proposal costs. A tabular summary of the results is provided in Section 3.7.

Four options to treat potential contaminated runoff from facility pad and foundations were identified: the capture, testing and removal by hydrovac/water trucks with offsite disposal, an onsite filtration and /or adsorption plant, biological treatment and oil water separation.

3.6.1. Hydrovac Removal and Offsite Disposal

Given the facility operating period will be twenty-five years, the cost-effectiveness of mitigation using third-party hydrovac with offsite disposal is low when compared to the cost of a permanent onsite treatment facility. The travel uncertainty across Howe Sound and the waste disposal fees will exceed the cost of building an onsite treatment system.

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The capital cost for third-party hydrovac is negligible since no additional infrastructure is needed for this option, but operation costs are estimated to be $USD 400,000 to $USD 800,000 per year for service and disposal. Over the course of a twenty five-year operational period, the order of magnitude of probable cost for third-party hydrovac disposal is $USD 10-20,000,000 for offsite treatment.

3.6.2. Filtration/Adsorption

The cost-effectiveness of a filtration/adsorption treatment system is considered to be moderate due to the cost of filters and GAC replacement and disposal. The total installed cost (TIC) for this option is in the range of $USD 1,000,000 - $USD 1,500,000. The order of magnitude cost for annual operation and maintenance is $USD 200,000 to $USD 300,000, with a twenty-five operational lifetime cost of $USD 6,000,000 to $USD 9,000,000.

3.6.3. Biological Treatment

The cost-effectiveness of biological treatment is moderate as there are ongoing food and nutrient additions and the frequency of these are unknown. The order of magnitude of TIC is $USD 1,000,000 to $USD 2,000,000 plus $USD 100,000 to $USD 250,000 in annual operating and maintenance costs. Included in the cost of operating is periodic removal and offsite disposal of waste sludge from the biological treatment unit. Over the course twenty-five years, the order of magnitude of operating lifetime costs are $USD 3,500,000 to $USD 8,250,000.

3.6.4. Oil-Water Solids Separation System

The cost-effectiveness of oil/water separators is high as they require low costs to install and require minimal maintenance. The order of magnitude TIC is $USD 750,000 to $USD 1,500,000, plus $USD 75,000 to $USD 150,000 in annual operating costs for periodic offsite removal and disposal of oil and waste sludge from the separation system. Over the course of twenty-five years, the order of magnitude of operating lifetime costs are $USD 2,625,000 to $USD 5,250,000.

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3.7 Step 7: Select the Best Achievable Technology

The project considered several options for the treatment of the identified COCs, based on the MDOs for TSS and EPH in the treated effluent. Table 6 summarizes the results of the previous steps of the assessment:

Table 6: Assessment Summary Table

Management Option	Hydrovac Removal and Offsite Disposal	Filtration and / or Adsorption	Biological Treatment	Oil-Water Separation
Feasibility	Feasible	Feasible	Feasible	Feasible
Reliability	Moderate to high, dependent on reliability of transportation across Howe Sound	High, dependent on ongoing monitoring of treatment system breakthrough potential	Moderate to High if sufficient food and nutrients are available.	High, simple systems with few moving parts
Operational Complexity	Moderate	Low; Requires filter monitoring and change out	High	Low
Control-Effectiveness	Low control-effectiveness	High control-effectiveness for achieving MDOs	Low control-effectiveness due to variability of incoming stream quantity and quality	High control-effectiveness for achieving MDOs
Cost-Effectiveness	Low cost-effectiveness due to high transportation and waste disposal costs	Moderate cost-effectiveness due to higher capital cost with higher operational costs	Moderate cost-effectiveness due to operation costs of ongoing monitoring and operator training/interaction	High cost-effectiveness due to low capital cost and minimal operating expenses
Order of Magnitude Total Installed Cost (TIC)	N/A	$USD 1 million to $USD 1.5 million	$USD 1 million to $USD 2 million	$USD 0.75 million to $USD 1.5 million
Order of Magnitude Lifetime Cost over 25-yr Operation	$USD 10 million to $USD 20 million	$USD 6 million to $USD 9 million	$USD 3.5 million to $USD 8.25 million	$USD 2.6 million to $USD 5.25 million

Four options to treat potential contaminated runoff from facility pad and foundations were identified and carried forward from Section 3.3: the capture, testing and removal by hydrovac/water trucks with offsite disposal; an onsite filtration and/or adsorption plant; biological treatment; and oil-water separation.

The selected treatment technology must be capable of achieving the following discharge criteria:

- Reduce Total Suspended Solids (TSS) to a monthly average of ≤25 mg/L

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- Reduce extractable petroleum hydrocarbons (EPH) to ≤15 mg/L.

Among the four evaluated options, filtration/adsorption and oil-water separation were assessed to have the highest reliability and control-effectiveness. Oil-water separation further distinguished itself by offering the most favorable operational simplicity and cost-effectiveness.

Given that all assessment criteria were weighed equally, oil-water separation is identified as the best achievable technology (BAT).

4.0 CONCLUSION

The best achievable technology with respect to reliability, operational simplicity, control-effectiveness, and cost-effectiveness was determined to be oil-water separation. These systems utilize fundamental physical principles (gravity and buoyancy) to effectively separate solids and free-phase oil with minimal operator intervention. Therefore, oil-water separators offer superior reliability and control performance, while maintaining a straightforward and cost-effective design.

The following table summarizes the selected management option as well as specifications for the minimum discharge objectives:

Table 7: Selected BAT for TSS and EPH Summary Table

Selected Management Option	Minimum Discharge Objective for Extractable Petroleum Hydrocarbons (EPH)	Minimum Discharge Objective for Total Suspended Solids (TSS)
Oil-Water Separation	≤15 ppmv (15 mg/L) EPH in treated water	Monthly average ≤25 ppmv (25 mg/L) TSS in treated water

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APPENDIX A: LIST OF CATALYSTS AND CHEMICALS

Appendix A contains the list of required catalysts and chemicals for the Woodfibre LNG Facility as shown in the following document:

- Woodfibre LNG - List of Catalysts and Chemicals (Document Number 350106-000-PR-LS-00014)

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Woodfibre LNG Project

Woodfibre LNG

McDermott (MDR)

Woodfibre LNG (WLNG)

Document Title: Woodfibre LNG - List of Catalysts and Chemicals

Document No: 350106-000-PR-LS-00014

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Issued for Internal Review	A	10-Sep-2024	DP	CAS	CAS

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Woodfibre LNG

Document Title:	Document No.	Rev:
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REVISION NOTES AND HOLDS

Revision	Description of Changes & Holds
A	Issued for Internal Review
0	Internal Comments incorporated.

HOLDS	Description of Holds	Rev
1	To be updated based on Vendor purchased information	0

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Document Title:	Document No.	Rev:
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1.0 INTRODUCTION

Woodfibre LNG Limited (WLNG) intends to develop, construct, and operate a Liquified Natural Gas (LNG) production, storage, and marine carrier LNG transfer facility on a decommissioned former pulp mill site, in British Columbia (BC), Canda. The WLNG site is located on the west side of Howe Sound, approximately 7 km southwest from Squamish, BC. The Woodfibre LNG facility is designed to have an LNG production capacity of 2.1 million tons per annum (MTPA) via processing pipeline quality gas.

The purpose of this document is to list and define the required catalysts and chemicals for the Woodfibre LNG Facility.

2.0 OVERVIEW

The Woodfibre LNG facility shall take pipeline quality gas, remove impurities and other component (mainly CO_2, trace sulphur and water), and liquefy the natural gas to produce LNG. The LNG shall be stored on FSTs and loaded onto LNG carriers for distribution to overseas natural gas markets.

All the following catalysts and chemicals are located and stored at the Woodfibre LNG Facility. The quantities and consumption of the catalysts and chemicals are based on final equipment selection, facility layout, and selected suppliers.

3.0 CATALYSTS

The table below lists the catalysts required for Woodfibre LNG Facility operation. The initial charge and consumption are based on final equipment selection, facility layout, and selected suppliers.

Service	Use	Material	Initial Charge	Consumption / Use	Chemical Storage Building Volume
Acid Gas Removal 01-FL-1203-02	aMDEA Filtration	Activated Carbon	5900 kg	6 to 12 month operating life	--
Dehydration 01-R-1303 A/B/C	Water Adsorbent	5.95m layer Adsorbent Bed Molecular Sieves	74.8 m^3/ dehydrator (Excluding Inert Balls-Alumina Balls) HOLD 1	5 yr operating life	--
Instrument Air Dryer 01-A-5604 A/B/C	Air Dryer Adsorbent	Molecular Sieve	1.93 m^3 / bed, 6 beds total	5 yr operating life	12 m^3
Mercury Removal 01-R-0201	Mercury Adsorbent	3.2 m layer Metal Oxide or approved equivalent	29 m^3 (Excluding Inert Balls-Alumina Balls) HOLD 1	5 yr operating life	--

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4.0 CHEMICALS

The table below lists the chemicals required for Woodfibre LNG Facility operation. The initial charge and consumption are based on final equipment selection, facility layout, and selected suppliers.

Service	Use	Material	Initial Charge	Consumption / Use	Chemical Storage Building Volume
Acid Gas Removal	CO_2 Removal	Solvent- aMDEA Pre-Mix Solution (89 wt% Amine-OASE Purple)	57 m^3 (Note 2)	10 liter / week	10.4 m^3
Diesel Fuel Storage 01-T-6603	Diesel Fuel for Engines	Diesel	8.62 m^3	As required	--
FW Pump Package	FW Pump Day Tank	Diesel	4.4 m^3	150 liter/week for testing- 1 hour for any of the 2 diesel driven FW pumps	--
Emergency Power-EDG 01-A-6601 A/B/C	EDG sub-base fuel tank	Diesel	6.65 m^3 / EDG	90 liter/week No Load Test- 1 hour for any of the 3 EDGs	--
Heating Medium	Heat Transfer Fluid	Dowtherm Q	100 m^3	2 m^3/ year (losses 2% approx.)	5.2 m^3
Tempered Water	Cooling Requirements for Rotating equipment	Inhibited Ethylene Glycol (40 wt%)	200 m^3	4 m^3/ year (losses 2% approx.)	5.2 m^3
Tempered Water	IA Compressor System	Inhibited Ethylene Glycol (40 wt%)	60 m^3 HOLD 1	1.2 m^3/ year (losses 2% approx.)	--
Acid Gas Removal	Anti-Foam Agent	OASE Anti-Foam A or equivalent	N/A	As required	2.1 m^3
Raw Water	Chlorination	Chlorine Tablets	100 kg	As required	200 kg
Sanitary Wastewater	Chlorination	1% Sodium Hypochlorite Solution HOLD 1	132.5 liter HOLD 1	43 liter/day HOLD 1	2.1 m^3

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Service	Use	Material	Initial Charge	Consumption / Use	Chemical Storage Building Volume
Sanitary Wastewater	De-Chlorination	1% Calcium Thiosulfate Solution HOLD 1	132.5 liter HOLD 1	43 liter/day HOLD 1	2.1 m^3
Lube Oil (Note 1)	Rotating Equipment Lubrication	Type by Supplier	Supplier to advise	As required	5.1 m^3
Grease (Note 1)	Rotating Equipment Lubrication	Type by Supplier	Supplier to advise	As required	2.1 m^3
Demineralized Water (Note 3)	Make Up	Regenerator Reflux Drum (01-V-1210)	0.5 m^3 (Fill to NLL level in 01-V-1210)	1.5 m^3/day (Makeup Water)	--
		Solvent Drain Drum (01-V-1212)	75 m^3 (for OASE dilution)	As required	--
		Demin Storage (01-T-6003)	120 m^3	As required	--
		Activated Carbon Filter (01-FL-1203-02)	11.4 m^3	As required (for loading activated carbon)	--
Ethane (Note 4)	Refrigerant	Refrigerant Grade Ethane	200 m3	As required	--
Propane (Note 4)	Refrigerant	Refrigerant Grade Propane	600 m3	As required	--
Liquid Nitrogen (Note 4)	Refrigerant	Refrigerant Grade	40 m^3	As required	--
Liquid Nitrogen	Purging	Refrigerant Grade	108 m^3	As required	
Foam Chemical for Fire Monitors	Fire Fighting	Alcohol Resistant Synthetic NFC510 or equivalent	10 portable totes stored in warehouse (1 m^3/each)	As required	--

Note 1: Refer to Woodfibre LNG Facility Lubrication List (350106-000-ME-LS-00002).

Note 2: Initial Charge volume based on OASE delivered 89 wt%. The initial charge will be diluted to 40% OASE to provide approximately 120 m^3 system volume.

Note 3: Demin Water volume assumes purchase of pre-mixed 40% glycol solution with no need for additional demin water.

Note 4: Value shown is initial refrigerant fill. Recommended to have 50% additional for startup reserve.

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APPENDIX 4.2-2: UNIT 64 EFFLUENT AND WASTEWATER SYSTEM - PROCESS DESIGN BASIS

McDermott (MDR)

Woodfibre LNG (WLNG)

Document Title: **UNIT 64 EFFLUENT AND WASTEWATER SYSTEM-PROCESS DESIGN BASIS**

Document No: **350106- 0000-64-EV-GEN-PDB-0001**

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UNIT 64 EFFLUENT AND WASTEWATER SYSTEM- PROCESS DESIGN BASIS	350106-0000-64-EV-GEN-PDB-0001	0

Revision Notes and Holds History

Revision	Description of Changes and Notes
D	• Added additional oily water collection sumps and pumps for Diesel Fuel Storage, Air Compressor Package, Loading Arm hydraulic system, Rail Car Loading system, Solvent Drain Drum and Heating Medium Drain Drum. • Revised Amine Sump Pump discharge from stormwater system to Oily Water Treatment Package. • Drain collection for Anti-foam Injection Package deleted. • Added sump pumps for FST 1 LNG Impoundment sump and FST 2 LNG Impoundment sump。 • Added LNG Impoundment Sumps and Pumps for FST 1 and FST 2 manifold area • Revised Jetty area LNG impoundment sump pumps to electrical type and revised from local discharge to Howe Sound to East Mill Creek Stormwater Sedimentation Pond 01-SU-6418.
E	• Incorporated Client Comments • Document updated to provide reference to Stormwater Drainage Philosophy, 350106-000-CS-PH-00001 Rev. 2 • Rail Car Condensate Loading area deleted. Stabilized Condensate Storage Tank Area sump & pump added in Oily water system. • Refrigerant Storage Area sump pump, Diesel Fuel Area sump & pump, Instrument Air compressor sump & sump pump deleted. • Details of Sanitary Wastewater Treatment Package, Oily Water treatment package updated. • Potentially contaminated Stormwater system details added.
0	• Updated per latest configuration for LNG Platform Sump, Condensate Barge Loading Sump, First Flush Sump • Section 3.0 Note 1 updated for AODD spare pumps details.

Holds	Description of Holds	Rev Date

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is as follows:

- Record the basis of design for the Unit 64 Effluent and Wastewater System based on Basis of Design, Document Number 350106-0000-00-EM-GEN-PDB-0001. Unit 64 consists of the stormwater system, oily water treatment, and sanitary sewer treatment. Section 1.2 provides additional details on the scope of this document.
- State process specifications used in development of Utility Flow Diagrams (UFD's), Piping & Instrument Diagrams (P&ID's) and equipment datasheets.

1.2 SCOPE

This Effluent and Wastewater System Process Design basis will cover the waste streams generated in the WLNG facility as specified below:

- Oily Water System
- Secondary Containment Drains
- Sanitary Wastewater from buildings
- Potential LNG and Refrigerant Spills
- Stormwater

1.2.1 OILY WATER SYSTEM

The oily water system will collect, convey and treat oily water equipment and piping drains. The design basis for the various components of the oily water system is provided in the following sections.

Oily Water Collection System

The oily water collection system consists of curbed areas to collect oily water equipment and piping drains and potentially lube oil contaminated surface runoff, and open hub collection headers to drain to the Oily Water Sump.

The collection systems are provided per the module layout as specified below.

- Module 01 North Oily Water collection
- Module 01/09 South Oily Water collection
- Module 02 South Oily Water collection
- Module 04/13 Oily Water collection
- Stabilized Condensate Storage Tank and Barge Loading Area Oily Water collection
- LNG loading platform Oily Water collection
- Solvent Drain Drum Oily Water collection
- Heating medium Drain Drum Oily Water collection

Oily Water Sump and Pump

The Oily Water Sumps receive drains from the oily water collection systems. The Sumps will be covered and vented to a safe location and constructed in-ground of reinforced concrete.

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The most sumps will be provided with self-priming air driven/motor driven pump for transfer of the sump contents to the Oily Water Treatment Package 01-A-6417 via Oily Water Storage Tank 01-T-6469. Pump will have manual start & manual/auto stop control as regulated by the liquid level in the sump and can be initiated/stopped by Operator from the control room. Stand by pump with common capacity will be provided as a warehouse spare. Ability shall be provided to hook up a temporary pump or truck out connection for each pump.

Collection areas not provided with a sump pump shall be emptied out using vacuum truck such as diesel fuel storage area curbing. Oily water from LNG loading platform sump shall transfer via temporary pump to a local container for appropriate treatment.

The oily water sumps and pumps are specified as below:

- Oily Water Sump for Module 01North (01-SU-6435)
- Oily Water Sump Pump for Module 01North (01-P-6436), Pneumatic pump.
- Oily Water Sump for Module 01/09 South (01-SU-6443)
- Oily Water Sump Pump for Module 01/09 South (01-P-6444), Pneumatic pump.
- Oily Water Sump for Module 02 South (01-SU-6437)
- Oily Water Sump Pump for Module 02 South (01-P-6438), Pneumatic pump.
- Oily Water Sump for Module 04/13 (01-SU-6415)
- Oily Water Sump Pump for Module 04/13 (01-P-6416), Pneumatic pump.
- Oily Water Sump for Stabilized Condensate Storage Tank Area (01-SU-6468)
- Oily Water Sump Pump for Stabilized Condensate Storage Tank Area (01-P-6483), Motor Driven Pump.
- Oily Water Sump for Stabilization Condensate Barge Loading Area (01-SU-6472)
- Sump for Solvent Drain Drum (01-SU-6447)
- Sump Pump for Solvent Drain Drum (01-P-6448), Pneumatic Pump.
- Sump for Heating Medium Drain Drum (01-SU-6467)
- Sump Pump for Heating Medium Drain Drum (01-P-6468), Pneumatic Pump.

Oily Water Storage Tank and Pump

The purpose of the Oily Water Storage Tank, 01-T-6469, is to hold the incoming flow allowing downstream Oily Water Treatment Package, 01-A-6417, to operate in a stable condition. Oily Water Storage Tank is provided with heating coils to maintain temperature and skimming facility to skim-off oil, if any, from the tank. Skimmed oil sent offsite to appropriate waste management. Oily water from Oily Water Storage Tank 01-T-6469 is pumped via Oily Water Storage Tank Pump 01-P-6417-21A/B to downstream treatment package.

Oily Water Treatment Package 01-A-6417

The Oily Water Treatment Package 01-A-6417 is provided for the removal of free oil, and settleable and suspended solids from the Oily Water Sumps contents. The package is to be vendor standard design, consisting of an Oil-Water Separator which will be of the enhanced gravity separation type

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complete with coalesce pack as well as associated instrumentation and controls designed to remove oil droplets.

The Oily Water Treatment Package 01-A-6417 will be installed above ground with the treated water pumped to the outfall Howe Sound. The Oil-Water Separator will be provided with an integral compartment to store the separated oil and an oil transfer pump. The separated oil collected within the Treatment Package will be removed periodically by the oil transfer pump into suitable containers or vacuum trucks for off-site waste management. Sludge accumulated in the Treatment Package will also be periodically transferred into suitable containers or vacuum trucks for off-site waste management. The treated water discharge from the Oily Water Treatment Package 01-A-6417 shall meet discharge specifications of $\leq$ 15 ppmv free oil (no visible sheen) and a monthly average of $<$ 25 mg/l Total Suspended Solids (TSS). To provide operating margin for potential upsets, the package was specified to provide 10 ppmv of free oil. If the treated water does not meet discharge specifications, water will be recycled back to the Oily Water Storage Tank (01-T-6469) for additional treatment.

1.2.2 SECONDARY CONTAINMENT DRAINS

Acid Gas Recovery Unit

All amine containing equipment and piping drains shall be collected by a closed drain system that shall gravity drain to a Solvent Drain Drum 01-V-1212. Material collected in the drum shall be returned to the AGRU for reuse.

The areas under the module which comprise the Acid Gas Recovery Unit (AGRU) will be paved and curbed, with surface runoff drained to a dedicated Amine Sump 01-SU-6401. The Sump serves to collect and retain the area runoff for inspection and testing to ensure that no amine solvent is inadvertently released to the Oily Water Treatment Package 01-A-6417.

The Amine Sump 01-SU-6401 will be constructed in-ground of reinforced concrete with the inner walls provided with liner or coating compatible with the amine solvent. The Sump will be provided with a level transmitter connected to the plant DCS for indication at the Control Room.

The Amine Sump 01-SU-6401, will be provided with a pump 01-P-6425. The sump also has a truck out connection, if needed. The Sump contents will be inspected and/or tested for solvent, and if found to meet regulatory requirements, will be pumped out to the Oily Water Treatment Package 01-A-6417. In the event of an amine solvent spill or leak, the following will be applied:

- Minor Amine Spills and Leaks – Minor incidental or accidental amine solvent leaks and spills will be managed through routine inspection, cleanup and expeditious maintenance and/or repairs. Cleanup will be by means of an inert material such vermiculite, sand or earth to adsorb the spill/leak. The waste cleanup material will be transferred to a suitable container for ultimate off-site waste management.
- Major Amine Spills – In the event of major spill or leak, the contained spill or leak material as well as any wash down water will be collected in the amine containment sump and transferred to a transport vessel or other suitable container for off-site waste management.

Tempered Water Storage, Electrical Transformers

Tempered Water storage equipment, oil filled electrical transformers and related truck loading/ unloading areas will be bounded by curbing.

- The area under the Tempered Water Header Tank 01-V-5302, Tempered Water Filter 01-FL-5304 and Tempered Water Pump 01-P-5303-A/B in the Tempered Water System will be paved and curbed to contain any glycol spills or leaks.
- Electrical transformers will be located on curbed containment area sloping to a common trench to drain and collect runoff away from the equipment.

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The secondary containment areas will be provided with low point corner sumps/area and drain lines with normally closed isolation valves connecting to the stormwater drainage system.
The contents will be inspected and/or tested for potential contaminants of concern, and if found to meet regulatory requirements, it will be released to the nearest clean stormwater drainage ditch or oily water system via the manual valve. In the event of detection of potential contaminants of concern, the contents of the low point corner sumps will be removed by means of a vacuum truck for off-site waste management.

Truck Unloading Area

The truck unloading areas for Amine, Heating Medium, Diesel Fuel, and Tempered Water will be paved and sloped to a catch basin or curbed area for secondary containment. The catch basin will be provided with grated cover, and a drain line with an isolation valve to the clean stormwater system for Heating Medium/Tempered Water catch basin and to Amine Sump for Amine/ Heating Medium catch basin. The Deisel Fuel loading area will be contained in a curbed area with an isolation valve.

The valve will be open during normal operations except for the Diesel Fuel loading area since diesel may be present in a double walled storage tank. During truck unloading operations, the valve will be closed to contain any spills. Spilled liquid will be collected and removed for appropriate off-site waste management or to Oily Water Treatment Package for treatment.

1.2.3 SANITARY WASTEWATER SYSTEM

The Sanitary wastewater system consists of Sanitary Lift Station (Control and Operation Building, Warehouse Maintenance Building) 01-A-6420, and Sanitary Lift Station (Administration Building) 01-A-6434 and Sanitary Wastewater Treatment Package 01-A-6433.

Sanitary Lift Stations

Individual Sanitary Lift Stations will be provided to collect sanitary wastewater from the Control Room, Administration, and Warehouse/ Maintenance buildings located west of Mill Creek.

Sanitary wastewater will drain to Sanitary Lift Stations for transfer to a Sanitary Wastewater Treatment Package, 01-A-6433. Each Sanitary Lift Station will be supplied as a package system of vendor's standard design complete with: wet well, two 100% submersible non-clog grinder type pumps, and discharge piping and valves. The lift stations will be installed below grade to permit gravity inflow and will be equipped with an odor control vent filter. The lift stations will be operated on automatic start-stop as regulated by the liquid level in the wet well with level indication in control room.

The discharge lines from the sanitary lift stations will be routed underground, below the frost line, to the Sanitary Wastewater Treatment Package.

Sanitary Wastewater Treatment Unit (01-A-6433)

The Sanitary Wastewater Treatment Package (01-A-6433) will be of the extended aeration type of vendor standard design. The packaged unit will include influent tank aeration tank, clarifier tank, effluent tank, waste sludge holding tank, aeration air blowers, treated product pumps, waste sludge pump and any other required internal transfer pumps, as well as all associated instrumentation and controls. The treated water from the treatment package will be discharged to a submerged outfall into Howe Sound with level monitoring in control room.

1.2.4 LNG AND REFRIGERANT SPILL CONTAINMENT AND ASSOCIATED STORMWATER

The LNG and Refrigerant Spill Containment system shall be provided to collect potential LNG and refrigerant releases from the Process Area, Refrigerant Storage Area, FST loading area and LNG

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Loading Platform. These areas shall be paved and curbed and sloped through open concrete/steel trenches to local LNG impoundment sumps. Spilled LNG shall be retained in the sumps until fully vaporized.

For Process Area and Refrigerant Storage Area, the LNG impoundment sumps shall be an in-ground basin constructed of insulating perlite concrete and filled with a layer of Foamglas cubes to suppress vapor dispersion and pool fires in the event of a spill.

For LNG impoundment sump in FST loading area, the LNG impoundment sump shall be a constructed steel tank and filled with a layer of Foamglas cubes to suppress vapor dispersion and pool fires in the event of an LNG spill.

Surface runoff from the curbed and contained LNG Process Area will be sent to the Oily Water Treatment Package, 01-A-6417, for treatment. Refrigerant storage area surface run off will be collected in the Impoundment Sump and removed via vacuum truck for proper waste management.

Clean surface runoff from the FST Loading area will be discharged to Howe Sound as there is no source for hydrocarbon contamination.

For the LNG Loading Platform, the LNG will boil-off in the containment area. Due to the potential contamination from biodegradable hydraulic fluid used in the LNG Loading Arms, the first inch of potentially contaminated Stormwater that contacts the area with hydraulic fluid will be contained in a metallic sump 00-SU-6471 and removed for appropriate off-site waste management

Each LNG Impoundment Sump shall be provided with a low temperature indicator, which will alarm in the event of LNG or refrigerant spill. Soft interlock will be added to prohibit pump start if the temperature in the sump is below zero Deg C, to prevent inadvertent LNG transfer to the stormwater system.

The LNG and Refrigerant Spill Containment system consists of sumps and pumps as specified below:

- Process Area Impoundment Sump 01-SU-6403 & Process Area Impoundment Sump Water Pump 01-P-6404-A/B,
- Propane Storage Area Impoundment Sump 01-SU-6451
- FST Loading LNG Impoundment Sump East 01-SU-6406
- FST Loading LNG Impoundment Sump West 01-SU-6405
- LNG Loading Platform Sump 00-SU-6471

Detailed system design information related to hydrocarbon containment basis of the LNG and Refrigerant Spill Containment refer to Basis of Design for Impoundment Sumps (350106-000-SE-BD-00001).

1.2.5 STORMWATER SYSTEM

Refer Stormwater Drainage Philosophy, 350106-000-CS-PH-00001 for detailed system design information.

2.0 DESIGN DATA

The following general design criteria for wastewater systems shall be considered; as per Section 13 and 14 in Project Design Basis 350106-0000-00-EM-GEN-PDB-0001:

- All spill containment systems shall be sufficiently impervious to prevent spilled material from being released to the environment.

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- All below-grade water lines shall be installed below the frost line.
- All above-grade water piping with intermittent flow shall be protected from freezing in accordance with the winterization philosophy.
- All wastewater treatment facilities shall be installed in a ventilated- and temperature-controlled enclosure to maintain a minimum operating temperature of 10°C.
- Drainage calculations shall be performed based on Stormwater Drainage Philosophy, 350106-000-CS-PH-00001.
- Site drainage design shall consider the risks of flooding from Woodfibre and Mill Creeks and mitigation provided, as necessary.

2.1 OILY WATER SYSTEM

Oily Water Collection system

The equipment and piping drains, such as feed gas and fuel gas knockout drums, pumps, compressors and hydrocarbon containing equipment, are from controlled operations and low in volume. Therefore, the oily water drain lines will be sized for the peak surface runoff flow rate from the paved and curbed area.

For Oily Water Sumps sizing basis, refer Section 3.0.

Water collected in the oily water sumps shall be pumped or transferred via vacuum truck to Oily Water Treatment Package (01-A-6417) through Oily Water Storage Tank (01-T-6469) for further treatment.

Oily Water Sump and Pump

Each Oily Water Sump shall be an in ground, closed concrete sump and shall be vented to a safe location.

Each Oily Water Sump Pump is on float level control and will manually start on high-level and automatically/manually stop on low level with operator intervention possible from control room. There are two types of Oily Water Pumps provided for the sumps: Air Operated Double Diaphragm (AODD) type & Self Priming pumps (centrifugal type) driven by electric motors. AODD pumps are designed for 5m^3/hr capacity and Motor driven pumps for 30 m3/hr capacity. Each pump type is supplied with common warehouse spares.

The Oily Water pump operating and design conditions are specified below:

Capacity, m3	5 m3/hr for AODD; 30m3/hr for Self Priming pumps; Refer Section 3.0 for specific pumps
Normal supply Temperature, °C	ambient
Design Temperature, °C	-29/70
Discharge Pressure, bar (G)	1.9 bar (G) for AODD; 2.44 bar (G) for Self Priming pumps; Refer Section 3.0 for specific pumps
Design Pressure, bar (G)	5.0

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Oily Water Storage Tank and Pump

Oily Water Storage Tank (01-T-6469) shall be above ground tank and shall be atmospherically vented to a safe location. The total required working capacity of approximately 450 m3. Oily Water Storage Tank Pump (01-P-6417-21A/B) are 2x100% pumps, with one pump operating and one on standby.

The Oily Water Storage Tank Pump operating and design conditions are specified below:

Capacity, m3/h	30.0
Normal supply Temperature, °C	ambient
Design Temperature, °C	-29/70
Discharge Pressure, bar (G)	1.0
Design Pressure, bar (G)	5.0

Oily Water Treatment Package (01-A-6417)

The oily water treatment system shall be supplied as a skid mounted system, which includes an Oil-Water Separator of enhanced separation, recovered oil tank, oil and treated water transfer pumps and all on-skid piping, wiring and instrumentation and controls for unattended operation, subject to meeting regulatory discharge specifications.

All oily water treatment facilities shall maintain a minimum operating temperature of 10°C.

The oily water and potentially contaminated flow to the Oily Water Treatment Package is mainly wet weather flows. The Oily Water Treatment Package (01-A-6417) is sized for a capacity of 30 m3/h.

The Oily Water Treatment Package will be specified to meet the regulatory discharge requirement of ≤ 15 ppmv free oil (no visible sheen) and a monthly average Total Suspended Solids < 25 mg/l. The influent and effluent lines of the treatment package will be provided with connections for periodic grab sampling. The Oily Water Treatment Package is designed for a free oil and grease content of 10 ppm or less in the treated water.

The discharge piping of Oily Water Treatment Package will be provided with online analyzers. If the treated discharge is off specification, it will be recirculated back to Oily water Storage Tank (01-T-6469) for reprocessing and it will be discharged to Howe Sound only upon meeting specification.

2.2 SECONDARY CONTAINMENT DRAINS

Acid Gas Recovery Unit drains

For Amine Sump sizing basis, refer Section 3.0. The sump is designed for containment of 100-year 24-hour rain event of 257.8 mm with 10% margin. The sump required volume is about 350 m3.

The Amine Sump Pump (01-P-6425) will be sized to empty full sump stormwater volume in about 12 hours and will be manually controlled. The pump capacity is 30 m3/h with a common warehouse spare.

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Tempered Water Storage, Electrical Transformers

A secondary containment will be provided for the below areas for accidental spills and leaks. These leaks and spills will be managed through routine inspection, cleanup and expeditious maintenance and/or repairs. Cleanup will be by means of a vacuum truck and transfer to Oily Water Treatment Package (01-A-6417) or for offsite waste management;

- For the Tempered Water Header Tank (01-V-5302), Tempered Water Filter (01-FL-5304) and Tempered Water Pump (01-P-5303A/B), the drip pans will hold any tempered water spillage & spillage shall be sent to offsite for waste management via vacuum truck.
- Electrical transformers: the secondary containment will be sized to contain 110% of the contents of the largest transformer.

2.3 SANITARY WASTEWATER SYSTEM

2.3.1 SANITARY LIFT STATIONS

The operating and design conditions for sanitary lift stations are specified as follows:

Normal supply Temperature, °C	Ambient (minimum of 10°C)*
Design Temperature, °C	-18/49
Lift stations Discharge Pressure, bar (G)	3.0
Design Pressure, bar (G)	5.0

*Note: Wet well shall be equipped with a heating coil or other suitable means of maintaining the temperature in the wet well at a minimum temperature of 10 °C.

Sanitary Lift Station for Control and Operation Building & Warehouse Maintenance Building (01-A-6420)

The daily flow of sanitary effluent is calculated on the number of persons occupying the building being considered. The capacity of the Sanitary Lift Station for Control and Operation Building & Warehouse Maintenance Building is specified as below:

Name of Building	Number of People per Building	Liters per Person per Day	Total Liters per Day
Control And Operations Room Building	20	130	2600
Warehouse Maintenance Building	20	130	2600
Total	40	130	5200

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Sanitary Lift Station for Administration Building (01-A-6434)

The daily flow of sanitary effluent is calculated on the number of persons occupying the building being considered. The capacity of the Sanitary Lift Station for Administration Building is specified as below:

Name of Building	Number of People per Building	Liters per Person per Day	Total Liters per Day
Administration Building	40	130	5200
Total	40	130	5200

2.3.2 SANITARY WASTEWATER TREATMENT PACKAGE (01-A-6433)

The occupancy of the LNG facility during operations is 80 persons, with a daily potable water consumption of 130 L/person/day. Therefore, the daily sanitary wastewater generation is set at 130 L/person/day. On this basis, the total volume of sanitary wastewater generated during operations of the LNG facility will be 10.4 m^3/day. The sanitary wastewater treatment unit will be a packaged unit with capacity to treat 12.5 m^3/day of average daily wastewater flow.

The operating and design conditions for Sanitary Wastewater Treatment Package (01-A-6433) are specified as follows:

Peak flow, m3/h	5 (Note 1)
Average flow, m3/h	0.52
Normal supply Temperature, °C	Ambient (Minimum of 10 °C) Note 2
Design Temperature, °C	-29/70 above ground -18/49 underground
Package Inlet Pressure, bar (G)	1.0
Package Outlet Pressure, bar (G)	1.0
Design Pressure, bar (G)	5.0

Note:

1. Peak flow is estimated typical flow for all the lift stations in pump out operation simultaneously, to be confirmed by package supplier.
2. The feed from the lift stations is minimum 10°C. The package shall be equipped with suitable provisions to maintaining the operation ‘of the package during cold winter days when the outside temperature is -16°C.

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The flow and composition of sanitary wastewater from lift stations going to the Sanitary Wastewater Treatment Package are specified below.

Sanitary Wastewater Flow/Characteristics

Parameter	Unit	Value
Normal/Average Flow	m3/h	0.52
Design Flow (Peak Load)	m3/h	5
Normal Temperature	°C	AMB (Minimum of 10°C) Refer Note 2 above
pH	STU	7.0 – 8.5
BOD_5	mg/l	300
COD	mg/l	600
TSS	mg/l	250
TDS	mg/l	500
Free Oil & Grease	mg/l	90

Waste biological sludge generated in the Sanitary Wastewater Treatment Unit shall be periodically removed for transport and offsite waste management. The discharge flow rate from the Sanitary Wastewater Treatment Unit shall be monitored and the discharge line shall be equipped with a sample connection for periodic off-line quality monitoring.

The treated sanitary wastewater shall meet the discharge limitation provided in the following table. The treated discharge limits are a combination of those provided in the Municipal Wastewater Regulation (BC Reg. 87/2012) of the British Columbia Environmental Management Act and the Canadian national Wastewater Systems Effluent Regulations (SOR/2012-139) of the Fisheries Act; as per Section 14.6, Table 34 in Project Design Basis 350106-0000-00-EM-GEN-PDB-0001:

Parameter	Source for Limits	Criteria
Carbonaceous Biological Oxygen Demand (CBOD) (average)	(a)	≦ 25 mg/L
Total Suspended Solids (TSS) (average)	(a)	≦ 25 mg/L
Un-ionized Ammonia, as N at 15°C ± 1°C (maximum)	(a)	≦ 1.25 mg/L
Residual Chlorine (average)	(a)	≦ 0.02 mg/L
Fecal Coliforms:		
- Shellfish bearing waters	(b)	< 14/100 mL
- Recreational use waters	(b)	≦ 200/100 mL

Notes:

(a) Per national *Wastewater Systems Effluent Regulations (SOR/2012-139)*

(b) Per BC *Municipal Wastewater Regulation (BC Reg. 87/2012).*

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2.4 LNG AND REFRIGERANT SPILL CONTAINMENT

Each LNG and Refrigerant Impoundment Sump designed working volume shall be based on the process spill volume or the rainfall volume, whichever is larger, plus 10% margin.

For Impoundment Sumps sizing basis, refer Section 3.0 The sump sizing has been specified as below. The sump depth has considered 0.3 meter for accommodating foam blocks for slow vaporization of LNG in case of spill.

Equipment Number	Description	Spill volume, m3 (Note 1)	Rainwater, m3 (Note 2)	Designed working volume, m3
01-SU-6403	Process Area Impoundment Sump	187.3	326	359
01-SU-6451	Propane Storage Area Impoundment Sump	17.6	21.9	25
01-SU-6405 & 01-SU-6406	FST Loading LNG Impoundment Sump West & FST Loading LNG Impoundment Sump East	Note 3	Note 3	25 (each)

Note:
1. Basis and detailed information refer to Design Basis for Spill Control, 350106-000-SE-BD-00001
2. Basis and detailed information refer Stormwater Drainage Philosophy, 350106-000-CS-PH-00001
3. Refer Basis of Design for Impoundment Sumps, 350106-000-SE-BD-00001

The impoundment sump for Process area will be provided with motor driven pump to remove water from the sumps after a rain event. After each rain event, the sump contents will be manual inspected and tested for contaminants of concern before discharge to oily water system. Soft interlock will be added to prohibit pump start if temperature in the Sump is below zero °C, to avoid LNG from being pumped to the oily water system.

FST Loading Impoundment Sumps West (01-SU-6405) & FST Loading Impoundment Sumps East (01-SU-6406) shall drain to Howe Sound by gravity as no hydrocarbon contamination of Stormwater is possible as no hydrocarbon contaminants of concern are present. Propane Storage Area Impoundment sump (01-SU-6451) shall be emptied using vacuum truck for appropriate waste management.

The emptying of stormwater from the sumps should be done in a timely manner so that the sump capacity is reserved for any potential LNG or propane spill.

All the pump capacity has been designed with minimum rate of 25% of the 100-year hourly rainfall rate based on the requirement of 5.2.2.8 CSA-Z276.

2.5 STORMWATER SYSTEM

Refer Stormwater Drainage Philosophy, 350106-000-CS-PH-00001.

2.6 POTENTIALLY CONTAMINATED STORMWATER SYSTEM

The potentially contaminated contact water from Inside Battery Limit (ISBL - east of Mill Creek) that is not routed to oily water sumps, stormwater in excess of first flush water from oily water sumps, and stormwater from unpaved areas in the LNG facility shall be collected and conveyed to the First Flush Sump (01-SU-6469).

Potentially contaminated stormwater in the First Flush Sump (01-SU-6469) will be inspected for a visible oil sheen or manually sampled prior to discharge via Clean Stormwater Sump Pump (01-P-6485) through an outfall to Howe Sound. If found contaminated, the stormwater will be routed via First Flush OW Sump Pump (01-P-6484) to the Oily Water Storage Tank for treatment.

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2.7 FIRST FLUSH SUMP (01-SU-6469)

The stormwater management approach for the Process ISBL area is based on the first one-inch (25 mm) flush philosophy, which is widely applied in industrial and petrochemical facilities for stormwater quality control.

At the onset of a rainfall event, accumulated contaminants on paved, operational, and equipment surfaces are rapidly mobilized and washed off. As a result, the initial portion of stormwater runoff typically contains the highest concentration of pollutants. Once the initial runoff has been conveyed and removed, subsequent stormwater becomes progressively diluted and generally exhibits a lower pollution potential.

Based on this industry-recognized behavior, stormwater generated from the initial 25 mm rainfall depth is classified as potentially contaminated contact stormwater and is preferentially collected, isolated, and managed. Runoff volumes generated beyond the first-flush depth may be discharged under controlled conditions, provided no active contamination sources are present.

Diversion Structure

A first-flush weir diversion structure (diversion box) is provided to implement the first-flush philosophy for the Process ISBL area.

Stormwater runoff from the Process ISBL area is conveyed to the diversion box via the site drainage system. The diversion box incorporates an internal weir and baffle arrangement that directs the initial runoff to a sump for collection and temporary storage.

The sump is designed for the collection and temporary storage of stormwater corresponding to the initial one-inch (25 mm) rainfall depth over the entire Process ISBL area. This volume represents the first flush and is isolated from downstream discharge.

The diversion structure also includes an overflow weir with a defined crest elevation to allow controlled bypass of stormwater volumes exceeding the first-flush capacity.

Operation

Under normal rainfall conditions, stormwater entering the diversion box is initially directed to the sump and retained as first-flush runoff.

The retained stormwater is held for sampling and testing, followed by further treatment or controlled disposal, in accordance with site environmental management procedures.

When the inflow volume exceeds the first-flush design capacity, additional stormwater flows beneath the internal baffle and rises on the downstream side. Once the water level reaches the design crest elevation of the overflow weir, excess stormwater overtops the weir and is discharged through the outlet.

The outlet conveys the bypassed stormwater to the adjacent ditch, allowing safe and controlled discharge of runoff beyond the first-flush volume while preventing overloading of the sump and associated management systems.

Retention Time in Diversion Structure

For ISBL active drainage area of approximately 2000 m^2 and typical rainfall intensities of 5–10 mm/hr (2-5 year rainfall event), the post–first flush residence time in the diversion box is approximately 8–15 minutes. This represents the time required for inflow to replace the available hydraulic volume between the internal baffle and the overflow weir (~2.7 m^3). This allows for additional settling time for hydrocarbon beyond the first flush volume.

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3.0 EQUIPMENT DESIGN MARGINS

Equipment Number	Description	Controlling Case / Margins	Notes
01-SU-6415	Oily Water Sump for Module 04/13	110%	(Note3)
01-P-6416	Oily Water Sump Pump for Module 04/13	-	Pneumatic Pump. Round up to 5 m3/h to share spare with other oily water pumps (Note 1)
01-SU-6435	Oily Water Sump for Module 01 North	110%	(Note3)
01-P-6436	Oily Water Sump Pump for Module 01 North	-	Pneumatic Pump. Round up to 5 m3/h to share spare with other oily water pumps (Note 1)
01-SU-6437	Oily Water Sump for Module 02 South	110%	(Note3)
01-P-6438	Oily Water Sump Pump for Module 02 South	-	Pneumatic Pump. Round up to 5 m3/h to share spare with other oily water pumps (Note 1)
01-SU-6443	Oily Water Sump for Module 01/09 South	110%	(Note3)
01-P-6444	Oily Water Sump Pump for Module 01/09 South	-	Pneumatic Pump. Round up to 5 m3/h to share spare with other oily water pumps (Note 1)
01-SU-6447	Sump for Solvent Drain Drum	110%	Size to accommodate the Solvent Drain Drum
01-P-6448	Sump Pump for Solvent Drain Drum	-	Pneumatic Pump. Round up to 5 m3/h to share spare with other oily water pumps (Note 1)
N/A	Curbed Area for Diesel Fuel Storage	110%	Curbed area hold volume is sized to handle greater of 110% Diesel Storage volume or stormwater per Note 4
01-SU-6467	Sump for Heating Medium Drain Drum	110%	Size to accommodate the Heating Medium Drain Drum
01-P-6468	Sump Pump for Heating Medium Drain Drum	-	Pneumatic Pump. Round up to 5 m3/h to share spare with other oily water pumps (Note 1)
01-T-6469	Oily Water Storage Tank	100%	25mm rain collection from all users and Process area 10yr 24hr rain.
01-P-6417-21A/B	Oily Water Storage Tank Pump	-	30 m3/h (Vendor Package)
01-A-6417	Oily Water Treatment Package	120%	30 m3/h (Vendor Package)
01-SU-6401	Amine Sump	110%	(Note4)
01-P-6425	Amine Sump Pump	-	Motor driven pump. Round up to 30 m3/h to share spare with other water pumps (Note 2)
01-SU-6403	Process Area Impoundment Sump	110%	Larger of process spill and rainfall (Note 5)

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Equipment Number	Description	Controlling Case / Margins	Notes
01-P-6404-A/B	Process Area Impoundment Sump Water Pump	-	Motor driven pump. Round up to 30 m3/h. (Note 2)
01-SU-6405	FST Loading LNG Impoundment Sump West	110%	Process spill
01-SU-6406	FST Loading LNG Impoundment Sump East	110%	Process spill
01-SU-6468	Oily Water Sump for Stabilized Condensate Storage Tank Area	110%	(Note 3)
01-P-6483	Oily Water Sump Pump for Stabilized Condensate Storage Tank Area	-	Motor driven pump. Round up to 30 m3/h (Note 2)
01-SU-6451	Propane Storage Area Impoundment Sump	110%	Process spill
01-SU-6469	First Flush Sump	110%	Size to accommodate Potentially Contaminated Stormwater 1” rain.
01-P-6484	First Flush OW Sump Pump	-	Motor driven pump. Round up to 30 m3/h to share spare with other water pumps (Note 2)
01-P-6485	Clean Stormwater Sump Pump	-	Motor driven pump. Round up to 30 m3/h to share spare with other water pumps (Note 2)
01-A-6420	Sanitary Lift Station (Control and Operation Building & Warehouse Maintenance Building)	N/A	Vendor package
01-A-6433	Sanitary Wastewater Treatment Package	20% on total demand	Vendor package
01-A-6434	Sanitary Lift Station (Administration Building)	N/A	Vendor package
00-SU-6471	LNG Loading Platform Sump	110%	(Note 3)
01-SU-6472	Stabilized Condensate Barge Loading Area Sump	110%	Larger of process spill and rainfall per Note 4

Notes:

1. Pneumatic Pump spares 01-P-6458-S,01-P-6464-S,01-P-6460-S and 01-P-6461-S. Oily Water Sump Pump common warehouse spare of capacity 5m3/hr and discharge pressure of 1.9 barg.
2. Motor Driven Pump spare, 01-P-6472-S. Oily Water Pump common warehouse spare of capacity 30m3/hr and discharge pressure of 2.44 barg.
3. Oily Sumps will be sized to accommodate the greater of the first 15 minutes of a 10-year hourly design rainfall event of 18.5mm or 1 inch of surface runoff, within a potentially contaminated area. Since 1 inch is larger, 25mm has been considered.
4. The sump is designed for containment of 100-year 24-hour rain event of 257.8 mm with 110% margin.
5. Process Area LNG Impoundment Sump is able to handle 10-year 24-hour rain event of 187.1 mm prior to overflow to the potentially contaminated stormwater system.

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4.0 REFERENCES

- Basis of Design, 350106-0000-00-EM-GEN-PDB-0001
- Basis of Design for Impoundment Sumps, 350106-000-SE-BD-00001
- Stormwater Drainage Philosophy, 350106-000-CS-PH-00001
- Basis of Design for Impoundment Sumps, 350106-000-SE-BD-00001

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APPENDIX 4.2-3: PIPING & INSTRUMENTATION DIAGRAMS (P&IDS)

APPENDIX 4.2-3-1: P&ID: OILY WATER STORAGE TANK

APPENDIX 4.2-3-2: P&ID: OILY WATER TREATMENT SYSTEM

APPENDIX 4.2-3-3: PIPING SYMBOLOGY LEGEND

APPENDIX 4.2.3-4: INSTRUMENT SYMBOLOGY LEGEND

01-T-6469
OILY WATER STORAGE TANK

CONFIGURATION: 1 X 100%
TYPE: STORAGE TANK
DESIGN CAPACITY: 508.0 m^3 NOTE 12
SIZE I.D. x HT: 7500 mm x 12000 mm
DESIGN P / T: ATM / @ 70 C / -29 C NOTE 23
NORMAL OPERATING P / T: ATM @ AMB /
MOC / TRIM: KCS /**01-TR-64069-(1P3)-WWT-HC(23 C)**
01-TR-64075-(3H1)-MAJ-HCO(180 C)

01-P-6417-21A/21B
OILY WATER STORAGE TANK PUMP

CONFIGURATION: 2 X 100%
TYPE: MONO SCREW PUMP
DESIGN FLOW @ PUMP DIFF PRESS: 30 m^3/hr @ 1.0 barg
NORMAL SUCTION P / T: 0.0 barg / 23 C
NORMAL DISCH P / T: 1.0 barg / 23 C
DESIGN P / T: 3.0 barg / @ 70 C / -29 C
SEAL PLAN: 02/61
DESIGN CODE: BY VENDOR
MOC BODY / STATOR / ROTOR: CS / NBR / DUPLEX STEEL
ABSORBED / RATED POWER: 2.9 kW / 5.5 kW
TRIM: 01-TR-64080-(1P3)-WWT-ET(23 C) PUMP A
01-TR-64079-(1P3)-WWT-ET(23 C) PUMP B
PUMP CASING INSULATION: ET (NOTE 20)

01-M-6417-21A/21B
OILY WATER STORAGE TANK PUMP MOTOR

PARENT TAG: 01-P-6417-21A/B
RATED POWER: 5.5 kW

NOTES CONTINUED:-

26. THE HEATING MEDIUM WILL BE COIL IMMERSED INTO THE TANK (01-T-6469) BELOW LLLL TO MAINTAIN LIQUID TEMPERATURE OF MINIMUM 25°C. INSULATION SHALL BE PROVIDED BELOW LLLL. DESIGN AND FABRICATION OF HEATING COIL IS IN THE FIELD FABRICATION TANK DESIGNER SCOPE.
27. 01-FI-64206A TO BE READABLE FROM GLOBE VALVE V640219.
28. 01-XV-64214 TO CLOSE WHEN TEMPERATURE REACHES 35 C.
29. CONE UP TO TANK CENTER 1:120, SUMP PER API 650 FIG 5.21.
30. PIPING TO PROVIDE HIGH POINT VENT AND LOW POINT DRAIN WHERE LOW POINT AND HIGH POINT POCKETS ARE UNAVOIDABLE. LOW POINT DRAINS VALVE TO BE AT AN ACCESSIBLE LOCATION FOR OPERATOR TO FACILITATE DRAINING OF HEATING MEDIUM TO TOTE/ BUCKET.
31. LOW POINT DRAIN TO BE PIPED AT ACCESSIBLE LOCATION TO COLLECT IN TOTE.
32. OUTLET NOZZLE (B1) & OUTLET SPARE NOZZLE (B2) SHALL BE AT SAME ELEVATION AND SEPARATED BY 30 DEGREE.
33. OFF SPEC OILY WATER TO RETURN TO BE 200MM ABOVE HIGH-HIGH LIQUID LEVEL.
34. COMMON CURB AREA FOR PUMPS AND TANK.
35. MANHOLE SHALL BE AT ACCESSIBLE LOCATION. MH1 TO BE CLOSE TO NOZZLE D.
36. TANK TO BE EPOXY LINED WITH CATHODIC PROTECTION.

GENERAL NOTES:

1. FOR GENERAL NOTES AND SYMBOLS SEE DRAWINGS 350106-0000-00-PR-DWG-PID-0001,0002, 0002A & 0003.
2. 01-XV-64214 AND FLOW METER (01-FE-64206) TO BE LOCATED INSIDE CURBED AREA.
3. OILY WATER INTAKE PUMP 01-P-6417-21A/B SHALL STOP AT LOW LEVEL OF TANK.
4. FOR MOTOR CONTROL DETAILS SEE DRAWING 350106-0000-00-PR-DWG-PID-0027.
5. FOR SAMPLE CONNECTION DETAILS SEE DRAWING 350106-0000-00-PR-DWG-PID-0009/0009A.
6. DIP HATCH WITH SELF CLOSING, NON-SPARKING GUAGE HATCH COVER.
7. MANUAL SAMPLE COLLECTION.
8. LOW TEMPERATURE ALARM TO BE SET AT 15 C. HIGH TEMPERATURE ALARM AT 30 C.
9. DELETED.
10. TANK DRAIN DISCHARGE TO BE ACCESSIBLE FOR SAMPLING AND VISUAL CHECK.
11. GOOSE NECK AND BIRD SCREEN BY TANK VENDOR. VENDOR TO CONFIRM TANK VENT SIZE. ROUTE VENT LINE SUCH THAT BLOCKAGE FROM SNOW IS PREVENTED.
12. TOTAL WORKING CAPACITY OF OILY WATER STORAGE TANK IS 444 m³.
13. ROOF HATCH WITH EMERGENCY VENT.
14. WITH ANTI-VORTEX PLATE.
15. WITH LINE SIZE INTERNAL PIPE WITH DRAWOFF SUMP PER API 650 WITH INTERNAL DIP PIPE FINISHED ONE DIAMETER ABOVE TANK SUMP BOTTOM.
16. OILY WATER INTAKE INLET NOZZLE TO BE LOCATED MINIMUM 2 METER ABOVE AND MINIMUM 90 DEGREE FROM OILY WATER OUTLET NOZZLES B1 AND B2.
17. DRAIN VALVE V640180 TO EMPTY TANK SUMP.
18. CURB TO ACCOMODATE 110% OF THE TANK VOLUME.
19. OILY SKIMMER TO BE PROVIDED AS A PRELIMINARY OILY WATER SEPERATOR IN THE TANK TO PREVENT SENDING SLUG OIL TO THE OILY WATER TREATMENT PACKAGE.
20. PUMP CASING, CASING DRAIN AND PRESSURE RELIEF LINE THAT ARE IN CONTACT WITH OILY WATER TO BE PROVIDED WITH ELECTRICAL TRACING IN ORDER TO ENSURE TEMPERATURE ABOVE 10 DEG C.
21. NOZZLE FOR COIL IMMERSED SHALL BE PROVIDED BELOW LLLL.
22. DISSIMILAR CHECK VALVES.
23. TANK TO BE DESIGNED FOR FULL OF LIQUID PLUS ONE (1) PSI.
24. PUMP 01-P-6417-21A/B TO STOP ON CPI SEPARATOR HIGH LEVEL PART OF OILY WATER TREATMENT PACKAGE (01-A-6417).
25. TEMPERATURE TRANSMITTER AND THE COIL IMMERSED NOZZLE TO BE LOCATED DIAGONALLY OPPOSITE ON THE SHELL OF THE TANK.

Digitally signed by Louis Joseph Garces -- P.Eng. - EGBC
Date: 2024.12.16 08:17:53 -06'00'

CB&I LLC, EGBC PERMIT TO PRACTICE NUMBER 1002575

NO.	REVISION	COMPANY APPD	DRWN	CK'D	APP'D	DATE
0	ISSUED FOR CONSTRUCTION	HG	BB	DS	CAS	16 Dec 24
F	ISSUED FOR ISOMETRIC CHECK	HG	BB	DS	CAS	02 Dec 24
E	ISSUED FOR DETAIL ENGINEERING		BB	DS	CAS	09 Sep 24
D	RE-ISSUED FOR HAZOP		BB	KP	CAS	16 Feb 24
C	ISSUED FOR HAZOP		BB	KP	CAS	19 Jul 23

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Drawn By	Drwn Date	Chkd By	Chkd Date	Aprvd By	Aprvd Date	Scale

Woodfibre LNG

WLNG Review Approval Status
Code 1 | No Comments | Work may proceed.
By: c_jonah_pitre | Date: January 28, 2025

Woodfibre LNG Project

CLIENT DWG NO:

PIPING & INSTRUMENTATION DIAGRAM

EFFLUENT AND WASTEWATER TREATMENT
OILY WATER STORAGE TANK

FOR: Woodfibre LNG Limited

PROJ. NO:	DWG NO:	REV:
350106	350106-4200-64-PR-DWG-PID-0025	0

Based on Form: CMS-830-00-SD-02302; MDR_D_Process_dyn.dwg

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WOODFBR - \TRAIN01\164\350106-4200-64-PR-DWG-PID-0025.pid - 12/15/2024 11:39:06 PM - [KT07]

PACKAGE INLET FEED PUMP MOTOR	
ITEM	01-M-6417-21 A/B
CONFIGURATION	2x100% (1 DTY, 1 STB)
RATED POWER	5.5 kW

ELECTRIC HEAT TRACING	
ITEM	01-EHTP-6417-21

PACKAGE INLET FEED PUMP	
ITEM	01-P-6417-21 A/B
CONFIGURATION	2x100% (1 DTY, 1 STB)
TYPE	HORIZONTAL MONO SCREW
DESIGN CODE	Supplier standard design (NOTE 1)
DESIGN FLOW RATE	30 m^3/hr
DISCHARGE PRESSURE	1.0 barg
MOTOR RATED POWER	5.5 kW
MATERIAL (CASING/STATOR/ROTOR)	CS/NBR/Duplex Steel (22% Chrome)
DESIGN PRESSURE /TEMPERATURE	5 barg@70C/-29C

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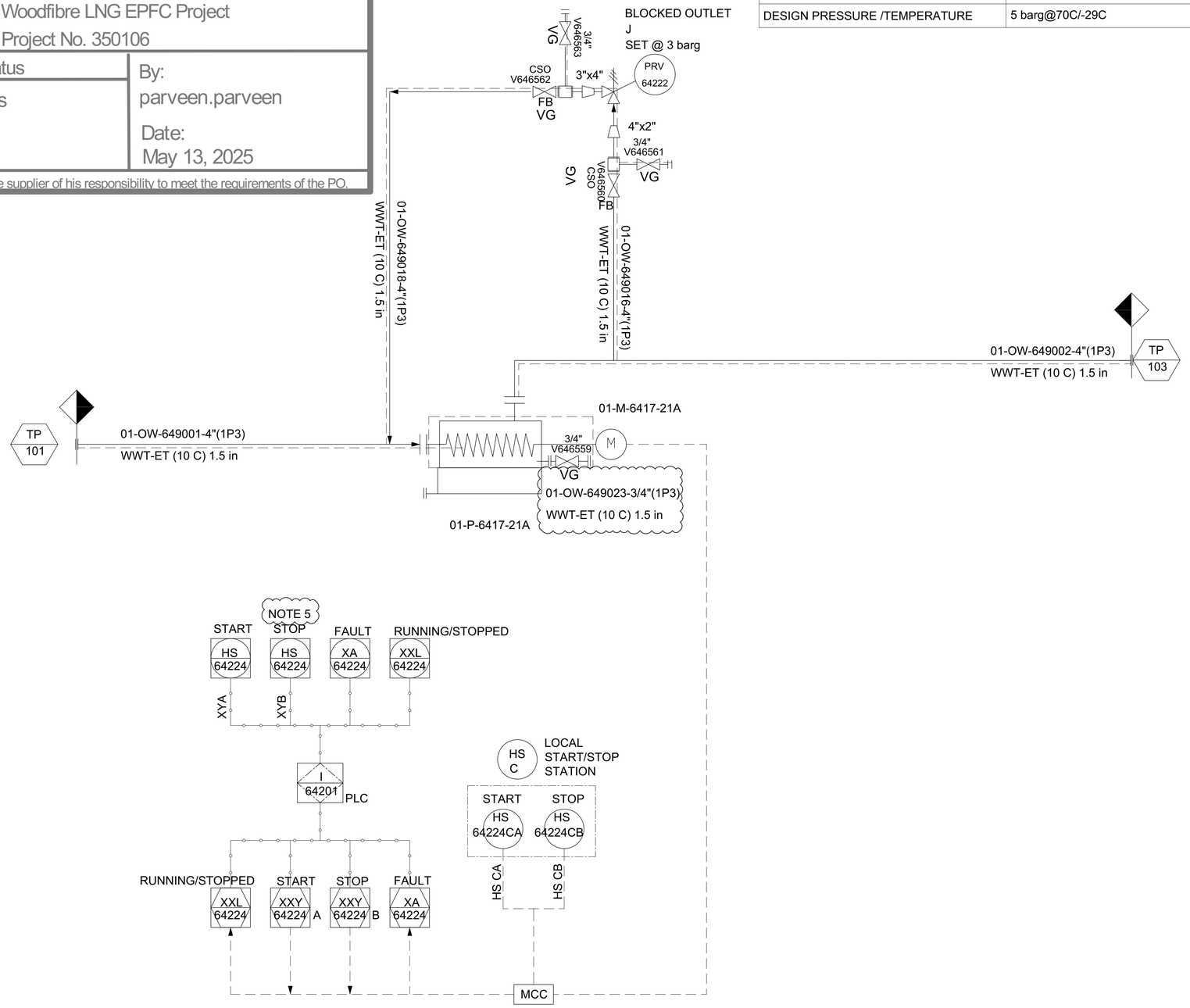
Woodfibre LNG EPFC Project
Project No. 350106

Engineering Review Status
Code 1 - No Comments

By:
parveen.parveen

Date:
May 13, 2025

These comments do not relieve the supplier of his responsibility to meet the requirements of the PO.



GENERAL NOTES:

A. SYMBOLOGY ACCORDING TO 350106-0000-00-PR-DWG-PID-0001 / 0002 /0003. OTHERS AS PER ARTES STANDARD SYMBOLOGY.
B. ALL INSTRUMENT AND SIGNAL TAGS SHALL BE PREFIXED WITH TRAIN NUMBER "01".
REFERENCE DOCUMENTS
ASME B31.3 Process Piping
35016-MR-11417-02.04/.05 Oily Water Treatment Package
350106-0000-00-PR-DWG-PID-001/0002/0003 Symbology
350106-PO-11417-02-SD-000073 Line and Component Sizing Report
350106-PO-11417-02-SD-000002 Quality Plan
350106-0000-00-MJ-DAS-MACH-0001 Project Design Data Sheet
350106-1204-64-MJ-DAS-MECH-0001 Oily Water Treatment Package Datasheet
3350106-PO-11417-02-SD-000016 Oily Water Treatment Package Motor Data Sheet Screw Pump
350106-1200-64-PR-DWG-UFD-0001 Utility flow diagram (UFD) Effluent and wastewater treatment oily water collection and treatment system (by the owner)
350106-PO-11417-02-SD-000076 Utility Consumption List
350106-PO-11417-02-SD-000054 Piping & Valve List
350106-PO-11417-02-SD-000062 Range, Alarm, Timer & Trip Setting List
350106-SC-ME-006-SD-000102 Spill Prevention, Control And Response Plan (by the owner)
350106-SC-PC-005-SD-000010 Quantitative Risk Analysis (by the owner)
350106-PO-11417-02-SD-000114 Flow transmitter Data Sheet
350106-PO-11417-02-SD-000115 Level Transmitters Data Sheet
350106-PO-11417-02-SD-000019 Analyzers Data Sheet
350106-PO-11417-02-SD-000018 Temperature Transmitters Data Sheet
350106-PO-11417-02-SD-000020 Pressure Gauges Data Sheet
350106-PO-11417-02-SD-000012 Oily Water Treatment Package Data Sheet 01-A-6417
350106-PO-11417-02-SD-000013 CPI Separator 01-H-6417-41 Data Sheet
350106-PO-11417-02-SD-000014 Monoscrew Pumps 01-P-6417-21A/B Data Sheet
350106-PO-11417-02-SD-000015 Centrifugal Pumps 01-P-6417-22A/B Data Sheet
350106-PO-11417-02-SD-000021 Automatic and Manual Valves Data Sheet
350106-PO-11417-02-SD-000022 PSV Data Sheet
350106-PO-11417-02-SD-000023 Heaters 01-HE-6417-31 & 01-HE-6417-32 Data Sheet
350106-PO-11417-02-SD-000024 Skimmer Data Sheet
350106-PO-11417-02-SD-000016 Monoscrew Pumps Motors 01-M-6417-21A/B Data Sheet
350106-PO-11417-02-SD-000017 Centrifugal Pumps Motors 01-M-6417-22A/B Data Sheet
350106-PO-11417-02-SD-000111 OIL SKIMMER MOTOR 01-M-6417-61 Data Sheet

NOTES:

1.MANUFACTURER PCM, MODEL 60A6, DESIGN IN COMPLIANCE TO THE APPLICABLE PROVISION OF API 676.
2. ARTES SCOPE OF SUPPLY:
- PUMP WITH MOTOR AND GERBOX ON BASEPLATE
- PSV
- PUMP BODY DRAIN VALVE
- PIPING WITH FLANGE
ALL ITEMS PROVIDED LOOSE FOR SITE INSTALLATION IN PACKAGE OILY WATER STORAGE TANK BY OTHERS.
5. TO BE REFERED ON PAGE 03 OF 05
(P&ID 350106-11417-02-SD-000043)

TIE-IN LABEL				
TP	SIZE	CLASS	FAC.	SERVICE
101	4"	150 LB	RF	PUMP SUCTION
103	4"	150 LB	RF	PUMP DISCHARGE

PIPING AND INSTRUMENTS DIAGRAM - DOC No.-4475-100

NO.	REVISION	DRWN	CK'D	APPD	DATE
8	Issued for Review	NG	CI	AC	06 May. 25
7	Issued for Review	LG	CI	AC	29 Jul. 24
6	Issued for Review	NG/LG	CI	AC	01 Jul. 24
5	Issued for Review	NG	CI	AC	30 Apr. 24
4	Issued for Review	NG	CI	AC	28 Mar. 24
3	Issued for Review	NG	CI	AC	14 Feb. 24
2	Issued for Review	NG	CI	AC	20 Dec. 23
1	Issued for Review	NG	CI	AC	07 Nov. 23

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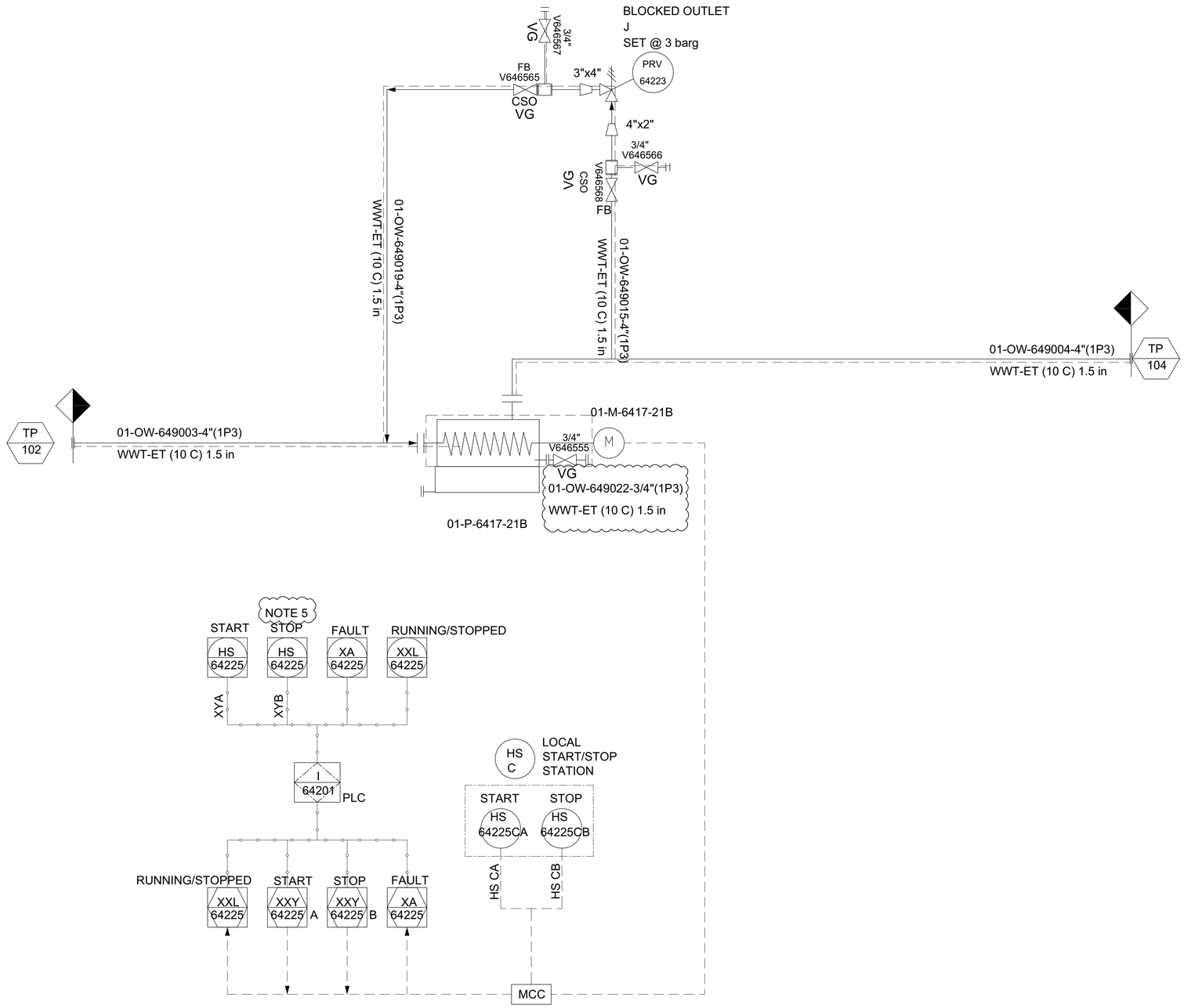
ARTES Job N°. 287D23 | Format: A1
DWG. N. 4475–100

WOODFIBRE LNG

Supplier Name: CANNON ARTES
SDR Code(s): D03
Equipment/Tag Number(s): 01-A-6417

Project Number		Purchase Order Number				Seq.No	Purchaser's Revision
350106	-	PO-11417-02	-	SD	-	000033	8

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GENERAL NOTES:

A. SYMBOLOGY ACCORDING TO 350106-0000-00-PR-DWG-PID-0001 / 0002 /0003. OTHERS AS PER ARTES STANDARD SYMBOLOGY.
B. ALL INSTRUMENT AND SIGNAL TAGS SHALL BE PREFIXED WITH TRAIN NUMBER "01".

NOTES:

1.MANUFACTURER PCM, MODEL 60A6, DESIGN IN COMPLIANCE TO THE APPLICABLE PROVISION OF API 676.
2. ARTES SCOPE OF SUPPLY:
- PUMP WITH MOTOR AND GERBOX ON BASEPLATE
- PSV
- PUMP BODY DRAIN VALVE
- PIPING WITH FLANGE
ALL ITEMS PROVIDED LOOSE FOR SITE INSTALLATION IN PACKAGE OILY WATER STORAGE TANK BY OTHERS.
5. TO BE REFERED ON PAGE 03 OF 05
(P&ID 350106-11417-02-SD-000043)

TIE-IN LABEL

TP	SIZE	CLASS	FAC.	SERVICE
102	4"	150 LB	RF	PUMP SUCTION
104	4"	150 LB	RF	PUMP DISCHARGE

PIPING AND INSTRUMENTS DIAGRAM - DOC No.-4475-100

NO.	REVISION	DRWN	CK'D	APPD	DATE
8	Issued for Review	NG	CI	AC	06 May. 25
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5	Issued for Review	NG	CI	AC	30 Apr. 24
4	Issued for Review	NG	CI	AC	28 Mar. 24
3	Issued for Review	NG	CI	AC	14 Feb. 24
2	Issued for Review	NG	CI	AC	20 Dec. 23
1	Issued for Review	NG	CI	AC	07 Nov. 23

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ARTES Job N°. 287D23 | Format: A1
DWG. N. 4475–100

WOODFIBRE LNG

Supplier Name: CANNON ARTES
SDR Code(s): D03
Equipment/Tag Number(s): 01-A-6417

Project Number		Purchase Order Number				Seq.No	Purchaser's Revision
350106	-	PO-11417-02	-	SD	-	000033	8

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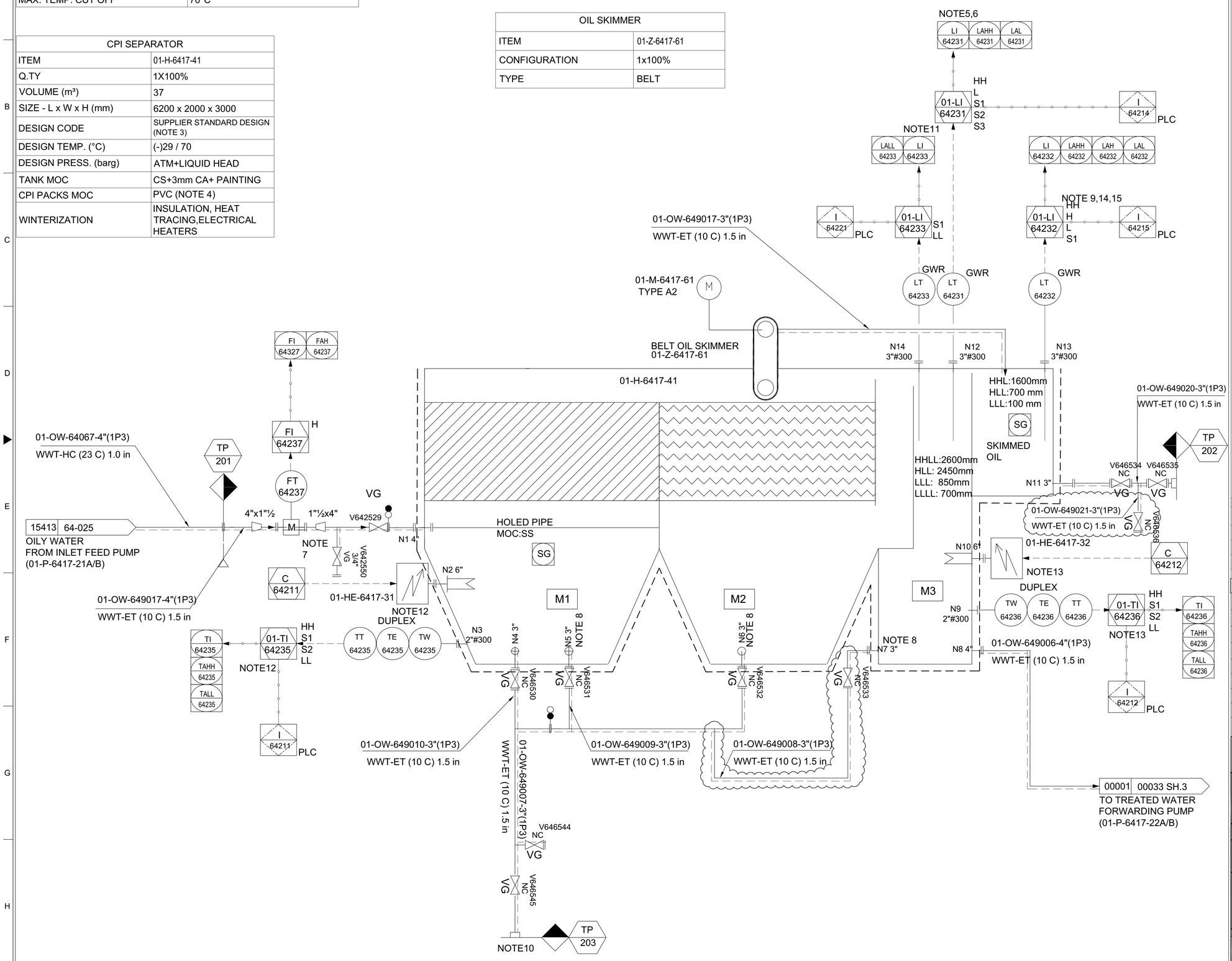
ELECTRIC HEATER	
ITEM	01-HE-6417-31 & 01-HE-6417-32
Q.TY	2 Duty
RATING (Kw.)	26.25
DUTY	ON START/STOP BASIS TO MAINTAIN 10°C
MAX. TEMP. CUT OFF	70°C

CPI SEPARATOR	
ITEM	01-H-6417-41
Q.TY	1X100%
VOLUME (m³)	37
SIZE - L x W x H (mm)	6200 x 2000 x 3000
DESIGN CODE	SUPPLIER STANDARD DESIGN (NOTE 3)
DESIGN TEMP. (°C)	(-)29 / 70
DESIGN PRESS. (barg)	ATM+LIQUID HEAD
TANK MOC	CS+3mm CA+ PAINTING
CPI PACKS MOC	PVC (NOTE 4)
WINTERIZATION	INSULATION, HEAT TRACING,ELECTRICAL HEATERS

ELECTRIC HEAT TRACING	
ITEM	01-EHTP-A-6417

OIL SKIMMER	
ITEM	01-Z-6417-61
CONFIGURATION	1x100%
TYPE	BELT

OIL SKIMMER MOTOR	
ITEM	01-M-6417-61
CONFIGURATION	1x100%
RATED POWER	0.37 kW



GENERAL NOTES:

A. SYMBOLOGY ACCORDING TO 350106-0000-00-PR-DWG-PID-0001 / 0002 /0003. OTHERS AS PER ARTES STANDARD SYMBOLOGY.
B. INTERCONNECTING PIPING WITHIN BATTERY LIMITS (PACKAGE LAYOUT) INCLUDED IN ARTES SCOPE OF SUPPLY.
C. ARTES SCOPE OF SUPPLY FOR INSTRUMENT INTERCONNECTING CABLE TRAY AND CABLE IS LIMITED WITHIN VENDOR SUPPLIED EQUIPMENT/SKIDS
D. OILY WATER TREATMENT PACKAGE AS PER ARTES STANDARD DESIGN.
E. INSULATION AND HEAT TRACING PROVIDED TO MAINTAIN THE OPERATING TEMPERATURE 10°C (MIN.) DURING WINTER AND SNOW-FALL CONDITIONS.
F. ON-OFF VALVES PROVIDED TO RECIRCULATE OFF-SPEC EFFLUENT UPON ALARM OF HH VALUE ON THE OIL IN WATER ANALYZER. EFFLUENT SHALL BE RECIRCULATED BACK TO OILY. WATER STORAGE TANK (01-T-6469) VIA BYPASS LINE FOR FURTHER REPROCESSING, ONCE DISCHARGE SPEC IS MET.

NOTES:

3. DOES NOT APPLY ANY INTERNATIONAL STANDARD OR PROJECT SPECIFICATION.
4. CPI PACK DESIGN TEMPERATURE (-)5 / 60°C.
5. PUMP 01-P-6417-21 A/B TO STOP ON CPI SEPARATOR (01-H-6417-41) HIGH HIGH LEVEL AND LOW LEVEL OF OILYWATER STORAGE TANK (01-T-6469)
6. TO BE REFERED ON PAGE 04 OF 05 (P&ID350106-11417-02-SD-000033)
7. SAMPLE CONNECTION.
8. DRAIN FROM N5,N6,N7 IS REQUIRED ONLY FOR TANK EMPTYING DURING MAINTENANCE. EXPECTED ONCE FOR YEAR, DISCHARGE VOLUME IS TOTAL COMPARTMENTS VOLUME.
9. SKIMMED OIL COMPARTMENT IS EMPTIED FOR HIGH LEVEL ON LT-64232, APPROX AFTER 10 BATCH OPERATIONS OF 12 HOURS.
10. THE HOPPER IS EMPTIED FROM THE SLUDGE AFTER EVERY SINGLE BATCH OPERATION OF 12 HOURS. TIMER FOR SLUDGE REMOVAL IS PROVIDED IN UCP
11. PUMP 01-P-6417-22A/B STOP ON CPI SEPARATOR (01-H-6417-41) LOW LOW LEVEL.
12. THE ELECTRICAL HEATER 01-HE-6417-31 IS STARTED/STOPPED BY LOW/HIGH TEMPERATURE ON 01-TT-64235.
13. THE ELECTRICAL HEATER 01-HE-6417-32 IS STARTED/STOPPED BY LOW/HIGH TEMPERATURE ON 01-TT-64236.
14. HH ALARM FOR LT64232 STOP THE PACKAGE INLET FEED PUMP 01-P-6417-21 A/B
15. L ALARM FOR LT64232 ADVICES OPERATOR TO STOP EMPTYING THE SKIMMED OIL COMPARTMENT.
16. PROCESS INTERLOCK 01-XS-64226 A WILL CLOSE 01-XV-64098 (MDR SCOPE) WHEN BELT OIL SKIMMER (01-Z-6417-61) IS NOT OPERATING.

TIE-IN LABEL				
TP	SIZE	CLASS	FAC.	SERVICE
201	4"	150 LB	RF	INLET OILY WATER
202	QUICK COUPLING			OIL TO VACUUM TRUCK
203	QUICK COUPLING			SLUDGE TO VACUUM TRUCK

PIPING AND INSTRUMENTS DIAGRAM - DOC No.-4475-100					
8	Issued for Review	NG	CI	AC	06 May. 25
7	Issued for Review	LG	CI	AC	29 Jul. 24
6	Issued for Review	NG/LG	CI	AC	01 Jul. 24
5	Issued for Review	NG	CI	AC	30 Apr. 24
4	Issued for Review	NG	CI	AC	28 Mar. 24
3	Issued for Review	NG	CI	AC	14 Feb. 24
2	Issued for Review	NG	CI	AC	20 Dec. 23
1	Issued for Review	NG	CI	AC	07 Nov. 23
NO.	REVISION	DRWN	CK'D	APPD	DATE

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ARTES Job N°. 287D23 | Format: A1
DWG. N. 4475-100

WOODFIBRE LNG

Supplier Name: CANNON ARTES
SDR Code(s): D03
Equipment/Tag Number(s): 01-A-6417

Project Number		Purchase Order Number				Seq.No	Purchaser's Revision
350106	-	PO-11417-02	-	SD	-	000033	8

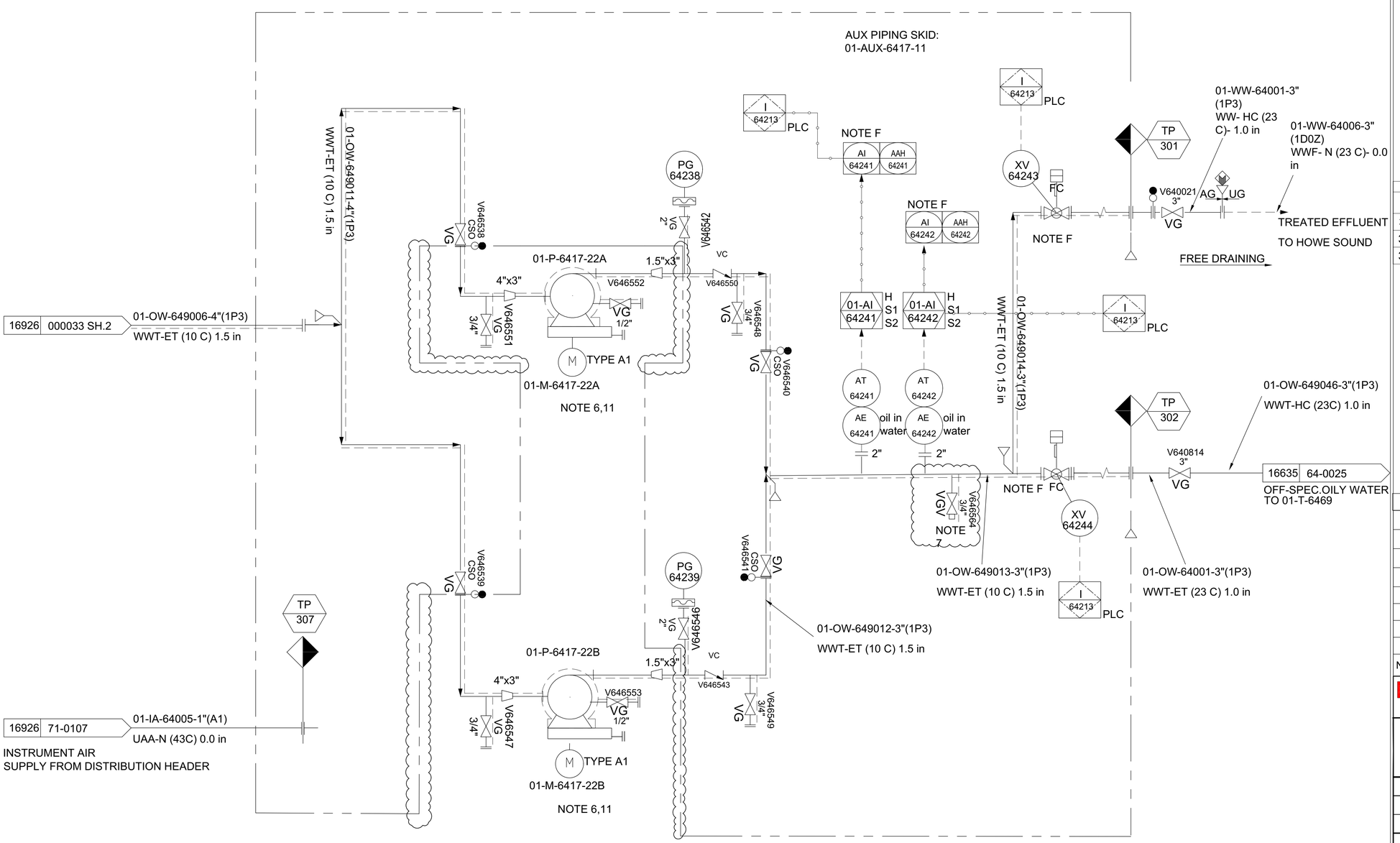
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Form Number: CMS-870-02-FM-30006 Issued for Use: 21/DEC/2017

ELECTRIC HEAT TRACING	
ITEM	01-EHTP-6417-21

TREATED WATER FORWARDING PUMP	
ITEM	01-P-6417-22 A/B
CONFIGURATION	2 x 100 % (1DTY-1STB)
TYPE	HORIZONTAL CENTRIFUGAL
DESIGN CODE	ASME B73.1
DESIGN FLOWRATE	30 m^3/hr
DISCHARGE PRESSURE	2 barg
MATERIAL (CASING /IMPELLER)	SS316/SS316
MOTOR RATED POWER	5.5 kw
DESIGN PRESSURE/TEMPERATURE	4 barg @ 70 C / -29 C
MANUFACTURER	ITT GOULDS
MODEL	3196 / 1.5x3-6 STI
DESIGN	ASME B73.1

TREATED WATER FORWARDING PUMP MOTOR	
ITEM	01-M-6417-22 A/B
CONFIGURATION	2x100%
RATED POWER	5.6 kW



GENERAL NOTES:

A. SYMBOLOGY ACCORDING TO 350106-0000-00-PR-DWG-PID-0001 / 0002 /0003. OTHERS AS PER ARTES STANDARD SYMBOLOGY.
B. INTERCONNECTING PIPING WITHIN BATTERY LIMITS (PACKAGE LAYOUT) INCLUDED IN ARTES SCOPE OF SUPPLY.
C. ARTES SCOPE OF SUPPLY FOR INSTRUMENT INTERCONNECTING CABLE TRAY AND CABLE IS LIMITED WITHIN SKID ONLY.
D. OILY WATER TREATMENT PACKAGE AS PER ARTES STANDARD DESIGN.
E. INSULATION AND HEAT TRACING PROVIDED TO MAINTAIN THE OPERATING TEMPERATURE 10°C (MIN.) DURING WINTER AND SNOW-FALL CONDITIONS.
F. ON-OFF VALVES PROVIDED TO RECIRCULATE OFF-SPEC EFFLUENT ALARM DETECTION OF HH VALUE ON THE OIL IN WATER ANALYZER. EFFLUENT SHALL BE RECIRCULATED BACK TO OILY. WATER STORAGE TANK (01-T-6469) VIA BYPASS LINE FOR FURTHER REPROCESSING ONCE DISCHARGE SPEC IS MET.

NOTES:

6. PUMP 01-P-6417-22A/B TO START ON CPI SEPARATOR (01-H-6417-41) HIGH LEVEL.
11. TO BE REFERED ON PAGE 03 OF 05 (P&ID 350106-11417-02-SD-000033)

TIE-IN LABEL				
TP	SIZE	CLASS	FAC.	SERVICE
301	3"	150 LB	RF	TREATED EFFLUENT
302	3"	150 LB	RF	OFF-SPEC.OILY WATER
307	1"	150 LB	RF	INSTRUMENT AIR (BY OTHER)

PIPING AND INSTRUMENTS DIAGRAM - DOC No.-4475-100					
8	Issued for Review	NG	CI	AC	06 May. 25
7	Issued for Review	LG	CI	AC	29 Jul. 24
6	Issued for Review	NG/LG	CI	AC	01 Jul. 24
5	Issued for Review	NG	CI	AC	30 Apr. 24
4	Issued for Review	NG	CI	AC	28 Mar. 24
3	Issued for Review	NG	CI	AC	14 Feb. 24
2	Issued for Review	NG	CI	AC	20 Dec. 23
1	Issued for Review	NG	CI	AC	07 Nov. 23
NO.	REVISION	DRWN	CK'D	APPD	DATE

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ARTES Job N°. 287D23 Format: A1
DWG. N. 4475-100

WOODFIBRE LNG

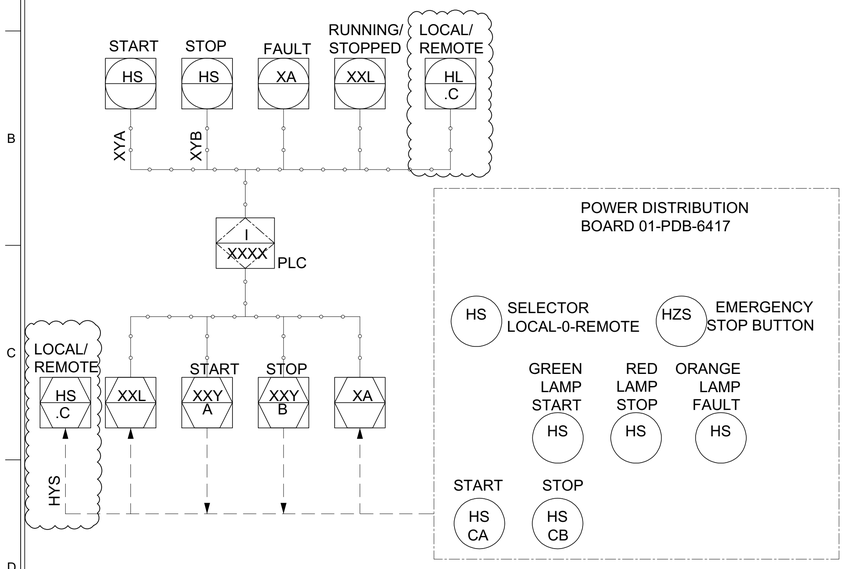
Supplier Name: CANNON ARTES
SDR Code(s): D03
Equipment/Tag Number(s): 01-A-6417

Project Number		Purchase Order Number				Seq.No	Purchaser's Revision
350106	-	PO-11417-02	-	SD	-	000033	8

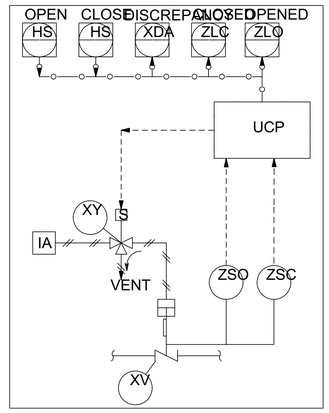
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LEGEND

TYPE A1



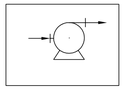
DETAILED REPRESENTATION PNEUMATIC ON/OFF VALVE



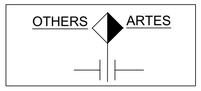
INSTALLED ON SKID



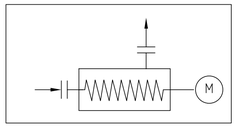
CENTRIFUGAL PUMP

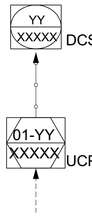


SCOPE OF SUPPLY



MONO SCREW PUMP





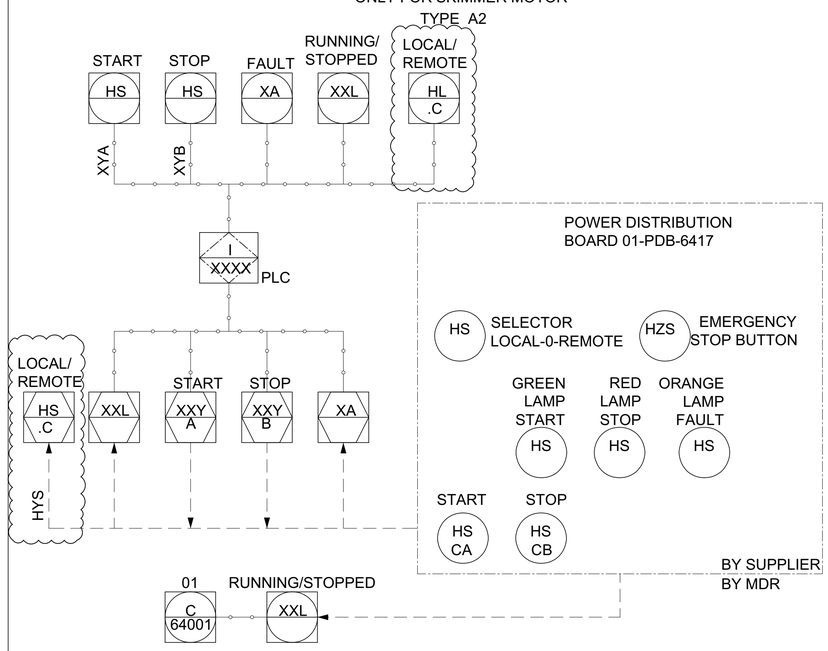
YY:
TI FOR TT
LI FOR LT
PI FOR PT
FI FOR FT

P&ID NO.	EQUIPMENT NO.	SERVICE DESCRIPTION	LOCAL START/STOP STATION	LOCAL START SWITCH	LOCAL STOP SWITCH	UCP RUNNING/ STOPPED	UCP HMI STOP SWITCH	UCP START COMMAND	UCP STOP COMMAND	UCP MCC FAULT	UCP INTERLOCK	SIS RUN STATUS	SIS STOP	SIS INTERLOCK	NOTES
350106-PO-11417-02-SD-000033 page 1 of 5	01-P-6417-21 A	PACKAGE INLET FEED PUMP	01-HS-64224C	01-HS-64224CA	01-HS-64224CB	01-XXL-64224	01-HS-64224	01-XXY-64224 A	01-XXY-64224 B	01-XA-64224	01-I-64201 01-I-64215	N/A	N/A	N/A	
350106-PO-11417-02-SD-000033 page 2 of 5	01-P-6417-21 B	PACKAGE INLET FEED PUMP	01-HS-64225C	01-HS-64225CA	01-HS-64225CB	01-XXL-64225	01-HS-64225	01-XXY-64225 A	01-XXY-64225 B	01-XA-64225	01-I-64201 01-I-64215	N/A	N/A	N/A	
350106-PO-11417-02-SD-000033 page 3 of 5	01-Z-6417-61	OIL SKIMMER	01-HS-64226C	01-HS-64226CA	01-HS-64226CB	01-XXL-64226	01-HS-64226	01-XXY-64226 A	01-XXY-64226 B	01-XA-64226	N/A	N/A	N/A	N/A	
350106-PO-11417-02-SD-000033 page 4 of 5	01-P-6417-22 A	TREATED WATER FORWARDING PUMP	01-HS-64227C	01-HS-64227CA	01-HS-64227CB	01-XXL-64227	01-HS-64227	01-XXY-64227 A	01-XXY-64227 B	01-XA-64227	01-I-64214 01-I-64221	N/A	N/A	N/A	
350106-PO-11417-02-SD-000033 page 4 of 5	01-P-6417-22 B	TREATED WATER FORWARDING PUMP	01-HS-64228C	01-HS-64228CA	01-HS-64228CB	01-XXL-64228	01-HS-64228	01-XXY-64228 A	01-XXY-64228 B	01-XA-64228	01-I-64214 01-I-64221	N/A	N/A	N/A	

DCS RUN CONCTACT STATUS	DCS INTERLOCK
N/A	N/A
N/A	N/A
01-XS/XXL-64226A	01-C-64001
N/A	N/A
N/A	N/A

ONLY FOR SKIMMER MOTOR

TYPE A2



PIPING AND INSTRUMENTS DIAGRAM - DOC No.-4475-100

NO.	REVISION	DRWN	CK'D	APPD	DATE
8	Issued for Review	NG	CI	AC	06 May. 25
7	Issued for Review	LG	CI	AC	29 Jul. 24
6	Issued for Review	NG/LG	CI	AC	01 Jul. 24
5	Issued for Review	NG	CI	AC	30 Apr. 24
4	Issued for Review	NG	CI	AC	28 Mar. 24
3	Issued for Review	NG	CI	AC	14 Feb. 24
2	Issued for Review	NG	CI	AC	20 Dec. 23
1	Issued for Review	NG	CI	AC	07 Nov. 23

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artes@cannon.com
cannonartes.com

ARTES Job N°. 287D23 | Format: A1

DWG. N. 4475-100

WOODFIBRE LNG

Supplier Name: CANNON ARTES

SDR Code(s): D03

Equipment/Tag Number(s): 01-A-6417

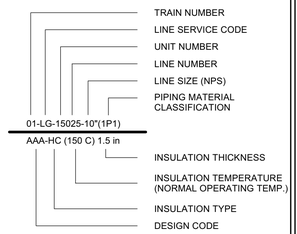
Project Number		Purchase Order Number				Seq.No	Purchaser's Revision
350106	-	PO-11417-02	-	SD	-	000033	8

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PIPING SYMBOLS

- PRIMARY PIPING
- SECONDARY PIPING
- HEAT TRACED PIPING
- JACKETED OR DOUBLE CONTAINMENT PIPING
- UNDERGROUND PIPING
- FUTURE PIPING
- EXISTING PIPING

LINE NOMENCLATURE



PIPING SPECIFICATION NOTE 2



INSULATION TYPES

ACB -	HOT SERVICE ACOUSTIC INSULATION (CLASS B) 16 C TO 300 C
ACC -	HOT SERVICE ACOUSTIC INSULATION (CLASS C) 16 C TO 300 C
ACD -	HOT SERVICE ACOUSTIC INSULATION (CLASS D) 16 C TO 300 C
CC -	HEAT GAIN REDUCTION -180 C TO 28 C
CCAB -	COLD SERVICE ACOUSTIC CONTROL (CLASS B) -180 C TO 28 C
CCAC -	COLD SERVICE ACOUSTIC CONTROL (CLASS C) -180 C TO 28 C
CCAD -	COLD SERVICE ACOUSTIC CONTROL (CLASS D) -180 C TO 28 C
CF -	COLD SERVICE FIRE PROTECTION -185 C TO 20 C
CP -	CONDENSATION CONTROL -180 C TO 28 C
DT-	DUAL TEMPERATURE 0 C TO 300 C
ET -	HEAT CONSERVATION - ELECTRIC TRACING 16 C TO 300 C
FJ -	POOL FIRE/ JET FIRE/ CRYO SPILL PROTECTION NOTE 6
HC -	HEAT CONSERVATION 16 C TO 300 C
HCO -	HOT OIL SERVICE (CELLULAR GLASS) 20 C TO 350 C
MG -	PERSONNEL PROTECTION (METAL GUARDS) 61 C TO 175 C
N -	NO INSULATION
PP -	PERSONNEL PROTECTION (INSULATION) 176 C TO 300 C

VALVES NOTE 4

VALVE CODE	SYMBOL	DESCRIPTION
VG	VG	GATE VALVE
VG	VG, HP/VENT SIDE	VENTED GATE VALVE NOTE 7
VC	VC	CHECK VALVE
VL	VL	GLOBE VALVE
VF	HP, VF	BUTTERFLY VALVE NOTE 5
VB	VB	BALL VALVE
VB	VB, HP/VENT SIDE	VENTED BALL VALVE NOTE 7
VGV	3/4", VGV	VENT/DRAIN GATE VALVE WITH PLUG
VG	3/4", VG	VENT/DRAIN GATE VALVE WITH FLANGE
VBB	/ VBB	FULL PORT BALL VALVE
VGF	/ VGF	FLANGED GATE VALVE FOR EQUIPMENT NOZZLE CONNECTION
VGI	3/4", VGI	GATE VALVE - INSTRUMENT ROOT VALVE
VBV	3/4", VBV	VENT/DRAIN BALL VALVE WITH PLUG
VB	3/4", VB	VENT/DRAIN BALL VALVE WITH FLANGE
VMI/VMV	DBB	INTEGRAL DOUBLE BLOCK AND BLEED VALVE
DBB DETAIL	PIPING, INSTR	
VMI/VMV	DBB	INTEGRAL DOUBLE BLOCK AND BLEED VALVE (CRYOGENIC)
DBB DETAIL (CRYOGENIC)	PIPING, INSTR	
VN	VN	NEEDLE VALVE

FITTINGS

- FLANGE
- PLUG
- CAP
- REDUCER
- ECCENTRIC REDUCER
- HOSE CONNECTION
- BLINDABLE LOCATION (TYPE BY PIPING DESIGN)
- PERMANENT BLIND BOTTOM CIRCLE DENOTES NORMAL POSITION

PIPING CONNECTORS

DRAWING CONTINUATION ARROW

OFF PAGE CONNECTOR NUMBER (XXXX) — XXXX | DWG NUMBER — TO/FROM

BI-DIRECTIONAL DRAWING CONTINUATION ARROW

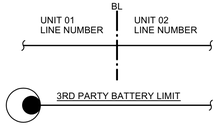
OFF PAGE CONNECTOR NUMBER (XXXX) — XXXX | DWG NUMBER — TO/FROM EQUIPMENT NO.

UTILITY CONTINUATION

OFF PAGE CONNECTOR NUMBER (XXXX) — XXXX | DWG NUMBER — TO/FROM UTILITY SERVICE

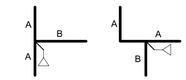
TIE-IN LABEL — TP 100

BATTERY LIMIT

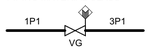


PIPING SEGMENT BREAKS & LABELS

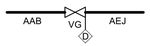
GROUP BREAK
BREAKS SERVICE CODE, LINE NUMBER AND LINE SIZE.
TRIANGLE POINTS TO LINE CHANGED.



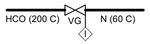
LINE CLASS BREAK
INDICATES CHANGE IN PIPING MATERIAL CLASS



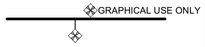
DESIGN CODE BREAK
INDICATES CHANGE IN DESIGN CODE



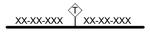
INSULATION BREAK
INDICATES CHANGE IN INSULATION TYPE AND/OR TEMPERATURE. BREAKS THICKNESS OVERRIDE



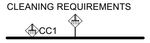
RESPONSIBILITY BREAK/DESIGNATOR
INDICATES CHANGE IN RESPONSIBILITY



TEST PACK BREAK
OVERRIDES TEST PRESSURE TO NEW VALUE SHOWN



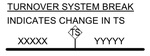
CLEANING REQUIREMENTS BREAK/DESIGNATOR
INDICATES CHANGE IN CLEANING REQUIREMENTS



WBS BREAK
INDICATES CHANGE IN WBS



TURNOVER SYSTEM BREAK
INDICATES CHANGE IN TS



DRAIN CONNECTORS

CLOSED DRAIN

OFF PAGE CONNECTOR NUMBER (XXXX) — XXXXX
LINE SERVICE CODE (YY) — YY
DWG NO

CLOSED DRAIN (NO P&ID)

LINE SERVICE CODE (YY) — YY

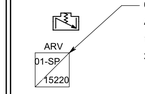
OPEN DRAIN

OFF PAGE CONNECTOR NUMBER (XXXX) — XXXXX
LINE SERVICE CODE (YY) — YY
DWG NO

OPEN DRAIN (NO P&ID)

LINE SERVICE CODE (YY) — YY

SPECIALTY LABELS



FIRE AND SAFETY ITEMS

- FIRE MONITOR
- FIRE HYDRANT / FIRE MONITOR COMBINATION
- FIRE HYDRANT
- W — SPECIAL HOSE CABINET
- FB — FIRE BLANKET
- HOSE REEL
- WATER SPRAY NOZZLE
- D — DELUGE VALVE
- E — EYE BATH (PORTABLE)
- EYEWASH
- POST INDICATOR BUTTERFLY VALVE
- SAFETY SHOWER AND EYEWASH

EQUIPMENT NOZZLE CONNECTIONS

- FLANGED NOZZLE
- FLANGED NOZZLE ON SIDE OF VESSEL
- WELDED NOZZLE
- INSTRUMENT CONNECTION
- BI- METALLIC FLANGE JOINTS
- REDUCING FLANGE KIT
- VORTEX BREAKER

SPECIALTY ITEMS

AGV	ANGLE VALVE	FH	FLEXIBLE HOSE	SES	EYE WASHER & SHOWER
ARV	AUTO RECIRCULATION VALVE	FLG	FLANGE	SG	SIGHT GLASS
AVV	AIR RELEASE VALVE	FLT	FILTER	SI	VENT SILENCER / MUFFLER
BAV	BALL VALVE	FLV	FLOAT VALVE	SI	IN-LINE SILENCER
BCV	BW, BUTTWELD CHECK VALVE	FTV	FOOT VALVE	SLV	SLIDE VALVE
BDV	ANGLE BLOWDOWN VALVE	FWV	4-WAY VALVE	SM	STATIC IN-LINE MIXER
BDV	TANDEM BLOWDOWN VALVE	GLV	Y-GLOBE VALVE	SN	SPRAY NOZZLE
BP	BP, BIO PROBE	GVC	GOOSENECK VENT W/MESH NOTE 2	STR	Y-TYPE STRAINER
BRS	BIRD SCREEN	HC	HOSE CONNECTION	STR	T-TYPE STRAINER
BR	BLEEDRING	HCN	W, SPECIAL HOSE CABINET	STR	CONE STRAINER
BRT	BARRED TEE	HRL	HOSE REEL	STR	DUPLEX STRAINER
BS	BLIND	HYD	FIRE HYDRANT	STR	PURITAN HAT STRAINER
BT	BLADDER TANK	HYM	FIRE HYDRANT/ FIRE MONITOR COMBINATION	STR	BASKET STRAINER
BVB	BW, BUTTWELD BALL VALVE	IFK	SPECIAL INSULATING FLANGE KIT	STR	SUCTION SCREEN STRAINER
BVF	BW, BUTTWELD BUTTERFLY VALVE	INJ	INJECTION NOZZLE	TB	TANK BREATHER
BVG	BW, BUTTWELD GATE VALVE	KGV	KNIFE GATE VALVE	TWV	3-WAY VALVE
CC	CORROSION COUPON	MON	FIRE MONITOR	VC	VENT COVER
CHL	BASKET TYPE CHLORINATOR	MT	T, MECHANICAL TRAP	VC	VENT COVER W/SCREEN
CKV	CHECK VALVE	MVM	DBB, METAL SEATED DOUBLE BLOCK AND BLEED	WSN	WATER SPRAY NOZZLE
CP	CP, CORROSION PROBE	MXT	MIXING TEE	RS	REMOVABLE SPOOL NOTE 2
DA	D, DETONATION ARRESTOR	PD	PULSATION DAMPENER	RS	ELBOW TYPE REMOVABLE SPOOL NOTE 2
DH	DESUPERHEATER	PIN	PINCH VALVE		SWING ELBOW NOTE 2
DIA	DIAPHRAGM VALVE	PLU	PLUG VALVE		GULLY DRAIN NOTE 2
DV	PIPING MANWAY DAVIT	PPF	PPF, PETRO PIPE		
ED	EJECTOR / EDUCTOR	SAM	S, SAMPLE CONNECTION (SAM) SAMPLE STATION		
EFV	EXCESS FLOW VALVE	00-0002	P, PURGE CONNECTION NOTE 2		
EH	EXHAUST HEAD	00-0002	F, FLUSHING CONNECTION NOTE 2		
EJ	EXPANSION JOINT	SCL	SAMPLE COOLER		
EWS	EYEWASH	SCV	STOP CHECK VALVE		
FA	FLAME ARRESTOR				

GENERAL NOTES:

1. FOR GENERAL NOTES AND SYMBOLS SEE DRAWINGS 350106-0000-00-PR-DWG-PID-0001, 0002, 0002A & 0003.
2. FOR LIST OF PIPING CLASS CODES, REFER TO 350106-0000-00-PR-DWG-PID-0002A OR "THE PIPING MATERIAL CLASS INDEX", 350106-000-PI-SP-00001.0001
3. SEE INSTRUMENT NOMENCLATURE TAG NUMBER ON 350106-0000-00-PR-DWG-PID-0003.
4. REFER TO SPECIFIC PIPE SPEC FOR COMPLETE LIST OF VALVE CODES AVAILABLE FOR USE.
5. "HP" ON BUTTERFLY VALVES INDICATE THE PREFERRED SEALING SIDE. IT DENOTES WHERE THE HIGHER PRESSURE SIDE IS WHEN VALVE IS IN CLOSED POSITION. VALVE TO BE INSTALLED FOLLOWING THE INDICATED "HP" (HIGH PRESSURE) ON THE P&ID.
6. INDIVIDUAL VESSEL COMPOSITE INSULATION SYSTEM SHALL BE APPLIED AS PER INSULATION, PAINT, AND FIREPROOFING (IPF) LIST (350106-000-ME-LS-00001) COMPOSITE INSULATION SYSTEM CAN BE A COMBINATION OF PROCESS INSULATION, CRYOGENIC SPILL PROTECTION, POOL FIRE PROTECTION, AND/ OR JET FIRE PROTECTION. THICKNESS SHOWN ON P&ID IS THE TOTAL COMPOSITE INSULATION SYSTEM THICKNESS.
7. CAVITY VENTED ISOLATION VALVES TO BE INSTALLED WITH THE VENT ORIENTED ON THE HIGH PRESSURE SIDE WHEN VALVE IS ON CLOSED POSITION.

Woodfibre LNG	WLNG Review Approval Status	
Code 1	No Comments	Work may proceed.
By: c_jonah_pitre		Date: August 12, 2024

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — L. J. GARCES # 54780

Digitally signed by Louis Joseph Garces -- P.Eng. - EGBC Date: 2024.07.22 12:46:42 -05'00'

CB&I LLC, EGBC PERMIT TO PRACTICE NUMBER 1002575

NO.	REVISION	COMPANY APPD	DRWN	CK'D	APPD	DATE
0	ISSUED FOR CONSTRUCTION	HG	BB	DS	CAS	19 Jul 24
K	ISSUED FOR ISOMETRIC CHECK	HG	BB	DS	CAS	10 May 24
J	ISSUED FOR DETAIL ENGINEERING		BB	MP	CAS	31 Mar 23
H	ISSUED FOR CLIENT REVIEW		BB	MP	BRS	22 Apr 21
G	ISSUED FOR CLIENT REVIEW		OC	MP	BRS	18 May 20

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Drawn By	Drwn Date	Chkd By	Chkd Date	Aprvd By	Aprvd Date	Scale

Woodfibre LNG

Woodfibre LNG Project

CLIENT DWG NO:

PIPING & INSTRUMENTATION DIAGRAM

GENERAL
PIPING SYMBOLOGY

FOR: Woodfibre LNG Limited

PROJ. NO.	DWG NO.	REV.
350106	350106-0000-00-PR-DWG-PID-0002	0

Based on Form: CMS-830-00-SD-02302: MDR_D_Process_dyn.dwg

WOODFBR - \COMMON\000\350106-0000-00-PR-DWG_PID-0002.pid - 7/19/2024 4:31:33 AM - [KT07]

839Mdl_C_pl\mdls_aprvd.dwg Last Saved: 7/16/2019 1:37 PM by: hpeeks

CONTROL VALVE OR REGULATORS

- GATE
- ANGLE
- 3-WAY GATE
- BALL
- VENTED BALL
- 3-WAY BALL
- GLOBE
- ANGLE GLOBE
- 3-WAY GLOBE
- HP BUTTERFLY NOTE 6
- 4-WAY
- PLUG
- 3-WAY PLUG
- KNIFE
- SLIDE
- 3-WAY SLIDE
- DAMPER
- PCV REDUCING PRESSURE REGULATOR SELF CONTAINED
- FLOW
- PCV BACKPRESSURE REGULATOR SELF CONTAINED
- FLOW
- PCV REDUCING PRESSURE REGULATOR W/EXTERNAL TAP
- PCV BACKPRESSURE REGULATOR W/EXTERNAL TAP
- PDCV DIFFERENTIAL PRESSURE REDUCING REGULATOR
- TEMPERATURE REGULATOR FILLED SYSTEM TYPE

INSTRUMENT SIGNAL LINES

- INSTRUMENT TO PROCESS
- CAPILLARY
- ELECTRIC
- PNEUMATIC
- HYDRAULIC
- GUIDED ELECTROMAGNETIC
- UNGUIDED ELECTROMAGNETIC
- SOFTWARE OR DCS LINK
- WIRELESS

ACTUATORS

- DIAPHRAGM ACTUATOR
- DIAPHRAGM ACTUATOR WITH HANDWHEEL
- PRESSURE BALANCED DIAPHRAGM ACTUATOR
- SINGLE/DOUBLE ACTING CYLINDER ACTUATOR
- M MOTOR OPERATED ACTUATOR
- D DIGITAL ACTUATOR
- EH ELECTROHYDRAULIC ACTUATOR
- S SINGLE SOLENOID ACTUATOR
- R S SINGLE SOLENOID ACTUATOR WITH MANUAL RESET
- HAND ACTUATOR OR HANDWHEEL
- S OFF-LINE SINGLE SOLENOID WITH SINGLE ACTUATOR
- S OFF-LINE ANGLE SOLENOID WITH SINGLE ACTUATOR
- S OFF-LINE 3-WAY SOLENOID WITH SINGLE ACTUATOR
- 4 OFF-LINE 4-WAY SOLENOID WITH SINGLE ACTUATOR
- 4 OFF-LINE 4-WAY SOLENOID WITH DOUBLE ACTUATOR
- OFF-LINE SWITCHING VALVE

PRESSURE RELIEF VALVES

- PRESSURE RELIEF VALVE
- VACUUM RELIEF VALVE
- PRESSURE/VACUUM RELIEF VALVE
- P PILOT OPERATED RELIEF VALVE
- ATMOSPHERIC PRESSURE RELIEF VALVE
- RUPTURE DISC
- CONTROLLING SIZING CASE
- FIRE ORIFICE SIZE
- 3L4 SET PRESSURE
- SET @ 10.0 barg
- NOTE 7
- PRV PRV LABEL
- PRV TYPE
- PRV SPARE RELIEF VALVE (WAREHOUSE)

FIRE AND SAFETY

- HC IR HYDROCARBON POINT DETECTOR (GD)
- IR3 TRIPLE BAND IR FLAME DETECTOR (FD)
- O2 OXYGEN DEFICIENCY DETECTOR
- H2S HYDROGEN SULFIDE DETECTOR
- LINE OF SIGHT (LoS) OF SOURCE (GDS)
- LINE OF SIGHT (LoS) RECEIVER (GDR)
- F HEAT DETECTOR (TT)
- LTD LOW TEMPERATURE DETECTOR OR FIBER-OPTIC LINEAR DETECTOR (TT)
- MAC MANUAL ALARM CALL POINT (MAC)
- MOB MANUAL ALARM CALL POINT (MAN OVERBOARD)
- HZS SHUTDOWN SWITCH
- FAP FIRE ALARM PANEL
- A AMBER STROBE (LOW OXYGEN LEVEL)
- B BLUE STROBE (TOXIC GAS)
- R RED STROBE (FIRE, COMBUSTIBLE GAS)
- AUDIBLE ALARM/ HORN
- COMBINATION HORN/BEACON

INSTRUMENT CONNECTOR

INSTRUMENT TO/FROM CONTINUATION

OFFPAGE CONNECTOR NUMBER (XXXX) — XXXX | DWG. NUMBER — TO FROM REMARKS

AIR DISTRIBUTION MANIFOLD — TRAIN NO. SEQUENCE NO. — XX-ADM-XXXX — NOTE 8

OTHER INSTRUMENTATION

- BY VENDOR
- LT INSTRUMENT FURNISHED BY EQUIPMENT SUPPLIER
- PV CONTROL VALVE LABEL
- FO GLOBE CONTROL VALVE WITH NOMINAL DIAMETER AND FAIL ACTION LABEL
- TT TE TEMPERATURE INDICATION SKIN TYPE
- TT TE TW TEMPERATURE INDICATION — NOTE 5
- TG TW TEMPERATURE GAUGE — NOTE 5
- THERMOWELL DETAIL — TW LABEL — TW — INST PIPING — NOTE 3, 5

PRIMARY ELEMENT SYMBOLS

- FE FLOW ELEMENT
- INTEGRAL INTEGRAL ORIFICE
- ORIFICE PLATE
- MULTISTAGE RESTRICTION ORIFICE
- PRE-FAB METER RUN
- ORIFICE PLATE IN QUICK CHANGE FITTING
- ORIFICE PLATE IN QUICK CHANGE FITTING AND PRE-FAB METER RUN
- VENTURI
- AVERAGING PITOT
- SINGLE PORT PITOT
- FLOW NOZZLE
- 00 FE 00 ROTAMETER
- POSITIVE DISPLACEMENT TYPE
- TURBINE OR PROPELLER TYPE
- C CORIOLIS TYPE
- TARGET TYPE
- V-CONE
- VORTEX
- M MAGNETIC
- ULTRASONIC
- FLUME
- WEIR
- SEGMENTAL WEDGE
- TH THERMAL
- CHEMICAL SEAL
- HH H ALARM HIGH HIGH LABEL / ALARM HIGH LABEL
- L LL ALARM LOW LABEL / ALARM LOW LOW LABEL
- 00 PG 00 — VG — CHEMICAL SEAL PIPING VALVE SIZE AS INDICATED
- FLOW STRAIGHTENING VANE
- FT FE FOR OTHER FLOW DEVICES (E.G. VORTEX)
- 00 PT 00 — FE FOR DP FLOW DEVICES - TYPICAL
- 00 PP 00 FLANGED CONNECTION FOR PRESSURE TEST GAUGE NOTE 2

INSTRUMENT OR FUNCTION SYMBOLS

- FIELD MOUNTED INSTRUMENT
- INSTRUMENT MOUNTED ON MAIN CONTROL ROOM PANEL
- INSTRUMENT MOUNTED BEHIND MAIN CONTROL ROOM PANEL
- INSTRUMENT FUNCTION MOUNTED ON LOCAL PANEL
- INSTRUMENT FUNCTION MOUNTED BEHIND LOCAL PANEL
- FIELD MOUNTED LIGHT
- LIGHT MOUNTED ON MAIN CONTROL ROOM PANEL
- LIGHT MOUNTED ON LOCAL PANEL
- PRIMARY DCS SHARED DISPLAY SHARED CONTROL FUNCTION ACCESSIBLE TO OPERATOR
- PRIMARY DCS SHARED DISPLAY SHARED CONTROL FUNCTION INACCESSIBLE TO OPERATOR
- AUXILIARY DCS SHARED DISPLAY SHARED CONTROL FUNCTION ACCESSIBLE TO OPERATOR
- AUXILIARY DCS SHARED DISPLAY SHARED CONTROL FUNCTION INACCESSIBLE TO OPERATOR
- I HARD WIRED INTERLOCK
- LOCAL PLC SHARED CONTROL FUNCTION
- PRIMARY PLC SHARED DISPLAY SHARED CONTROL FUNCTION ACCESSIBLE TO OPERATOR
- I PRIMARY PLC SHARED DISPLAY SHARED CONTROL FUNCTION INACCESSIBLE TO OPERATOR
- AUXILIARY PLC SHARED DISPLAY SHARED CONTROL FUNCTION ACCESSIBLE TO OPERATOR
- AUXILIARY PLC SHARED DISPLAY SHARED CONTROL FUNCTION INACCESSIBLE TO OPERATOR
- LOCAL COMPUTER SHARED CONTROL FUNCTION
- PRIMARY COMPUTER SHARED DISPLAY SHARED CONTROL FUNCTION ACCESSIBLE TO OPERATOR
- PRIMARY COMPUTER SHARED DISPLAY SHARED CONTROL FUNCTION INACCESSIBLE TO OPERATOR
- AUXILIARY COMPUTER SHARED DISPLAYED SHARED CONTROL FUNCTION ACCESSIBLE TO OPERATOR
- AUXILIARY COMPUTER SHARED DISPLAYED SHARED CONTROL FUNCTION INACCESSIBLE TO OPERATOR
- UNIT CONTROL PANEL
- C INTERLOCK FUNCTION (DCS)
- K SEQUENCING INTERLOCK (DCS)
- INTERLOCK FUNCTION (SIS)
- FGS INTERLOCK FUNCTION (FGS)
- PLC INTERLOCK FUNCTION (PLC)

INSTRUMENT SYMBOLOGY DEFINITION

THIS TABLE APPLIES ONLY TO THE FUNCTIONAL IDENTIFICATION OF INSTRUMENTS

	FIRST-LETTER		SUCCEEDING-LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION, BLOWDOWN		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE		CLOSED	CONTROL	
D	USER'S CHOICE	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE		GLASS, GAUGE VIEWING DEVICE (INDICATE)		
H	HAND	SIS (NOTE 4)			HIGH
I	CURRENT (ELECT.)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT, INDICATE, STATUS		LOW
M	USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N	USER'S CHOICE	COMPUTATION	USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, OPEN		
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE TOTALIZE			
R	RADIATION, RESTRICTION	RELIEF	RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL, ANALYSIS	VACUUM		VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE CONVERT, SOLENOID VALVE	
Z	POSITION, DIMENSION	Z AXIS SAFETY	SAFETY (HAND SWITCH)	DRIVER, ACTUATOR UNCLASSIFIED FINAL CONTROL ELEMENT	

NOTE: FOR FURTHER EXPLANATORY NOTES WITH REGARD TO ABOVE TABLE, SEE ANSI/ISA-S5.1 STANDARD ENTITLED "INSTRUMENTATION SYMBOLS AND IDENTIFICATION"

INSTRUMENT NOMENCLATURE

TAG NUMBER: XX - AAAAAA - UUnnnSSS

- TRAIN NO.
- XX AAAA UUnnnSS — FUNCTION CODE SUFFIX / SEQUENCE NO. / UNIT NO.
- XX AAAA UUnnnSS
- XX AAAA UUnnnSS — I UUnnn
- XX AAAA UUnnnSS
- SUFFIX LETTERS (FOR IDENTICAL INSTRUMENTATION IN LOOP)
- SEQUENCE NUMBER
- UNIT NUMBER
- FUNCTION IDENTIFICATION (MAXIMUM 6 CHARACTERS)
  - FIRST LETTER AND SUCCEEDING LETTER, AS PER ISA ENGINEERING STANDARD S5.1, WITH THE FOLLOWING EXCEPTIONS:
  - SUCCEEDING LETTER, READOUT OR PASSIVE FUNCTION
  - G - INDICATE (FOR FIELD MOUNTED INSTRUMENT ONLY, INSTEAD OF I)
  - L - LIGHT, STATUS, INDICATION (XL - STATUS) (ZL - POSITION INDICATION)
- TRAIN OR COMMON (00)

FUNCTION LABELS

- Σ SUMMING FUNCTION
- Σ/n AVERAGING FUNCTION
- △ DIFFERENCE FUNCTION
- K PROPORTIONAL FUNCTION
- ∫ INTEGRAL FUNCTION
- d/dt DERIVATIVE FUNCTION
- x MULTIPLYING FUNCTION
- ÷ DIVIDING FUNCTION
- SEL SELECT FUNCTION
- n√– ROOT EXTRACTION FUNCTION
- x^n EXPONENTIAL FUNCTION
- f(x) UNSPECIFIED FUNCTION
- f(t) TIME FUNCTION
- > HIGH SELECTING FUNCTION
- < LOW SELECTING FUNCTION
- ≯ HIGH LIMITING FUNCTION
- ≮ LOW LIMITING FUNCTION
- -K REVERSE PROPORTIONAL FUNCTION
- I/P CURRENT TO PNEUMATIC
- P/I PNEUMATIC TO CURRENT
- +, −, ± BIAS FUNCTION
- DIR DIRECT ACTION
- REV REVERSE ACTION

GENERAL NOTES:

1. FOR GENERAL NOTES AND SYMBOLS SEE DRAWINGS 350106-0000-00-PR-DWG-PID-0001, 0002, 0002A & 0003.
2. TEMPORARY PRESSURE TEST POINTS FOR START-UP REQUIREMENTS. HOOK UP MATERIAL TO BE PROVIDED BY COMMISSIONING AS REQUIRED. PERMANENT INSTALLATION TO BE BLINDED.
3. THERMOWELL SS FLANGE AND PIPING CS FLANGE CONNECTION RATINGS TO BE VERIFIED AGAINST ASME B31.3 TABLES BASED ON LINE DESIGN PRESSURE AND TEMPERATURE.
4. SELECTED TAGS ASSOCIATED WITH A SAFETY INSTRUMENTED SYSTEM (SIS) SHALL INCLUDE THE "Z" VARIABLE MODIFIER. IN GENERAL THIS INCLUDES:
   A. HZS - FOR FIELD/CCR PUSHBUTTONS ASSOCIATED WITH ESD AND BLOWDOWN INITIALIZATION.
   B. XZY - FOR MCC INTERPOSING RELAYS.
   C. SPECIAL APPLICATIONS AS AGREED DURING DETAIL ENGINEERING.
5. THERMOWELLS ARE TYPICALLY 2" - FLANGED EXCEPT AS NOTED. CONNECTIONS SIZE AND TYPE TO BE PROVIDED IN ACCORDANCE TO THE INSTRUMENT INSTALLATION SPECIFICATION, 350106-000-IC-SP-00008.
6. "HP" ON BUTTERFLY VALVES INDICATE THE PREFERRED SEALING SIDE. IT DENOTES WHERE THE HIGHER PRESSURE SIDE IS WHEN VALVE IS IN CLOSED POSITION. VALVE TO BE INSTALLED FOLLOWING THE INDICATED "HP" (HIGH PRESSURE) ON THE P&ID.
7. FOR PRV METALLURGY, REFER TO NOTE 54 ON 350106-0000-00-PR-DWG-PID-0001.
8. FOR AIR DISTRIBUTION MANIFOLD USER INFORMATION, REFER TO DOCUMENT 350106-0000-00-IC-GEN-IX0-0001 FOR TRAIN/ ISBL, 350106-0000-00-IC-GEN-IX0-0002 FOR OSBL/ UTILITIES, AND 350106-0000-00-IC-GEN-IX0-0003 FOR MARINE/ FST.

Woodfibre LNG — WLNG Review Approval Status

Code 1	No Comments	Work may proceed.
By: c_jonah_pitre		Date: August 12, 2024

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — L. J. GARCES # 54780

Digitally signed by Louis Joseph Garces -- P.Eng. - EGBC Date: 2024.07.22 12:45:35 -05'00'

CB&I LLC, EGBC PERMIT TO PRACTICE NUMBER 1002575

NO.	REVISION	COMPANY APPD	DRWN	CK'D	APPD	DATE
0	ISSUED FOR CONSTRUCTION	HG	BB	DS	CAS	19 Jul 24
K	ISSUED FOR ISOMETRIC CHECK	HG	BB	DS	CAS	10 May 24
J	ISSUED FOR DETAIL ENGINEERING		BB	MP	CAS	31 Mar 23
H	ISSUED FOR CLIENT REVIEW		BB	MP	BRS	22 Apr 21
G	ISSUED FOR CLIENT REVIEW		OC	MP	BRS	18 May 20

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Drawn By	Drwn Date	Chkd By	Chkd Date	Aprvd By	Aprvd Date	Scale

Woodfibre LNG — Woodfibre LNG Project

CLIENT DWG NO:

PIPING & INSTRUMENTATION DIAGRAM

GENERAL
INSTRUMENT SYMBOLOGY

FOR: Woodfibre LNG Limited

PROJ. NO:	DWG NO:	REV:
350106	350106-0000-00-PR-DWG-PID-0003	0

Based on Form: CMS-830-00-SD-02302; MDR_D_Process_dyn.dwg

WOODFBR - \COMMON\000\350106-0000-00-PR-DWG-PID-0003.pid - 7/19/2024 4:43:53 AM - [KT07]

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APPENDIX 4.2-4: OILY WATER TREATMENT SYSTEM PROCESS GUARANTEE

Cannon Artes S.P.A.
Via Irno 221 - 84135 Salerno (Sa) Italy +39 089 271717
Via Resistenza 12 - 20068 Peschiera B.meo (Mi) - Italy +39 02 55302848
artes@cannon.com cannonartes.com

Cannon Artes

To:
CB&I, LLC.
915 N. Eldridge Parkway
Houston, TX, 77079

Salerno, 26/Sep/25

OBJECT: 350106 - Woodfibre LNG-PO-11417-02 Oily Water Treatment Package – Compliance with Discharge Requirements

In reference to the package in question, we hereby confirm that it has been designed in full compliance with the applicable discharge requirements.

Specifically, the system has been engineered to ensure the following minimum discharge standards:

- Total Suspended Solids (TSS): less than 25 mg/L
- Extractable Petroleum Hydrocarbons (EPH): less than 15 mg/L

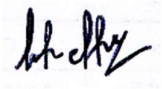
considering the following influent water quality:

- EPH (influent): 0 to 200 mg/L
- TSS (influent): 10 to 200 mg/L

NOTE: EPH physical state is free oil.

Sincerely,

Mr. Antonio Catalano (PM)



APPENDIX 4.2-5: CANNON ARTES EXPERIENCE LIST FOR CPI OIL SEPARATOR

WOODFIBRE LNG

CANNON ARTES REFERENCE LIST FOR OIL SEPARATOR - CPI

Project	Contractor	End user	Year
TILENGA	McDermott	TotalEnergies	2022
WEST TO EAST PIPELINE	ENPPI	ADNOC	2022
Borouge 4 U&O	TECNIMONT S.P.A	Abu Dhabi Polymers Co.	2022
GEMLIK GUBRE	TECNIMONT	Gemlik Urea Fertilizer	2021
New Water Treating Facilities (Brownfield & Greenfield)	Petrofac ISKER LLP	North Caspian Operating Company N. V	2021
WEST QURNA 2	SICIM S.p.A.	LUKOIL	2021
PETROCHEMICAL COMPLEX IN SOUTH OF VIETNAM	TECHNIP ENERGIES	Long Son Petrochemicals Co., Ltd	2019
Bottom of the Barrel	N.A.	CEPSA - Compania Espanola de Petroleo S.A.U.	2019
SINGAPORE EXPANSION PRJ	N.A.	NESTE SINGAPORE PTE LTD	2019
OKPAI 2	SAIPEM	NAOC	2018
CEC BoP phase II	SAIPEM	BOSCONGO	2018
SIBA FIELD DEVELOPMENT	PETROJET	Kuwait Energy	2016
Reggane Nord Development	PETROFAC	Sonatrach/Repsol/RWE	2015
Alrar Boosting Facilities	PETROFAC	SONATRACH	2014
CENTRALE ELECTRIQUE EN CYCLE COMBINE KAIS	GS E&C DAELIM	COMPAGNIE DE L'ENGINEERING DE L'ELECTRICITE ET DU GAZ	2014
Turkmenbashi Complex of Oil Refineries	PETROGAS	Turkmenbashi Complex of Oil Refineries	2014
Tsung Hsiao Power Plant	CTCI Corporation	Taiwan Power Company	2014
Tempa Rossa Oil Field Development	TECNIMONT	TOTAL	2013
Suriname Refinery expansion	SAIPEM	Staatsolie	2011
DAHAB FIELD DEVELOPMENT PHASE II	BONATTI S.p.A.	Zueitina Oil Company	2010
Sonatrach - Algeria	ABB Lummus Global	Sonatrach	2002
CEMENTIR Taranto Factory	N.A.	CEMENTIR	1997

NOTE: The referenced projects were selected based on their technical similarity to the Woodfibre LNG Oil Water Treatment Package, including alignment in treatment processes and treated-water discharge criteria.

APPENDIX 4.2-6: OPERATIONS & MAINTENANCE

APPENDIX 4.2-6-1: OPERATIONS & MAINTENANCE MANUAL FOR OILY WATER TREATMENT SYSTEM

APPENDIX 4.2-6-2: SCHEDULE OF MANUFACTURER'S COMMISSIONING AND START-UP AND 2 YEARS OPERATION SPARES

APPENDIX 4.2-6-3: CONTROL PHILOSOPHY AND LOGIC DIAGRAM FOR OILY WATER TREATMENT SYSTEM

APPENDIX 4.2-6-4: CAUSE AND EFFECT CHARTS FOR OILY WATER TREATMENT SYSTEM

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SUPPLIER DOCUMENT COVER SHEET

Woodfibre LNG

350106 Woodfibre LNG Project

Supplier Name:	Cannon Artes spa
Purchase Order Title:	Oily Water Treatment Package
Equipment / Tag Number(s):	01-A-6417
Supplier Document No:	MO.23.287-03
SDR Code:	M03

Supplier's Revision Record

Rev	Date	Issue State	By	Checked	Approved
1	6-Jun-25	Issued for Review	ES	CI	AC

Project Document Number

Project Number	Purchase Order Number		Seq. No.	
350106	PO-11417-02	SD	000082	1

DOCUMENT TITLE: **Operating and Maintenance Manual**

SUPPLIER DOCUMENT REVIEW STATUS

Purchaser's review of Supplier's documents does not relieve Supplier of the responsibility for correctness under the Purchase Order. Permission to proceed does not constitute acceptance of design, detail and calculations, test methods or materials developed or selected by the Supplier and does not relieve the Supplier from full compliance with the Purchase Order or any other obligations, nor detract from any of the Purchaser's rights.

Purchaser's Review Stamp

MCDERMOTT
Woodfibre LNG EPFC Project
Project No. 350106

Engineering Review Status
Code 2 - Reviewed with Minor Comments
Reviewed with minor non-technical comments. Supplier is to address comments and resubmit immediately

By: parveen.parveen
Date: June 24, 2025

These comments do not relieve the supplier of his responsibility to meet the requirements of the PO.

O&M details of PDB shall be included once available.

Should the Supplier consider that any comments made by the Purchaser change the Scope of Supply, the Supplier shall advise the price and delivery implications of such changes within five working days of receipt. The Supplier must not incorporate such changes without prior approval of the Purchaser of the revised price and/or delivery period. RETROSPECTIVE CLAIMS WILL NOT BE CONSIDERED.

This document consists of this front sheet plus 1842 number of pages.

Operating and Maintenance Manual Table of Contents

Project Name : **350106 Woodfibre LNG**
Purchase Order Number : **PO-11417-02**
Package Description : **Oily Water Treatment Package**
Supplier's Name : **Cannon Artes Ingegneria**

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	1		**Index**					
		1.1			PURPOSE		4	
		1.2			DEFINITIONS		4	
		1.3			LIST OF ABBREVIATIONS		4	
		1.4			INSTALLATION AND AMBIENT CONDITION		5	
		1.5			OILY WATER INLET DATA		5	
		1.6			TREATED WATER CHARACTERISTICS		6	
		1.7			PROCESS DESCRIPTION		6	
	2		**Description**					
		2.1	350106-PO-11417-02-SD-000033		Piping and Instruments Diagram			01
		2.2	350106-PO-11417-02-SD-000040		General Arrangement Drawing of main equipment (plot plan)			01
		2.3	350106-PO-11417-02-SD-000043		Base Plate/ Foundation Drawing			01
		2.4	350106-PO-11417-02-SD-000070		Process & Sizing Calculations			01
		2.5	350106-PO-11417-02-SD-000012		Oily Water Treatment Package Data Sheet 01-A-6417	01-A-6417		01
		2.6	350106-PO-11417-02-SD-000013		CPI Separator 01-H-6417-41 Data Sheet	01-H-6417-41		01
		2.7	350106-PO-11417-02-SD-000014		Monoscrew Pumps 01-P-6417-21A/B Data Sheet	01-P-6417-21A/B		01
		2.8	350106-PO-11417-02-SD-000015		Centrifugal Pumps 01-P-6417-22A/B Data Sheet	01-P-6417-22A/B		01
		2.9	350106-PO-11417-02-SD-000016		Monoscrew Pumps Motors 01-M-6417-21A/B Data Sheet	01-M-6417-21A/B		01
		2.10	350106-PO-11417-02-SD-000017		Centrifugal Pumps Motors 01-M-6417-22A/B Data Sheet	01-M-6417-22A/B		01
		2.11	350106-PO-11417-02-SD-000018		Temperature Transmitters Data Sheet	01-TT-64235 & 01-TT-64236		01
		2.12	350106-PO-11417-02-SD-000019		Analyzers Data Sheet	01-AT-64241 & 01-AT-64242		01
		2.13	350106-PO-11417-02-SD-000020		Pressure Gauges Data Sheet	01-PG-64238 & 01-PG-64239		01
		2.14	350106-PO-11417-02-SD-000021		Automatic and Manual Valves Data Sheet	V646550, V646543, V646530, V646531, V646532, V646533, V646544, V646545, V646534, V646535, V646536, V646540, V646541, V646562, V646560, V646565, V642529, V646538, V646539, V646568, V646563, V646561, V646559, V646567, V646566, V646555, V642550, V646551, V646553, V646549, V646564, V646552, V646547, V646548, V646542, V646546, 01-XV-64244, 01-XV-64243		01
		2.15	350106-PO-11417-02-SD-000022		PSV Data Sheet	01-PRV-64222 & 01-PRV-64223		01
		2.16	350106-PO-11417-02-SD-000023		Heaters 01-HE-6417-31 & 01-HE-6417-32 Data Sheet	01-HE-6417-31 & 01-HE-6417-32		01
		2.17	350106-PO-11417-02-SD-000024		Skimmer Data Sheet	01-Z-6417-61		01
		2.18	350106-PO-11417-02-SD-000111		OIL SKIMMER MOTOR 01-M-6417-61 Data Sheet	01-M-6417-61		01
		2.19	350106-PO-11417-02-SD-000114		Flow transmitter Data Sheet	01-FT-64237		01
		2.20	350106-PO-11417-02-SD-000115		Level Transmitters Data Sheet	01-LT-64231 & 01-LT-64232 & 01-LT-64233		01
		2.21	350106-PO-11417-02-SD-000038		Electrical Single Line Diagram			01
		2.22	350106-PO-11417-02-SD-000063		Instrument Connection / Wiring Diagrams			01
		2.24	350106-PO-11417-02-SD-000076		Utility Consumption List			01
		2.25	350106-PO-11417-02-SD-000052		Hook-Up Drawings			01
		2.26	350106-PO-11417-02-SD-000050		Control Panel/ Console/ Cabinet Layout Dawings	01-UCP-A6417-01 01-PDB-6417		01
	3		**Installation**					
		3.1	350106-PO-11417-02-SD-000096		Transport, Storage and Preservation Requirements			01
		3.2	350106-PO-11417-02-SD-000110		Bill of Materials for ship loose items			01
		3.3	350106-PO-11417-02-SD-000080		Erection and Installation Procedures			01

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Purchase Order Number : **PO-11417-02**
Package Description : **Oily Water Treatment Package**
Supplier's Name : **Cannon Artes Ingegneria**

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	4		**Commissioning Instruction**					
		4.1	350106-PO-11417-02-SD-000099		Pre-Commissioning/ Commissioning Procedure			01
	5		**Operating**					
		5.1	350106-PO-11417-02-SD-000034		Control Philosophy and Logic Diagram			01
		5.2	350106-PO-11417-02-SD-000036		Cause and Effect Charts			01
		5.3	350106-PO-11417-02-SD-000058		Modbus List			01
		5.4			Operator Training and Qualifications		7	
	6		**Maintenance**					
		6.1	350106-PO-11417-02-SD-000005		Schedule of Manufacturer's Commissioning and Start-Up and 2 Years Operation Spares			01
		6.2	350106-PO-11417-02-SD-000006		Lube Oil and Operating Fluids Schedule			01
	7		**Annex**					
		7.1			IOM for Monoscrew Pumps 01-P-6417-21A/B	01-P-6417-21A/B	8	02
		7.2			IOM for Centrifugal Pumps 01-P-6417-22A/B	01-P-6417-22A/B	9	02
		7.3			IOM for Monoscrew Pumps Motors 01-M-6417-21A/B	01-M-6417-21A/B	8	03
		7.4			IOM for Centrifugal Pumps Motors 01-M-6417-22A/B	01-M-6417-22A/B	9	04
		7.5			IOM for Temperature Transmitters	01-TT-64235 & 01-TT-64236	10	
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NOTE

01. Reference document. Not included in IOM.
02. IOM for auxiliary items e.g. gear, mechanical seal, coupling is part of parent equipment (i.e. pump) IOM.
03. Included in 7.1
04. Included in 7.2.

1.1 PURPOSE

This document contains technical information useful for installation, commissioning, start-up, operating and maintenance of the Oily Water Treatment Package 01-A-6417 supplied for this project and prefabricated at Vendor workshop:

PROJECT NAME	:	350106 Woodfibre LNG Project
PLANT LOCATION	:	Howe Sound Woodfibre site, Squamish, BC, Canada
CONTRACTOR	:	MCDERMOTT
OWNER'S NAME	:	WOODFIBRE LNG
P.O. NO.	:	350106-PO-11417-02
P.O. DESCRIPTION	:	OILY WATER TREATMENT PACKAGE
ITEM NO.	:	01-A-6417
VENDOR JOB No.	:	23.D.287

1.2 DEFINITIONS

COMPANY/OWNER:	Principal end user – Woodfibre LNG Limited (WLNG)
CONTRACTOR:	Party appointed by COMPANY to carry out EPC services for the Project – McDermott (MDR)
PROJECT:	Woodfibre LNG Project
PURCHASER:	Entity placing the order i.e., McDermott / MDR
SUPPLIER:	Party responsible for furnishing the equipment, Cannon Artes S.p.A (also referred as Artes)
SPECIFICATIONS:	All applicable technical documents included in material requisition

1.3 LIST OF ABBREVIATIONS

DCS	Distributed Control System
PDB	Power Distribution Board
UCP	Unit Control Panel
PLC	Programmable logic controller
HMI	Human Machine Interface
CPI pack	Corrugated Plate Interceptor - Coalescer pack
TSS	Total Suspended Solids

1.4 INSTALLATION AND AMBIENT CONDITION

Location	Onshore, outdoor, uncovered
Climate	Saline Air, Freezing Temperatures and Snow
Maximum Air Temperature	+38 °C
Minimum Air Temperature	-16 °C
Design Temperature (mechanical)	-29 / +70 °C
Elevation	8.5 mt
Humidity Design Criteria (min/max)	70.6 % / 86.4 %
Average Annual total precipitation (rain + snow water equivalent)	2200 mm
Average annual snowfall	637 mm
Hazardous Area	Classified. All motors & instruments within the package shall be suitable for minimum Class 1, Zone 2, Group II A/B, T3.
Enclosure rating	CSA Type 4X (minimum)
Seismic	Per specification 350106-000-CS-BD-00003.0001 Site Class B, Seismic Category III
Basic Wind Speed (Vb) (10 min mean, 50 yrs return period)	27.8 m/s

1.5 OILY WATER INLET DATA

Flammable/ Explosive	No / No
Toxic	No
Average Free Oil and Grease	0 to 200 ppm
Total Suspended Solids Content	10 to 200 ppm
Temperature	10°C
Range of specific gravity of Oil	0.85 to 0.94

1.6 TREATED WATER CHARACTERISTICS

Total Suspended Solids (TSS)	25 ppm Max.
Free Oil and Grease	10 ppmv (No visible sheen)

1.7 PROCESS DESCRIPTION

The Oily Water Treatment Package 01-A-6417 is provided for the removal of free and dispersed oil and settleable & suspended solids from the oily water received from Oily Water Storage Tank 01-T-6469. The Oily Water Storage Tank 01-T-6469 (by others) collects the oily water from oily water sumps.

The PACKAGE INLET FEED PUMP 01-P-6417-21 A/B (provided loose by Artes and installed by MDR in upstream package) take suction from the Oily Water Storage Tank 01-T-6469 and feeds the Oily Water Treatment Package (at TP 201) with a fixed flowrate of 30 m^3/hr.

The Oily Water Treatment Package 01-A-6417 duty is a 12 hour batch operation.

The Oily Water Treatment Package is mainly composed by:

- Two PACKAGE INLET FEED PUMPS 01-P-6417-21 A/B (2x100% (1 DTY, 1 STB)) - Positive displacement type

- One CPI SEPARATOR 01-H-6417-41 (1X100%)

- Two TREATED WATER FORWARDING PUMPS 01-P-6417-22 A/B (2 x 100 % (1DTY-1STB)) – Centrifugal type

The CPI SEPARATOR 01-H-6417-41 is designed to separate oil with droplet size of 60 microns and bigger at a maximum flowrate of 30m3/hr. It is equipped with CPI pack and a motorized belt skimmer.

When the oil-water flows through the CPI pack, the oil rises to the liquid surface while the suspended solids settle to the bottom of the separator (hopper). The skimmer automatically starts when the package starts and is operating continuously collecting the oil on the surface and depositing it to the skimmed oil compartment (which is part of CPI separator).

The recovered oil (concentration 70%) is stored in the skimmed oil compartment, which will be emptied periodically (approximately after 10 batch operations of 12 hours) by a vacuum truck equipped with vacuum suction pump (by Client).

The sludge stored in the hopper is at 1% concentration. The hopper is emptied of the sludge periodically (after every single batch operation of 12 hours) by a vacuum truck equipped with vacuum suction pump for off-site disposal (by Client).

The treated water from the separator overflows the weir directly into the treated water compartment (which is part of CPI separator). The treated water compartment is emptied using the TREATED WATER FORWARDING PUMP 01-P-6417-22 A/B (one on line one in standby) and is disposed via outlet line to Howe Sound (by others).

5.4 Operator Training and Qualifications

SUPPLIER shall be responsible for the training of OWNER's technical personnel at SUPPLIER's premises or at OWNER's PROJECT SITE.
SUPPLIER has allowed for three (3) calendar days for such training and SUPPLIER has allowed for (10) of OWNER's personnel to attend such training & provision of manuals to trainees.

Operator training enables operators to acquire the skills needed to handle the package safely and efficiently. The primary goal is to prepare operators to handle real-world situations, including emergency situations, without putting the plant or personnel at risk.

The training consists of theoretical lessons (with the help of explanatory slides) and practical lessons (with simulation of operation in UCP) provided by a SUPPLIER qualified site supervisor.
At the end of each lesson there is a section for questions and answers.

The training procedure covers the following topics:

- Safety
- Common terminology
- Chemical/physical processes theory
- Unit description and overview
- Design criteria
- Equipment operation
- Operation, Control philosophy and start-up
- Troubleshooting and Problem Solving
- Maintenance

At the end of the course a personal attendance certificate is issued for each operator.

7.1 IOM for Monoscrew Pumps 01-P-6417-21A/B

Installation, Operation & Maintenance Manual (IOM)	*Company Document Number*: **N/A**	
	Revision: **00**	*Status:* **IFR**
Vendor Document Number : **PCM500**	*Rev. Date:* **02/08/2024**	
Vendor Name : **PCM**	*Page* **1 of 229**	
PO Title : **WOODFIBRE LNG PROJECT / INLET FEED PUMPS**	*PO Nr:* **30-2400309**	

Cannon Artes

00	IFR	02-Aug-2024	Issued for Review	BDE	GLL	AHA
Rev.	***Status***	***Date***	***Revision Description***	***Issued by***	***Checked by***	***Approved by***

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Vendor Name : **PCM**	*Page* **2 of 229**	
PO Title : **WOODFIBRE LNG PROJECT / INLET FEED PUMPS**	*PO Nr:* **30-2400309**	

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Vendor Name : **PCM**	*Page* **3 of 229**	
PO Title : **WOODFIBRE LNG PROJECT / INLET FEED PUMPS**	*PO Nr:* **30-2400309**	

1. Pump

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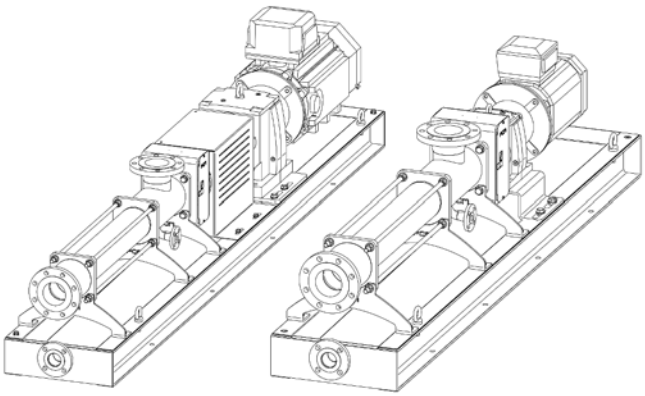
keep it moving

INSTRUCTION MANUAL

TO BE KEPT FOR FUTURE REFERENCE

PCM Moineau™ A pump

Models: 003A24 – 05A12 – 1A12 – 1A36 – 3A12 – 6A6 – 6A12 – 6A24 – 13A6 – 13A12 – 13A24 – 25A6 – 25A12 – 25A24 – 40A6 – 40A12 – 60A6



Document No.: NIPMAM03EN (genuine manual)

Date issued: 12/2019

PCM Technologies S.A.S.

6 Boulevard Bineau – 92300 Levallois-Perret – France

Phone: +33 (0) 1.77.68.31.00 – www.pcm.eu – contact@pcm.eu

Declaration of Conformity

We declare that the subassembly described below complies with the requirements of the Machinery Directive 2006/42/EC.

The subassembly complies with the harmonised standard EN ISO 12100.

Champtocé sur Loire, 16/11/2015

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1. Introduction

1.1. General

The pump you have just acquired was manufactured and inspected with the utmost care.

This manual contains information for qualified and authorised personnel on how to install, commission, run and maintain the equipment mentioned on the front cover. It also contains important information regarding safety and potential hazards related to the equipment. Users should read these instructions carefully before carrying out any commissioning, repair or maintenance work on or near the equipment.

The information contained in this manual may not be copied or published in any form whatsoever, whether by printing, photography, recording on microfilm or any other means (electronic or mechanical) without the prior written consent of PCM.

The information given in this manual is subject to change without notice.

PCM or its representatives decline all responsibility in the event of damage resulting from the use of this manual. This exemption from responsibility applies to damage of all types, including (without any limit) compensatory damages, whether direct or indirect, loss of data, profits or return of capital, loss or damage caused to the property of others, and third-party claims.

PCM or its representatives accept no responsibility and do not guarantee the accuracy, completeness, or up-to-date nature of the information contained in this manual.

1.2. Limits of the guarantee



Before performing any maintenance operations on the pump, check that all necessary precautions have been taken: upstream and downstream valves closed, pipework cleaned and purged, electrical power supply disconnected and disabled. Check also that all the usual precautions have been taken in accordance with the regulations in force regarding the safety of personnel.

On receiving the pump, examine it immediately to check that no signs of damage are apparent. If it is visibly damaged, indicate clearly on the carrier's documents that the merchandise was received damaged, with a brief description of the type of damage observed. If you decide to accept the equipment, please send a registered letter with acknowledgement of receipt to the carrier within forty-eight hours, with a copy to your PCM service centre.

Comply with handling and storage conditions (see page 38).

To avoid all risk of damage or accidents (in particular when the products being conveyed are hazardous), it is essential that you do not use the equipment for an application other than the one provided for in our Technical description (see Appendices).



WARNING: To maintain the original qualities of the pump and to preserve the PCM guarantee on the equipment as well as compliance with the machines directive, it is essential to use genuine PCM parts only.

1.3. Information regarding residual risks

PCM have taken into account all internal risks for the equipment and draw the attention of the user to the residual risks if the following verifications are not carried out:

- Compliance with the pump conditions of use.
- Fixing of the pump.

- Connections of the pipework to and from the pump.
- Installing security devices against overpressure, cavitation and frost.
- Installing accessories to prevent foreign bodies from entering the pumping circuit.
- Compliance with the electrical wiring instructions.
- Continuous feeding of the pump.
- Leak tightness of the assembly.
- For maintenance purposes, all necessary precautions against hazardous fluids.
- Compliance with the operating and maintenance instructions.
- Protection casing in place.
- Exclusive use of original PCM parts.

1.4. Environment

PCM is committed to an environmental protection initiative in accordance with the recommendations of the ISO 14001 standard.

PCM has set up a system through which its customers can ask PCM to handle the disposal of waste material (used pumps and spare parts). This system is especially useful for the disposal of parts containing elastomers, such as the stators of eccentric rotor pumps or hoses from peristaltic pumps.

All returns must be sent to the PCM factory, carriage paid. The equipment must be clean, with the pump and drive completely emptied of products, and must arrive with the sheet entitled: risk prevention (see Appendices)

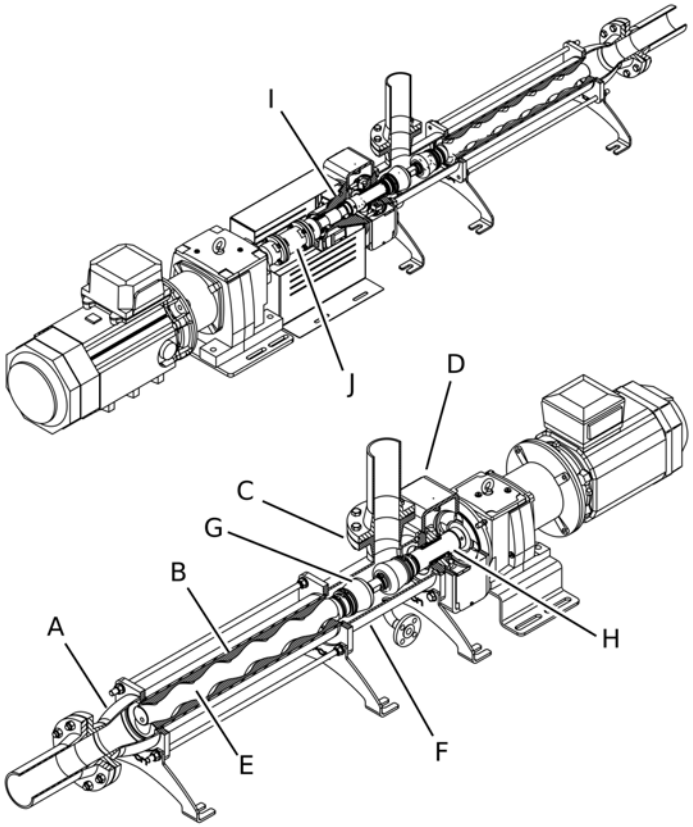
All items returned for this purpose must be legibly marked with the words 'Equipment to be recycled'.

Send to: PCM – Rue René Moineau – 49123 Champtocé-sur-Loire – France

2. Characteristics and installation

2.1. Operating principle

2.1.1. Principle of the pump



A: Stator flange (discharge or suction port). B: Stator. C: Body flange (discharge or suction port). D: Spacer. E: Rotor. F: Body. G: Connecting rod. H: Drive shaft. I: Bearing. J: Coupling.

The PCM Moineau™ progressing cavity pump (or eccentric screw pump) essentially consists of two internal helical gears, which have the following features:

- The stator, which is the external element, has one more lobe than the rotor, which is the internal element.
- In any given cross-section, each section of the rotor is in contact with the stator, creating a helical seal line along the pump.
- The helical pitch of the stator is double that of the rotor.

The PCM Moineau™ A series pump is designed according to the principles of API Standard 676 (Positive Displacement Pumps – Rotary).

When the rotor is positioned in the stator, a series of watertight cavities is created. Consequently, when the rotor turns inside the stator, these cavities progress spirally around the outside of the rotor, conveying the fluid from the inlet to the outlet.

The PCM Moineau™ pump is a volumetric pump whose displacement is equal to the volume of one cavity. The drive system is directly attached to the pump by a flange, and drives the rotation of the rotor via a connecting rod.

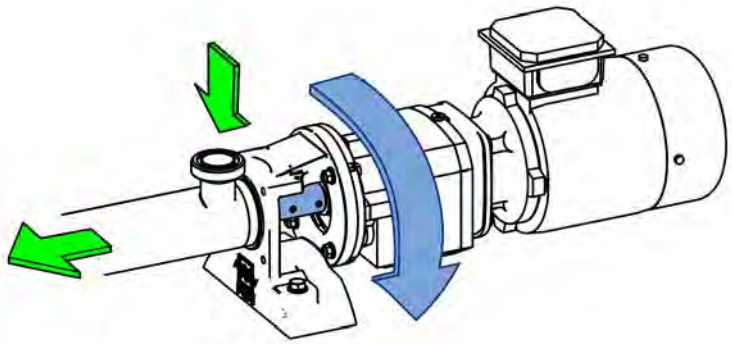
The body design allows the port to be positioned in the most suitable orientation for the pumping conditions (vertical, horizontal, right or left).

The body has a boss enabling drainage. An optional flanged drainage port is available.

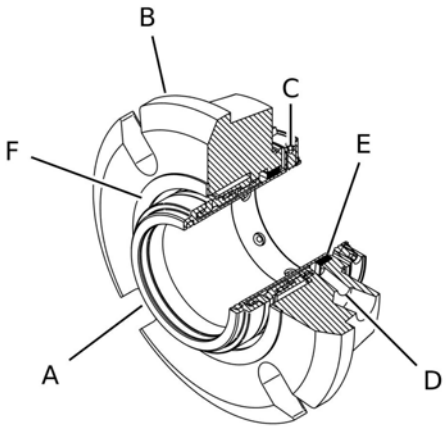
A baseplate, with or without a drip pan, is also available with the pump.

2.1.2. Pump rotation direction

For a discharge on the stator port side, the rotor rotates anticlockwise when viewed from the drive end. The suction connection (flange) is marked on the pump. The other connection (flange) is for the discharge (see "Equipment Installation" section, page 15).



2.1.3. Sealing by single mechanical seal



A: Sleeve. B: Body. C: Set screw. D: Orifice. E: Fix throttle bushing. F: Flat seal.

At the drive shaft, the seal between the pump body and the atmosphere is provided by a single cartridge-type mechanical seal system:

The cartridge-type mechanical seals enable rapid assembly with no need for adjustments. They must be installed in one piece.

The stationary ring is immobilised in the body (B). A rotating ring is installed on the sleeve (A), mounted on the drive shaft and fixed using set screws (C). The rotating ring comes into contact with the stationary ring via a spring. The thrusting force of the spring is preset in the factory.

The mechanical seal is equipped with lubrication orifices:

- FO ("Flush Out") orifice for lubricating the friction surfaces on the process fluid side.
- Q ("Quench") and D ("Drain") orifices for quenching the atmosphere side or collecting leaks.

Under normal operating conditions, there may be a slight leak. The mechanical seal is equipped with a fix throttle bushing (E) to contain this leak.

An optional single mechanical seal complying with API 682 is available.



NOTE: a mechanical seal must not run dry.
The auxiliary lubrication system must be clean and filtered.
The parts that receive the mechanical seal must be clean and free of defects.
Never separate the sleeve from the body.
Ensure that installation is performed under conditions of strict cleanliness.
During assembly, never force a part into position.

2.1.4. Sealing by double mechanical seal

The double mechanical seal is of cartridge type and must be installed in one piece. It consists of two single lubricated mechanical seals mounted front to back. The product to be sealed is insulated from the atmosphere by a barrier fluid confined between the two mechanical seals. With this type of seal, the pressure of the barrier fluid must be higher than the pressure of the product to be sealed.

The use of a double mechanical seal is mainly recommended with products with little lubrication, products that are very heavily solids laden or products that are dangerous in contact with the atmosphere.

The lubrication orifices are the following:

- LBI and LBO for the entry and exit of the barrier fluid
- V (if present) for venting
- D (if present) for drainage

An optional double mechanical seal complying with API 682 is available.

2.2. Markings

Information shown on the pump motor unit or on an identification plate attached to the pump:

- Manufacturer name and address.
- Serial Number
- The displacement (depending on the case) and the rotation speed of the pump unit.
- Maximum allowable pump pressure, according to its motor.
- Customer reference (optional).
- Year of manufacture.

This information is essential when ordering spare parts (contact the PCM service centre).



Pump characteristics (e.g. flow rate, pressure, speed of rotation, construction, direction of pump rotation, etc.) must not be modified without written permission from our customer services department.

2.3. Build Specifications

2.3.1. Pump

The materials used are as follows:

Element	Models	Material(s) used
Stator	All	NBR, FPM (FKM)
Sheath	All	NBR, FPM (FKM)
Static seal	All	NBR, FPM (FKM)
Dynamic seal	All	See section below
Rotor	003A24, 05A12, 1A12	X2CrNiMo17-12-2 (1.4404 /AISI 316L - Optional chromium plating)
	1A36, 3A12, 6A6, 6A12, 6A24, 13A6, 13A12, 13A24, 25A6, 25A12, 25A24, 40A6, 40A12, 60A6	X30Cr13 (1.4028 / AISI 420 – Optional chromium plating) - X2CrNiMoN22-5-3 (1.4462 / AISI 329 LN)
Drive shaft	All	X2CrNiMoN22-5-3 (1.4462 / AISI 329 LN)
Sleeve	25A6, 25A12, 25A24, 40A6, 40A12, 60A6	X30Cr13 (1.4028 / AISI 420)
Body / Pipe	All	S235JR (1.0037) - X2CrNiMo17-12-2 (1.4404 / AISI 316L) - X2CrNiMoN22-5-3 (1.4462 / AISI 329 LN) – Others on request
Brace	All	S355JR(1.0045)
Baseplate	All	S235JR (1.0037)
Drip pan	All	S235JR (1.0037)
Rod	003A24, 05A12, 1A12	X2CrNiMoN22-5-3 (1.4462 / AISI 329 LN)
	1A36, 3A12, 6A6, 6A12, 6A24, 13A6, 13A12, 13A24, 25A6, 25A12, 25A24, 40A6, 40A12, 60A6	Nitrided 30CrNiMo8 (1.6580 with or without E-CTFE coating)

The material designation comply with the AFNOR standard.

NOTE: The PCM Moineau™ A series pumps are designed to resist corrosive environments. This includes the systematic use of painting systems dedicated to C3 and C5M environments (following ISO 12944) for parts that may oxidise and the use of stainless steel.

The process and details of how these painting systems are applied are defined in the technical description.

PCM Moineau™ A series pumps are equipped with ANSI B16.5 Class 150 or 300 flanged connections.

2.3.2. Dynamic seal

The materials used for the dynamic seals are as follows:

Element	Material(s) used
Mechanical seal body	X2CrNiMo17-12-2 (1.4404 / AISI 316L)
Friction surfaces of mechanical seal	Silicon carbide / silicon carbide
O-rings	FPM (FKM)
Flat seal	Glass-filled PTFE

Other materials are available on request.

2.3.3. Allowable force and torque

The admissible forces and moments are defined by the API 676 standard.

Examples of maximum admissible forces and moments on the suction and discharge flanges:

Models	Flange	Max. forces Fx, Fy and Fz	Max. moments Mtx, Mty and Mtz
003A24, 05A12, 1A12	Class 150 / Class 300 DN25 (NPS 1")	650 N (150 lbf)	350 Nm (250 lbf.ft)
1A36, 3A12, 6A6, 6A12A, 6A24, 13A6, 13A12	Class 150 / Class 300 DN50 (NPS 2")	650 N (150 lbf)	350 Nm (250 lbf.ft)
25A6, 25A12, 13A24	Class 150 / Class 300 DN80 (NPS 3")	1040 N (225 lbf)	560 Nm (375 lbf.ft)
25A24, 40A6, 40A12, 60A6	Class 150 / Class 300 DN100 (NPS 4")	1300 N (300 lbf)	700 Nm (500 lbf.ft)

2.4. General Dimensions

The general dimensions and weights are available in the appendix as per the following drawing(s):

Model	Drawing number
003A24, 05A12, 1A12	TPE00569
1A36, 3A12, 6A6, 6A12, 6A24, 13A6, 13A12	TPE00567
25A6, 25A12, 13A24	TPE00568
40A6, 40A12, 25A24, 60A6	TPE00570
Motors	TPE00571, TPE00572

2.5. Operating Specifications



WARNING: Pumps do not tolerate dry running.



WARNING: Pump specifications (capacity, pressure, speed of rotation, construction, etc.) must not be changed without written authorisation from our Customer Service Department.

The specifications are indicated on the technical description of the equipment supplied.

The A-weighted sound pressure level (SPL) of pumps manufactured by PCM is below 80 dB(A), in compliance with the European directive in force concerning noise from motor-driven equipment.

PCM Moineau™ A Series pumps are used in the oil industry.

Their design enables them to pump any type of fluid, including aqueous solutions, oils and hydrocarbons, flashing or not. The body drain enables these fluids to be evacuated for cleaning or maintenance. These fluids are collected in the drip pan (available as an option) and can be evacuated by connecting an outlet flange.

IMPORTANT: The operating temperature limit is determined by the stator material and the specifications given in the technical description provided in Appendix.

2.5.1. Pump performance

The pumps in the PCM Moineau™ range are volumetric pumps. This means that fluid is moved by imprisoning a certain quantity of fluid in a cavity created between the rotor and the stator. The flow is then generated by rotating the rotor relative to the stator.

The cavities must be sufficiently sealed to enable pumping by generating pressure and thus to produce good hydraulic efficiency. But they must also allow a slight degree of internal leakage to lubricate the contact between the rotor and the stator in order to improve mechanical efficiency and extend the life of the components. The internal leakage rate thus plays an important role in the performance of a Moineau™ pump.

As the overall efficiency of a volumetric pump is the product of the hydraulic efficiency and the mechanical efficiency, the efficiency of a PCM Moineau™ pump will depend on the compromise made with regard to the internal leakage rate, as shown by the table below:

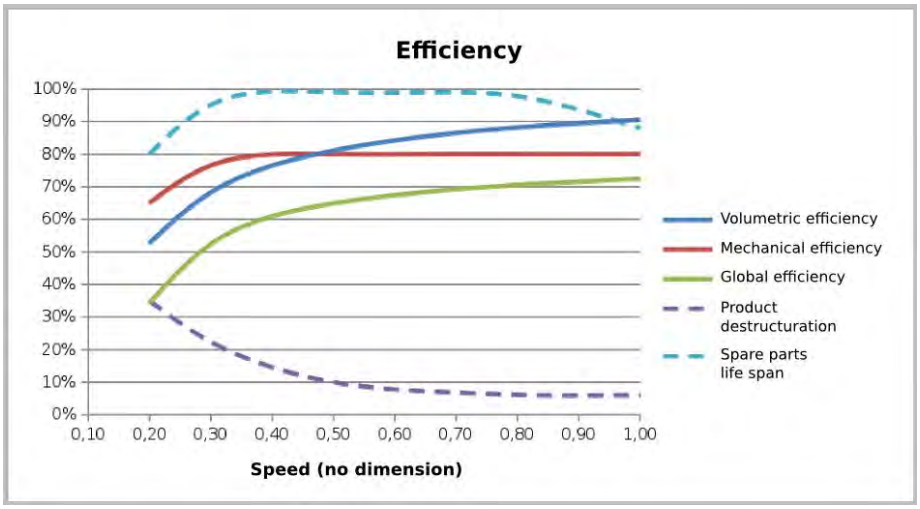
Parameter	Action	Hydraulic efficiency	Mechanical efficiency
Internal leakage rate	↗	↘	↗
	↘	↗	↘

2.5.2. Influence of rotation speed

As the internal leakage rate is independent of the rotation speed, we can increase the volumetric efficiency by increasing the rotation speed, as shown by the graph below.

In addition, the integrity of the product being pumped depends mainly on the leakage ratio. The leakage ratio is the ratio between the internal leakage rate and the total pump flow rate. Increasing the rotation speed thus reduces the leakage ratio and better respects the product being pumped.

With regard to the components' lifetimes, too low a rotation speed does not allow the hydrodynamic lubrication film to form, thus limiting the components' lifetimes. Too high a rotation speed, however, places too much mechanical stress on the components, as shown by the graph below.



Manufacturing tolerances, chemical attack on the elastomers and wear of the rotor and stator components can cause the internal leakage rate to vary from the flow rate initially predicted.

The following points should be noted:

- The flow rate will be better controlled if the leakage ratio is reduced, and thus the rotation speed slightly increased (>150 rpm). **The rotation speed must be maintained above 80 rpm during all the phases of the**

pump's use.

- Respect for the integrity of the product increases with the pump's rotation speed.
- Due to the component manufacturing tolerances, two different stators may produce slightly different flow rates. The flow rate of the pump should thus be checked when new parts are installed.
- If the stator is not subject to chemical degradation or mechanical wear, the flow rate of the pump will remain constant.

2.5.3. Performance curves

The rotational speeds and pressures shown on the curves represent typical performance characteristics obtained with water at 20°C. When operating conditions differ from this standard, the performance characteristics must be adjusted according to:

- product characteristics (viscosity, fragility, abrasion),
- the characteristics of the application (operating speed, discharge pressure, available NPSH).

Inevitably with the tolerances of mechanical parts, and especially elastomer parts, after a stator is replaced the flow rate may fluctuate slightly.

The performance curves are available in the appendix.

2.5.4. Pump motors

Unless the customer issues specific requirements, the motor assemblies of PCM Moineau™ pumps are selected in order to optimise the overall efficiency of the pump motor unit and thus reduce installation costs.

Two operating phases are to be taken into account when selecting the motor assemblies: the start-up phase and the operating phase.

2.5.4.1. Start-up phase

After the stoppage phase, the coefficient of friction between the rotor and the stator is at its highest. The start-up torque can therefore be much higher than the torque in operation.

The start-up torque depends on:

- the stoppage time before start-up,
- the temperature of the stator during start-up,
- the nature of the fluid present in the stator during the stoppage (lubricity).

PCM progressive cavity pumps (Moineau™) are selected to start at a high temperature after time-limited stoppage phases.

The gearmotors selected by PCM supply enough torque to start under normal conditions of electric power and pump operation.

2.5.4.2. Operating phase

During the operating phase, when the PCM Moineau™ pump is in its steady state, the pump operates with constant torque.

The operating torque depends on:

- mechanical efficiency,
- operating pressure.

The gearmotors selected by PCM are selected to supply enough torque to operate under the contractual conditions of pressure, viscosity and temperature.

2.5.4.3. Variable frequency operation

The use of a Variable Speed Drive (VSD) considerably extends the possibilities for using PCM Moineau™ pumps compared with fixed speed operation.

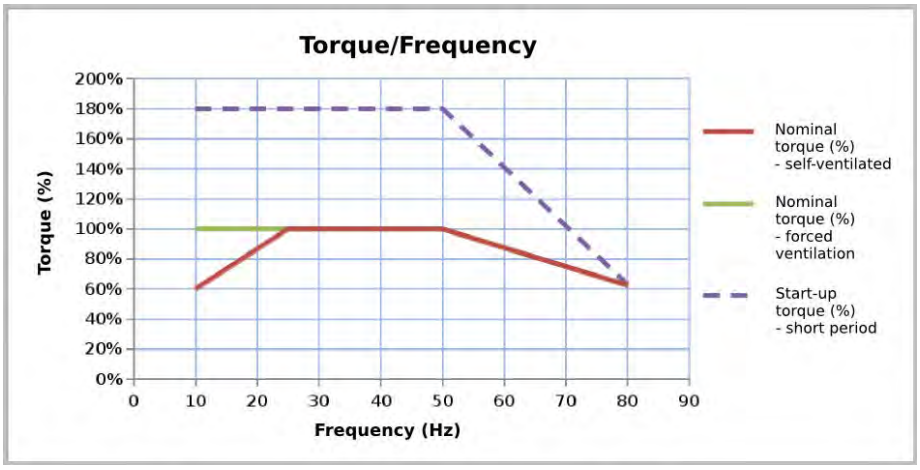
The frequency converter makes it possible to:

- extend continuous speed adjustment,
- save energy by adapting and optimising the process,
- adjust the speed for better control of the flow rate,
- configure programmable acceleration ramps for a gradual start or stop. Beneficial for the drive system and the pumped fluid, this prevents water hammer in the pipework and the pump.

2.5.4.4. Technical characteristics of variable frequency operation

Three-phase asynchronous motors supply a torque that is at its maximum at the nominal frequencies and voltages of the network to which it is connected.

Motors powered via a Variable Speed Drive (VSD) generally operate over a range of 10 to 80 Hz as shown by the graph below:



They supply a constant torque up to 50 Hz (or the nominal frequency), and then operate at constant power. The torque available thus decreases in proportion to the increase in speed.

2.5.4.5. Torque of an asynchronous motor in relation to drive frequency

For continuous operation at a **frequency of less than 25 Hz**, it is preferable to fit the motor with forced ventilation to avoid the risk of overheating and significant power loss.

For continuous operation at a **frequency of up to 80 Hz**, the motor power is chosen according to the torque available at 80 Hz.

The gearmotors powered by a Variable Speed Drive (VSD) and selected by PCM are selected to supply enough torque to start up and operate under the predefined conditions of pressure, viscosity and temperature.

2.5.4.6. Choice of the Variable Speed Drive (VSD)

The Variable Speed Drive chosen to power a PCM Moineau™ pump must:

- enable operation at a constant torque,
- be designed according to a characteristic at 50 Hz (or the nominal frequency),
- be sufficiently powerful to supply the start-up torque as a peak level and supply the pump in operation,
- supply a voltage compatible with the motor supplied by PCM,
- supply enough current to achieve the required torque,
- have electrical protection compatible with the characteristics of the installed motor.

Refer to the variator supplier's installation instructions and contact PCM customer services to validate your installation.

2.6. Equipment Installation

All PCM Moineau™ A series pumps are inspected in our workshop before dispatch.

2.6.1. Installation precautions

Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

It is important to leave enough space around the pump to allow access for maintenance and adjustments. Avoid installing the pump in a location where the ambient temperature might not be within the operating temperature limits of the pump (refer to the technical description in Appendix). For an outdoor installation, it is advisable to provide shelter above the equipment, and protection against freezing.

WARNING: the pump must be installed horizontally (unless a specific assembly request was made when ordering).

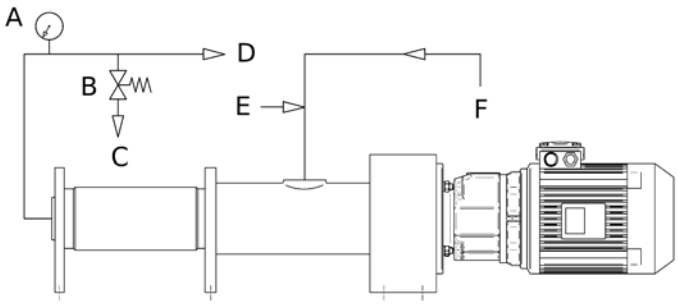
It is also recommended that you install a removable fitting for ease of servicing the entire pump motor unit. The pump must not support the weight of the pipework.

A safety valve or pressure switch and a pressure gauge located at the discharge will give protection and allow the pump's operating characteristics to be monitored. A dry running protection probe will protect the pump when there is a shortage of the product to be pumped. Please ask PCM about our wide selection of accessories to suit your requirements.

2.6.1.1. Tips for Optimum Pump Operation:

- Preferably the pump should have have a flooded suction.
- Place the pump as close as possible to the suction point.
- If a valve is present in the circuit, it is ESSENTIAL to provide a safety valve or pressure switch.

Without protection on the circuit, a valve at the discharge is often the cause of operating errors leading to damage to the pump or pipework, and presents a danger to personnel and equipment nearby.



A: Press. gauge &/or press. switch. B: Pressure Relief Valve (PRV). C: Return to tank or drain. D: To process. E: Dry running protection probe. F: From storage tank.

2.6.2. Pipework connections

An easily removable component should be installed on the stator end side. This allows the stator and then the rotor to be removed easily for maintenance, without removing the whole pump from its mounting location.

The weights of the pipes must not be supported by the pump. The allowable torques and forces on the fittings are given in "Build Specifications" section.

2.6.3. Pump position

The pump and its drive mechanism must be securely fixed to an adequately sized concrete plinth using screws and rawl plugs or anchor bolts. The unit shall be placed on a flat surface so that the body and the stator ports are maintained on the installation plane. If necessary, use shims to ensure that the unit is stable.

When mounting on feet, the pump must be installed horizontally. Each foot must be in contact with the ground and fixed down to ensure proper stability of the unit.

The pump equipped with a bearing must be secured to a rigid baseplate and aligned with its drive by a coupling system. The pump, mounted by PCM on a baseplate with its motor assembly, is aligned in our workshop, but the alignment must also be checked after final installation (sealing, anchoring, etc.). To do this, remove the coupling guard, and check that the alignment characteristics comply with the manufacturer's instructions (refer to the specific instructions in the Appendix).

2.6.4. Connecting the dynamic sealing system (cartridge type)

PCM Moineau™ A series pumps are designed to operate solely with single or double mechanical seals.

It is important to ensure that the components of the equipment are kept as clean as possible and are protected from damage under all circumstances.

The performance characteristics of the equipment depend on its environment and the operating conditions to which it is subjected. You should therefore consider that the time spent checking the environment before installation can help to prevent premature failure and can therefore reduce equipment maintenance costs.

All handling must be done with the greatest care to protect the seal, which must not be subject to impact. An effective seal essentially depends on how carefully the mechanical seal is installed.

Before installation begins, ensure that all the parts to be installed are clean and that the products to be used are compatible with the seals.

You must also check that the O-rings have no trace of cuts, to avoid damaging the O-rings on assembly.

Ensure that there are no knocks or marks on the bearing surfaces of the O-rings, and eliminate any imperfections or scratches.

Carefully clean and examine the bearing surface and the bore of the cartridge.

2.6.4.1. Single mechanical seal

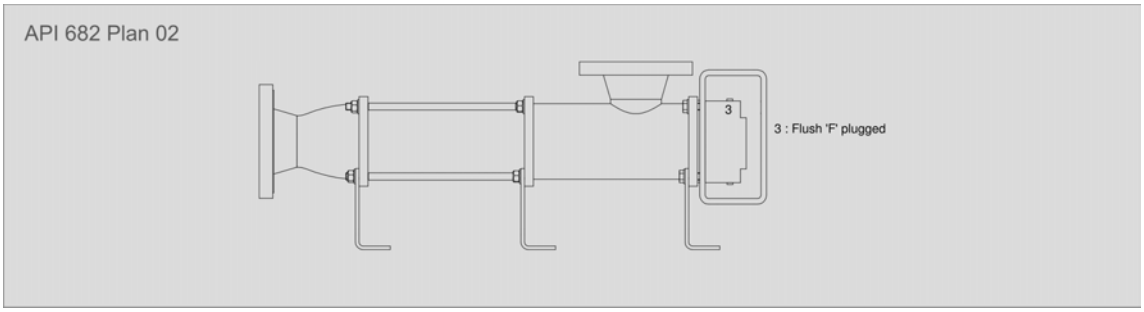
The friction surfaces are lubricated by the pumped product.

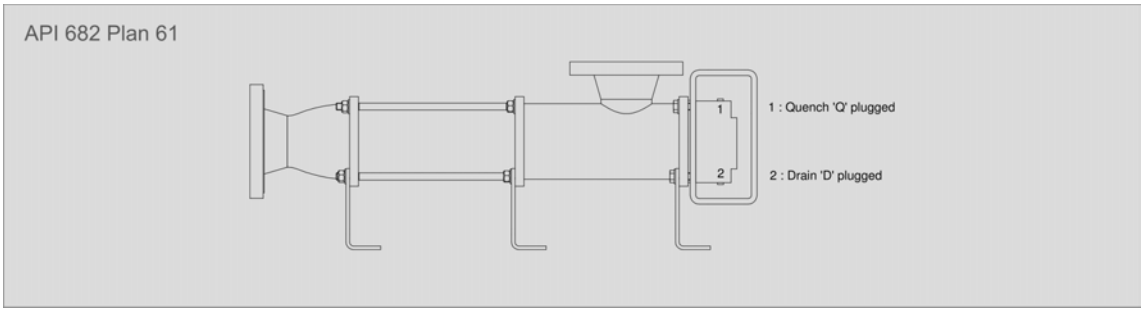
Mechanical seals can be used according to different sealing plans. These plans are described in the API 682 standard. The usual configurations are described below.



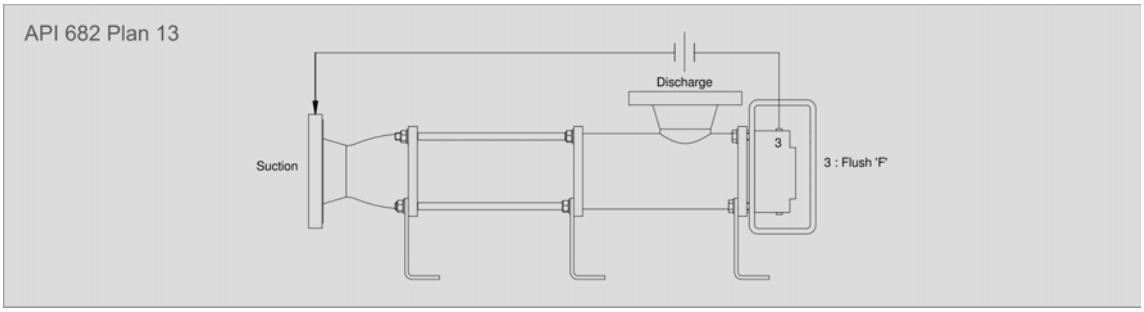
WARNING: the sealing plan connection must be carried out by qualified personnel.
The auxiliary lubrication system must be clean and filtered (if applicable).
Installation must be performed under the best conditions of cleanliness.

API 682 Plan 02/61 (as standard) Dead end seal chamber. Note: this type of arrangement is not suitable for vertical mounting of the pump.

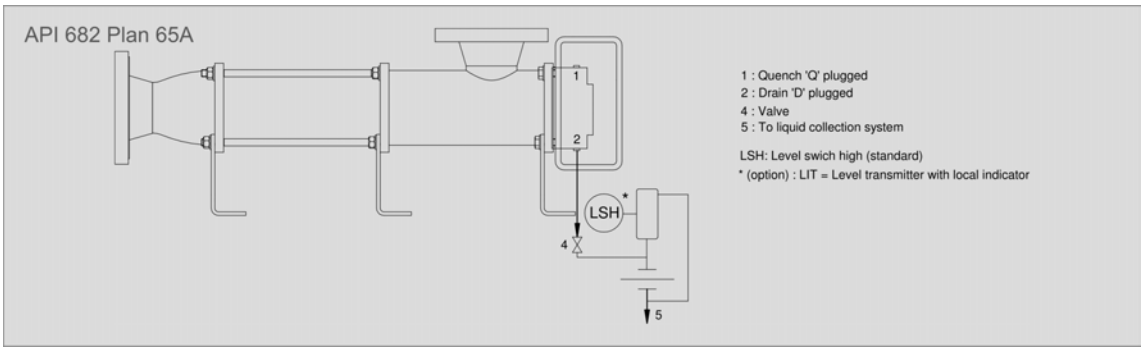


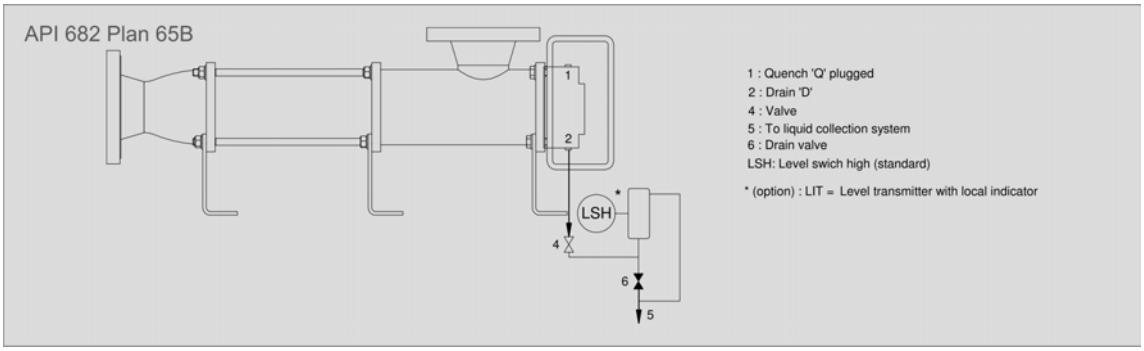


API 682 Plan 13 (optional) Recirculation from pump seal chamber through a flow control orifice and back to the pump suction. This type of arrangement is suitable for vertical mounting of the pump.



API 682 Plan 65A or B (optional) Detection of any leak in the mechanical seal via an alarm system. For the assembly and installation of the lubrication system, see the specific instructions supplied with the associated lubrication system.





Note: a plan 13 can be combined with a plan 65A or B.

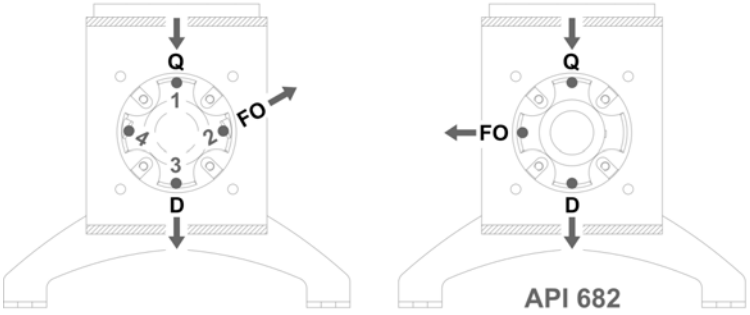
Other configurations are possible on request. For any changes of sealing plan, contact PCM.

2.6.4.1.1. Seal orientation

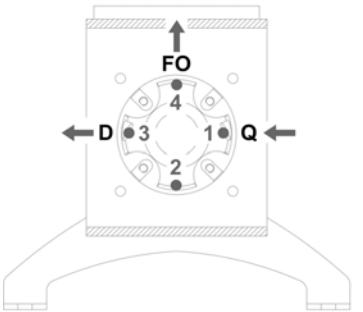
The diagrams below show the position of the orifices depending on the chosen sealing plan.

The seals are shown seen from the motor in the direction of the pump.

Plan 02/61/13:



Plan 65:



2.6.4.1.2. Fitting

The connections are of type 3/8" NPT on all the seal orifices.

The unused connections are closed off using metal plugs supplied with the pump.

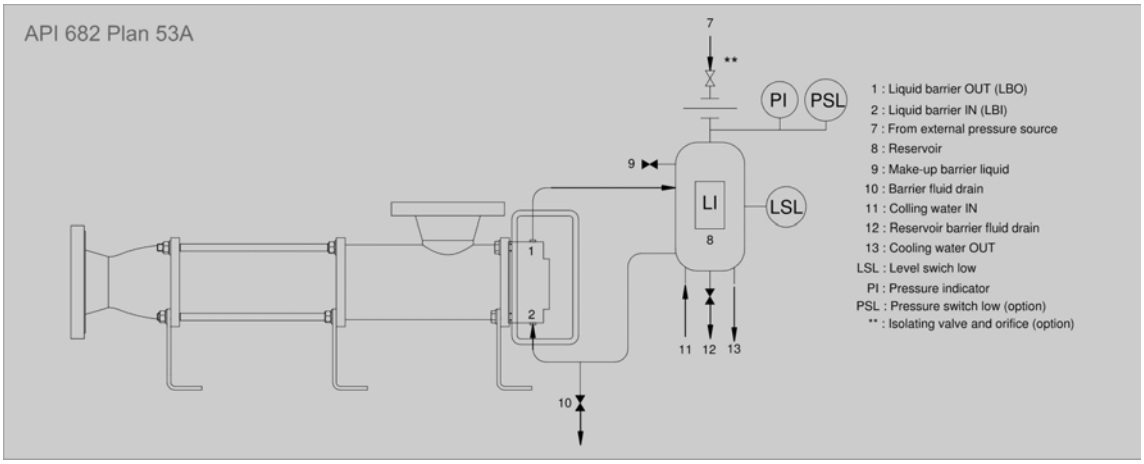
2.6.4.2. Double mechanical seal

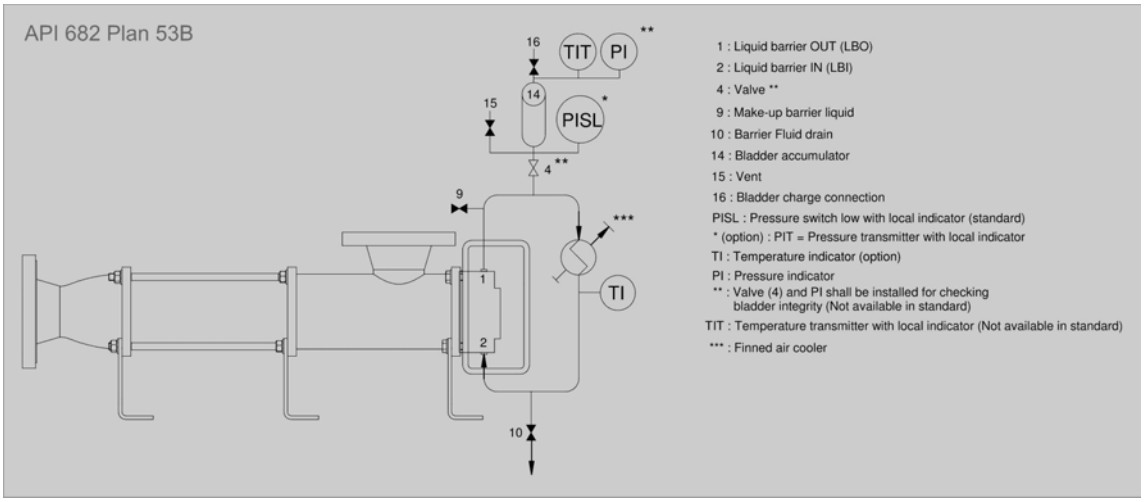
Double seals for PCM Moineau™ A series pumps are designed to operate solely with a barrier fluid such as oil or glycol and water.

The usual configurations are API plan 53A and API plan 53B. These systems are described in the API 682 standard.

WARNING: the sealing plan connection must be carried out by qualified personnel.
The auxiliary lubrication system must be clean and filtered (if applicable).
Installation must be performed under the best conditions of cleanliness.

API 682 Plan 53A or 53B Supplied with barrier fluid from a pressurised tank.





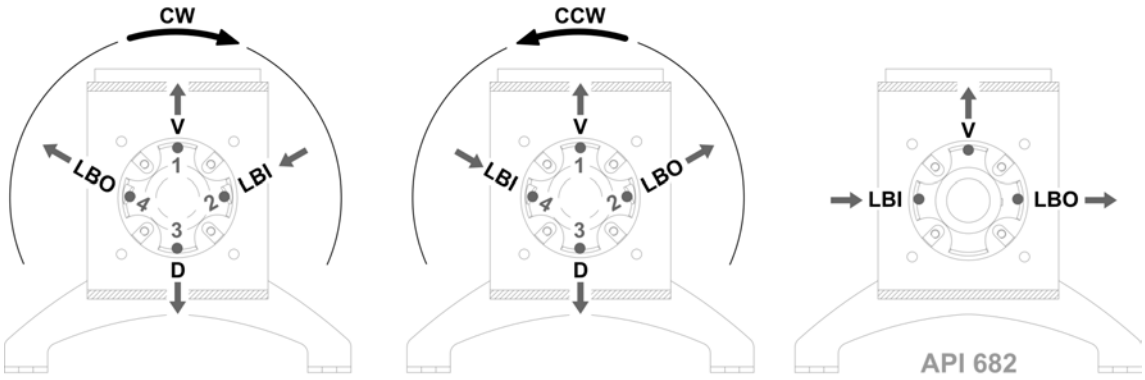
For the assembly and installation of the lubrication system, see the specific instructions supplied with the associated lubrication system.

2.6.4.2.1. Seal orientation

The diagrams below show the position of the orifices depending on the chosen sealing plan.

The seals are shown seen from the motor in the direction of the pump.

Plan 53A or 53B



CW: seen from the motor, the rotor turns clockwise. CCW: seen from the motor, the rotor turns counter-clockwise.

2.6.4.2.2. Fitting

The connections are of type 3/8" NPT on all the seal orifices.

The unused connections are closed off using metal plugs supplied with the pump.

2.6.5. Motor connection

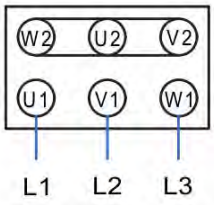
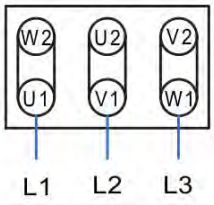
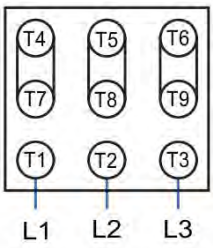
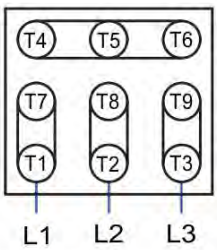
WARNING: All procedures must be performed by qualified personnel. PCM declines all responsibility if this requirement is not fulfilled. Before performing any connections, ensure that the electrical power supply has the characteristics listed on the motor plate. There is also a wiring diagram in the motor terminal box (see also the instructions in the Appendix).

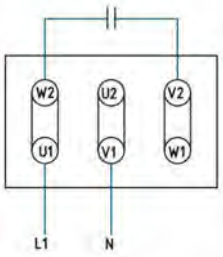
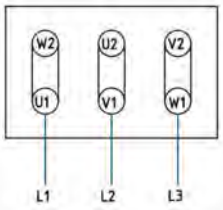
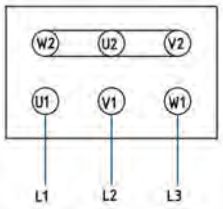
For thermal protection, the setting value is the current indicated on the motor.

When all connections have been made, the motor should be run at low speed for a few seconds (if possible using a mechanical or frequency variator) in order to check the sense of rotation as indicated by the arrow marked on the pump.

WARNING: Pumps do not tolerate dry running.

2.6.5.1. Examples of wiring diagrams

Device	Configuration	Diagram
Three-phase IEC motor	Y connection High voltage	
	Δ connection Low voltage	
Three-phase NEMA motor	Y connection High voltage	
	YY connection Low voltage	

Device	Configuration	Diagram
Forced ventilation	Single-phase operation Steinmetz connection 230V - 277V 50 + 60Hz	
	Three-phase operation Δ triangle connection 220V - 290V 50Hz 220V - 332V 60Hz	
	Three-phase operation Y star connection 380V - 500V 50Hz 380V - 575V 60Hz	

3. Operation

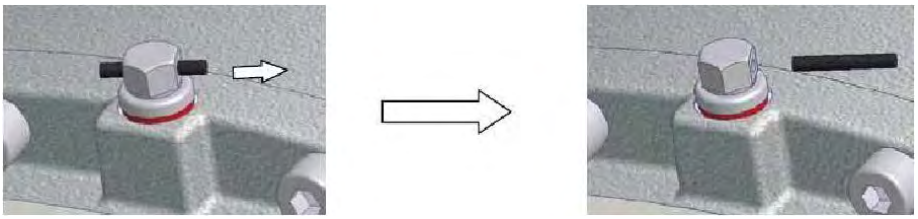
3.1. Commissioning

Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

3.1.1. Before start-up

Ensure that:

- The motor and baseplate are grounded (earthed).
- The electrical connections are correct and their arrangement does not lead to supplementary risks (falls).
- The gearbox has been filled with lubricant to the correct level.
- The motor has been filled with lubricant to the correct level.
- The gearbox screw (or vent valve where relevant) has been correctly installed and activated.



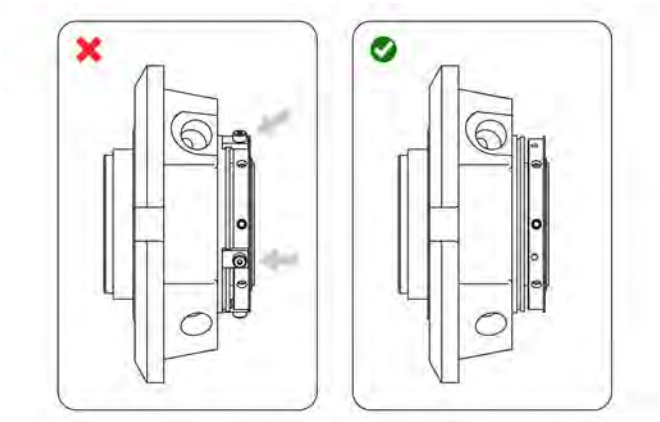
Activation of the vent screw



Installation of the vent valve

NOTE: for the positioning, see the drive instructions in the appendix.

- The product to be pumped is present in the tank and the pump body.
- The mechanical seal is connected to its sealing plan.
- The mechanical seal is vented (if used in a vertical installation or with a barrier fluid).
- The spacers (shown by the arrows on the diagram below) have been removed from the mechanical seal and conserved for maintenance operations.



- All valves installed upstream and downstream from the pump are open.
- The temperature and type of product to be pumped are correct.
- The alignment of the coupling has been checked.
- The screws are tightened to the right torque for their diameter.
- The direction of shaft rotation corresponds to the desired direction of pumped fluid flow.

Also follow the motor manufacturer's instructions (supplied in the appendix).

3.1.2. Start-up

WARNING: Never allow the pump to run dry!

To prevent dry running, PCM can supply a dry run protection system.

If the pump is not primed, you are advised to fill the pump body by hand. If the pump is temporarily not primed, the small amount of liquid remaining in the pump is enough to lubricate the stator until the next priming.

During the first few minutes of operation, check the following:

- The liquid being pumped reaches the end of the discharge pipe.
- The pump is not vibrating abnormally.
- No unusual noise.
- Sealing system functioning well.
- Check that the pressure stabilises, if a pressure gauge is installed.
- No abnormal heating of the stator or sealing system.

Check that the parameters (speed, flow rate, pressure, viscosity, and temperature) match the design parameters of the pump.

Note: it is normal for a fine black powder to form behind the mechanical seal. This is due to wear of the fix throttle bushing in the first moments of operation.

WARNING: If the values are not those indicated, consult your PCM service centre.

3.2. Normal operating procedure

The pump and its drive system can reach significant surface temperatures.



Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

3.2.1. Start-up procedure

Before each start-up, check the following:

- Fluid present at suction.
- Valves open on the suction and discharge pipes.
- Correct temperature of the product to be pumped.

Start the pump.

3.2.2. General Operating Precautions

During operation, ensure that:

- The pump is continuously supplied with product and power.
- The discharge pressure remains stable and below the maximum capacity of the pump.
- The temperature of the product being pumped remains within the operating limits.
- The operating instructions in force at the production site are observed.

3.2.3. Shutdown Procedure

This shutdown procedure depends on the type of product being pumped. Refer to the specific characteristics on the technical description (see Appendices).

The shutdown procedure is therefore defined by the process.

Nonetheless, the minimum procedure is to switch off the pump, then close the suction and discharge valves.



WARNING: for a product which settles, clean the pump using a suitable product in order to enable the pump to be restarted without damage. .



It is important to protect the pump against water hammer, which could destroy the equipment and cause a risk to staff and other equipment nearby.

3.2.4. Operating Procedure in the Event of an Incident

In the event of operating irregularities, such as:

- Pump does not start.
- Pump does not prime itself.
- Flow rate too low or irregular.
- Pump stops.
- Pump is not delivering.
- Pump is abnormally noisy.

Proceed as follows:

- Shut down the pump according to the shutdown procedure (see page 25).
- Hydraulically isolate the pump (suction, discharge).
- See "Troubleshooting" section (see page 43).

3.2.5. Automatic control

It is advisable to use devices that automatically control the operation of the pump.

Examples: pressure switch, valves with electrical position contact, dry running protection probe.

4. Maintenance

4.1. Spare parts list

For the list of spare parts for your pump, contact the PCM service centre, giving the serial number of your equipment. This number is shown on the manufacturer identification plate.

You can ask us to repair your pump. Within three days of receiving it, we will supply a quotation showing the cost of the overhaul and how long it will take to do.

PCM service centre address:

PCM – Rue René Moineau – 49123 Champtocé-sur-Loire – France

Phone: +33 (0) 1.77.68.31.00 – contact@pcm.eu

PCM USA Inc. – 11940 Brittmoore Park Drive – Houston, TX 77041 – USA

Phone: +1 713-896-4888 – contact@pcm.eu

PCM China – Unit 10A01, Shanghai Mart, No. 2299 – Ya Nan West Road, Shanghai, China 200336

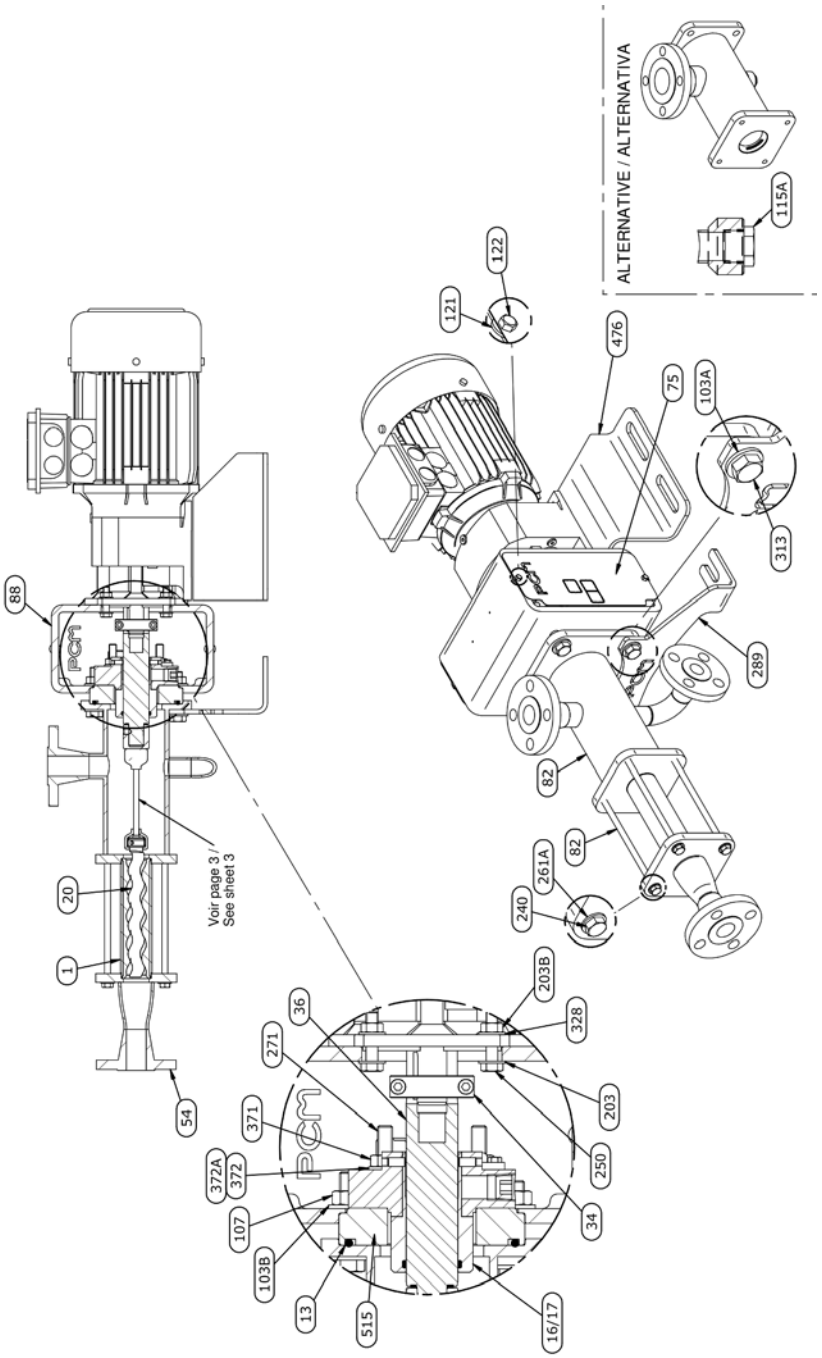
Phone: +86 21 6236 2521 – contact@pcm.eu

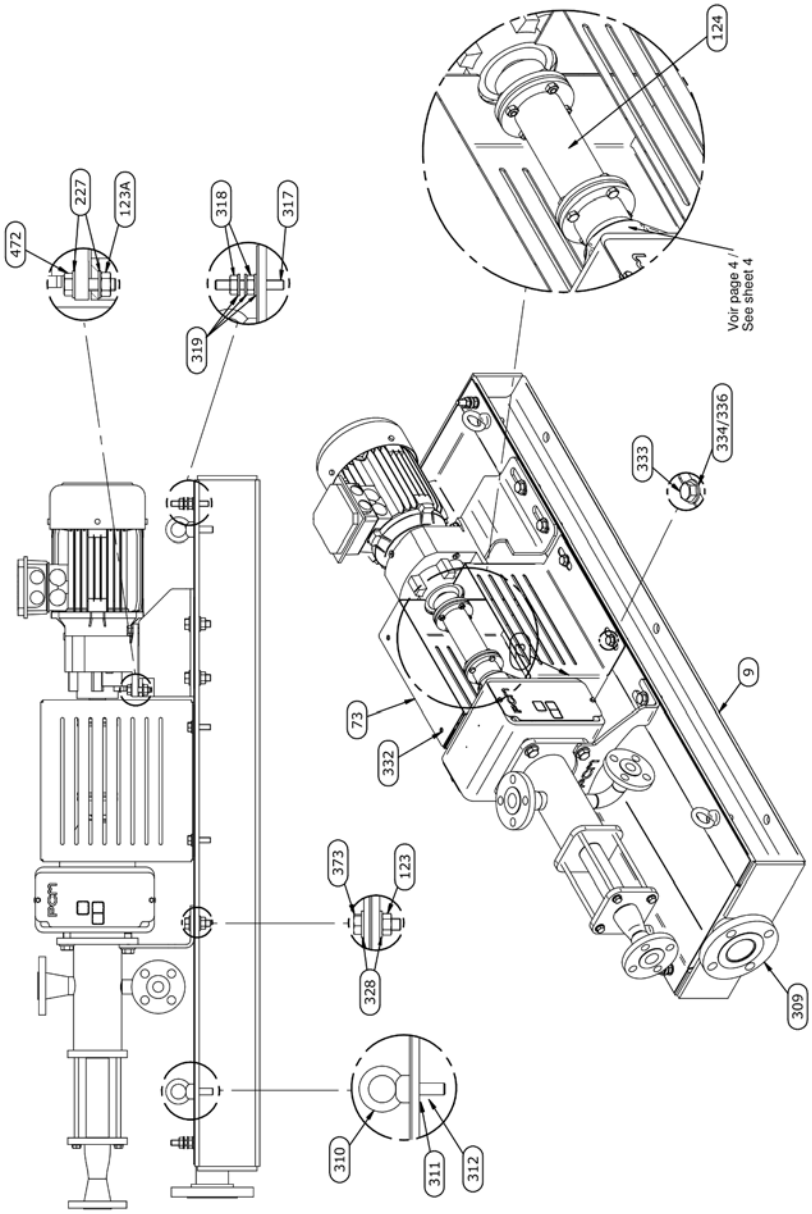
PCM MIDDLE EAST FZE – Office N° 741 – Building 5, East Wing, Block B – Dubai Airport Free Zone – PO Box 293527, Dubai – United Arab Emirates

Phone: +971 42 04 58 48 – contact@pcm.eu

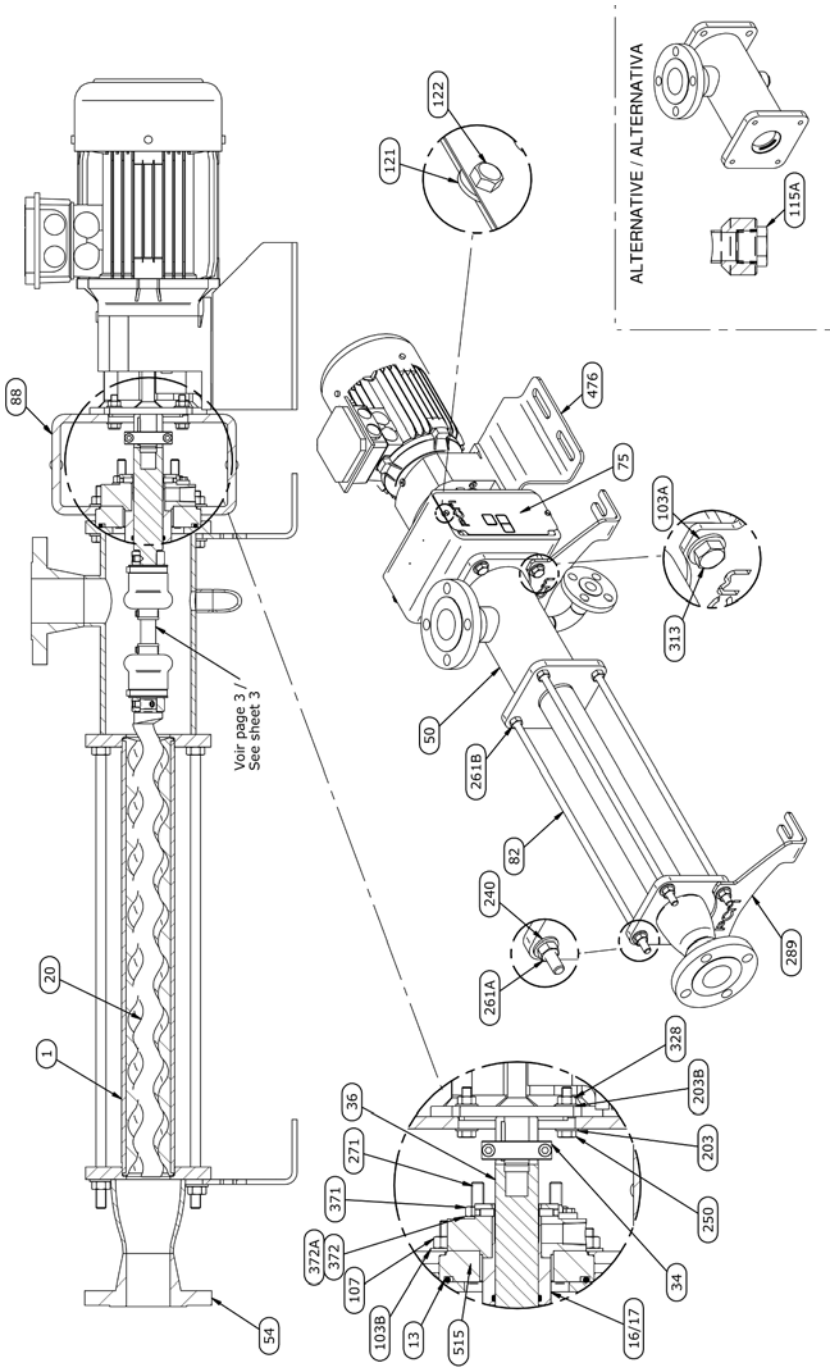
4.2. Cross-section of the pump

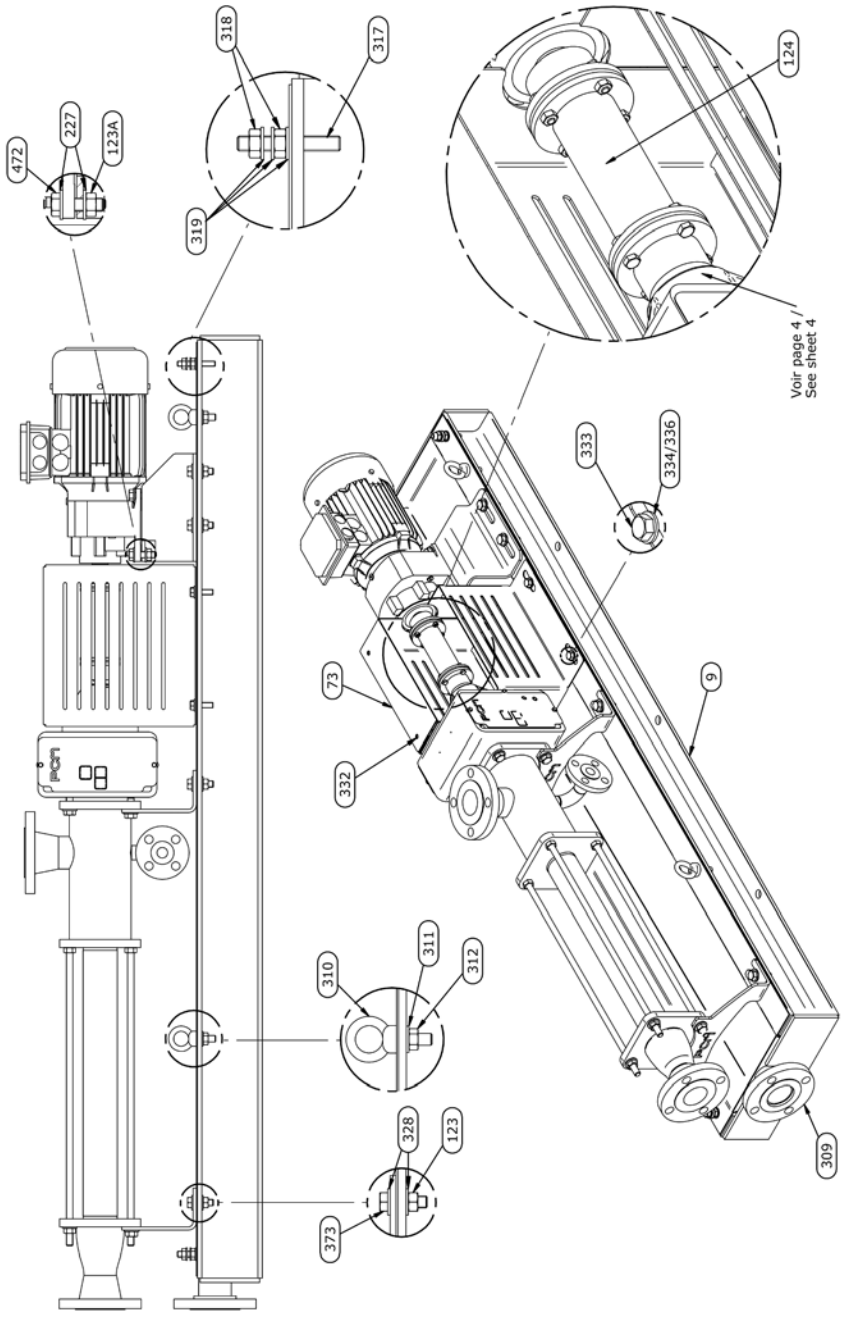
4.2.1. Models 003A24, 05A12, 1A12



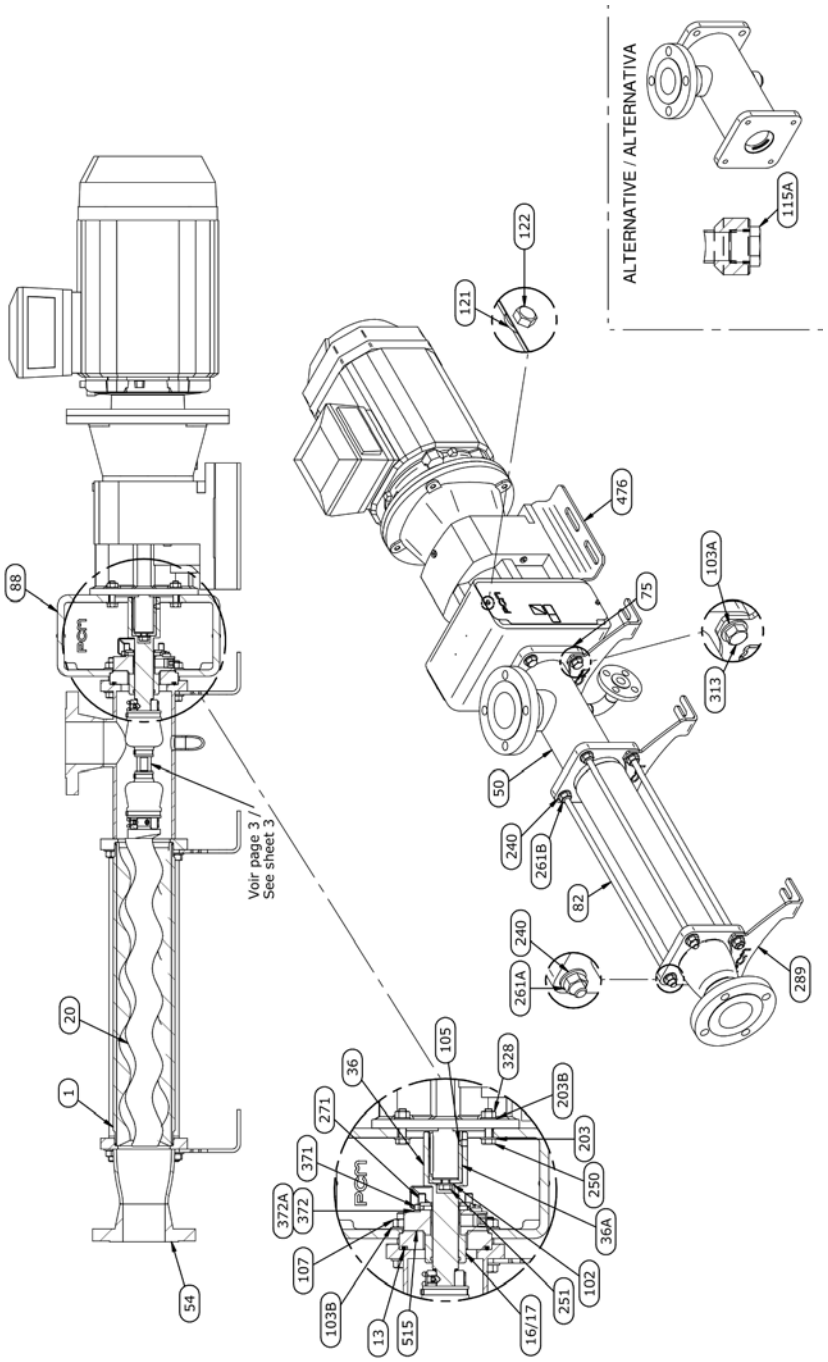

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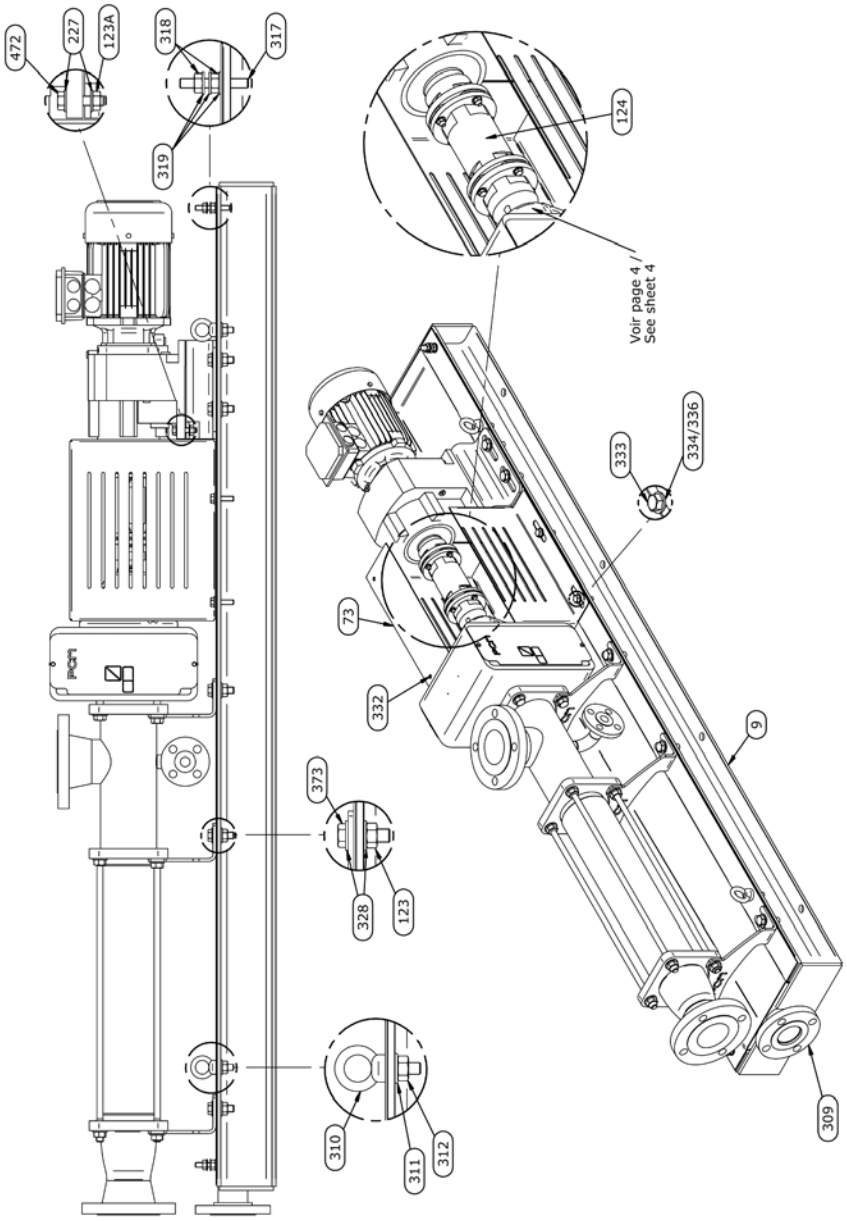
4.2.2. Models 1A36, 3A12, 6A6, 6A12, 6A24, 13A6, 13A12



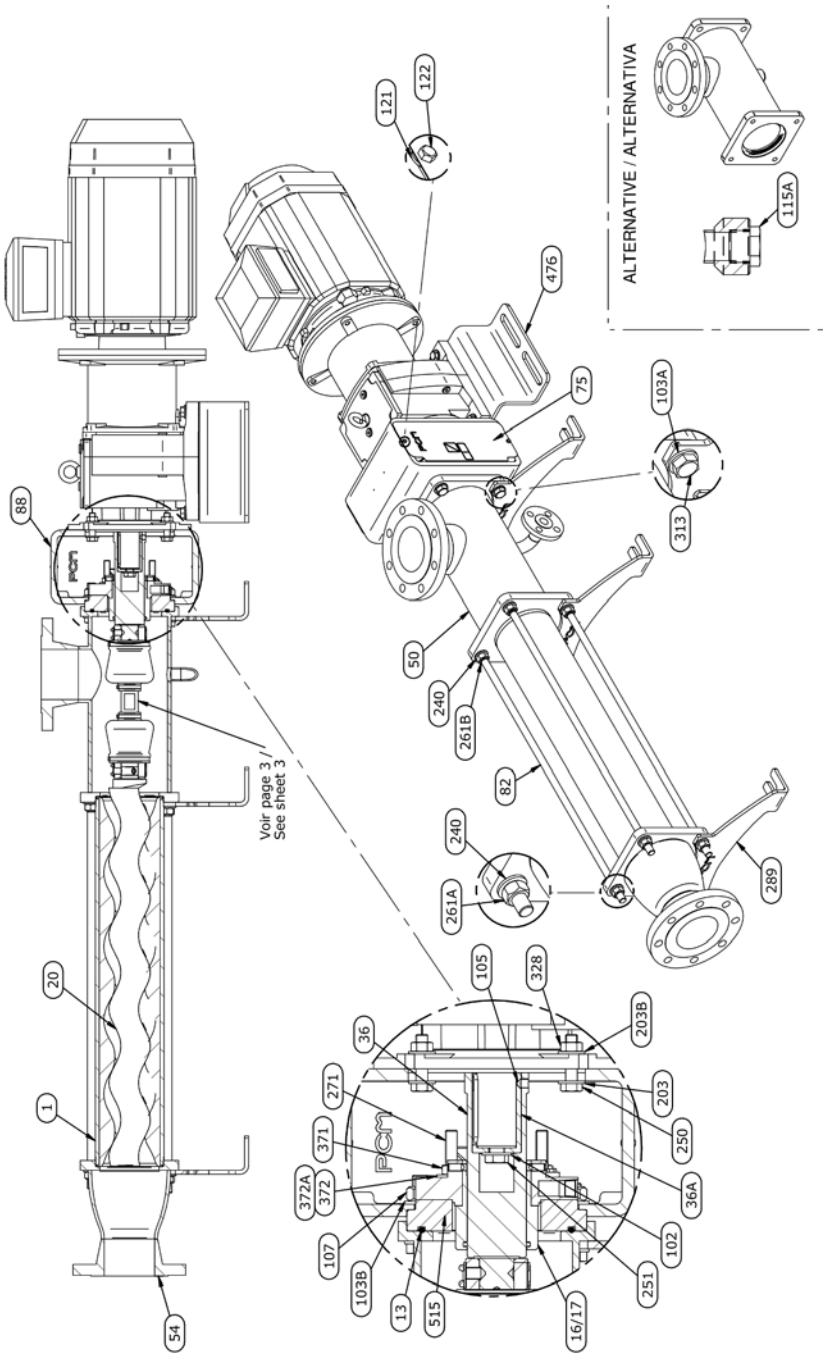

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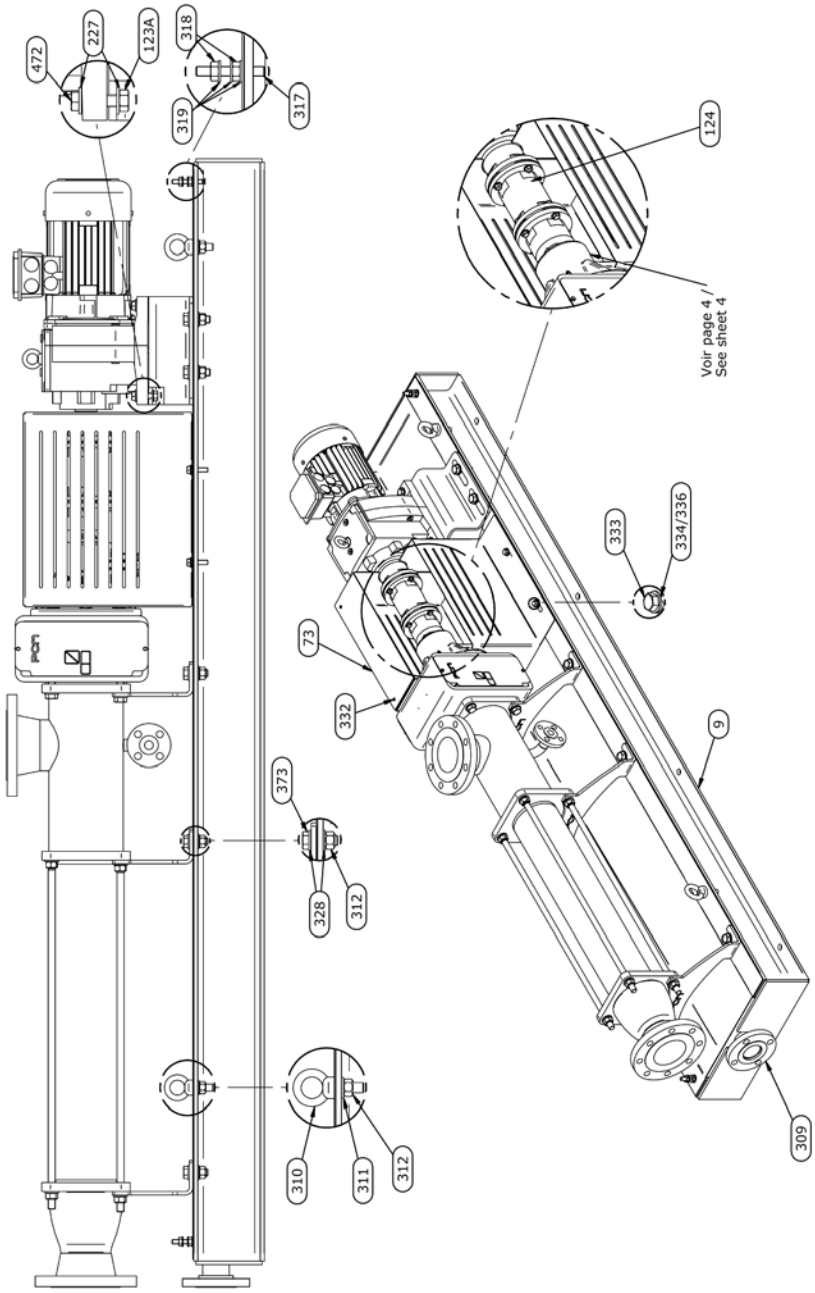
4.2.3. Models 25A6, 25A12, 13A24




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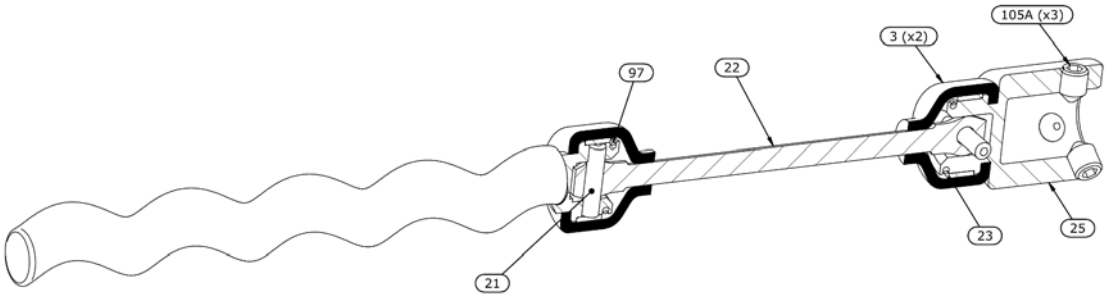
4.2.4. Models 25A24, 40A6, 40A12, 60A6



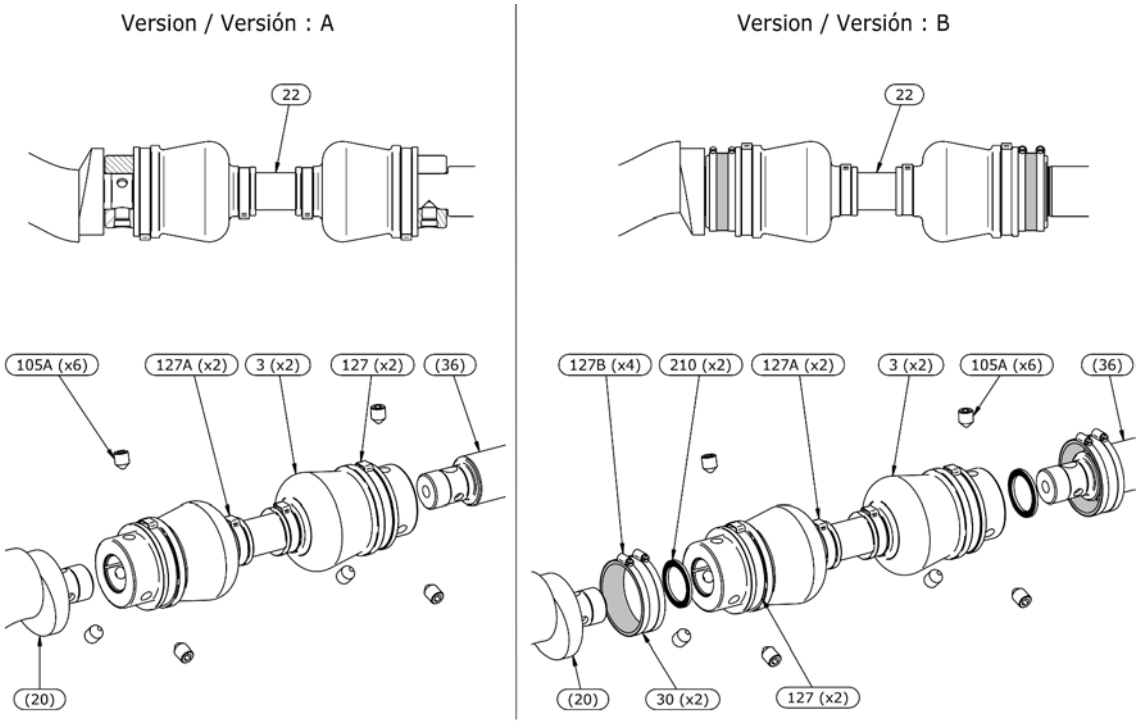

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4.3. Rod assembly

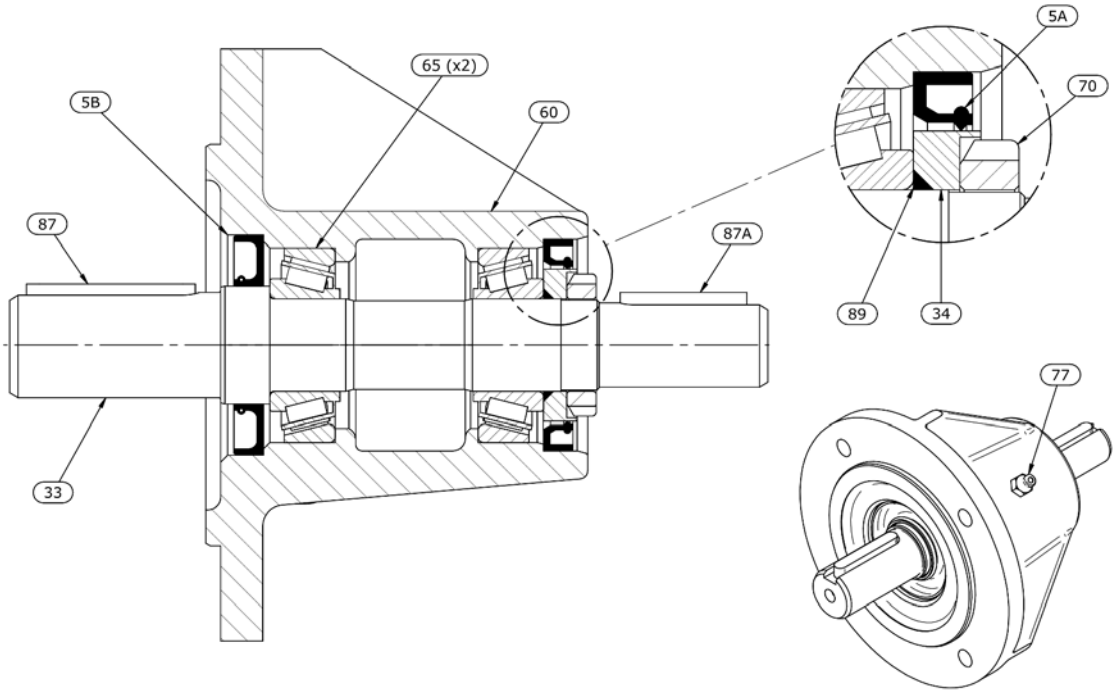
4.3.1. Models 003A24, 05A12, 05A24, 1A12



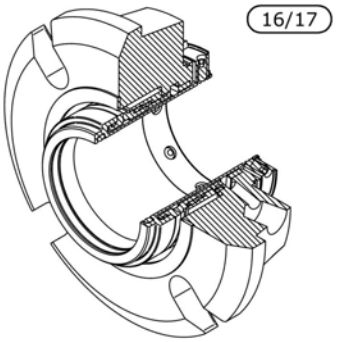
4.3.2. Models 1A36, 3A12, 6A6, 6A12, 6A24, 13A6, 13A12, 25A6, 25A12, 13A24, 25A24, 40A6, 40A12, 60A6



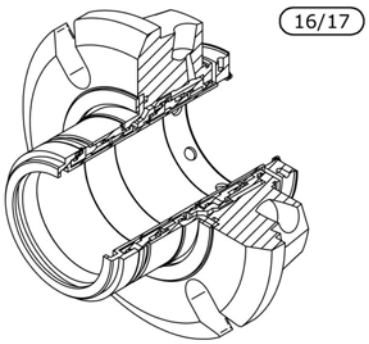
4.4. Bearing



4.5. Sealing by single mechanical seal



4.6. Sealing by double mechanical seal



4.7. Handling Equipment and Procedure

WARNING: To handle the complete pump, refer to the procedure in force and comply with legislation concerning the safety of personnel. Slinging must be performed by trained, qualified personnel in accordance with the instructions given in this manual. Any failure to observe this rule releases PCM from all responsibility.
Before lifting the pump, ensure that all its components are securely fastened to each other. Do not sling with a single sling or an endless sling that can slip on the lifting hook.

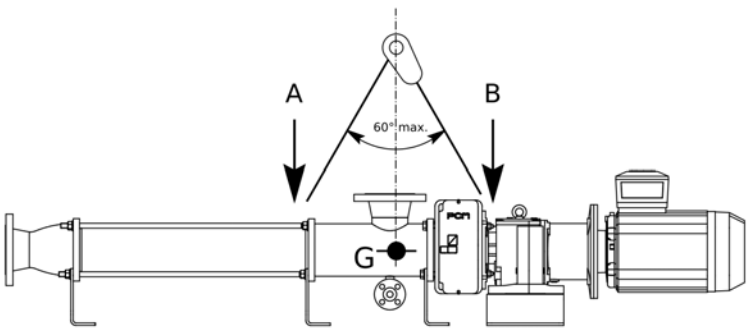
Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

4.7.1. Monobloc pump with no baseplate

Use two single slings working in a loop on the stator (A) and the motor unit (B), while using a lining to protect the slings from sharp edges.

The hoisting rings that may be present on the motor unit (gearmotor, motor or gearbox) should not be used to lift the pump.

If the motor is equipped with an IEC or NEMA adaptor, do not attach the slings to the motor or the adaptor attach them to the gearbox.



Use a protective thimble or a sliding hook where the loop is situated. The max. loads on the pump units are available in the appendix.

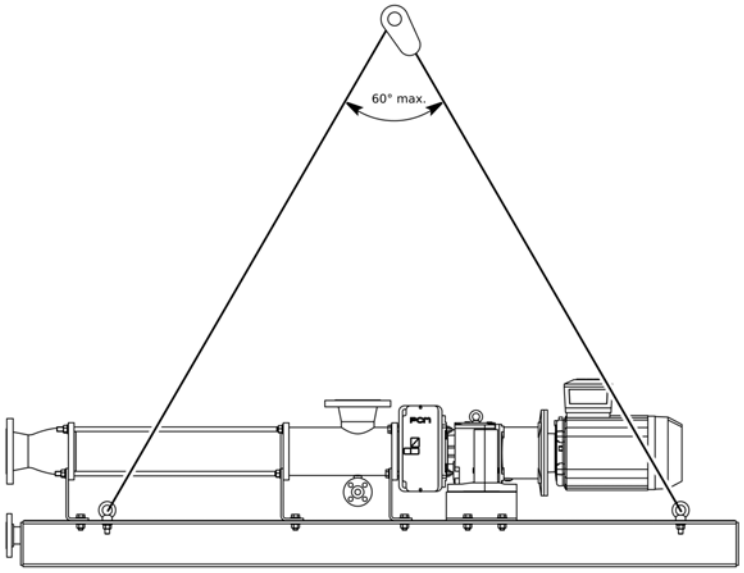
Use an adjustable sling with an adequate working load limit (WLL)[1]. Perform the adjustment with a series of tests to place the centre of gravity (G) of the load vertically below the hook (with latch), or position two slings of different lengths by attaching the shorter one on the heavier side so that the centre of gravity (G) of the load is positioned vertically below the hook (with latch).

The parts of the pump that cannot be handled may be lifted using a hoist and slings (or any similar lifting equipment). Metallic slings (chain, cable, etc.) are not recommended. Fragile parts must be handled with particular care to avoid impact. After removal, they must be laid in a stable position on wooden blocks, and protected from shocks.

4.7.2. Pump with baseplate

The motor must be wedged during all transport and handling (e.g. using a wooden wedge between the motor and the baseplate).

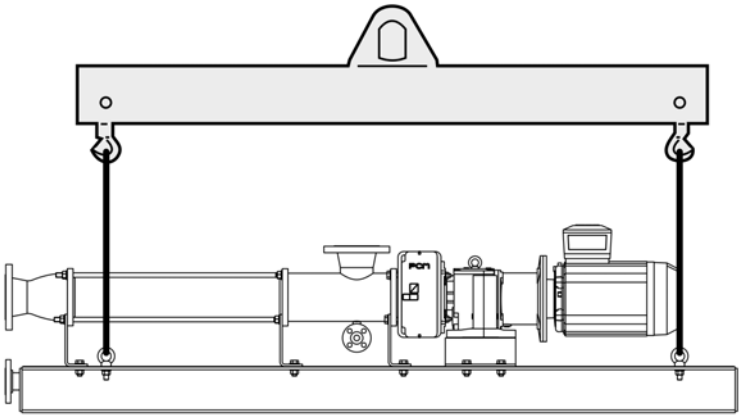
Always use the four dedicated hoisting rings on the pump baseplate.



1. WLL: Maximum allowable mass (kg) that can be hung vertically from the sling in normal use

The use of a lifting beam is recommended in the following cases:

- Long pumps
- Motor terminal box located laterally, on one side of the motor.



4.8. Storage conditions

4.8.1. General storage recommendations

Every two months, turn the pump through four or five revolutions using the fan or the bearing shaft. Check all visible machined surfaces, lubricating them with universal grease if necessary (flange bearings, bearing shafts, gearbox shaft etc.).

Protect the bearing, motor and coupling against sand, gravel and other foreign bodies (bearing pumps only).

Note: exposure to light and temperatures below 0°C or above 40°C are likely to damage elastomer parts (sheaths, seals, stator).

4.8.2. In PCM standard packaging

Pumps and pump parts must be stored in their original packaging, in a stable position, protected from impact and in a dry location.

The maximum storage temperature is +40°C.

4.8.3. In Packaging according to S.E.I. 4c

Pumps and pump parts must be stored in their original packaging, in a stable position, protected from impact and bad weather.

Every six months:

- Replace the desiccant pouches.
- Check machined surfaces, and lubricate if necessary,

Close the packaging carefully to avoid any water ingress.

4.8.4. After Unpacking

- Protect the equipment from impact, dust and humidity.

WARNING: In the event of prolonged storage, ensure that elastomer parts do not swell, crack or become sticky to the touch. If this occurs, change these parts before starting the pump.

4.9. Specialist Tools

No specialist tools.

Straight-jawed pliers would be useful for the installation and removal of the collars (127/127A).

4.10. Rules on preventive maintenance operations



WARNING: All servicing must be carried out by trained, qualified personnel in accordance with the instructions given in the present manual.
Any failure to observe this rule releases PCM from all responsibility.
Before performing any maintenance operations on the pump, check that all necessary precautions have been taken: upstream and downstream valves closed, pipework cleaned and purged, electrical power supply disconnected and disabled. Check also that all the usual precautions have been taken in accordance with the regulations in force regarding the safety of personnel.

4.11. Periodic Inspection

If the equipment is used daily, the following should be checked:

- Complete leak tightness of the pump (once a week).
- Tightness of the assembly mounting hardware (port, stator, body, spacer, drive) (once a month).
- Level of lubricant in the drive, if applicable (once a month).
- Anchoring (once a year).
- Motor current and cleanliness of drive ventilation grid (once a month).
- Condition of power supply electrical ducts (once a year).
- Alignment of the coupling for bearing pumps (once a year).

4.12. Cleaning



Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

4.12.1. External cleaning

Remove any dirt that could damage the paint and corrode the pump.

4.12.2. Internal cleaning

Cleaning procedures and frequency depend on the specific application of the pump, and the product being pumped. In any case, the minimum procedure is described below.

With the pump running, feed in the cleaning product that is compatible with the pumped product and pump materials at the suction end.

Cleaning time is defined according to the process using the pump. When this time has expired, shut down the pump according to "Shutdown Procedure" section of the chapter "Normal Operating Procedure" (see page 25).

4.13. Lubrication

The gearmotor, the bearing (if applicable) and the shaft line are supplied lubricated. Check the levels before putting the pump in service.

Consult the manufacturer documentation supplied in Appendix for the precautions to be taken when lubricating the gearmotor, where applicable.

The following table indicates the recommended lubricants to be used when servicing the pump:

Component to be lubricated	Recommended lubricant	Supplier
Gearbox shaft / drive shaft (36) or sleeve (36A) connection	GERALYN 2 grease	FUCHS LUBRITECH
Drive shaft (36) / gearbox shaft or sleeve (36A) connection	GERALYN 2 grease	FUCHS LUBRITECH
Gearbox shaft / sleeve (36A) connection	GERALYN 2 grease	FUCHS LUBRITECH
Sleeve (36A) / drive shaft (36) connection	GERALYN 2 grease	FUCHS LUBRITECH
Drive shaft (36) / drive (E) connection	GERALYN 2 grease	FUCHS LUBRITECH
Drive (E) / rotor (20) connection	GERALYN 2 grease	FUCHS LUBRITECH
Roller bearings (65)	AVIATION N°10	ELF
	UPTON 400	LABO
Stator (1) (for assembly)	GLYCERINE	

For the **sheathed connections**, the lubricant quantity required for each sheath depends on the pump model:

Model	Recommended lubricant	Supplier	Quantity per sheath
003A24, 05A12, 1A12	TOTAL AXA grease, grade 1	TOTAL	5 grams
1A36, 3A12, 6A6, 6A12, 6A24, 13A6, 13A12			30 grams
25A6, 25A12, 13A24			55 grams
25A24S, 40A6S, 40A12S, 60A6			170 grams

4.14. Thread locking

The following table indicates the recommended products to use when reassembling the pump:

Element to be locked	Recommended product	Supplier
Screws (105/105A)	LOCTITE® 243	HENKEL
Pin (271)	LOCTITE® 243	HENKEL
Nut (70)	LOCTITE® 243	HENKEL

4.15. Tightening torques

General tightening torque values for the fixing elements hardware are defined in the following table:

Screw diameter	Class 8.8 steel	Class 70 stainless steel
M4	4.1 N.m [2.95 lbf.ft]	4.1 N.m [2.95 lbf.ft]
M5	4.1 N.m [2.95 lbf.ft]	4.1 N.m [2.95 lbf.ft]

Screw diameter	Class 8.8 steel	Class 70 stainless steel
M6	10 N.m [7.38 lbf.ft]	7 N.m [5.16 lbf.ft]
M8	15 N.m [11.06 lbf.ft]	10 N.m [7.38 lbf.ft]
M10	30 N.m [22.13 lbf.ft]	20 N.m [14.75 lbf.ft]
M12	40 N.m [29.5 lbf.ft]	30 N.m [22.13 lbf.ft]
M14	65 N.m [47.94 lbf.ft]	50 N.m [36.88 lbf.ft]
M16	90 N.m [66.38 lbf.ft]	65 N.m [47.94 lbf.ft]

4.16. Troubleshooting the pump

4.16.1. Incidents and causes

Causes	Incident													Solutions (see section below)
	Pump does not start	Pump does not deliver	Pump does not prime itself	Pump stops running	Flow rate too low	Discharge pressure too low	Drive is overloaded	Pump is noisy or vibrates abnormally	Leak in shaft seal	Premature stator wear	Premature rotor wear	Flow rate is not constant	Joints deteriorate quickly	
The stator is swollen.	●			●			●			●			●	1
Rotor drive system is broken.	●	●	●	●										2
Product temperature is too high.	●		●	●			●	●		●	●		●	3
Sedimentation or precipitation of the fluid in the pump body	●	●	●	●			●	●		●	●		●	4
The solid bodies contained in the liquid are too voluminous	●	●		●			●			●	●		●	5
The electrical installation is not compliant, or is faulty.	●			●	●	●	●					●		6
The devices driving the pump are worn or broken.	●	●	●	●	●	●		●				●		7
Pump is blocked by a foreign body.	●	●		●			●			●	●		●	8

Causes	Incident													Solutions (see section below)
	Pump does not start	Pump does not deliver	Pump does not prime itself	Pump stops running	Flow rate too low	Discharge pressure too low	Drive is overloaded	Pump is noisy or vibrates abnormally	Leak in shaft seal	Premature stator wear	Premature rotor wear	Flow rate is not constant	Joints deteriorate quickly	
The stator has become hard and brittle.		●	●		●	●	●	●		●	●		●	9
The stator is sectioned at its rim.			●		●	●								10
The stator is worn.		●	●		●	●		●		●				11
The rotor is worn.		●	●		●	●		●		●				12
Leak in mechanical seal.			●						●					13
Incorrect direction of rotation.			●			●								14
Product temperature is lower than expected.		●	●		●	●								15
Net positive suction head is too low NPSHa<NPSHr		●			●	●		●		●	●	●	●	16
The pump suction is drawing in air.		●			●	●				●		●		17
Speed of rotation is too low.		●			●	●								18
Pump installation location, pipework and accessories should all be checked	●	●		●	●		●	●		●		●	●	19
The pump is running dry.		●	●					●		●				20
Viscosity of the pumped product is higher than expected.		●		●	●		●							21

Causes	Incident													Solutions (see section below)
	Pump does not start	Pump does not deliver	Pump does not prime itself	Pump stops running	Flow rate too low	Discharge pressure too low	Drive is overloaded	Pump is noisy or vibrates abnormally	Leak in shaft seal	Premature stator wear	Premature rotor wear	Flow rate is not constant	Joints deteriorate quickly	
Pressure at discharge is too high.	●	●		●	●		●	●		●	●		●	22
Speed of rotation is too high.							●	●		●	●		●	23
For a new pump or new stator: excessive static tightening.	●						●							24
Shaft is damaged (according to model).		●	●		●	●			●			●		25
The roller bearings are worn (according to model).								●	●					26
Stability of pump motor unit (according to model).								●						27
A valve upstream or downstream from the pump is closed.	●	●		●	●		●	●					●	28

4.16.2. Solutions

Solution no.	Description
1	The stator material swells when in contact with the product being pumped. Check that the material and the product are those specified in the order. Otherwise contact the PCM service centre.
2	Determine the cause of failure by checking points 1, 3, 4, 5, 8, 22, and 23, and then replace the damaged parts.
3	The operating temperature limit is defined according to the stator material.
4	Clean the pump body and rinse the pump after each use.
5	Remove these bodies using a strainer, or contact the PCM service centre to obtain another pump.
6	Check the network voltage, motor connections, circuit breaker calibration, and number of phases.

Solution no.	Description
7	Replace defective parts and check the load on the drive.
8	Disassemble the pump, clean it, and replace any defective components.
9	Check that the temperature is not higher than initially planned and that the product being pumped is the intended product. If any parameters change, contact the PCM service centre to determine a different pump construction.
10	This type of damage is typically caused by overpressure. Contact the PCM service centre.
11	Replace the stator and check the condition of the rotor.
12	Determine the cause of the wear: abrasion, corrosion, cavitation. Contact the PCM service centre to define a new rotor material if necessary, and install the new part.
13	Remove the mechanical seal and replace it with a new one.
14	Change the electrical connections.
15	Contact the PCM service centre, who will recommend a tighter stator.
16	Reduce head loss in the suction pipe, lower the temperature, and raise the suction level.
17	Check the installation for leaks.
18	Contact the PCM service centre to determine the best way to increase the speed.
19	Check all pipes for obstruction by a foreign body, for a defective or improperly sealed valve, for a leaky poppet, etc.
20	Re-arrange the overall layout of the installation, or provide a dry running protection system.
21	For any viscosity change, contact the PCM service centre, who will re-calculate the parameters.
22	Measure the pressure using a pressure gauge, and compare it to the pressure stated in the technical description.
23	Contact the PCM service centre to determine the best way to reduce the speed.
24	Fill the pump, and rotate the motor fan about ten revolutions by hand.
25	Replace the shaft and the mechanical seal.
26	Remove the bearing or gearbox and replace the roller bearings and seals.
27	Adjust the feet or check the mountings.
28	Open the abnormally closed valve.

4.17. Troubleshooting the seals

4.17.1. Incidents and causes

Causes	Incident				Solutions (see section below)
	Static leak in sealing system	Dynamic leak in sealing system from start-up	Abnormal heating in seal	The seal makes an abnormal noise	
The seal is damaged	●	●			1
Incorrect assembly	●	●			2
Geometric fault in the adapter fittings	●	●			3
Poor flatness of the mechanical seal surfaces	●	●			4
Operating conditions are too harsh		●			5
Poor choice of seal		●			6
Poor lubrication and/or cooling			●		7
Poor lubrication, dry running				●	8

4.17.2. Solutions

Solution no.	Description
1	Check condition of seals, faces, etc.
2	(at the assembly procedure, taking care to follow the instructions.
3	Check the geometry.
4	Bed in the faces of the mechanical seal (contact your local PCM representative).
5	Check the operating conditions.
6	Review the choice of equipment to determine the most suitable seal.
7	Check the injections, sealing circuit, thermosyphon etc.
8	Restore the lubrication and pressurisation circuits. Eliminate gas pockets, etc.

4.18. Disassembling the pump (models 003A24, 05A12, 1A12)

WARNING: Before performing any maintenance operations on the pump, check that all necessary precautions have been taken: upstream and downstream valves closed, pipework cleaned and purged, electrical power supply disconnected and disabled. Check also that all the usual precautions have been taken in accordance with the regulations in force regarding the safety of personnel.
Systems connected to the mechanical seal must be disconnected before disassembling the pump.

Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

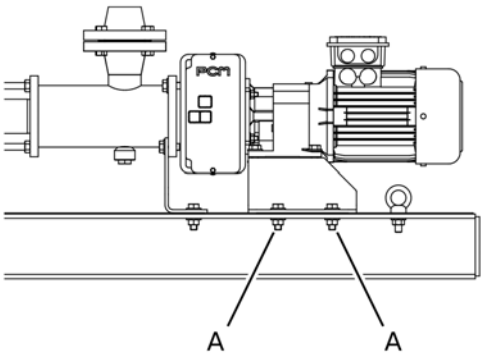
4.18.1. Residual fluids

During maintenance operations, the fluid inside the pump is not fully evacuated. A certain volume of non-drainable fluid remains in the stator, with the quantity depending on the pump model:

Pump model	Fluid volume in the stator (in cm^3)
003A24	5
05A12	10
1A12	40

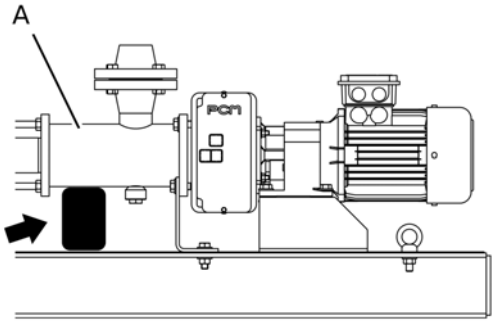
Take the necessary steps depending on the type of fluid present.

4.18.2. Disassembling the monobloc pump



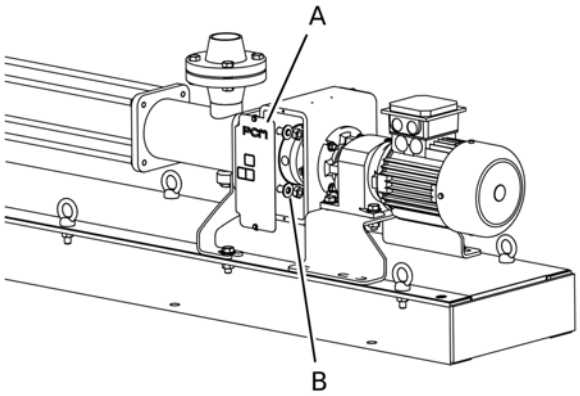
1.

Remove the motor support mounting screws (A).



2.

Support the pump body (A) with a wedge or slings.

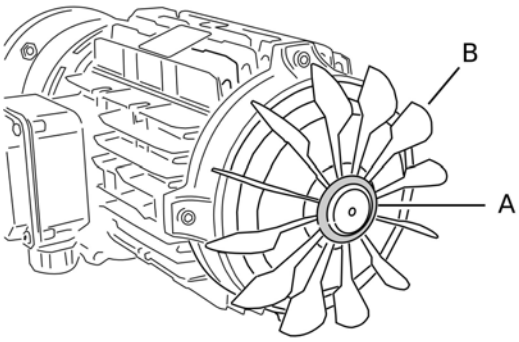


3.

Remove the two plates (A) and make sure to leave the washers on the screws.

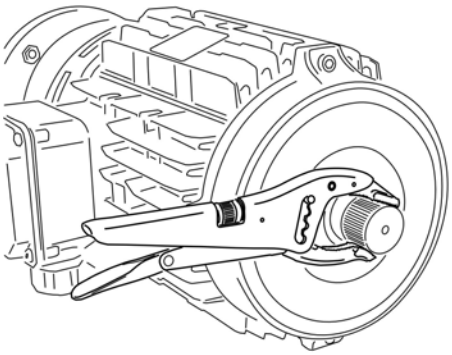
Remove any pipes connected to the mechanical seal.

Remove the four fixing screws (B) from the body.



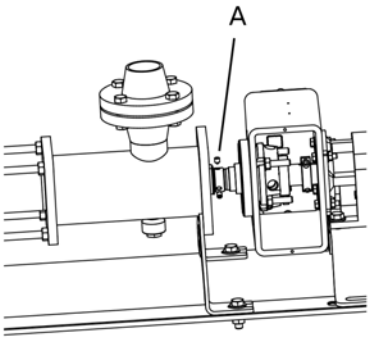
4.

Remove the motor's protective casing, the ring (A) and the fins (B).



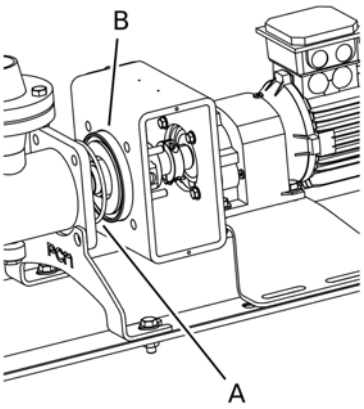
5.

Using locking pliers, turn the shaft to pull the drive back by about 70 mm.



6.

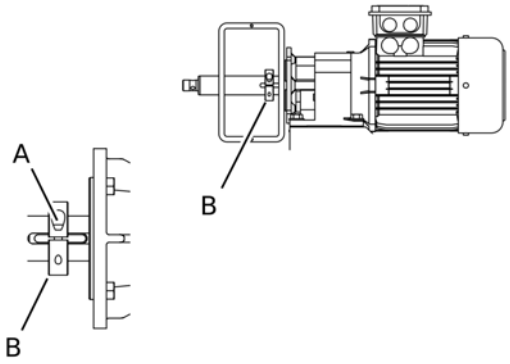
Unscrew the 3 screws (A).



7.

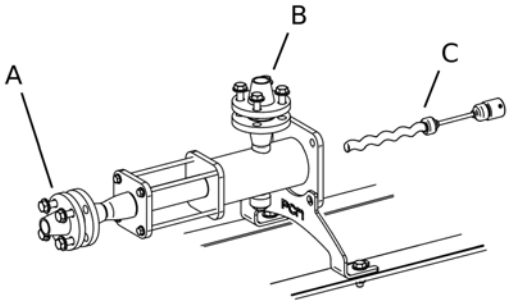
Remove and check the seal (A).

Remove the sealing system (B) only if it requires maintenance (removal instructions can be found in the "Removal of the sealing system" section).



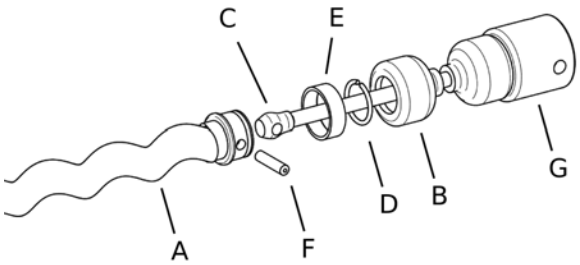
8.

Remove the motor unit, unscrew the 2 screws (A) and remove the shaft collar (B) to remove the shaft.



9.

Disconnect the pipes (A) and (B) and remove the shaft line and the rotor (C).



10.

To release the rotor (A), slide the sheath (B) on the connecting rod (C).

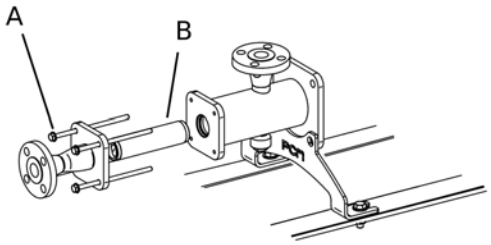
Remove any surplus grease.

Remove the circlip (D) with pliers.

Slide the ring (E) on the connecting rod (C).

Remove the pin (F) and recover the rotor (A).

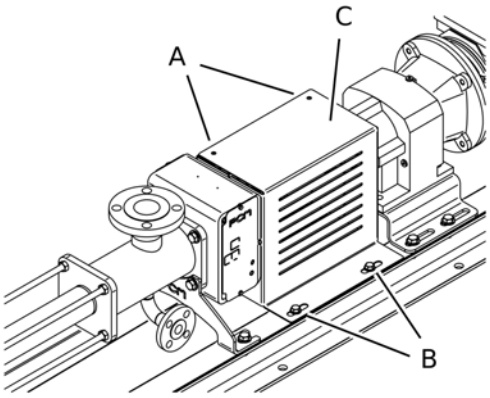
Do the same to release the drive system (G).



11.

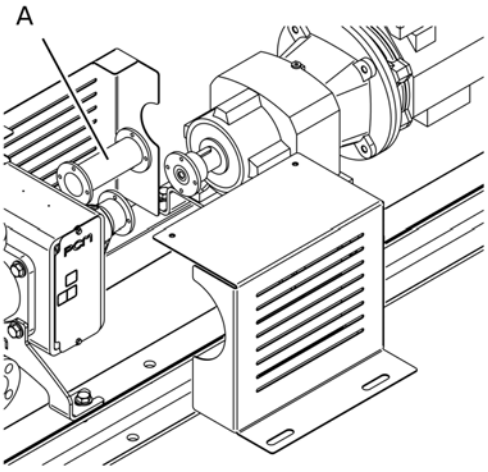
Unscrew the 4 screws (A) to remove the stator (B) and the last components.

4.18.3. Disassembling a bearing pump



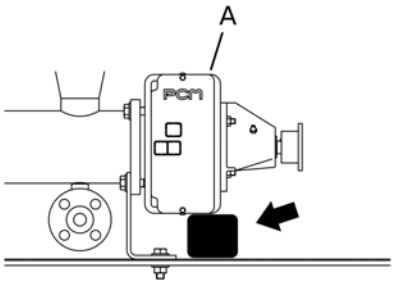
1.

Remove the 2 screws (A). Remove the 4 screws (B) and the coupling cover (C).



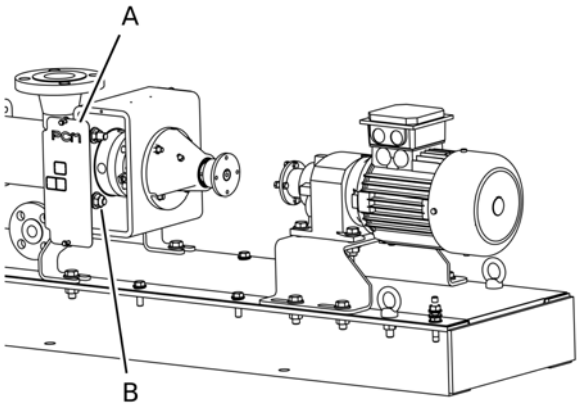
2.

Remove the coupling spacer (A) (the disassembly instructions are given in the coupling instructions).



3.

Wedge the bearing-spacer unit (A).

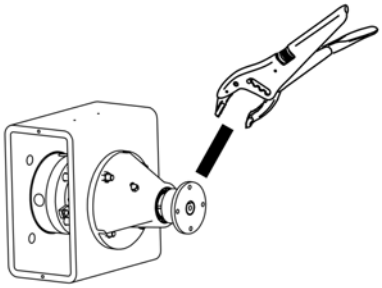


4.

Remove the two plates (A) and make sure to leave the washers on the screws.

Remove any pipes connected to the mechanical seal.

Remove the four fixing screws (B) from the body.



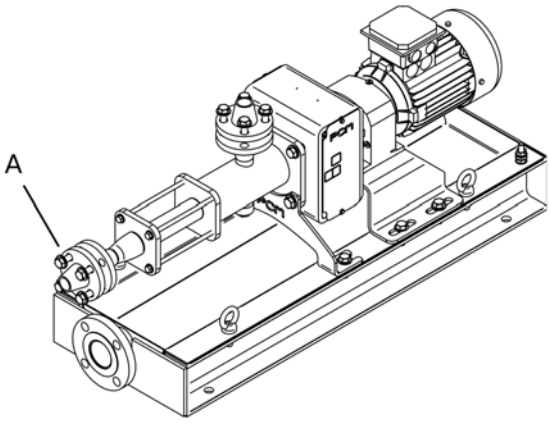
5.

Using locking pliers, turn the hub to pull the bearing-spacer unit back by about 70 mm.

6.

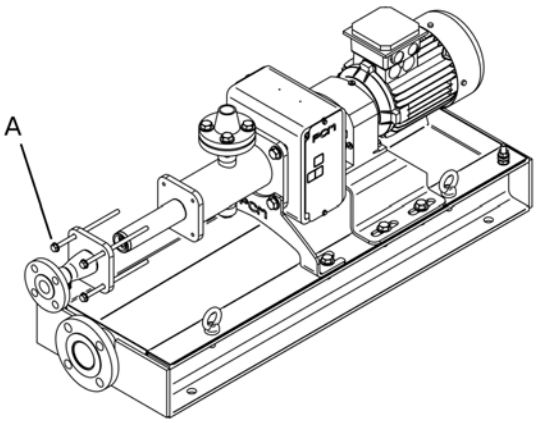
Continue the disassembly from step 6 of the "Disassembling the monobloc pump" section.

4.18.4. Disassembly to change the stator



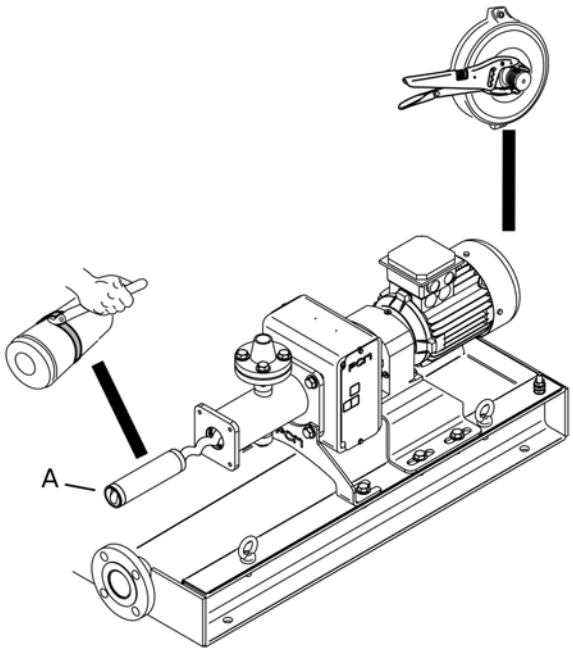
1.

Remove the pipes (A).



2.

Unscrew the 4 screws (A).



3.

Remove the stator (A).

If necessary, block the shaft line on the motor side using a plier wrench and use a strap wrench to unscrew the stator.

4.19. Reassembling the pump (models 003A24, 05A12, 1A12)

The pump is re-assembled in the reverse order.

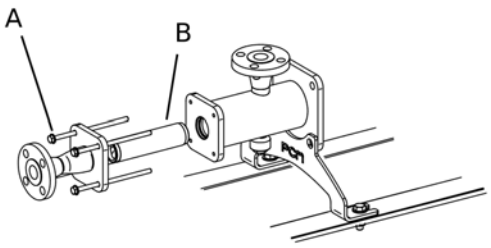
Some screws are coated with LOCTITE® Freinfilet 243 (see steps mentioned below). All other screws or bearings must be covered with grease (GERALYN 2) to prevent sticking during disassembly and reassembly.

The threaded elements must be tightened as shown on page 42.

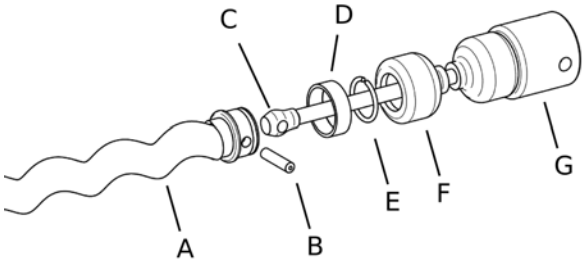
WARNING: To preserve optimum operating characteristics for the pump, it is essential to use original PCM parts only. Pump maintenance must be performed by qualified personnel only, in compliance with the recommendations in force.

Make sure to comply with the following points:

Coat the rotor and the inside of the stator with glycerine.



Fit the stator (B) and screw in the 4 screws (A).

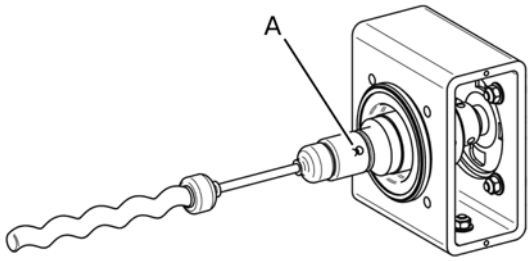


To fit the rotor (A), insert the pin (B) through the rod (C) and the rotor (A).

Fit the ring (D) and then the circlip (E) using pliers.

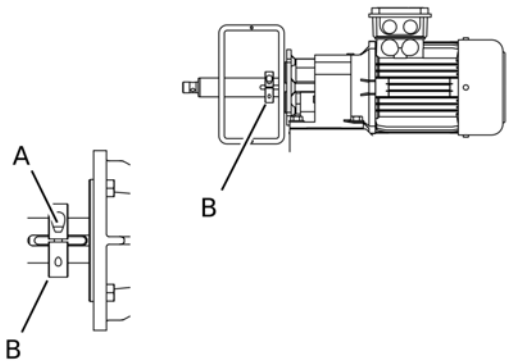
Replace the sheath (F) after adding the grease.

Do the same to fit the drive system (G).



Coat the 3 conical screws (A) with Freinfilet® before screwing them in.

Check that the tightening torque (10 Nm) is the same for all 3 screws.



When fitting the drive shaft, ensure the shaft collar (B) is properly positioned relative to the key. Tighten the screws (A) (15 Nm) and check that they are uniformly tight.

4.20. Disassembling the pump (models 1A36, 3A12, 6A6, 6A12, 6A24, 13A6, 13A12)

WARNING: Before performing any maintenance operations on the pump, check that all necessary precautions have been taken: upstream and downstream valves closed, pipework cleaned and purged, electrical power supply disconnected and disabled. Check also that all the usual precautions have been taken in accordance with the regulations in force regarding the safety of personnel.
Systems connected to the mechanical seal must be disconnected before disassembling the pump.

Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

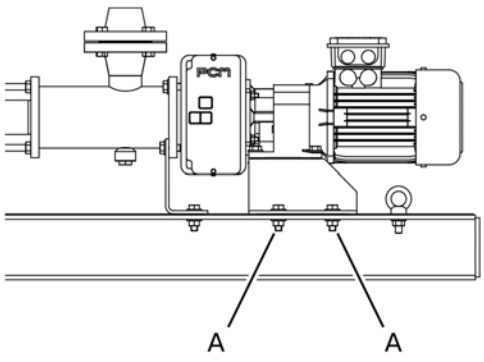
4.20.1. Residual fluids

During maintenance operations, the fluid inside the pump is not fully evacuated. A certain volume of non-drainable fluid remains in the stator, with the quantity depending on the pump model:

Pump model	Fluid volume in the stator (in cm^3)
1A36	120
3A12	90
6A6	70
6A12	200
6A24	470
13A6	150
13A12	440

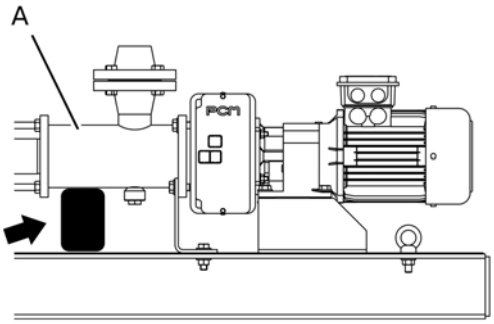
Take the necessary steps depending on the type of fluid present.

4.20.2. Disassembling the monobloc pump



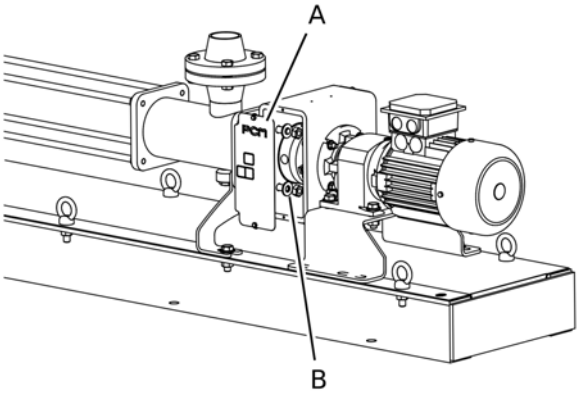
1.

Remove the motor support mounting screws (A).



2.

Support the pump body (A) with a wedge or slings.

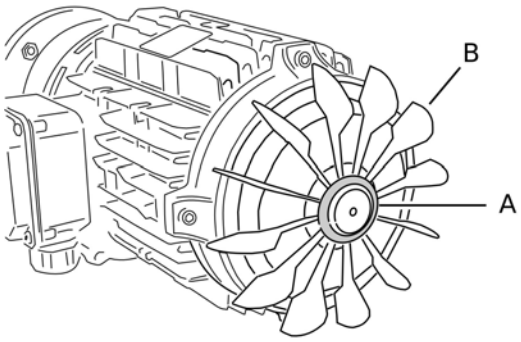


3.

Remove the two plates (A) and make sure to leave the washers on the screws.

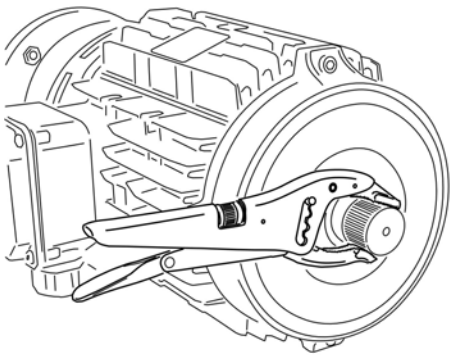
Remove any pipes connected to the mechanical seal.

Remove the four fixing screws (B) from the body.



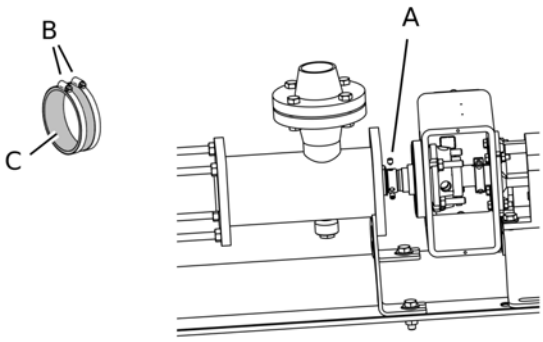
4.

Remove the motor's protective casing, the ring (A) and the fins (B).



5.

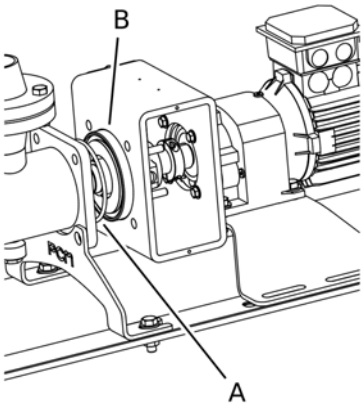
Using locking pliers, turn the shaft to pull the drive back by about 70 mm.



6.

Unscrew the 3 screws (A).

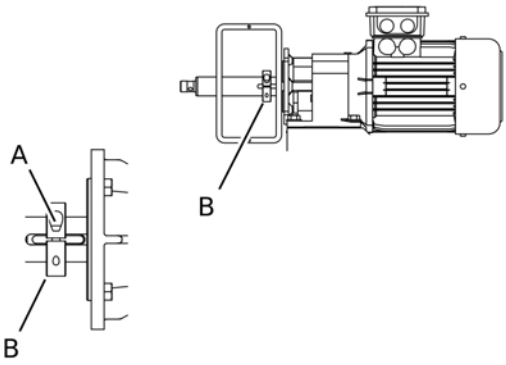
If the pump is equipped with protective sheaths, the screws cannot be accessed directly. In this case, remove the collars (B) and move the protective sheath (C) to reach the 3 screws (A).



7.

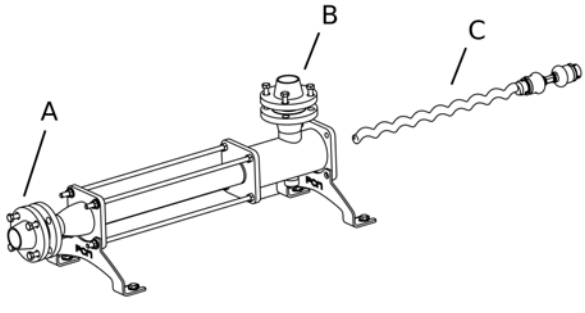
Remove and check the seal (A).

Remove the sealing system (B) only if it requires maintenance (removal instructions can be found in the "Removal of the sealing system" section).



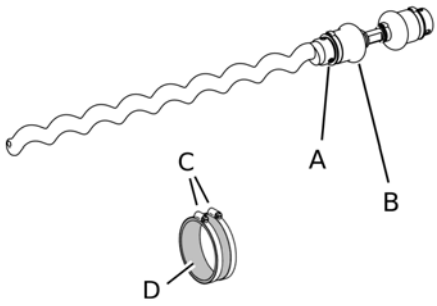
8.

Remove the motor unit, unscrew the 2 screws (A) and remove the shaft collar (B) to remove the shaft.



9.

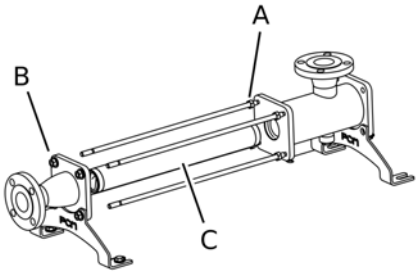
Disconnect the pipes (A) and (B) and remove the shaft line and the rotor (C).



10.

Unscrew the 3 screws (A) and remove the connecting rod (B).

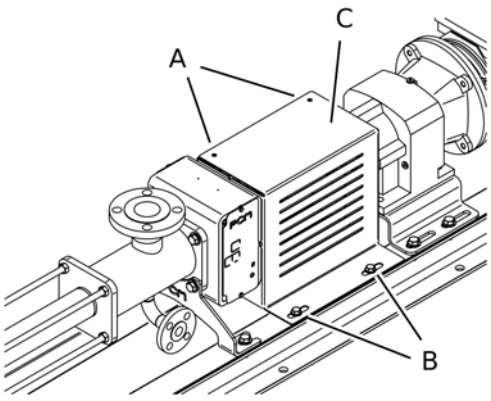
If the pump is equipped with protective sheaths, the screws cannot be accessed directly. In this case, remove the collars (C) and move the protective sheath (D) to reach the 3 screws (A).



11.

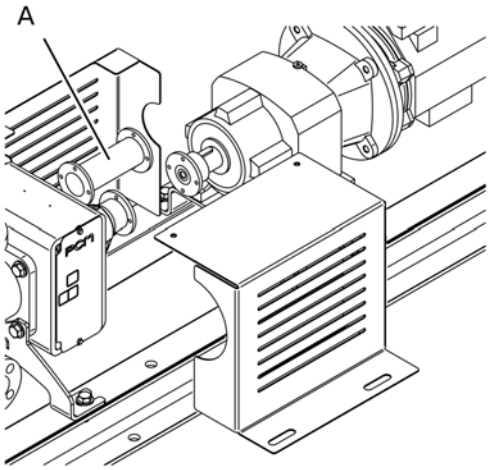
Unscrew the 4 nuts (A) and remove the 4 nuts (B) to remove the stator (C) and the last components.

4.20.3. Disassembling a bearing pump



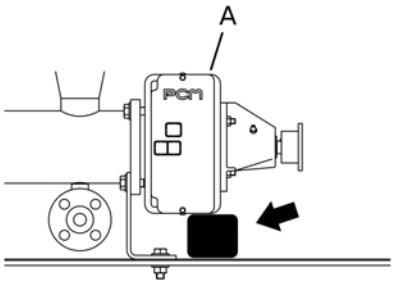
1.

Remove the 2 screws (A). Remove the 4 screws (B) and the coupling cover (C).



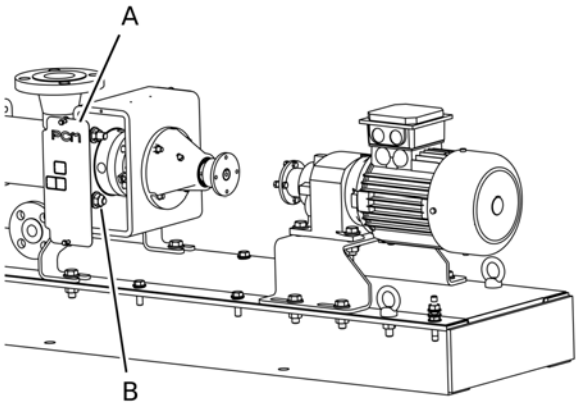
2.

Remove the coupling spacer (A) (the disassembly instructions are given in the coupling instructions).



3.

Wedge the bearing-spacer unit (A).

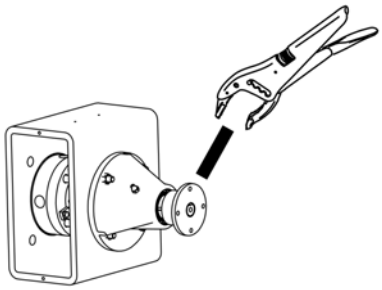


4.

Remove the two plates (A) and make sure to leave the washers on the screws.

Remove any pipes connected to the mechanical seal.

Remove the four fixing screws (B) from the body.



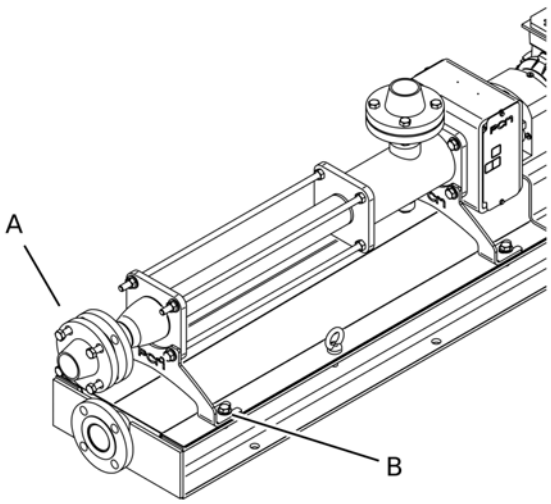
5.

Using locking pliers, turn the hub to pull the bearing-spacer unit back by about 70 mm.

6.

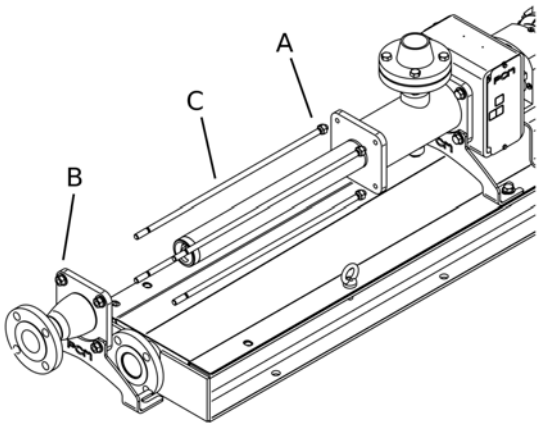
Continue the disassembly from step 6 of the "Disassembling the monobloc pump" section.

4.20.4. Disassembly to change the stator



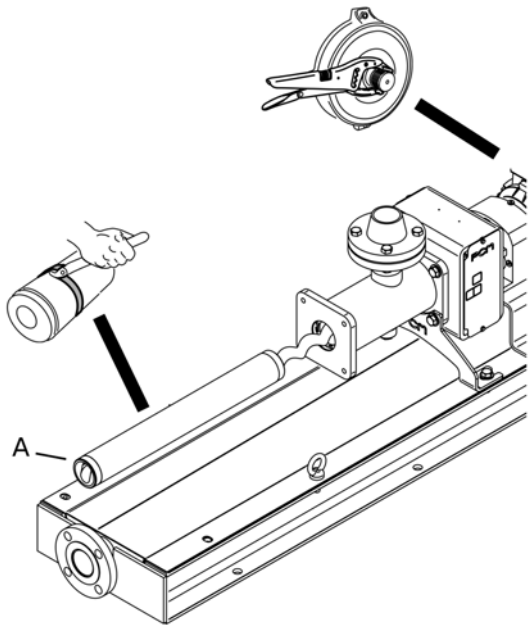
1.

Remove the pipes (A) and unbolt the foot (B).



2.

Unscrew the 4 nuts (A) and remove the 4 nuts (B) to remove the 4 pins (C).



3.

Remove the stator (A).

Block the shaft line on the motor side using a plier wrench and use a strap wrench to unscrew the stator.

4.21. Reassembling the pump (models 1A36, 3A12, 6A6, 6A12, 6A24, 13A6, 13A12)

The pump is re-assembled in the reverse order.

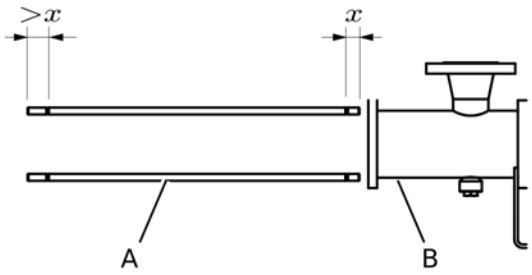
Some screws are coated with LOCTITE® Freinfilet 243 (see steps mentioned below). All other screws or bearings must be covered with grease (GERALYN 2) to prevent sticking during disassembly and reassembly.

The threaded elements must be tightened as shown on page 42.

WARNING: To preserve optimum operating characteristics for the pump, it is essential to use original PCM parts only. Pump maintenance must be performed by qualified personnel only, in compliance with the recommendations in force.

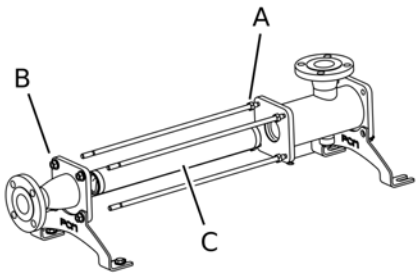
Make sure to comply with the following points:

Coat the rotor and the inside of the stator with glycerine.

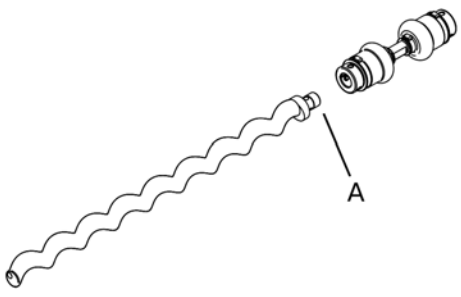


The threads at the ends of the pins (A) do not have the same length.

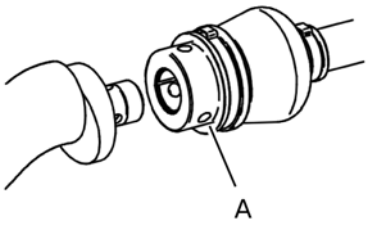
Position each pin so that the shortest thread, equipped with a nut, is screwed into the body (B).



Fit the stator (C), fix the pins and tighten the nuts (B).



Grease the end of the rotor (A) and fix the shaft line to the rotor.

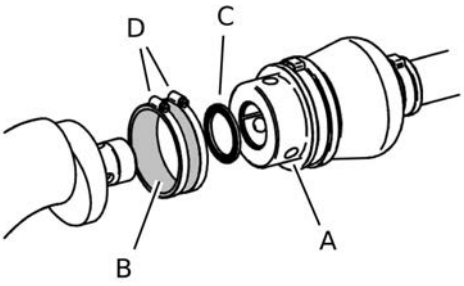


If the pump is not equipped with protective sheaths (option A):

Insert the rotor into the connecting rod.

Coat the 3 conical screws (A) with Freinfilet® before screwing them in.

Check that the tightening torque (10 Nm) is the same for all 3 screws.



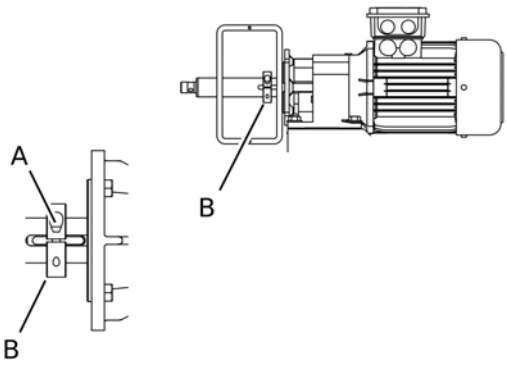
If the pump is equipped with protective sheaths (option B):

First fit the sheath (B) and the seal (C) together, then insert the rotor into the connecting rod.

Coat the 3 conical screws (A) with Freinfilet® before screwing them in.

Check that the tightening torque (10 Nm) is the same for all 3 screws.

Cover the screws with the sheath and tighten the collars (D) at each end of the sheath.



When fitting the drive shaft, ensure the shaft collar (B) is properly positioned relative to the key. Tighten the screws (A) (15 Nm) and check that they are uniformly tight.

4.22. Disassembling the pump (models 13A24, 25A6, 25A12, 40A6, 40A12, 25A24, 60A6)

WARNING: Before performing any maintenance operations on the pump, check that all necessary precautions have been taken: upstream and downstream valves closed, pipework cleaned and purged, electrical power supply disconnected and disabled. Check also that all the usual precautions have been taken in accordance with the regulations in force regarding the safety of personnel.
Systems connected to the mechanical seal must be disconnected before disassembling the pump.

Always wear personal protective equipment (at least shoes, gloves, goggles/mask and ear defenders) when working on or near the pump.

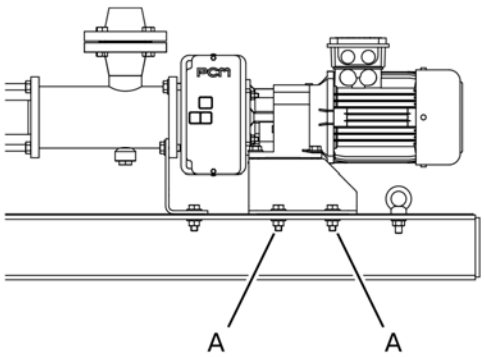
4.22.1. Residual fluids

During maintenance operations, the fluid inside the pump is not fully evacuated. A certain volume of non-drainable fluid remains in the stator, with the quantity depending on the pump model:

Pump model	Fluid volume in the stator (in cm^3)
13A24	1030
25A6	470
25A12	1400
40A12	2400
40A6	980
25A24	3310
60A6	1960

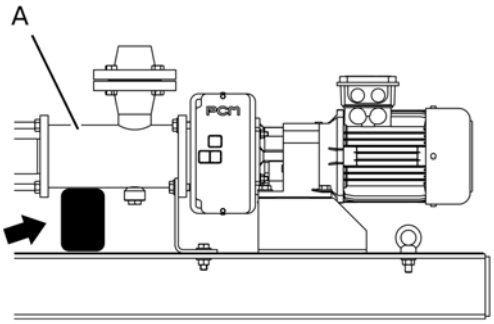
Take the necessary steps depending on the type of fluid present.

4.22.2. Disassembling the monobloc pump



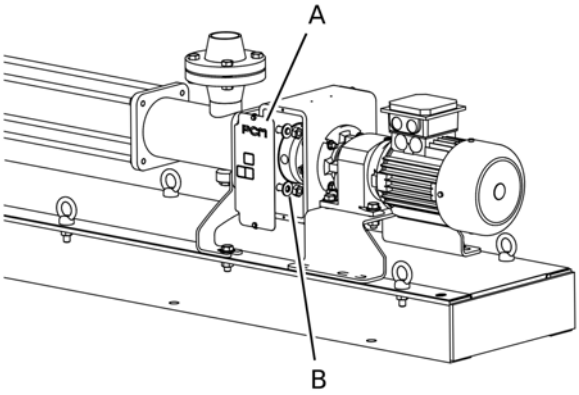
1.

Remove the motor support mounting screws (A).



2.

Support the pump body (A) with a wedge or slings.

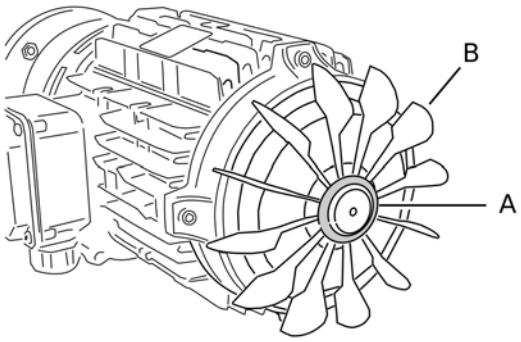


3.

Remove the two plates (A) and make sure to leave the washers on the screws.

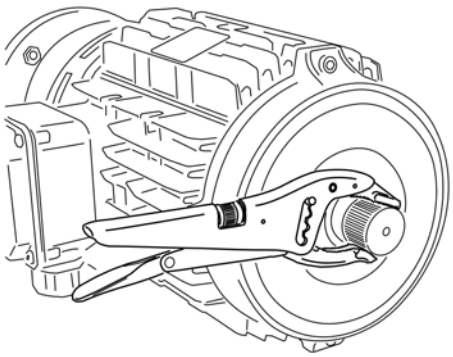
Remove any pipes connected to the mechanical seal.

Remove the four fixing screws (B) from the body.



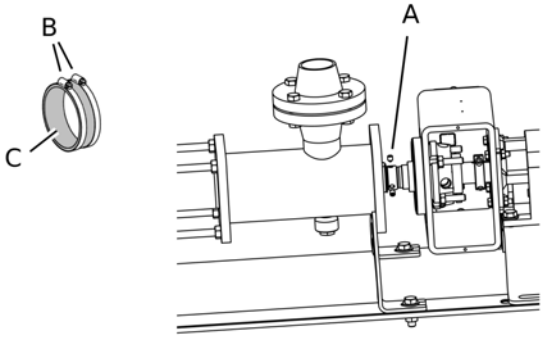
4.

Remove the motor's protective casing, the ring (A) and the fins (B).



5.

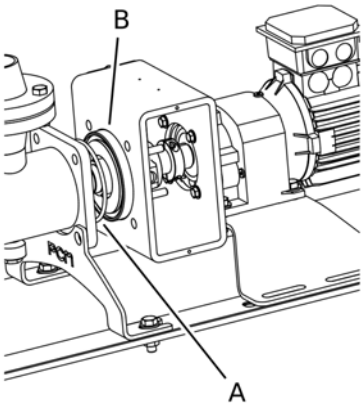
Using locking pliers, turn the shaft to pull the drive back by about 70 mm.



6.

Unscrew the 3 screws (A).

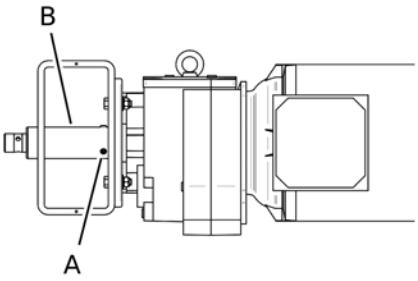
If the pump is equipped with protective sheaths, the screws cannot be accessed directly. In this case, remove the collars (B) and move the protective sheath (C) to reach the 3 screws (A).



7.

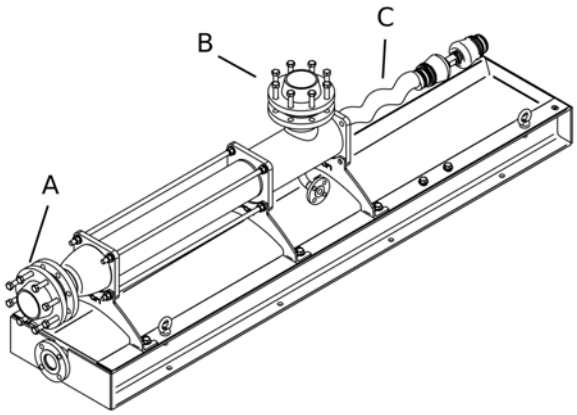
Remove and check the seal (A).

Remove the sealing system (B) only if it requires maintenance (removal instructions can be found in the "Removal of the sealing system" section).



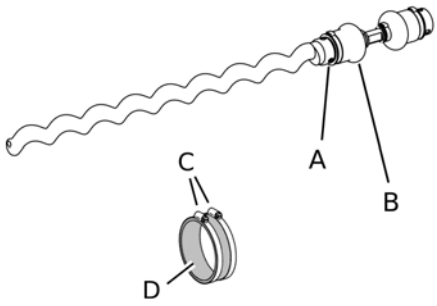
8.

Remove the motor unit, unscrew the 3 screws (A) and remove the shaft (B).



9.

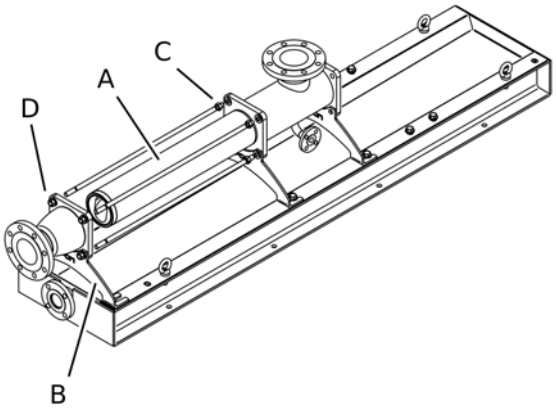
Disconnect the pipes (A) and (B) and remove the shaft line and the rotor (C).



10.

Unscrew the 3 screws (A) and remove the connecting rod (B).

If the pump is equipped with protective sheaths, the screws cannot be accessed directly. In this case, remove the collars (C) and move the protective sheath (D) to reach the 3 screws (A).



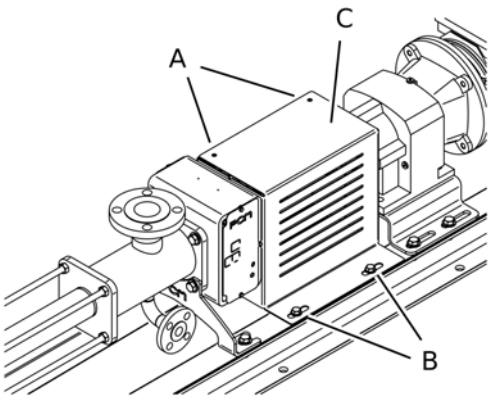
11.

Wedge the stator (A).

Unbolt the front baseplate support (B), loosen the 4 nuts (C) and remove the nuts (D).

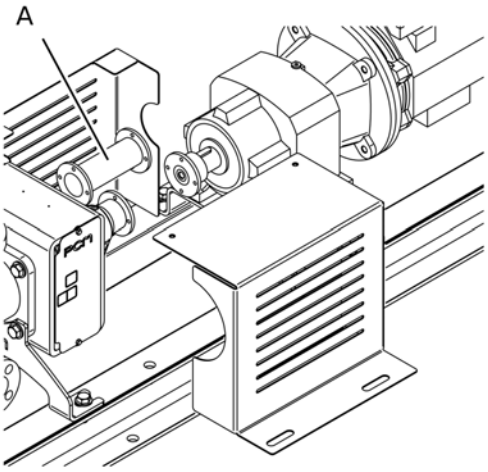
Recover the stator and the last components.

4.22.3. Disassembling a bearing pump



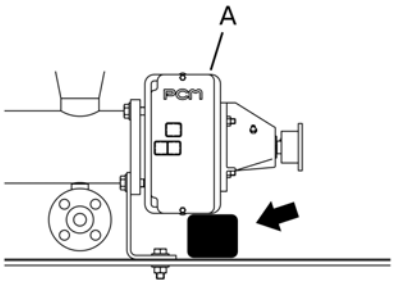
1.

Remove the 2 screws (A). Remove the 4 screws (B) and the coupling cover (C).



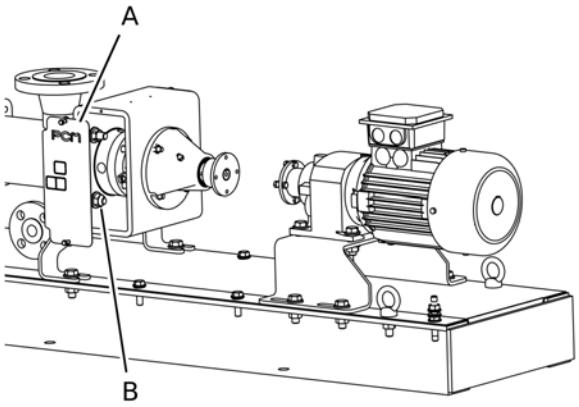
2.

Remove the coupling spacer (A) (the disassembly instructions are given in the coupling instructions).



3.

Wedge the bearing-spacer unit (A).

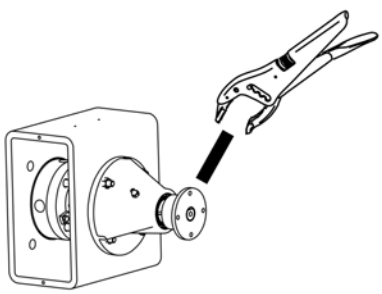


4.

Remove the two plates (A) and make sure to leave the washers on the screws.

Remove any pipes connected to the mechanical seal.

Remove the four fixing screws (B) from the body.



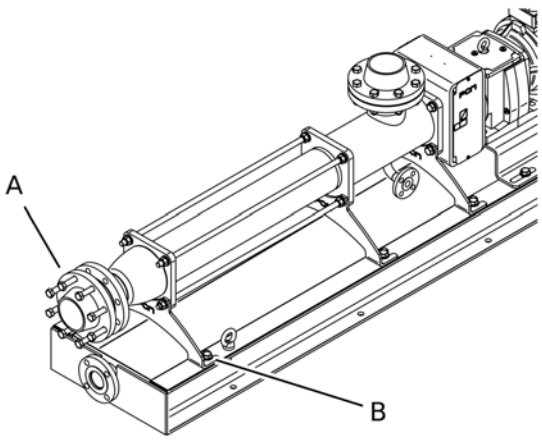
5.

Using locking pliers, turn the hub to pull the bearing-spacer unit back by about 70 mm.

6.

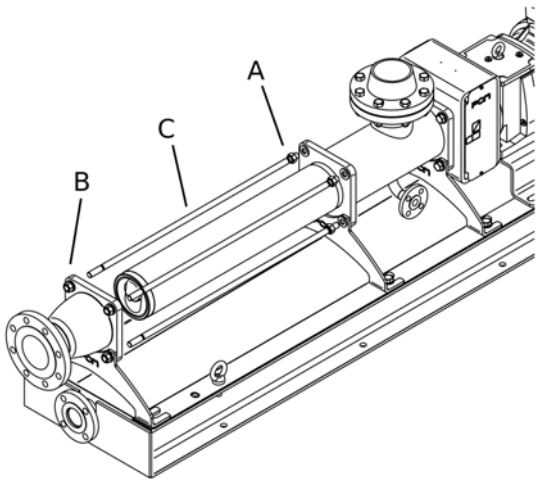
Continue the disassembly from step 6 of the "Disassembling the monobloc pump" section.

4.22.4. Disassembly to change the stator



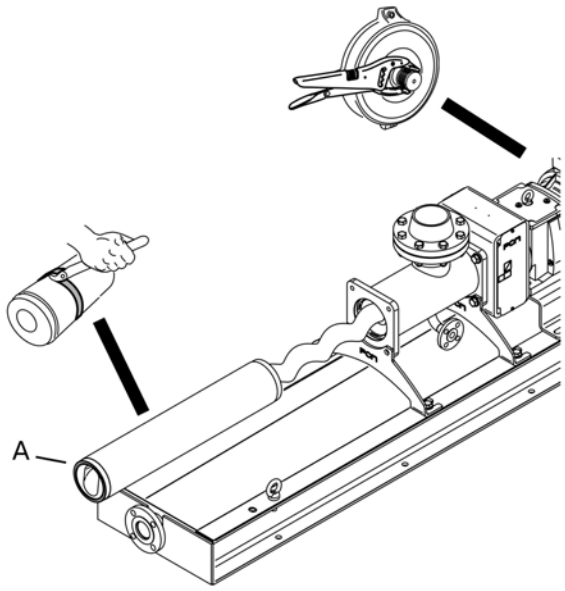
1.

Remove the pipes (A) and unbolt the front support (B).



2.

Unscrew the 4 nuts (A) and remove the 4 nuts (B) to remove the 4 pins (C).



3.

Remove the stator (A).

Block the shaft line on the motor side using a plier wrench and use a strap wrench to unscrew the stator.

4.23. Reassembling the pump (models 13A24, 25A6, 25A12, 40A6, 40A12, 25A24, 60A6)

The pump is re-assembled in the reverse order.

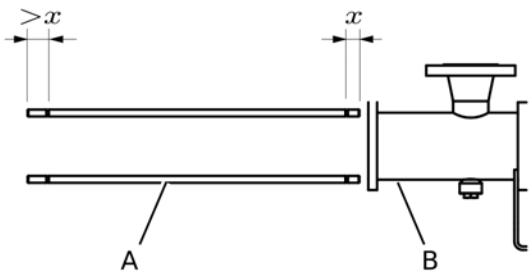
Some screws are coated with LOCTITE® Freinfilet 243 (see steps mentioned below). All other screws or bearings must be covered with grease (GERALYN 2) to prevent sticking during disassembly and reassembly.

The threaded elements must be tightened as shown on page 42.

WARNING: To preserve optimum operating characteristics for the pump, it is essential to use original PCM parts only. Pump maintenance must be performed by qualified personnel only, in compliance with the recommendations in force.

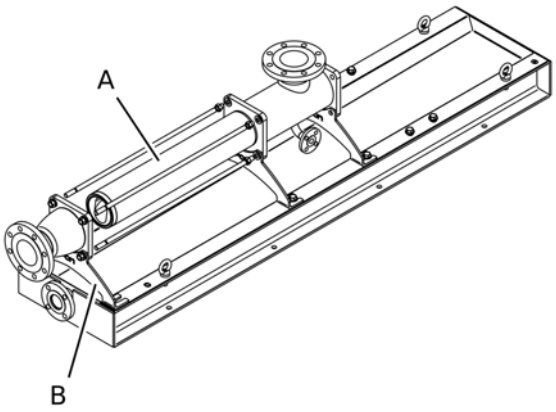
Make sure to comply with the following points:

Coat the rotor and the inside of the stator with glycerine.

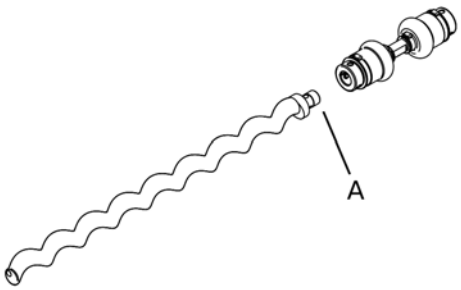


The threads at the ends of the pins (A) do not have the same length.

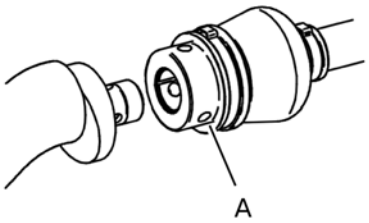
Position each pin so that the shortest thread, equipped with a nut, is screwed into the body (B).



Fit the stator (A), fix the pins and tighten the nuts (B).



Grease the end of the rotor (A) and fix the shaft line to the rotor.

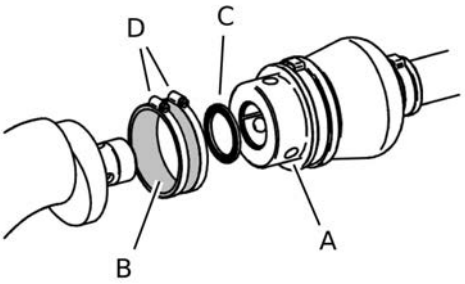


If the pump is not equipped with protective sheaths (option A):

Insert the rotor into the connecting rod.

Coat the 3 conical screws (A) with Freinfilet® before screwing them in.

Check that the tightening torque[2] is the same for all 3 screws.



If the pump is equipped with protective sheaths (option B):

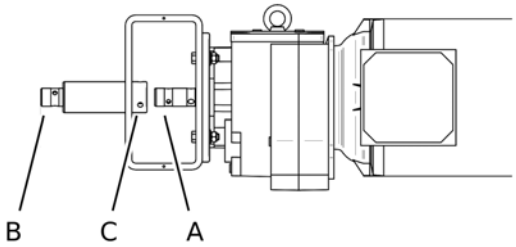
First fit the sheath (B) and the seal (C) together, then insert the rotor into the connecting rod.

Coat the 3 conical screws (A) with Freinfilet® before screwing them in.

Check that the tightening torque[3] is the same for all 3 screws.

Cover the screws with the sheath and tighten the collars (D) at each end of the sheath.

2. Models 13A24, 25A6, 25A12: 20 Nm; Models 40A6, 40A12, 25A24, 60A6: 40 Nm.
3. Models 13A24, 25A6, 25A12: 20 Nm; Models 40A6, 40A12, 25A24, 60A6: 40 Nm.

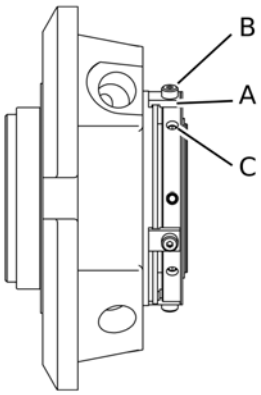


Grease the shaft ends (A) and (B).

Coat the three screws (C) with Freinfilet® before screwing them in.

4.24. Disassembling the sealing system

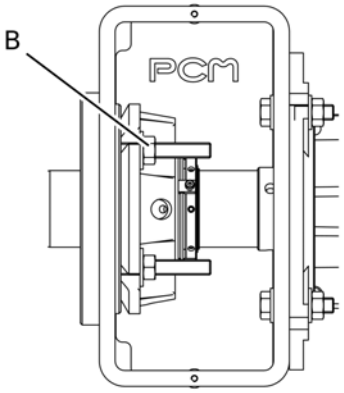
WARNING: Before any procedures are performed, the equipment must be at atmospheric pressure, ambient temperature, purged, and degassed. All control valves must be locked.
Before performing any servicing on the pump, please check that all necessary precautions have been taken: pump switched off, upstream and downstream valves closed, pipes cleaned and purged, electrical power supply disconnected and made inaccessible. All the usual precautions must be taken, in accordance with the texts in force regarding the safety of personnel.



1.

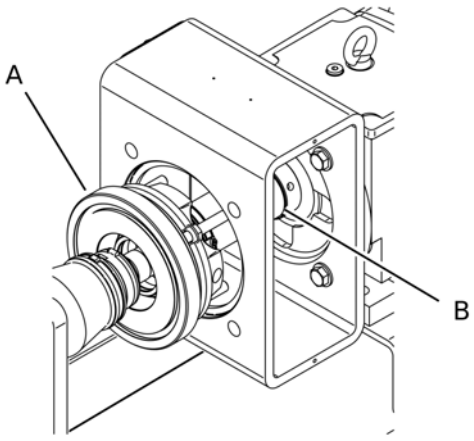
Fit the spacers (A) using screws (B).

Release the set screws (C).



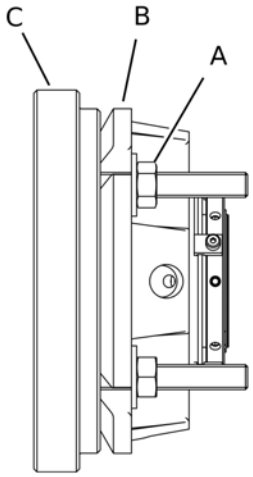
2.

Loosen the 4 screws (B) without removing them.



3.

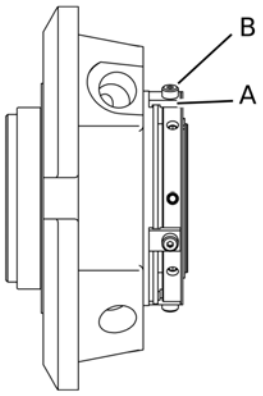
Remove the mechanical seal and mechanical seal support assembly (A) from the drive shaft (B).



4.

Remove the 4 nuts (A) and disassemble the mechanical seal (B) from the mechanical seal support (C).

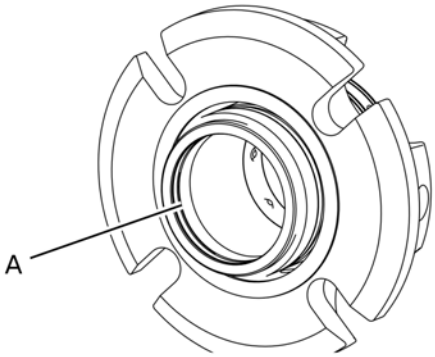
4.25. Reassembling the sealing system



1.

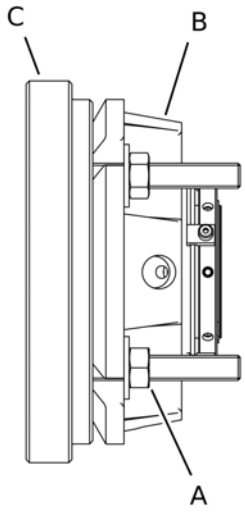
Ensure the seal gland is correctly positioned in its housing.

Check that the spacers (A) are in place and held by screws (B).



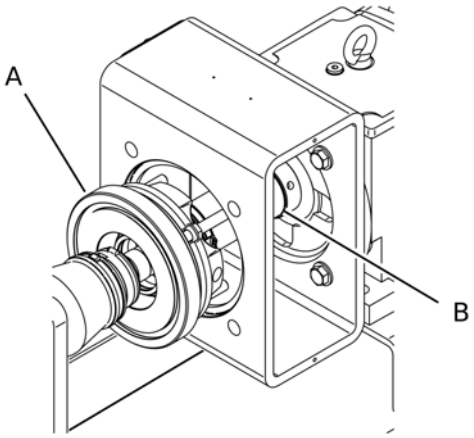
2.

Grease the sleeve O-ring (A).



3.

Position the mechanical seal (B) against the mechanical seal support (C) and position the nuts (A) without tightening them.



4.

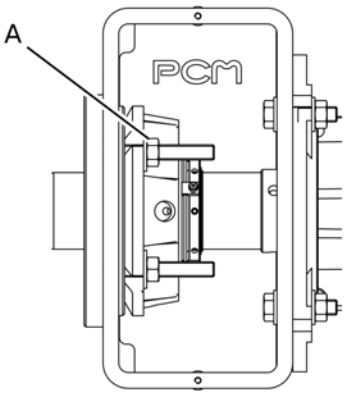
Fit the mechanical seal and mechanical seal support assembly (A) to the drive shaft (B).

5.

Orient the mechanical seal according to the lubrication system chosen (see the "Connecting the dynamic sealing system" section, page 16).

6.

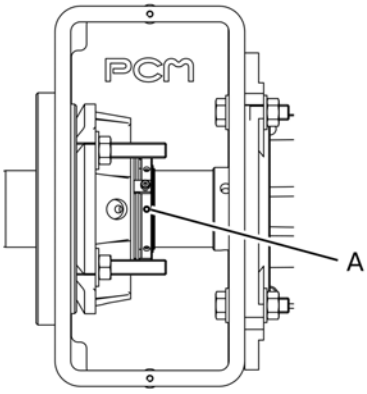
Follow the procedure to reassemble the pump.



7.

Once the pump is fully assembled, tighten the nuts (A) to the recommended torque (see the "Tightening torques" section, page 42).

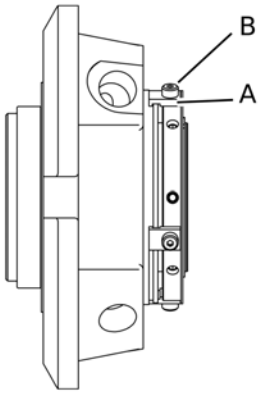
WARNING: If the mechanical seal is sealed by a flat seal, check the tightness again after an hour.



8.

Position the set screws (A) to centre the seal on the shaft, then tighten them to the following torques:

- M5 screw: 3.5 N.m [2.6 lbf.ft]
- M6 screw (models 25A24, 40A6, 40A12 and 60A6 only): 7.0 N.m [5.2 lbf.ft]



9.

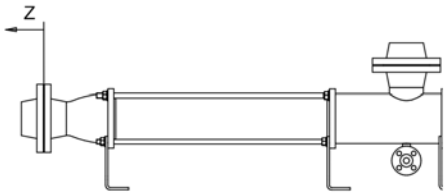
Remove the spacers (A) and screws (B).

10.

Connect the sealing system (see the "Connecting the dynamic sealing system (cartridge type)" section, page 16).

4.26. Disassembly in confined spaces

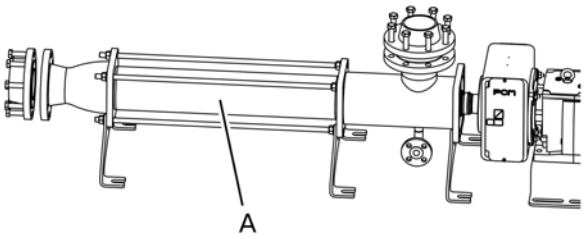
It is possible to reduce at least the Z dimension indicated in the footprint plans in order to disassemble the stator.



To do this, follow this procedure:

1.

Follow the pump disassembly procedure until you come to disconnect the shaft line.



2.

Disconnect the suction and discharge pipes and remove the complete subassembly (A).

3.

Disassemble the rotor from the stator (see the stator disassembly procedure, page 53, 60 or 69 depending on the pump type).

4.27. Equipment Storage when not in Use

Proceed as follows:

1. Release pressure at the suction and discharge.
2. Drain the pipework and the pump.
3. Clean the pipework and the pump using a cleaning product that is compatible with the pumped product and pump materials.
4. Run the pump for more effective cleaning.
5. Switch off the pump.
6. Isolate the pump from the rest of the circuit.

Prolonged stoppage of the pump can damage the hose fitted inside. Removing the hose is advisable if the pump needs to be stopped for more than three days.

4.27.1. Preserving the Rubber Components

We recommend that you store all rubber parts in a cool location, away from light to avoid damage by UV rays.

4.27.2. Preserving the sealing systems

When the seal is stored fitted to the machine, it is recommended that you rotate the shaft one quarter turn every two months to prevent the sealing faces from sticking.

5. Appendices

Risk prevention

Technical description

Accessories (optional)

Automatic control (optional)

Risk prevention

To return any equipment, please complete this form and include it with the equipment.

Equipment Return

Company using the equipment

.....

Activity

.....

Equipment Part No.

.....

Is the equipment likely to present any particular risks due to its use ?

☐ yes ☐ no

Chemical risks ☐ yes ☐ no

Product or Substance	Mode of Contamination	Prevention
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

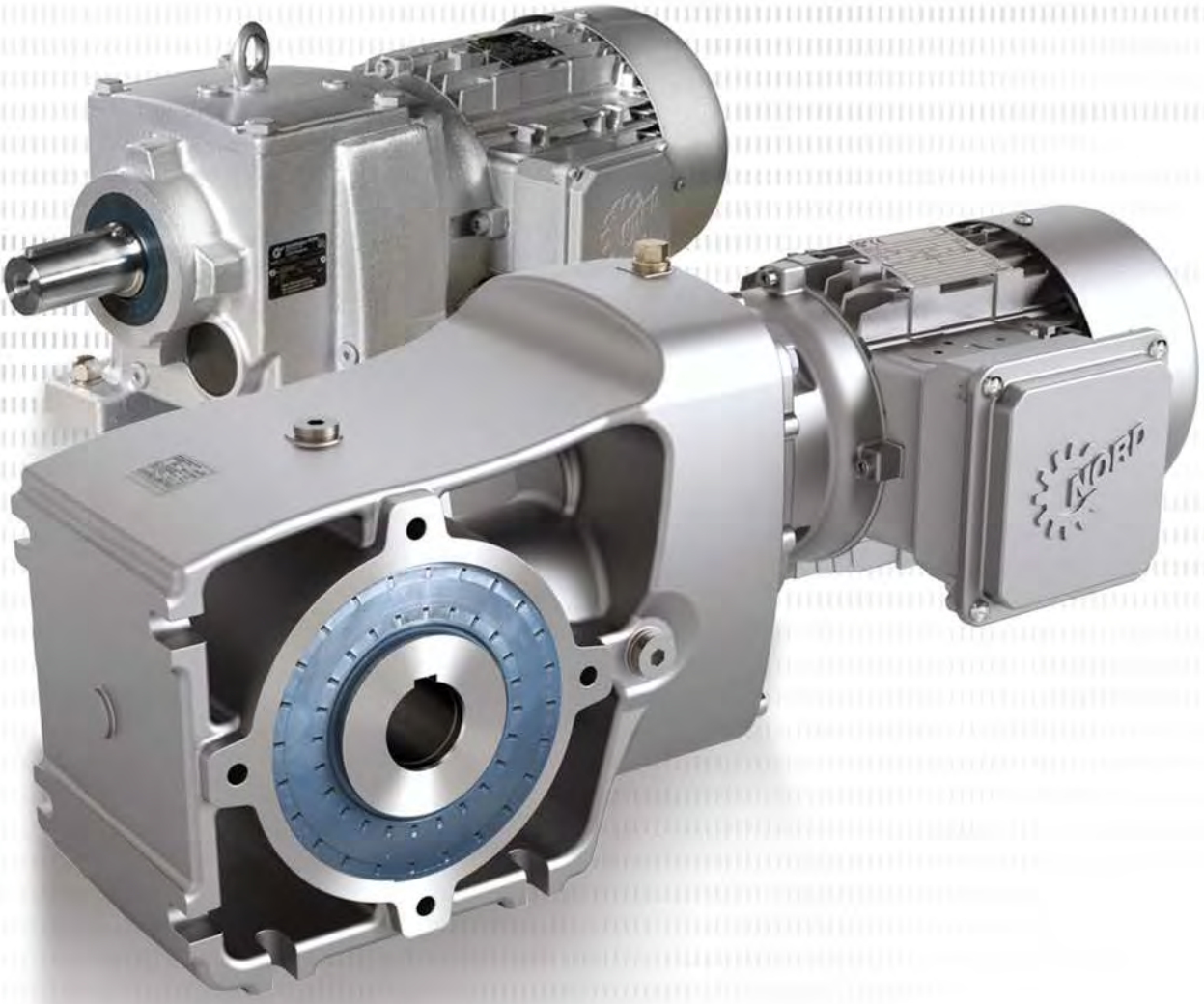
Biological risks ☐ yes ☐ no

Biological Agents	Mode of Contamination	Prevention
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

Installation, Operation & Maintenance Manual (IOM)	*Company Document Number*: **N/A**	
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Vendor Document Number : **PCM500**	*Rev. Date:* **02/08/2024**	
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2. Gear unit

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B 2000 – en

Explosion-protected gear units

Operating and Assembly Instructions



Read document and keep for future reference

Read this document carefully prior to performing any work on or putting the device into operation. It is essential to read and observe the instructions in this document. They serve as the prerequisite for smooth and safe operation and the fulfilment of any warranty claims.

Contact Getriebebau NORD GmbH & Co. KG if your questions regarding the handling of the device are not answered in this document or if you require further information.

The German version of this document is the original. The German document is always decisive. If this document is available in other languages, this will be a translation of the original document.

Keep this document in the vicinity of the device so that it is available if required.

Use the version of this documentation that is valid for your device at the time of delivery. You can find the currently valid version of the documentation under www.nord.com.

Please also note the following documents:

- Gear unit catalogues,
- Documentation for the electric motor,
- Documentation for equipment which is attached or provided,
- Special documentation according to details on the name plate.

Documentation

Designation: B 2000

Part No.: 6051402

Series: Gear units and geared motors

Type series:

Gear unit types:
Helical gear unit
NORDBLOC.1® helical in-line gear units
Standard helical gear units
Parallel shaft gear unit
Bevel gear unit
Helical worm gear units
MINIBLOC worm gear units
UNIVERSAL worm gear units

Version list

Title, **Date**	**Order number** / Version Internal code	**Remarks**
B 2000, January 2013	**6051402** / 0413	-
B 2000, September 2014	**6051402** / 3814	• General corrections
B 2000, April 2015	**6051402** / 1915	• New gear unit types SK 10382.1 + SK 11382.1
B 2000, March 2016	**6051402** / 0916	• General corrections • Adaptation of new ATEX Directives as of 20/04/2016
B 2000, April 2017	**6051402** / 1417	• General corrections • New helical gear units 071.1, SK 171.1, SK 371.1, SK 571.1, SK 771.1
B 2000, October 2017	**6051402** / 4217	• General corrections • New parallel shaft gear units SK 0182.1; SK 0282.1; SK 1282.1; SK 1382.1 • New worm gear unit SK 02040.1 • New declarations of conformity 2D + 2G; 3D + 3G
B 2000, April 2019	**6051402** / 1419	• General corrections • Revision of safety and warning information • Change of labelling according to DIN EN 13463-1 to DIN EN ISO 80079-36 • New declarations of conformity 2D + 2G; 3D + 3G

Title, **Date**	**Order number** / Version Internal code	**Remarks**
B 2000, October 2019	**6051402** / 4419	• General corrections • Structural modifications to the document • Supplementation of gear unit types SK 871.1; SK 971.1; SK 1071.1 • Removal of the declaration of conformity according to DIN EN 13463-1.
B 2000, September 2021	**6051402** / 3921 32550	• Editorial revision • General corrections and amendments • Options AI, AN added
B 2000, July 2022	**6051402** / 2822 34342	• Revision of the maximum motor weights

Table 1: Version list B 2000

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Any editing or amendment or other utilisation of the document is prohibited.

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Member of the NORD DRIVESYSTEMS Group

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1 Safety information

1.1 Intended use

These gear units are used to transmit rotary movements. They convert velocity and torque. They are intended for use as part of a drive system in commercially used plant and machinery. The gear units must not be operated until it has been established that the plant or machinery can be safely operated with the gear unit. Suitable protective measures must be provided if failure of a gear unit or a geared motor could result in a risk to persons. The machine or system must comply with local legislation and directives. All applicable health and safety requirements must be met. In particular, the Machinery Directive 2006/42/EC, TR CU 010/2011 and the TR CU 020/2011 must be especially observed in the relevant areas of application.

The gear units are suitable for use in explosion hazard areas according to the category stated on the type plate. They satisfy the explosion protection requirements of Directive 2014/34/EU and TR CU 012/2011 for the category indicated on the type plate. The gear units may only be operated with components which are intended for use in explosion hazard areas. Atmospheres with gases, vapours and aerosols (CE: Zone 1 or 2, labelling G; EAC: Category IIG) and dusts (CE: Zone 21 or 22, labelling IID; EAC: Category IIID) must not be present during operation. The approval of the gear unit is void in case of a hybrid mixture.

Structural modifications to the gear units are not permitted and result in the approval for the gear unit becoming void.

The gear units may only be used according to the information in the technical documentation from Getriebebau NORD GmbH & Co. KG. Damage to the gear unit may result if the gear unit is not used as intended and according to the information in the operating and assembly manual. This may also result in personal injury.

The base or the gear unit mount must be appropriately designed for the weight and torque. All of the fastenings provided must be used.

Some gear units are equipped with a cooling coil. These gear units may only be operated if the cooling circuit is connected and in operation.

1.2 Safety information for explosion protection

The gear units are suitable for use in explosion hazard areas. The following information must be observed in order to ensure adequate explosion protection.

Note all technical data stated on the name plate and comply with them. Observe the special documentation stated in field "S" of the name plate as well as instructions for equipment and attachments.

1.2.1 Field of use

- Gear units must be properly designed. Overloads may result in breakage of components. This may cause sparks. Carefully fill in the enquiry form. Getriebebau NORD GmbH & Co KG designs gear units according to the details in the enquiry form. Please note the information for gear unit selection in the enquiry form and in the catalogue.
- Explosion protection only applies for areas which correspond to the device category and the type of explosive atmosphere according to the labelling on the type plate. The type of gear unit and all technical data must comply with the planning details for the plant or machinery. If there are several operating points, the maximum drive power, torque or speed must not be exceeded in any operating point. The gear unit may only be operated in the installation position which complies with the version. Carefully check all details on the type plate before installing the gear unit.

- All work, e.g. transportation, storage, installation, electrical connection, commissioning, servicing and maintenance must be performed in a non-explosive atmosphere.
- The atmospheric conditions, in which the drive is commissioned, must be within an ambient pressure range from 80 kPa to 110 kPa and an oxygen content of approx. 21 % according to DIN EN ISO 80079-36.

1.2.2 Attachments and equipment

- Gear units with a cooling coil for oil cooling must not be commissioned without lubricant cooling. The function of the lubricant cooling must be monitored. The drive must be shut down if the permissible temperature is exceeded. Check for leaks at regular intervals.
- Equipment attached to the gear unit such as couplings, pulleys, cooling systems, pumps, sensors etc., as well as drive motors must also be suitable for use in the zone with an explosive atmosphere. The ATEX labelling must conform to the details of the system and/or machine design.

1.2.3 Lubricants

- Unsuitable oils can cause an explosion risk. Therefore only use oils which correspond with the details on the name plate. Recommended lubricants can be found in the appendix to these operating and installation instructions.

1.2.4 Operating conditions

- If the gear unit is equipped with a back stop, note the minimum speed for releasing the back stop as well as the maximum speed. Gear units with a back stop on the drive shaft may only be operated with a minimum speed of the drive shaft of 900 min^{-1}. Speeds which are too low cause increased wear and temperature increases. Excess speeds will damage the back stop.
- If the gear unit is exposed to direct sunlight or comparable radiation, the ambient temperature or the temperature of the cooling air must always be at least 10 K below the maximum permissible ambient temperature range "Tu" as stated on the name plate.
- Even small changes to the installation conditions can have a significant effect on the temperature of the gear unit. Gear units with temperature class T4 or with a maximum surface temperature of 135 °C or less must be provided with a temperature sticker. The dot in the middle of the temperature sticker turns black if the surface temperature is too high. Take the gear unit out of service immediately if the dot has turned black.

1.2.5 Radial and axial forces

- Drive and driven elements may only be subjected to the maximum permitted radial forces F_{R1} and F_{R2} and axial forces F_{A2} indicated on the name plate (see Section 2.2 "Name plate").
- Observe the correct tension, particularly for belts and chains.
- Additional loads due to unbalanced hubs are not permitted.

1.2.6 Assembly, installation and commissioning

- Incorrect installation results in stresses and impermissibly high loads. This causes increased surface temperatures. Note the installation and assembly instructions in these operating and installation instructions.
- Before commissioning, carry out all of the checks which are prescribed in these operating and maintenance instructions in order to detect faults which could increase the risk of explosion in good time. Do not commission the gear unit if abnormalities are found during the checks. Contact Getriebebau NORD.

- For gear units with temperature class T4 or with a maximum surface temperature of less than 200 °C, carry out a measurement of the surface temperature of the gear unit before commissioning. Take the gear unit out of service if the measured surface temperature is too high.
- The gear unit housing must be earthed in order to prevent electrostatic charging.
- Defective lubrication causes temperature increases and sparks. Check the oil level before commissioning.

1.2.7 Service and maintenance

- Perform all of the inspection and maintenance work specified in these operating and installation instructions with great care, in order not to increase the risk of explosion due to functional faults and damage. The drive must be shut down if any abnormalities are detected. Contact Getriebebau NORD.
- Defective lubrication causes temperature increases and sparks. Check the oil level at regular intervals according to the details in these operating and installation instructions.
- Dust and dirt deposits cause temperature increases. Dust may also be deposited inside covers which are not dust-proof. Remove deposits at regular intervals according to the details in these operating and installation instructions.

1.2.8 Protection against electrostatic charging

- Non-conducting coatings, or low pressure hoses may become electrostatically charged. Sparks may be produced on discharge. Such components must not be used in areas in which processes that cause charging are to be expected. Oil level tanks may only be located in areas with the gas group IIB.
- Gear units with a coating thickness in excess of 0.2 mm may only be used in areas in which processes that cause charging are not to be expected.
- The painting of the gear unit is designed for Category 2G Group IIB (Zone 1 Group IIB). For use in Category 2G Group IIC (Zone 1 Group IIC) the gear unit must not be used or installed in areas in which processes which cause electrostatic charging are to be expected.
- In case of subsequent painting it must be ensured that the paint has the same characteristics as the original paint.
- To prevent electrostatic charging, surfaces may only be cleaned with a damp cloth.

1.3 Applied ignition protection classes according to DIN EN ISO 80079-37

The following ignition protection types are used:

- Measures to ensure constructional safety "c"
  - Strength and thermal calculations for all applications,
  - Selection of suitable materials and components,
  - Calculation of a recommended interval for general overhaul,
  - Inspection interval for lubricant level, therefore ensuring lubrication of bearings, seals and gears,
  - Requirement for thermal check during commissioning.
- Measures to ensure encapsulation with liquid "k"
  - The gears are lubricated with a suitable lubricant,
  - Statement of approved lubricants on the name plate,
  - Statement of lubricant fill levels.
- Measures to ensure monitoring of sources of ignition "b"
  - Use of temperature monitoring for oil cooling systems as ignition protection system b1.

1.4 Do not make any modifications.

Do not make any structural modifications to the gear unit. Do not remove any protective guards.

1.5 Performing inspection and maintenance work

Due to lack of maintenance and damage, malfunctions may occur which can result in personal injury.

- Carry out all servicing and maintenance work at the specified intervals.
- Also note that servicing is necessary after long storage periods prior to commissioning.
- Do not operate damaged gear units. The gear unit must not have any leaks.

1.6 Personnel qualification

All transport, storage, installation, commissioning and maintenance work must be carried out by qualified specialist personnel.

Qualified specialist personnel are persons who have the training and experience to recognise and avoid any possible risks.

Repairs may only be done by Getriebebau NORD GmbH & Co. KG or by a person authorised in accordance with the statutory regulations of explosion protection.

1.7 Safety for particular activities

1.7.1 Check for transport damage

Transport damage may cause malfunctions of the gear unit, which may cause personal injury. Oil which escapes due to leaks may cause a slipping hazard.

- Check the packaging and the gear unit for transport damage.
- Do not operate damaged gear units.

1.7.2 Safety information for installation and maintenance

Before starting work on the gear unit disconnect the drive from the power supply and secure it against accidental switch-on. Allow the gear unit to cool down. Depressurise the cooling circuit lines.

Damaged or defective components, attachment adapters, flanges and covers may have sharp edges. Wear work gloves and work clothing.

1.8 Hazards

1.8.1 Hazards when lifting

Persons may be injured by falling or swinging gear units. Therefore also observe the following information:

- Cordon off a wide area around the hazard area. Take care that there is adequate space to avoid swinging loads.
- Never stand under suspended loads.
- Use adequately dimensioned means of transport which are suitable for the purpose. The weight of the gear unit can be obtained from the type plate.
- Only lift the gear units by the eye bolts which are provided. The eye bolts must be fully screwed in. Only pull on the eye bolts vertically, never cross-wise or at an angle. Only use the eye bolts to lift the gear unit without other components. The eye bolts are not designed for lifting the gear unit with attachments. Use the eye bolts on both the gear unit and the motor to lift a geared motor.

1.8.2 Hazards due to rotating parts

Rotating parts cause a risk of entanglement. This may lead to severe injuries such as crushing or strangling.

- Provide contact protection. In addition to shafts, this also applies to fans as well as drives and driven elements such as belt drives, chain drives, shrink discs and couplings. Take possible run-on of the machine into consideration for the design of protective devices.
- Do not operate the drive without covers or hoods.
- Secure the drive to prevent activation during installation and maintenance work.
- For test operation do not switch on the drive without an installed driven element or secure the motor shaft key.
- Also observe the safety information in the operating and installation instructions provided by manufacturers of components supplied.

1.8.3 Hazards due to high or low temperatures

The gear unit may heat up to 90 °C during operation. Touching hot surfaces or contact with hot oil may result in burns. At very low ambient temperatures freezing may occur on contact.

- Only touch the gear unit when wearing gloves after operation or at very low ambient temperatures.
- Before starting maintenance work, allow the gear unit to cool down sufficiently after operation.
- Provide a contact guard if there is a risk that persons may touch the gear unit when it is in operation.
- Bursts of hot oil mist may be emitted from the pressure vent screw during operation. Provide a suitable guard so that persons cannot be injured by this.
- Do not place any flammable materials on the gear unit.

1.8.4 Hazards due to lubricants and other substances

Chemical substances which are used with the gear unit may be toxic. Eye injuries may result if these substances enter the eyes. Lubricants and adhesives may cause skin irritation.

Oil mist may escape when vent screws are opened.

Due to lubricants and conservation materials, gear units may be slippery and slip out of the hands. There is a slipping hazard from spilled lubricants.

- When working with chemical substances wear chemical-resistant gloves and work clothing. Wash your hands after working.
- Wear protective goggles if there is a possibility of splashed chemicals, for example when filling oil or during cleaning work.
- If chemicals enter the eyes, rinse with large amounts of cold water immediately. Consult a physician in case of symptoms.
- Observe the safety data sheets for the chemicals. Keep the safety data sheets in the vicinity of the gear unit.
- Collect spilled lubricants immediately with a binding agent.

1.8.5 Hazards due to noise

Some gear units or attached components may cause hazardous noise levels during operation. Wear hearing protection if work has to be carried out close to such gear units.

1.8.6 Hazards due to pressurised coolants

The cooling system is under high pressure. Damage or opening a cooling line which is under pressure may result in injury. Depressurise the cooling circuit before working on the gear unit.

2 Description of gear units

2.1 Gear unit types and type designations

Gear unit types/ Type designations
UNICASE helical gear units **2-stage:** SK 02, SK 12, SK 22 SK 32, SK 42, SK 52, SK 62N, SK 62, SK 72, SK 82, SK 92, SK 102 **3-stage:** SK 03, SK 13, SK 23, SK 33N, SK 43, SK 53, SK 63, SK 73, SK 83, SK 93, SK 103
NORDBLOC.1® helical gear unit **1-stage:** SK 071.1, SK 171.1, SK 371.1, SK 571.1, SK 771.1, SK 871.1, SK 971.1, SK 1071.1 **2-stage:** SK 072.1, SK 172.1, SK 372.1, SK 572.1, SK 672.1, SK 772.1, SK 872.1, SK 972.1 **3-stage:** SK 373.1, SK 573.1, SK 673.1, SK 773.1, SK 873.1, SK 973.1
STANDARD helical gear units **2-stage:** SK 0, SK 01, SK 20, SK 25, SK 30, SK 33 **3-stage:** SK 010, SK 200, SK 250, SK 300, SK 330
UNICASE parallel gear units **2-stage:** SK 0182NB, SK 0182.1, SK 0282NB, SK 0282.1, SK 1282, SK 1282.1, SK 2282, SK 3282, SK 4282, SK 5282, SK 6282, SK 7282, SK 8282, SK 9282 **3-stage:** SK 2382, SK 3382, SK 4382, SK 5382, SK 6382, SK 7382, SK 8382, SK 9382, SK 10382, SK 10382.1, SK 11382
UNICASE bevel gear units **3-stage:** SK 9012.1, SK 9016.1, SK 9022.1, SK 9032.1, SK 9042.1, SK 9052.1, SK 9062.1, SK 9072.1, SK 9082.1, SK 9086.1, SK 9092.1, SK 9096.1 **4-stage:** SK 9013.1, SK 9017.1, SK 9023.1, SK 9033.1, SK 9043.1, SK 9053.1
NORDBLOC.1® bevel gear unit **2-stage:** SK 920072.1, SK 92072.1, SK 92172.1, SK 92372.1, SK 92672.1, SK 92772.1, SK 930072.1, SK 93072.1, SK 93172.1, SK 93372.1, SK 93672.1, SK 93772.1
UNICASE worm gear units **2-stage:** SK 02040, SK 02040.1, SK 02050, SK 12063, SK 12080, SK 32100, SK 42125 **3-stage:** SK 13050, SK 13063, SK 13080, SK 33100, SK 43125
UNIVERSAL SI worm gear units **1-stage:** SK 1SI31, SK 1SID31, SK 1SI40, SK 1SID40, SK 1SI50, SK 1SID50, SK 1SI63, SK 1SID63, SK 1SI75 **2-stage (Helical worm gear unit):** SK 2SID40, SK 2SID50, SK 2SID63
UNIVERSAL SMI worm gear units **1-stage:** SK 1SMI31, SK 1SMID31, SK 1SMI40, SK 1SMID40, SK 1SMI50, SK 1SMID50, SK 1SMI63, SK 1SMID63, SK 1SMI75 **2-stage (Helical worm gear unit):** SK 2SMID40, SK 2SMID50, SK 2SMID63

Table 2: Gear unit types and type designations

Double gear units consist of two single gear units. The type designation of the SK 73/22 double gear unit, for example, means that the double gear unit consists of the single gear units SK 73 and SK 22.

Abbreviation	Description
(without)	Foot mounting with solid shaft
/31	Worm gear first stage
/40	Worm gear first stage
5	Reinforced output shaft
A	Hollow shaft
AI	Standard IEC motor attachment
AI…BRG1	Standard IEC motor attachment with manual re-lubrication
AI…RLS	Standard IEC motor attachment with integrated back stop
AL	Reinforced axial bearing
AN	Standard NEMA motor attachment
AN…BRG1	Standard NEMA motor attachment with manual re-lubrication
AN…RLS	Standard NEMA motor attachment with integrated back stop
B	Fastening element
CC	Cooling coil
D	Torque arm
EA	Splined hollow shaft
F	B5 flange
G	Rubber buffer for torque arm
H	Cover cap
/H10	Modular helical pre-stage for universal worm gear units
H66	IP66 cover
IEC	Standard IEC motor attachment
K	Torque bracket
L	Solid shaft both sides
NEMA	Standard NEMA motor attachment
OA	Oil expansion chamber
OT	Oil level tank
R	Back stop
S	Shrink disc
SCX	Screw conveyor flange ATEX
SO1	Synthetic oil ISO VG 220
V	Solid shaft (for standard helical gear units: reinforced drive)
VG	Reinforced rubber buffer
VI	Viton radial shaft seals
VL	Reinforced output bearings
VL2	Agitator version - Reinforced bearings
VL3	Agitator version - Reinforced bearings - Drywell
VS	Reinforced shrink disc
W	Free drive shaft
X	Housing foot mounting
Z	B14 flange

Table 3: Versions and options

2.2 Name plate

The name plate must be permanently attached to the gear unit and must not be exposed to permanent dirtying. Please contact the NORD service department if the name plate is illegible or damaged.

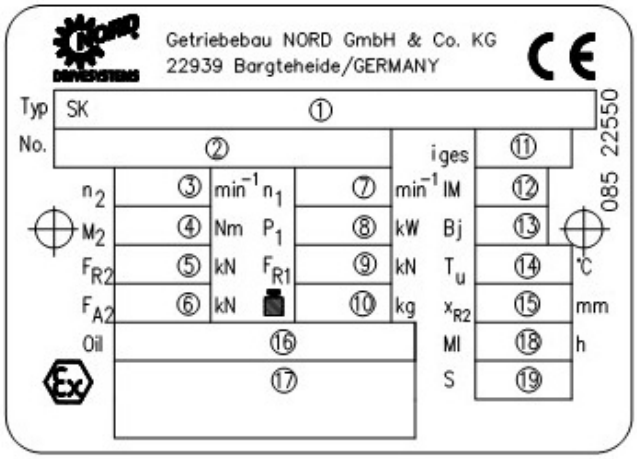


Figure 1: Name plate

Explanation

1	NORD gear unit type
2	Serial number
3	Rated speed of gear unit output shaft [1)]
4	Rated torque of gear unit output shaft
5	Max. permissible transverse force on the gear unit output shaft
6	Max. permissible axial force on the gear unit output shaft
7	Rated speed of the gear unit drive shaft or drive motor [1)]
8	Max. permissible drive power
9	Max. permissible transverse force on the gear unit drive shaft for option W
10	Weight
11	Overall gear unit ratio
12	Installation position
13	Year of manufacture
14	Permissible ambient temperature range
15	Max. dimension for the point of application of the transverse force F_{R2}
16	Lubricant type, viscosity and quantity
17	Labelling according to DIN EN ISO 80079-36: 1. Group (always II, not for mines) 2. Category (2G, 3G for gas or 2D, 3D for dust) 3. Labelling of non-electrical devices (Ex h) or ignition protection type if fitted (c) 4. Explosion group if present (Gas: IIC, IIB; Dust: IIIC, IIIB) 5. Temperature class (T1-T3 or T4 for gas) or max. surface temperature (e.g. 125°C for dust) or special max. surface temperature see special documentation 6. EPL (equipment protection level) Gb, Db, Gc, Dc 7. Note the special documentation and/or temperature measurement during commissioning (X)
18	Interval for general overhaul in operating hours or according to the specification of the dimensionless maintenance class CM
19	Number of the special documentation

1) The maximum permissible speeds are 10% above the rated speed if the maximum permissible drive power P1 is not exceeded.
If the fields FR1, FR2, and FA2 are empty, the forces are zero. If the field xR2 is empty, the point of application of force FR2 is central on the driven shaft journal.

For geared motors (gear units with attached electric motor), the electric motor has its own name plate with separate labelling according to Directive 2014/34/EU (ATEX). The motor labelling must also comply with data for the planning of the plant and the machine.

The lowest explosion protection level on the gear unit and the motor labelling applies for the geared motor unit.

If the electric motor is driven with a frequency inverter, the motor requires approval for inverter operation according to Directive 2014/34/ EU If the motor is operated with an inverter, significant differences between the nominal speeds on the name plates of the motor and the gearbox are normal and permissible. For operation of the motor with the mains supply, differences of the nominal speeds on the name plates of motor and gear unit of up to ± 60 rpm are permissible.

2.3 Additional labelling for EAWU

	EAC Ex	CE Ex
Directive	TR CU 012/2011	2014/34/EU – DIN EN ISO 80079-36
Labelling	II Gb c T4 X	II2G Ex h IIC T4 Gb
	II Gb c T3 X	II2G Ex h IIC T3 Gb
	II Gb c IIB T4 X	II2G Ex h IIB T4 Gb
	II Gb c IIB T3 X	II2G Ex h IIB T3 Gb
	III Db c T125°C X	II2D Ex h IIIC T125°C Db
	III Db c T140°C X	II2D Ex h IIIC T140°C Db
	II Gc T4 X	II3G Ex h IIC T4 Gc
	II Gc T3 X	II3G Ex h IIC T3 Gc
	III Dc T125°C X	II3D Ex h IIIC T125°C Dc
	III Dc T140°C X	II3D Ex h IIIC T140°C Dc

Table 4: EAC Ex / CE Ex labelling

In addition to the name plate according to Directive 2014/34/EU, explosion-protected gear units which are intended for use in the territory of the Eurasian Economic Union have an additional name plate which includes additional information according to Directive TP TC 012/2011.

In these operating and installation instructions, the EAC Ex logo will not be indicated together with the CE Ex logo. The EAC Ex logo is equivalent to the CE Ex logo. If "ATEX" is stated in these operating and installation instructions, this also applies accordingly for EAC Ex gear units.

With servicing as specified, gear units may have a service life of 30 years. The gear unit should be taken out of service at the latest 30 years after delivery by Getriebebau NORD. The year of delivery corresponds to the year of manufacture which is stated on the name plate.



Figure 2: Additional name plates for EAC Ex

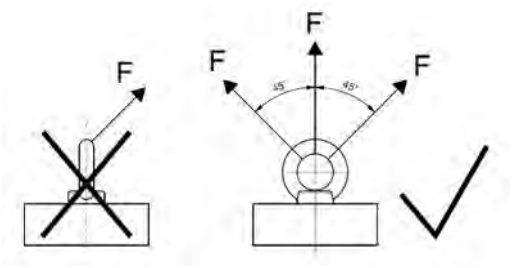
3 Transport, storage, assembly

3.1 Transporting the gear unit

⚠ WARNING

Hazard due to falling loads

- The thread of the eyebolt must be fully screwed in.
- As shown in the illustration to the right, only lift on the eyebolts vertically to the female thread and not more oblique than 45° to the vertical.
- Note the centre of gravity of the gear unit.



Only use the eyebolts attached to the gear unit for transport. If geared motors have an additional eyebolt attached to the motor, this must also be used.

Transport the gear unit with care. Impacts to the free ends of shafts may cause internal damage to the gear unit.

No additional loads must be attached to the gear unit.

Use suitable aids such as cross-beams or similar to facilitate transportation of the gear unit. Gear units may only be transported with shackles and lifting strapschains at an angle of 90° to 70° to the horizontal.

3.2 Storage and downtimes

3.2.1 General measures

- Store the gear unit in a dry space, relative humidity less than 60%.
- Store the gear unit at a temperature in the range of – 5 °C to + 50 °C without severe temperature fluctuations.
- Do not expose the gear unit to direct sunlight or UV light.
- There must be no aggressive or corrosive substances (contaminated air, ozone, gases, solvents, acids, alkalis, salts, radioactivity etc.) in the immediate vicinity.
- The gear unit must not be exposed to vibration or oscillation.
- Store the gear unit in the mounting position (see chapter 7.1 "Versions and mounting position"). Secure it against falling.

3.2.2 Storage and downtimes in excess of 3 months

Note the following measures in addition to Section 3.2.1 "General measures".

- Repair damages to the coating. Check if a corrosion protection agent has been applied to the flange bearing surfaces, the shaft ends and the unpainted surfaces. If required, apply a suitable corrosion protection agent to the surfaces.
- Seal all openings on the gear unit.
- The output shaft must be rotated by at least one revolution every 3 months so that the contact position of the gear teeth and the roller bearings are changed.

3.2.3 Storage and downtimes in excess of 9 months

Under certain conditions, storage of 2 to 3 years is possible. The specified storage duration is for guidance only. The actual storage duration depends on the local conditions. Note the following measures in addition to Sections 3.2.1 "General measures"and 3.2.2 "Storage and downtimes in excess of 3 months".

Gear units can be supplied prepared for long-term storage. The gear units are completely filled with lubricant, have VCI corrosion protection agent mixed with the gear oil or are filled with small quantities of VCI concentrate. The adhesive label on the housing shows the respective information.

Conditions of the gear unit and storage area for long-term storage prior to commissioning:

- Store the gear unit at a temperature in the range of -5 °C to +40 °C without severe temperature fluctuations.
- Check if the sealing cord in the vent screw is in place. It must not be removed during storage.
- Store the gear unit in a dry space. With a relative humidity less than 60%, the gear unit can be stored for up to two years; with a relative humidity less than 50%, storage of up to three years is possible.
- For gear units, which are filled with VCI concentrate for long-term storage, the VCI concentrate must be renewed after 2 years and distributed in the oil by rotating the shaft.
- In tropical regions, protect the gear unit against damage by insects.
- Gear unit components such as brakes, couplings, belt drive, and cooling units must be protected for a long-term storage in accordance to their operation instructions.

In addition to the preparations listed in 4 "Commissioning", the following measures are necessary before commissioning:

- Check the gear unit for external damage.
- After storage of more than 2 years, or with storage temperatures outside of the permissible range from -5 °C to +40 °C, replace the lubricant in the gear unit before commissioning.
- If the gear unit is completely filled, the oil level must be reduced according to the mounting position. For the lubricant quantity and lubricant type, refer to the information on the name plate.
- For gear units without oil filling, the oil level must be refilled and checked according to chapter 5.2.3 "Checking the oil level" before commissioning. The VCI concentrate may remain in the gear unit. The VCI concentrate is not mixable with polyglycol-based lubricants (PG oils). If PG oils are used, the VCI concentrate must be removed from the gear unit. When using VCI additive, only use the oil types which are specified on the name plate and are approved by Getriebebau NORD (see chapter 7.2.2 "Gear oils").
- For the option with manual re-lubrication, switch the bearing grease after a storage of more than 2 years. The service life of the grease is reduced after a storage time or gearbox shutdown of more than 9 months (see chapter 5.2.11 "Re-greasing (Option: VL2, VL3, W, AI, AN)").
- Gear units filled with VCI concentrate for long-term storage are fully closed. Take care that the vent is fitted and released as necessary prior to commissioning.

3.3 Checking the version

The gear unit may only be operated in the stated version. The permissible version is stated in the field IM on the name plate. Gear units with the abbreviation UN in field IM of the name plate are version-independent. Section 7.1 "Versions and mounting position" shows the versions of the individual gear unit types. If an X is present in the field IM, the special documentation, whose number is stated in field S, must be observed.

Ensure that the version as stated on the name plate complies with the installation position and that the installation position does not change during operation.

For geared motors, also pay attention to the operating instructions of the motor.

3.4 Preparing for installation

3.4.1 Check for damages

Please examine the delivery for transport and packaging damage immediately on receipt. Pay particular attention to radial shaft seals and sealing caps. Report any damage to the carrier immediately.

Do not put the drive into operation if damage such as leaks are visible.

3.4.2 Remove corrosion protection agents

All bare metal surfaces and shafts of the drive are protected with corrosion protection agents before shipping.

Thoroughly remove corrosion protection agents and any dirt (e.g. colour residues) from all shafts, flange surfaces and gear unit attachment surfaces before assembly.

3.4.3 Check rotational direction

If an incorrect rotational direction may result in damage or potential risk, check for the correct rotational direction of the output shaft during a test run before attaching it to the machine. Ensure the correct rotational direction during operation.

For gear units with an integrated back stop, switching the drive motor to the blocked direction of rotation, may result in damage to the gear unit. Gears with integrated back stops are marked with arrows on the drive/driven sides. The arrows point in the rotation direction of the gear unit. When connecting the motor and during motor control, ensure, e.g. by testing the field of rotation, that the gear unit can only operate in the direction of rotation.

For further explanations refer to Catalogue G1000 and document WN 0-000 40.

3.4.4 Check ambient conditions

Make sure that no aggressive or corrosive substances which attack metal, lubricants or elastomers are present at the installation site or are subsequently expected during operation. If such substances are to be expected, contact Getriebebau NORD.

The gear unit, especially its radial shaft seals should be protected from exposure to direct sunlight.

3.4.5 Installing the oil expansion chamber (Option: OA)

Mount the oil expansion chamber (Option OA) according to document WN 0-530 04. For gear units with an M10x1 pressure relief vent, document WN 0-521 35 must also be observed during installation.

3.4.6 Installing the oil reservoir tank (Option: OT)

Mount the oil reservoir tank (Option OT) according to document WN 0-521 30.

For explosion-protected gear units, pressure venting is mandatory. Screw the enclosed M12x1.5 pressure relief vent into the oil reservoir tank.

3.5 Installing the gear unit

DANGER

Explosion hazard

- No explosive atmosphere must be present when installing the gear unit
- For geared motors, check that the cooling air from the motor fan can circulate around the gear unit without obstruction.

NOTICE

Damage of bearing and gear wheel

- Do not carry out any welding work on the gear unit.
- Do not use the gear unit as earth connection for welding work.

The following conditions must be met at the installation site in order to prevent overheating during operation:

- There must be adequate space around the gear unit.
- Air must be able to flow freely past all sides of the gear unit.
- For geared motors, the cooling air from the motor fan must be able to circulate around the gear unit without obstruction.
- The gear unit must not be enclosed or encased.
- The gear unit must not be exposed to high energy radiation.
- Do not direct warm exhaust air from other units onto the gear unit.
- The base or flange to which the gear unit is attached must not input any heat into the gear unit during operation.
- Do not allow dust to accumulate in the area of the gear unit

Install the gear unit in the correct mounting position (see chapter 7.1 "Versions and mounting position")**. Oil checking and oil drain screws must be accessible.**

The base or flange to which the gear unit is fitted should be vibration-free, torsionally rigid and flat. The flatness of the bolting surface on the base or flange must comply with DIN ISO 2768-2 tolerance class K.

Precisely align the gear unit with the drive shaft of the machine in order to prevent additional forces from being imposed on the gear unit due to distortion.

Fasten the gear unit to all gear unit feet of one side or to all flange holes. Use bolts with a minimum quality of 8.8. Tighten the bolts with correct torques (see chapter 7.3 "Screw tightening torques").

For foot and flange-mounted gear units (Option XZ or XF), ensure tension-free bolting. The foot mounting is used to fasten the gear unit. It is designed to absorb the reaction forces from the torque, radial and axial forces as well as the weight. B5 or B14 flanges are basically not designed to absorb the reaction forces. In case of doubt, contact Getriebebau NORD for investigation of the particular case.

Earth the gear unit housing. For geared motors, ensure the earthing via the motor connection.

3.6 Installation of a hub on solid shaft (option: V, L)

DANGER

Explosion hazard due to increased temperature or sparks

The gear unit may heat up to an impermissible extent if transverse forces are applied unfavourably. Bearing, gearing and housing may be damaged and cause sparks.

- The transverse force must be applied as closely as possible to the gear unit.

NOTICE

The gear unit may be damaged by axial forces.

Bearings, gearwheels, shafts and housings may be damaged by incorrect fitting.

- Use a suitable pulling device.
- Do not hit the hub with a hammer.

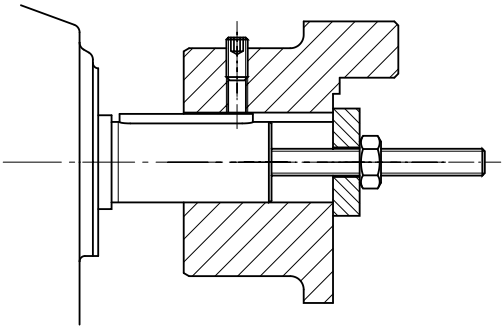


Figure 3: Example of a simple pulling device

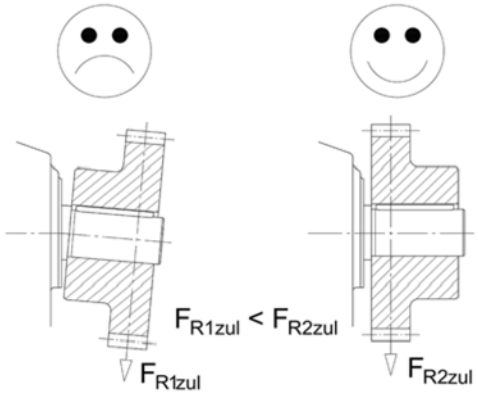
During fitting, ensure that the shaft axes are precisely aligned with each other. Comply with the permissible tolerance details provided by the manufacturer.

Information

Use the end thread of the shafts for pulling. Fitting can be facilitated by coating the hub with lubricant or heating it up to approx. 100 °C beforehand.

The maximum radial forces FR1 and FR2 and axial forces FA2 which are imposed on the driving and driven elements of the gear unit must not be exceeded (refer to the name plate). Pay particular attention to the correct tension of belts and chains.

Additional loads due to unbalanced hubs are not permitted.



The transverse force must be applied as closely as possible to the gear unit. For drive shafts with free shaft ends (Option W), the maximum permissible transverse force F_{R1} applies for the application of the transverse force to the centre of the free shaft journal. For output shafts, the application of the transverse force F_{R2} must not exceed the dimension x_{R2}. If the radial force F_{R2} is stated on the name plate, but no dimension x_{R2} is stated, application of force is assumed to be to the centre of the shaft journal.

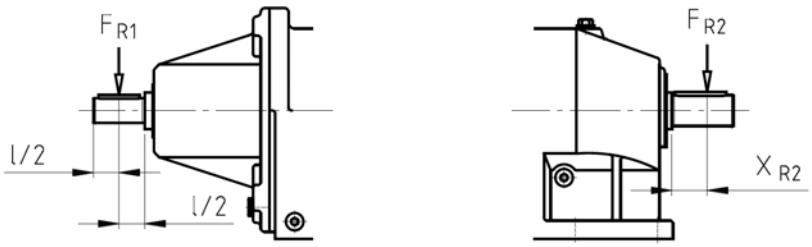


Figure 4: Permissible application of force to drive and driven shafts

3.7 Fitting push-on gear units with fastening element (option: B)

⚠ WARNING

Risk of severe injuries

If the screw fastenings of the torque arm are removed during operation, the gear unit will rotate around the output shaft.

- Secure the screw fastening against loosening, e.g. with Loctite 242 or a second nut.

NOTICE

The gear unit may be damaged by axial forces.

Bearings, gearwheels, shafts and housings may be damaged by incorrect fitting.

- Use a suitable pulling device.
- Do not strike the gear unit with a hammer.

Assembly and subsequent dismantling is facilitated by applying an anti-corrosive lubricant to the shaft before fitting (e.g. NORD Anti-Corrosion Part No. 089 00099). Excess lubricant may escape after fitting and may drip off. This escape of grease is not due to a leak in the gear unit. Thoroughly clean these points on the output shaft after a running-in time of approx. 24 hours.

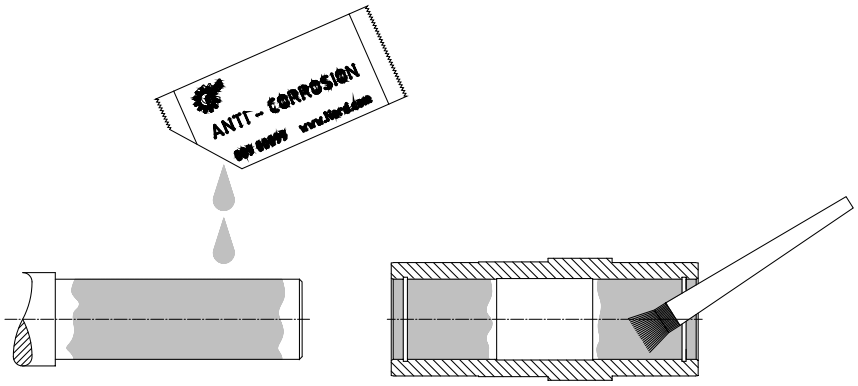


Figure 5: Applying lubricant to the shaft and the hub

For push-on gear units with cover cap IP66 (Option H66) and fastening element (Option B) the pressed-in closing cap must be pushed out before installing the gear unit. The pressed-in closing cap may be destroyed during dismantling. A 2nd closing cap is supplied as a spare part. Fit the closing cap after installation of the gear unit as described in Section 3.10 "Fitting the covers (option: H, H66)".



Figure 6: Removing the factory-fitted closing cap

The gear unit can be fitted to solid shafts with and without a shoulder using the fixing element (Option B). Tighten the fastening element bolt with correct torque (see chapter 7.3 "Screw tightening torques").

When fastening without a contact shoulder, a circlip is used in the hollow shaft for axial fastening.

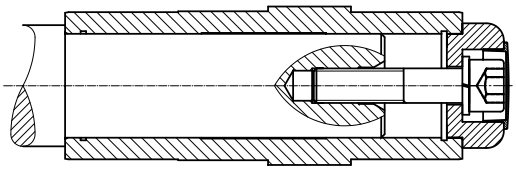


Figure 7: Gear unit mounted on shaft with a shoulder using the fastening element

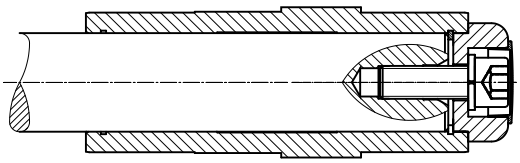


Figure 8: Gear unit mounted on shaft without a shoulder using the fastening element

A gear unit can be removed from a shaft with a shoulder e.g. using the following device.

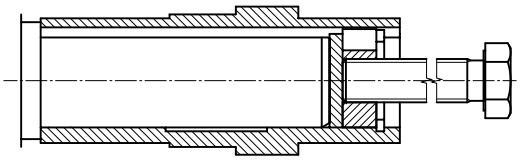


Figure 9: Removal using dismantling device

Do not distort the support when installing push-on gear units with a torque support. Tension-free mounting is aided by the rubber buffer (Option G or VG).

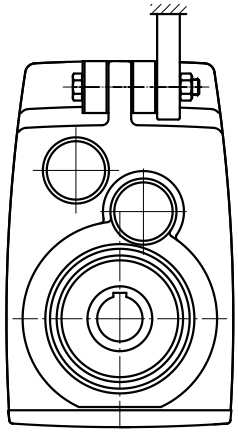
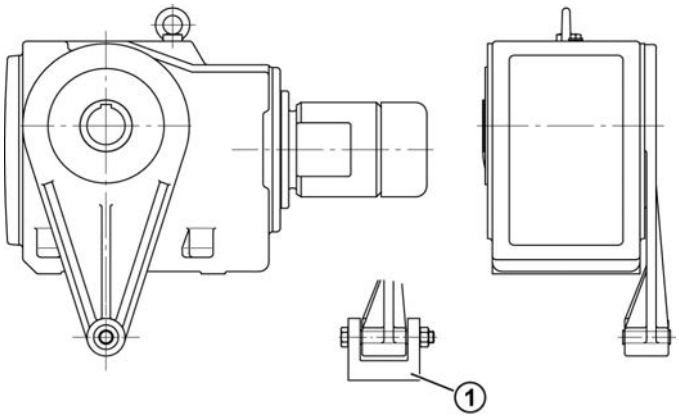


Figure 10: Mounting the rubber buffer (Option G and/or VG) on parallel shaft gear units

To fit the rubber buffer, tighten the screw fastening until there is no play between the contact surfaces when there is no load. For screw fastenings with standard thread, then rotate the fastening nut half a turn in order to pre-tension the rubber buffer. Greater pre-tension is not permissible.



Explanation	
1	Always support torque support on both sides

Figure 11: Attaching the torque support on bevel gear and worm gear units

Tighten the fastenings of the torque support with the correct torque (see chapter 7.3 "Screw tightening torques")and secure them against loosening, e.g. with Loctite 242 or Loxeal 54-03.

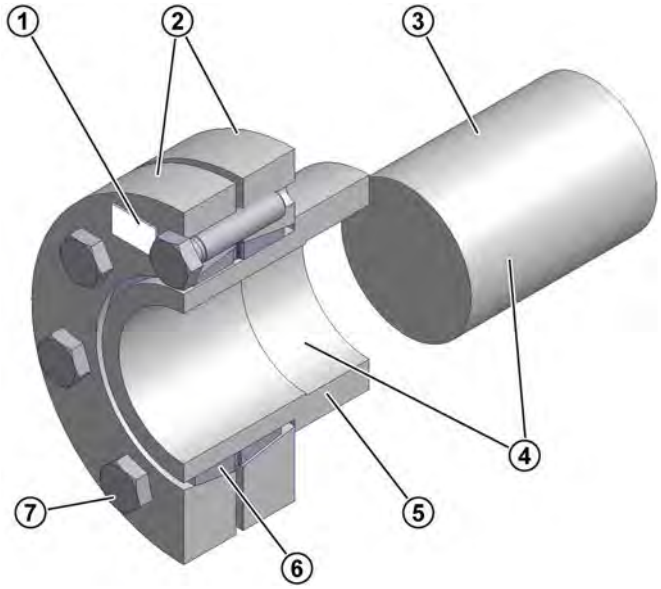
3.8 Fitting a hollow shaft with shrink disc (Option: S)

NOTICE

Risk of damage to the gear unit if the shrink disk is installed incorrectly

- Do not tighten the tensioning bolts if the solid shaft is not installed. This would permanently deform the hollow shaft.

Hollow shafts with shrink discs must be protected from dust, dirt and moisture. NORD recommends option H/H66 (see chapter 3.10 "Fitting the covers (option: H, H66)").



Explanation

1 Shrink disc, type, part no. and torque details for tensioning bolts
2 Tensioning flanges
3 Solid shaft of machine
4 Shaft and hollow shaft bore **FREE OF GREASE**
5 Hollow shaft of gear unit
6 Double half-slotted inner ring
7 Tensioning bolts DIN 931 (933) -10.9

Figure 12: Hollow shaft with shrink disc

The shrink disc is supplied ready for fitting. It must not be dismantled prior to fitting.

The solid shaft material must have a minimum yield strength of 360 N/mm^2. This ensures that no permanent deformation occurs due to the clamping force.

If necessary, also observe the documentation from the manufacturer of the shrink disc.

Prerequisites

- The hollow shaft must be completely free of grease.
- The solid shaft of the machine must be completely free of grease.
- The external diameter of the solid shaft must be within the tolerance h6 or k6 for highly irregular operation, unless otherwise specified in the order-related dimension sheet. The fit must be according to DIN EN ISO 286-2.

Fitting procedure

1. Remove the cover, if any.

2. Loosen the tensioning bolts of the shrink disc, but do not unscrew them completely. Tighten the tensioning bolts gently by hand until there is no play between the flanges and the inner ring.

3. Lightly grease the bore of the inner ring. Push the shrink disc onto the hollow shaft until the outer clamping flange is flush with the hollow shaft.

4. Grease the solid shaft of the machine in the area which will later come into contact with the bushing in the hollow shaft. Do not grease the bronze bushing. It is essential that the tensioning seat of the hollow shaft is free of grease.

5. Insert the solid shaft of the machine into the hollow shaft so that the area around the shrink connection is completely filled.

6. Tighten the tensioning bolts of the shrink disc **in sequence** with approx. ¼ rotation of the bolt per turn in clockwise direction by several turns. Use a torque wrench to tighten tensioning bolts to the tightening torque specified on the shrink disc.

7. Check if there is an even gap between the clamping flanges. If this is not the case, the shrink disc connection must be dismantled and checked for correct fit.

8. Mark the hollow shaft of the gear unit and the solid shaft of the machine with a label in order to detect any slippage under load.

Standard disassembly procedure:

⚠ WARNING

Danger of injury due to sudden mechanical release

The elements of the shrink disc are under great mechanical tension. Sudden release of the outer rings produces high separating forces and can result in uncontrolled detachment of shrink disc components.

- Do not remove any tensioning bolts if you have not ensured that the external outer rings of the shrink disc have been released from the inner ring.

1. Loosen the tensioning bolts of the shrink disc with approx. ¼ rotation of the bolt per turn **in sequence** in a clockwise direction by several turns. Do not remove the tensioning bolts from their thread.

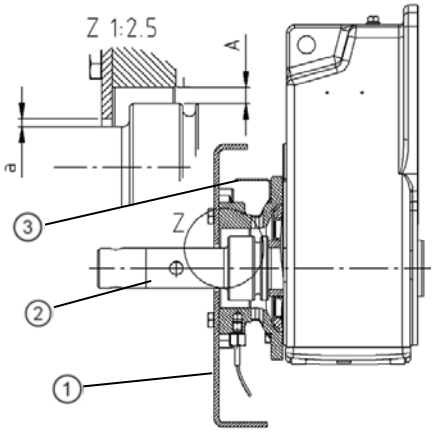
2. Loosen the clamping flanges from the cone of the inner ring.

3. Remove the gear unit from the solid shaft of the machine.

If a shrink disc has been in use for a long period or is dirty, dismantle it and clean it before refitting. Check the shrink disc for damage or corrosion. Replace the damaged elements if they are not in perfect condition.

Coat the conical surfaces with MOLYKOTE® G-Rapid Plus or a similar lubricant. Place some multi-purpose grease on the screw thread and the contact surfaces of the screw heads.

3.9 Installation of an SCX flange (option: SCX)



Explanations

1 Rear wall of the conveyor
2 Push-in shaft
3 Protection bracket

Figure 13: Installation example of an SCX flange

The SCX flange may only be operated in the mounting positions M1, M2, M3 and M4.

A temperature sensor can be optionally installed. The sensor must trip at a temperature of 120 °C and stop the drive. Visual inspection may be omitted upon usage of a temperature sensor (see chapter 5.1 "Inspection and maintenance intervals").

The gap (dimension A) between the push-in shaft (2) and the rear wall of the conveyor (1) or the fastening plate must not be larger than 8 mm.

The protection bracket (3) must cover the open hole running vertically upwards in the SCX flange.

3.10 Fitting the covers (option: H, H66)

DANGER

Explosion hazard due to damaged and rubbing covers

- Inspect covers for transportation damage, e.g. dents and warping before fitting.
- Do not use damaged covers.

Use all fastening screws. Secure the fastening screws by coating them with securing lubricant, e.g. Loctite 242, Loxeal 54-03. Tighten the fastening screws with the correct torque (see chapter 7.3 "Screw tightening torques").

For covers with Option H66, press in the new condition closing cap by tapping it lightly with a hammer.



Figure 14: Fitting the covers, Option SH, Option H, and Option H66

3.11 Fitting the covers

Some versions of universal worm gear units are delivered as standard with a plastic cover cap. The cover cap protects the radial shaft seals against the entry of dust and other contamination. The cover cap can attached on the A side or the B side. It can be removed by hand without tools.

NOTICE

Damage to the expansion elements of the cover cap

- Do not jam the cover cap when pulling it off or attaching it.

Pull the cover cap off vertically prior to the installation of the universal worm gear unit. After completing the fitting, attach the cover cap onto the right side by attaching the expanding elements into the threaded holes on the output flange.



Figure 15: Disassembly and assembly of the cover cap

3.12 Fitting a standard motor (Option: IEC, NEMA, AI, AN)

The maximum permitted motor weights indicated in the tables below must not be exceeded:

DANGER

Explosion hazard

- Only standard motors with an adequate ATEX Zone category according to the type plate may be used.
- For ATEX category 2D gear units (see the ATEX labelling on the last line of the gear unit type plate), the motor must have at least protection class IP6x.

Maximum permitted motor weights														
Motor size	63	71	80	90	100	112	132	160	180	200	225	250	280	315
Max. motor weight [kg]	**25**	**30**	**50**	**50**	**80**	**80**	**100**	**250**	**250**	**350**	**500**	**1000**	**1000**	**1500**
SK 32, SK 3282, SK 9032.1, SK 32100, SK 772.1, SK 773.1					100	100								
SK 42, SK 4282, SK 9042.1, SK 42125					100	100	130	200						
SK 52, SK 63, SK 5282, SK 6382, SK 9052.1, SK 872.1, SK 873.1, SK 972.1, SK 973.1					100	100	130							
SK 62, SK 73, SK 83, SK 6282, SK 7382, SK 8382, SK 9072.1					100	100	130							
SK 72, SK 82, SK 93, SK 103, SK 7282, SK 8282, SK 9382, SK 10382.1, SK 9082.1, SK 9086.1, SK 9092.1, SK 9096.1							130							
SK 920072.1, SK 92072.1, SK 0, SK 071.1, SK 0182.1			40											
SK 1382NB, SK 1382.1, SK 92372, SK 92372.1, SK 12063, SK 372.1, SK 371.1					60									

Table 5: Motor weights IEC motors

Maximum permitted motor weights														
Motor size		56C		140TC		180TC	201TC	250TC	280TC	320TC	360TC	400TC		
Max. motor weight [kg]		**30**		**50**		**80**	**100**	**200**	**250**	**350**	**700**	**700**		
SK 62, SK 72, SK 73, SK 83, SK 93, SK 9072.1, SK 6282, SK 7282, SK 7382, SK 8382, SK 9382											500	500		

Table 6: Motor weights NEMA motors

Gear units with IEC or NEMA adapter must be operated with self-ventilated motors (IC411, TEFC) or externally ventilated motors (IC416, TEBC) according to EN 60034-6. The gear unit must be exposed to a continuous airflow. Please contact Getriebebau NORD if the use of motors without fans (IC410, TENV) is intended.

Fitting a standard motor to the IEC adapter (Option IEC) or NEMA adapter (Option NEMA)

1. Clean the motor shaft and the flange surfaces of the motor and motor adapter, and check them for damage. Check the motor dimensions. The dimensions must be within the tolerances according to DIN EN 50347 or NEMA MG1 Part 4.
2. For motor sizes 90, 160, 180 and 225, position the spacer bushes that may be provided onto the motor shaft.
3. Position the half-coupling onto the motor shaft so that the motor parallel key engages into the groove of the half-coupling. Tighten the half-coupling in accordance with the motor manufacturer's instructions. With standard helical gear units, observe dimension B between the half-coupling and the collar (see "Figure 16"). Adjust the coupling in accordance with the specifications indicated on the adhesive plate for certain **NEMA adapters** .
4. If the half-coupling contains a setscrew, secure the coupling axially on the shaft. Coat the setscrew with securing adhesive before screwing it in, e.g. Loctite 242 or Loxeal 54-03, and tighten it with the correct torque (see chapter 7.3 "Screw tightening torques").
5. For category 2D gear units (see ATEX labelling in the last line of the gear unit name plate), the flange surfaces of the motor and motor adapter must be sealed. For other gear units, sealing of the flange surfaces is recommended if the motor is installed outside or in a humid environment. Completely coat the flange surfaces with surface sealant, e.g. Loctite 574 or Loxeal 58-14.
6. Attach the motor to the adapter. Also attach the enclosed ring gear or the enclosed gear sleeve (see figure below).
7. Tighten the adapter bolts with the correct torque (see chapter 7.3 "Screw tightening torques").

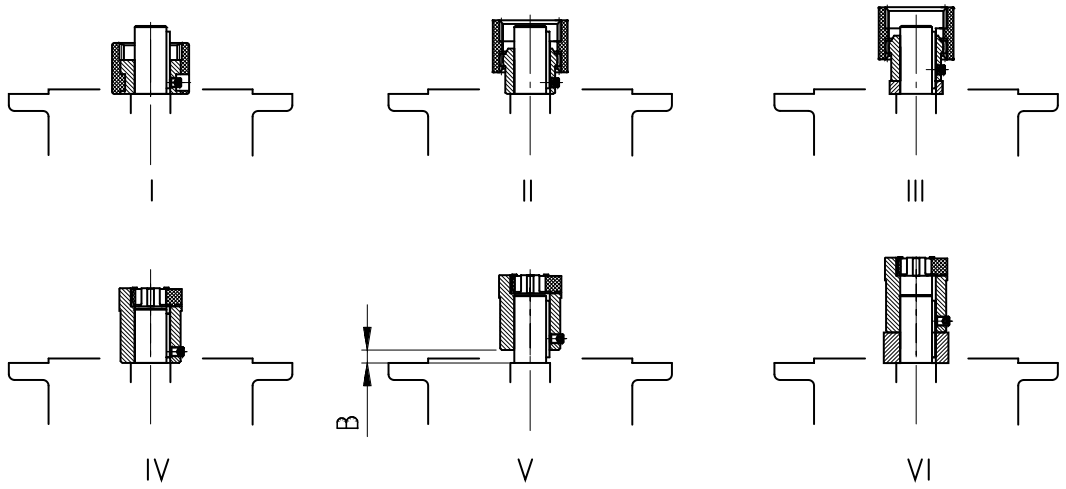


Figure 16: Fitting the coupling onto the motor shaft - various types of coupling

I Curved tooth coupling (BoWex®), one-piece

II Curved tooth coupling (BoWex®), two-piece

III Curved tooth coupling (BoWex®), two-part with spacer bush

IV Claw coupling (ROTEX®), two-piece

V Claw coupling (ROTEX®), two-piece, observe dimension B:

Standard helical gear units: SK 0, SK 01, SK 20, SK 25, SK 30, SK 33 (2-stage) SK 010, SK 200, SK 250, SK 300, SK 330 (3-stage)		
	IEC size 63	IEC size 71
Dimension B (Fig. V)	B = 4.5 mm	B = 11.5 mm

VI Claw coupling (ROTEX®), two-piece with spacer bush

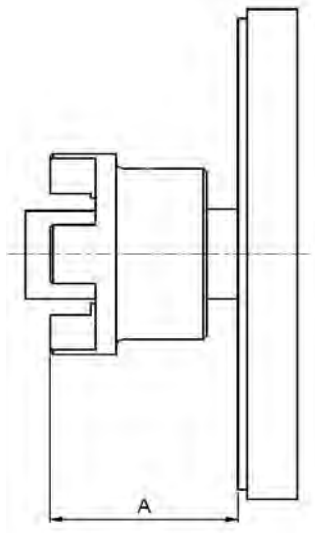
Fitting a standard motor to the IEC adapters AI160–AI315 (Option AI) or NEMA adapter AN250TC–AN400TC (Option AN)

1. Clean the motor shaft and the flange surfaces of the motor and motor adapter, and check them for damage. Check the motor dimensions. The dimensions must be within the tolerances according to DIN EN 50347 or NEMA MG1 Part 4.
2. Remove the motor shaft's key.
3. With the adapters AI160, AI180 and AI225, attach the spacer bush supplied with the product.
4. Attach the key supplied with the product (see "Table7: Motor parallel keys").
5. For the attachment of the half-coupling, heat up the half-coupling to approx. 100 °C. Position the half-coupling as follows:
   - Push AI160, AI180 and AI225 on to the spacer bush.
   - Push AI200, AI250, AI280 and AI315 on to the motor shaft collar.
   - AN250TC–AN400TC until dimension A has been reached (see "Table 8: Position of the half-coupling on the NEMA motor shaft").
6. If the half-coupling contains a setscrew, secure the coupling axially on the shaft. Coat the setscrew with securing adhesive before screwing it in, e.g. Loctite 242 or Loxeal 54-03, and tighten it with the correct torque (see chapter 7.3 "Screw tightening torques").

7. For category 2D gear units (see ATEX labelling in the last line of the gear unit name plate), the flange surfaces of the motor and motor adapter must be sealed. For other gear units, sealing of the flange surfaces is recommended if the motor is installed outside or in a humid environment. Completely coat the flange surfaces with surface sealant, e.g. Loctite 574 or Loxeal 58-14.
8. Attach the motor to the adapter. Also attach the enclosed ring gear or the enclosed gear sleeve (see Figure 16: Fitting the coupling onto the motor shaft - various types of coupling). For the AN360TC and AN400TC adapters, attach the adapter flange to the motor first, and screw the motor onto the adapter.
9. Tighten the adapter bolts with the correct torque (see chapter 7.3 "Screw tightening torques").

IEC/NEMA type	Coupling	Shaft ø	Motor shaft's key
AI 160	R42	42	AB12x8x45
AI 180	R48	48	AB14x9x45
AN 250	R42	41.275	B3/8x3/8x1 1/2
AN 280	R48	47.625	B1/2x1/2x1 1/2
AI 200	R55	55	B16x10x50x
AN 320	R55	53.976	B1/2x1/2x1 1/2
AI 225	R65	60	B18x11x70
AN 360 R350	R65	60.325	B5/8x5/8x2 1/4
AI 250	R75	65	B18x11x70
AI 280	R75	75	B20x12x70
AN 360 R450	R75	60.325	B5/8x5/8x3 1/8
AN 400	R75	73.025	B3/4x3/4x3 1/4

Table7: Motor parallel keys



NEMA type	Coupling size	A [mm]
N250TC R350	R42	83
N250TC 300S	R42	86
N280TC R350	R48	87.5
N280TC 300S	R48	102.5
N320TC	R55	91
N360TC/350	R65	126.5
N360TC/450	R75	150.5
N400TC	R75	164.5

Table 8: Position of the half-coupling on the NEMA motor shaft

3.13 Mounting of the cooling coil onto the cooling system

⚠ WARNING

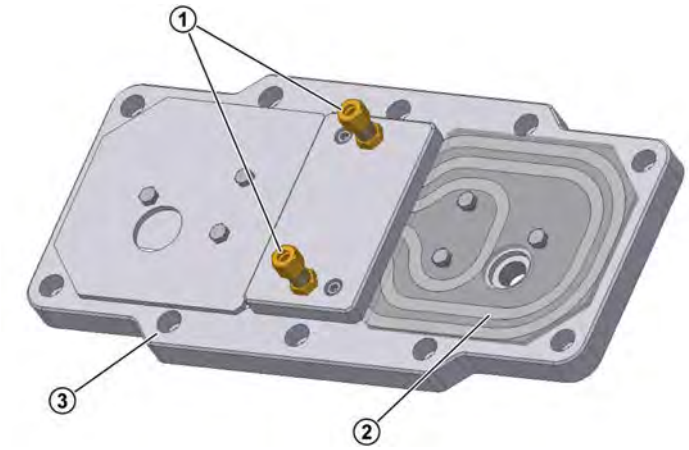
Risk of injury due to pressure discharge

- Ensure that the pressure is released from the cooling circuit before carrying out any work on the gear unit.

NOTICE

Damage to the cooling coil

- Do not twist the connection pieces during installation.
- Even after the installation, no external forces must be able to act on the cooling coil via the connection pieces.
- Prevent vibrations from reaching the cooling coil during operation.



Explanation

1 Connection pieces with cutting ring screw connections
2 Cooling coil
3 Housing cover

Figure 17: Cooling cover

The cooling coil is installed in the housing cover. For the inlet and outlet of cooling fluid, connection pieces with cutting ring screw connections according to DIN 2553 are provided on the housing cover for a connection of a pipe with an external diameter of 10 mm.

Remove the sealing plug from the screw necks prior to assembly and flush the cooling coil to prevent any contamination of the cooling system. Then, connect the connection pieces with the coolant circuit. The flow direction of the coolant is irrelevant.

3.14 Installation of an oil expansion chamber (Option: OA)

3.14.1 Installation of the sizes I, II and III

The oil expansion chamber is available in 3 sizes with different capacities:

- 0.7 l (Size I)
- 2.7 l (Size II)
- 5.4 l (Size III)

The oil expansion chamber must be mounted vertically with the hose connection facing downwards and the vent screw facing upwards. Taking the hose length into account, the container should be fitted as high as possible. Suggestions for the position of the oil expansion chamber see the following illustration.

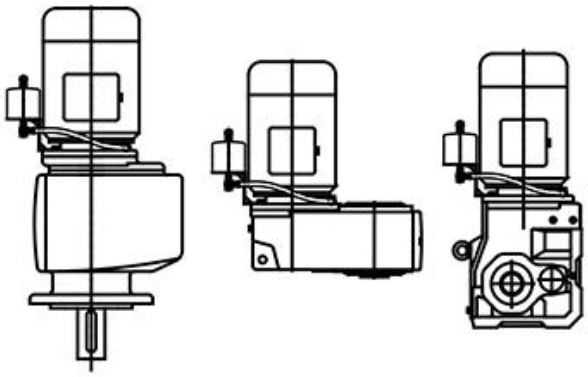


Figure 18: Position of the oil expansion chamber

1. After installing the gear unit, remove the vent screw.
2. Screw in the reduction or extension with the existing sealing ring.
3. If the fastening screw is screwed into a through hole, seal the thread with a medium strength screw securing material such as LOXEAL 54-03 or Loctite 242.
4. Screw on the expansion tank. If the necessary screw insertion depth of 1.5 × d can no longer be achieved, use a 5 mm longer screw. If a longer screw cannot be fitted, use a stud and a nut with appropriate dimensions.
5. Attach the vent hose with the enclosed hollow screws and seals.
6. Screw the enclosed M12 x 1.5 pressure vent into the oil expansion chamber.

3.14.2 Installation of sizes 0A and 0B

The oil expansion chamber must be mounted vertically with the hose connection facing downwards and the vent screw facing upwards. Taking the hose length into account, the container should be fitted as high as possible. Suggestions for the position of the oil expansion chamber see Figure 18. Note that with the M4 configuration with terminal box position in position 2, it is not possible to install the oil expansion chamber.

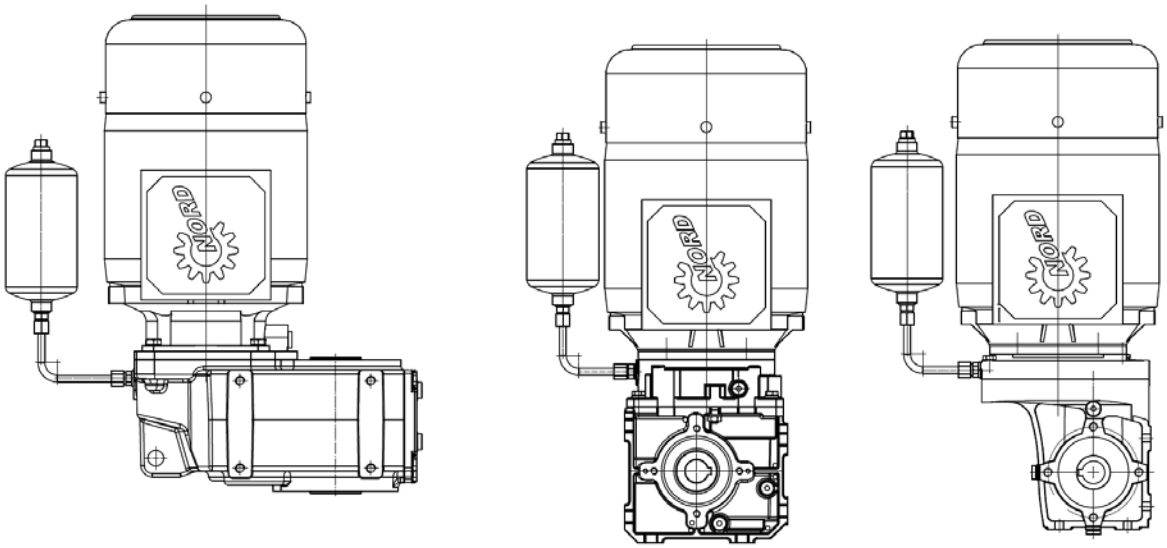


Figure 19: Position of the oil expansion chamber

1. After installing the gear unit, remove the oil level or vent screw.
2. Install the oil expansion chamber according to Figure 18. Align it parallel to the motor shaft.
3. Maintain the maximum tightening torque of 12 Nm for screwing the oil expansion chamber onto the gear unit housing.
4. Screw the enclosed M10 x 1.0 pressure vent into the oil expansion chamber.

3.15 Attaching the temperature sticker

For temperature class T4 gear units or gear units with a maximum surface temperature of less than 135 °C the supplied temperature sticker (printed with value 121 °C) must be affixed to the gear unit housing.

Part No.: 2839050.

The temperature class or the maximum surface temperature can be obtained from the ATEX labelling in the last line of the gear unit name plate.

Examples:

II 2G Ex h IIC **T4** Gb or. II 3D Ex h IIIC **T125°C** Dc

Affix the temperature sticker next to the oil level screw (see chapter 7.1 "Versions and mounting position")towards the motor. For gear units with an oil reservoir tank, affix the temperature sticker in the same position as for gear units without oil reservoir tanks. For gear units which are lubricated for life, affix the temperature sticker next to the name plate.

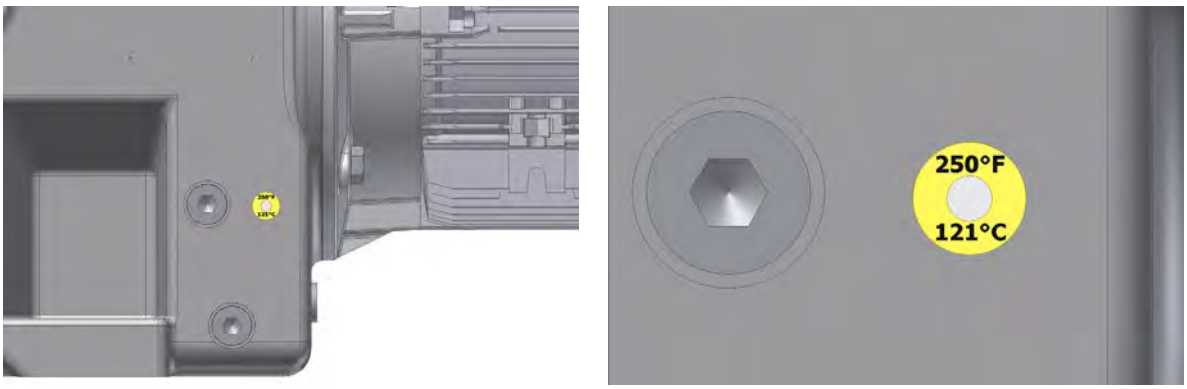


Figure 20: Position of the temperature sticker

3.16 Subsequent painting

DANGER

Explosion hazard due to electrostatic charge

- Subsequent painting must have the same characteristics and layer thickness as the original painting.

For retrospective painting of the gear unit, the shaft sealing rings, rubber elements, pressure vent screws, hoses, type plates, adhesive labels and motor coupling components must not come into contact with paints, lacquers or solvents, as otherwise the components may be damaged or made illegible.

4 Commissioning

4.1 Checking the oil level

DANGER

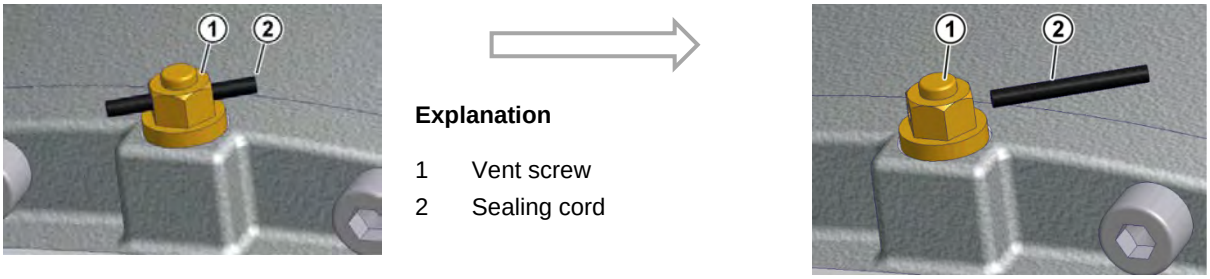
Explosion hazard in case of inadequate lubrication

- Check the oil level before commissioning (see chapter 5.2.3 "Checking the oil level").

4.2 Activating the vent

If venting of the gear unit is provided, the pressure vent must be activated before commissioning. Double gear units consist of two single units, are equipped with 2 oil chambers and possibly 2 vents.

To activate, remove the sealing cord in the pressure relief vent. For the position of the pressure relief vent, see Section 7.1 "Versions and mounting position".



Explanation

1 Vent screw
2 Sealing cord

Figure 21: Activating the pressure vent screw

4.3 Activating the automatic lubricant dispenser

Some gear unit types with standard motor (Option IEC/NEMA, not AI/AN) have an automatic lubricant dispenser for the roller bearings. The lubricant sensor must be activated prior to commissioning the gear unit The cartridge case cover of the adapter for attaching an IEC/NEMA standard motor has a red information sign for activation of the lubricant dispenser. Opposite to the lubricant dispenser there is a grease escape hole which is closed with a G1/4 cap screw. After activation of the lubricant dispenser, the cap screw can be removed and replaced with the grease collection container (Part No. 28301210) which is supplied separately with the delivery.

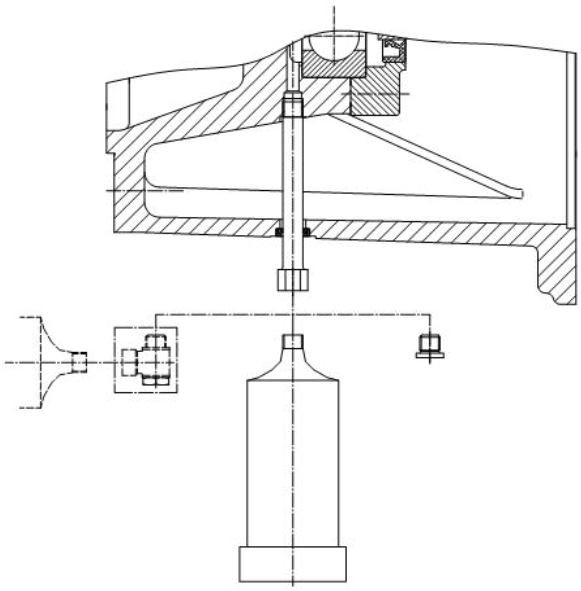
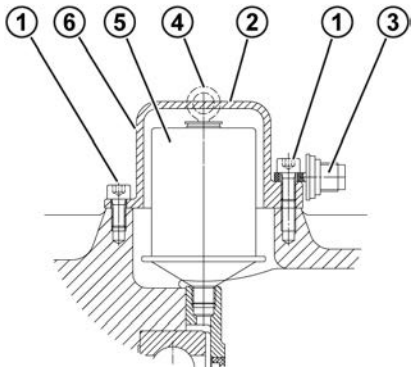


Figure 22: Fitting the grease collection container

Procedure:

1. Loosen and remove the cap screws.
2. Remove the cartridge cover.
3. Screw the activation screw into the lubricant dispenser until the lug breaks off at the defined fracture point.
4. For category 2D gear units (see ATEX labelling, last line of the gear unit name plate): Completely coat **the flange surfaces** of the cartridge cover with **surface sealant**, e.g. Loctite 574 or Loxeal 58-14.
5. Re-fit the cartridge cover. Attach the cartridge cover with the cap screws (see chapter 7.3 "Screw tightening torques").
6. Mark month and year of activation on the adhesive label.



	Explanation
1	Cap screws M8 x 16
2	Cartridge cover
3	Activation screw
4	Lug
5	Lubricant sensor
6	Position of adhesive label

Figure 23: Activating the automatic lubricant sensor with standard motor mounting

Adhesive label



Figure 24: Adhesive label

4.4 Cooling coil (Option: CC)

DANGER

Explosion hazard

- The drive may only be commissioned after the cooling spiral has been connected to the cooling circuit, and the cooling circuit has been put into operation.
- The temperature and the flow rate of the cooling fluid must be monitored and ensured.
- If there is a danger of frost, a suitable anti-freeze solution must be added to the cooling water in due time.
- Observe the special ATEX documentation provided by NORD.

The coolant must have a thermal capacity similar to water.

- Specific thermal capacity of water at 20 °C: c = 4.18 kJ/kgK

Clean, industrial water without any air bubbles or sediments is recommended as a coolant. The hardness of the water must be between 1 dH and 15 dH; the pH value must be between pH 7.4 and pH 9.5. No aggressive liquids may be added to the coolant!

The **coolant pressure** must not exceed **8 bar**. We also recommend fitting a pressure reducer at the coolant inlet to avoid damage due to excessive pressure.

The **coolant inlet temperature** must not exceed 40 °C. **10 °C** are recommended.

The required **coolant flow rate** is **10 l/min**.

4.5 Temperature measurement

The details of the ATEX temperature class or the maximum surface temperature are based on normal installation conditions. Even small changes to the installation conditions can have a significant effect on the temperature of the gear unit.

During commissioning, a surface temperature measurement of the gear unit must be made under maximum load. This does not apply to gear units which are labelled as temperature class T1 – T3 or a maximum surface temperature of 200 °C in the last line of the rating plate.

For the temperature measurement, a normal temperature measuring device is required, which covers a measurement range from 0 °C to 130 °C and a precision of at least ± 4 °C and which enables the measurement of the surface temperature and the temperature of the air.

Temperature measurement procedure:

1. Allow the gear unit to run at maximum speed under maximum load for approx. 4 hours.

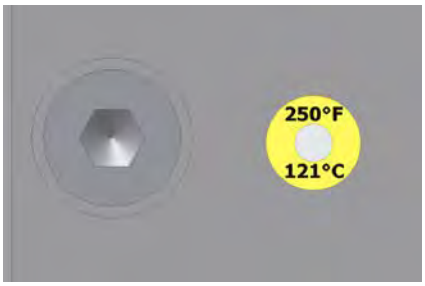
2. Following warm-up, the temperature of the gear unit housing surface T_{gm} is to be measured close to the temperature sticker (see chapter 3.15 "Attaching the temperature sticker").
3. Measure the temperature of the air T_{um} in the immediate vicinity of the gear unit.

Shut down the drive and contact Getriebebau NORD if one of the following criteria is not fulfilled:

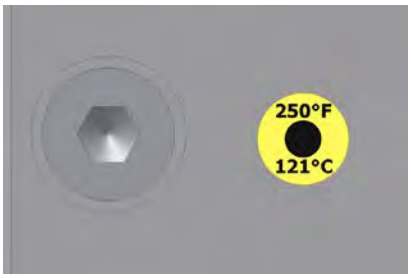
- The measured air temperature T_{um} is within the permissible range stated on the type plate.
- The measured air temperature on the surface of the gear unit housing T_{gm} is less than 121 °C.
- The temperature sticker has not turned black (see Figure 26).
- The measured temperature of the surface of the gear unit housing plus the difference between the highest permissible air temperature T_u stated on the type plate and the measured air temperature must be at least 15 °C lower than the maximum permissible surface temperature, i.e.:

ATEX labelling:	II 2G Ex h IIC T4 Gb/ II 3G Ex h IICT4 Gc: $T_{gm} + T_u - T_{um} < 135\ °C - 15\ °C$
ATEX labelling:	II 2D Ex h IIIC T_{max} Db / II 3D Ex h IIIC T_{max}:Dc: $T_{gm} + T_u - T_{um} < T_{max} - 15\ °C$
T_{gm}:	Measured temperature of the surface of the gear unit housing in °C
T_{um}::	Measured air temperature in °C
T_{max}:	Maximum surface temperature according to gear unit type plate (ATEX labelling) in °C
T_u:	Upper value of the permissible ambient temperature range in °C according to the type plate

Figure 25: ATEX labelling



Centre dot is **white:** OK



Centre dot is **black:** Temperature was too high.

Figure 26: Temperature sticker

4.6 Test run

During commissioning of the gear unit a test run should be carried out in order to detect any problems prior to continuous operation.

During a test run under full load, the gear unit should be checked for:

- Unusual noises, such as grinding, knocking or rubbing noises
- Unusual vibrations, oscillations or other movements
- Production of steam or smoke

After the test run, the gear unit should be checked for:

- Leaks
- Slippage of the shrink discs. To do this, remove the cover and check whether the marking specified in Section 3.8 "Fitting a hollow shaft with shrink disc (Option: S)"indicates a movement of the gear unit hollow shaft relative to the machine shaft. Then remount the cover as described in Section 3.10 "Fitting the covers (option: H, H66)".

Information

Radial shaft seals are rubbing seals and have sealing lips made from an elastomer material. These sealing lips are lubricated with a special grease at the factory. This reduces the wear due to their function and ensures a long service life. An oil film in the region of the rubbing sealing lip is therefore normal and is not due to leakage.

4.7 Running-in time for the worm gear unit

In order to achieve maximum efficiency of the worm gear unit, the gear unit must be subjected to a running-in period of approx. 25 h – 48 h under maximum load.

There may be a reduction in efficiency before the running-in period is complete.

4.8 Checklist

Checklist		
Item to be checked	**Date of check:**	**Information see Section**
Are there any transport damages or other damages visible?		3.4.1
Does the labelling on the name plate comply with the specifications?		2.2
Does the version on the name plate conform to the actual installation?		3.3
Is the pressure vent activated?		4.2
Do all drive and driven elements have ATEX approval?		1.2.2
Are the external gear shaft forces within permitted limits (chain tension)?		3.6
Are rotating parts covered with the contact guard?		3.10
Does the motor also have appropriate ATEX approval?		3.12
Has the temperature sticker been affixed?		3.15
Has the correct oil level for the version been checked?		5.2.3
Is the automatic lubricant sensor activated?		4.3
Has the temperature been measured?		4.5
Does the centre of the temperature sticker have a white colour?		4.5
Is the cooling system connected?		3.13 4.4
Was the gear unit checked in a test run?		4.6
Was the shrink disc connection tested for slippage?		4.6

Table 9: Checklist for commissioning

5 Service and maintenance

5.1 Inspection and maintenance intervals

Inspection and maintenance intervals	Inspection and maintenance work	Information see Section
Weekly or every 100 operating hours	• Visual inspection for leaks • Check the gear unit for unusual running noises and/or vibrations • Only for **gear units with cooling cover**: Visual inspection of the temperature sticker	5.2.1 5.2.2 5.2.8
Every 2,500 operating hours, at least every six months	• Check the oil level • Visual inspection of the rubber buffer • Visual inspection of hose • Visual inspection of radial shaft seal • Visual inspection of Option SCX • Visual inspection of the temperature sticker	5.2.3 5.2.4 5.2.5 5.2.6 5.2.7 5.2.8
	• Remove dust (only for category 2D) • Check coupling (only for category 2G and standard IEC/NEMA motor attachment) • Re-grease/remove excess grease (only applicable for free drive shaft/option W, for agitator bearings/option VL2/VL3 and for AI…/AN… adapter with option BRG1) • Clean or replace the pressure relief vent	5.2.9 5.2.10 5.2.11 5.2.15
Every 5000 operating hours, at least every year (only for standard IEC / NEMA motor attachment)	• Replace the automatic lubricant sensor, remove excess grease, empty or replace the grease collection container at each second replacement of the lubricant sensor	5.2.12
For operating temperatures up to 80 °C, every 10000 operating hours, at least every 2 years	• Change the oil (if filled with synthetic products, the interval is doubled, with the use of ***SmartOilChange*** the interval is specified by ***SmartOilChange***) • Check the cooling coil for deposits (fouling) • Replace the radial shaft seals at every oil change, at the latest after 10,000 operating hours • Clean or replace the vent screw as necessary	5.2.3 5.2.14 5.2.16 5.2.15
Every 20000 operating hours, at least every 4 years	• Re-lubricate the bearings in the gear unit • Replace the hoses • Check the function of the resistance thermometer (only II2GD)	5.2.17
Interval as stated in field MI of the name plate (only for Category 2G and 2D) or at least every 10 years	• General overhaul	5.2.18

Information

The oil change intervals apply for normal operating conditions and operating temperatures up to 80 °C. The oil change intervals are reduced in the case of extreme conditions (operating temperatures higher than 80 °C, high humidity, aggressive environment and frequent fluctuations in the operating temperature).

Information

SmartOilChange determines the optimum time for an oil change based on a continuous determination of the oil temperature. With ***SmartOilChange*** from Getriebebau NORD, this is done entirely on the basis of key data for the specific product, the specified ambient temperature and internal measurement values of the power electronics such as the current consumption. Additional hardware is therefore not required for the Getriebebau NORD solution.

The measurement results are processed and interpreted by the integrated software and result in the display of the residual time until the next oil change.

5.2 Service and maintenance work

DANGER

Explosion hazard

- No explosive atmosphere must be present during repair work.
- When cleaning the gear unit, do not use procedures or materials which may cause electrostatic charging of the gear unit or adjacent non-conducting components.

5.2.1 Visual inspection for leaks

The gear unit must be checked for leaks. Attention should be paid to escaping gear oil and traces of oil on the exterior or underneath the gear unit. In particular, the radial shaft seals, cover caps, screw fittings, hoses and housing joints should be checked.

Information

Radial shaft seals are components with a limited life and are subject to wear and ageing. The service life of radial shaft seals depends on various ambient conditions. Temperature, light (especially UV light), ozone and other gases and liquids affect the ageing process of radial shaft seals. Some of these influences may change the physical or chemical properties of the radial shaft seals and result in a significant reduction of their service life. Foreign matter (e.g. dust, sludge, sand, metallic particles) and excess temperature (excessive speed or external heating) accelerate the wear of the sealing lip. These sealing lips are made of an elastomer material and are lubricated with a special grease at the factory. This reduces the wear due to their function and ensures a long service life. An oil film in the region of the rubbing sealing lip is therefore normal and is not due to leakage (see chapter 7.5 "Leakage and leak-tightness").

NOTICE

Damage to the radial shaft seals through unsuitable cleaning agents

Unsuitable cleaning agents may damage the radial shaft seals, which may then cause an increased risk of leaks.

- Do not clean the gear unit with cleaning agents which contain acetone or benzol.
- Avoid contact with hydraulic oils.

If leaks are suspected, the gear unit should be cleaned, the oil level checked and checked again for leaks after approx. 24 hours. If a leak is confirmed (dripped oil), the gear unit must be repaired immediately. Please contact the NORD service department.

If the gear unit is equipped with a cooling coil in the housing cover, the connections and the cooling coil must be checked for leaks. If there are any leaks, these must be repaired immediately. Please contact the NORD service department.

5.2.2 Check for running noises

If the gear unit produces unusual running noises or vibrations, this could indicate damage to the gear unit. In this case the gear unit must be repaired immediately. Please contact the NORD Service department.

5.2.3 Checking the oil level

Section 7.1 "Versions and mounting position" describes the versions and the corresponding oil level screws. With double gear units, the oil level must be checked on both units. The pressure vent must be at the position marked in Section 7.1 "Versions and mounting position".

The oil level does not need to be checked on gear units without oil level screw (see chapter 7.1 "Versions and mounting position").

The oil level must only be carried out when the gear unit is at a standstill and has cooled down. Provide protection against accidental activation. Check the oil level with an oil temperature of between 10 °C to 40 °C.

Gear units with oil level screw

1. Standard version M4 (V1 and V5) helical gear units have an angled pipe for checking the oil level as shown in Figure 27 (right-hand illustration). This must point vertically upwards. Before checking the oil level, unscrew the pressure vent.
2. Unscrew the oil level screw corresponding to the mounting position (see chapter 7.1 "Versions and mounting position").
3. Check the oil level in the gear unit with the dipstick supplied (Part No.: 283 0050) as shown in Figure 27 (left and right illustration). To do this, hold the part of the dipstick which is submerged in the oil vertically.
4. The maximum oil level is the lower edge of the oil level hole.
5. The minimum oil level is approx. 4 mm below the lower edge of the oil level hole. The dipstick then just dips into the oil.
6. If the oil level is not correct, adjust the oil level by draining off oil or topping up with the type of oil stated on the name plate.
7. If the integrated seal of the oil level screw is damaged, use a new oil level screw or clean the thread and coat it with securing adhesive before screwing it in, e.g. Loctite 242 or Loxeal 54-03.
8. Attach the oil level screw together with the sealing ring and tighten with the correct torque (see chapter 7.3 "Screw tightening torques").
9. If the pressure vent has been unscrewed, screw it back in again together with the sealing ring and tighten with the correct torque (see chapter 7.3 "Screw tightening torques").
10. Mount all removed attachments again.

Gear units with an oil level tank

The oil level must be checked with the aid of the dipstick plug (thread G1¼) in the oil reservoir tank. The oil level must be between the upper and lower marking when the dipstick is fully screwed in; see Figure 27 (centre illustration). These gear units may only be operated in the mounting position stated in Section 7.1 "Versions and mounting position".

Gear units with oil inspection glass

1. The oil level can be seen directly in the window.
2. The correct oil level is:
   - Maximum: the middle of the oil inspection glass,
   - Minimum: Lower edge of the oil inspection glass.
3. If the oil level is not correct, adjust the oil level by draining off oil or topping up with the type of oil stated on the name plate.

Final check

All previously removed screws must be screwed back in correctly.

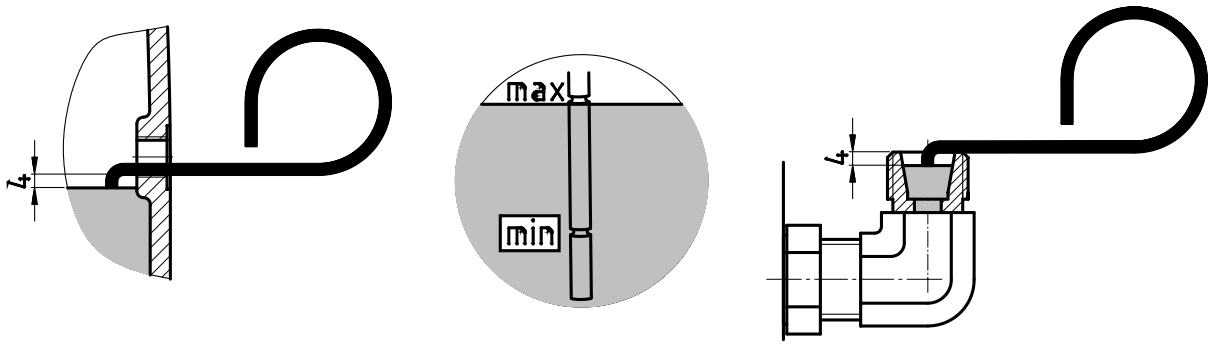


Figure 27: Checking the oil level with a dipstick

5.2.4 Visual inspection of the rubber buffers (Option: G, VG)

If these show damage such as tears to the surface, the rubber elements must be replaced. In this case, please contact NORD Service.

5.2.5 Visual inspection of the hoses (Option: OT)

Gear units with an oil reservoir tank have rubber hoses.

Check the hoses and screw connectors for leaks, cuts, tears, porous areas and chafing. In case of damage, the hoses must be replaced. Please contact the NORD service department.

5.2.6 Visual inspection of the radial shaft seals

Information

Radial shaft seals are rubbing seals and have sealing lips made from an elastomer material. These sealing lips are lubricated with a special grease at the factory. This reduces the wear due to their function and ensures a long service life. An oil film in the region of the rubbing sealing lip is therefore normal and is not due to leakage.

5.2.7 Visual inspection of the SCX flange (option: SCX)

Check the dirt outlet holes on the SCX flange for dirt.

The gap between the shaft and the fastening plate must be free from dirt. If severe soiling is apparent, pull the gear unit off the push-in shaft and clean the push-in shaft and the inside of the flange.

Check the radial shaft seals on the gear unit for damage. Damaged radial shaft seals must be replaced with new radial shaft seals.

Mount the gear unit on the cleaned SCX flange.

5.2.8 Visual inspection of the temperature sticker

(only necessary for temperature class T4 or maximum surface temperature < 135 °C)

Check the temperature sticker for black colouration. If the temperature sticker has turned black, the gear unit has become too hot. The cause of overheating must be determined. Please contact the NORD service department. Do not resume operation of the drive before the cause of overheating has been remedied and renewed overheating can be ruled out.

Before putting into operation again, affix a new temperature sticker on the gear unit.

5.2.9 Remove dust

(only necessary for category 2D)

Remove dust deposits on the gear unit housing if they are more than 5 mm thick.

For gear units fitted with a cover (Option H), remove the cover. Remove dust deposits in the cover, on the output shaft and on the shrink disc. Remount the cover cap afterwards.

Information

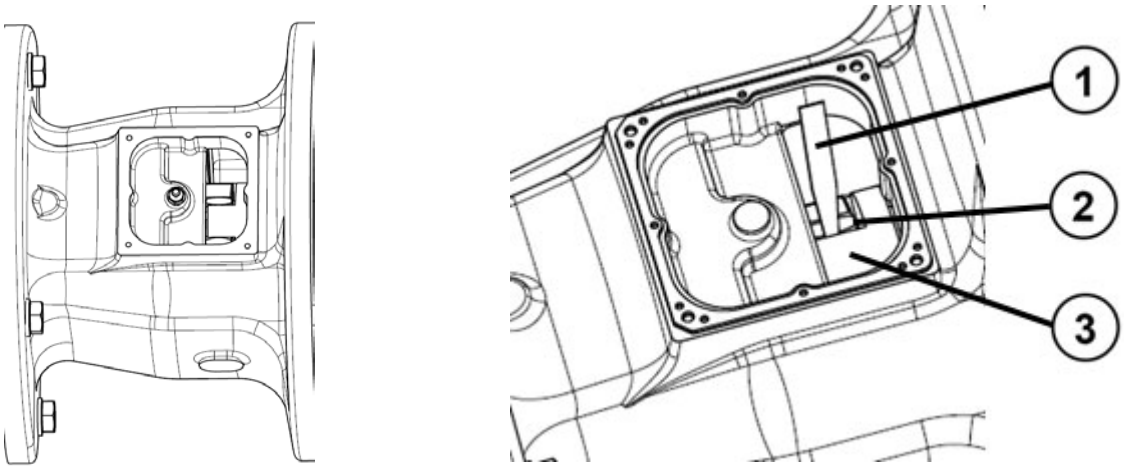
If the cover cap is completely sealed with a liquid sealing agent such as Loctite 574 or Loxeal 58-14, there is no need for regular cleaning of the cover cap

5.2.10 Check coupling (option: IEC, NEMA, AI, AN)

(only necessary for category 2G)

For option AN or AI, it is possible to check the coupling through the inspection hole. Remove the inspection cover and check the claw coupling's play. If the wear limit X_{max} has been exceeded, the ring gear must be replaced.

For the IEC or NEMA option, remove the motor.



1) Feeler gauge
2) Ring gear
3) Hub

Figure 28: For option AI, AN, check coupling through the inspection hole

Examine the plastic and elastomer coupling components for traces of wear. Permissible wear limits can be found in Table 10. If the limit values are undershot, the coupling components must be replaced. Only use replacement parts which have the same colour as the original parts. The colour corresponds to a permissible temperature range and the torque transmission. Otherwise there is an increased risk of material fatigue.

With claw couplings (ROTEX®), measure the tooth thickness of the elastomer ring gear as shown in Figure 29. B_{min} is the minimum permitted tooth thickness.

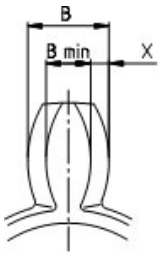
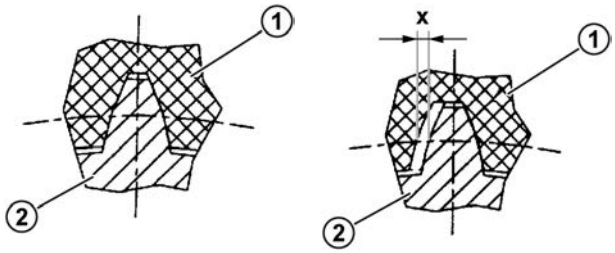


Figure 29: Measuring the tooth thickness on the ROTEX® claw coupling

Limiting wear values for coupling ring gears								
Type	R14	R24	R38	R42	R48	R55	R65	R90
B [mm]	9.7	8.6	13.3	15.7	17.7	19.6	22.2	32.3
B_{min} [mm]	7.7	5.6	10.3	11.7	13.7	14.6	17.2	24.3

Table 10: Limiting wear values of the coupling ring gears

For gear couplings, the limiting wear value is X = 0.8 mm, as shown in the following illustration.



Explanation

1 Sleeve

2 Hub

Figure 30: Measurement of gear sleeve wear for curved tooth BoWex® couplings

Information

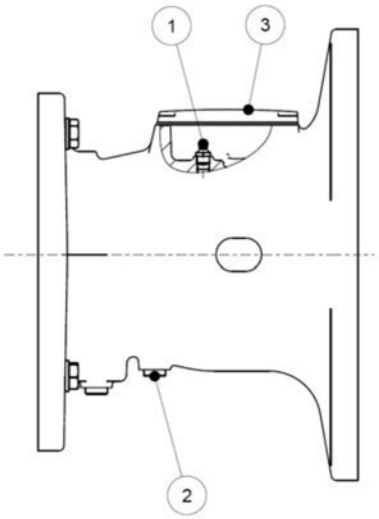
If the examination of the coupling only shows wear below 25% of the limiting value, it is permissible to duplicate the interval for examination of the coupling, i.e. to 5,000 operating hours, at least one year.

5.2.11 Re-greasing (Option: VL2, VL3, W, AI, AN)

Some gear unit designs are equipped with a re-greasing device.

For the agitator versions VL2 and VL3, unscrew the vent screw opposite the grease nipple prior to re-greasing. Inject grease until a quantity of 20 - 25g escapes from the vent hole. Screw the vent screw back in.

For option W and the IEC/NEMA adapters AI and AN with option BRG1, grease the outer roller bearing with approx. 20–25 g of grease at the grease nipple. The grease nipple is located under a bolt-on inspection cover. Before re-greasing, unscrew the grease drain screw so that the excess grease can drain off. Remove the excess grease on the motor adapter.

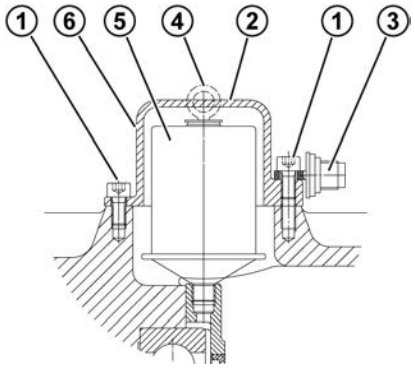


1 Conical grease nipple
2 Grease drain screw
3 Inspection cover

Figure 31: Re-grease IEC/NEMA adapters AI and AN with option BRG1

Recommended grease: Petamo GHY 133N (Klüber Lubrication) As an option, food-compatible grease may be used (see chapter 7.2.1 "Roller bearing greases")..

5.2.12 Replacing the automatic lubricant dispenser



Explanation

1 Cap screws M8 x 16
2 Cartridge cover
3 Activation screw
4 Lug
5 Lubricant dispenser
6 Position of adhesive label

Figure 32: Switching the automatic lubricant sensor with standard motor mounting

(Lubricant sensor: Part No.: 28301000 or for food-compatible grease Part No.: 28301010)

1. Unscrew the cartridge cover.
2. Unscrew the lubricant sensor.
3. Screw in the new lubricant sensor.
4. Remove excess grease from the adapter.
5. Activate the full lubricant sensor (see chapter 4.3 "Activating the automatic lubricant dispenser").

The grease collection container (Part No. 28301210) must be replaced or drained with every second replacement of the lubricant sensor. Due to the form of the container, a residual amount of grease remains in the container.

1. Unscrew the grease collection container from the screw connector.
2. Press grease out of the grease collection container. To do this, push the internal piston back with a rod. The rod may have a maximum diameter of 10 mm. Collect the extracted grease and dispose it properly.
3. Check the collecting vessel. If the collecting vessel is damaged, replace it with a new one.
4. Screw the collecting vessel back into the drain hole on the motor adapter.

5.2.13 Change the oil

On the figures in Section 7.1 "Versions and mounting position"the positions of the oil drain screw, the oil level screw and the vent screw, if present, are shown depending on the mounting position.

WARNING

Danger of burns

The oil may be very hot. Use protective equipment.

Procedure:

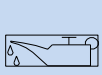
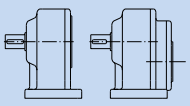
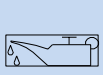
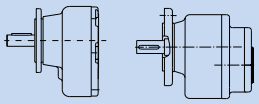
1. Place a collection vessel under the oil drain screw or the oil drain tap.
2. Screw out the oil level screw (if present) and the oil drain screw. When using an oil reservoir tank, screw out the screw plug with dipstick.
3. Completely drain the oil from the gear unit.
4. Check the sealing rings of the oil drain screw and the oil level screw. If a sealing ring is damaged, replace the corresponding screw. You can also clean the threads and coat them with securing adhesive e.g. Loctite 242 54-03 before screwing them in.
5. Screw the oil drain screw into the hole and tighten to the correct torque (see chapter 7.3 "Screw tightening torques").
6. Using a suitable filling device, refill with oil of the same type through the oil level hole until oil emerges from the oil level hole. The oil can also be filled through the hole of the pressure vent screw or of a screw plug located higher than the oil level. If an oil reservoir tank is used, fill the oil through the upper inlet (thread G1¼) until the oil level is set as described in Section 5.2.3 "Checking the oil level".
7. Check the oil level after at least 15 min, if using an oil level container after at least 30 min.

Information

The oil does not need to be replaced for gear units without oil drain screws (see chapter 7.1 "Versions and mounting position"). The gear unit are lifelong lubricated.

Standard helical gear units in ATEX categories 3G and 3D (see chapter 2.2 "Name plate")do not have an oil level screw. Here, new oil is injected through the threaded hole of the pressure vent, with the oil quantity according to the following table.

Oil quantities

													
	M1	**M2**	**M3**	**M4**	**M5**	**M6**		**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
Gear unit type	Quantity [l]						Gear unit type	Quantity [l]					
SK 0	0.13	0.22	0.13	0.22	0.13	0.13	**SK 0 F**	0.13	0.22	0.13	0.22	0.13	0.13
SK 01	0.22	0.38	0.22	0.38	0.22	0.22	**SK 01 F**	0.22	0.38	0.22	0.38	0.22	0.22
SK 20	0.55	1.00	0.55	1.00	0.55	0.55	**SK 20 F**	0.35	0.60	0.35	0.60	0.35	0.35
SK 25	0.50	1.00	0.50	1.00	0.50	0.50	**SK 25 F**	0.50	1.00	0.50	1.00	0.50	0.50
SK 30	0.90	1.30	0.90	1.30	0.90	0.90	**SK 30 F**	0.70	1.10	0.70	1.10	0.70	0.70
SK 33	1.00	1.60	1.00	1.60	1.00	1.00	**SK 33 F**	1.00	1.50	1.00	1.50	1.00	1.00
SK 000	0.24	0.40	0.24	0.41	0.24	0.24	**SK 000 F**	0.24	0.41	0.24	0.41	0.24	0.24
SK 010	0.38	0.60	0.38	0.60	0.38	0.38	**SK 010 F**	0.35	0.65	0.40	0.74	0.50	0.30

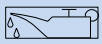
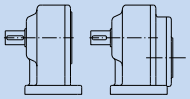
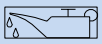
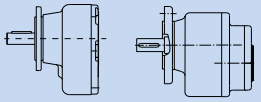
Oil quantities													
													
	M1	M2	M3	M4	M5	M6		M1	M2	M3	M4	M5	M6
Gear unit type	Quantity [l]						Gear unit type	Quantity [l]					
SK 200	0.80	1.30	0.80	1.30	0.80	0.80	**SK 200 F**	0.65	0.95	0.70	1.10	0.80	0.50
SK 250	1.20	1.50	1.20	1.50	1.20	1.20	**SK 250 F**	0.90	1.40	1.00	1.60	1.30	0.80
SK 300	1.20	2.00	1.20	2.00	1.20	1.20	**SK 300 F**	1.25	1.50	1.20	1.80	1.30	0.95
SK 330	1.80	2.80	1.80	2.80	1.80	1.80	**SK 330 F**	1.60	2.50	1.60	2.90	1.90	1.40

Table 11: Oil quantities for standard helical gear units for ATEX categories 3G and 3D

5.2.14 Checking the cooling coil for deposits (Option: CC)

The cooling water flow rate must be controlled. For this, pay attention to the information in Section 4.4 "Cooling coil (Option: CC)".

If a chemical cleaner is used, it must be ensured that the cleaning agent does not attack the material of the cooling coil (copper pipe and brass fittings).

Check the cooling coil and the cover for leaks if strong corrosion is found on the connections.

Please contact the NORD Service department.

5.2.15 Clean and check vent screw

1. Unscrew the vent screw.
2. Thoroughly clean the vent screw, e.g. with compressed air.
3. Check the vent screw and the sealing ring. If the sealing ring is damaged, use a new vent screw.
4. Screw the vent screw back in.

5.2.16 Replacing the shaft sealing ring

Once the shaft sealing ring has reached the end of its service life, the oil film in the region of the sealing lip increases and a measurable leakage with dripping oil occurs. **The radial shaft seal must then be replaced.** The space between the sealing lip and the protective lip must be filled approximately 50 % with grease on fitting (recommended grease: PETAMO GHY 133N). Take care that after fitting, the new radial shaft seal does not run in the old wear track.

5.2.17 Re-lubrication of bearings in the gear unit

NOTICE

Damage to the gear unit due to insufficient lubricant

There is a risk of bearing failure in the event of inadequate lubrication.

- It is essential to comply with the recommended intervals.
- Only use greases which are approved by Getriebebau NORD.
- Never mix different greases. If different greases are mixed, the gear unit may be damaged due to inadequate lubrication caused by incompatibility between the different greases.
- Avoid contamination of the grease with foreign substances and washing out of the grease by lubricating oil.

Please contact the NORD Service department for replacement of the grease in the roller bearings.

Recommended grease: Petamo GHY 133N - Klüber Lubrication. (see chapter 7.2.1 "Roller bearing greases")

5.2.18 General overhaul

DANGER

Explosion hazard

- The general overhaul must be carried out by qualified personnel in a specialist workshop with appropriate equipment.
- We urgently recommend that the general overhaul is carried out by the NORD Service Department.

With Category 2G and 2D gear units, a general overhaul is necessary after a specified period of operation.

The approved period of operation is usually stated on the name plate in field MI.

Alternatively, the maintenance class CM may be stated in field MI (e.g.: MI CM = 5.).

In this case, the time for general overhaul in years after commissioning (N_A) is calculated according to the following formula: The maximum permissible duration of operation after commissioning is 10 years. This also applies to higher calculated values.

$N_A = CM \cdot f_L \cdot k_A$

CM Maintenance class according to field MI of the name plate

f_L: Running time factor

- $f_L = 10$ Maximum running time 2 hours per day
- $f_L = 6$ Running time 2 to 4 hours per day
- $f_L = 3$ Running time 4 to 8 hours per day
- $f_L = 1.5$ Running time 8 to 16 hours per day
- $f_L = 1$ Running time 16 to 24 hours per day

k_A: Utilisation factor (usually $k_A = 1$)

Longer maintenance intervals often result if the actual power required by the application is known. The utilisation factor may be calculated as follows.

$$k_A = \left(\frac{P_1}{P_{tat}} \right)^3$$

P1 Max. permissible drive power or motor power in kW according to the name plate

P_{tat}: Actual drive power or motor power in kW which is required by the application at the rated speed., determined e.g. by measurements

For variable loads with differing actual drive powers with nominal speeds P_{tat1}, P_{tat2}, P_{tat3}, … with known percentage times q_1, q_2, q_3, …, the following equivalent average drive power applies:

$$P_{tat} = \sqrt[3]{P_{tat1}^{\,3} \cdot \frac{q_1}{100} + P_{tat2}^{\,3} \cdot \frac{q_2}{100} + P_{tat3}^{\,3} \cdot \frac{q_3}{100} + \ldots}$$

During general overhaul, the gear unit is completely dismantled. The following work steps are carried out:

- All gear unit components are cleaned.
- All gear unit components are checked for damage.
- Damaged parts are replaced.
- All roller bearings are replaced.
- Replace all seals, radial shaft seals and Nilos rings.
- Optional: The back stop will be renewed.
- Optional: Replace the elastomers in the coupling.

6 Disposal

Observe the current local regulations. In particular, lubricants must be collected and disposed of correctly.

Gear unit components	Material
Gearwheels, shafts, roller bearings, keys, circlips, …	Steel
Gear unit housing, housing components, …	Grey cast iron
Light alloy gear unit housing, light alloy housing components, …	Aluminium
Worm gears, sockets, ...	Bronze
Radial shaft seals, sealing caps, rubber components, …	Elastomers with steel
Coupling components	Plastic and steel
Flat seals	Asbestos-free sealing material
Gear oil	Additive mineral oil
Synthetic gear oil (adhesive label: CLP PG)	Polyglycol-based lubricants
Synthetic gear oil (adhesive label CLP PG)	Poly-alpha-olefin based lubricants
Cooling coil, embedding material of the cooling coil, screw fittings	Copper, epoxy, yellow brass

Table 12: Materials

7 Appendix

7.1 Versions and mounting position

For versions which are not listed, please refer to the special documentation drawing (see chapter 2.2 "Name plate").

7.1.1 Explanation of symbols



Vent



Oil level



Oil drain

7.1.2 Standard helical gear units

Standard ATEX category 3G and 3D helical gear units do not have oil filling screws (see chapter 2.2 "Name plate").

7.1.3 NORDBLOC.1® helical in-line gear units SK 072.1 and SK 172.1

1. Bring the gear unit from the M4 installation position into the M2 installation position. Remove the oil level screw for the M2 installation position.

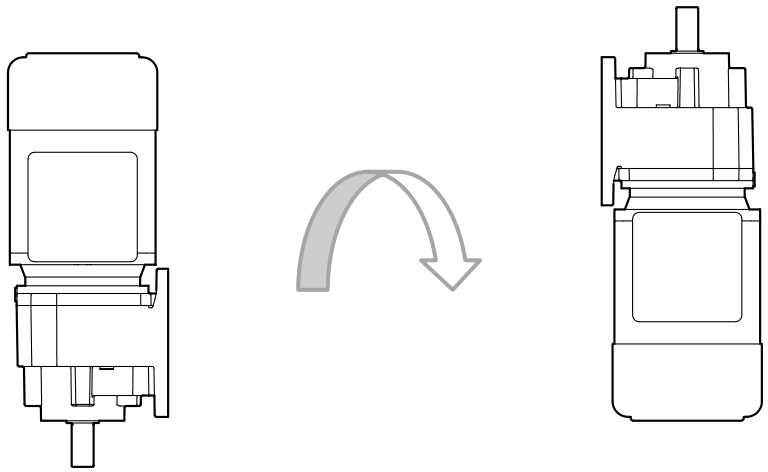
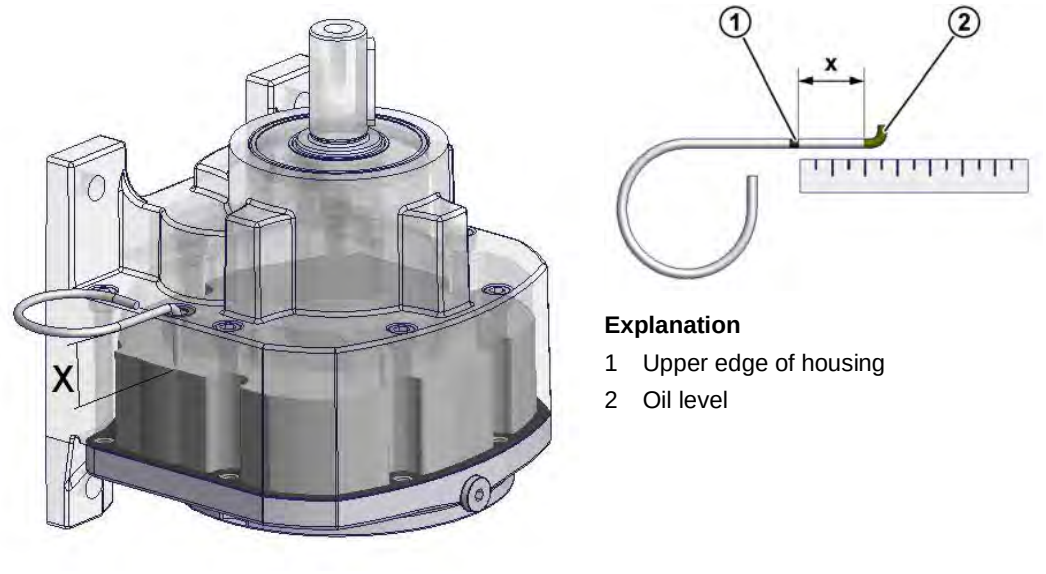


Figure 33: Oil level measurement SK 072.1 – SK 172.1

2. Determine the measurement X between the upper edge of the gear unit housing and the oil level. If necessary, adjust the dipstick accordingly (see Figure 34).



Explanation

1 Upper edge of housing
2 Oil level

Figure 34: Measuring the oil level

3. Compare the determined measurement X with the corresponding measurement in the following table. If necessary, adjust the oil level with the type of oil shown on the name plate.

Gear unit type	Thread size	Measurement X [mm]
SK 072.1	M8 x 1	22 ± 1
SK 172.1	M8 x 1	20 ± 1

4. Screw the oil level screw of the M2 installation position back in and tighten it.
5. Bring the gear unit back into the M4 installation position.

7.1.4 NORDBLOC.1® helical in-line gear units SK 071.1, SK 171.1, SK 371.1, SK 571.1, SK 771.1 … SK 1071.1

The gear units do not have oil level screws in the installation position M2. The oil level must be measured in installation position M4. Proceed as follows.

SK 071.1, SK 171.1, SK 371.1, SK 571.1

1. Bring the gear unit into the M4 installation position.

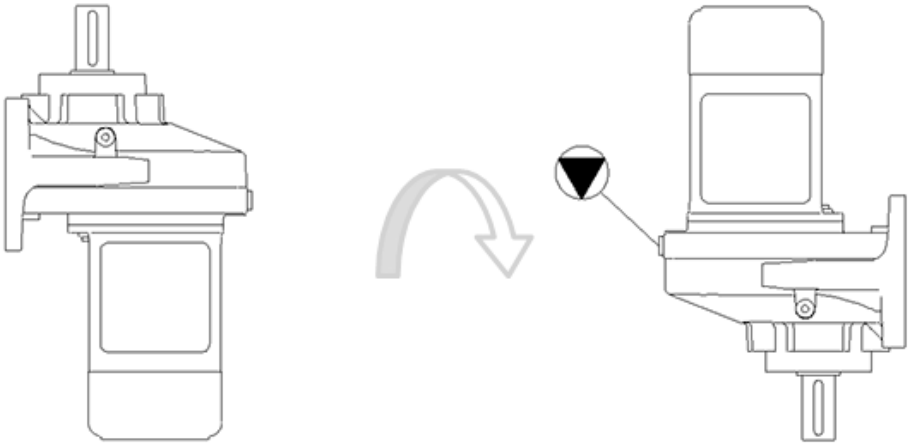
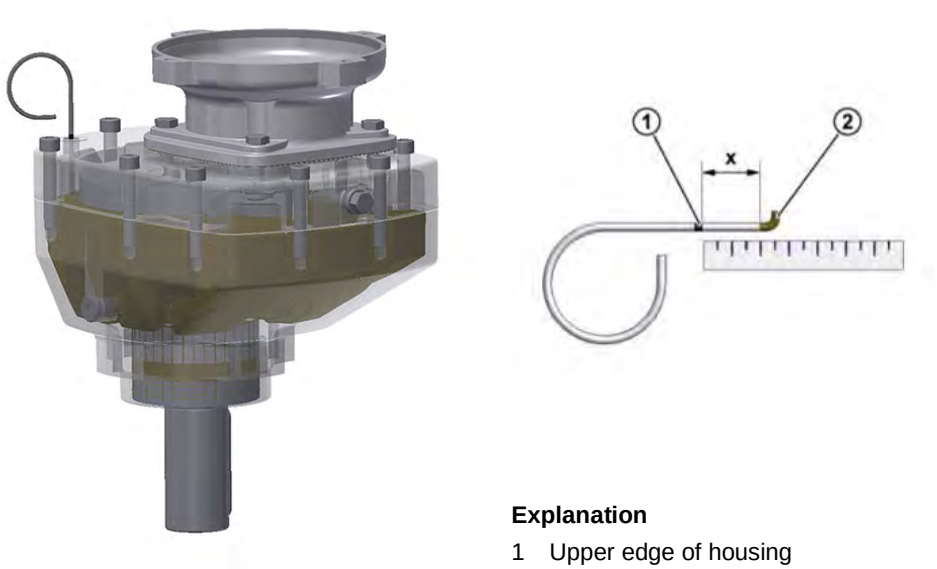


Figure 35: Oil level measurement SK 071.1 – SK 371.1

2. Remove the oil level screw for the M4 installation position. Check the oil level according to Section 5.2.3 "Checking the oil level". If necessary, adjust the oil level with the type of oil shown on the name plate.
3. Screw the oil level screw of the M4 installation position back in and tighten with the correct torque (see chapter 7.3 "Screw tightening torques").
4. Bring the gear unit back into the M2 installation position and remount it.

SK 771.1 … 1071.1

1. Bring the gear unit into the M4 installation position (see Figure 35)
2. Determine the measurement X between the upper edge of the gear unit cover and the oil level.



Explanation

1 Upper edge of housing
2 Oil level

Figure 36: Oil level SK 771.1 … 1071.1

3. Compare the determined measurement X with the measurement in the following table. If necessary, adjust the oil level with the type of oil shown on the name plate.

Gear unit type	Thread size	Measurement X [mm]
SK 771.1	M12 x 1.5	28 ± 1
SK 871.1	M12 x 1.5	14 ± 1
SK 971.1	M12 x 1.5	26 ± 1
SK 1071.1	M12 x 1.5	10 ± 1

4. Screw in the oil level screw of the M4 installation position and tighten with the correct torque (see chapter 7.3 "Screw tightening torques").
5. Bring the gear unit back into the M2 installation position and remount it.

7.1.5 NORDBLOC.1® helical in-line gear units

In category 2G and 2D, the gear unit types SK 320, SK 172, SK 272, SK 372 as well as SK 273 and SK 373 have only one oil level screw. These gear unit types have a checkable life-long lubrication. These gear unit types in ATEX categories 3G and 3D do not have oil level screws (see chapter 2.2 "Name plate").

7.1.6 Parallel shaft gear units

The following illustration applies to the M4 / H5 version of gear unit types SK 9282, SK 9382, SK 10282, SK 10382, SK 11282, SK 11382, SK 12382, SK10382.1, SK11382.1 with oil reservoir tank.

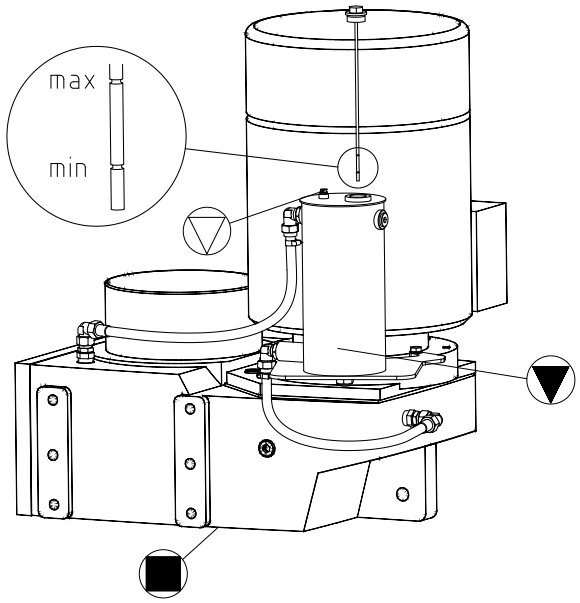


Figure 37: Parallel shaft gear units with oil level tank

In category 2G and 2D, types SK 0182 NB, SK 0282 NB and SK 1382 NB have a checkable life-long lubrication. In this category, the gear unit types have only one oil level screw. These gear unit types in ATEX categories 3G and 3D do not have oil level screws (see chapter 2.2 "Name plate").

7.1.7 UNIVERSAL worm gear units

SK 1SI 31 – SK 1SI 75

SK 1SIS 31 – SK 1SIS 75

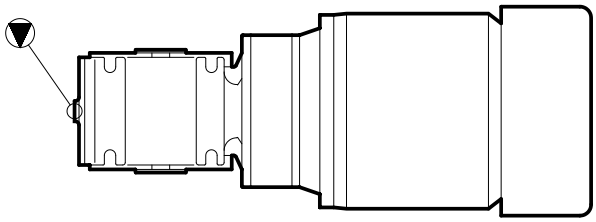


Figure 38: Orientation for oil level check

For the **oil level check**, bring the gear unit into the position shown above. To do this, it may be necessary to remove the gear unit or the geared motor.

Information

The warm gear unit must be adequately settled in the position shown in Figure 38, in order to allow the oil to settle evenly.

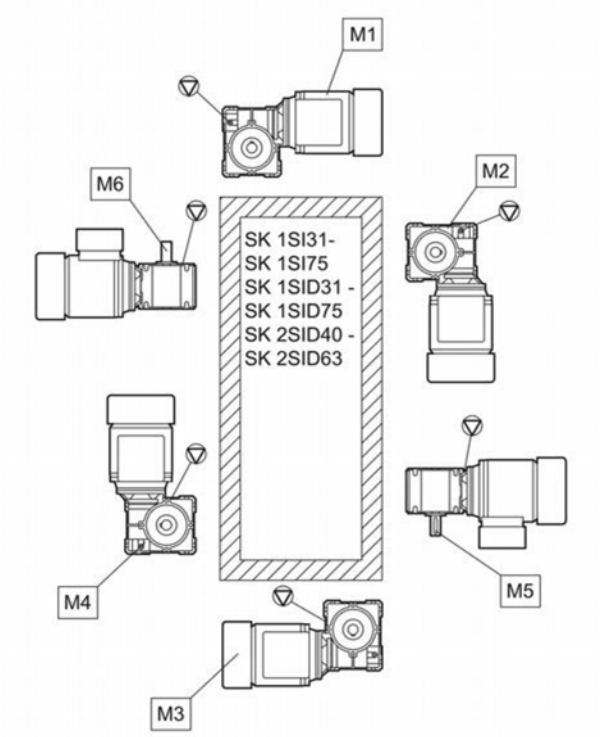
Afterwards, check the oil level as described in Section (see chapter 5.2.3 "Checking the oil level" on page 51).

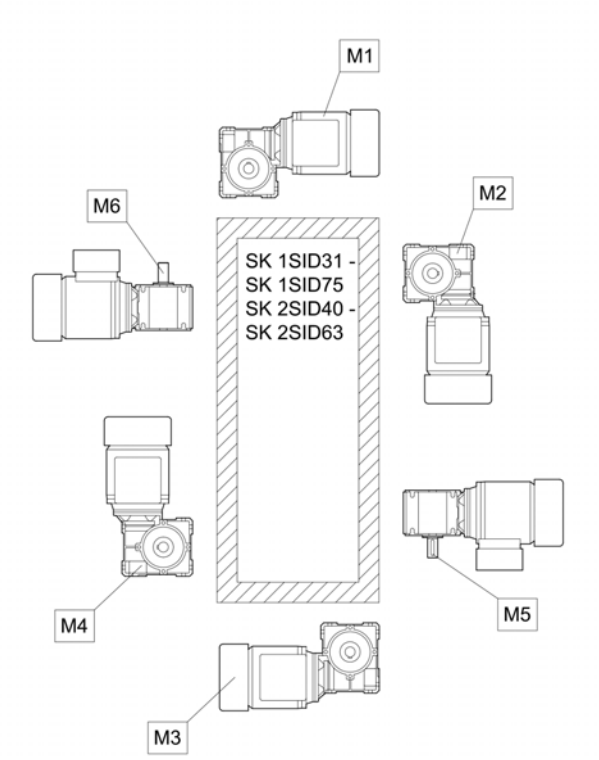
In category 2G and 2D the gear units only have one oil level screw. These gear unit types have a checkable life-long lubrication.

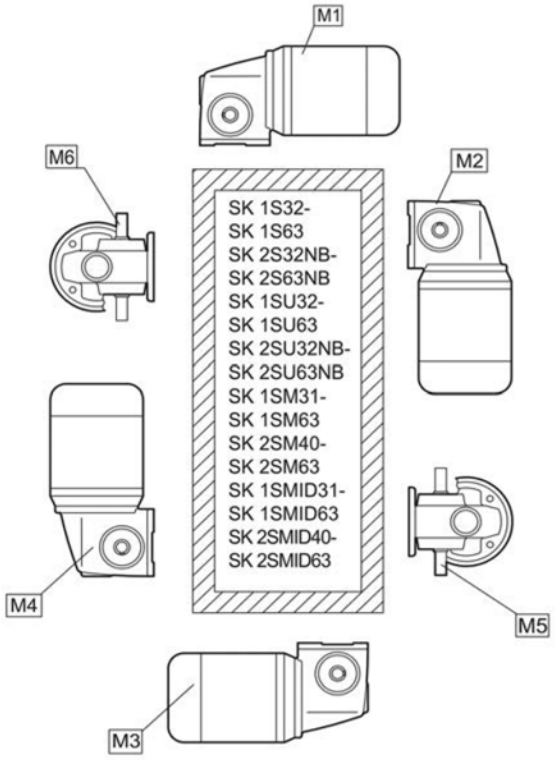
The oil level screws are not used in ATEX categories 3G and 3D. These gear unit types are lubricated for life.

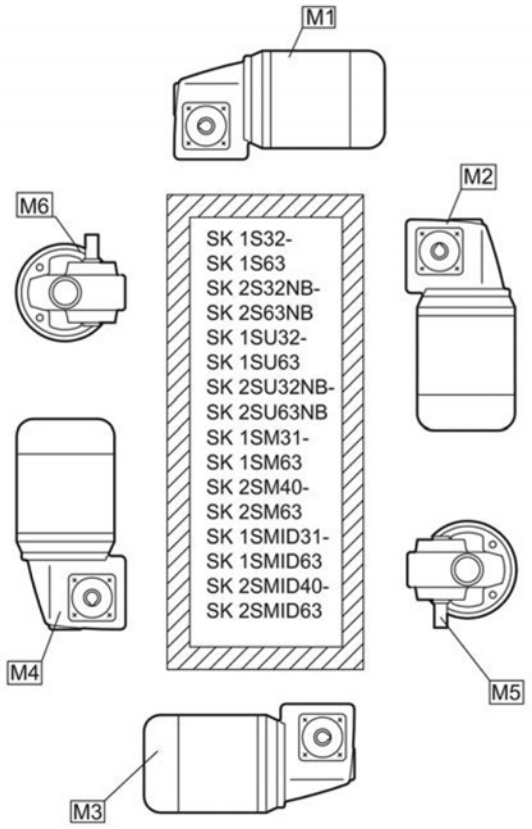
The gear unit types **SK 1S xx, SK 2S xx, SK 1SU xx, SK 2SU xx, SK 1SM xx, SK 2SM xx, SK 1SMI xx, SK 2SMI xx** may only be used in category 3G and 3D. These gear units are lubricated for life and do not have an oil level screw.

As an option, types SI and SMI can be equipped with a pressure relief vent.

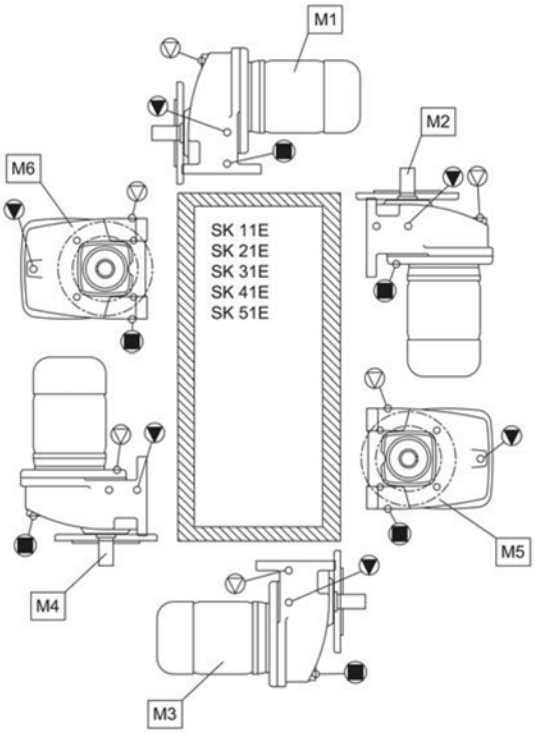

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SK 1SID75
SK 2SID40 -
SK 2SID63
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M5
M3

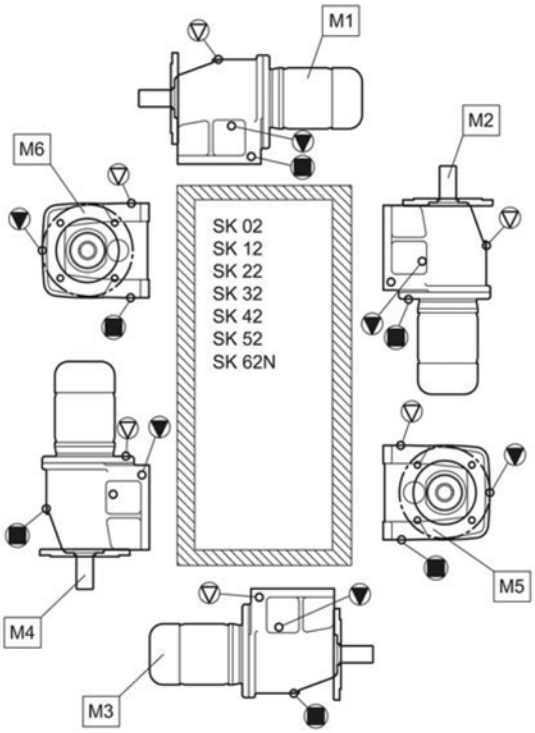

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M5
M3

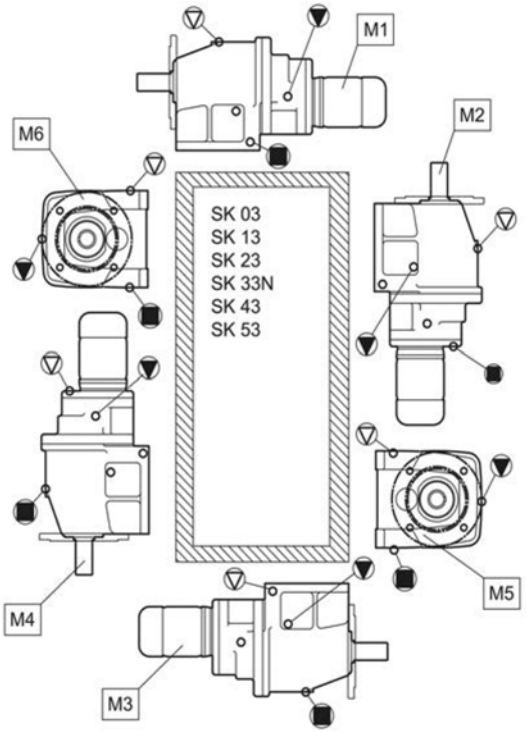

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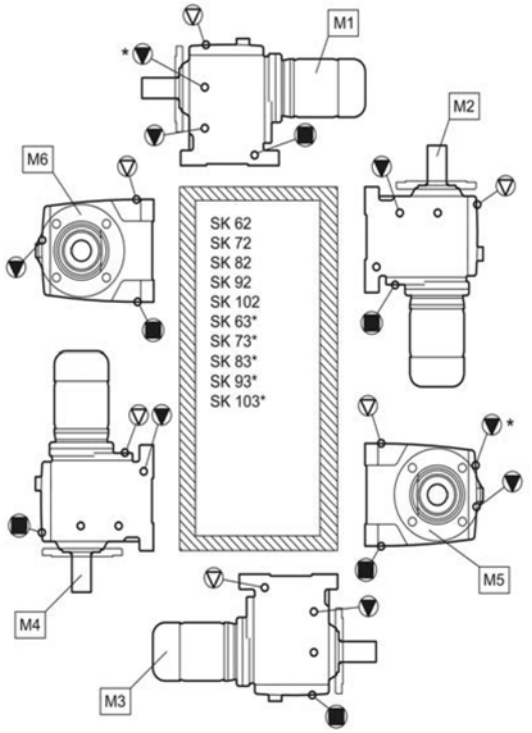

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M3

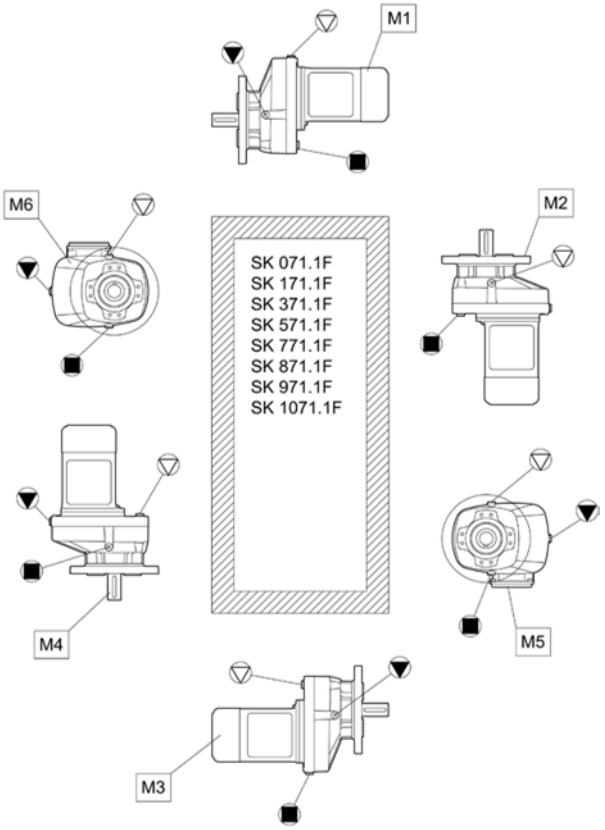
7.1.8 Overview of mounting positions

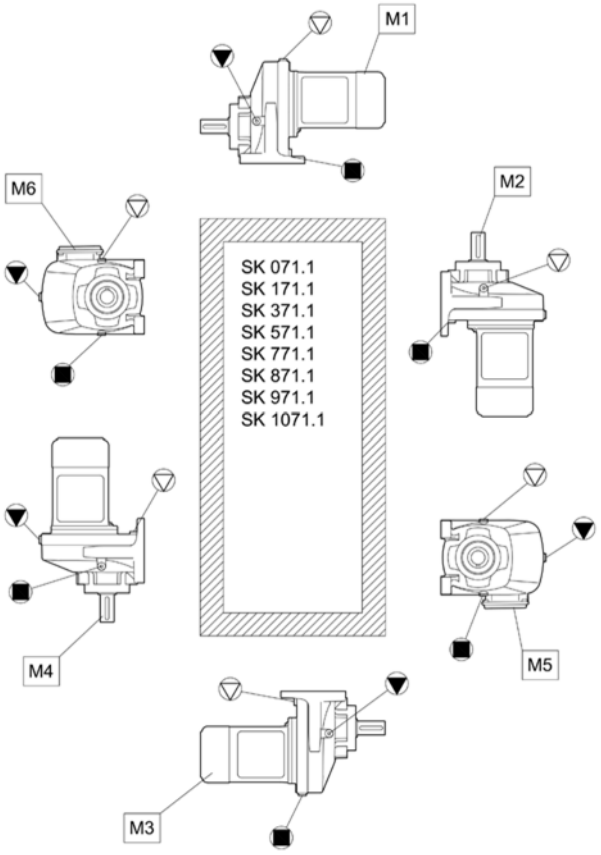


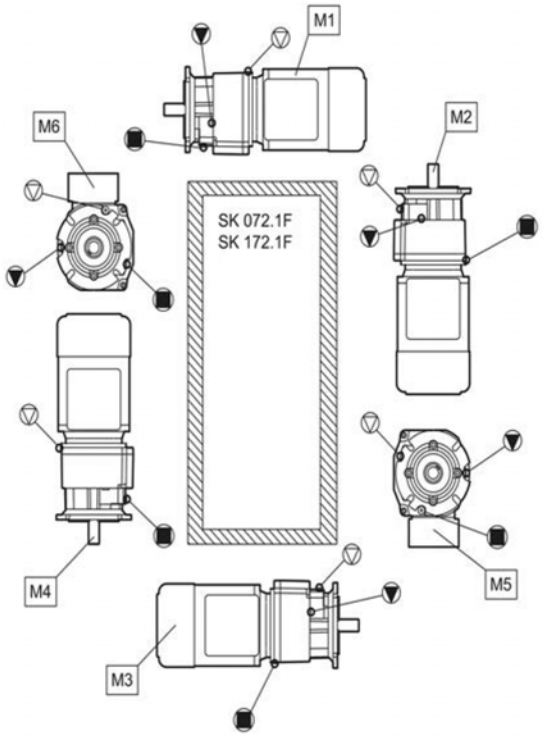


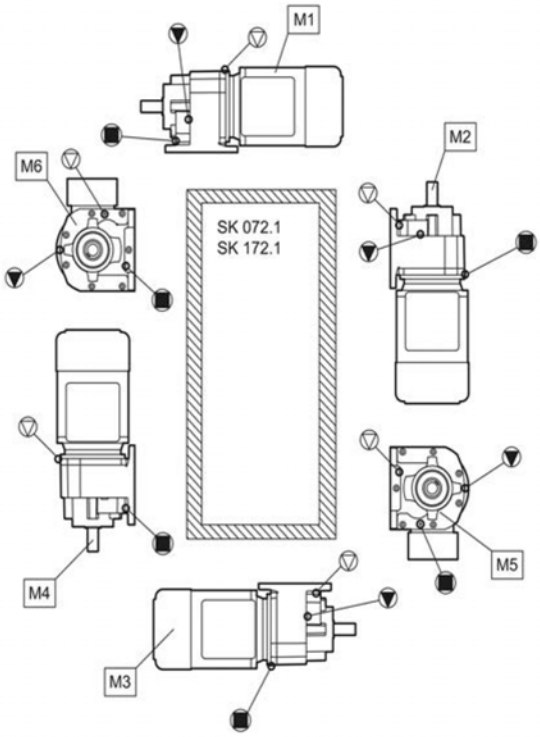


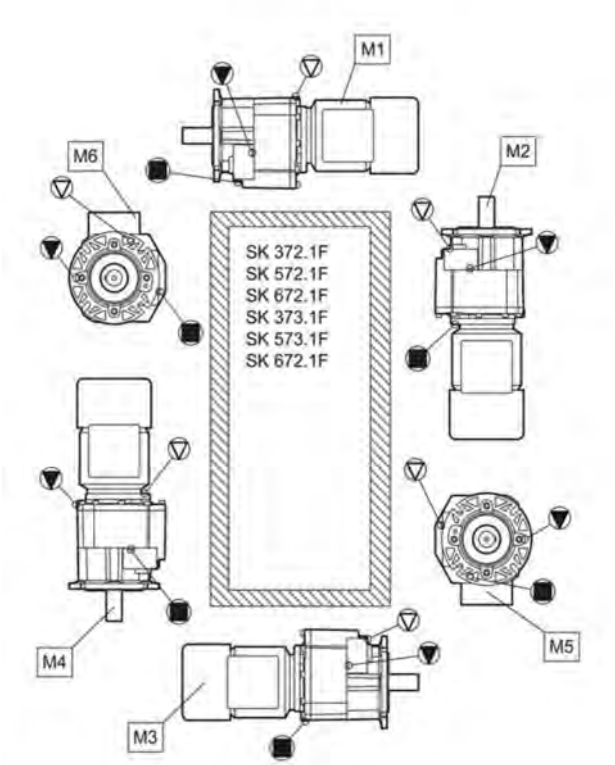


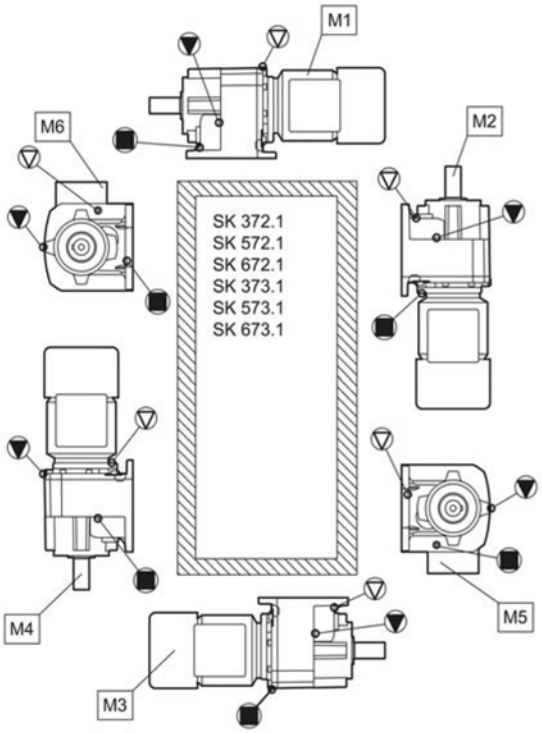

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M3

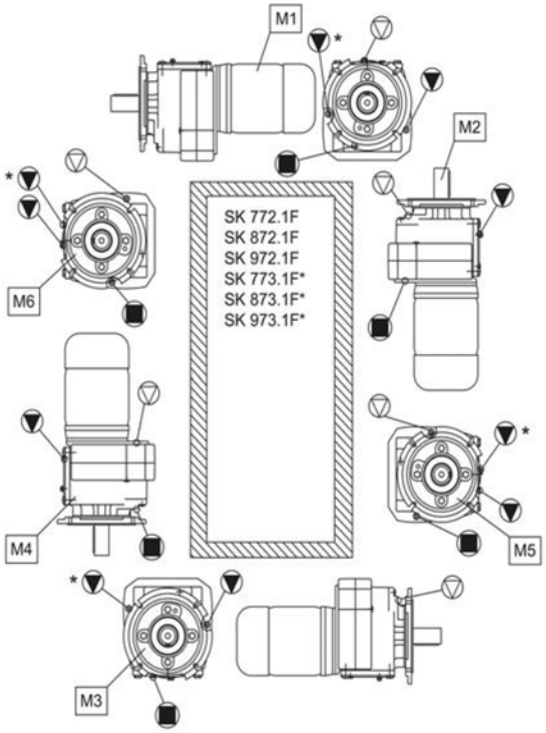

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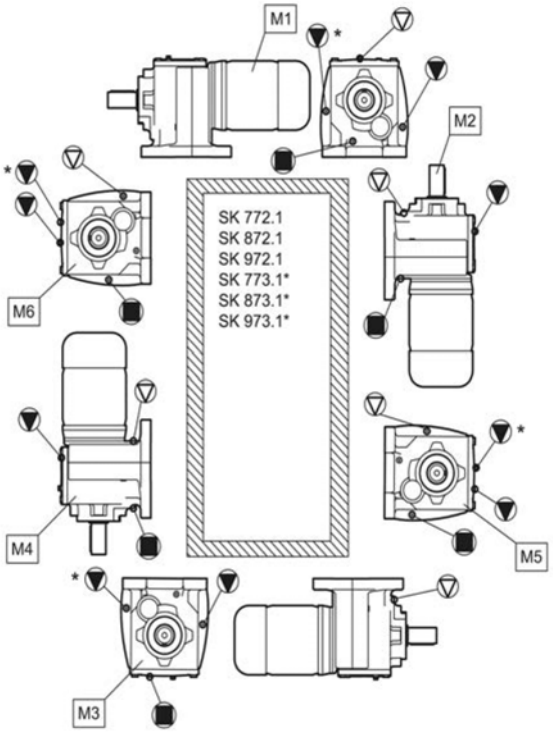

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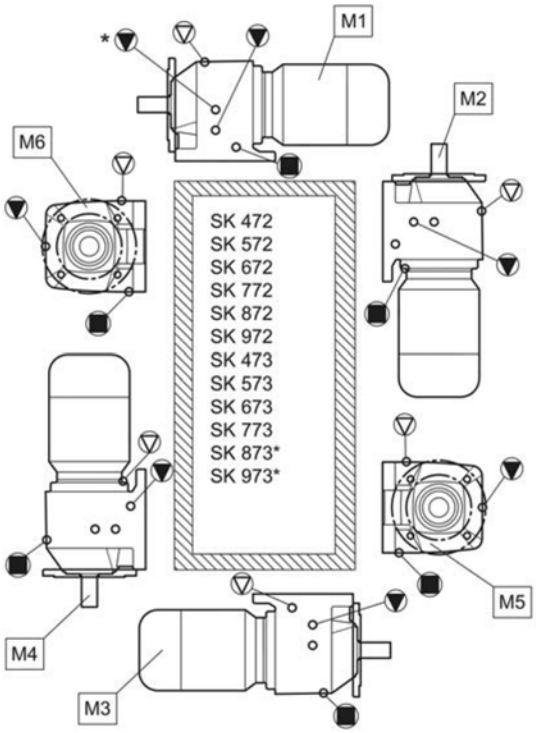

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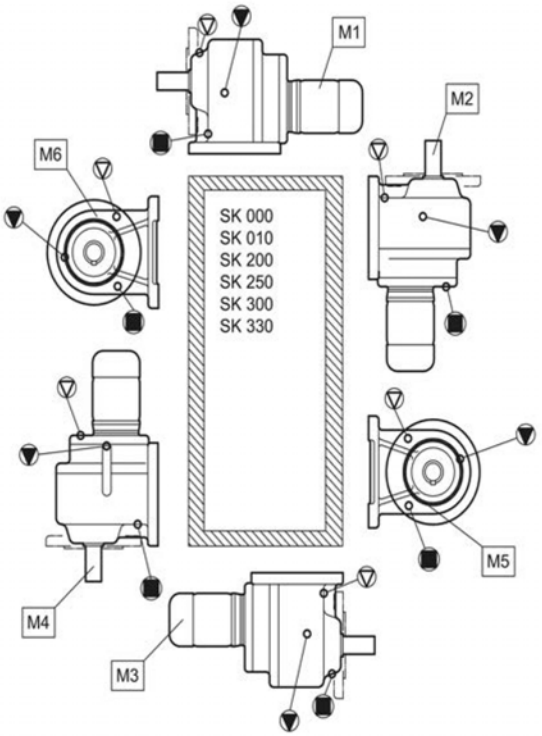

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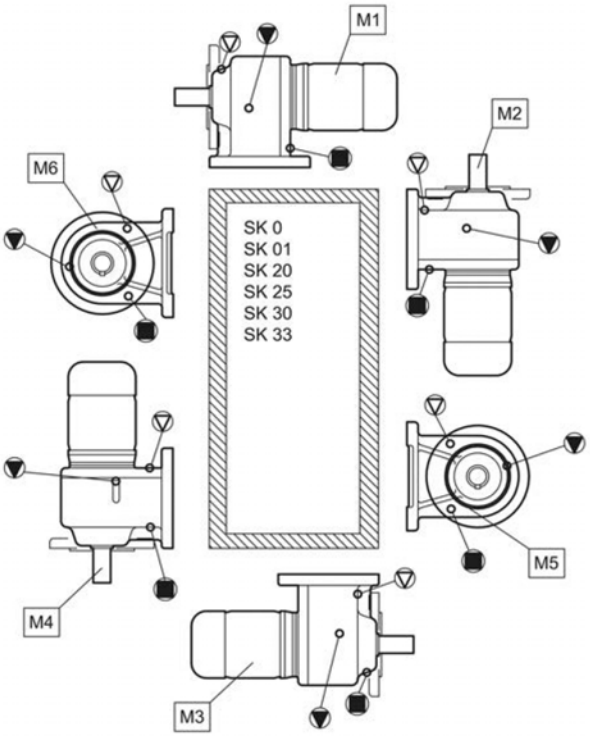

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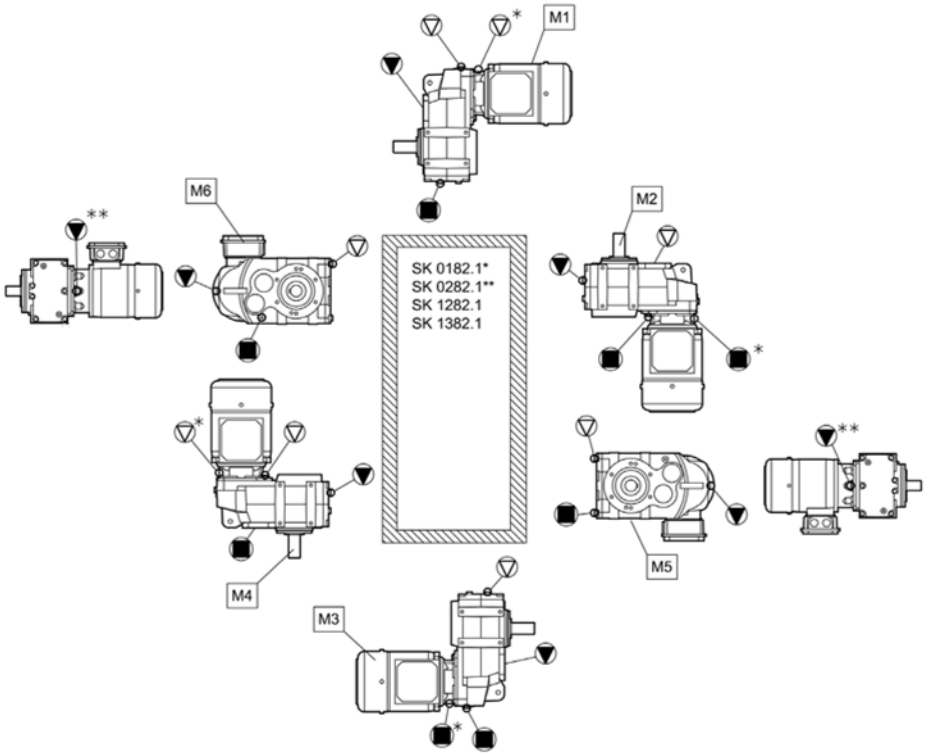

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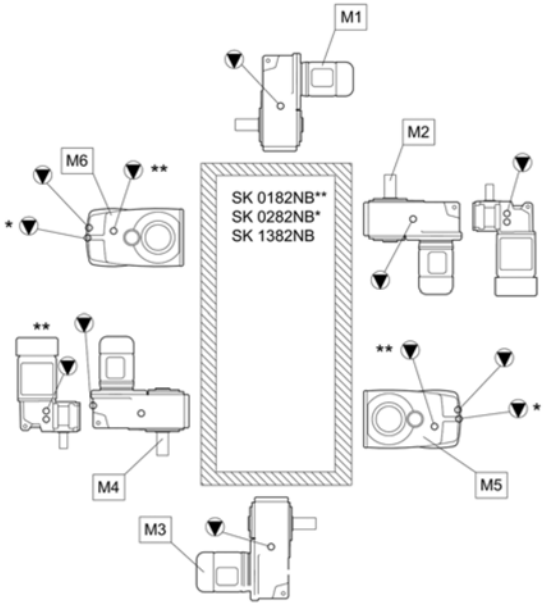

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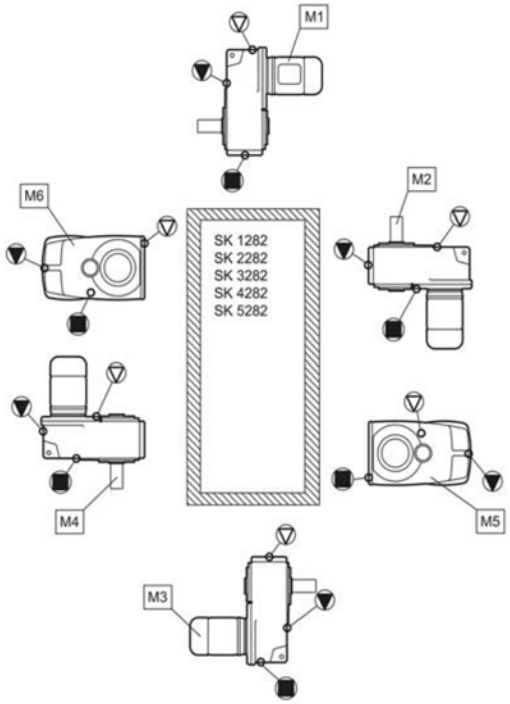

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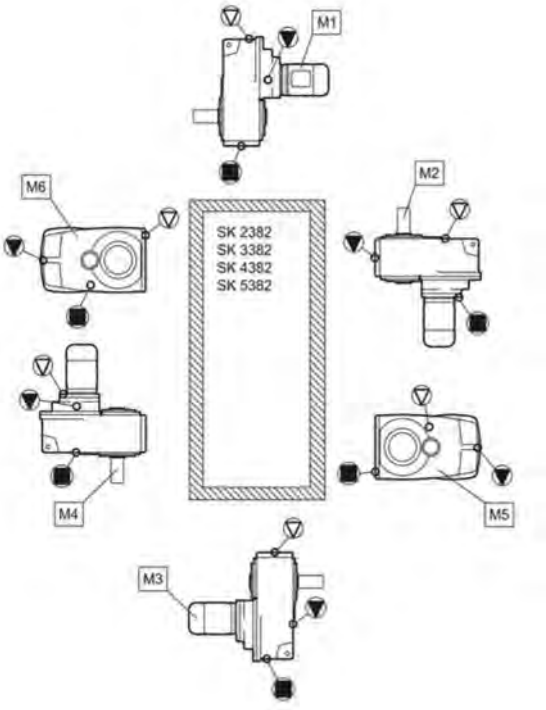

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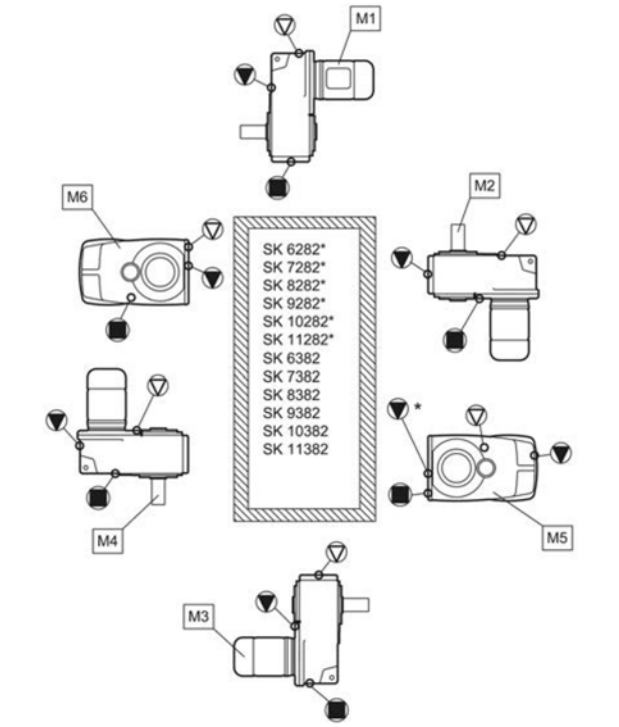

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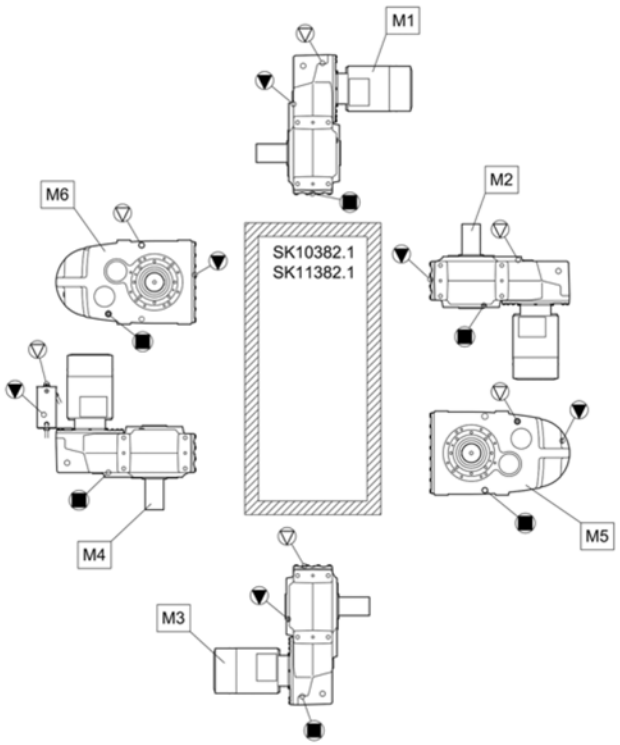

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SK 0282.1**
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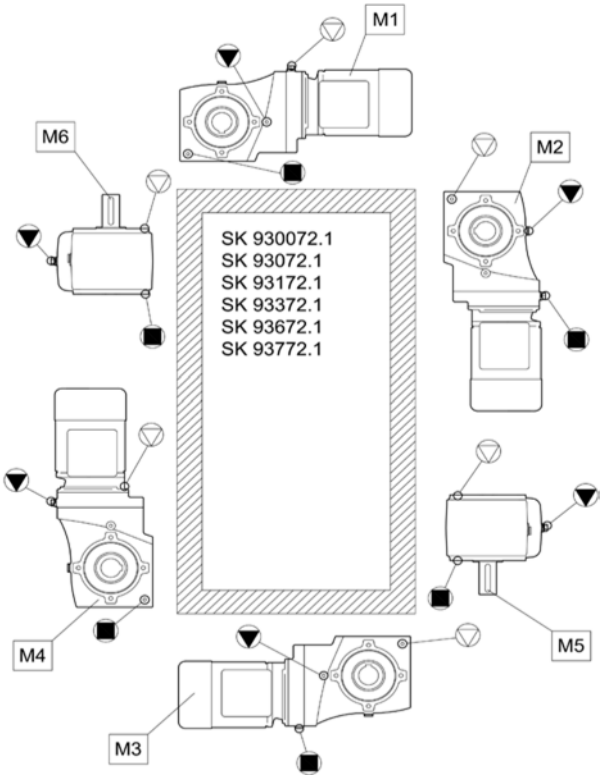

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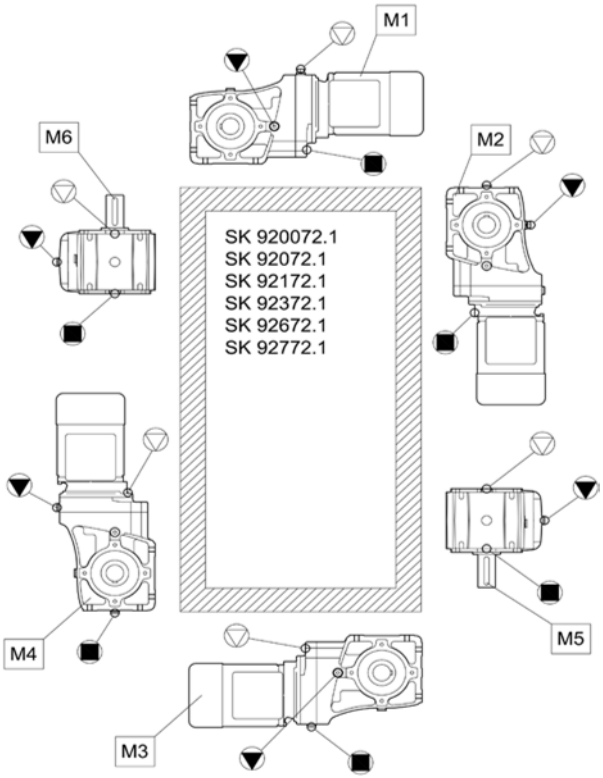

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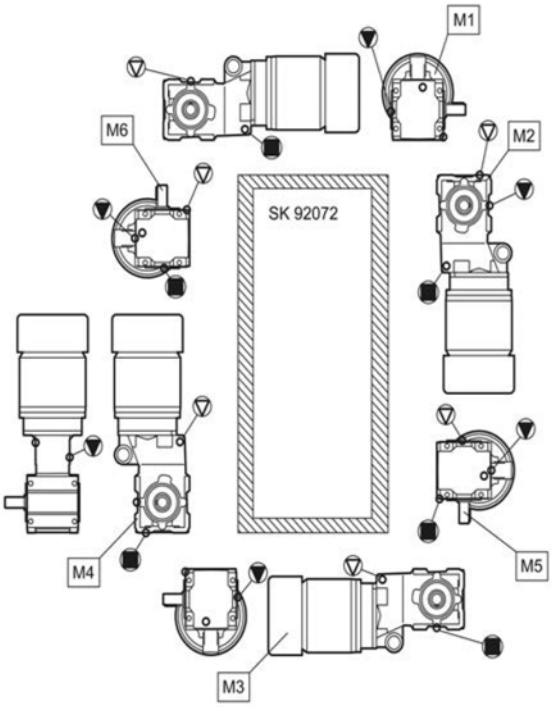

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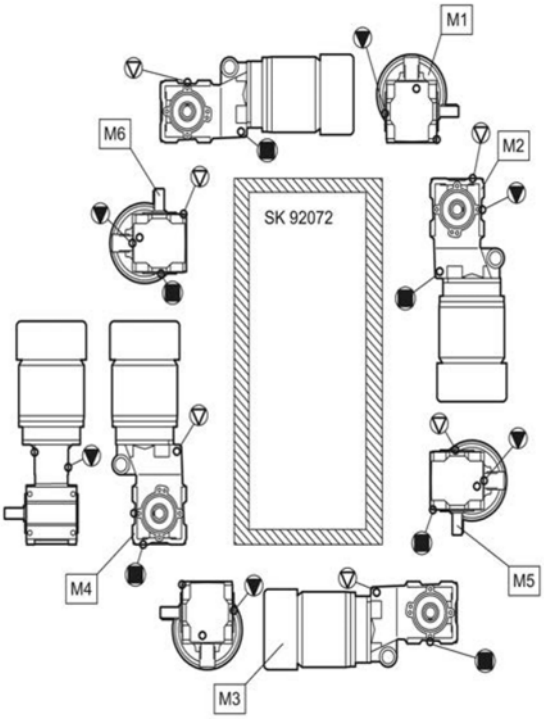

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SK 10382
SK 11382
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M4
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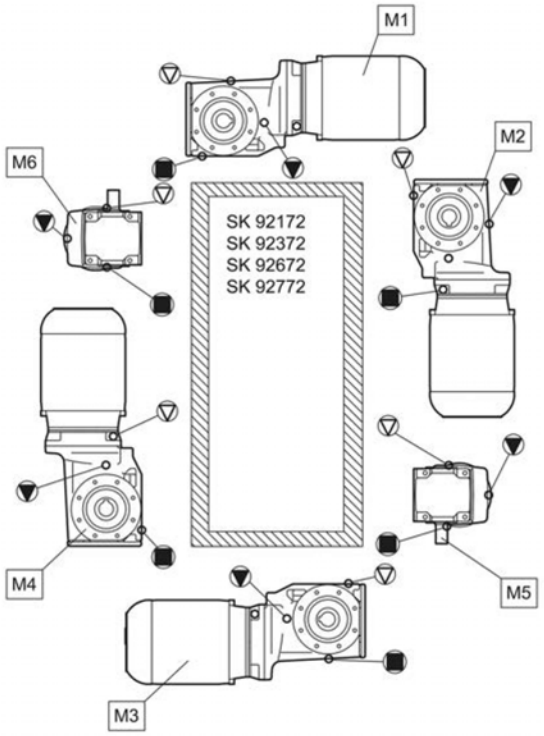

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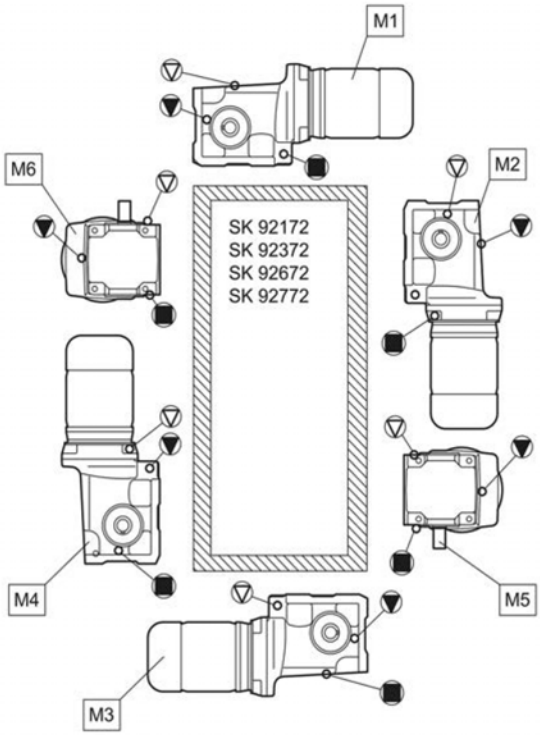

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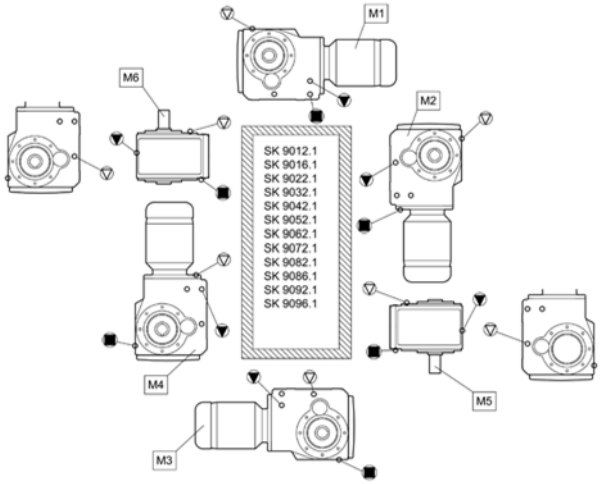

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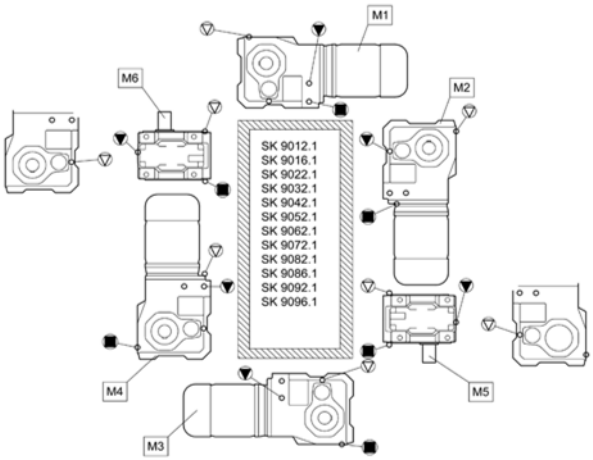

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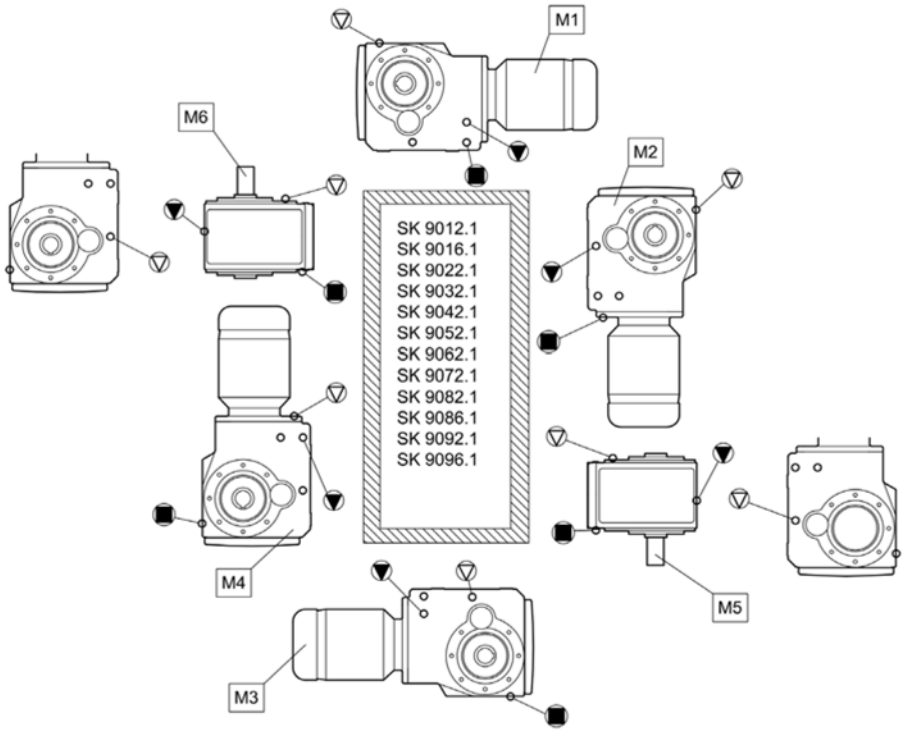

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M4
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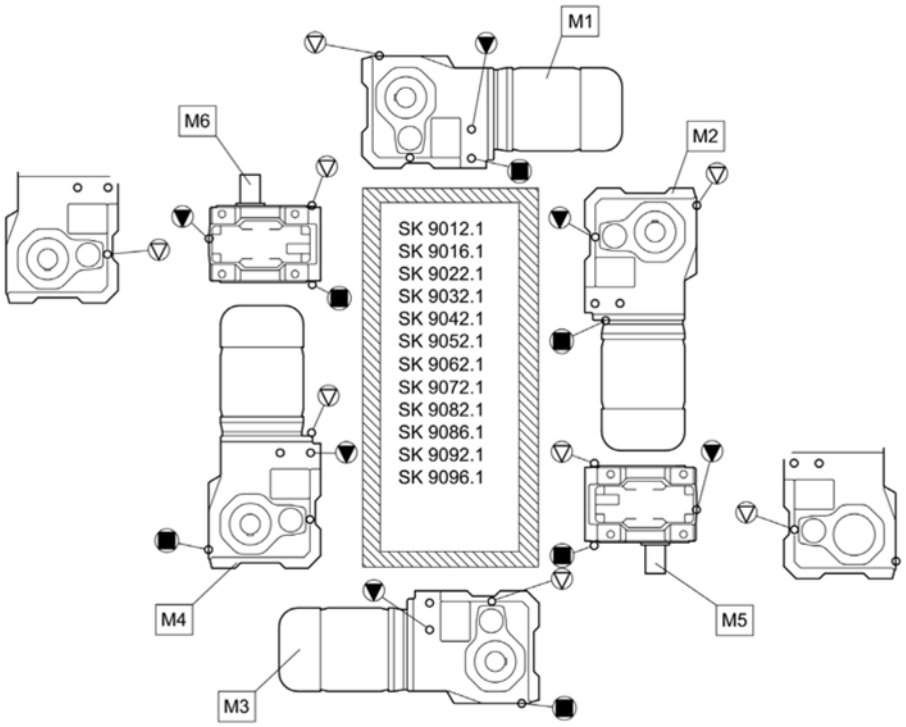

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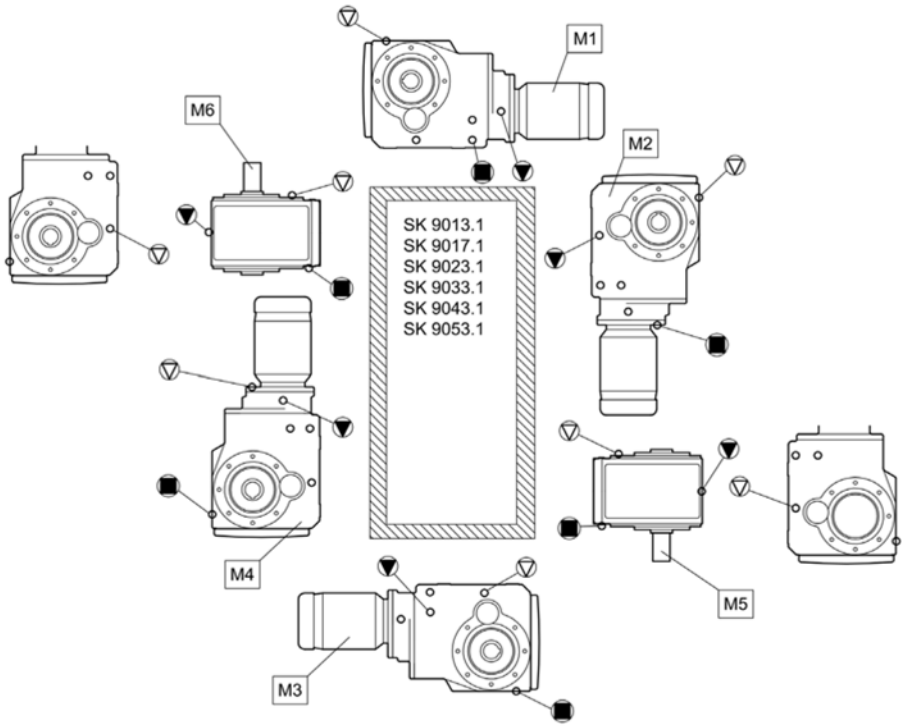

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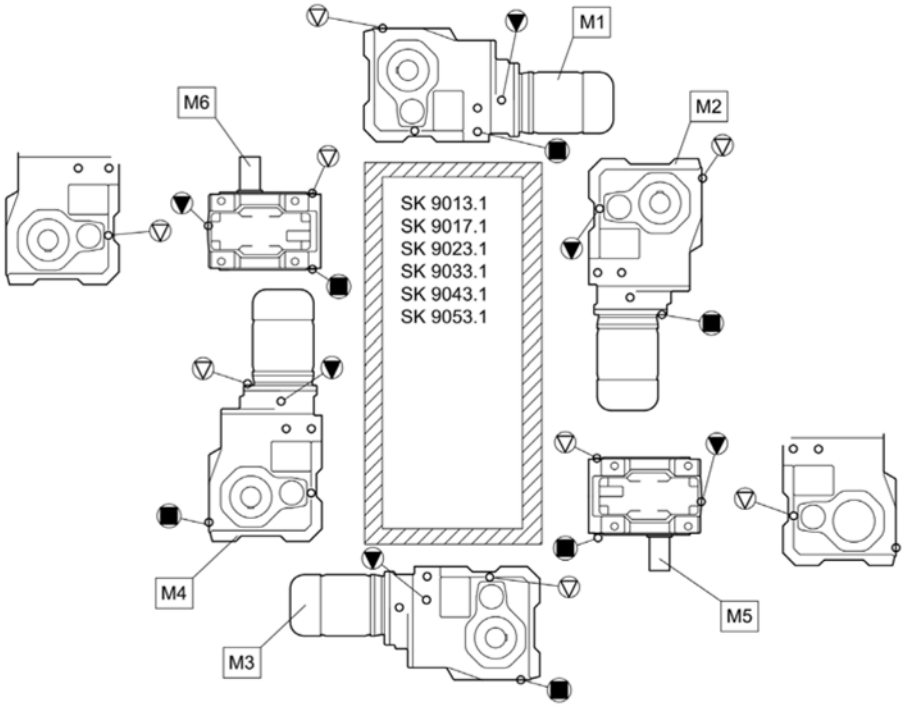

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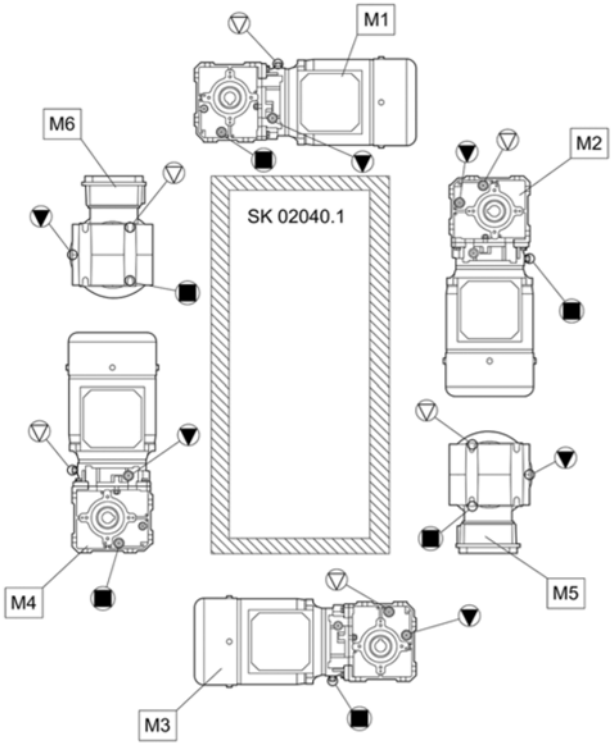

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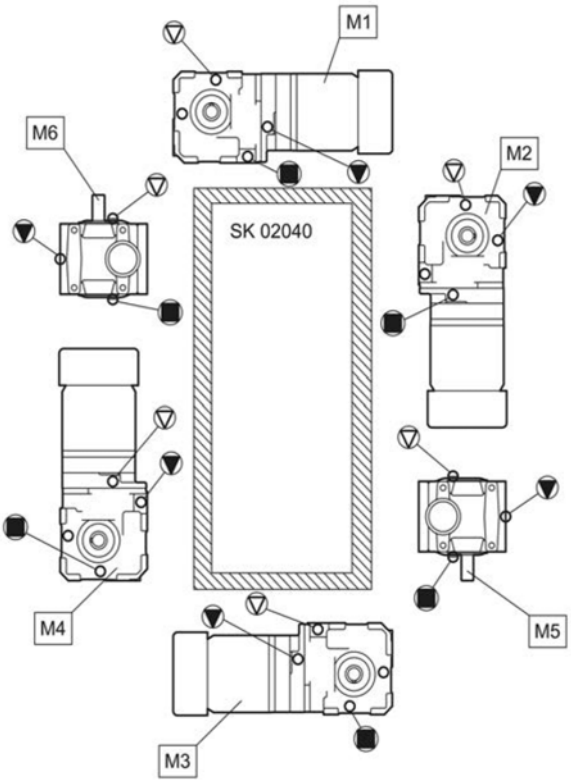

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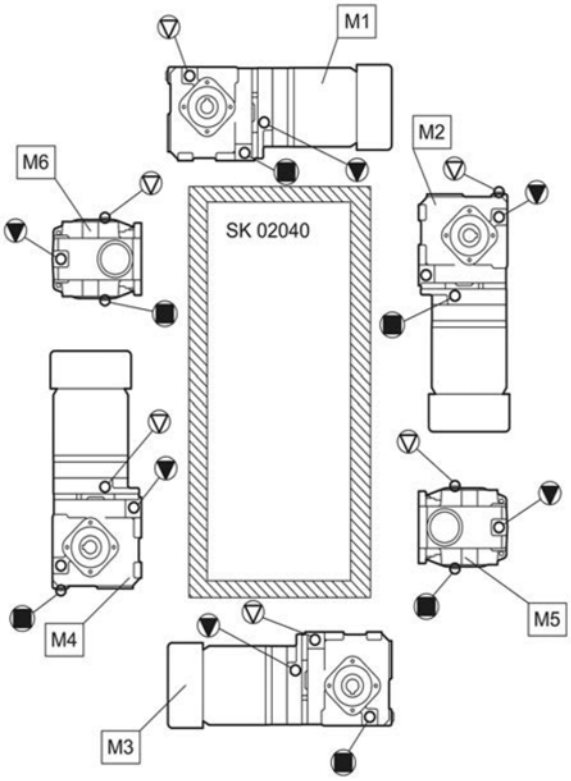

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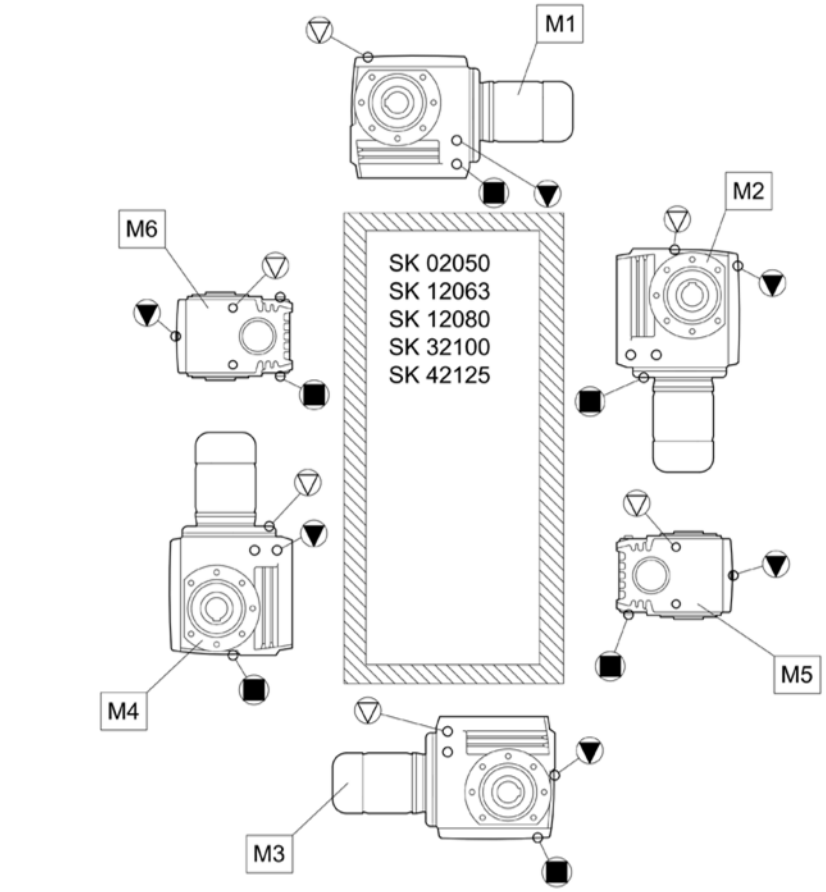

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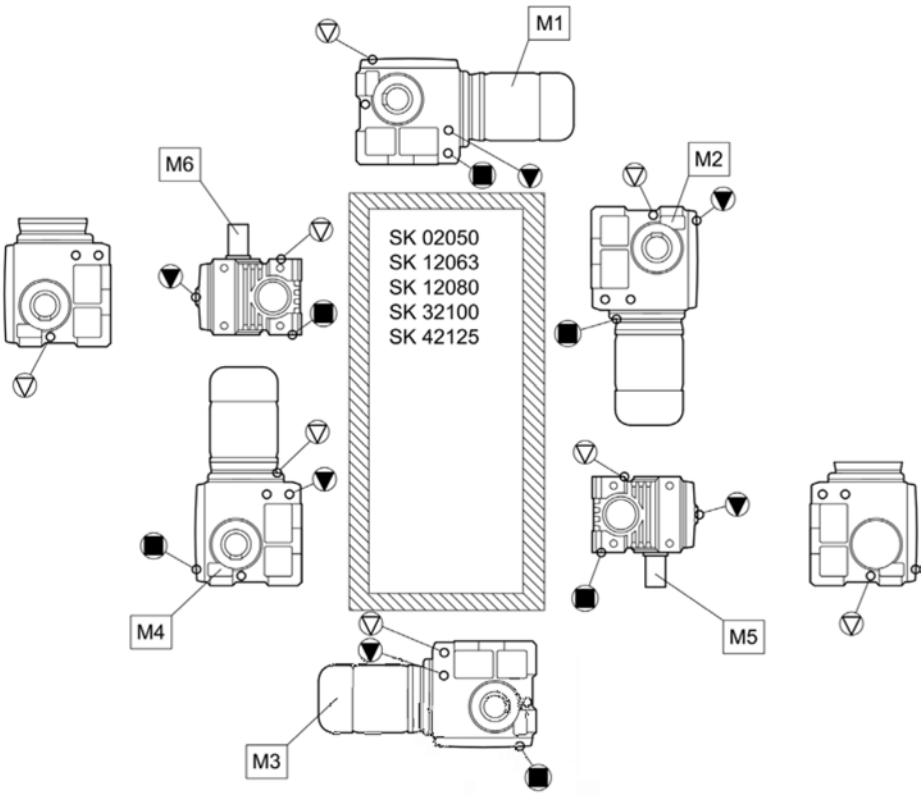

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SK 9053.1
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M5
M3

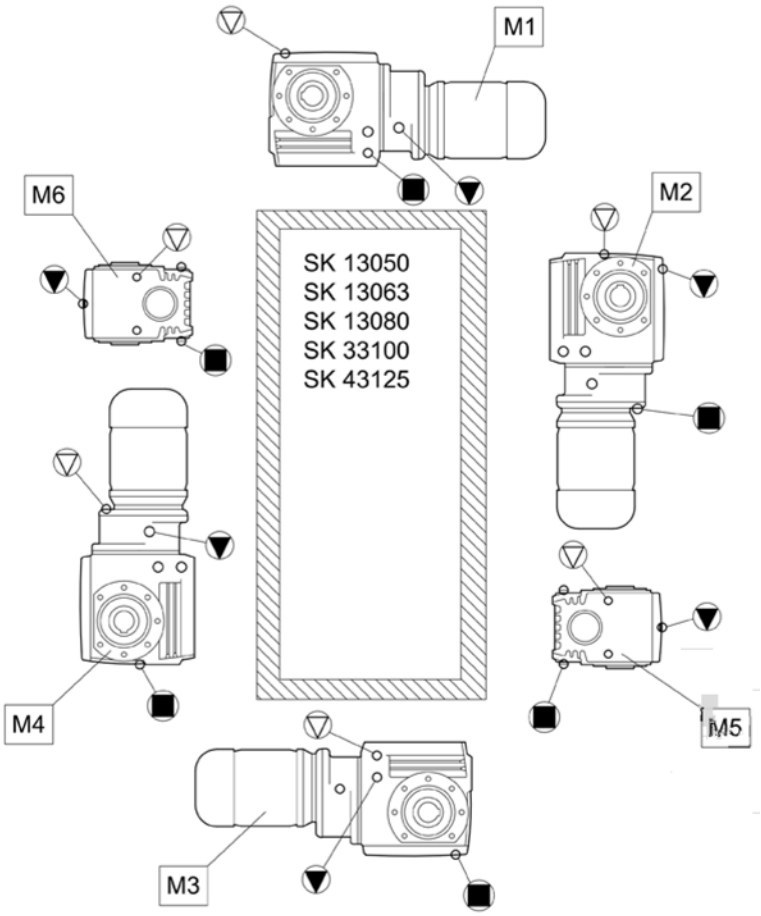

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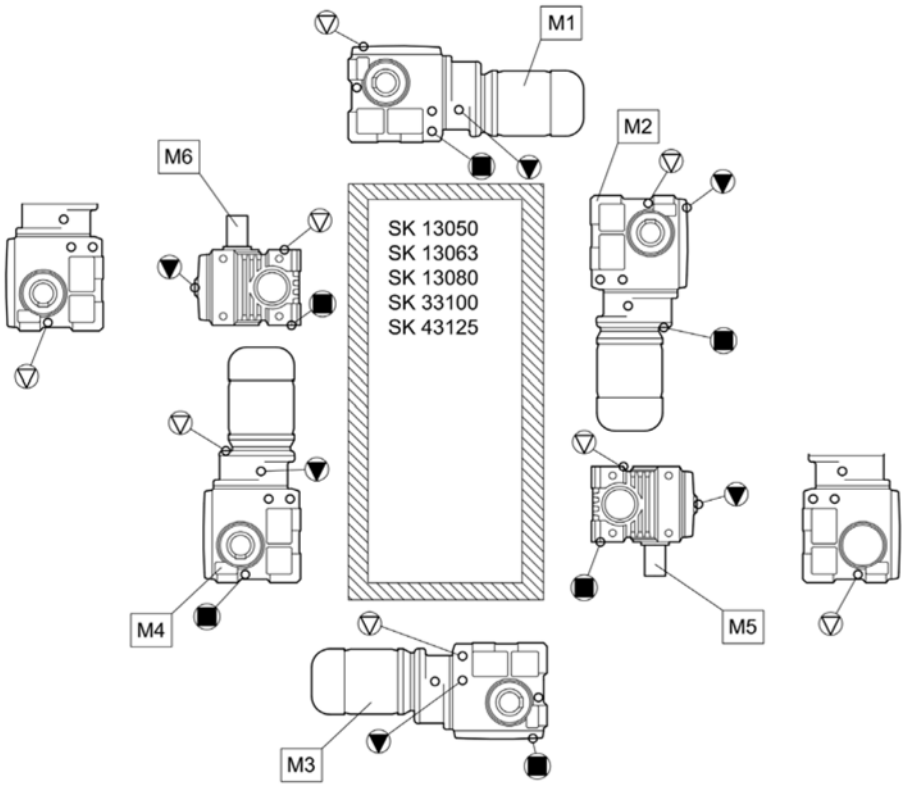

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SK 02040
M4
M5
M3


M1
M6
M2
SK 02040
M4
M5
M3


M1
M2
M6
SK 02050
SK 12063
SK 12080
SK 32100
SK 42125
M4
M5
M3


M1
M6
M2
SK 02050
SK 12063
SK 12080
SK 32100
SK 42125
M4
M5
M3


M1
M6
M2
SK 13050
SK 13063
SK 13080
SK 33100
SK 43125
M4
M5
M3


M1
M6
M2
SK 13050
SK 13063
SK 13080
SK 33100
SK 43125
M4
M5
M3

7.2 Lubricants

With the exception of types SK 11382.1, SK 12382 and SK 9096.1, the gear units are filled with lubricant for the required mounting position and are ready for operation as delivered. The initial filling corresponds to a lubricant from the column for the ambient temperatures (standard version) in the lubricant table.

7.2.1 Roller bearing greases

This table contains comparable roller bearing greases from various manufacturers. The manufacturer can be changed within a grease type. When changing the grease type or the ambient temperature range, please consult Getriebebau NORD. Otherwise no guarantee can be accepted for the function of the gear units.

Lubricant type	**Ambient temperature**	Castrol	FUCHS	KLÜBER LUBRICATION	Mobil	Shell
Grease mineral oil-based	-30 … 60 °C	Tribol GR 100-2 PD	Renolit GP 2	-	Mobilux EP 2	Gadus S2 V100 2
			Renolit LZR 2 H			
	-50 … 40 °C	Optitemp LG 2	Renolit WTF 2	-	-	-
Synthetic grease	-25 … 80 °C	Tribol GR 4747/220-2 HAT	Renolit HLT 2	PETAMO GHY 133 N	Mobiltemp SHC 32	
			Renolit LST 2	Klüberplex BEM 41-132		
Bio-degradable grease	-25 … 40 °C	-	Plantogel 2 S	Klüberbio M 72-82	Mobil SHC Grease 102 EAL	Naturelle Grease EP2

Table 13: Roller bearing greases

7.2.2 Gear oils

DANGER

Explosion hazard due to unsuitable oil

Use of the gear oil type which is stated on the name plate is essential.

This table shows comparable lubricants from various manufacturers. The oil manufacturer can be changed within a viscosity and lubricant type. Only change the lubricant type or the viscosity after consultation with Getriebebau NORD.

Mixing different oil types is not permissible. When changing gear oil, different oils of one oil type with the same viscosity may be mixed in a maximum ratio of 1/20 (5 %).

Prior to the change of oils of different oil types, the gear unit must be thoroughly flushed with the new oil type. It is recommended to use the new product with a lower viscosity for flushing. This is especially valid when switching from a mineral oil (CLP) or synthetic oil CLP HC to to a synthetic oil CLP PG and vice versa.

Lubricant type	Details on name plate	Castrol	FUCHS	KLÜBER LUBRICATION	Mobil		TOTAL
Mineral oil	CLP 220	Alpha EP 220 Alpha SP 220 Optigear BM 220 Optigear 1100/220	Renolin CLP 220 Renolin CLP 220 Plus Renolin Gear 220 VCI	Klüberoil GEM 1-220 N	Mobilgear 600 XP 220	Omala S2 G 220	Carter EP 220 Carter XEP 220
	CLP 100	Alpha EP 100 Alpha SP 100 Optigear BM 100 Optigear 1100/100	Renolin CLP 100 Renolin CLP 100 Plus	Klüberoil GEM 1-100 N	Mobilgear 600 XP 100	Omala S2 G 100	Carter EP 100
Synthetic oil (Polyglycol)	CLP PG 680	Alphasyn GS 680 Optigear Synthetic 800/680	Renolin PG 680	Klübersynth GH 6-680	Mobil Glygoyle 680	Omala S4 WE 680	Carter SY 680 Carter SG 680
	CLP PG 220	Alphasyn GS 220 Alphasyn PG 220 Optigear Synthetic 800/220	Renolin PG 220	Klübersynth GH 6-220	Mobil Glygoyle 220	Omala S4 WE 220	-
Synthetic oil (hydrocarbon)	CLP HC 220	Alphasyn EP 220	Renolin Unisyn CLP 220 Renolin Unisyn Gear 220 VCI	Klübersynth GEM 4-220 N	Mobil SHC 630	Omala S4 GX 220	Carter SH 220
Bio-degradable oil	CLP E 680	-	Plantogear 680 S	-	-	-	-
	CLP E 220	Performance Bio GE 220 ESS	Plantogear 220 S	Klübersynth GEM 2-220	-	Naturelle Gear Fluid EP 220	-
Food-compatible oil according to FDA 178.3570	CLP PG H1 680	Optileb GT 1800/680	Cassida Fluid WG 680	Klübersynth UH1 6-680	Mobil Glygoyle 680	-	-
	CLP PG H1 220	Optileb GT 1800/220	Cassida Fluid WG 220	Klübersynth UH1 6-220	Mobil Glygoyle 220	-	Nevastane SY 220
	CLP HC H1 680	Optileb GT 680	Cassida Fluid GL 680	Klüberoil 4 UH1-680 N	-	-	-
	CLP HC H1 220	Optileb GT 220	Cassida Fluid GL 220	Klüberoil 4 UH1-220 N	Mobil SHC Cibus 220	-	Nevastane XSH 220

Table 14: Gear oils

7.3 Screw tightening torques

Screw tightening torques [Nm]							
Dimensions	Screw fastenings in strength classes				Cap screws	Threaded pin on coupling	Screw fastenings on covers
	8.8	10.9	12.9	V2A-70 V4A-70			
M4	3.2	5	6	2.8	-	-	-
M5	6.4	9	11	5.8	-	2	-
M6	11	16	19	10	-	-	6.4
M8	27	39	46	24	11	10	11
M10	53	78	91	48	11	17	27
M12	92	135	155	83	27	40	53
M16	230	335	390	207	35	-	92
M20	460	660	770	414	-	-	230
M24	790	1150	1300	711	80	-	460
M30	1600	2250	2650	1400	170	-	-
M36	2780	3910	4710	2500	-	-	1600
M42	4470	6290	7540	4025	-	-	-
M48	6140	8640	16610	5525	-	-	-
M56	9840	13850	24130	8860	-	-	-
G½	-	-	-	-	75	-	-
G¾	-	-	-	-	110	-	-
G1	-	-	-	-	190	-	-
G1¼	-	-	-	-	240	-	-
G1½	-	-	-	-	300	-	-

Table 15: Screw tightening torques

Installing hose unions

Oil the thread of the union nut, the cutting ring and the thread of the connecting piece. Tighten the union nut with a spanner until the union nut becomes more difficult to turn. Turn the union nut further by approx. 30° to 60° but only to a maximum of 90° while holding the connecting piece with a spanner. Remove excess oil from the union.

7.4 Troubleshooting

DANGER

Explosion hazard

- Shut down the gear unit immediately in case of malfunction.

Gear unit malfunctions		
Error	**Possible cause**	**Remedy**
Unusual running noises, vibrations	Oil too low or bearing damage or gear wheel damage	Consult NORD Service department
Oil escaping from gear unit or motor	Defective seal	Consult NORD Service department
Oil escaping from pressure vent	Incorrect oil level	Use oil expansion chamber (Option OA)
	Incorrect, dirty oil	Oil change
	Unfavourable operating conditions	Consult NORD Service department
Gear unit becomes too hot	Unfavourable installation conditions or gear unit damage	Consult NORD Service department
Shock when switching on, vibrations	Motor coupling defective	Replace elastomer ring
	Gear unit fastening loose	Tighten motor and gear unit fastening screws
	Defective rubber element	Replace rubber element
Output shaft does not rotate although motor is running	Breakage in gear unit	Consult NORD Service department
	Motor coupling defective	
	Shrink disc slip	

Table 16: Overview of malfunctions

7.5 Leakage and leak-tightness

Gear units are filled with oil or grease to lubricate the moving parts. Seals prevent the escape of lubricants. A complete seal is technically not possible, as a certain film of moisture, for example on the radial shaft sealing rings is normal and advantageous for a long-term seal. In the region of vents, moisture due to oil may be visible due to the escape of oil mist because of the function. In the case of grease-lubricated labyrinth seals, e.g. Taconite sealing systems, used grease emerges from the sealing gap due to the principle of operation. This apparent leak is not a fault.

According to the test conditions as per DIN 3761, the leak is determined by the medium which is to be sealed, which in test bench tests exceeds the function-related moisture in a defined test period and which results in dripping of the medium which is to be sealed. The measured quantity which is then collected is designated as leakage.

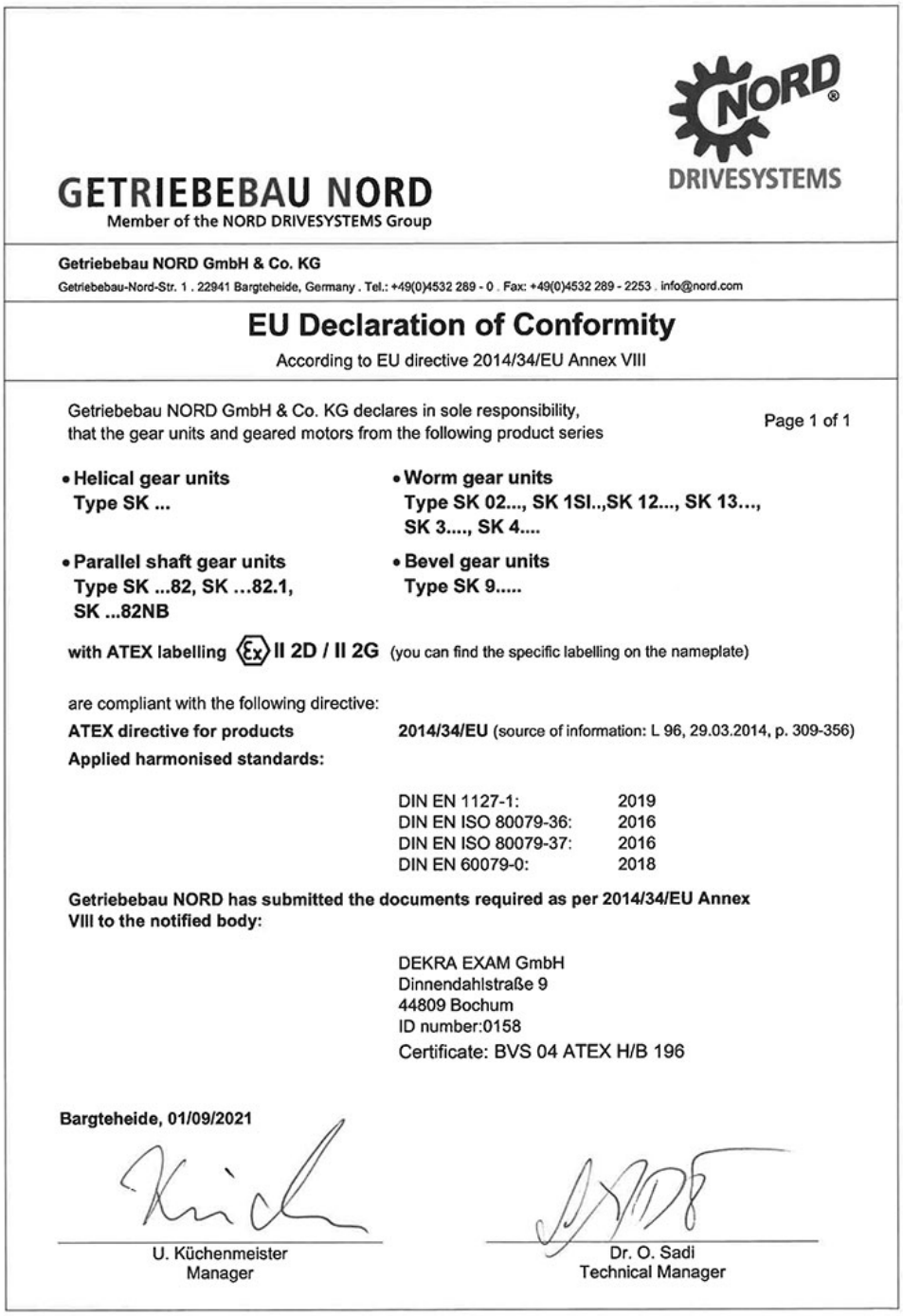
Definition of leakage according to DIN 3761 and its appropriate use					
		Location of leak			
Term	**Explanation**	**Radial shaft seal**	**In IEC adapter**	**Housing joint**	**Venting**
Sealed	No moisture apparent	No reason for complaint	No reason for complaint	No reason for complaint	No reason for complaint
Damp	Moisture film locally restricted (not an area)	No reason for complaint	No reason for complaint	No reason for complaint	No reason for complaint
Wet	Moisture film beyond the extent of the component	No reason for complaint	No reason for complaint	Repair if necessary	No reason for complaint
Measurable leakage	Recognisable stream, dripping	Repair recommended	Repair recommended	Repair recommended	Repair recommended
Temporary leakage	Temporary malfunction of the sealing system or oil leak due to transport *)	No reason for complaint	No reason for complaint	Repair if necessary	No reason for complaint
Apparent leakage	Apparent leakage, e.g. due to soiling, sealing systems which can be re-lubricated	No reason for complaint	No reason for complaint	No reason for complaint	No reason for complaint

Table 17: Definition of leaks according to DIN 3761

*) Previous experience has shown that moist or wet radial shaft sealing rings stop leaking later. Therefore, under no circumstances can replacement be recommended at this stage. The reason for momentary moisture may be e.g. small particles under the sealing lip.

7.6 Declaration of Conformity

7.6.1 Explosion protected gear units and geared motors, Category 2G and 2D



GETRIEBEBAU NORD
Member of the NORD DRIVESYSTEMS Group

DRIVESYSTEMS

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Getriebebau-Nord-Str. 1 . 22941 Bargteheide, Germany . Tel.: +49(0)4532 289 - 0 . Fax: +49(0)4532 289 - 2253 . info@nord.com

EU Declaration of Conformity

According to EU directive 2014/34/EU Annex VIII

Getriebebau NORD GmbH & Co. KG declares in sole responsibility, that the gear units and geared motors from the following product series

Page 1 of 1

- **Helical gear units Type SK ...**
- **Worm gear units Type SK 02..., SK 1SI..,SK 12..., SK 13..., SK 3...., SK 4....**
- **Parallel shaft gear units Type SK ...82, SK ...82.1, SK ...82NB**
- **Bevel gear units Type SK 9.....**

with ATEX labelling Ⓔx **II 2D / II 2G** (you can find the specific labelling on the nameplate)

are compliant with the following directive:

ATEX directive for products **2014/34/EU** (source of information: L 96, 29.03.2014, p. 309-356)

Applied harmonised standards:

DIN EN 1127-1:	2019
DIN EN ISO 80079-36:	2016
DIN EN ISO 80079-37:	2016
DIN EN 60079-0:	2018

Getriebebau NORD has submitted the documents required as per 2014/34/EU Annex VIII to the notified body:

DEKRA EXAM GmbH
Dinnendahlstraße 9
44809 Bochum
ID number:0158
Certificate: BVS 04 ATEX H/B 196

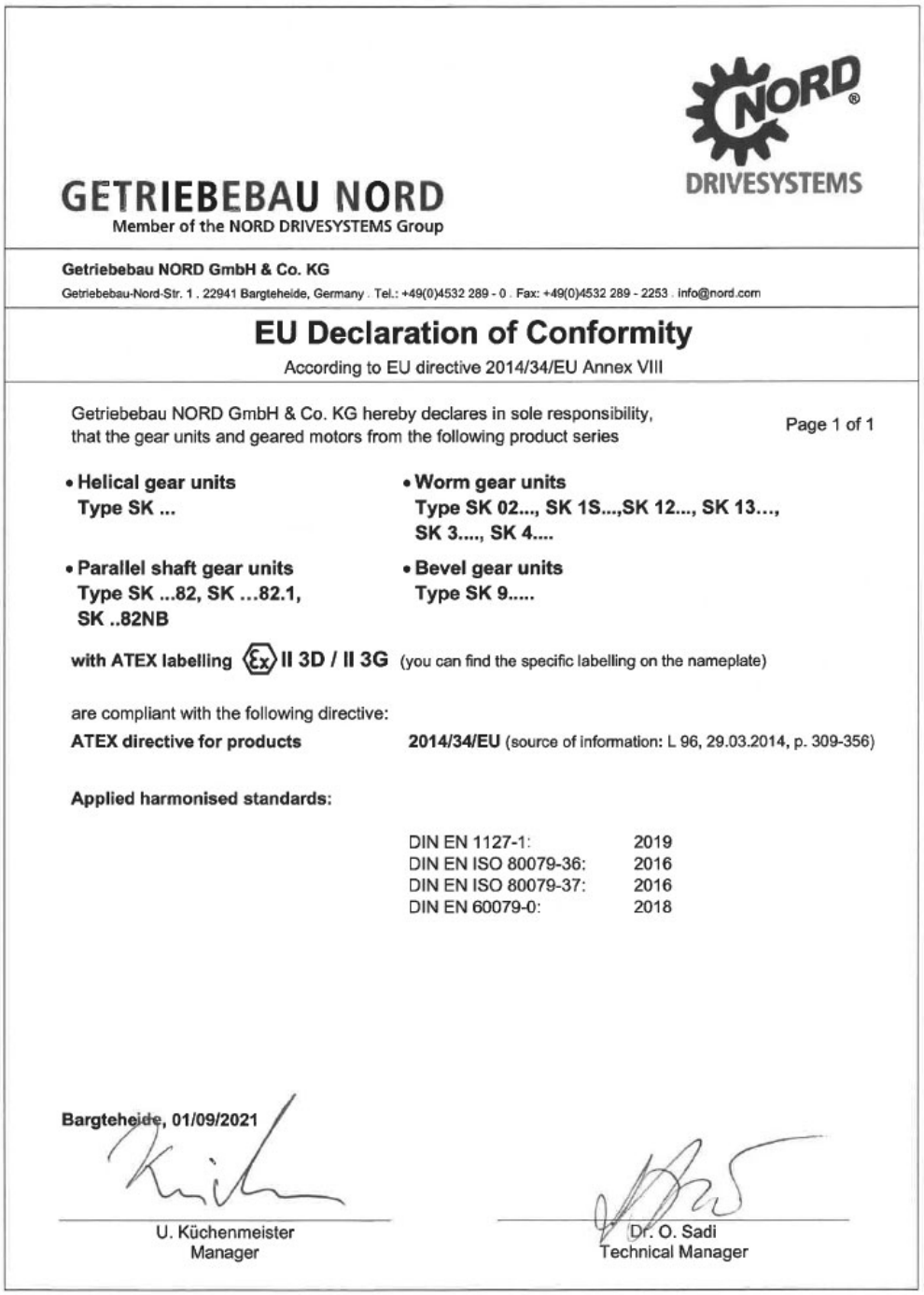
Bargteheide, 01/09/2021

U. Küchenmeister
Manager

Dr. O. Sadi
Technical Manager

Figure 39: Declaration of Conformity for Category 2G / 2D, labelling according to DIN EN ISO 80079-36

7.6.2 Explosion protected gear units and geared motors, Category 3G and 3D



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DRIVESYSTEMS

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EU Declaration of Conformity

According to EU directive 2014/34/EU Annex VIII

Getriebebau NORD GmbH & Co. KG hereby declares in sole responsibility, that the gear units and geared motors from the following product series

Page 1 of 1

- **Helical gear units**
  Type SK ...
- **Worm gear units**
  Type SK 02..., SK 1S...,SK 12..., SK 13..., SK 3...., SK 4....
- **Parallel shaft gear units**
  Type SK ...82, SK ...82.1, SK ..82NB
- **Bevel gear units**
  Type SK 9.....

with ATEX labelling Ex **II 3D / II 3G** (you can find the specific labelling on the nameplate)

are compliant with the following directive:

ATEX directive for products **2014/34/EU** (source of information: L 96, 29.03.2014, p. 309-356)

Applied harmonised standards:

DIN EN 1127-1:	2019
DIN EN ISO 80079-36:	2016
DIN EN ISO 80079-37:	2016
DIN EN 60079-0:	2018

Bargteheide, 01/09/2021

U. Küchenmeister
Manager

Dr. O. Sadi
Technical Manager

Figure 40: Declaration of Conformity for Category 3G / 3D, labelling according to DIN EN ISO 80079-36

7.6.3 UKCA - Explosion protected gear units and geared motors, Category 2G and 2D

GETRIEBEBAU NORD
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Getriebebau NORD GmbH & Co. KG
Getriebebau-Nord-Str. 1 , 22941 Bargteheide, Germany . Tel.: +49(0)4532 289 - 0 . Fax: +49(0)4532 289 - 2253 . info@nord.com

UK Declaration of Conformity

According to UK Statutory Instruments listed below

Getriebebau NORD GmbH & Co. KG declares in sole responsibility, that the gear units and geared motors from the following product series

- **Helical gear units Type SK ...**
- **Worm gear units Type SK 02..., SK 1SI..,SK 12..., SK 13..., SK 3...., SK 4....**
- **Parallel shaft gear units Type SK ...82, SK ...82.1, SK ...82NB**
- **Bevel gear units Type SK 9.....**

with labelling Ⓔx **II 2D / II 2G** (you can find the specific labelling on the nameplate)

comply with the following, as amended, UK Statutory Instruments:

Title	Years and Numbers
Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016	2016 No. 1107

Applied standards:

BS EN 1127-1:	2019
BS EN ISO 80079-36:	2016
BS EN ISO 80079-37:	2016
BS EN 60079-0:	2018

Getriebebau NORD has submitted the documents required as per 2016 No. 1107 to the notified body:

DEKRA Certification UK Ltd
Body number: 8505

Bargteheide, 26/10/2022

U. Küchenmeister
Manager

Dr. O. Sadi
Technical Manager

7.6.4 UKCA - Explosion protected gear units and geared motors, Category 3G and 3D

GETRIEBEBAU NORD
Member of the NORD DRIVESYSTEMS Group

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UK Declaration of Conformity

According to UK Statutory Instruments listed below

Getriebebau NORD GmbH & Co. KG declares in sole responsibility, that the gear units and geared motors from the following product series

- **Helical gear units**
  Type SK ...
- **Worm gear units**
  Type SK 02..., SK 1S...,SK 12..., SK 13..., SK 3...., SK 4....
- **Parallel shaft gear units**
  Type SK ...82, SK ...82.1, SK ..82NB
- **Bevel gear units**
  Type SK 9.....

with ATEX labelling Ⓔx **II 3D / II 3G** (you can find the specific labelling on the nameplate)

comply with the following, as amended, UK Statutory Instruments:

Title	Years and Numbers
Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016	**2016 No. 1107**

Applied standards:

BS EN 1127-1:	2019
BS EN ISO 80079-36:	2016
BS EN ISO 80079-37:	2016
BS EN 60079-0:	2018

Bargteheide, 26/10/2022

U. Küchenmeister
Manager

Dr. O. Sadi
Technical Manager

7.7 Repair information

For enquiries to our technical and mechanical service department, please have the exact gear unit type and, if applicable, the order number to hand. You can find this information on the name plate.

7.7.1 Repairs

In case of repair, remove all non-original parts from the gear unit or geared motor. No guarantee can be given for any attached parts, such as rotary encoders or external fans.

Send the device to the following address:

Getriebebau NORD GmbH & Co. KG
Serviceabteilung
Getriebebau-Nord-Straße 1
22941 Bargteheide

Information

If possible, state the reason for returning the component/device. Specify a contact person for queries.

This is important in order to keep repair times as short as possible.

7.7.2 Internet information

In addition, you will find the manuals in the available languages on our website: www.nord.com.

7.8 Warranty

NORD GmbH & Co. KG accepts no liability for damage to persons, materials or assets as a result of failure to observe this operating manual, operating errors or incorrect use. General wearing parts, e.g. radial seals are excluded from the warranty.

7.9 Abbreviations

2D	Dust explosion protected gear units, Zone 21
2G	Gas explosion protected gear units, Zone 1
3D	Dust explosion protected gear units, Zone 22
ATEX:	**AT**mosphrères **EX**plosible
B5	Flange fastening with through holes
B14	Flange fastening with threaded holes
CLP	Mineral oil
CLP HC	Synthetic polyalphaolefin oil
CLP PG	Synthetic polyglycol oil
cSt	Centistokes
CW	Clockwise, right rotation
CCW	Counter-clockwise, left rotation
°dH	Water hardness in German hardness degrees 1 dH = 0.1783 mmol/l
DIN	Deutsches Institut für Normung [*German Standards Institute*]
E	Ester oil
EC	European Community
EN	European standard
F_R	Radial force
F_A	Axial force
H1	Lubricant for the food industry
IE1	Standard efficiency motors
IE2	High efficiency motors
IEC	International Electrotechnical Commission
NEMA	National Electrical Manufacturers Association
IP55	International Protection
ISO	International standardisation organisation
pH	pH value
PPE	Personal Protective Equipment
DIR	Directive
VCI	Volatile Corrosion Inhibitor
VG	Viscosity group
WN	Document from Getriebebau NORD

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3. Motor

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INSTALLATION, OPERATION AND MAINTENANCE MANUAL OF ELECTRIC MOTORS

This manual provides information about WEG induction motors fitted with squirrel cage, permanent magnet or hybrid rotors, low, medium and high voltage, in frame sizes IEC 56 to 630 and NEMA 42 to 9606/10.
The motor lines indicated below have additional information that can be checked in their respective manuals:

- Smoke Extraction Motors;
- Electromagnetic Brake Motors;
- Hazardous Area Motors.

These motors meet the following standards, if applicable:

- NBR 17094-1: Máquinas Elétricas Girantes - Motores de Indução - Parte 1: trifásicos.
- NBR 17094-2: Máquinas Elétricas Girantes - Motores de Indução - Parte 2: monofásicos.
- IEC 60034-1: Rotating Electrical Machines - Part 1: Rating and Performance.
- NEMA MG 1: Motors and Generators.
- CSA C 22.2 N°100: Motors and Generators.
- UL 1004-1: Rotating Electrical Machines - General Requirements.

If you have any questions regarding this manual please contact your local WEG branch, contact details can be found at www.weg.net.

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1. TERMINOLOGY

Balancing: the procedure by which the mass distribution of a rotor is checked and, if necessary, adjusted to ensure that the residual unbalance or the vibration of the journals and/or forces on the bearings at a frequency corresponding to service speed are within specified limits in International Standards.
[ISO 1925:2001, definition 4.1]
Balance quality grade: indicates the peak velocity amplitude of vibration, given in mm/s, of a rotor running free-in-space and it is the product of a specific unbalance and the angular velocity of the rotor at maximum operating speed.
Grounded Part: metallic part connected to the grounding system.
Live Part: conductor or conductive part intended to be energized in normal operation, including a neutral conductor.
Authorized personnel: employee who has formal approval of the company.
Qualified personnel: employee who meets the following conditions simultaneously:
- Receives training under the guidance and responsibility of a qualified and authorized professional;
- Works under the responsibility of a qualified and approved professional.

Qualified personnel: employee previously qualified and registered with the competent class council.
Qualified personnel: employee who proves completion of a specific course in the electrical area by the official education system.

Note*: The qualification is only valid for the company that trained the employee in the conditions set out by the authorized and qualified professional responsible for training.*

2. INITIAL RECOMMENDATIONS

Electric motors have energized circuits, exposed rotating parts and hot surfaces that may cause serious injury to people during normal operation. Therefore, it is recommended that transportation, storage, installation, operation and maintenance services are always performed by qualified personnel.
Also the applicable procedures and relevant standards of the country where the machine will be installed must be considered.
Noncompliance with the recommended procedures in this manual and other references on the WEG website may cause severe personal injuries and/or substantial property damage and may void the product warranty.

For practical reasons, it is not possible to include in this Manual detailed information that covers all construction variables nor covering all possible assembly, operation or maintenance alternatives.
This Manual contains only the required information that allows qualified and trained personnel to carry out their services. The product images are shown for illustrative purpose only.
For special applications and operating conditions(50026367 manual for Smoke Extraction Motors, 50021973 manual for Brake Motors, 50078700 manual for Electronically Conmutated Motors, 14629920 manual for Roller Table motors, 50106963 manual for WEG Lift Gearless motors) refer to the applicable manual on the website www.weg.net or contact WEG.
For motors supplied with WEG Motor Scan sensor, see installation guidelines Overview of Receipt to Operation Manual (10008475131) available on www.weg.net.

For information about permissible radial and axial shaft loads, please check the product technical catalogue.

The user is responsible for the correct definition of the installation environment and application characteristics.

During the warranty period, all repair, overhaul and reclamation services must be carried out by WEG authorized Service Centers to maintain validity of the warranty.

2.1 WARNING SYMBOL

Warning about safety and warranty.

2.2 RECEIVING INSPECTION

All motors are tested during the manufacturing process.
The motor must be checked when received for any damage that may have occurred during the transportation. All damages must be reported in writing to the transportation company, to the insurance company and to WEG. Failure to comply with such procedures will void the product warranty.
You must inspect the product:

- Check if nameplate data complies with the purchase order;
- Remove the shaft locking device (if any) and rotate the shaft by hand to ensure that it rotates freely. The shaft might not rotate freely in WMagnet and WQuattro motors, due to alignment torque from the magnets. It might be necessary to use a lever;

When rotating the shaft, it is necessary to certify that the terminals are insulated to eliminate the risc of electric shock from induced voltage.

- Check that the motor has not been exposed to excessive dust and moisture during the transportation.

Do not remove the protective grease from the shaft, or the plugs from the cable entries. These protections must remain in place until the installation has been completed.

2.3 NAMEPLATES

The nameplate contains information that describes the construction characteristics and the performance of the motor. Figure 1, Figure 2 and Figure 3 show nameplate layout examples.



Figure 1 - IEC motor nameplate

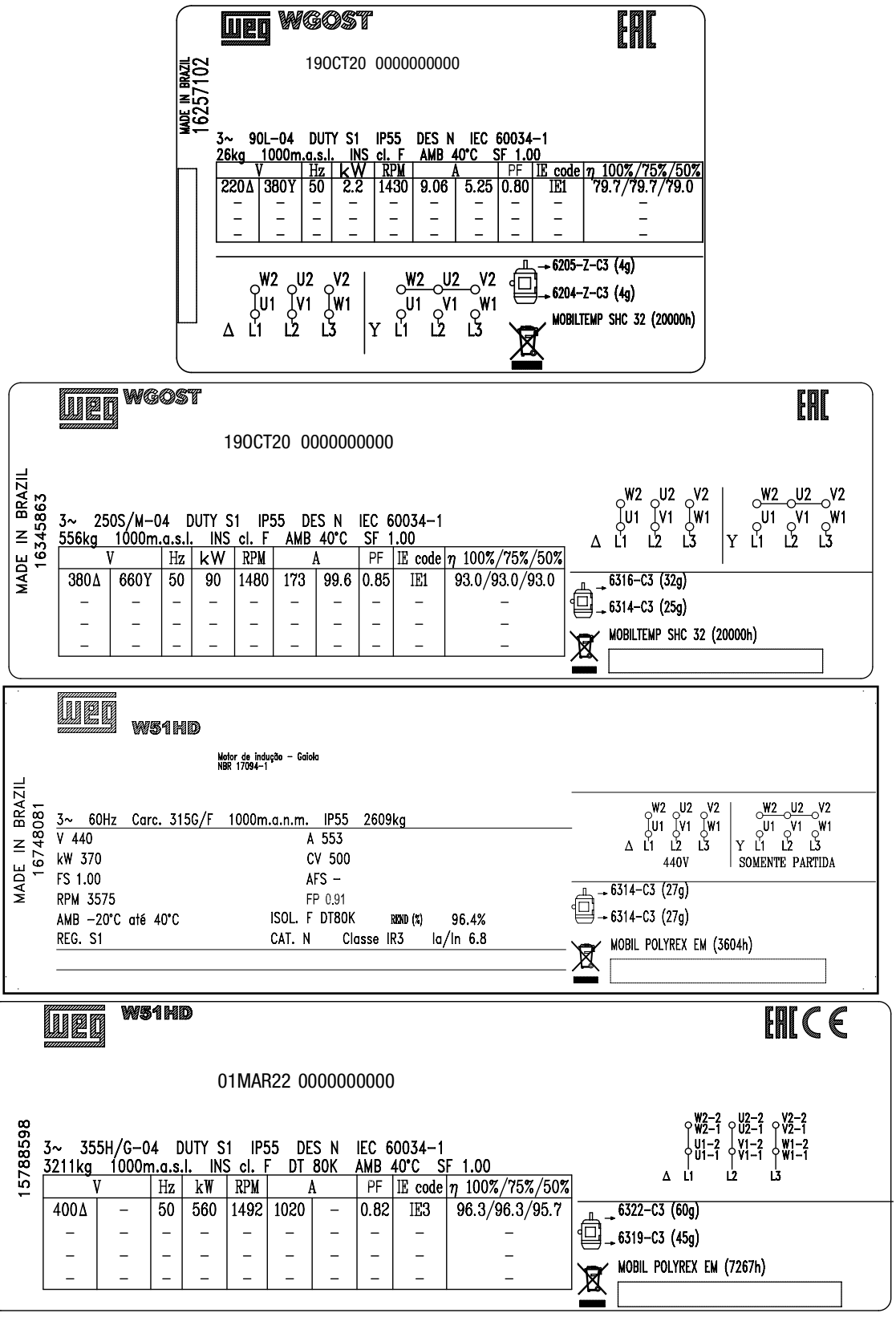
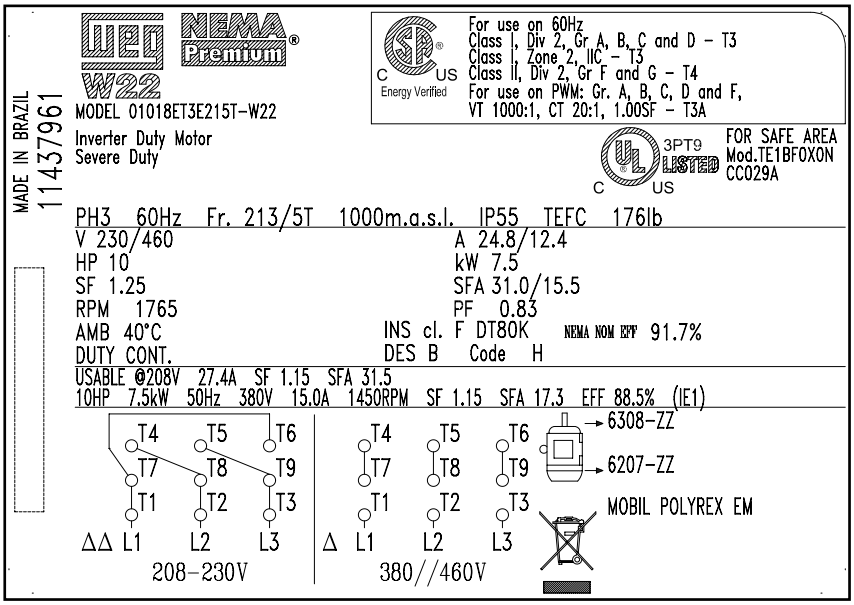
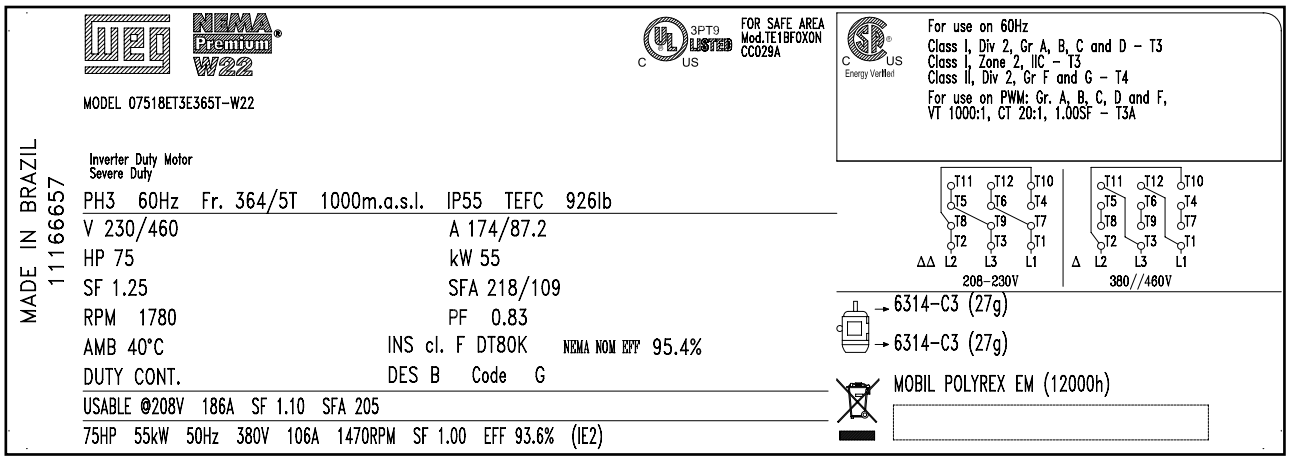


Figure 2 - IEC motor nameplate





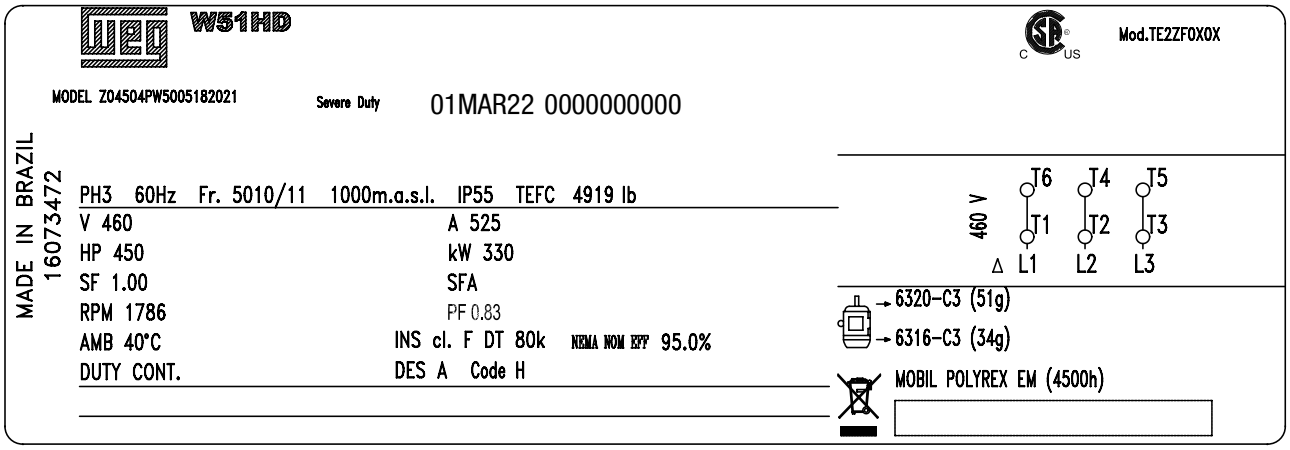


Figure 3 - NEMA motor nameplate

3. SAFETY INSTRUCTIONS

The motor must be disconnected from the power supply and be completely stopped before conducting any installation or maintenance procedures. Additional measures should be taken to avoid accidental motor starting.

Professionals working with electrical installations, either in the assembly, operation or maintenance, should use proper tools and be instructed on the application of standards and safety requirements, including the use of Personal Protective Equipment (PPE) that must be carefully observed in order to reduce risk of personal injury during these services.

Electric motors have energized circuits, exposed rotating parts and hot surfaces that may cause serious injury to people during normal operation. It is recommended that transportation, storage, installation, operation and maintenance services are always performed by qualified personnel.

Pacemaker users and unqualified personnel shall not open WMagnet and WQuattro motors, because high energy magnets are used.

Always follow the safety, installation, maintenance and inspection instructions in accordance with the applicable standards in each country.

4. HANDLING AND TRANSPORT

Individually packaged motors should never be lifted by the shaft or by the packaging. They must be lifted only by means of the eyebolts, when supplied. Use always suitable lifting devices to lift the motor. Eyebolts on the frame are designed for lifting the machine weight only as indicated on the motor nameplate. Motors supplied on pallets must be lifted by the pallet base with lifting devices fully supporting the motor weight. The package should never be dropped. Handle it carefully to avoid bearing damage.

Eyebolts provided on the frame are designed for lifting the machine only. Do not use these eyebolts for lifting the motor with coupled equipment such as bases, pulleys, pumps, reducers, etc..

Never use damaged, bent or cracked eyebolts. Always check the eyebolt condition before lifting the motor.

Eyebolts mounted on components, such as on end shields, forced ventilation kits, etc. must be used for lifting these components only. Do not use them for lifting the complete machine set.

Handle the motor carefully without sudden impacts to avoid bearing damage and prevent excessive mechanical stresses on the eyebolts resulting in its rupture.

Do not handle the motors by the polymeric components: fan cover, drip cover, terminal box and / or terminal box cover.

To move or transport motors with cylindrical roller bearings or angular contact ball bearings, use always the shaft locking device provided with the motor.
All HGF, W50, W51 HD and W60 motors, regardless of bearing type, must be transported with shaft locking device fitted.
Vertical mounted motors with oil-lubricated bearings must be transported in the vertical position. If necessary to move or transport the motor in the horizontal position, install the shaft locking device on both sides (drive end and non-drive end) of the motor.

4.1 LIFTING

Before lifting the motor ensure that all eyebolts are tightened properly and the eyebolt shoulders are in contact with the base to be lifted, as shown in Figure 4. Figure 5 shows an incorrect tightening of the eyebolt.
Ensure that lifting machine has the required lifting capacity for the weight indicated on the motor nameplate.



Figure 4 - Correct tightening of the eyebolt



Figure 5 - Incorrect tightening of the eyebolt

The center-of-gravity may change depending on motor design and accessories. During the lifting procedures the maximum allowed angle of inclination should never be exceeded as specified below.

4.1.1 Horizontal motors with one eyebolt

For horizontal motors fitted with only one eyebolt, the maximum allowed angle-of-inclination during the lifting process should not exceed 30° in relation to the vertical axis, as shown in Figure 6.



Figure 6 - Maximum allowed angle-of-inclination for motor with one eyebolt

4.1.2 Horizontal motor with two eyebolts

When motors are fitted with two or more eyebolts, all supplied eyebolts must be used simultaneously for the lifting procedure.
There are two possible eyebolt arrangements (vertical and inclined), as shown below:

- For motors with vertical lifting eyebolts, as shown in Figure 7, the maximum allowed lifting angle should not exceed 45° in relation to the vertical axis. We recommend to use a spreader beam for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface;



Figure 7 - Maximum resulting angle for motors with two or more lifting eyebolts

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- For HGF, W40, W50 and W51 HD motors, as shown in Figure 8, the maximum resulting angle should not exceed 30° in relation to the vertical axis;



Figure 8 - Maximum resulting angle for horizontal HGF, W40, W50 and W51 HD motors

For W60 motors, as shown in Figure 9, the use of a spreader beam is required for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface.



Figure 9 - Lifting for W60 motors with paralel chains

- For motors fitted with inclined eyebolts, as shown in Figure 10, the use of a spreader beam is required for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface.



Figure 10 - Use of a spreader beam for lifting

4.1.3 Vertical motors

For vertical mounted motors, as shown in Figure 11, the use of a spreader beam is required for maintaining the lifting element (chain or rope) in vertical position and thus preventing damage to the motor surface.



Figure 11 - Lifting of vertical mounted motors

Always use the eyebolts mounted on the top side of the motor, diametrically opposite, considering the mounting position. See Figure 12.



Figure 12 - Lifting of HGF, W50 and W51 HD motors.

4.1.3.1 Procedures to place W22/WEG General Purpose/WIN motors in the vertical position

For safety reasons during the transport, vertical mounted Motors are usually packed and supplied in horizontal position.
To place W22/WEG General Purpose/WIN motors fitted with eyebolts (see Figure 10), to the vertical position, proceed as follows:

1. Ensure that the eyebolts are tightened properly, as shown in Figure 4;
2. Remove the motor from the packaging, using the top mounted eyebolts, as shown in Figure 13;



Figure 13 - Removing the motor from the packaging

3. Install a second pair of eyebolts, as shown in Figure 14;



Figure 14 - Installation of the second pair of eyebolts

4. Reduce the load on the first pair of eyebolts to start the motor rotation, as shown in Figure 15. This procedure must be carried out slowly and carefully.



Figure 15 - End result: motor placed in vertical position

These procedures will help you to move motors designed for vertical mounting. These procedures are also used to place the motor from the horizontal position into the vertical position and vertical to horizontal.

For motors of IEC 112 to 200 frame (and equivalent NEMA), WEG has a kit of devices to facilitate the motor tipping to the vertical, with the point up or down (as shown in Figure 16 and Figure 17).



Figure 16 - Eyebolt to place the motor in vertical position, with the shaft end up (V6/V36)



Figure 17 - Eyebolts with extension fixed at NDE side to place the motor in vertical position, with the shaft end down (V5/V35)

4.1.3.2 Procedures to place HGF, W50 and W51 HD motors in the vertical position

HGF motors are fitted with eight lifting points: four at drive end and four at non-drive end. W50 and W51 HD motors are fitted with nine lifting points: four at drive end, one in the central part and four at non-drive end. The motors are usually transported in horizontal position, however for the installation they must be placed in the vertical position.

To place an these motors in the vertical position, proceed as follows:

1. Lift the motor by using the four lateral eyebolts and two hoists, see Figure 18;



Figure 18 - Lifting of HGF, W50 and W51 HD motors with two hoists

2. Lower the hoist fixed to motor drive end while lifting the hoist fixed to motor non-drive end until the motor reaches its equilibrium, see Figure 19;



Figure 19 - Placing HGF, W50 and W51 HD motors in vertical position

3. Remove the hoist hooks from the drive end eyebolts and rotate the motor 180° to fix the removed hooks into the two eyebolts at the motor non-drive end, see Figure 20;



Figure 20 - Lifting HGF, W50 and W51 HD motors by the eyebolts at the non-drive end

4. Fix the removed hoist hooks in the other two eyebolts at the non-drive end and lift the motor until the vertical position is reached, see Figure 21.



Figure 21 - HGF, W50 and W51 HD motors in the vertical position

These procedures will help you to move motors designed for vertical mounting. These procedures are also used to place the motor from the horizontal position into the vertical position and vertical to horizontal.

4.2 PROCEDURES TO PLACE W22/WEG GENERAL PURPOSE/WIN VERTICAL MOUNT MOTORS IN HORIZONTAL POSITION

To place W22/WEG General Purpose/WIN vertical mount motor in horizontal position, proceed as follows:
1. Ensure that all eyebolts are tightened properly, as shown in Figure 4;

2. Install the first pair of eyebolts and lift the motor as shown in Figure 22;



Figure 22 - Install the first pair of eyebolts

3. Install the second pair of eyebolts, as shown in Figure 23;



Figure 23 - Install the second pair of eyebolts

4. Reduce the load on the first pair of eyebolts for rotating the motor, as shown in Figure 24. This procedure must be carried out slowly and carefully;



Figure 24 - Motor is being rotated to horizontal position

5. Remove the first pair of eyebolts, as shown in Figure 25.



Figure 25 - Final result: motor placed in horizontal position

For IEC 112 to 200 (and NEMA equivalents), WEG has a device kit available to facilitate the procedure of tipping the motor for instalation in a vertical shaft up or shaft down position.

For Easy Maintenance, Wash, Brake motors, motors with forced ventilation, encoder or painting plan 212 or 213, please contact WEG.

5. STORAGE

If the motor is not installed immediately, it must be stored in a dry and clean environment, with relative humidity not exceeding 60%, with an ambient temperature between 5 °C and 40 °C, without sudden temperature changes, free of dust, vibrations, gases or corrosive agents. The motor must be stored in horizontal position, unless specifically designed for vertical operation, without placing objects on it. Do not remove the protection grease from shaft end to prevent rust.

If the motor are fitted with space heaters, they must always be turned on during the storage period or when the installed motor is out of operation. Space heaters will prevent water condensation inside the motor and keep the winding insulation resistance within acceptable levels. Store the motor in such position that the condensed water can be easily drained. If fitted, remove pulleys or couplings from the shaft end (more information are given on item 6).

The space heaters should never be energized when the motor is in operation.

5.1 EXPOSED MACHINED SURFACES

All exposed machined surfaces (like shaft end and flange) are factory-protected with temporary rust inhibitor. A protective film must be reapplied periodically (at least every six months), or when it has been removed and/or damaged.

5.2 STORAGE

The stacking height of the motor packaging during the storage period should not exceed 5 m, always considering the criteria indicated in Table 1:

Packaging type	Frame sizes	Maximum stacking quantity
Cardboard box	IEC 56 to 132 NEMA 143 to 215	Indicated on the top side of the cardboard box
Wood crate	IEC 56 to 315 NEMA 48 to 504/5	06
	IEC 355 NEMA 586/7 and 588/9	03
	W40 / W50 / W60 / W51 HD / HGF IEC 315 to 630 W40 / W50 / W51 HD / HGF NEMA 5000 to 9600	Indicated on the packaging

Table 1 - Maximum recommended stacking height

Notes:
1) Never stack larger packaging onto smaller packaging;
2) Align the packaging correctly (see Figure 26 and Figure 26);

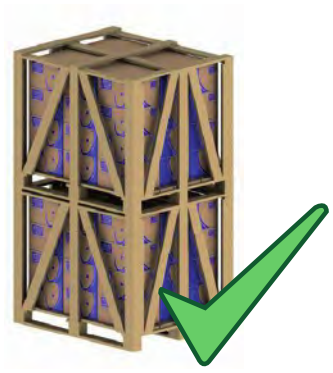


Figure 26 - Correct stacking

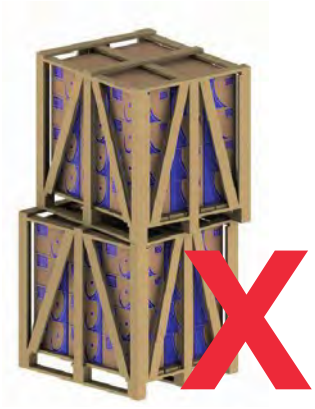


Figure 26 - Incorrect stacking

3) The feet of the crates above should always be supported by suitable wood battens (Figure 27) and never stand on the steel tape or without support (Figure 27);

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Figure 27 - Correct stacking



Figure 27 - Incorrect stacking

4) When stacking smaller crates onto longer crates, always ensure that suitable wooden supports are provided to withstand the weight (see Figure 28). This condition usually occurs with motor packaging above IEC 225S/M (NEMA 364/5T) frame sizes.



Figure 28 - Use of additional battens for stacking

5.3 BEARINGS

5.3.1 Grease lubricated bearings

We recommend rotating the motor shaft at least once a month (by hand, at least five revolutions, stopping the shaft at a different position from the original one). The shaft might not rotate freely in WMagnet and WQuattro motors, due to alignment torque from the magnets. It might be necessary to use a lever.

When rotating the shaft, it is necessary to certify that the terminals are insulated to eliminate the risc of electric shock from induced voltage.

If the motor is fitted with shaft locking device, remove it before rotating the shaft and install it again before performing any handling procedure.

Vertical motors may be stored in the vertical or in horizontal position. If motors with open bearings are stored longer than six months, the bearings must be relubricated according to item 8.2 before commissioning of the motor.

If the motor is stored for longer than 2 years, the bearings must be replaced or removed, washed, inspected and relubricated according to item 8.2.

5.3.2 Oil lubricated bearings

The motor must be stored in its original operating position and with oil in the bearings. Correct oil level must be ensured. It should be in the center of the sight glass.

During the storage period, remove the shaft locking device and rotate the shaft by hand every month, at least five revolutions, thus achieving an even oil distribution inside the bearing and maintaining the bearing in good operating conditions. Reinstall the shaft locking device every time the motor has to be moved.

If the motor is stored for a period equal or longer than the oil change interval, the oil must be replaced according to Item 8.2, before starting the operation. If the motor is stored for a period of over two years, the bearings must be replaced or removed, washed according to manufacturer instructions, checked and relubricated according to Item 8.2. The oil of vertical mounted motors is removed to prevent oils leaks during the transport. After receiving the motor the bearings must be lubricated.

5.3.3 Oil Mist lubricated bearings

The motor must be stored in horizontal position. Lubricate the bearings with ISO VG 68 mineral oil in the amount indicated in the Table 2 (this is also valid for bearings with equivalent dimensions). After filling with oil, rotate the shaft by hand, at least five revolutions)
During the storage period, remove the shaft locking device (if any) and rotate the shaft by hand every week, at least five revolutions, stopping it at a different position from the original one. Reinstall the shaft locking device every time the motor has to be moved. If the motor is stored for a period of over two years, the bearings must be replaced or removed, washed according to manufacturer instructions, checked and relubricated according to item 8.2.

Bearing size	Amount of oil (ml)	Bearing size	Amount of oil (ml)
6201	15	6309	65
6202	15	6311	90
6203	15	6312	105
6204	25	6314	150
6205	25	6315	200
6206	35	6316	250
6207	35	6317	300
6208	40	6319	350
6209	40	6320	400
6211	45	6322	550
6212	50	6324	600
6307	45	6326	650
6308	55	6328	700

Table 2 - Amount of oil per bearing

The oil must always be removed when the motor has to be handled. If the oil mist system is not operating after installation, fill the bearings with oil to prevent bearing rusting. During the storage period, rotate the shaft by hand, at least five revolutions, stopping it at a different position from the original one. Before starting the motor, all bearing protection oil must be drained from the bearing and the oil mist system must be switched ON.

5.3.4 Sleeve bearing

The motor must be stored in its original operating position and with oil in the bearings. Correct oil level must be ensured. It should be in the middle of the sight glass. During the storage period, remove the shaft locking device and rotate the shaft by hand every month, at least five revolutions, and at 30 rpm, thus achieving an even oil distribution inside the bearing and maintaining the bearing in good operating conditions. Reinstall the shaft locking device every time the motor has to be moved.
If the motor is stored for a period equal or longer than the oil change interval, the oil must be replaced, according to Item 8.2, before starting the operation.
If the motor is stored for a period longer than the oil change interval, or if it is not possible to rotate the motor shaft by hand, the oil must be drained and a corrosion protection and dehumidifiers must be applied.

5.4 INSULATION RESISTANCE

We recommend measuring the winding insulation resistance at regular intervals to follow-up and evaluate its electrical operating conditions. If any reduction in the insulation resistance values are recorded, the storage conditions should be evaluated and corrected, where necessary.

5.4.1 Insulation resistance measurement



The insulation resistance must be measured in a safe environment.

The insulation resistance must be measured with a megohmmeter. The machine must be in cold state and disconnected from the power supply.



To prevent the risk of an electrical shock, ground the terminals before and after each measurement. Ground the capacitor (if any) to ensure that it is fully discharged before the measurement is taken.

It is recommended to insulate and test each phase separately. This procedure allows the comparison of the insulation resistance between each phase. During the test of one phase, the other phases must be grounded.
The test of all phases simultaneously evaluates the insulation resistance to ground only but does not evaluate the insulation resistance between the phases.

The power supply cables, switches, capacitors and other external devices connected to the motor may considerably influence the insulation resistance measurement. Thus all external devices must be disconnected and grounded during the insulation resistance measurement.
Measure the insulation resistance one minute after the voltage has been applied to the winding. The applied voltage should be as shown in Table 3.

Winding rated voltage (V)	Testing voltage for measuring the insulation resistance (V)
< 1000	500
1000 - 2500	500 - 1000
2501 - 5000	1000 - 2500
5001 - 12000	2500 - 5000
> 12000	5000 - 10000

Table 3 - Voltage for the insulation resistance

The reading of the insulation resistance must be corrected to 40 °C as shown in the Table 4.

Measuring temperature of the insulation resistance (°C)	Correction factor of the insulation resistance corrected to 40 °C	Measuring temperature of the insulation resistance (°C)	Correction factor of the insulation resistance corrected to 40 °C
10	0.125	30	0.500
11	0.134	31	0.536
12	0.144	32	0.574
13	0.154	33	0.616
14	0.165	34	0.660
15	0.177	35	0.707
16	0.189	36	0.758
17	0.203	37	0.812
18	0.218	38	0.871
19	0.233	39	0.933
20	0.250	40	1.000
21	0.268	41	1.072
22	0.287	42	1.149
23	0.308	43	1.231
24	0.330	44	1.320
25	0.354	45	1.414
26	0.379	46	1.516
27	0.406	47	1.625
28	0.435	48	1.741
29	0.467	49	1.866
30	0.500	50	2.000

Table 4 - Correction factor for the insulation resistance corrected to 40 °C

The motor insulation condition must be evaluated by comparing the measured value with the values indicated in Table 5 (corrected to 40 °C):

Limit value for rated voltage up to 1.1 kV (MΩ)	Limit value for rated voltage above 1.1 kV (MΩ)	Situation
Up to 5	Up to 100	Dangerous. The motor can not be operated in this condition
5 to 100	100 to 500	Regular
100 to 500	Higher than 500	Good
Higher than 500	Higher than 1000	Excellent

Table 5 - Evaluation of the insulation system

The values indicated in the table should be considered only as reference values. It is advisable to log all measured values to provide a quick and easy overview on the machine insulation resistance.
If the insulation resistance is low, moisture may be present in the stator windings. In this case the motor should be removed and transported to a WEG authorized Service Center for proper evaluation and repair (This service is not covered by the warranty). To improve the insulation resistance through the drying process, see section 8.4.

6. INSTALLATION

The insulation resistance must be measured in a safe environment.

Check some aspects before proceeding with the installation:

1. Insulation resistance: must be within the acceptable limits. See item 5.4.
2. Bearings:
   If the motor is installed without running immediately, proceed as described in item 5.3.
3. Operating conditions of the start capacitors: If single-phase motors are stored for a period of over two years, it is recommended to change the start capacitors before motor starting since they lose their operating characteristics.
4. Terminal box:
   a. the inside of the terminal box must be clean and dry;
   b. the contacts must be correctly connected and corrosion free. See 6.9 and 6.10;
   c. the cable entries must be correctly sealed and the terminal box cover properly mounted in order to ensure the degree of protection indicated on the motor nameplate.
5. Cooling: the cooling fins, air inlet and outlet openings must be clean and unobstructed. The distance between the air inlet openings and the wall should not be shorter than ¼ (one quarter) of the diameter of the air inlet. Ensure sufficient space to perform the cleaning services. See item 7.
6. Coupling: remove the shaft locking device (where fitted) and the corrosion protection grease from the shaft end, including the grounding brush area, and flange immediately before installing the motor. See item 6.4.
7. Drain hole: the motor must always be positioned so the drain hole is at the lowest position (If there is any indication arrow on the drain, the drain must be so installed that the arrow points downwards).
   Motors supplied with rubber drain, threaded drain or any other open/close drain plugs must be opened periodically to allow the exit of condensed water. For environments with high water condensation levels and motor with degree of protection IP55, the drain plugs can be mounted in open position (see Figure 29).
   For motors with degree of protection IP56, IP65 or IP66, the drain plugs must remain at closed position (see Figure 29), being opened only during the motor maintenance procedures.
   The drain system of motors with Oil Mist lubrication system must be connected to a specific collection system (see Figure 29).

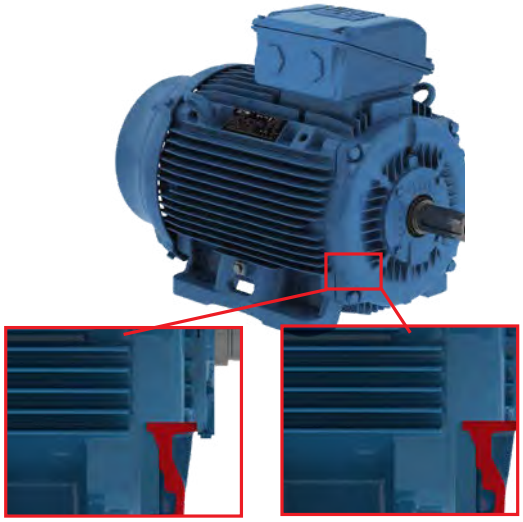


Figure 29 - Detail of the rubber drain plug mounted in closed and open position

8. Additional recommendations:
   a. Check the direction of motor rotation, starting the motor at no-load before coupling it to the load;
   b. Vertical mounted motors with shaft end down must be fitted with drip cover to protect them from liquids or solids that may drop onto the motors;
   c. Vertical mounted motors with shaft end up should be fitted with water slinger ring to prevent water ingress inside the motor.
   d. The fixing elements mounted in the threaded through holes in the motor enclosure (for example, the flange) must be properly sealed.

Remove or fix the shaft key before starting the motor.

Changes on the motor construction (features), such as installation of extended grease fittings or modification of the lubrication system, installation of accessories at alternative locations, etc., can be carried out only after prior written consent from WEG.

6.1 FOUNDATIONS

The foundation is the structure, structural element, natural or prepared base, designed to withstand the stresses produced by the installed equipment, ensuring safe and stable performance during operation. The foundation design should consider the adjacent structures to avoid the influences of other installed equipment and no vibration is transferred through the structure

The foundation must be flat and its selection and design must consider the following characteristics:

a) The features of the machine to be installed on the foundation, the driven loads, application, maximum allowed deformations and vibration levels (for instance, motors with reduced vibration levels, foot flatness, flange concentricity, axial and radial loads, etc. lower than the values specified for standard motors).

b) Adjacent buildings, conservation status, maximum applied load estimation, type of foundation and fixation and vibrations transmitted by theses constructions.

If the motor is supplied with leveling/alignment bolts, this must be considered in the base design.

Please consider for the foundation dimensioning all stresses that are generated during the operation of the driven load.
The user is responsible for the foundation designing and construction.

The foundation stresses can be calculated by using the following equations (see Figure 6.2):

$$F_1 = 0,5 * g * m - (4 * T_b / A)$$
$$F_2 = 0,5 * g * m + (4 * T_b / A)$$

Where:

F_1 and F_2 = lateral stresses (N);
g = gravitational acceleration (9,8 m/s^2);
m = motor weight (kg);
T_b = breakdown torque (Nm);
A = distance between centerlines of mounting holes in feet or base of the machine (end view) (m).

The motors may be mounted on:

- Concrete bases: are most used for large-size motors (Figure 30);
- Metallic bases: are generally used for small-size motors (Figure 31).

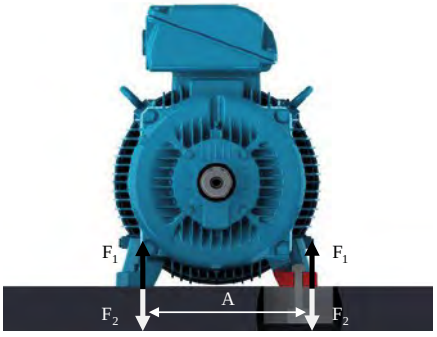


Figure 30 - Motor installed on concrete base



Figure 31 - Motor installed on metallic base

The metallic and concrete bases may be fitted with sliding system. These types of foundations are generally used where the power transmission is achieved by belts and pulleys. This power transmission system is easier to assemble/disassemble and allows the belt tension adjustment. Other important aspect of this foundation type is the location of the base locking screws that must be diagonally opposite. The rail nearest the drive pulley is placed in such a way that the positioning bolt is between the motor and the driven machine. The other rail must be placed with the bolt on the opposite side (diagonally opposite), as shown in Figure 32.

To facilitate assembly, the bases may have the following features:

- Shoulders and/or recesses;
- Anchor bolts with loose plates;
- Bolts cast in the concrete;
- Leveling screws;
- Positioning screws;
- Steel & cast iron blocks, plates with flat surfaces.

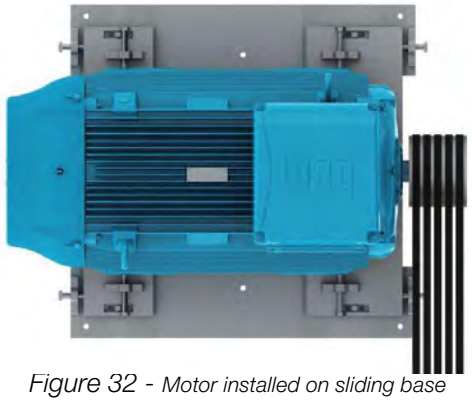


Figure 32 - Motor installed on sliding base

After completing the installation, it is recommended that all exposed machined surfaces are coated with suitable rust inhibitor.

6.2 MOTOR MOUNTING

Footless motors supplied with transportation devices, according to Figure 33, must have their devices removed before starting the motor installation.

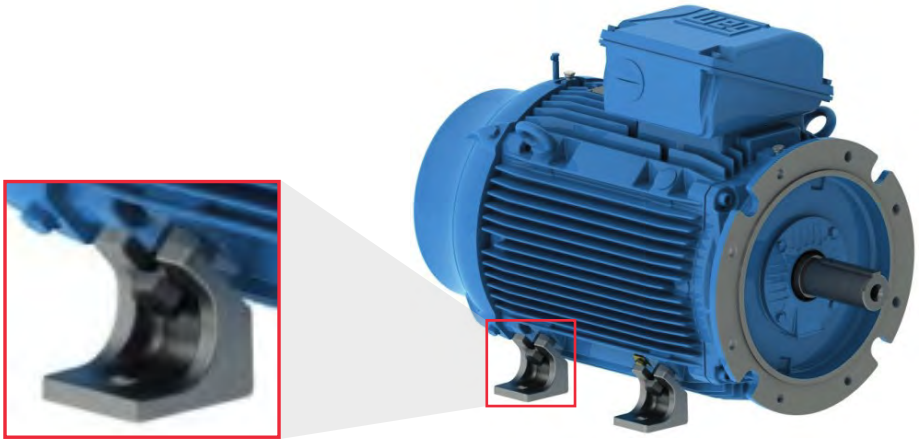


Figure 33 - Detail of the transportation devices for footless motors

6.2.1 Foot mounted motors

The drawings of the mounting hole dimensions for NEMA or IEC motors can be checked in the respective technical catalogue.
The motor must be correctly aligned and leveled with the driven machine. Incorrect alignment and leveling may result in bearing damage, generate excessive vibration and even shaft distortion/breakage.
For more details, see section 6.3 and 6.6. The thread engagement length of the mounting bolt should be at least 1.5 times the bolt diameter. This thread engagement length should be evaluated in more severe applications and increased accordingly.
Figure 6.6 shows the mounting system of a foot mounted motor indicating the minimum required thread engagement length.

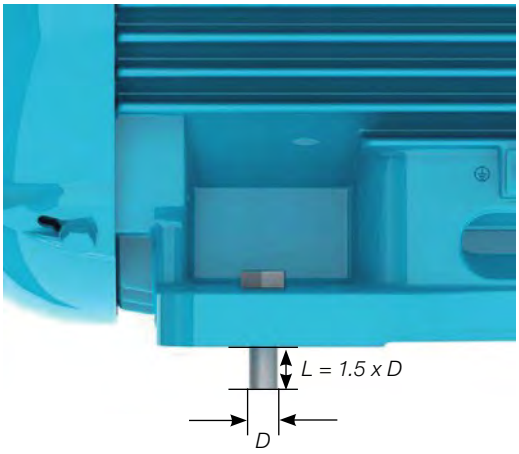


Figure 34 - Mounting system of a foot mounted motor

6.2.2 Flange mounted motors

The drawings of the flange mounting dimensions, IEC and NEMA flanges, can be checked in the technical catalogue. The coupling of the driven equipment to the motor flange must be properly dimensioned to ensure the required concentricity of the assembly.
Depending on the flange type, the mounting can be performed from the motor to the driven equipment flange (flange FF (IEC) or D (NEMA)) or from the driven equipment flange to the motor (flange C (DIN or NEMA)).
For the mounting process from the driven equipment flange to the motor, you must consider the bolt length, flange thickness and the thread depth of the motor flange.

In cases that use polymer flanges with a built-in nut or the aluminum flange with hexagonal hole, the length of the motor fixing screw must not exceed the length of the hole, thus avoiding misalignment and clearance of the coupling.

If the motor flange has tapped through-holes, the length of the mounting bolts must not exceed the tapped through-hole length of the motor flange, thus preventing damage to the winding head.

Motors with aluminum frame and/or flange can be supplied with hexagonal holes for flange mounting. These holes are suitable for receiving cylindrical screws compatible with standardized coupling dimensions, with attention to the minimum screw strength class according to the product catalog.
For flange mounting the thread engagement length of the mounting bolt should be at least 1.5 times the bolt diameter. In severe applications, longer thread engagement length may be required.

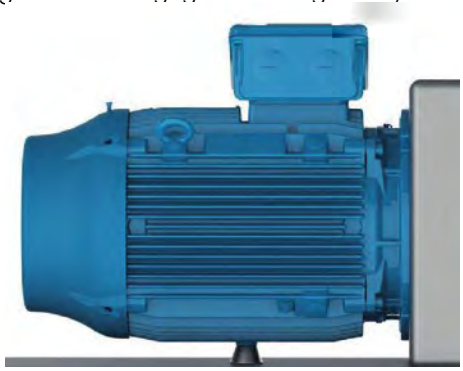


Figure 35 - Mounting method of flange mounted motors with frame base support

In severe applications or if large motors are flange mounted, a foot or pad mounting may be required in addition to the flange mounting (Figure 35). The motor must never be supported on its cooling fins.

The tightening torques indicated in Table 6 must be respected when:
- fixing a polymeric foot and/or flange to the customer equipment for W12/WEG General Purpose motors;
- installing polymeric fan covers for WEG General Purpose and WIN motors and/or changing/rotating the position of the terminal box for W12/WEG General Purpose motors.

For installation of W12/WEG General Purpose motors in frame sizes IEC56, W63 and W71 in the vertical position with the shaft upwards, the foot must be locked axially by the fixing of a flat head screw as indicated.
The hexagonal holes in the C-DIN flanges of W12/WEG General Purpose motors in frame sizes IEC56/W63/W71 are suitable for the screws indicated in Table 6.

Frame	Component	Bolt/Screw specification (Thread size x length)	Torque (Nm)
IEC56	Polymeric Foot	M5x12	8
W63/W71		M5x16	8
IEC56/W63/ W71	Polymeric Flange	-	8
	C-80	M5	5
	C-105	M6	6
160/180/200/W225/225/250/W280	Fan cover	M8 / M10	6 to 8
IEC 56/W63/W71	Terminal box/Grounding	M5	1,8 to 2,4
71/W80/90/W100/112/132	Terminal box/Grounding	M5	5

Table 6 - Tightening torque and screw specification for W12/WEG General Purpose motors.

Note:
When liquid (for example oil) is likely to come into contact with the shaft seal, please contact your local WEG representative.

For WFL motors, the flange has hexagonal holes suitable for M6 screws (maximum torque 8 Nm), and the screws must have at least a 5.6 resistance class. The length of the screws that will be used in the application to fix the motor to the equipment must not exceed the thickness of the endshield wall where they are mounted, at the risk of damaging the motor coil head and causing electric shock. The application screw must be embedded into the endshield with a minimum depth of 7 mm and a maximum of 9 mm.

6.2.3 Pad mounted motors

Typically, this method of mounting is used in axial fans. The motor is fixed by tapped holes in the frame. The dimensions of these tapped holes can be checked in the respective product catalogue. The selection of the motor mounting rods/bolts must consider the dimensions of the fan case, the installation base and the thread depth in the motor frame.
The mounting rods and the fan case wall must be sufficiently stiff to prevent the transmission of excessive vibration to the machine set (motor & fan). Figure 35 shows the pad mounting system.

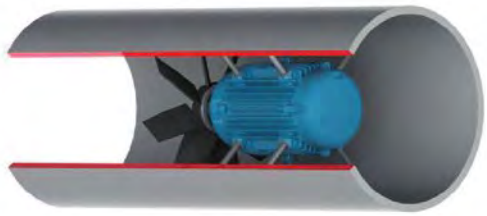


Figure 36 - Mounting of the motor inside the cooling duct

6.3 BALANCING

Unbalanced machines generate vibration which can result in damage to the motor. WEG motors are dynamically balanced with “half key” and without load (uncoupled). Special balancing quality level must be stated in the Purchase Order.

The transmission elements, such as pulleys, couplings, etc., must balanced with “half key” before they are mounted on the motor shaft.

The balance quality grade meets the applicable standards for each product line.
The maximum balancing deviation must be recorded in the installation report.

6.4 COUPLINGS

Couplings are used to transmit the torque from the motor shaft to the shaft of the driven machine. The following aspects must be considered when couplings are installed:

- Use proper tools for coupling assembly & disassembly to avoid damages to the motor and bearings;
- Whenever possible, use flexible couplings, since they can absorb eventual residual misalignments during the machine operation;
- The maximum loads and speed limits informed in the coupling and motor manufacturer catalogues cannot be exceeded;
- Level and align the motor as specified in sections 6.5 and 6.6, respectively.

Remove or fix the shaft key firmly when the motor is operated without coupling in order to prevent accidents.

6.4.1 Direct coupling

Direct coupling is characterized when the Motor shaft is directly coupled to the shaft of the driven machine without transmission elements. Whenever possible, use direct coupling due to lower cost, less space required for installation and more safety against accidents.

Do not use roller bearings for direct coupling, unless sufficient radial load is expected.

6.4.2 Gearbox coupling

Gearbox coupling is typically used where speed reduction is required.
Make sure that shafts are perfectly aligned and strictly parallel (in case of straight spur gears) and in the right meshing angle (in case of bevel and helical gears).

6.4.3 Pulley and belt coupling

Pulleys and belts are used when speed increase or reduction between motor shaft and driven load is required.

Excessive belt tension will damage the bearings and cause unexpected accidents such as breakage of the motor shaft.

6.4.4 Coupling of sleeve bearing motors

Motors designed with sleeve bearings must be operated with direct coupling to the driven machine or a gearbox. Pulley and belts can not be applied for sleeve bearing motors.

Motors designed with sleeve bearings have 3 (three) marks on the shaft end. The center mark is the indication of the magnetic center and the 2 (two) outside marks indicate the allowed limits of the rotor axial movement, as shown in Figure 36
The motor must be so coupled that during operation the arrow on the frame is placed over the central mark indicating the rotor magnetic center. During start-up, or even during operation, the rotor may freely move between the two outside marks when the driven machine exerts an axial load on the motor shaft. However, under no circumstance, the motor can operate continuously with axial forces on the bearing.

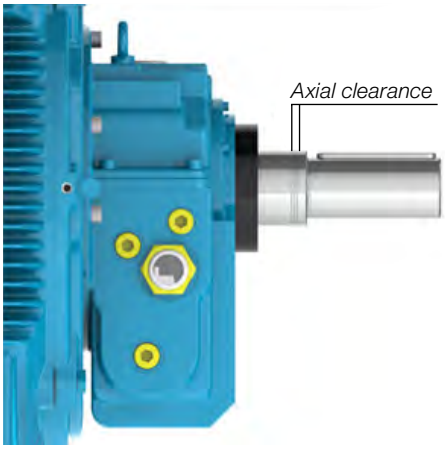


Figure 37 - Axial clearance of motor designed with sleeve bearing.

For coupling evaluation consider the maximum axial bearing clearance as shown in Table 7.
The axial clearance of the driven machine and coupling influence the maximum bearing clearance.

Bearing size	Total axial clearance (mm)
9*	3 + 3 = 6
11*	4 + 4 = 8
14*	5 + 5 =10
18	7,5 + 7,5 = 15

Table 7 - Clearance used for sleeve bearings

** For Motors in accordance with API 541, the total axial clearance is 12.7 mm*

The sleeve bearings used by WEG were not designed to support axial load continuously.
Under no circumstance must the motor be operated continuously at its axial clearance limits.

6.5 LEVELING

The motor must be leveled to correct any deviations in flatness arising from the manufacturing process and the material structure rearrangement. The leveling can be carried out by a leveling screw fixed on the motor foot or on the flange or by means of thin compensation shims. After the leveling process, the leveling height between the motor mounting base and the motor cannot exceed 0.1 mm.
If a metallic base is used to level the height of the motor shaft end and the shaft end of the driven machine, level only the metallic base relating to the concrete base.

Record the maximum leveling deviations in the installation report.

6.6 ALIGNMENT

The correct alignment between the motor and the driven machine is one of the most important variables that extends the useful service life of the motor. Incorrect coupling alignment generates high loads and vibrations reducing the useful life of the bearings and even resulting in shaft breakages. Figure38 illustrates the misalignment between the motor and the driven machine.

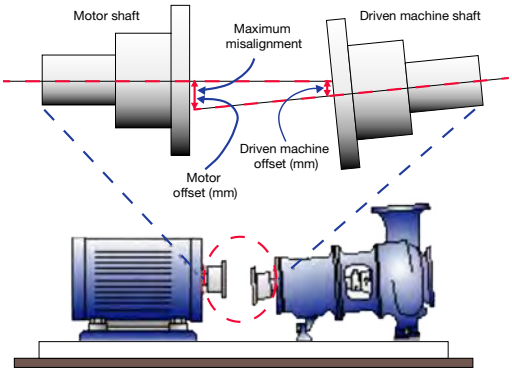
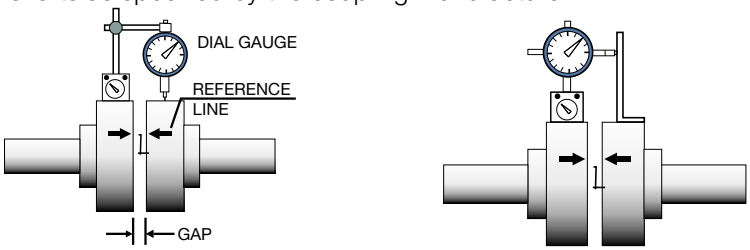


Figure 38 - Typical misalignment condition

Alignment procedures must be carried out using suitable tools and devices, such as dial gauge, laser alignment instruments, etc.. The motor shaft must be aligned axially and radially with the driven machine shaft.

The maximum allowed eccentricity for a complete shaft turn should not exceed 0.03 mm, when alignment is made with dial gauges, as shown in Figure 39. Ensure a gap between couplings to compensate the thermal expansion between the shafts as specified by the coupling manufacturer.



Parallel alignment *Angular alignment*

Figure 39 - Alignment with dial gauge

If alignment is made by a laser instrument, please consider the instructions and recommendations provided by the laser instrument manufacturer.
The alignment should be checked at ambient temperature with machine at operating temperature.

The coupling alignment must be checked periodically.

Pulley and belt couplings must be so aligned that the driver pulley center lies in the same plane of the driven pulley center and the motor shaft and the shaft of the driven machine are perfectly parallel.
After completing the alignment procedures, ensure that mounting devices do not change the motor and machine alignment and leveling resulting into machine damage during operation.

It is recommended to record the maximum alignment deviation in the Installation Report.

6.7 CONNECTION OF OIL LUBRICATED OR OIL MIST LUBRICATED MOTORS

When oil lubricated or oil mist lubricated motors are installed, connect the existing lubricant tubes (oil inlet and oil outlet tubes and motor drain tube), as shown in Figure 40. The lubrication system must ensure continuous oil flow through the bearings as specified by the manufacturer of the installed lubrication system.

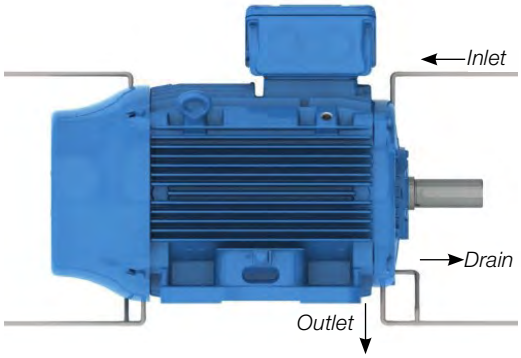


Figure 40 - Oil supply and drain system of oil lubricated or oil mist lubricated motors

6.8 CONNECTION OF THE COOLING WATER SYSTEM

When water cooled motors are installed, connect the water inlet and outlet tubes to ensure proper motor cooling. According to item 7.2, ensure correct cooling water flow rate and water temperature in the motor cooling system.

6.9 ELECTRICAL CONNECTION

Consider the rated motor current, service factor, starting current, environmental and installation conditions, maximum voltage drop, etc. to select appropriate power supply cables and switching and protection devices.
All motors must be installed with overload protection systems. Three-phase motors should be fitted with phase fault protection systems.

Before connecting the motor, check if the power supply voltage and the frequency comply with the motor nameplate data. All wiring must be made according to the connection diagram on the motor nameplate. Please consider the connection diagrams in the Tables 8 and 10 as reference value.
To prevent accidents, check if motor has been solidly grounded in accordance with the applicable standards.

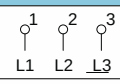
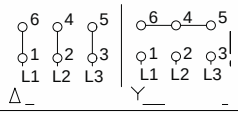
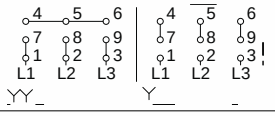
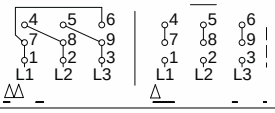
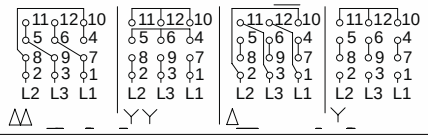
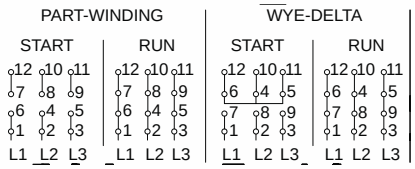
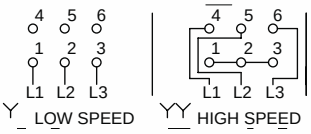
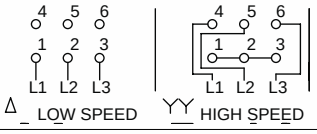
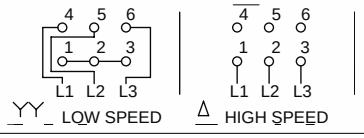
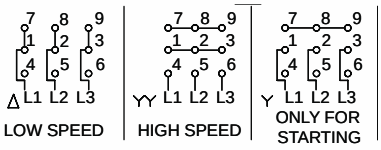
Configuration	Quantity of leads	Type of connection	Connection diagram
Single speed	3	-	
	6	Δ - Y	
	9	YY - Y	
		ΔΔ - Δ	
	12	ΔΔ - YY - Δ - Y	
		Δ - PWS Part-winding start	
Double speed Dahlander	6	YY - Y Variable Torque	
		Δ - YY Constant Torque	
		YY - Δ Constant Output	
	9	Δ - Y - YY	
Double speed Double winding	6	-	

Table 8 - Typical connection diagram for three-phase motors.

Lead identification on the wiring diagram		1	2	3	4	5	6	7	8	9	10	11	12
Single speed	NEMA MG 1 Part 2	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
	IEC 60034-8	U1	V1	W1	U2	V2	W2	U3	V3	W3	U4	V4	W4
Double speed (Dahlander / Double winding)	NEMA MG 1 Part 2[1)]	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W
	IEC 60034-8	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W

Table 9 - Equivalent table for lead identification

1) NEMA MG 1 Part 2 defines T1 to T12 for two or more winding, however WEG adopts 1U to 4W.

ENGLISH

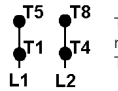
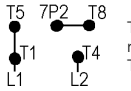
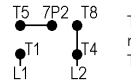
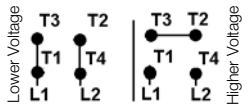
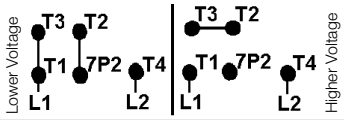
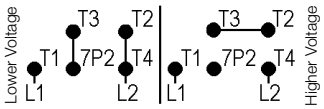
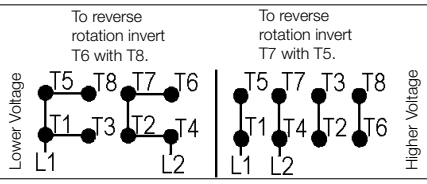
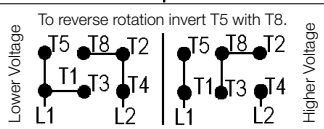
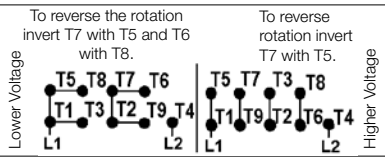
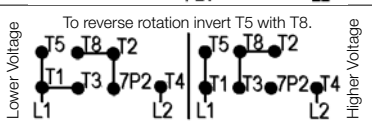
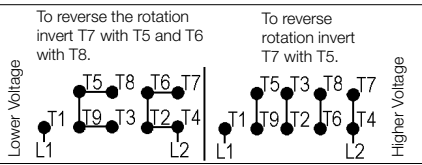
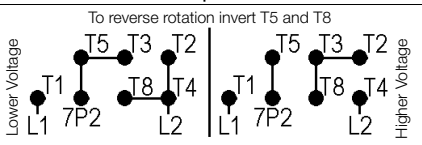
Voltage	Direction of Rotation	Thermal Protection	Type	Connection diagram
Single	CW or CCW	With or Without	Run / Permanent Capacitors Two values	
	Both	Without		
		Phenolic Thermal Protector		
		Thermostat		
Double	CW or CCW	Without	Run / Permanent Capacitors Two values or Split Phase	
		Phenolic Thermal Protector		
		Thermostat		
	Both	Without	Split Phase (without capacitor)	
			Run / Permanent Capacitors Two values	
		Phenolic Thermal Protector	Split Phase (without capacitor)	
			Run / Permanent Capacitors Two values	
		Thermostat	Split Phase (without capacitor)	
			Run / Permanent Capacitors Two values	

Table 10 - Typical connection diagram for single-phase motors.

W12/WEG General Purpose motors with polymeric terminal box cover have the connection diagram printed on its interior. To connect the cables, check on the nameplate the diagram code that must be used.

For motors with polymeric fan cover assembled by snap fit, to remove the polymeric fan cover use two crewdrivers or similar tool positioned near the snap fit region and remove one side by lifting carefully, repeat for the other sides until the complete removal of the fan cover.

Make sure that the motor is correctly connected to the power supply through safe and permanent contacts.

WARNING - Local Standards have priority on the definition of the connection standards.

The connections presented below are a reference for the connection of the customer's power cables on low voltage motors with terminal block. The terminal blocks presented below are the standard for each product line, however variations may occur.
It is recommended the use of terminals made of electrolytic copper or brass, similar to the terminals used on the motors cables.

K1M* terminal block

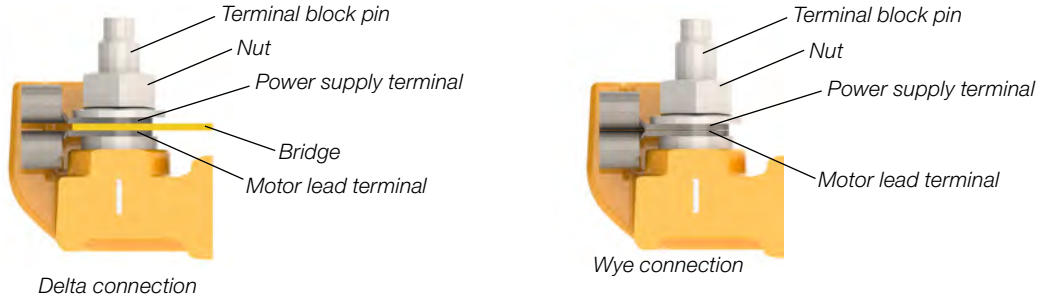


Figure 41 - Connetion for K1M terminal blocks*

KWLV* and KWMV* terminal blocks

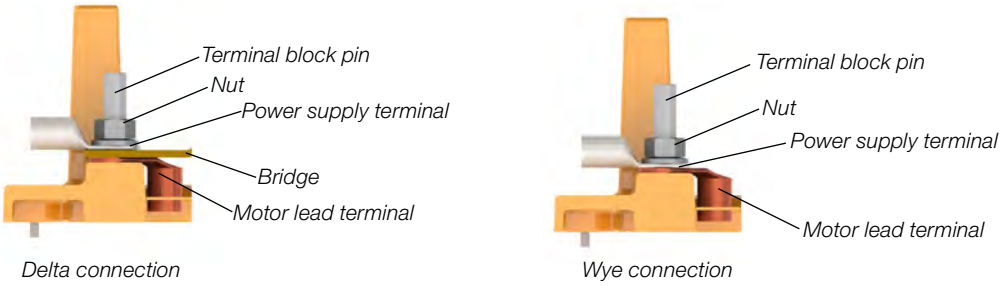


Figure 42 - Connetion for KWLV and KWMV* terminal blocks*

If motors are supplied without terminal blocks, insulate the cable terminals with suitable insulation material that meets the power supply voltage and the insulation class indicated on the motor nameplate.

Ensure correct tightening torque for the power cable and grounding connections as specified in Table 11.
The clearance distance (see Figure 6.15) between non-insulated live parts with each other and between grounded parts must be as indicated in Table 6.4.



Figure 43 - Minimum clearance distance (mm) x supply voltage

Voltage	Minimum clearance distance (mm)
U ≤ 440 V	4
440 < U ≤ 690 V	5.5
690 < U ≤ 1000 V	8
1000 < U ≤ 6900 V	45
6900 < U ≤ 11000 V	70
11000 < U ≤ 16500 V	105

Table 11 - Minimum clearance distance (mm) x supply voltage

Even when the motor is off, dangerous voltages may be present inside the terminal box used for the space heater supply or winding energization when the winding is used as heating element.
Motor capacitors will hold a charge even after the power has been cut off. Do not touch the capacitors and/or motor terminals, before discharging the capacitors completely. For WMagnet and WQuattro motors, even when the motor is disconnected from the power supply, there may be voltage in the motor's terminals if the rotor moves.

After the motor connection has been completed, ensure that no tool or foreign body has been left inside the terminal box.

Take the required measures in order to ensure the degree of protection indicated on the motor nameplate:
- unused cable inlet holes in the terminal boxes must be properly closed with threaded blanking plugs;
- components supplied loose (for example, terminal boxes mounted separately) must be properly closed and sealed.

The cable inlets used for power supply and control must be fitted with components (for example, cable-glands and conduits) that meet the applicable standards and regulations in each country.

If the motor is fitted with accessories, such as brakes and forced cooling systems, these devices must be connected to the power supply according to the information provided on their nameplates and with special care as indicated above.

In motors with polymeric terminal box and/or its cover, ensure that the fittings and locks of these components are correctly assembled after performing the cable connection.

For motors with terminal box knockouts, it is necessary to use a flathead screwdriver or similar tool and a hammer to detach the knockout, hammering the screwdriver several times until the knockout is removed. First, break the inside knockout, then if necessary, the external according to the cable gland size to be used. For the T-box polymeric knockouts, it can be necessary to use a blade or a driller to machine the hole and to not damage the auxiliary T-box. Caution, do not knock through to the inside of the terminal box and remove all material detached from the internal side of the t-box.
All protection devices, including overcurrent protection, must be set according to the rated machine conditions. These protection devices must protect the machine against short circuit, phase fault or locked rotor condition. The motor protection devices must be set according to the applicable standards.

Check the direction of rotation of the motor shaft. If there is no limitation for the use of unidirectional fans, the shaft rotation direction can be changed by reversing any two of the phase connections. For single-phase motor, check the connection diagram indicated on the motor nameplate.

6.10 CONNECTION OF THE THERMAL PROTECTION DEVICES

If the motor is supplied with temperature monitoring devices, such as, thermostat, thermistors, automatic thermal protectors, Pt-100 (RTD), etc., they must be connected to the corresponding control devices as specified on the accessory nameplates. The non-compliance with this procedure may void the product warranty and cause serious material damages.

Do not apply test voltage above 2.5 V on thermistors and current above 1 mA on RTDs (Pt-100) according to IEC 60751 standard.

Figure 43 and Figure 44 show the connection diagram of the bimetal thermal protector (thermostats) and thermistors, respectively.

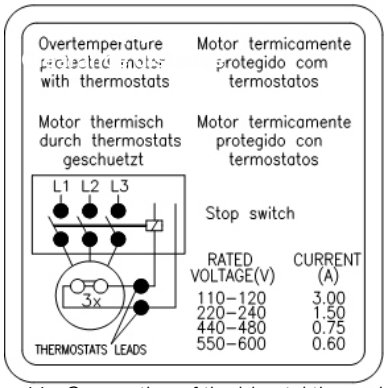


Figure 44 - Connection of the bimetal thermal protectors (thermostats)

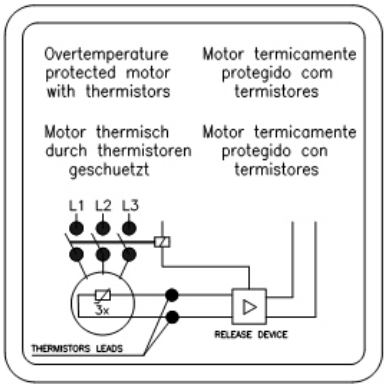


Figure 45 - Thermistor connection

The alarm temperature limits and thermal protection shutdowns can be defined according to the application; however these temperature limits can not exceed the values in Table 12

Component	Insulation class	Maximum temperature of the protection setting (°C)	
		Alarm	Tripping
Winding	B	-	130
	F	130	155
	H	155	180
Bearing	All	110	120

Table 12 - Maximum activation temperature of the thermal protections

Notes:
1) The number and type of the installed protection devices are stated on the accessory nameplate of the motor.
2) If the motor is supplied with calibrated resistance, (for example, Pt-100), the motor protection system must be set according to the operating temperatures indicated in Table 6.5.

6.11 RESISTANCE TEMPERATURE DETECTORS (PT-100)

The thermocouples Pt-100 are made of materials, whose resistance depends on the temperature variation, intrinsic property of some materials (usually platinum, nickel or copper), calibrated resistance. Its operation is based on the principle that the electric resistance of a metallic conductor varies linearly with the temperature, thus allowing a continuous monitoring of the motor warm-up through the controller display ensuring a high level of precision and answer stability. These devices are widely used for measuring temperatures in various industry sectors.
In general these devices are used in installations where precise temperature control is required, for example, in installation for irregular or intermittent duty. The same detector may be used for alarm and tripping purposes. Table 13 and Figure 45 show the equivalence between the Pt-100 resistance and the temperature. The Figure 46 shows the connection of a winding Pt-100.

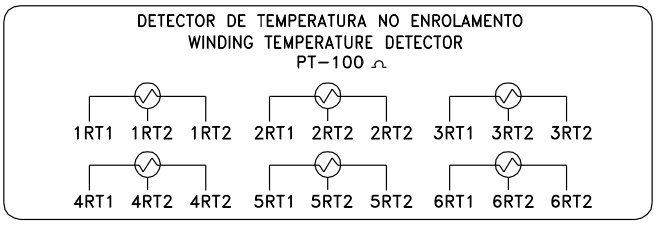


Figure 46 - Connection of winding Pt-100

°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-29	88.617	17	106.627	63	124.390	109	141.908	155	159.180
-28	89.011	18	107.016	64	124.774	110	142.286	156	159.553
-27	89.405	19	107.404	65	125.157	111	142.664	157	159.926
-26	89.799	20	107.793	66	125.540	112	143.042	158	160.298
-25	90.193	21	108.181	67	125.923	113	143.420	159	160.671
-24	90.587	22	108.570	68	126.306	114	143.797	160	161.043
-23	90.980	23	108.958	69	126.689	115	144.175	161	161.415
-22	91.374	24	109.346	70	127.072	116	144.552	162	161.787
-21	91.767	25	109.734	71	127.454	117	144.930	163	162.159
-20	92.160	26	110.122	72	127.837	118	145.307	164	162.531
-19	92.553	27	110.509	73	128.219	119	145.684	165	162.903
-18	92.946	28	110.897	74	128.602	120	146.061	166	163.274
-17	93.339	29	111.284	75	128.984	121	146.438	167	163.646
-16	93.732	30	111.672	76	129.366	122	146.814	168	164.017
-15	94.125	31	112.059	77	129.748	123	147.191	169	164.388
-14	94.517	32	112.446	78	130.130	124	147.567	170	164.760
-13	94.910	33	112.833	79	130.511	125	147.944	171	165.131
-12	95.302	34	113.220	80	130.893	126	148.320	172	165.501
-11	95.694	35	113.607	81	131.274	127	148.696	173	165.872
-10	96.086	36	113.994	82	131.656	128	149.072	174	166.243
-9	96.478	37	114.380	83	132.037	129	149.448	175	166.613
-8	96.870	38	114.767	84	132.418	130	149.824	176	166.984
-7	97.262	39	115.153	85	132.799	131	150.199	177	167.354
-6	97.653	40	115.539	86	133.180	132	150.575	178	167.724
-5	98.045	41	115.925	87	133.561	133	150.950	179	168.095
-4	98.436	42	116.311	88	133.941	134	151.326	180	168.465
-3	98.827	43	116.697	89	134.322	135	151.701	181	168.834

°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-2	99.218	44	117.083	90	134.702	136	152.076	182	169.204
-1	99.609	45	117.469	91	135.083	137	152.451	183	169.574
0	100.000	46	117.854	92	135.463	138	152.826	184	169.943
1	100.391	47	118.240	93	135.843	139	153.200	185	170.313
2	100.781	48	118.625	94	136.223	140	153.575	186	170.682
3	101.172	49	119.010	95	136.603	141	153.950	187	171.051
4	101.562	50	119.395	96	136.982	142	154.324	188	171.420
5	101.953	51	119.780	97	137.362	143	154.698	189	171.789
6	102.343	52	120.165	98	137.741	144	155.072	190	172.158
7	102.733	53	120.550	99	138.121	145	155.446	191	172.527
8	103.123	54	120.934	100	138.500	146	155.820	192	172.895
9	103.513	55	121.319	101	138.879	147	156.194	193	173.264
10	103.902	56	121.703	102	139.258	148	156.568	194	173.632
11	104.292	57	122.087	103	139.637	149	156.941	195	174.000
12	104.681	58	122.471	104	140.016	150	157.315	196	174.368
13	105.071	59	122.855	105	140.395	151	157.688	197	174.736
14	105.460	60	123.239	106	140.773	152	158.061	198	175.104
15	105.849	61	123.623	107	141.152	153	158.435	199	175.472
16	106.238	62	124.007	108	141.530	154	158.808	200	175.840

Table 13 - Equivalence between the Pt-100 resistance and the temperature

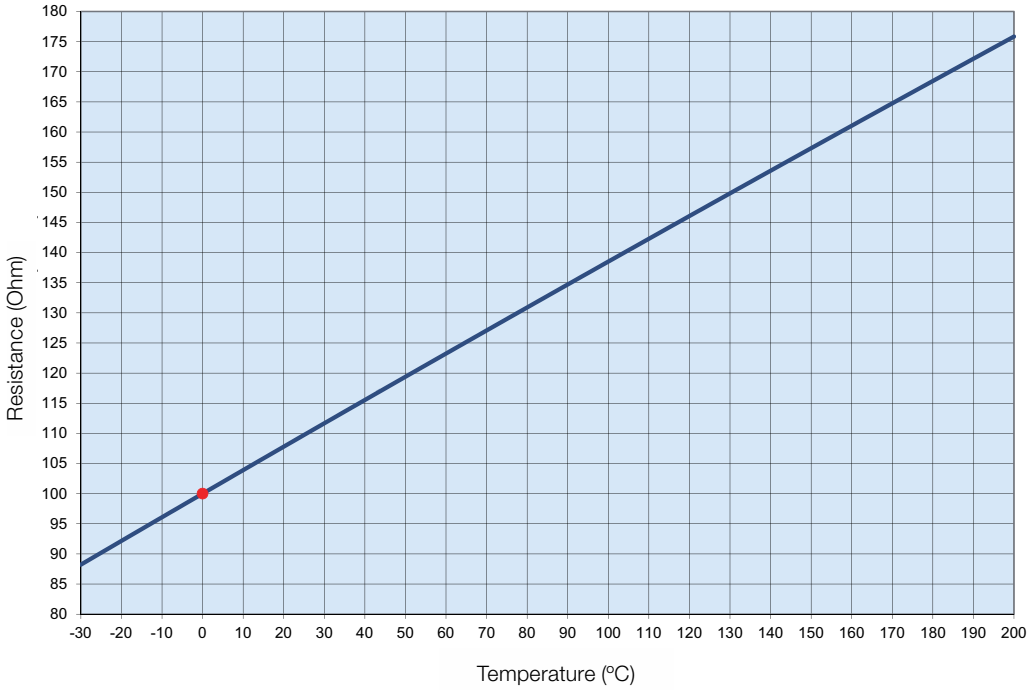


Figure 47 - Ohmic resistance of the Pt-100 x temperature

6.12 CONNECTION OF THE SPACE HEATERS

Before switching ON the space heaters, check if the space heaters connection have been made according to the connection diagram shown on the space heater nameplate. For motors supplied with dual voltage space heaters (110-127/220-240 V), see Figure 48.

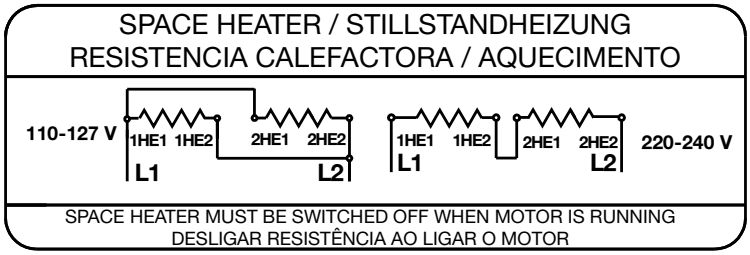


Figure 48 - Dual voltage space heater connection

The space heaters should never be energized when the motor is in operation.

6.13 STARTING METHODS

Whenever possible, the motor starting must be Direct On Line (DOL) at rated voltage. This is the most simple and feasible starting method. However, it must only be applied when the starting current does not affect the power supply. Please consider the local electric utility regulations when installing a motor.
High inrush current may result in:
a) high voltage drop in the power supply line creating unacceptable line disturbance on the distribution system; b) requiring oversized protection system (cables and contactor) increasing the installation costs.

If DOL starting is not allowed due to the reasons mentioned above, an indirect starting method compatible with the load and motor voltage to reduce the starting current may be used.
If reduced voltage starters are used for starting, the motor starting torque will also be reduced.

Table 14 shows the possible indirect starting methods that can be used depending on the number of the motor leads.

Number of leads	Possible starting methods
3 leads	Autotransformer Soft-starter
6 leads	Star-Delta Autotransformer Soft-starter
9 leads	Series/Parallel Part winding Autotransformer Soft-starter
12 leads	Star-Delta Series/Parallel Part winding Autotransformer Soft-starter

Table 14 - Starting method x number of motor leads

Table 15 shows examples of possible indirect starting methods to be used according to the voltage indicated on the motor nameplate and the power supply voltage.

Nameplate voltage	Operating voltage	Star-delta	Autotransformer starting	Starting by series/ parallel switch	Part-winding starting	Starting by Soft-starter
220/380 V	220 V 380 V	YES NO	YES YES	NO NO	NO NO	YES YES
220/440 V	220 V 440 V	NO NO	YES YES	YES NO	YES NO	YES YES
230/460 V	230 V 460 V	NO NO	YES YES	YES NO	YES NO	YES YES
380/660 V	380 V	YES	YES	NO	NO	YES
220/380/440 V	220 V 380 V 440 V	YES NO YES	YES YES YES	YES YES NO	YES YES NO	YES YES YES

Table 15 - Starting methods x voltage

Another possible starting method that does not overload the power supply network is the use of an inverter of frequency. For more information on motors powered by a frequency inverter, see item 6.14.

6.14 MOTORS DRIVEN BY FREQUENCY INVERTER

The operation with frequency inverter must be stated in the Purchase Order since this drive type may require some changes of the motor design.

The frequency inverter used to drive motors up to 690 V must be fitted with Pulse With Modulation (PWM) with vector control.
When a motor is driven by a frequency inverter at lower frequencies than the rated frequency, you must reduce the motor torque to prevent motor overheating. The torque reduction (derating torque) can be found in the item 6.4 of the “Technical Guidelines for Induction Motors driven by PWM Frequency inverters” available on the site www.weg.net.

If the motor is operated above the rated frequency, please note:
- That the motor must be operated at constant output;
- That the motor can supply max. 95% of its rated output;
- Do not exceed the maximum speed and please consider:
  - max. operating frequency stated on the additional nameplate;
  - mechanical speed limitation of the motor.

For WMagnet motors driven by non-WEG inverters, in addition to the speed limit stated in the motor data sheet, the maximum permitted speed limit must be checked to avoid burning the inverter in the event of a power failure. It should be considered according to the equation below:

$$RPM_{max} = \frac{0.9 * V_{rmsMax} * 1000}{ke}$$

Being,
RPM_{max} – Maximum speed allowed to avoid burning the inverter in the event of a power failure in [RPM].
V_{rmsMax} – Maximum input rms voltage of the inverter, as informed by the inverter manufacturer in [V].
ke – Parameter informed on the nameplate and in the motor data sheet in [V / kRPM].

Information on the selection of the power cables between the frequency inverter and the motor can be found in the item 6.4 of the "Technical Guidelines for Induction Motors driven by PWM Frequency inverters" available at www.weg.net.

6.14.1 Use of dV/dt filter

6.14.1.1 Motor with enameled round wire

Motors designed for rated voltages up to 690 V, when driven by frequency inverter, do not require the use of dV/dT filters, provided they comply with the criteria in Table 16.

Motor rated votage [1]	Peak voltage at the motor terminals (max)	dV/dt inverter output (max)	Inverter Rise Time [2] (min.)	MTBP [2] Time between pulses (min)
Vnom < 460 V	≤ 1600 V	≤ 5200 V/µs	≥ 0,1 µs	≥ 6 µs
460 ≤ Vnom < 575 V	≤ 2000 V	≤ 6500 V/µs		
575 ≤ Vnom ≤ 1000 V	≤ 2400 V	≤ 7800 V/µs		

Table 16 - Criteria for the selection of motors with round enameled wire when driven by frequency inverter

Notes:
1. For the application of dual voltage motors, example 380/660 V, consider the lower voltage (380 V).
2. Information supplied by the inverter manufacturer.

6.14.1.2 Motor with prewound coils

Motors with prewound coils (medium and high voltage motors regardless of frame sizes, and low voltage motors from IEC 500 / NEMA 800 frame on), designed for the use with frequency inverters, do not require the use of filters, provided they comply with the criteria in Table 17.

Motor rated voltage	Type of modulation	Turn to turn insulation (phase-phase)		Phase-ground insulation	
		Peak voltage at the motor terminals	dV/dt at the motor terminals	Peak voltage at the motor terminals	dV/dt at the motor terminals
690 < Vnom ≤ 4160 V	Sinusoidal	≤ 5900 V	≤ 500 V/µs	≤ 3400 V	≤ 500 V/µs
	PWM	≤ 9300 V	≤ 2700 V/µs	≤ 5400 V	≤ 2700 V/µs
4160 < Vnom ≤ 6600 V	Sinusoidal	≤ 9300 V	≤ 500 V/µs	≤ 5400 V	≤ 500 V/µs
	PWM	≤ 14000 V	≤ 1500 V/µs	≤ 8000 V	≤ 1500 V/µs

Table 17 - Criteria to be considered when using motor with prewound coils to be drive by frequency inverters

6.14.2 Bearing insulation

If motor must be driven by frequency inverter, insulate the bearing according to Table 18.

Frame size	Recommendation
IEC 315 and 355 NEMA 445/7 to L5810/11	■ Insulated bearing/end shield ■ Grounding between shaft and frame by grounding brush
IEC 400 and larger NEMA 680 and larger	■ Insulated NDE bearing ■ Grounding between shaft and frame by grounding brush

Table 18 - Recommendation on the bearing insulation for inverter driven motors

When motors are supplied with shaft grounding system, monitor the grounding brush constantly during its operation and, when it reaches the end of its useful life, it must be replaced by another brush with the same specification.
If a motor is supplied with an internal grounding brush, indicated by a tag in the product, it must be verified each time the bearings or any internal part of the motor is maintained.
Motors of frame sizes IEC 315, NEMA 445/7 and above, when inverter fed, must be equipped with shaft grounding kits.

For safe area motors and for verification testing purposes, contact pins can be installed on both sides of the bearing insulation, so that voltage measurements can be taken on the bearing, or, if the pins are connected by a cable or metallic strand (shorting-circuiting the bearing insulation), of the current through the bearing. It should be noted, however, that during the normal motor operation the bearing insulation must not be short-circuited.



Figure 49 - Metal flexible braid

6.14.3 Switching frequency

The minimum inverter switching frequency must not be lower than 2 kHz and should not exceed 5 kHz.

The non-compliance with the criteria and recommendations indicated in this manual may void the product warranty.

6.14.4 Mechanical speed limitation

Table below shows the maximum speeds allowed for motors driven by frequency inverter. For WMagnet motors, see the motor's data sheet or contact WEG.

Frame size		Polarity	Maximum speed for standard motors
NEMA	IEC		
254	160	2	5.200
		4	
		6	
284	180	2	4.800
		4	4.400
		6	
324/6	200L	2	3.700
		4	
		6	
364/5	225	2	
		4	3.600
		6	
404/5	250	2	3.700
		4	3.200
		6	
444/5 - 447/9	280	2	3.700
		4	2.400
		6	
5010/11	315	2	3.600
		4	2.400
L5010/11	355	2	3.600
		4	2.000
L5810/11	400	2	3.600
		4	1.800

Table 19 - Maximum motor speed W40 (em RPM)

Frame size		Polarity	Maximum speed for standard motors
NEMA	IEC		
5810/11	315	2	3600
		4	2000
		6	
L5810/11	355	2	3600
		4	1800
		6	
6810/11	400	2	3600
		4	1800
		6	1700

Table 20 - Maximum motor speed W60 (em RPM)

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Frame size		Polarity	Maximum speed for standard motors
NEMA	IEC		
-	63	2	12.300
		4	
		6	
-	71	2	11.300
		4	
		6	
-	80	2	10.300
		4	
		6	
143/5	90S	2	8.600
		4	
		6	
-	100L	2	7.800
		4	
		6	
182/4	112	2	7.600
		4	7.100
		6	
213/5	132	2	6.000
		4	5.900
		6	
254/6	160	2	5.300
		4	5.000
		6	
284/6	180	2	4.400
		4	
		6	
324/6	200L	2	4.200
		4	4.000
		6	
364/5	225	2	3.600
		4	3.200
		6	
404/5	250	2	3.600
		4	3.200
		6	
444/5 - 445/7	280	2	3.600
		4	3.200
		6	
447/9 - L447/9	-	2	-
		4	
		6	
504/5	315	2	3.600
		4	2.300
		6	
586/7 - 588/9	355	2	3.600
		4	1.900
		6	

Table 21 - Maximum motor speed W22 (em RPM)

Frame size	Polarity	Maximum speed for standard motors
NEMA		
W56	2	13600
	4	13600
56	2	12000
	4	12000
	6	13600
56H	2	12000
	4	12000
	6	10900
143/5T	2	10400
	4	10400
	6	10400
182/4T	2	8800
	4	8800
	6	8800
213/5T	2	6800
	4	6800
	6	6800
254/6T	2	5300
	4	5300
	6	5300

Table 22 - Maximum motor speed W01 (em RPM)

Frame size		Polarity	Maximum speed for standard motors
NEMA	IEC		
5009/10	315	2	3600
		4	2200
		6	
5809/10	355	2	3600
		4	1900
		6	
6806/07-6808/09	400	2	3600
		4	1800
		6	1700

Table 23 - Maximum motor speed W50 (em RPM)

Notes:
1. *When the motor has lip seals or Inproseals, contact WEG.*
2. *For speeds above the nominal one, measure the bearing vibration and temperature; if the temperature and vibration levels exceed the specified limits, contact WEG.*
3. *Check the DE bearing model on the motor plate.*
4. *For conditions other than those described in Tables 18 to 22, consult WEG.*

For more information on the application of frequency inverters, contact WEG or check the “Technical Guidelines for Induction Motors driven by PWM Frequency inverters” available at www.weg.net.

7. COMMISSIONING

7.1 INITIAL START-UP

After finishing the installation procedures and before starting the motor for the first time or after a long period without operation, the following items must be checked:

- If the nameplate data (voltage, current, connection diagram, degree of protection, cooling system, service factor, etc.) meet the application requirements;
- If the machine set (motor + driven machine) has been mounted and aligned correctly;
- If the motor driving system ensures that the motor speed does not exceed the max. allowed speed indicated in Table 6.12;
- Measure the winding insulation resistance, making sure it complies with the specified values in item 5.4;
- Check the motor rotation direction;
- Inspect the motor terminal box for damage and ensure that it is clean and dry and all contacts are rust-free, the seals are in perfect operating conditions and all unused threaded holes are properly closed thus ensuring the degree of protection indicated on the motor nameplate;
- Check if the motor wiring connections, including grounding and auxiliary equipment connection, have been carried out properly and are in accordance with the recommendations in item 6.9;
- Check the operating conditions of the installed auxiliary devices (brake, encoder, thermal protection device, forced cooling system, etc.);

- Check bearing operating conditions. If the motors are stored and/or installed for more than two years without running, it is recommended to change the bearings, or to remove, wash, inspect and relubricate them before the motor is started. If the motor is stored and/or installed according to the recommendations described in item 5.3, lubricate the bearings as described in item 8.2. For the bearing condition evaluation, it is recommended to use of the vibration analysis techniques: Envelope Analysis or Demodulation Analysis.
- For roller bearing motors with oil lubrication, ensure:
  - The oil level should be in the center of the sight glass (see Figure 51 and Figure 52);
  - That if the motor is stored for a period equal or longer than the oil change interval, the oil must be changed before starting the motor.
- When motors are fitted with sleeve bearings, ensure:
  - Correct oil level for the sleeve bearing. The oil level should be in the center of the sight glass (see Figure 8.3);
  - That the motor is not started or operated with axial or radial loads;
  - That if the motor is stored for a period equal or longer than the oil change interval, the oil must be changed before starting the motor.
- Inspect the capacitor operating condition, if any. If motors are installed for more than two years, but were never commissioned, it is recommended to change the start capacitors since they lose their operating characteristics;
- Ensure that the air inlet and outlet opening are not blocked. The minimum clearance to the nearest wall (L) should be at least ¼ of the fan cover diameter (D), see Figure 50. The intake air temperature must be at ambient temperature.

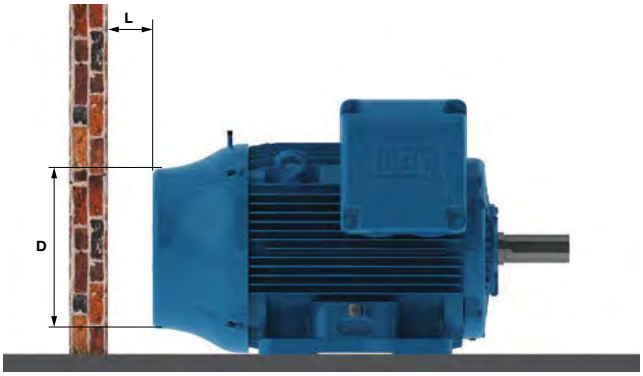


Figure 50 - Minimum clearance to the wall

Please consider the minimum distances shown in the Table 24 as reference value;

Frame size		Distance between the fan cover and the wall (L)	
IEC	**NEMA**	**mm**	**inches**
63	-	25	0.96
71	-	26	1,02
80	-	30	1.18
90	143/5	33	1.30
100	-	36	1.43
112	182/4	41	1.61
132	213/5	50	1.98
160	254/6	71	2,79
180	284/6	72	2,83
200 / W225	324/6	83	3,27
225 250	364/5 404/5	92	3,62
280	444/5 445/7 447/9	108	4.23
315	L447/9 504/5 5006/7/8 5009/10/11	122	4.80
355	586/7 588/9 5807/8/9 5810/11/12	136	5.35
400	6806/7/8 6809/10/11	147	5.79
450	7006/10	159	6.26
500	8006/10	171	6.73
560	8806/10	185	7.28
630	9606/10	200	7.87

Table 24 - Minimum distance between the fan cover and wall

- Ensure correct water flow rate and water temperature when water cooled motors are used. See item 7.2;
- Ensure that all rotating parts, such as pulleys, couplings, external fans, shaft, etc. are protected against accidental contact.

Other tests and inspections not included in the manual may be required, depending on the specific installation, application and/or motor characteristics.

After all previous inspections have been carried out, proceed as follows to start the motor:

- Start the motor on no-load (if possible) and check the motor direction of rotation. Check for the presence of any abnormal noise, vibration or other abnormal operating conditions;
- Ensure the motor starts smoothly. If any abnormal operating condition is noticed, switch off the motor, check the assembly system and connections before the motor is started again;
- If excessive vibrations are noticed, check if the motor mounting bolts are well tightened or if the vibrations are not generated and transmitted from adjacent installed equipment. Check the motor vibration periodically and ensure that the vibration limits are as specified in item 7.2.1;
- Start the motor at rated load during a short time and compare the operating current with the rated current indicated on the nameplate;
- Continue to measure the following motor variables until thermal equilibrium is reached: current, voltage, bearing and motor frame temperature, vibration and noise levels;
- Record the measured current and voltage values on the Installation Report for future comparisons.

As induction motors have high inrush currents during start-up, the acceleration of high inertia load requires an extended starting time to reach full speed resulting in fast motor temperature rise. Successive starts within short intervals will result in winding temperature increases and can lead to physical insulation damage reducing the useful life of the insulation system. If the duty cycle S1 / CONT. is specified on the motor nameplate, this means that the motor has been designed for:

- Two successive starts: first start from cold condition, i. e., the motor windings are at room temperature and the second start immediately after the motor stops;
- One start from hot condition, i. e., the motor windings are at rated temperature.

The Troubleshooting Chart in section 10 provides a basic list of unusual cases that may occur during motor operation with the respective corrective actions.

7.2 OPERATING CONDITIONS

Unless otherwise stated in the Purchase Order, electric motors are designed and built to be operated at altitudes up to 1000 meters above sea level and in a temperature range from -20 °C to +40 °C. Any deviation from the normal condition of motor operation must be stated on the motor nameplate. Some components must be changed if the ambient temperature is different from the specified one. Please contact WEG to check the required special features.

For operating temperatures and altitudes differing from those above, the factors indicated in Table 25 must be applied to the nominal motor power rating in order to determine the derated available output (Pmax = Pnom x correction factor).

T (°C)	Altitude (m)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
10							0.97	0.92	0.88
15						0.98	0.94	0.90	0.86
20					1.00	0.95	0.91	0.87	0.83
25				1.00	0.95	0.93	0.89	0.85	0.81
30			1.00	0.96	0.92	0.90	0.86	0.82	0.78
35		1.00	0.95	0.93	0.90	0.88	0.84	0.80	0.75
40	1.00	0.97	0.94	0.90	0.86	0.82	0.80	0.76	0.71
45	0.95	0.92	0.90	0.88	0.85	0.81	0.78	0.74	0.69
50	0.92	0.90	0.87	0.85	0.82	0.80	0.77	0.72	0.67
55	0.88	0.85	0.83	0.81	0.78	0.76	0.73	0.70	0.65
60	0.83	0.82	0.80	0.77	0.75	0.73	0.70	0.67	0.62
65	0.79	0.76	0.74	0.72	0.70	0.68	0.66	0.62	0.58
70	0.74	0.71	0.69	0.67	0.66	0.64	0.62	0.58	0.53
75	0.70	0.68	0.66	0.64	0.62	0.60	0.58	0.53	0.49
80	0.65	0.64	0.62	0.60	0.58	0.56	0.55	0.48	0.44

Table 25 - Correction factors for altitude and ambient temperature

Motors installed inside enclosures (cubicles) must be ensured an air renewal rate in the order of one cubic meter per second for each 100 kW installed power or fraction of installed power. Totally Enclosed Air Over motors - TEAO (fan and exhaust / smoke extraction) are supplied without cooling fan and the manufacturer of the driven machine is responsible for sufficient motor cooling. If no minimum required air speed between motor fins is indicated on the motor nameplate, ensure the air speed indicated in the table 21 is provided. The values shown in Table 26 are valid for 60 Hz motors. To obtain the minimum air speed for 50 Hz motors, multiply the values in the table by 0.83.

Frame		Poles			
IEC	NEMA	2	4	6	8
56 to 90	143/5	13	7	5	4
100 to 132	182/4 to 213/5	18	12	8	6
160 to 200	254/6 to 324/6	20	15	10	7
225 to 280	364/5 to 444/5	22	20	15	12
315 to 450	445/7 to 7008/9	25	25	20	15

Table 26 - Minimum required air speed between motor fins (metres/second)

The voltage and frequency variations may affect the performance characteristics and the electromagnetic compatibility of the motor. The power supply variations should not exceed the values specified in the applicable standards. Examples:

- ABNT NBR 17094 - Parts 1 and 2. The motor has been designed to supply the rated torque for a combined variation in voltage and frequency:
  - Zone A: ±5% of the rated voltage and ±2% of the rated frequency;
  - Zone B: ±10% of the rated voltage and +3% -5% of the rated frequency.

When operated continuously in Zone A or B, the motor may show performance variations and the operating temperature may increase considerably. These performance variations will be higher in Zone B. Thus it is not recommended to operate the motor in Zone B during extended periods.

- IEC 60034-1. The motor has been designed to supply the rated torque for combined variation in voltage and frequency:
  - Zone A: ±5% of the rated voltage and ±2% of the rated frequency;
  - Zone B: ±10% of the rated voltage and +3% -5% of the rated frequency.

When operated continuously in Zone A or B, the motor may show performance variations and the operating temperature may increase considerably. These performance variations will be higher in Zone B. Thus it is not recommended to operate the motor in Zone B during extended periods. For multivoltage motors (example 380-415/660 V), a ±5% voltage variation from the rated voltage is allowed.

- NEMA MG 1 Part 12. The motor has been designed to be operated in one of the following variations:
  - ±10% of the rated voltage, with rated frequency;
  - ±5% of the rated frequency, with rated voltage;
  - A combined variation in voltage and frequency of ±10%, provided the frequency variation does not exceed ±5%.

If the motor is cooled by ambient air, clean the air inlet and outlet openings and cooling fins at regular intervals to ensure a free airflow over the frame surface. The hot air should never be returned to the motor. The cooling air must be at room temperature limited to the temperature range indicated on the motor nameplate (if no room temperature is specified, please consider a temperature range between -20 °C and +40 °C).

Table 22 shows the minimum required water flow for water cooled motors considering the different frame sizes and the maximum allowed temperature rise of the cooling water after circulating through the motor. The inlet water temperature should not exceed 40 °C.

Frame size		Flow rate (litres/minute)	Maximum allowed water temperature rise (°C)
IEC	NEMA		
180	284/6	12	5
200	324/6	12	5
225	364/5	12	5
250	404/5	12	5
280	444/5 445/7 447/9	15	6
315	504/5	16	6
355	586/7 588/9	25	6

Table 27 - Minimum required water flow and the maximum allowed temperature rise of the cooling water after circulating through the motor

For W60 motors, please see the nameplate at heat-exchanger.
Motors fitted with oil mist lubrication systems can be operated continuously for a maximum of one hour after the failure of the oil pumping system.

Considering the sun's heat increases the operating temperature, externally mounted motors must always be protected from direct sunlight exposure.

Each and every deviation from the normal operating condition (tripping of the thermal protection, noise and vibration level increase, temperature and current rise) should be investigated and corrected by WEG Authorized Service Centers.

Failure to observe the criteria and recommendations set out in this manual may result in the cancellation of the product warranty.

7.2.1 Limits of vibration

The vibration severity is the maximum vibration value measured at all positions and in all directions as recommended in the standard IEC 60034-14. Table 28 specifies the limits of the maximum vibrations magnitudes according to standard IEC 60034-14 for shaft heights IEC 56 to 400, for vibrations grades A and B. The vibration severity limits in Table 28 are given as RMS values (Root Mean Square values or effective values) of the vibration speed in mm/s measured in free suspension condition.

Shaft height [mm]	56 ≤ H ≤ 132	H ≥ 132
Vibration grade	Vibration severity on elastic base [mm/s RMS]	
A	2.8	2.8
B	1.1	1.8

Table 28 - Recommended limits for the vibration severity according to standard IEC 60034-14

Notes:
1 - The values in valid for measurements carried out with decoupled machines (without load) operated at rated voltage and frequency.
2 - The values in valid regardless of the direction of rotation of the machine.
3 - The values in not applicable to single-phase motors, three-phase motors powered by a single-phase system or to machines mounted in situ or coupled with inertia flywheels or to loads.

According to NEMA MG 1, the allowed vibration limit for standard motors is 0.15 in/s (peak vibration in in/s).

Note:
For the load operation condition, the use of the standard ISO 10816-3 is recommended for evaluating the motor vibration limits. In the load condition the motor vibration will be influenced by several factors, such as, type of the coupled load, condition of the motor fixation, alignment condition under load, structure or base vibration due to other equipments, etc..

ENGLISH

8. MAINTENANCE

The purpose of the maintenance is to extend the useful life of the equipment. The non-compliance with one of these previous items can cause unexpected machine failures.
If motors with cylindrical roller or angular contact bearings are to be transported during the maintenance procedures, the shaft locking device must always be fitted. All HGF, W50, W51 HD and W60 motors, regardless of the bearing type, must always be transported with the shaft locking device fitted.
All repairs, disassembly and assembly related services must be carried out only by qualified and well-trained personnel by using proper tools and techniques. Make sure that the machine has stopped and it is disconnected from the power supply, including the accessory devices (space heater, brake, etc.), before any servicing is undertaken.
The company does not assume any responsibility or liability for repair services or maintenance operations executed by non-authorized Service Centers or by non qualified service personnel. The company shall have no obligation or liability whatsoever to the buyer for any indirect, special, consequential or incidental loss or damage caused or arising from the company's proven negligence.

Pacemaker users and unqualified personnel shall not open WMagnet and WQuattro motors, because high energy magnets are used.

8.1 GENERAL INSPECTION

The inspection intervals depend on the motor type, application and installation conditions. Proceed as follows during inspection:

- Visually inspect the motor and coupling. Check if abnormal noises, vibrations, excessive heating, wear signs, misalignment or damaged parts are noticed. Replace the damaged parts as required;
- Measure the insulation resistance according to the item 5.4;
- Clean the motor enclosure. Remove oil spills and dust accumulation from the motor frame surface to ensure a better heat transfer to the surrounding ambient;
- Check cooling fan condition and clean the air inlet & outlet openings to ensure a free air flow over the motor;
- Investigate the actual condition of the seals and replace them, if required;
- Drain the condensed water from inside the motor. After draining, reinstall the drain plugs to ensure the degree of protection as indicated on the motor nameplate. The motor must always be positioned so the drain hole is at the lowest position (see item 6);
- Check the connections of the power supply cables, ensuring the correct clearance distance between live and grounded parts, as specified in Figure 31.

- Check if the tightening torque of the bolted connections and mounting bolts meets the tightening torque specified in Table 44;
- Check the status of the cable passages, the cable gland seals and the seals inside the terminal box and replace them, if required;
- Check the bearing operating conditions. Check for the presence of any abnormal noise, vibration or other abnormal operating conditions, like motor temperature rise. Check the oil level, the lube oil condition and compare the workings hours with the informed life time;
- Record and file all changes performed on the motor.



Do not reuse damaged or worn parts. Damaged or worn parts must be replaced by parts supplied by the manufacturer and must be installed as if they were the original parts.

8.2 LUBRICATION

Proper lubrication plays a vital role in the motor performance. Only use the grease or oil types, amounts and lubrication intervals recommended for the bearings. This information is available on the motor nameplate and the lubrication procedures must be carried out according to the type of lubricant (oil or grease).
When the motor is fitted with thermal protection devices for bearing temperature control, consider the operating temperature limits shown in Table 12.
The maximum operating temperature of motors used in special applications may differ from those shown in Table 31. The grease and oil disposal should be made in compliance with applicable laws in each country.



Please contact WEG when motors are to be installed in special environments or used for special applications.

8.2.1 Grease lubricated rolling bearings



Excess grease causes bearing overheating, resulting in bearing failure.

The lubrication intervals specified in Table 29, Table 30, Table 31, Table 32, Tabla 34, Table 34 Table 35, Table 36 and Table 37, Table 38, andTable 39 consider an absolute temperature on the bearing of 70 °C (up to frame size IEC 200 / NEMA 324/6) and 85 °C (for frame size IEC 225 / NEMA 364/5 and above), the motor running at rated speed, a motor mounted in horizontal position and greased with Mobil Polyrex EM grease. Any variation of the parameters listed above must be evaluated.

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)					
					ODP (Open Drip Proof)		W21 TEFC (Totally Enclosed Fan Cooled)		W22 TEFC (Totally Enclosed Fan Cooled)	
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
90	143/5	2	6205	4	-	-	20000	20000	25000	25000
		4								
		6								
		8								
100	-	2	6206	5						
		4								
		6								
		8								
112	182/4	2	6207/ 6307	9						
		4								
		6								
		8								
132	213/5	2	6308	11				18400		
		4						20000		
		6								
		8								
160	254/6	2	6309	13	20000	20000	18100	15700		
		4					20000	20000		
		6								
		8								
180	284/6	2	6311	18			13700	11500		
		4					20000	20000		
		6								
		8								
200	324/6	2	6312	21			11900	9800		
		4					20000	20000		
		6								
		8								
225 250 280 315 355	364/5 404/5 444/5 445/7 447/9 L447/9 504/5 5008 5010/11 586/7 588/9	2	6314	27	18000	14400	4500	3600	5000	4000
		4			20000	20000	11600	9700	14000	12000
		6					16400	14200	20000	17000
		8					19700	17300	24000	20000
		2	6316	34	14000	*Upon request	3500	*Upon request	4000	*Upon request
		4			20000	20000	10400	8500	13000	10000
		6					14900	12800	18000	16000
		8					18700	15900	20000	20000
		2	6319	45	*Upon request					
		4			20000	20000	9000	7000	11000	8000
		6					13000	11000	16000	13000
		8					17400	14000	20000	17000
		4	6322	60			7200	5100	9000	6000
		6					10800	9200	13000	11000
		8					15100	11800	19000	14000

Table 29 - Lubrication intervals for ball bearings

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)					
					ODP (Open Drip Proof)		W21 TEFC (Totally Enclosed Fan Cooled)		W22 TEFC (Totally Enclosed Fan Cooled)	
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
160	254/6	2	NU309	13	20000	19600	13300	9800	16000	12000
		4				20000	20000	20000	25000	25000
		6								
		8								
180	284/6	2	NU311	18	18400	12800	9200	6400	11000	8000
		4			20000	20000	20000	19100	25000	25000
		6						20000		
		8								
200	324/6	2	NU312	21	15200	10200	7600	5100	9000	6000
		4			20000	20000	20000	17200	25000	21000
		6						20000		25000
		8								
225 250 280 315 355	364/5 404/5 444/5 445/7 447/9 L447/9 504/5 5008 5010/11 586/7 588/9	4	NU314	27	17800	14200	8900	7100	11000	9000
		6			20000	20000	13100	11000	16000	13000
		8					16900	15100	20000	19000
		4	NU316	34	15200	12000	7600	6000	9000	7000
		6			20000	19000	11600	9500	14000	12000
		8				20000	15500	13800	19000	17000
		4	NU319	45	12000	9400	6000	4700	7000	5000
		6			19600	15200	9800	7600	12000	9000
		8			20000	20000	13700	12200	17000	15000
		4	NU322	60	8800	6600	4400	3300	5000	4000
		6			15600	11800	7800	5900	9000	7000
		8			20000	20000	11500	10700	14000	13000

Table 30 - Lubrication intervals for cylindrical roller bearings

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B and 315C/D/E	5006/7/8T and 5009/10/11T	2	6314	27	3100	2100
		4 - 8	6320	50	4500	4500
			6316	34		
355L/A/B and 355C/D/E	5807/8/9T and 5810/11/12T	2	6314	27	3100	2100
		4 - 8	6322	60	4500	4500
			6319	45		
400L/A/B and 400 C/D/E	6806/7/8T and 6809/10/11T	2	6315	30	2700	1800
		4 - 8	6324	72	4500	4500
			6319	45		
450	7006/10	2	6220	31	2500	1400
		4	6328	93	4500	3300
			6322	60		4500
		6 - 8	6328	93		
			6322	60		
500	8006/10	4	6330	104	4200	2800
			6324	72	4500	4500
		6 - 8	6330	104		
			6324	72		
560	8806/10	4 - 8	*Upon request			
630	9606/10	4 - 8				

Table 31 - - Lubrication intervals for ball bearings - HGF line

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B and 315C/D/E	5006/7/8 and 5009/10/11	4	NU320	50	4300	2900
		6 - 8			4500	4500
355L/A/B and 355C/D/E	5807/8/9 and 5810/11/12	4	NU322	60	3500	2200
		6 - 8			4500	4500
400L/A/B and 400C/D/E	6806/7/8 and 6809/10/11	4	NU324	72	2900	1800
		6 - 8			4500	4500
450	7006/10	4	NU328	93	2000	1400
		6			4500	3200
		8			4500	4500
500	8006/10	4	NU330	104	1700	1000
		6			4100	2900
		8			4500	4500
560	8806/10	4	NU228 + 6228	75	2600	1600
		6 - 8		106	4500	4500
630	9606/10	4	NU232 + 6232	92	1800	1000
		6		120	4300	3100
		8		140	4500	4500

Table 32 - Lubrication intervals for cylindrical roller bearings - HGF line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Ball bearings	315 H/G	5009/10	2	6314	27	4500	3500	6314	27	4500	3500
			4 - 8	6320	50		4500	6316	34		4500
	355 J/H	5809/10	2	6314	27		3500	6314	27		3500
			4 - 8	6322	60		4500	6319	45		4500
	400 L/K and 400 J/H	6806/07 and 6808/09	2	6218	24	3800	2500	6218	24	3800	1800
			4 - 8	6324	72	4500	4500	6319	45	4500	4500
	450 L/K and 450 J/H	7006/07 and 7008/09	2	6220	31	3000	2000	6220	31	3000	2000
			4	6328	93	4500	3300	6322	60	4500	4500
			6 - 8				4500				
Vertical mounting Ball bearings	315 H/G	5009/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6320	50	4200	3200	6316	34	4500	4500
			6 - 8			4500	4500				
	355 J/H	5809/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6322	60	3600	2700	6319	45	4500	3600
			6 - 8			4500	4500				4500
	400 L/K and 400 J/H	6806/07 and 6808/09	2	7218	24	2000	1300	6218	24	2000	1300
			4	7324	72	3200	2300	6319	45	4500	3600
			6			4500	4300				4500
			8				4500				
	450 L/K and 450 J/H	7006/07 and 7008/09	2	7220	31	1500	1000	6220	31	1500	1000
			4	7328	93	2400	1700	6322	60	3500	2700
			6			4100	3500			4500	4500
			8			4500	4500				

Table 33 - Lubrication intervals for ball bearings - W50 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Roller bearings	315 H/G	5009/10	4	NU320	50	4300	2900	6316	34	4500	4500
			6 -8			4500	4500				
	355 J/H	5809/10	4	NU322	60	3500	2200	6319	45		
			6 - 8			4500	4500				
	400 L/K and 400 J/H	6806/07 and 6808/09	4	NU324	72	2900	1800				
			6 - 8			4500	4500				
	450 L/K and 450 J/H	7006/07 and 7008/09	4	NU328	93	2000	1400	6322	60		
			6			4500	3200				
			8				4500				

Table 34 - Lubrication intervals for cylindrical roller bearings - W50 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Ball bearings	160M/L	254/6	2 - 8	6309	13	20000	20000	6209	9	20000	20000
	180M/L	284/6		6311	18			6211	11		
	200M/L	324/6		6312	21						
	225S/M	364/5	2	6314	27	18000	14400	6212	13		
			4 – 8								
	250S/M	404/5	2								
			4 – 8	6316	34	20000	20000				
	280S/M	444/5	2	6314	27	18000	14400				
			4 – 8	6319	45	20000	20000	6314	27		
	280L	447/9	2	6314	27	18000	14400			18000	14400
			4 – 8	6319	45	20000	20000			20000	20000
	315G/F	5010/11	2	6314	27	4500	4500			4500	4500
			4 – 8	6319	45						
	355J/H	L5010/11	2	6218	24	2200	2200	6218	24	2200	2200
			4 – 8	6224	43	4500	4500			4500	4500
	400J/H	L5810/11	2	6220	31	2200	2200	6220	31	2200	2200
			4 – 8	6228	52	4500	4500			4500	4500
	450K/J	L6808/09	2	6220	31	2200	2200			2200	2200
			4 – 8	6228	52	4500	4500			4500	4500

Table 35 - Lubrication intervals for ball bearings - W40 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Roller bearings	225S/M	364/5	4 – 8	NU314	27	20000	20000	6314	27	20000	20000
	250S/M	404/5		NU316	34						
	280S/M	444/5		NU319	45		18800				
	280L	447/9				4500	4500			4500	4500
	315G/F	5010/11						6218	24		
	355J/H	L5010/11		NU224	43						
	400J/H	L5810/11		NU228	52		3300	6220	31		
	450K/J	L6808/09									

Table 36 - Lubrication intervals for cylindrical roller bearings - W40 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Ball bearings	355H/G	5810/11	2	6218	24	2300	1500	6218	24	2300	1500
			4/8	6224	43	4500	4500			4500	4500
	400J/H	L5810/11	2	6220	31	1800	1200	6220	31	1800	1200
			4/8	6228	52	4500	4500			4500	4500
	400G/F	6810/11	2	6220	31	1800	1200			1800	1200
			4/8	6228	52	4500	4500			4500	4500
Horizontal mounting Roller bearings	355H/G	5810/11	4	NU224	43	4500		6218	24		
			6/8								
	400J/H	L5810/11	4	NU228	52		1500		31	4500	1500
			6/8				4500	6220			4500
	400G/F	6810/11	4				1500				1500
			6/8				4500				4500

Table 37 - Lubrication intervals for ball bearings and for cylindrical roller bearings - W60 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	Rolamento traseiro	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem horizontal Rolamento de esferas	315 G/F	5010/11	2	6314	27	4500	3500	6314	27	4500	3500
			4-12	6320	50		4500	6316	34		4500
	355H/G	5810/11	2	6314	27		3500	6314	27		3500
			4-12	6322	60		4500	6319	45		4500
	400H/G	6809/10	2	6220	24	2700	2000	6220	24	2700	2000
			4-12	6324	72	4500	3800	6319	45	4500	4500
	450H/G	7009/10	2	6220	31	3500	-	6220	31	3500	-
			4	6328	93	4500	3800	6322	60	4500	4500
			6-12				4500				
Montagem vertical Rolamento de esferas	315 G/F	5010/11	2	7314	27	Mediante consulta		6314	27	Mediante consulta	
			4	7320	50	2700	2100	6316	34	4500	4200
			6-12			4500	4500				4500
	355H/G	5810/11	2	7314	27	Mediante consulta		6314	27	Mediante consulta	
			4	7322	60	1600	1600	6319	45	3500	3500
			6			3900	2900			4500	4500
			8-12			4500	4500				
	400H/G	6809/10	2	7220	24	Mediante consulta		6220	24	Mediante consulta	
			4	7324	72	1700	1200	6319	45	4500	3500
			6			3300	2500				4500
			8-12			4500	4500				
	450H/G	7009/10	2	7220	31	Mediante consulta		6220	31	Mediante consulta	
			4	7328	93	2900	2000	6322	60	4300	3200
			6			4500	4200			4500	4500
			8-12				4500				

Table 38 - Lubrication interval for ball bearings - W51 HD line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem horizontal Rolamento de rolos	315 G/F	5010/11	4	NU320	50	4500	4200	6316	34	4500	4500
			6 -12			4500	4500				
	355H/G	5810/11	4	NU322	60	3300	3300	6319	45		
			6 -12			4500	4500				
	400H/G	6809/10	4	NU324	72	3500	2400				
			6 -12			4500	4500				
	450H/G	7009/10	4	NU328	93	1100	600	6322	60		
			6			2900	2000				
			8 -12			4500	4500				

Table 39 - Lubrification interval for roller bearings - W51 HD line

ENGLISH

WGOST motors use Mobiltemp SHC 32 grease as standard, suitable for operation at low temperatures, with the ambient temperature ranging from -45°C to +40°C. Table 40 indicates the lubrication intervals for these motors.

Frame IEC	Poles	50 Hz (h)	Frame IEC	Poles	50 Hz (h)	Frame IEC	Poles	50 Hz (h)	Frame IEC	Poles	50 Hz (h)
71	2	20.000	112	2	20.000	200	2	20.000	315	2	7.000
	4			4			4			4	18.000
	6			6			6			6	20.000
	8			8			8			8	
80	2		132	2		225	2	9.000	355	2	6.000
	4			4			4	20.000		4	14.000
	6			6			6			6	20.000
	8			8			8			8	
90	2		160	2		250	2	9.000			
	4			4			4	20.000			
	6			6			6				
	8			8			8				
100	2		180	2		280	2	7.000			
	4			4			4	18.000			
	6			6			6	20.000			
	8			8			8				

Table 40 - Lubrication interval for ball bearings - WGOST line

The lubrication intervals specified in Table 41 consider the rated motor speed, horizontal installation and Mobil Polyrex EM grease. Any variation in the parameters indicated above must be assessed from time to time.

Frame IEC	Poles	DE Bearing	Amount of grease (g)	NDE Bearing	Amount of grease (g)	Ambient Temperature 40 °C		Ambient Temperature 50 °C	
						50 Hz (h)	60 Hz (h)	50 Hz (h)	60 Hz (h)
225S/M	2	6214	15	6212	12	8800	6600	6600	4400
	4					13200	13200	13200	8800
250S/M	2					8800	6600	6600	4400
	4					13200	13200	13200	8800
W280S/M	2	6314	26			6600	4400	4400	3000
	4	6316	33			13200	8800	8800	6600
280S/M	2	6314	26	6314	26	6600	4400	4400	3000
	4	6316	33			13200	8800	8800	6600
	6						13200	8800	8800
W315S/M	2	6314	26			6600	4400	4400	3000
	4	6319	45			8800	8800	6600	4400
	6					13200	13200	8800	6600
315S/M	2	6314	26			6600	4400	4400	3000
	4	6319	45	6316	33	8800	8800	6600	4400
	6					13200	13200	8800	6600
315L	2	6314	26	6314	26	4400	3000	3000	3000
	4	6319	45	6316	33	8800	6600	4400	4400
	6						8800	6600	6600
355M/L	2	6316	33	6314	26	4400	3000	3000	3000
	4	6322	60	6319	45	8800	6600	4400	4400
	6						8800	6600	6600

Table 41 - Lubrication interval for ball bearings - WEG General Purpose and WIN lines

The WEG General Purpose and WIN motor lines with relubrication system (grease fitting and open bearings) in frame sizes 225S/M, 250S/M and W280S/M is provided with a grease storage chamber inside the motor and do not have an opening for its exit. The internal volume destined to store the old grease has the capacity to reach to 7 (seven) relubrications, limited to 5 years of operation, being necessary the grease removal after this period. For each increment of 15 ºC above the bearing temperature, the relubrication intervals given in the Table must be halved. The relubrication interval of motors designed by the manufacturer for mounting in horizontal position, but installed in vertical position (with WEG authorization), must be halved.
For special applications, such as: high and low temperatures, aggressive environments, driven by frequency inverter (VFD - frequency inverter), etc., please contact WEG about the required amount of grease and the relubrication intervals.

8.2.1.1 Motor without grease fitting

Motors without grease fittings must be lubricated in accordance with the existing Maintenance Plan. Motor disassembly must be carried out as specified in Item 8.3. If motors are fitted with shielded bearings (for example, ZZ, DDU, 2RS, VV), these bearings must be replaced at the end of the grease service life.

8.2.1.2 Motor with grease fitting

To lubricate the bearings with the motor stopped, proceed as follows:
- Before lubricating, clean the grease nipple and immediate vicinity thoroughly;
- Lift grease inlet protection;
- Remove the grease outlet plug (not required for motors with automatic grease relief fittings, such as IEEE Std 841);
- Pump in approximately half of the total grease indicated on the motor nameplate and run the motor for about 1 (one) minute at rated speed;
- Switch-off the motor and pump in the remaining grease;
- Lower again the grease inlet protection and reinstall the grease outlet plug.

To grease the motor while running, proceed as follows:
- Before lubricating, clean the grease nipple and immediate vicinity thoroughly;
- Lift grease inlet protection;
- If safe and possible, remove the grease outlet plug;
- Pump the total grease indicated on the motor nameplate;
- Lower again the grease inlet protection and reinstall the grease outlet plug (if removed).

For lubrication, use only manual grease gun.

Due to internal clearances in the motor, it is possible that, in the first re-lubrication of the bearings, the grease will not come out of the grease outlet. Therefore, do not apply excess grease expecting for it to come out.

If Motors are provided with a spring device for grease removal, the grease excess must be removed by pulling the rod and cleaning the spring until the spring does not remove more grease.

8.2.1.3 Compatibility of the Mobil Polyrex EM grease with other greases

The Mobil Polyrex EM grease has a polyurea thickener and a mineral oil and it is not compatible with other greases.
If you need another type of grease, contact WEG.
It is not recommended to mix different types of greases. In such a case, clean the bearings and lubrication channels before applying new grease.
The used grease must have in its formulation corrosion and oxidation inhibitors.

8.2.1.4 Oil lubricated bearings

To change the oil of oil lubricated motor proceed as follows:
- Switch-off the motor;
- Remove threaded oil drain plug;
- Open the valve and drain the oil;
- Close the drain valve again;
- Reinstall the threaded oil drain plug;
- Fill-up with the type and amount of oil as specified on the nameplate;
- Check oil level. The oil level is OK when the lubricant can be viewed approximately in the center of the sight glass;
- Reinstall oil inlet plug;
- Check for oil leaks and ensure that all not used threaded plugs are closed with plugs.

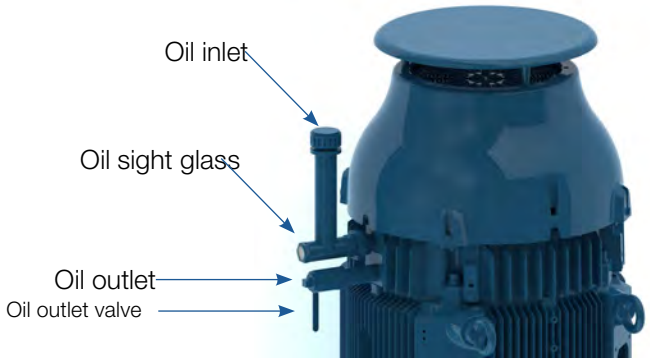


Figure 51 - Oil lubricated bearing - vertical mounting

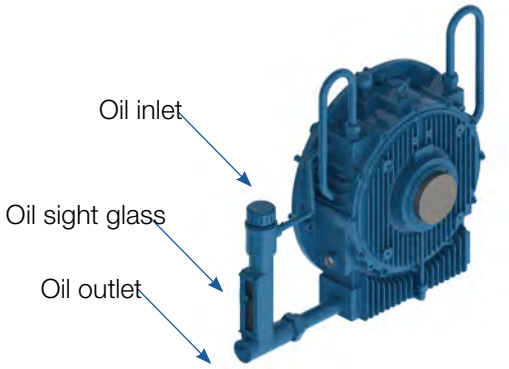


Figure 52 - Oil lubricated bearing - horizontal mounting

The bearing lubricating oil must be replaced as specified on the nameplate or whenever changes in the oil properties are noticed. The oil viscosity and pH must be checked periodically. The oil level must be checked every day and must be kept in the center of the sight glass.
Please contact WEG, when oils with different viscosities should be used.
Note:
The HGF vertical mounted motors with high axial thrust are supplied with grease lubricated DE-bearings and with oil lubricated NDE-bearings. The DE-bearings must be lubricated according to recommendations in item 8.2.1. Table 8.10 specifies the oil type and the amount of oil required for this motor lubrication.

Mounting - high axial thrust	Frame		Poles	Bearing designation	Oil (liters)	Interval (h)	Lubricant	Lubricant specification
	IEC	NEMA						
	315L/A/B and 315C/D/E	5006/7/8T and 5009/10/11T	4 - 8	29320	20	8000	FUCHS Renolin DTA 40 / Mobil SHC 629	ISO VG150 mineral oil with antifoam and antioxidant additives
	355L/A/B and 355C/D/E	5807/8/9T and 5810/11/12T			26			
	400L/A/B and 400C/D/E	6806/7/8T and 6809/10/11T			37			
	450	7006/10			45			

Table 42 - Oil properties for HGF vertical mounted motors with high axial thrust and Vertical High Thrust

8.2.1.5 Oil mist lubricated bearings

Check the service conditions of the seals and if replacement is required use only original components. Clean the seal components before assembly (bearing caps, end shields, etc.).
Apply joint sealant between the bearing caps and end shields. The joint sealant must be compatible with the used lubricating oil. Connect the oil lubricant tubes (oil inlet and oil outlet tubes and motor drain tube), as shown in Figure 40

8.2.1.6 Sleeve bearings

The lubricating oil of sleeve bearings must be changed at the intervals specified in Table 43 To replace the oil, proceed as follows:
- NDE-bearing: remove the protection plate from the fan cover;
- Drain the oil through the drain hole located at the bottom of the bearing (see Figure 53);
- Close the oil drain hole;
- Remove the oil inlet plug;
- Fill the sleeve bearing with the specified oil and with the amount of oil specified in the Table 43;
- Check the oil level and ensure it is kept close to the center of the sight glass;
- Install the oil inlet plug;
- Check for oil leaks.

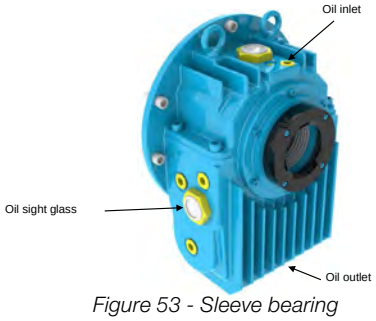


Figure 53 - Sleeve bearing

Frame		Poles	Bearing designation	Oil (liters)	Interval (h)	Lubricant	Lubricant specification
IEC	NEMA						
315	5000	2	9-80	3.6	8000	FUCHS Renolin DTA 10	ISO VG32 mineral oil with antifoam and antioxidant additives
355	5800						
400	6800						
450	7000						
315	5000	4 - 8	9-90		8000	FUCHS Renolin DTA 15	ISO VG46 mineral oil with antifoam and antioxidant additives
355	5800		9-100				
400	6800		11-110	4.7			
450	7000		11-125				
500	8000						

Table 43 - Oil properties for sleeve bearings

The lubricating oil must be replaced as specified on the nameplate or whenever changes on the oil properties are noticed. The oil viscosity and pH must be checked periodically. The oil level must be checked every day and kept in the center of the sight glass.
Please contact WEG, when oils with different viscosities are to be used.

8.3 MOTOR ASSEMBLY AND DISASSEMBLY

All repair services on motors should be always performed by qualified personnel and in accordance with the applicable laws and regulations in each country. Always use proper tools and devices for motor disassembly and assembly.

Disassembly and assembly services can be carried out only after the motor has been disconnected from the power supply and is completely stopped.
Dangerous voltages may be present at the motor terminals inside the terminal box since capacitors can retain electrical charge for long periods of time even when they are not connected directly to a power source or when space heaters are connected to the motor or when the motor windings are used as space heaters.
Dangerous voltages may be present at the motor terminals when they are driven by frequency inverter even when they are completely stopped.

Record the installation conditions such as terminal connection diagram, alignment / leveling conditions before starting the disassembly procedures. These records should be considered for later assembly.
Disassemble the motor carefully without causing scratches on machined surfaces or damaging the threads.
Assemble the motor on a flat surface ensuring a good support base. Footless motors must be fixed/locked on the base to prevent accidents.
Handle the motor carefully to not damage the insulated components such as windings, insulated rolling bearings, power cables etc..
Seal elements, such as joint seals and bearing seals should always be replaced when wear or damage is noticed.
Motors with degree of protection higher than IP55 are supplied with joint and screw seal Loctite 5923 (Henkel)
Clean the components and apply a new coat of Loctite 5923 on the surfaces before assembly.

For motors with permanent magnet rotor (WQuattro and WMagnet motors), the motor assembly and disassembly require the use of proper devices due to the attracting or repelling forces that occur between metallic parts. This work must only be performed by a WEG Authorized service center specifically trained for such an operation. People with pacemakers cannot handle these motors.
The permanent magnets can also cause disturbances or damages to other electric equipment and components during maintenance.

For the W40, W50, W51 HD and HGF motor lines provided with axial fans, the motor and the axial fan have different markings for indicating the direction of rotation for prevent incorrect assembly.
The axial fan must be assembled so that the indicative arrow for direction of rotation is always visible, viewing the non-drive end side. The marking indicated on the axial fan blade, CW for clockwise direction of rotation or CCW for counterclockwise direction of rotation, indicates the direction of rotation of the motor viewing the drive end side.

For motors with encoder, it is necessary to check the radial run out of the encoder seat. The runout should not exceed the limit specified by the encoder manufacturer.

For motors with polymeric fan cover assembled by snap fit, to remove the polymeric fan cover use two screwdrivers or similar tool positioned near the snap fit region and remove one side by lifting carefully, repeat for the other sides until the complete removal of the fan cover.
When assembling polymeric components, the tightening torques specified in Table 28 must be respected.

Engines with fans fixed only by interference on the shaft, if disassembled, the component must be replaced with a new one. For engines that have aluminum injected covers without machining, it is necessary to heat the covers for assembly and disassembly.

8.3.1.1 Terminal box

Proceed as follows to remove the terminal box cover and to disconnect/connect the power supply cables and the cables of the accessory devices:

- Ensure that during the screw removal the terminal box cover does not damage the components installed inside the terminal box;
- If the terminal box cover is fitted with lifting eyebolt, lift the terminal box cover always by its lift eyebolt;
- If motors are supplied with terminal blocks, ensure the correct tightening torque on the motor terminals as specified in Table 44;

For flying leads motors, do not push the overlength of leads into the motor in order to prevent that they touch the rotor.

  - Ensure that the cables do not contact sharp edges;
- Ensure that the original IP degree of protection is not changed and is maintained as indicate on the motor nameplate. The power supply cables and the control cables must always be fitted with components (cable glands, conduits) that meet the applicable standards and regulations of each country;
- Ensure that the pressure relief device is in perfect operating condition, if provided. The seals in the terminal box must be in perfect condition for reuse and must be reinstalled correctly to ensure the specified degree of protection;
- Ensure the correct tightening torque for the securing bolts of the terminal box cover as specified in Table 44.

Screw type and seal	M4	M5	M6	M8	M10	M12	M14	M16	M20
Hex bolt/hex socket bolt (rigid joint)	-	3,5 to 5	6 to 9	14 to 20	28 to 40	45 to 70	75 to 110	115 to 170	230 to 330
Combined slotted screw (rigid joint)	1,5 to 3	3 to 5	5 to 10	10 to 18	-	-	-	-	-
Hex bolt/hex socket bolt (flexible joint)	-	3 to 5	4 to 8	8 to 15	18 to 30	25 to 40	30 to 45	35 to 50	-
Combined slotted screw (flexible joint)	-	3 to 5	4 to 8	8 to 15	-	-	-	-	-
Terminal blocks	1 to 1,5	2 to 4 1)	4 to 6,5	6,5 to 9	10 to 18	15,5 to 30	-	30 to 50	50 to 75
Grounding terminals	1,5 to 3	3 to 5	5 to 10	10 to 18	28 to 40	45 to 70	-	115 to 170	-

Table 44 - Tightening torque for the securing bolts [Nm]

Note: 1) For 12-pin terminal block, apply the minimum torque of 1.5 Nm and maximum torque of 2.5 Nm.

8.4 DRYING THE STATOR WINDING INSULATION

Dismantle the motor completely. Remove the end shields, the rotor with the shaft, the fan cover, the fan and the terminal box before the wound stator with the frame is transferred to the oven for the drying process. Place the wound stator in the oven heated to max. 120 °C for two hours. For larger motors a longer drying time may be required. After the drying process has been concluded, allow the stator to cool to room temperature. Measure the insulation resistance again as described in item 5.4. Repeat the stator drying process if the required insulation resistance does not meet the values specified in Table 3. If the insulation resistance does not improve despite several drying processes, evaluate the causes of the insulation resistance drop carefully and an eventual replacement of the motor winding may be required. If in doubt contact WEG.

To prevent electrical shock, discharge the motor terminals immediately before, and after each measurement. If the motor is equipped with capacitors, these must be discharged before beginning any repair.

Pacemaker users and unqualified personnel shall not open WMagnet and WQuattro motors, because high energy magnets are used.

8.5 SPARE PARTS

When ordering spare parts, always provide complete motor designation, indicating the motor type, the code number and the serial number, which are stated on the motor nameplate.
Spare parts must always be purchased from WEG authorized Service Centers. The use of non-original spare parts can cause motor failure, performance drop and void the product warranty.
The spare parts must be stored in a clean, dry and properly ventilated room, with relative air humidity not exceeding 60%, with ambient temperature between 5 °C and 40 °C, free of dust, vibrations, gases, corrosive smokes and at constant temperature. The spare parts must be stored in their normal mounting position without placing other components onto them.

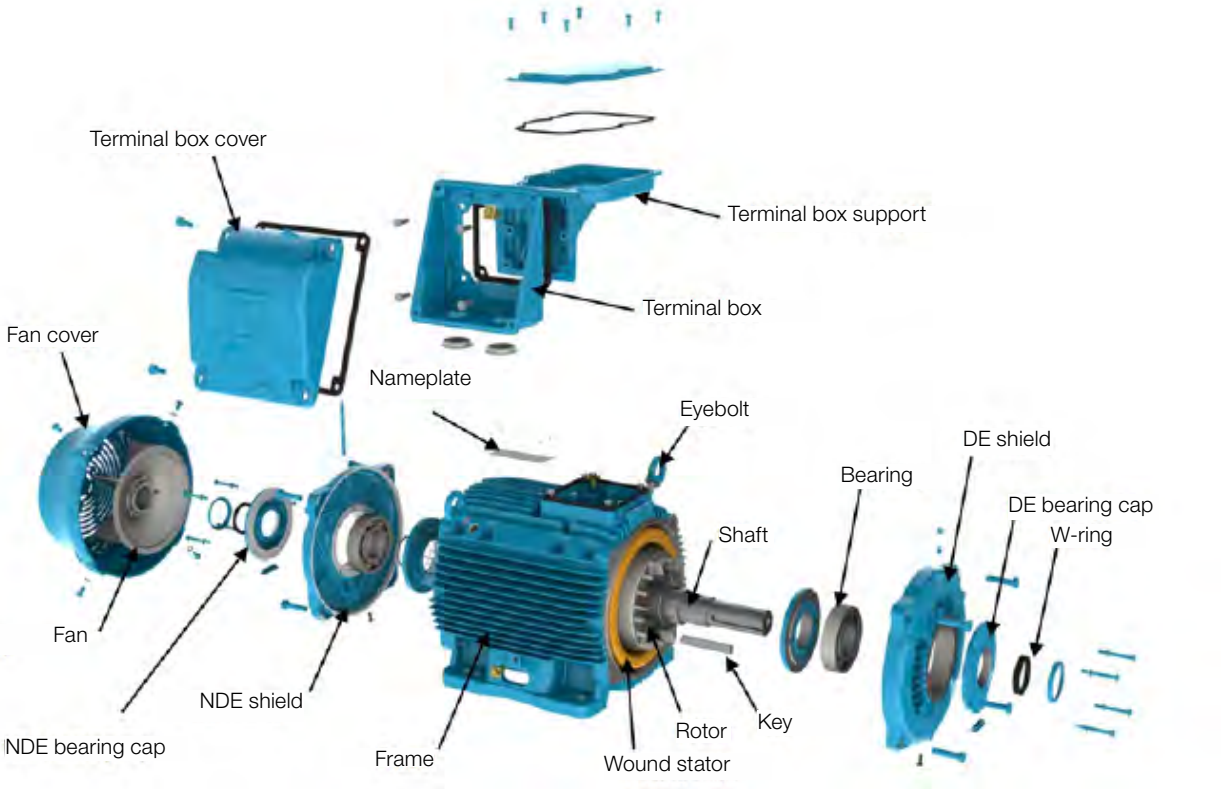


Figure 54 - Exploded view of the components of a W22 motor

9. ENVIRONMENTAL INFORMATION

9.1 PACKAGING

WEG electric motors are supplied in cardboard, plastic or wooden packaging. These materials can be recycled and must be disposed according to the applicable laws and regulations in each country. All wood used in the packaging of WEG motors come from the company reforestation program and is not submitted to any chemical conservation treatment.

9.2 PRODUCT

Electric motors consist mainly of ferrous metals (steel plates and cast iron), non ferrous metals (copper and aluminum) and plastic materials.
In general, electric motors have relatively long service live. However when they must be discarded, WEG recommends to dismantle the motor, sort the different materials and send them for recycling.
No-recyclable materials should be disposed of at industrial landfills according to the applicable environmental laws and regulations in each country, or co-processed in cement kilns or incinerated.
The recycling service providers, the disposal in industrial landfills, the waste co-processing or the incineration process must be properly authorized by the state environment agency to carry out these activities.

10. TROUBLESHOOTING CHART X SOLUTIONS

This troubleshooting chart provides a basic list of problems that may occur during motor operation, possible causes and recommended corrective actions. In case of doubts, please contact WEG Service Center.

Problem	Possible cause	Corrective action
Motor does not start, neither coupled nor decoupled	Power cables are interrupted	Check the control panel and the motor power supply cables
	Blown fuses	Replace blown fuses
	Wrong motor connection	Correct the motor connection according to connection diagram
	Locked rotor	Check motor shaft to ensure that it rotates freely
The motor starts at no-load, but fails when load is applied. It starts very slowly and does not reach the rated speed	Load toque is too high during start-up	Do not start the motor on load
	Too high voltage drop in the power cables	Check the installation dimensioning (transformer, cable cross section, relays, circuit breakers, etc.)
Abnormal/excessive noise	Defective transmission component or defective driven machine	Check the transmission force, the coupling and the alignment
	Misaligned / unleveled base	Align / level the motor with the driven machine
	Unbalanced components or unbalanced driven machine	Balance the machine set again
	Different balancing methods used for motor and coupling balancing (halve key, full key)	Balance the motor again
	Wrong motor direction of rotation	Reverse the direction of rotation
	Loose bolts	Retighten the bolts
	Foundation resonance	Check the foundation design
	Damaged bearings	Replace the bearings
Motor overheating	Insufficient cooling	Clean air inlet and outlet and cooling fins
		Check the minimum required distance between the fan cover and nearest walls. See item 7
		Check air temperature at inlet
	Overload	Measure motor current, evaluate motor application and if required, reduce the load
	Number of starts per hour is too high or the load inertia moment is too high	Reduce the number of starts per hour
	Power supply voltage too high	Check the motor power supply voltage. Power supply voltage must not exceed the tolerance specified in item 7.2
	Power supply voltage too low	Check the motor power supply voltage and the voltage drop. Power supply voltage must not exceed the tolerance specified in item 7.2
	Interrupted power supply	Check the connection of the power cables
	Voltage unbalance at the motor terminals	Check for blown fuses, wrong commands, voltage unbalance in the power line, phase fault or interrupted power cables
	Direction of rotation is not compatible with the unidirectional fan	Check if the direction of rotation matches the rotation arrow indicated on end shield
Bearing overheating	Excessive grease/oil	Clean the bearing and lubricate it according to the provided recommendations
	Grease/oil aging	
	The used grease/oil does not matches the specified one	
	Lack of grease/oil	Lubricate the bearing according to the provided recommendations
	Excessive axial or radial forces due to the belt tension	Reduce the belt tension
		Reduce the load applied to the motor

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The values shown are subject to change without prior notice.
The information contained is reference values.

7.2 IOM for Centrifugal Pumps 01-P-6417-22A/B

GOULDS PUMPS

Installation, Operation, and Maintenance Manual

Model 3196 i-FRAME



ITT

ENGINEERED FOR LIFE

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Introduction and Safety

Introduction

Purpose of this manual

The purpose of this manual is to provide necessary information for:

- Installation
- Operation
- Maintenance



CAUTION:
Failure to observe the instructions contained in this manual could result in personal injury and property damage, and may void the warranty. Read this manual carefully before installing and using the product.

NOTICE:
Save this manual for future reference and keep it readily available.

Requesting other information

Special versions can be supplied with supplementary instruction leaflets. See the sales contract for any modifications or special version characteristics. For instructions, situations, or events that are not considered in this manual or in the sales documents, please contact the nearest ITT representative.

Always specify the exact product type and identification code when requesting technical information or spare parts.

Safety



WARNING:

- The operator must be aware of the pumpage and take appropriate safety precautions to prevent physical injury.
- Risk of serious injury or death. If any pressure-containing device is over-pressurized, it can explode, rupture, or discharge its contents. It is critical to take all necessary measures to avoid over-pressurization.
- Risk of death, serious personal injury, and property damage. Installing, operating, or maintaining the unit using any method not prescribed in this manual is prohibited. Prohibited methods include any modification to the equipment or use of parts not provided by ITT. If there is any uncertainty regarding the appropriate use of the equipment, please contact an ITT representative before proceeding.
- Risk of serious personal injury. Applying heat to impellers, propellers, or their retaining devices can cause trapped liquid to rapidly expand and result in a violent explosion. This manual clearly identifies accepted methods for disassembling units. These methods must be adhered to. Never apply heat to aid in their removal unless explicitly stated in this manual.
- If the pump or motor is damaged or leaking, electric shock, fire, explosion, liberation of toxic fumes, physical harm, or environmental damage may result. Do not operate the unit until the problem has been corrected or repaired.
- Risk of serious personal injury or property damage. Dry running may cause rotating parts within the pump to seize to non-moving parts. Do not run dry.
- Risk of death, serious personal injury, and property damage. Heat and pressure buildup can cause explosion, rupture, and discharge of pumpage. Never operate the pump with suction and/or discharge valves closed.
- Running a pump without safety devices exposes operators to risk of serious personal injury or death. Never operate a unit unless appropriate safety devices (guards, etc.) are properly installed. See specific information about safety devices in other sections of this manual.



CAUTION:
Risk of injury and/or property damage. Operating a pump in an inappropriate application can cause over pressurization, overheating, and/or unstable operation. Do not change the service application without the approval of an authorized ITT representative.

Safety terminology and symbols

About safety messages

It is extremely important that you read, understand, and follow the safety messages and regulations carefully before handling the product. They are published to help prevent these hazards:

- Personal accidents and health problems
- Damage to the product
- Product malfunction

Hazard levels

Hazard level	Indication
 **DANGER:**	A hazardous situation which, if not avoided, will result in death or serious injury

Hazard level	Indication
WARNING:	A hazardous situation which, if not avoided, could result in death or serious injury
CAUTION:	A hazardous situation which, if not avoided, could result in minor or moderate injury
NOTICE:	· A potential situation which, if not avoided, could result in undesirable conditions · A practice not related to personal injury

Hazard categories

Hazard categories can either fall under hazard levels or let specific symbols replace the ordinary hazard level symbols.

Electrical hazards are indicated by the following specific symbol:



Electrical Hazard:

These are examples of other categories that can occur. They fall under the ordinary hazard levels and may use complementing symbols:

- Crush hazard
- Cutting hazard
- Arc flash hazard

The Ex symbol

The Ex symbol indicates safety regulations for Ex-approved products when used in atmospheres that are potentially explosive or flammable.



Environmental safety

The work area

Always keep the station clean to avoid and/or discover emissions.

Waste and emissions regulations

Observe these safety regulations regarding waste and emissions:

- Appropriately dispose of all waste.
- Handle and dispose of the processed liquid in compliance with applicable environmental regulations.
- Clean up all spills in accordance with safety and environmental procedures.
- Report all environmental emissions to the appropriate authorities.



WARNING:
If the product has been contaminated in any way, such as from toxic chemicals or nuclear radiation, do NOT send the product to ITT unless it has been properly decontaminated.

Electrical installation

For electrical installation recycling requirements, consult your local electric utility.

Recycling guidelines

Always follow local laws and regulations regarding recycling.

User safety

General safety rules

These safety rules apply:

- Always keep the work area clean.
- Pay attention to the risks presented by gas and vapors in the work area.
- Avoid all electrical dangers. Pay attention to the risks of electric shock or arc flash hazards.
- Always bear in mind the risk of drowning, electrical accidents, and burn injuries.

Safety equipment

Use safety equipment according to the company regulations. Use this safety equipment within the work area:

- Helmet
- Safety goggles, preferably with side shields
- Protective shoes
- Protective gloves
- Gas mask
- Hearing protection
- First-aid kit
- Safety devices

Electrical connections

Electrical connections must be made by certified electricians in compliance with all international, national, state, and local regulations. For more information about requirements, see sections dealing specifically with electrical connections.

Precautions before work

Observe these safety precautions before you work with the product or are in connection with the product:

- Provide a suitable barrier around the work area, for example, a guard rail.
- Make sure that all safety guards are in place and secure.
- Make sure that you have a clear path of retreat.
- Make sure that the product cannot roll or fall over and injure people or damage property.
- Make sure that the lifting equipment is in good condition.
- Use a lifting harness, a safety line, and a breathing device as required.
- Allow all system and pump components to cool before you handle them.
- Make sure that the product has been thoroughly cleaned.
- Disconnect and lock out power before you service the pump.
- Check the explosion risk before you weld or use electric hand tools.

Precautions during work

Observe these safety precautions when you work with the product or are in connection with the product:



CAUTION:
Failure to observe the instructions contained in this manual could result in personal injury and property damage, and may void the warranty. Read this manual carefully before installing and using the product.

- Never work alone.
- Always wear protective clothing and hand protection.
- Stay clear of suspended loads.
- Always lift the product by its lifting device.
- Beware of the risk of a sudden start if the product is used with an automatic level control.
- Beware of the starting jerk, which can be powerful.
- Rinse the components in water after you disassemble the pump.
- Do not exceed the maximum working pressure of the pump.
- Do not open any vent or drain valve or remove any plugs while the system is pressurized. Make sure that the pump is isolated from the system and that pressure is relieved before you disassemble the pump, remove plugs, or disconnect piping.
- Never operate a pump without a properly installed coupling guard.
- The coupling guard used in an ATEX classified environment must be constructed from a non-sparking material.

Hazardous liquids

The product is designed for use in liquids that can be hazardous to your health. Observe these rules when you work with the product:

- Make sure that all personnel who work with biologically hazardous liquids are vaccinated against diseases to which they may be exposed.
- Observe strict personal cleanliness.
- A small amount of liquid will be present in certain areas like the seal chamber.

Wash the skin and eyes

1. Follow these procedures for chemicals or hazardous fluids that have come into contact with your eyes or your skin:

Condition	Action
Chemicals or hazardous fluids in eyes	1. Hold your eyelids apart forcibly with your fingers. 2. Rinse the eyes with eyewash or running water for at least 15 minutes. 3. Seek medical attention.
Chemicals or hazardous fluids on skin	1. Remove contaminated clothing. 2. Wash the skin with soap and water for at least 1 minute. 3. Seek medical attention, if necessary.

Ex-approved products

Follow these special handling instructions if you have an Ex-approved unit.

Personnel requirements

These are the personnel requirements for Ex-approved products in potentially explosive atmospheres:

- All work on the product must be carried out by certified electricians and ITT-authorized mechanics. Special rules apply to installations in explosive atmospheres.
- All users must know about the risks of electric current and the chemical and physical characteristics of the gas, the vapor, or both present in hazardous areas.
- Any maintenance for Ex-approved products must conform to international and national standards (for example, IEC/EN 60079-17).

ITT disclaims all responsibility for work done by untrained and unauthorized personnel.

Product and product handling requirements

These are the product and product handling requirements for Ex-approved products in potentially explosive atmospheres:

- Only use the product in accordance with the approved motor data.

- The Ex-approved product must never run dry during normal operation. Dry running during service and inspection is only permitted outside the classified area.
- Before you start work on the product, make sure that the product and the control panel are isolated from the power supply and the control circuit, so they cannot be energized.
- Do not open the product while it is energized or in an explosive gas atmosphere.
- Make sure that thermal contacts are connected to a protection circuit according to the approval classification of the product, and that they are in use.
- Intrinsically safe circuits are normally required for the automatic level-control system by the level regulator if mounted in zone 0.
- The yield stress of fasteners must be in accordance with the approval drawing and the product specification.
- Do not modify the equipment without approval from an authorized ITT representative.
- Only use parts that are provided by an authorized ITT representative.

Product approval standards

Regular standards



WARNING:
Use of equipment unsuitable for the environment can pose risks of ignition and/or explosion. Ensure that the code classifications on the pump are compatible with the specific environment in which the equipment is to be installed. If they are not compatible, do not operate the equipment and contact an ITT representative before proceeding.

All standard products are approved according to CSA standards in Canada and UL standards in USA. The drive unit degree of protection follows IP68. See the nameplate for maximum submersion, according to standard IEC 60529.

All electrical ratings and performance of the motors comply with IEC 600341.

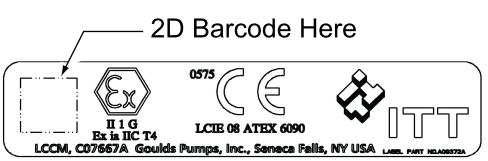
Explosion-proofing standards

All explosion-proof products for use in explosive atmospheres are designed in compliance with one or more of the following approvals:

- EN, ATEX Directive 94/9/EC
- FM According to NEC
  - Class 1 Div 1 Groups “C”, and “D”
  - Class 2 Div 1 Groups “E”, “F”, and “G”
  - Class 3 Div 1 Hazardous Locations

ATEX/IECEx:

- Group: IIC
- Category: Ex ia
- Temperature Class: T4 (for ambients up to 100ºC)
- ATEX Marking: Ex II 1 G

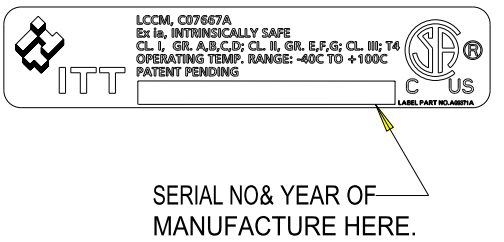


CSA certification

Intrinsically safe for:

- Class I, Div. 1, Groups A, B, C, D
- Class II, Div. 1, Groups E, F, G

- Class III
- Certified to Canadian and US requirements



Product warranty

Coverage

ITT undertakes to remedy faults in products from ITT under these conditions:

- The faults are due to defects in design, materials, or workmanship.
- The faults are reported to an ITT representative within the warranty period.
- The product is used only under the conditions described in this manual.
- The monitoring equipment incorporated in the product is correctly connected and in use.
- All service and repair work is done by ITT-authorized personnel.
- Genuine ITT parts are used.
- Only Ex-approved spare parts and accessories authorized by ITT are used in Ex-approved products.

Limitations

The warranty does not cover faults caused by these situations:

- Deficient maintenance
- Improper installation
- Modifications or changes to the product and installation made without consulting ITT
- Incorrectly executed repair work
- Normal wear and tear

ITT assumes no liability for these situations:

- Bodily injuries
- Material damages
- Economic losses

Warranty claim

ITT products are high-quality products with expected reliable operation and long life. However, should the need arise for a warranty claim, then contact your ITT representative.

Transportation and Storage

Inspect the delivery

Inspect the package

1. Inspect the package for damaged or missing items upon delivery.
2. Note any damaged or missing items on the receipt and freight bill.
3. File a claim with the shipping company if anything is out of order.
   If the product has been picked up at a distributor, make a claim directly to the distributor.

Inspect the unit

1. Remove packing materials from the product.
   Dispose of all packing materials in accordance with local regulations.
2. Inspect the product to determine if any parts have been damaged or are missing.
3. If applicable, unfasten the product by removing any screws, bolts, or straps.
   For your personal safety, be careful when you handle nails and straps.
4. Contact your sales representative if anything is out of order.

Transportation guidelines

Pump handling



WARNING:
Dropping, rolling or tipping units, or applying other shock loads, can cause property damage and personal injury. Ensure that the unit is properly supported and secure during lifting and handling.



CAUTION:
Risk of injury or equipment damage from use of inadequate lifting devices. Ensure lifting devices (such as chains, straps, forklifts, cranes, etc.) are rated to sufficient capacity.

Lifting methods



WARNING:

- Risk of serious personal injury or equipment damage. Proper lifting practices are critical to safe transport of heavy equipment. Ensure that practices used are in compliance with all applicable regulations and standards.
- Safe lifting points are specifically identified in this manual. It is critical to lift the equipment only at these points. Integral lifting eyes or eye bolts on pump and motor components are intended for use in lifting the individual components only.
- Lifting and handling heavy equipment poses a crush hazard. Use caution during lifting and handling and wear appropriate Personal Protective Equipment (PPE, such as steel-toed shoes, gloves, etc.) at all times. Seek assistance if necessary.

Table 1: Methods

Pump type	Lifting method
A bare pump without lifting handles	Use a suitable sling attached properly to solid points like the casing, the flanges, or the frames.
A bare pump with lifting handles	Lift the pump by the handles.
A base-mounted pump	Use slings under the pump casing and the drive unit, or under the base rails.

Examples

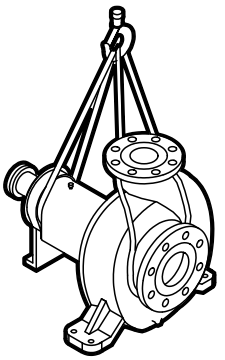
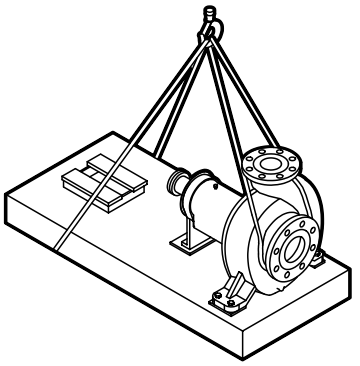
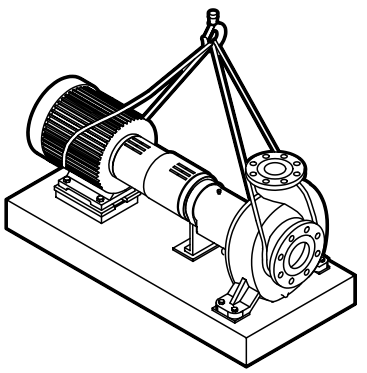


Figure 1: Example of a proper lifting method



NOTICE:
Do not use this method to lift a Polyshield ANSI Combo with the pump and motor mounted. These items are not designed to handle the heavy weight of the Polyshield system. Doing so may result in equipment damage.

Figure 2: Example of a proper lifting method



NOTICE:
Do not use this method to lift a Polyshield ANSI Combo with the pump and motor mounted. These items are not designed to handle the heavy weight of the Polyshield system. Doing so may result in equipment damage.

Figure 3: Example of a proper lifting method

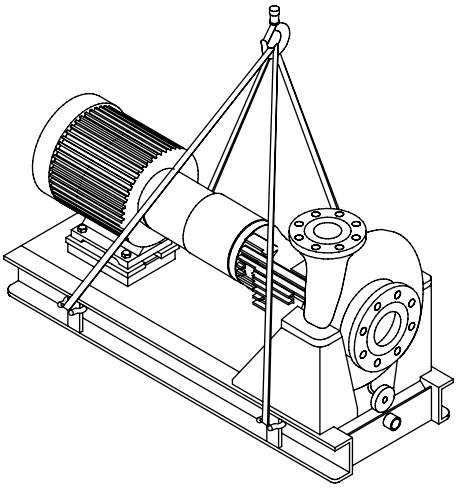


Figure 4: Example of a proper lifting method

NOTICE:

When lifting a unit for which a strap cannot be secured at the suction flange, secure the strap through the frame/frame adapter. Securing at the frame adapter will prevent slipping of the strap and possible equipment damage.

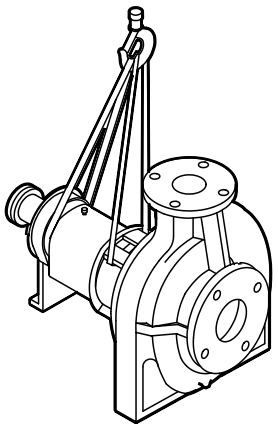


Figure 5: Example of a proper lifting method with a strap secured around the frame adapter

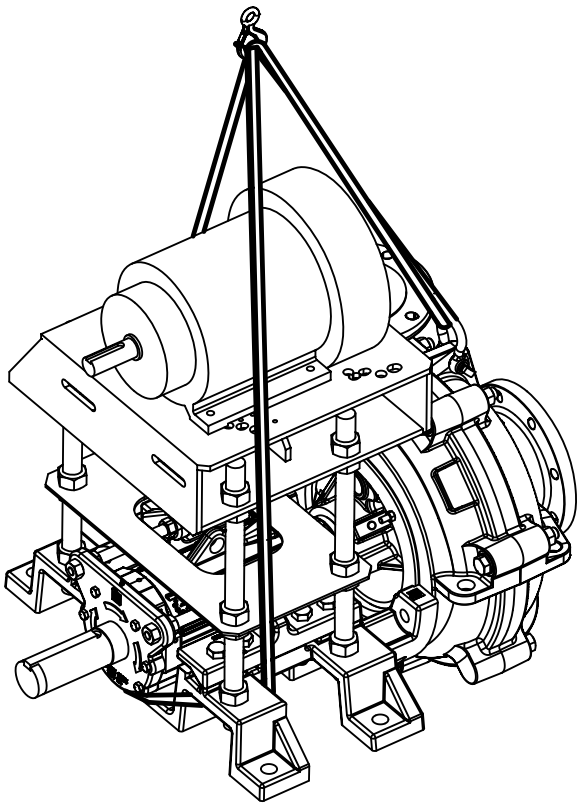


Figure 6: Example of offset overhead motor mount pump proper lifting method

Storage guidelines

Pump storage requirements

Storage requirements depend on the amount of time that you store the unit. The normal packaging is designed only to protect the unit during shipping.

Length of time in storage	Storage requirements
Upon receipt/short-term (less than six months)	· Store in a covered and dry location. · Store the unit free from dirt and vibrations.
Long-term (more than six months)	· Store in a covered and dry location. · Store the unit free from heat, dirt, and vibrations. · Rotate the shaft by hand several times at least every three months.

Treat bearing and machined surfaces so that they are well preserved. Refer to drive unit and coupling manufacturers for their long-term storage procedures.

You can purchase long-term storage treatment with the initial unit order or you can purchase it and apply it after the units are already in the field. Contact your local ITT sales representative.

Frostproofing

Table 2: Situations when the pump is or is not frostproof

Situation	Condition
Operating	The pump is frostproof.
Immersed in a liquid	The pump is frostproof.
Lifted out of a liquid into a temperature below freezing	The impeller might freeze.

Product Description

General description 3196 i-FRAME

The 3196 i-FRAME is a horizontal overhung, open impeller, centrifugal pump. This pump is ANSI B73.1 compliant.

The model is based on 5 power ends and 31 hydraulic sizes.



Figure 7: 3196 i-FRAME pump

This table shows the number of hydraulic sizes available for each drive-unit size group.

Drive-unit size group	Number of hydraulic sizes
STi	5
MTi	15
LTi	15
XLT-i	6
i-17	5

WARNING:
Use of equipment unsuitable for the environment can pose risks of ignition and/or explosion. Ensure that the code classifications on the pump are compatible with the specific environment in which the equipment is to be installed. If they are not compatible, do not operate the equipment and contact an ITT representative before proceeding.

Part description 3196

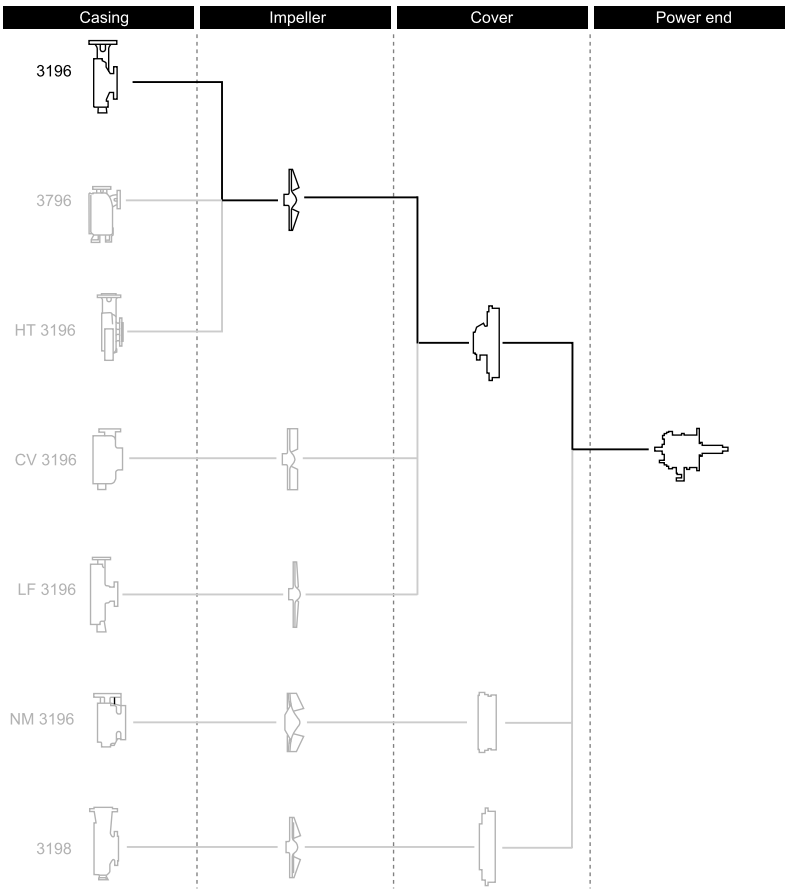


Figure 8: 3196 part description

Table 3: Casing

This table describes the pump casing parts.

Part	Description
Discharge	Top-centerline
Casing ventilation	Self venting
Gasket	Fully confined
Mounting method	Integral foot support for maximum resistance to misalignment due to piping loads.
Standard flange	ANSI flat-faced serrated flange
Optional flanges	One of the following flanges can be used: · ANSI class 150 raised-face serrated flange · ANSI class 300 flat-face serrated flange · ANSI class 300 raised-face serrated flange

Impeller

The impeller is

- fully open
- threaded onto the shaft

The threads are sealed from the pumped liquid by a PTFE O-ring for the 3196.

Cover

Standard

- Stuffing Box cover designed for packing or a mechanical seal
- BigBore or TaperBore® PLUS seal chambers designed for improved performance of mechanical seals

Optional sealing design

- a dynamic seal is available which uses a repeller to pump liquid out of the stuffing box while the pump operates. A static seal prevents leakage when the pump is shut down.

Table 4: Power end

This table describes the main parts of the power end.

Part	Description
Frame adapter	The ductile iron frame adapter has · a machined rabbet fit to the seal chamber/ stuffing box cover · a precision dowel pin fit to the bearing frame.
Power end	· Flood-oil lubrication is standard. · Oil-mist, regreasable and greased-for-life options are available. · The oil level is checked through a sight glass. · The power end is sealed with labyrinth seals. · The power end is made in the following sizes: · STi · MTi · LTi · XLT-i · i-17
Shaft	The shaft is available with or without a sleeve.
Bearings	The inboard bearing · carries only radial loads. · is free to float axially in the frame. · is a single-row deep-groove ball bearing The outboard bearing · is shouldered and locked to the shaft and housing to enable it to carry radial and thrust loads. · is a double-row angular-contact bearing, except for the LTi which uses a pair of single-row angular-contact ball bearings mounted back-to-back.

General description i-ALERT® Condition Monitor

Description

The i-ALERT®2 Condition Monitor is a compact, battery-operated monitoring device that continuously measures the vibration and temperature of the pump power end. The condition monitor uses blinking red LEDs to alert the pump operator when the pump exceeds pre-set vibration and temperature limits. This allows the pump operator to make changes to the process or the pump before a catastrophic failure occurs. The condition monitor is also equipped with a single green LED to indicate when it is operational and has sufficient battery life. (i-ALERT®2) Bluetooth Equipment Health Monitor option available. The i-ALERT®2 monitor allows customers to identify potential problems before they become costly failures. It tracks vibration, temperature and run-time hours and wirelessly syncs the data with a smart phone or tablet the i-ALERT®2 mobile app. More information available on *http://www.ittproservices.com/aftermarket-products/monitoring/i-alert2/*i-ALERT2.com).

Software License Agreement

BY USING THE i-ALERT®2 CONDITION MONITOR, YOU AGREE TO BE BOUND BY THE TERMS AND CONDITIONS OF THE FOLLOWING LICENSE AGREEMENT. PLEASE READ THIS AGREEMENT CAREFULLY.

ITT Corporation and its subsidiaries, affiliates, either directly, or through its authorized sublicensees ("ITT") grants you a limited, non-exclusive license to use the software embedded in this device ("Software") in binary executable form in the normal operation of the i-ALERT®2 condition monitor for monitoring the condition of an Goulds Pump Inc. model. Title, ownership rights, and intellectual property rights in and to the Software remain in ITT or its third-party

providers. You agree that this license agreement does not need to be signed for it to take effect.

You acknowledge that this Software is the property of ITT and is protected under United States of America copyright laws and international copyright treaties. You further acknowledge that the structure, organization, and code of the Software are valuable trade secrets of ITT and/or its third-party providers and that the Software in source code form remains a valuable trade secret of ITT. You agree not to decompile, disassemble, modify, reverse assemble, reverse engineer, or reduce to human readable form the Software or any part thereof or create any derivative works based on the Software. You agree not to export or re-export the Software to any country in violation of the export control laws of the United States of America.

Alarm mode

The condition monitor enters alarm mode when either vibration or temperature limits are exceeded over two consecutive readings within a ten minute period. Alarm mode is indicated with two red flashing LEDs within two second intervals.

Temperature and vibration limits

Variable	Limit
Temperature	91°C | 195°F
Vibration	100% increase over the baseline level

Battery life

The i-ALERT®2 Condition Monitor battery is not replaceable. You must replace the entire unit once the battery runs out of power.

The battery life is not covered as part of the standard pump warranty.

This table shows the average condition monitor battery life under normal and alarm-mode operating conditions.

Condition monitor operational state	Battery life
Normal operating and environmental conditions	Three to five years
Alarm mode	One year

Nameplate information

Important information for ordering

Every pump has nameplates that provide information about the pump. The nameplates are located on the casing and the bearing frame.

When you order spare parts, identify this pump information:

- Model
- Size
- Serial number
- Item numbers of the required parts

Refer to the nameplate on the pump casing for most of the information. See Parts List for item numbers.

Nameplate types

Nameplate	Description
Pump casing Pump	Provides information about the hydraulic characteristics of the pump. The formula for the pump size is: Discharge x Suction - Nominal Maximum Impeller Diameter in inches. (Example: 2x3-8)
Bearing frame	Provides information about the lubrication system used.
ATEX	If applicable, your pump unit might have an ATEX nameplate affixed to the pump, the baseplate, or the discharge head. The nameplate provides information about the ATEX specifications of this pump.
IECEx	If applicable, your pump unit might have the following IECEx nameplate affixed to the pump and/or baseplate. The nameplate provides information about the IECEx specifications of this pump.

Nameplate on the pump casing using English units

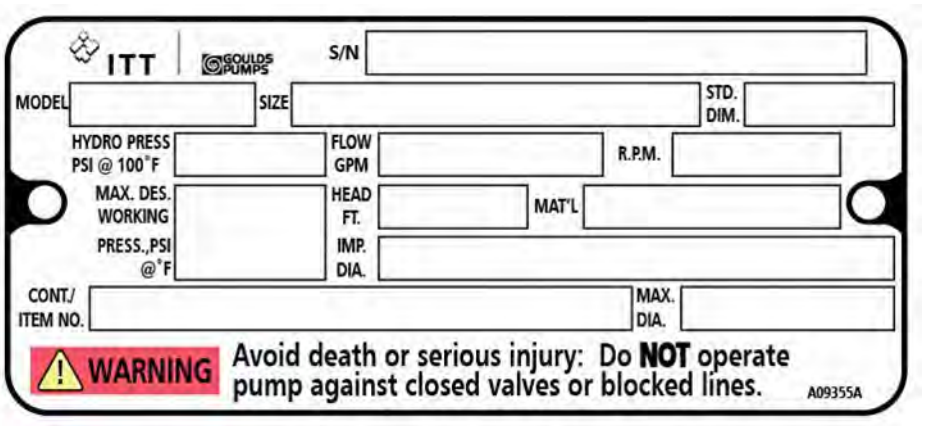


Figure 9: Nameplate on the pump casing using English units

Table 5: Explanation of nameplate on the pump casing

Nameplate field	Explanation
IMPLR. DIA.	Impeller diameter, in inches
MAX. DIA.	Maximum impeller diameter, in inches
GPM	Rated pump flow, in gallons per minute
FT HD	Rated pump head, in feet
RPM	Rated pump speed, revolutions per minute
MOD.	Pump model
SIZE	Size of the pump
STD. NO.	ANSI standard designation
MAT L. CONST.	Material of which the pump is constructed
SER. NO.	Serial number of the pump
MAX DSGN PSI @ 100ºF	Maximum pressure at 100ºF according to the pump design

Nameplate on the pump casing using metric units

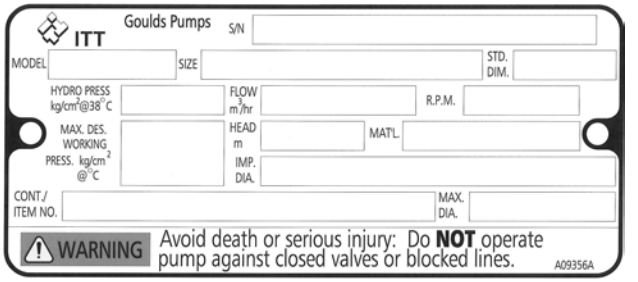


Figure 10: Metric units - nameplate on pump casing

Table 6: Explanation of the nameplate on the pump casing

Nameplate field	Explanation
IMPLR. DIA.	Impeller diameter
MAX. DIA.	Maximum impeller diameter
M^3/HR	Rated pump flow, in cubic meters per hour
M HD	Rated pump head, in meters
RPM	Rated pump speed, in revolutions per minute
MOD.	Pump model
SIZE	Size of the pump
STD. NO.	ANSI standard designation
MAT L. CONST	Material of which the pump is constructed
SER. NO.	Serial number of the pump
MAX. DSGN KG/CM^3 @ 20°C	Kilograms per cubic centimeter at 20°C

Nameplate on the bearing frame

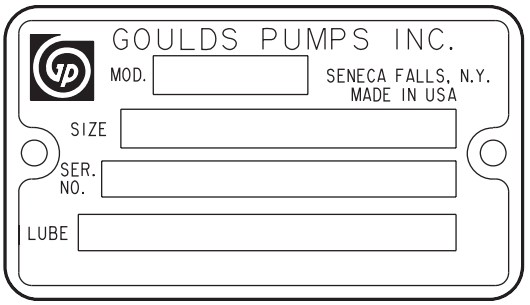


Figure 11: Nameplate on the bearing frame

Table 7: Explanation of the nameplate on the bearing frame

Nameplate field	Explanation
BRG. O. B.	Outboard bearing designation
BRG. I. B.	Inboard bearing designation
S/N	Serial number of the pump
LUBE	Lubricant, oil or grease

ATEX nameplate



Figure 12: ATEX nameplate

Nameplate field	Explanation
II	Group 2
2	Category 2

Nameplate field	Explanation
G/D	Pump can be used when gas and dust are present
T4	Temperature class



WARNING:
Use of equipment unsuitable for the environment can pose risks of ignition and/or explosion. Ensure that the code classifications on the pump are compatible with the specific environment in which the equipment is to be installed. If they are not compatible, do not operate the equipment and contact an ITT representative before proceeding.

Nameplate information

Important information for ordering

Every pump has nameplates that provide information about the pump. The nameplates are located on the casing and the bearing frame.

When you order spare parts, identify this pump information:

- Model
- Size
- Serial number
- Item numbers of the required parts

Refer to the nameplate on the pump casing for most of the information. See Parts List for item numbers.

Nameplate types

Nameplate	Description
Pump casing Pump	Provides information about the hydraulic characteristics of the pump. The formula for the pump size is: Discharge x Suction - Nominal Maximum Impeller Diameter in inches. (Example: 2x3-8)
Bearing frame	Provides information about the lubrication system used.
ATEX	If applicable, your pump unit might have an ATEX nameplate affixed to the pump, the baseplate, or the discharge head. The nameplate provides information about the ATEX specifications of this pump.
IECEx	If applicable, your pump unit might have the following IECEx nameplate affixed to the pump and/or baseplate. The nameplate provides information about the IECEx specifications of this pump.

Nameplate on the pump casing using English units

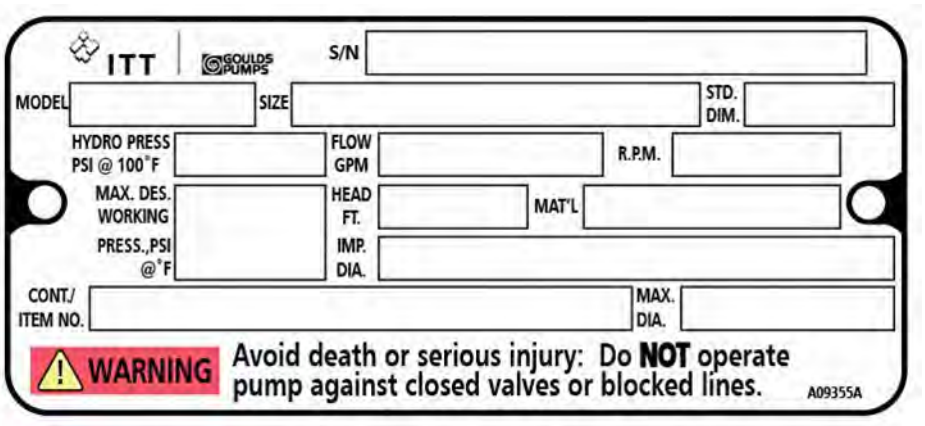


Figure 13: Nameplate on the pump casing using English units

Table 8: Explanation of nameplate on the pump casing

Nameplate field	Explanation
IMPLR. DIA.	Impeller diameter, in inches
MAX. DIA.	Maximum impeller diameter, in inches
GPM	Rated pump flow, in gallons per minute
FT HD	Rated pump head, in feet
RPM	Rated pump speed, revolutions per minute
MOD.	Pump model
SIZE	Size of the pump
STD. NO.	ANSI standard designation
MAT L. CONST.	Material of which the pump is constructed
SER. NO.	Serial number of the pump
MAX DSGN PSI @ 100ºF	Maximum pressure at 100ºF according to the pump design

Nameplate on the pump casing using metric units

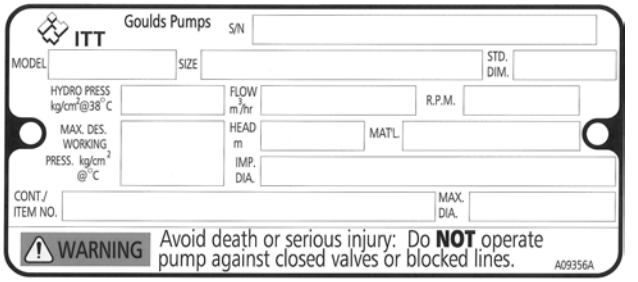


Figure 14: Metric units - nameplate on pump casing

Table 9: Explanation of the nameplate on the pump casing

Nameplate field	Explanation
IMPLR. DIA.	Impeller diameter
MAX. DIA.	Maximum impeller diameter
M^3/HR	Rated pump flow, in cubic meters per hour
M HD	Rated pump head, in meters
RPM	Rated pump speed, in revolutions per minute
MOD.	Pump model
SIZE	Size of the pump
STD. NO.	ANSI standard designation
MAT L. CONST	Material of which the pump is constructed
SER. NO.	Serial number of the pump
MAX. DSGN KG/CM^3 @ 20°C	Kilograms per cubic centimeter at 20°C

Nameplate on the bearing frame

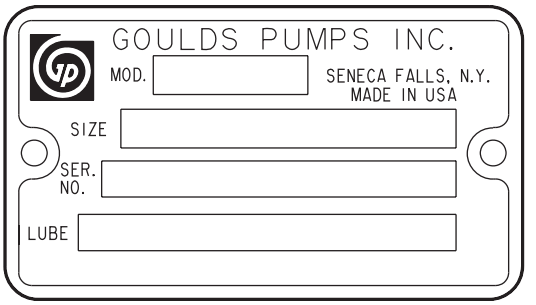


Figure 15: Nameplate on the bearing frame

Table 10: Explanation of the nameplate on the bearing frame

Nameplate field	Explanation
BRG. O. B.	Outboard bearing designation
BRG. I. B.	Inboard bearing designation
S/N	Serial number of the pump
LUBE	Lubricant, oil or grease

ATEX nameplate



Figure 16: ATEX nameplate

Nameplate field	Explanation
II	Group 2
2	Category 2

Nameplate field	Explanation
G/D	Pump can be used when gas and dust are present
T4	Temperature class



WARNING:
Use of equipment unsuitable for the environment can pose risks of ignition and/or explosion. Ensure that the code classifications on the pump are compatible with the specific environment in which the equipment is to be installed. If they are not compatible, do not operate the equipment and contact an ITT representative before proceeding.

Installation

Preinstallation

Precautions



WARNING:

- (Ex) When installing in a potentially explosive environment, ensure that the motor is properly certified.
- (Ex) All equipment being installed must be properly grounded to prevent unexpected discharge. Discharge can cause equipment damage, electric shock, and result in serious injury. Test the ground lead to verify it is connected correctly.

NOTICE:

- Electrical connections must be made by certified electricians in compliance with all international, national, state and local regulations.
- Supervision by an authorized ITT representative is recommended to ensure proper installation. Improper installation may result in equipment damage or decreased performance.

Pump location guidelines

Guideline	Explanation/comment
Keep the pump as close to the liquid source as practically possible.	This minimizes the friction loss and keeps the suction piping as short as possible.
Make sure that the space around the pump is sufficient.	This facilitates ventilation, inspection, maintenance, and service.
If you require lifting equipment such as a hoist or tackle, make sure that there is enough space above the pump.	This makes it easier to properly use the lifting equipment and safely remove and relocate the components to a safe location.
Protect the unit from weather and water damage due to rain, flooding, and freezing temperatures.	This is applicable if nothing else is specified.
Do not install and operate the equipment in closed systems unless the system is constructed with properly-sized safety devices and control devices.	Acceptable devices: · Pressure relief valves · Compression tanks · Pressure controls · Temperature controls · Flow controls If the system does not include these devices, consult the engineer or architect in charge before you operate the pump.
Take into consideration the occurrence of unwanted noise and vibration.	The best pump location for noise and vibration absorption is on a concrete floor with subsoil underneath.
If the pump location is overhead, undertake special precautions to reduce possible noise transmission.	Consider a consultation with a noise specialist.

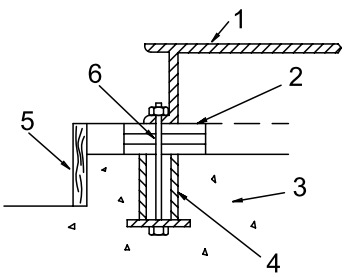
Foundation requirements

Requirements

- The foundation must be able to absorb any type of vibration and form a permanent, rigid support for the unit.
- The location and size of the foundation bolt holes must match those shown on the assembly drawing provided with the pump data package.

- The foundation must weigh between two and three times the weight of the pump.
- Provide a flat, substantial concrete foundation in order to prevent strain and distortion when you tighten the foundation bolts.

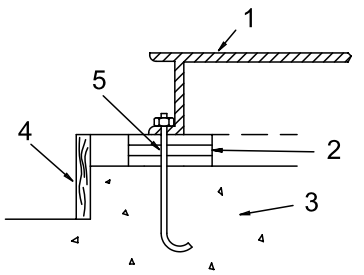
Sleeve-type bolts



1. Baseplate
2. Shims or wedges
3. Foundation
4. Sleeve
5. Dam
6. Bolt

Figure 17: Sleeve type bolts

J-type bolts



1. Baseplate
2. Shims or wedges
3. Foundation
4. Dam
5. Bolt

Figure 18: J-type bolts

Baseplate-mounting procedures

Prepare the baseplate for mounting

1. Remove all the attached equipment from the baseplate.
2. Clean the underside of the baseplate completely.
3. If applicable, coat the underside of the baseplate with an epoxy primer.
   Use an epoxy primer only if you used an epoxy-based grout.
4. Remove the rust-proofing coat from the machined mounting pads using an appropriate solvent.
5. Remove water and debris from the foundation-bolt holes.

Install the baseplate using shims or wedges

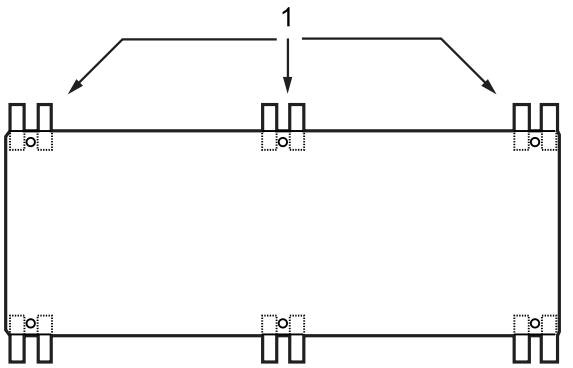
Required tools:

- Two sets of shims or wedges for each foundation bolt

- Two machinist's levels
- Baseplate-leveling worksheet

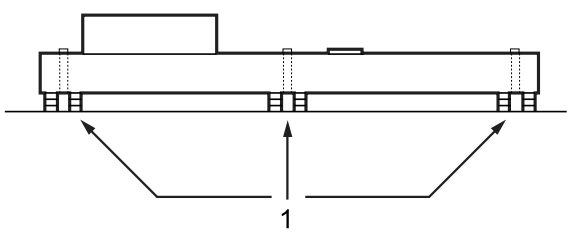
This procedure is applicable to cast iron and fabricated steel baseplates.

1. If you use sleeve-type bolts, fill the bolt sleeves with packing material or rags to prevent grout from entering the bolt holes.
2. Put the sets of wedges or shims on each side of each foundation bolt.
   The sets of wedges should have a height of between 19 mm | 0.75 in. and 38 mm | 1.50 in.



1. Shims or wedges

Figure 19: Top view



1. Shims or wedges

Figure 20: Side view

3. Lower the baseplate carefully onto the foundation bolts.
4. Put the machinist's levels across the mounting pads of the driver and the mounting pads of the pump.

NOTICE:
Remove all dirt from the mounting pads in order to ensure that the correct leveling is achieved. Failure to do so can result in equipment damage or decreased performance.

5. Level the baseplate both lengthwise and across by adding or removing shims or moving the wedges.
   These are the leveling tolerances:
   - A maximum difference of 3.2 mm | 0.125 in. lengthwise
   - A maximum difference of 1.5 mm | 0.059 in. across

   You can use the baseplate-leveling worksheet when you take the readings.
6. Hand-tighten the nuts for the foundation.

Install the baseplate using jackscrews

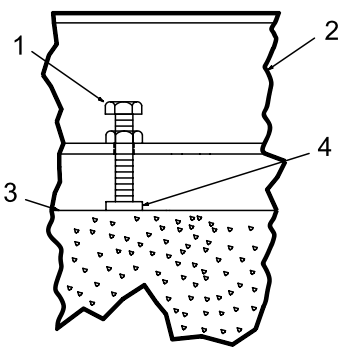
Tools required:

- Anti-seize compound
- Jackscrews
- Bar stock
- Two machinist's levels

- Baseplate-leveling worksheet

This procedure is applicable to the feature-fabricated steel baseplate and the advantage base baseplate.

1. Apply an anti-seize compound on the jackscrews.
   The compound makes it easier to remove the screws after you grout.
2. Lower the baseplate carefully onto the foundation bolts and perform these steps:
   a) Cut the plates from the bar stock and chamfer the edges of the plates in order to reduce stress concentrations.
   b) Put the plates between the jackscrews and the foundation surface.
   c) Use the four jackscrews in the corners in order to raise the baseplate above the foundation.
      Make sure that the distance between the baseplate and the foundation surface is between 19 mm | 0.75 in. and 38 mm | 1.50 in.
   d) Make sure that the center jackscrews do not touch the foundation surface yet.



1. Jackscrew
2. Baseplate
3. Foundation
4. Plate

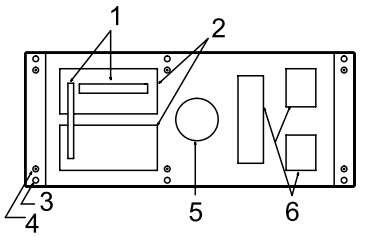
Figure 21: Jackscrews

3. Level the driver mounting pads:

NOTICE:
Remove all dirt from the mounting pads in order to ensure that the correct leveling is achieved. Failure to do so can result in equipment damage or decreased performance.

   a) Put one machinist's level lengthwise on one of the two pads.
   b) Put the other machinist's level across the ends of the two pads.

c) Level the pads by adjusting the four jackscrews in the corners.
Make sure that the machinist's level readings are as close to zero as possible, both lengthwise and across.
Use the baseplate-leveling worksheet when you take the readings.



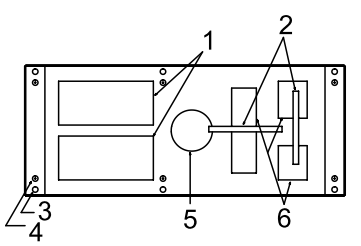
1. Machinist's levels
2. Driver's mounting pads
3. Foundation bolts
4. Jackscrews
5. Grout hole
6. Pump's mounting pads

Figure 22: Level driver mounting pads

4. Turn the center jackscrews down so that they rest on their plates on the foundation surface.
5. Level the pump mounting pads:

NOTICE:
Remove all dirt from the mounting pads in order to ensure that the correct leveling is achieved. Failure to do so can result in equipment damage or decreased performance.

a) Put one machinist's level lengthwise on one of the two pads.
b) Put the other level across the center of the two pads.
c) Level the pads by adjusting the four jackscrews in the corners.
Make sure that the machinist's level readings are as close to zero as possible, both lengthwise and across.



1. Driver's mounting pads
2. Machinist's levels
3. Foundation bolts
4. Jackscrews
5. Grout hole
6. Pump's mounting pads

Figure 23: Level pump mounting pads

6. Hand-tighten the nuts for the foundation bolts.
7. Check that the driver's mounting pads are level and adjust the jackscrews and the foundation bolts if necessary.
The correct level measurement is a maximum of 0.0167 mm/m | 0.002 in./ft .

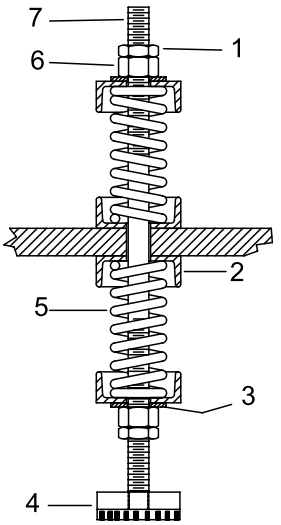
Install the baseplate using spring mounting

NOTICE:
The spring-mounted baseplate is designed only to support piping loads from thermal expansion. Ensure that the suction and discharge piping are supported individually. Failure to do so may result in equipment damage.

The foundation pads are not provided with the baseplate. Make sure that the foundation pads are 316 stainless-steel plates, which have a 16-20 micro-inch surface finish.

Before you start this procedure, make sure that the foundation pads are correctly installed on the foundation/floor (see the manufacturer's instructions).

1. Put the baseplate on a support above the foundation/floor.
   Make sure that there is enough space between the baseplate and the foundation/floor in order to install the spring assemblies.
2. Install the lower part of the spring assembly:
   a) Screw the lower jam nut onto the spring stud.
   b) Screw the lower adjusting nut onto the spring-stud, on top of the jam nut.
   c) Set the lower adjusting nut to the correct height.
      The correct height depends on the required distance between the foundation/floor and the baseplate.
   d) Put a washer, a follower, a spring, and one more follower onto the lower adjusting nut.
3. Install the spring assembly on the baseplate:
   a) Insert the spring assembly into the baseplate's anchorage hole from below.
   b) Put a follower, a spring, another follower, and a washer onto the spring stud.
   c) Fasten the spring assembly with the upper adjusting nut by hand.
4. Thread the upper jam nut onto the spring stud by hand.
5. Repeat steps 2 through 4 for all the spring assemblies.
6. Lower the baseplate so that the spring assemblies fit into the foundation pads.
7. Level the baseplate and make the final height adjustments:
   a) Loosen the upper jam nuts and adjusting nuts.
   b) Adjust the height and level the baseplate by moving the lower adjusting nuts.
   c) When the baseplate is level, tighten the top adjusting nuts so that the top springs are not loose in their followers.
8. Fasten the lower and upper jam nuts on each spring assembly.



1. Upper jam nut
2. Follower
3. Washer
4. Foundation pads
5. Spring
6. Upper adjusting nut
7. Spring stud

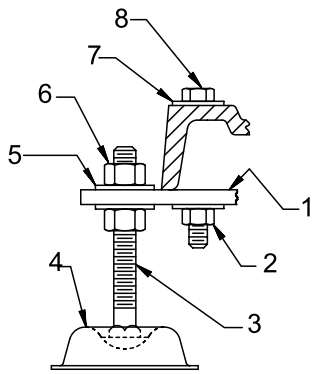
Figure 24: Example of an installed spring assembly

Install the baseplate using stilt mounting

NOTICE:

The stilt-mounted baseplate is not designed to support static piping loads. Ensure that the suction and discharge piping are supported individually. Failure to do so may result in equipment damage.

1. Put the baseplate on a support above the foundation/floor.
   Make sure that there is enough space between the baseplate and the foundation/floor to install the stilts.
2. Install the lower part of the stilt assembly:
   a) Screw the lower jam nut and adjusting nut onto the stilt.
   b) Set the lower adjusting nut to the correct height.
      The correct height depends on the required distance between the foundation/floor and the baseplate.
   c) Put a washer onto the lower adjusting- nut.
3. Install the stilt assembly on the baseplate:
   a) Insert the stilt assembly into the baseplate's anchorage hole from below.
   b) Put a washer onto the stilt.
   c) Fasten the stilt assembly with the upper adjusting nut by hand.
4. Screw the upper jam nut onto the stilt by hand.
5. Repeat steps 2 through 4 for all the stilt assemblies.
6. Lower the baseplate so that the stilts fit into the foundation cups.
7. Level the baseplate and make the final height adjustments:
   a) Loosen the upper jam nuts and adjusting nuts.
   b) Adjust the height and level the baseplate by moving the lower adjusting nuts.
   c) When the baseplate is level, tighten the top adjusting nuts.
8. Fasten the lower and upper jam nuts on each stilt.

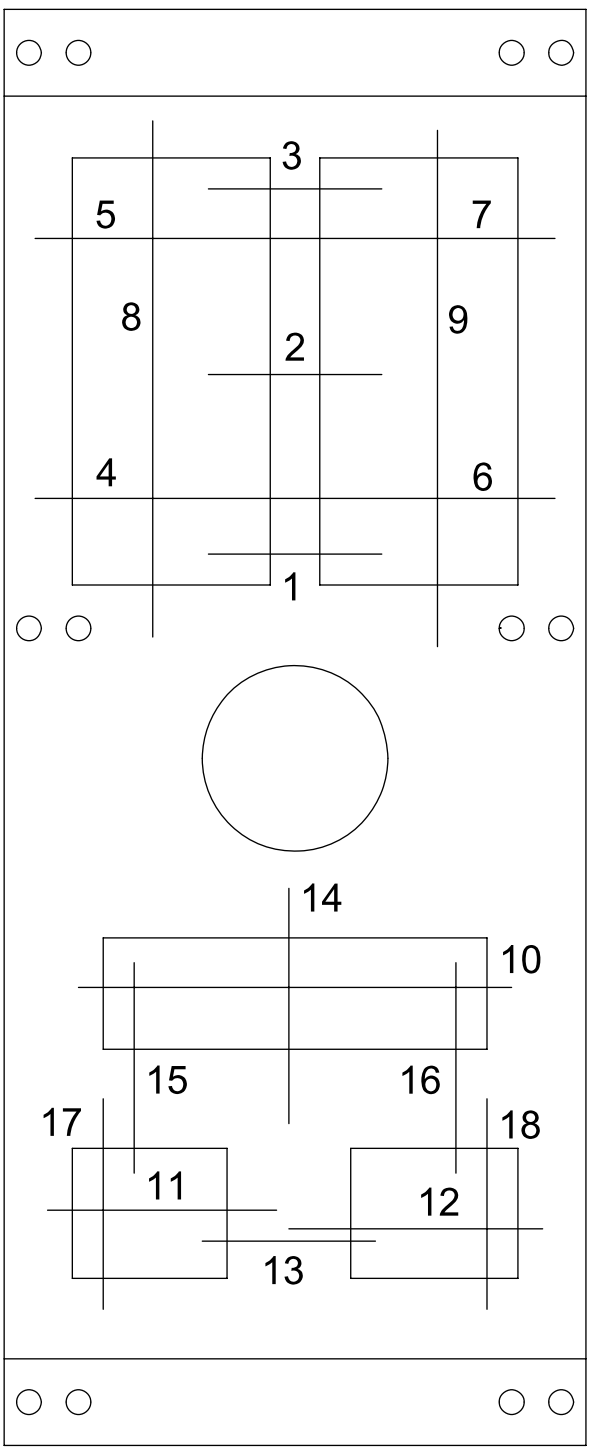


1. Mounting plate
2. Mounting nut
3. Stilt bolt
4. Foundation cups
5. Washer
6. Upper adjustment nut
7. Mounting washer
8. Mounting bolt

Figure 25: Example of an installed stilt assembly

Baseplate-leveling worksheet

Level measurements



1)_____

2)_____

3)_____

4)_____

5)_____

6)_____

7)_____

8)_____

9)_____

10)_____

11)_____

12)_____

13)_____

14)_____

15)_____

16)_____

17)_____

18)_____

Install the pump, driver, and coupling

1. Mount and fasten the pump on the baseplate. Use applicable bolts.
2. Mount the driver on the baseplate . Use applicable bolts and hand tighten.
3. Install the coupling.
   See the installation instructions from the coupling manufacturer.

Pump-to-driver alignment

Precautions



WARNING:

- Misalignment can cause decreased performance, equipment damage, and even catastrophic failure of frame-mounted units leading to serious injury. Proper alignment is the responsibility of the installer and the user of the unit. Check the alignment of all drive components prior to operating the unit.
  - Follow the coupling installation and operation procedures from the coupling manufacturer.
- Failure to disconnect and lock out driver power may result in serious physical injury or death. Always disconnect and lock out power to the driver before performing any installation or maintenance tasks.
  - Electrical connections must be made by certified electricians in compliance with all international, national, state, and local rules.
  - Refer to driver/coupling/gear manufacturer's installation and operation manuals (IOM) for specific instructions and recommendations.

Alignment checks

When to perform alignment checks

You must perform alignment checks under these circumstances:

- The process temperature changes.
- The piping changes.
- The pump has been serviced.

Types of alignment checks

Type of check	When it is used
Initial alignment (cold alignment) check	Prior to operation when the pump and the driver are at ambient temperature.
Final alignment (hot alignment) check	After operation when the pump and the driver are at operating temperature.

Initial alignment (cold alignment) checks

When	Why
Before you grout the baseplate	This ensures that alignment can be accomplished.
After you grout the baseplate	This ensures that no changes have occurred during the grouting process.
After you connect the piping	This ensures that pipe strains have not altered the alignment. If changes have occurred, you must alter the piping to remove pipe strains on the pump flanges.

Final alignment (hot alignment) checks

When	Why
After the first run	This ensures correct alignment when both the pump and the driver are at operating temperature.
Periodically	This follows the plant operating procedures.

Permitted indicator values for alignment checks

NOTICE:
The specified permitted reading values are valid only at operating temperature. For cold settings, other values are permitted. The correct tolerances must be used. Failure to do so can result in misalignment.

When dial indicators are used to check the final alignment, the pump and drive unit are correctly aligned when these conditions are true:

- The Total Indicated Reading (T.I.R.) is at 0.05 mm | 0.002 in. or less at operating temperature.
- The tolerance of the indicator is 0.0127 mm per mm | 0.0005 in. per in. of indicator separation for the reverse dial indicator or laser method when the pump and driver are at operating temperature.

Cold settings for parallel vertical alignment

Introduction

This section shows the recommended preliminary (cold) settings for electric motor-driven pumps based on different temperatures of pumped fluid. Consult driver manufacturers for recommended cold settings for other types of drivers such as steam turbines and engines.

Recommended settings for models 3196, CV 3196, and LF 3196

Pumpage temperature	Recommended setting
10°C | 50°F	0.05 mm | 0.002 in., low
65°C | 150°F	0.03 mm | 0.001 in., high
120°C | 250°F	0.12 mm | 0.005 in., high
175°C | 350°F	0.23 mm | 0.009 in., high
218°C | 450°F	0.33 mm | 0.013 in., high
228°C | 550°F	0.43 mm | 0.017 in., high
343°C | 650°F	0.53 mm | 0.021 in., high
371°C | 700°F	0.58 mm | 0.023 in., high

Alignment measurement guidelines

Guideline	Explanation
Rotate the pump coupling half and the driver coupling half together so that the indicator rods have contact with the same points on the driver coupling half.	This prevents incorrect measurement.
Move or shim only the driver in order to make adjustments.	This prevents strain on the piping installations.
Make sure that the hold-down bolts for the driver feet are tight when you take indicator measurements.	This keeps the driver stationary since movement causes incorrect measurement.
Make sure that the hold-down bolts for the driver feet are loose before you make alignment corrections.	This makes it possible to move the driver when you make alignment corrections.
Check the alignment again after any mechanical adjustments.	This corrects any misalignments that an adjustment may have caused.

Attach the dial indicators for alignment

You must have two dial indicators in order to complete this procedure.

1. Attach two dial indicators on the pump coupling half (X):
   a) Attach one indicator (P) so that the indicator rod comes into contact with the perimeter of the driver coupling half (Y).
      This indicator is used to measure parallel misalignment.
   b) Attach the other indicator (A) so that the indicator rod comes into contact with the inner end of the driver coupling half.
      This indicator is used to measure angular misalignment.

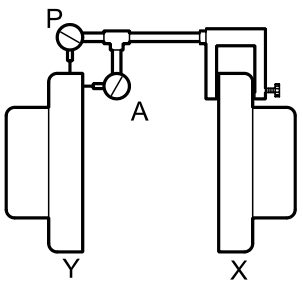


Figure 26: Dial indicator attachment

2. Rotate the pump coupling half (X) in order to check that the indicators are in contact with the driver coupling half (Y) but do not bottom out.
3. Adjust the indicators if necessary.

Pump-to-driver alignment instructions

Perform angular alignment for a vertical correction

1. Set the angular alignment indicator to zero at the top-center position (12 o'clock) of the driver coupling half (Y).
2. Rotate the indicator to the bottom-center position (6 o'clock).
3. Record the indicator reading.

When the reading value is...	Then...
Negative	The coupling halves are farther apart at the bottom than at the top. Perform one of these steps: · Add shims in order to raise the feet of the driver at the shaft end. · Remove shims in order to lower the feet of the driver at the other end.
Positive	The coupling halves are closer at the bottom than at the top. Perform one of these steps: · Remove shims in order to lower the feet of the driver at the shaft end. · Add shims in order to raise the feet of the driver at the other end.

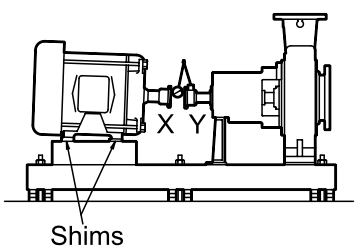


Figure 27: Side view of an incorrect vertical alignment

4. Repeat the previous steps until the permitted reading value is achieved.

Perform angular alignment for a horizontal correction

1. Set the angular alignment indicator (A) to zero on left side of the driver coupling half (Y), 90° from the top-center position (9 o'clock).
2. Rotate the indicator through the top-center position to the right side, 180° from the start position (3 o'clock).
3. Record the indicator reading.

When the reading value is...	Then...
Negative	The coupling halves are farther apart on the right side than the left. Perform one of these steps: · Slide the shaft end of the driver to the left. · Slide the opposite end to the right.
Positive	The coupling halves are closer together on the right side than the left. Perform one of these steps: · Slide the shaft end of the driver to the right. · Slide the opposite end to the left.

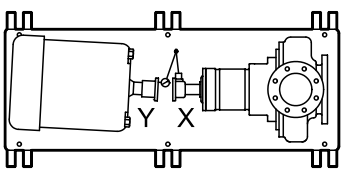


Figure 28: Top view of an incorrect horizontal alignment

4. Repeat the previous steps until the permitted reading value is achieved.

Perform parallel alignment for a vertical correction

Refer to the alignment table in "Permitted indicator values for alignment checks" (see Table of Contents for location of table) for the proper cold alignment value based on the motor temperature rise and the pump operating temperature.

Before you start this procedure, make sure that the dial indicators are correctly set up.

A unit is in parallel alignment when the parallel indicator (P) does not vary by more than 0.05 mm | 0.002 in. as measured at four points 90° apart at the operating temperature.

1. Set the parallel alignment indicator (P) to zero at the top-center position (12 o'clock) of the driver coupling half (Y).
2. Rotate the indicator to the bottom-center position (6 o'clock).
3. Record the indicator reading.

When the reading value is...	Then...
Negative	The pump coupling half (X) is lower than the driver coupling half (Y). Remove shims of a thickness equal to half of the indicator reading value under each driver foot.
Positive	The pump coupling half (X) is higher than the driver coupling half (Y). Add shims of a thickness equal to half of the indicator reading value to each driver foot.

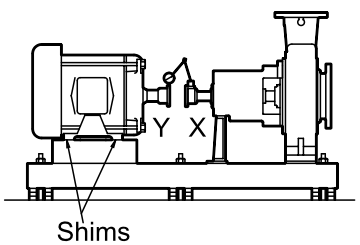


Figure 29: Side view of an incorrect vertical alignment

4. Repeat the previous steps until the permitted reading value is achieved.

NOTICE:
The specified permitted reading values are valid only at operating temperature. For cold settings, other values are permitted. The correct tolerances must be used. Failure to do so can result in misalignment.

Perform parallel alignment for a horizontal correction

NOTICE:
The specified permitted reading values are valid only at operating temperature. For cold settings, other values are permitted. The correct tolerances must be used. Failure to do so can result in misalignment.

A unit is in parallel alignment when the parallel indicator (P) does not vary by more than 0.05 mm | 0.002 in. as measured at four points 90° apart at the operating temperature.

1. Set the parallel alignment indicator (P) to zero on the left side of the driver coupling half (Y), 90° from the top-center position (9 o'clock).
2. Rotate the indicator through the top-center position to the right side, 180° from the start position (3 o'clock).
3. Record the indicator reading.

When the reading value is...	Then...
Negative	The driver coupling half (Y) is to the left of the pump coupling half (X).
Positive	The driver coupling half (Y) is to the right of the pump coupling half (X).

4. Slide the driver carefully in the appropriate direction. Make sure to slide the driver evenly. Failure to do so can negatively affect horizontal angular correction.

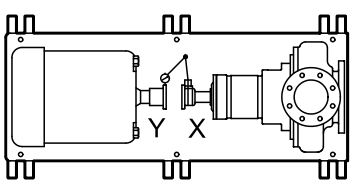


Figure 30: Top view of an incorrect horizontal alignment

5. Repeat the previous steps until the permitted reading value is achieved.

NOTICE:
The specified permitted reading values are valid only at operating temperature. For cold settings, other values are permitted. The correct tolerances must be used. Failure to do so can result in misalignment.

Perform complete alignment for a vertical correction

A unit is in complete alignment when both the angular indicator (A) and the parallel indicator (P) do not vary by more than 0.05 mm | 0.002 in. as measured at four points 90° apart.

1. Set the angular and parallel dial indicators to zero at the top-center position (12 o'clock) of the driver coupling half (Y).
2. Rotate the indicators to the bottom-center position (6 o'clock).
3. Record the indicator readings.
4. Make corrections according to the separate instructions for angular and parallel alignment until you obtain the permitted reading values.

Perform complete alignment for a horizontal correction

A unit is in complete alignment when both the angular indicator (A) and the parallel indicator (P) do not vary by more than 0.05 mm | 0.002 in. as measured at four points 90° apart.

1. Set the angular and parallel dial indicators to zero at the left side of the driver coupling half (Y), 90° from the top-center position (9 o'clock).
2. Rotate the indicators through the top-center position to the right side, 180° from the start position (3 o'clock).
3. Record the indicator readings.
4. Make corrections according to the separate instructions for angular and parallel alignment until you obtain the permitted reading values.

C-face adapter

Intended use

The C-face adapter is a device that attaches the pump to the drive unit to minimize the axial and radial play between the two coupling halves.

Illustration

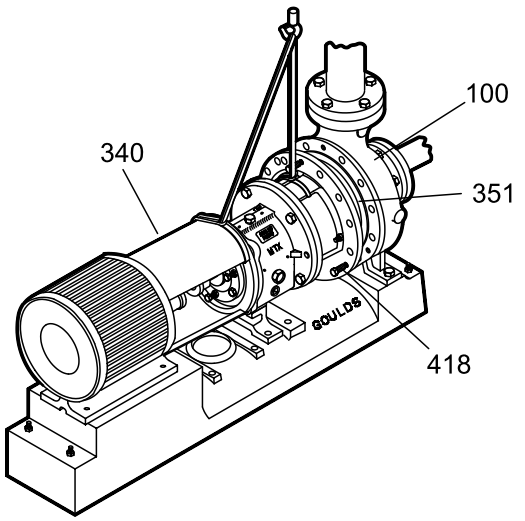


Figure 31: Example of the C-face adapter (340)

Alignment requirements

When you use a C-face adapter, you do not have to align the shaft. The rabbeted fit of the drive unit to the adapter and the adapter to the bearing housing automatically align the shafts to within the specified limits.

Specified limits

A C-face adapter can attain a nominal alignment of 0.18mm | 0.007 in. Total Indicated Runout (T.I.R.). However, because of the stack-up of the machining tolerances of the various parts, the alignment can be as high as 0.38mm | 0.015 inches TIR. Use of a flexible coupling with an elastomeric insert is required to maintain acceptable pump and motor life when using a c-face adapter.

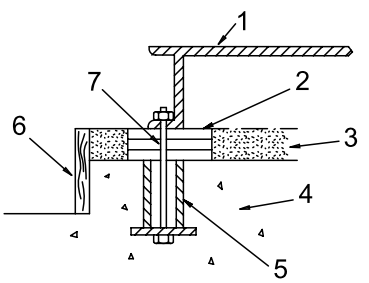
If high reliability (with shaft alignments of less than 0.05mm | 0.002 in.) is required for the pump, use a foot-mounted drive unit on a precision-machined baseplate and perform a conventional alignment.

Grout the baseplate

Required equipment:

- Cleaners: Do not use an oil-based cleaner because the grout will not bond to it. See the instructions provided by the grout manufacturer.
- Grout: Non-shrink grout is recommended.

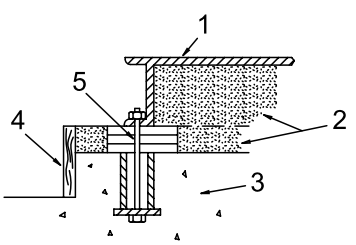
1. Clean all the areas of the baseplate that will come into contact with the grout.
2. Build a dam around the foundation.
3. Thoroughly wet the foundation that will come into contact with the grout.
4. Pour grout through the grout hole into the baseplate up to the level of the dam.
   When you pour the grout, remove air bubbles from it by using one of these methods:
   - Puddle with a vibrator.
   - Pump the grout into place.
5. Allow the grout to set.



1. Baseplate
2. Shims or wedges
3. Grout
4. Foundation
5. Sleeve
6. Dam
7. Bolt

Figure 32: Pour grout into baseplate

6. Fill the remainder of the baseplate with grout, and allow the grout to set for at least 48 hours.



1. Baseplate
2. Grout
3. Foundation
4. Dam
5. Bolt

Figure 33: Fill remainder of baseplate with grout

7. Tighten the foundation bolts.

Piping checklists

General piping checklist

Precautions



WARNING:
Risk of premature failure. Casing deformation can result in misalignment and contact with rotating parts, causing excess heat generation and sparks. Flange loads from the piping system, including those from the thermal expansion of the piping, must not exceed the limits of the pump.

NOTICE:
Vary the capacity with the regulating valve in the discharge line. Never throttle the flow from the suction side. This action can result in decreased performance, unexpected heat generation, and equipment damage.

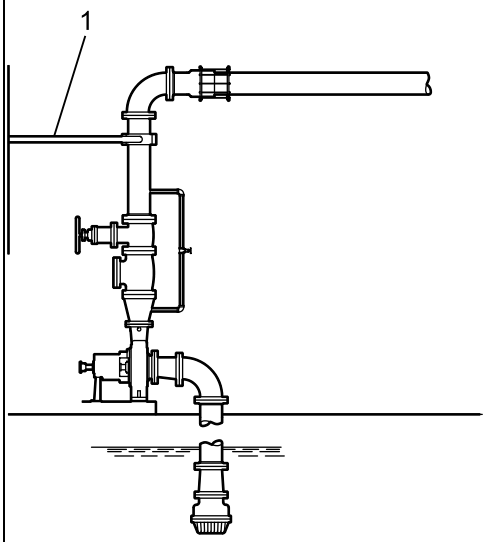
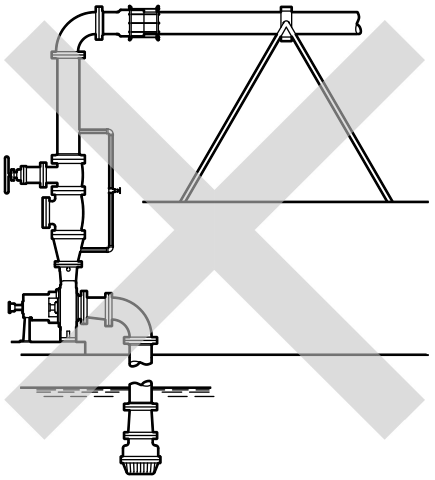
Piping guidelines

Guidelines for piping are given in the Hydraulic Institute Standards available from the Hydraulic Institute at 9 Sylvan Way, Parsippany, NJ 07054-3802. You must review this document before you install the pump.

Checklist

Check	Explanation/comment	Checked
Check that all piping is supported independently of, and lined up naturally with, the pump flange.	This helps to prevent: · Strain on the pump · Misalignment between the pump and the drive unit · Wear on the pump bearings and the coupling · Wear on the pump bearings, seal, and shafting	
Keep the piping as short as possible.	This helps to minimize friction losses.	
Check that only necessary fittings are used.	This helps to minimize friction losses.	
Do not connect the piping to the pump until: · The grout for the baseplate or sub-base becomes hard. · The hold-down bolts for the pump and the driver are tightened.	—	
If the pump handles liquids at elevated temperatures, make sure that the expansion loops and joints are properly installed.	This helps to prevent misalignment due to linear expansion of the piping.	

Example: Installation for expansion

Correct	Incorrect
This illustration shows a correct installation for expansion:  1. Expansion loop/joint	This illustration shows an incorrect installation for expansion: 

Fastening

WARNING:
Risk of serious personal injury or property damage. Fasteners such as bolts and nuts are critical to the safe and reliable operation of the product. Ensure appropriate use of fasteners during installation or reassembly of the unit.

- Use fasteners of the proper size and material only.
- Replace all corroded fasteners.
- Ensure that all fasteners are properly tightened and that there are no missing fasteners.

Suction-piping checklist

Performance curve reference

Net positive suction head available ($NPSH_A$) must always exceed NPSH required ($NPSH_R$) as shown on the published performance curve of the pump.

Suction-piping checks

Check	Explanation/comment	Checked
Check that the distance between the inlet flange of the pump and the closest elbow is at least two pipe diameters. Check that the distance between the inlet flange of the pump and the closest elbow is at least five pipe diameters.	This minimizes the risk of cavitation in the suction inlet of the pump due to turbulence. See the Example sections for illustrations.	
Check that elbows in general do not have sharp bends.	See the Example sections for illustrations. —	
Check that the suction piping is one or two sizes larger than the suction inlet of the pump. Install an eccentric reducer between the pump inlet and the suction piping.	The suction piping must never have a smaller diameter than the suction inlet of the pump. See the Example sections for illustrations.	

Check	Explanation/comment	Checked
Check that the eccentric reducer at the suction flange of the pump has the following properties: · Sloping side down · Horizontal side at the top	See the example illustrations.	
Suggested suction strainers are used. Check that they are at least three times the area of the suction piping. Monitor the pressure drop across the suction strainer. An increased pressure drop across the strainer of 5 psi (34.5 kPa) indicates that the strainer should be removed and cleaned. After a period of time (24 hours minimum) system flushing should be complete and the suction strainer can be removed.	Suction strainers help to prevent debris from entering the pump. Mesh holes with a minimum diameter of 1/16 in. (1.6 mm) are recommended. Liquids with specific gravity less than 0.60 a pressure drop across the suction strainer may be due to ice buildup. Ice buildup can cause turbulence, low pressure areas and pumpage vaporization.	
If more than one pump operates from the same liquid source, check that separate suction-piping lines are used for each pump.	This recommendation helps you to achieve a higher pump performance and prevent vapor locking especially with specific gravity of liquid less than 0.60.	
If necessary, make sure that the suction piping includes a drain valve and that it is correctly installed.	—	
Assure adequate insulation is applied for liquids with specific gravity less than 0.60.	To assure sufficient NPSHa.	

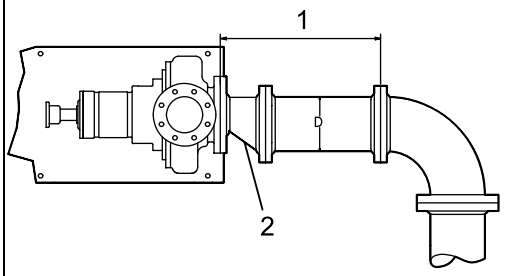
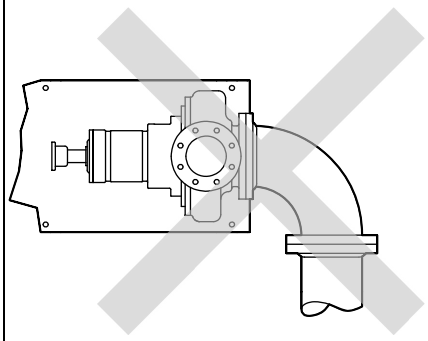
Liquid source below the pump

Check	Explanation/comment	Checked
Make sure that the suction piping is free from air pockets.	This helps to prevent the occurrence of air and cavitation in the pump inlet.	
Check that the suction piping slopes upwards from the liquid source to the pump inlet.	—	
If the pump is not self-priming, check that a device for priming the pump is installed.	Use a foot valve with a diameter that is at least equivalent to the diameter of the suction piping.	

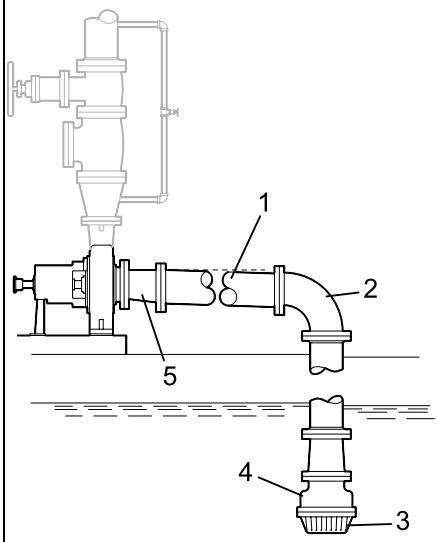
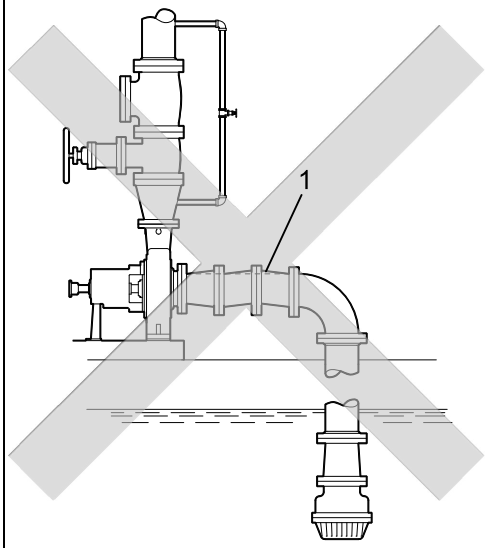
Liquid source above the pump

Check	Explanation/comment	Checked
Check that an isolation valve is installed in the suction piping at a distance of at least two times the pipe diameter from the suction inlet.	This permits you to close the line during pump inspection and maintenance. Do not use the isolation valve to throttle the pump. Throttling can cause these problems: · Loss of priming · Excessive temperatures · Damage to the pump · Voiding the warranty	
Make sure that the suction piping is free from air pockets.	This helps to prevent the occurrence of air and cavitation in the pump inlet.	
Check that the piping is level or slopes downward from the liquid source.	—	
Make sure that no part of the suction piping extends below the suction flange of the pump.	—	
Make sure that the suction piping is adequately submerged below the surface of the liquid source.	This prevents air from entering the pump through a suction vortex.	

Example: Elbow close to the pump suction inlet

Correct	Incorrect
The correct distance between the inlet flange of the pump and the closest elbow must be at least five pipe diameters.  1. Enough distance to prevent cavitation 2. Eccentric reducer with a level top	

Example: Suction piping equipment

Correct	Incorrect
 1. Suction pipe sloping upwards from liquid source 2. Long-radius elbow 3. Strainer 4. Foot valve 5. Eccentric reducer with a level top	 1. Air pocket, because the eccentric reducer is not used and because the suction piping does not slope gradually upward from the liquid source

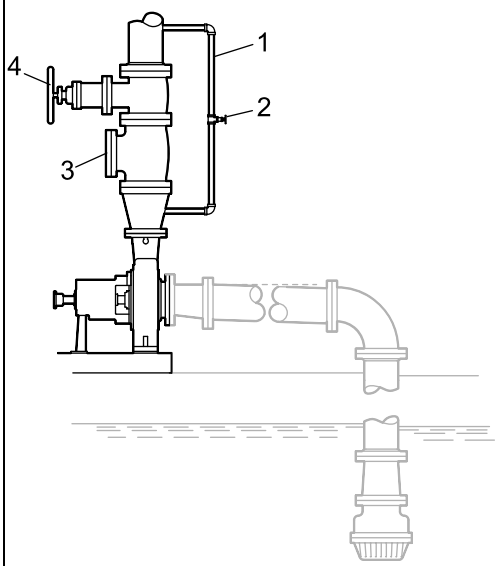
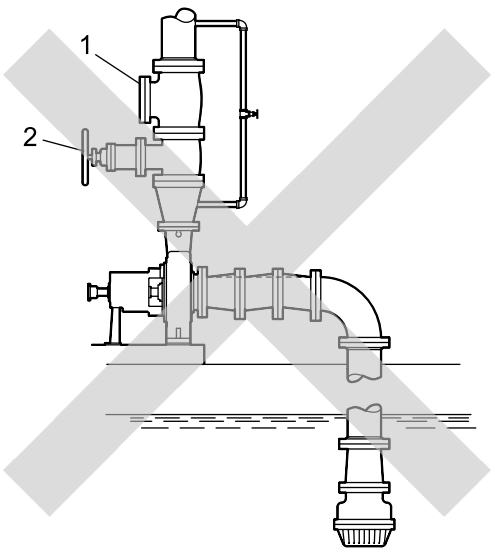
Discharge piping checklist

Checklist

Check	Explanation/comment	Checked
Check that an isolation valve is installed in the discharge line. For specific gravity less than 0.60, minimize distance from pump discharge.	The isolation valve is required for: · Priming · Regulation of flow · Inspection and maintenance of the pump · Reduce risk of pumpage vaporization and vapor locking at low flow rates for low specific gravity liquids. See Example: Discharge piping equipment for illustrations.	

Check	Explanation/comment	Checked
Check that a check valve is installed in the discharge line, between the isolation valve and the pump discharge outlet.	The location between the isolation valve and the pump allows inspection of the check valve. The check valve prevents damage to the pump and seal due to the back flow through the pump, when the drive unit is shut off. It is also used to restrain the liquid flow. See Example: Discharge piping equipment for illustrations.	
If increasers are used, check that they are installed between the pump and the check valve.	See Example: Discharge piping equipment for illustrations.	
If quick-closing valves are installed in the system, check that cushioning devices are used.	This protects the pump from surges and water hammer.	

Example: Discharge piping equipment

Correct	Incorrect
	
1. Bypass line 2. Shut-off valve 3. Check valve 4. Discharge isolation valve	1. Check valve (incorrect position) 2. The isolation valve should not be positioned between the check valve and the pump.

Commissioning, Startup, Operation, and Shutdown

Preparation for startup



WARNING:

- Breach of containment can cause fire, burns, and other serious injury. Failure to follow these precautions before starting the unit may lead to dangerous operating conditions, equipment failure, and breach of containment.
- Risk of serious physical injury or death. Exceeding any of the pump operating limits (e.g. - pressure, temperature, power, etc.) could result in equipment failure, such as explosion, seizure, or breach of containment. Assure that the system operating conditions are within the capabilities of the pump.
- Risk of explosion and serious physical injury. Do not operate pump with blocked system piping or with suction or discharge valves closed. This can result in rapid heating and vaporization of pumpage.
- Risk of breach of containment and equipment damage. Ensure the pump operates only between minimum and maximum rated flows. Operation outside of these limits can cause high vibration, mechanical seal and/or shaft failure, and/or loss of prime.
- Running a pump without safety devices exposes operators to risk of serious personal injury or death. Never operate a unit unless appropriate safety devices (guards, etc.) are properly installed.
- Failure to disconnect and lock out driver power may result in serious physical injury or death. Always disconnect and lock out power to the driver before performing any installation or maintenance tasks.
  - Electrical connections must be made by certified electricians in compliance with all international, national, state, and local rules.
  - Refer to driver/coupling/gear manufacturer's installation and operation manuals (IOM) for specific instructions and recommendations.
- Starting the pump in reverse rotation can result in the contact of metal parts, heat generation, and breach of containment. Ensure correct driver settings prior to starting any pump.
- Risk of death or serious injury. Leaking fluid can cause fire and/or burns. Ensure all openings are sealed prior to filling the pump.

Precautions

NOTICE:

- Make sure that the temperature change does not exceed 19°C | 35°F per minute.
- Make sure that the temperature change does not exceed 11°C | 20°F per minute.
- The maximum allowable temperature change for an abnormal transient event such as thermal shock is 121°C | 250°F
- Excessive warm-up rates can cause equipment damage. Ensure the warm-up rate does not exceed 1.4°C | 2.5°F per minute.
- When a cartridge mechanical seal is used, ensure that the set screws in the seal locking ring are tightened and that the centering clips have been removed prior to startup. This prevents seal or shaft sleeve damage by ensuring that the seal is properly installed and centered on the sleeve.

You must follow these precautions before you start the pump:

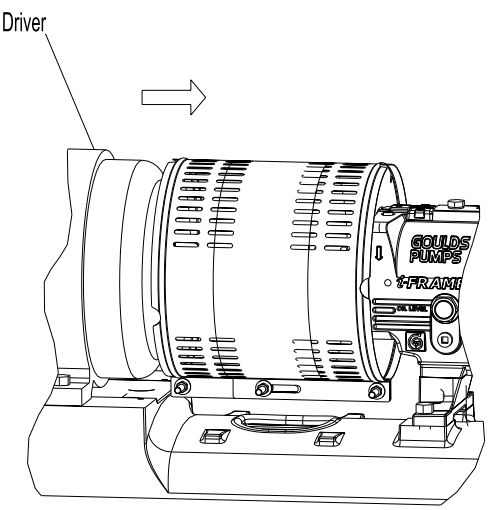
- Flush and clean the system thoroughly to remove dirt or debris in the pipe system in order to prevent premature failure at initial startup.

- Bring variable-speed drivers to the rated speed as quickly as possible.
- Run a new or rebuilt pump at a speed that provides enough flow to flush and cool the close-running surfaces of the stuffing-box bushing.
- If temperatures of the pumped fluid will exceed 93°C | 200°F, then warm up the pump prior to operation. Circulate a small amount of fluid through the pump until the casing temperature is within 38°C | 100°F of the fluid temperature. Accomplish this by flowing fluid from pump inlet to discharge drain (optionally, the casing vent can be included in warm-up circuit but not required). Soak for (2) hours at process fluid temperature.

At initial startup, do not adjust the variable-speed drivers or check for speed governor or over-speed trip settings while the variable-speed driver is coupled to the pump. If the settings have not been verified, then uncouple the unit and refer to instructions supplied by the driver manufacturer.

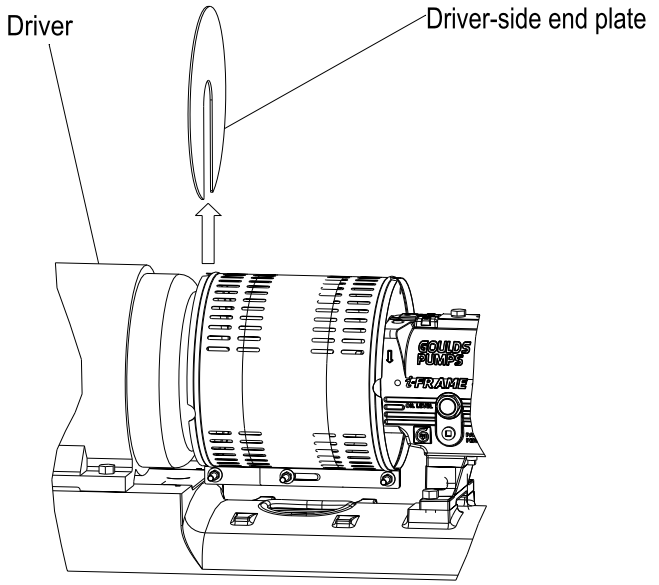
Remove the coupling guard

1. Remove the nut, bolt, and washers from the slotted hole in the center of the coupling guard.
2. Slide the driver half of the coupling guard toward the pump.

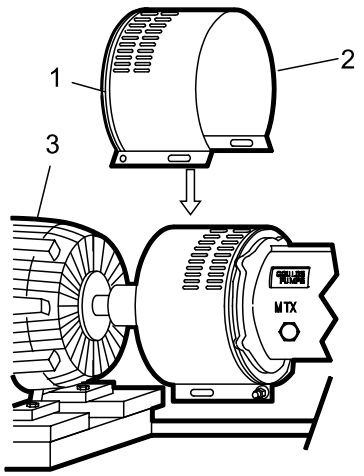


3. Remove the nut, bolt, and washers from the driver half of the coupling guard.

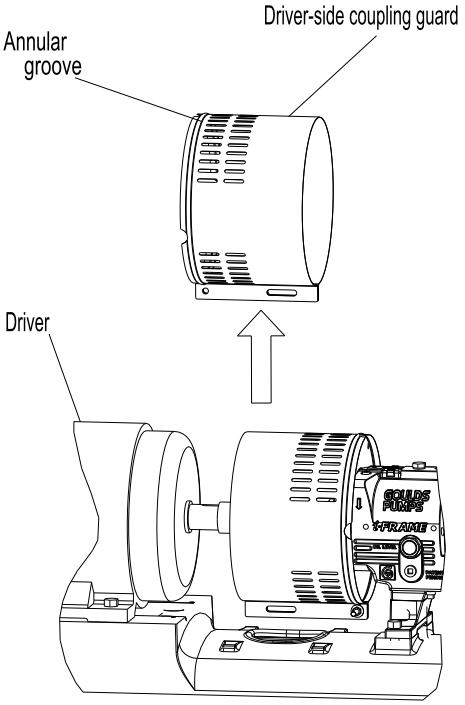
4. Remove the driver-side end plate.



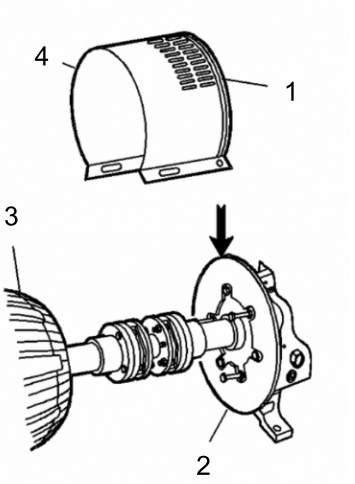
5. Remove the driver half of the coupling guard:
   a) Slightly spread the bottom apart.
   b) Lift upwards.



1. Annular groove
2. Driver half of the coupling guard
3. Driver



6. Remove the remaining nut, bolt, and washers from the pump half of the coupling guard. It is not necessary to remove the end plate from the pump side of the bearing housing. You can access the bearing-housing tap bolts without removing this end plate if maintenance of internal pump parts is necessary.
7. Remove the pump half of the coupling guard:
   a) Slightly spread the bottom apart.
   b) Lift upwards.



1. Annular groove
2. Pump-side end plate
3. Driver
4. Pump half of the coupling guard

Check the rotation - Frame Mounted

WARNING:

- Starting the pump in reverse rotation can result in the contact of metal parts, heat generation, and breach of containment. Ensure correct driver settings prior to starting any pump.
- Failure to disconnect and lock out driver power may result in serious physical injury or death. Always disconnect and lock out power to the driver before performing any installation or maintenance tasks.
  - Electrical connections must be made by certified electricians in compliance with all international, national, state, and local rules.
  - Refer to driver/coupling/gear manufacturer's installation and operation manuals (IOM) for specific instructions and recommendations.

1. Lock out power to the driver.
2. Make sure that the coupling hubs are fastened securely to the shafts.
3. Make sure that the coupling spacer is removed.
   The pump ships with the coupling spacer removed.
4. Unlock power to the driver.
5. Make sure that everyone is clear, and then jog the driver long enough to determine that the direction of rotation corresponds to the arrow on the bearing housing or close-coupled frame.
6. Lock out power to the driver.

Impeller-clearance check

The impeller-clearance check ensures the following:

- The pump turns freely.
- The pump operates at optimal efficiency for long equipment life and low energy consumption.

Impeller clearances (3196 and HT 3196)

NOTICE:

Set the cold (ambient) impeller clearance according to this table. Failure to do so may result in heat generation and equipment damage. Higher clearances are used above 93°C | 200°F to prevent the impeller from contacting the casing due to thermal expansion.

Table 11: Impeller clearances

This pump requires the impeller clearances in the following table.

Service temperature	STi	MTi/LTi	XLT-i/i17
	mm | in.	mm | in.	mm | in.
-29 to 93°C | -20 to 200°F	0.13 | 0.005	0.20 | 0.008	0.38 | 0.015
Up to 121°C | 250°F	0.15 | 0.006	0.22 | 0.009	0.41 | 0.016
Up to 149°C | 300°F	0.18 | 0.007	0.25 | 0.010	0.43 | 0.017
Up to 177°C| 350°F	0.22 | 0.009	0.30 | 0.012	0.48 | 0.019
Up to 204°C | 400°F	0.25 | 0.010	0.33 | 0.013	0.50 | 0.020
Up to 232°C | 450°F	0.28 | 0.011	0.35 | 0.014	0.53 | 0.021
Up to 260°C| 500°F	0.30 | 0.012	0.38 | 0.015	0.56 | 0.022
Up to 288°C | 550°F	0.33 | 0.013	0.41 | 0.016	0.58 | 0.023
Up to 316°C | 600°F	0.36 | 0.014	0.43 | 0.017	0.61 | 0.024
Up to 343°C | 650°F	0.40 | 0.016	0.48 | 0.019	0.66 | 0.026
Up to 371°C | 700°F	0.43 | 0.017	0.50 | 0.020	0.69 | 0.027

Impeller-clearance setting

Importance of a proper impeller clearance

A proper impeller clearance ensures that the pump runs at high performance.

WARNING:

- Risk of mechanical seal damage leading to breach of containment. If a cartridge mechanical seal is used, ensure that the set screws in the seal locking ring are loosened and that the centering clips have been installed prior to clearance adjustment.

Impeller clearance methods

You can set the impeller clearance with either of these methods:

- Dial indicator method
- Feeler gauge method

Set the impeller clearance - dial indicator method (all except CV 3196)

WARNING:
Failure to disconnect and lock out driver power may result in serious physical injury or death. Always disconnect and lock out power to the driver before performing any installation or maintenance tasks.

- Electrical connections must be made by certified electricians in compliance with all international, national, state, and local rules.
- Refer to driver/coupling/gear manufacturer's installation and operation manuals (IOM) for specific instructions and recommendations.

1. Remove the coupling guard.
2. Set the indicator so that the button contacts either the shaft end or the face of the coupling.

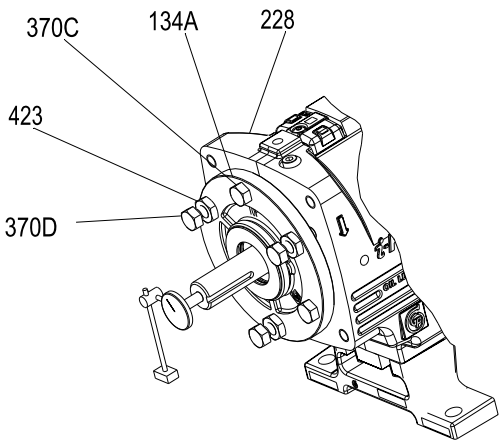


Figure 34: Dial indicator setting

3. Loosen the jam nuts (423) on the jack bolts (370D) , and then back the bolts out about two turns.
4. Tighten the locking bolts evenly (370C), bringing the bearing housing (134A) towards the frame (228) until the impeller contacts the casing.
5. Turn the shaft to ensure that there is contact between the impeller and the casing.
6. Set the indicator to zero and loosen the locking bolt (370C) about one turn.
7. Thread in the jack bolts (370D) until the jack bolts evenly contact the bearing frame.

8. Tighten the jack bolts evenly about one flat at a time, moving the bearing housing (134A) away from the bearing frame until the indicator shows the correct clearance.
   Refer to the impeller clearance table to determine the correct clearance.
9. Tighten the bolts evenly in this order:
   a) Tighten the locking bolts (370C).
   b) Tighten the jack bolts (370D).
   Make sure to keep the indicator reading at the proper setting.
10. Make sure the shaft turns freely.

Set the impeller clearance - feeler gauge method (all except CV 3196)

WARNING:
Failure to disconnect and lock out driver power may result in serious physical injury or death. Always disconnect and lock out power to the driver before performing any installation or maintenance tasks.

- Electrical connections must be made by certified electricians in compliance with all international, national, state, and local rules.
- Refer to driver/coupling/gear manufacturer's installation and operation manuals (IOM) for specific instructions and recommendations.

1. Lock out the driver power and remove the coupling guard.
2. Loosen the jam nuts (423B) on the jack bolts (371A), and then back the bolts out about two turns.

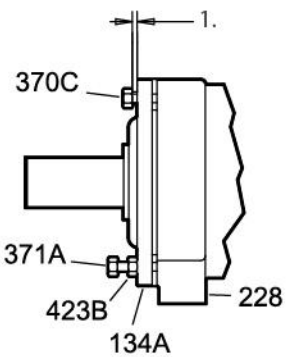


Figure 35: Loosen jam nuts

1. See impeller clearance table for distance

3. Evenly tighten the locking bolts (370C), bringing the bearing housing (134A) towards the frame (228) until the impeller contacts the casing.
4. Turn the shaft to ensure that there is contact between the impeller and the casing.
5. Use a feeler gauge to set the gap between the three locking bolts (370C) and the bearing housing (134A) to the correct impeller clearance.
   Refer to the impeller clearance table to determine the correct clearance.
6. Use the three jack bolts (370D) to evenly loosen the bearing housing (134A) until it contacts the locking bolts (370C).
7. Evenly tighten the jam nuts (423B).
8. Make sure the shaft turns freely.

Couple the pump and driver

WARNING:
Failure to disconnect and lock out driver power may result in serious physical injury or death. Always disconnect and lock out power to the driver before performing any installation or maintenance tasks.

- Electrical connections must be made by certified electricians in compliance with all international, national, state, and local rules.
- Refer to driver/coupling/gear manufacturer's installation and operation manuals (IOM) for specific instructions and recommendations.

Couplings must have proper certification to be used in an ATEX classified environment. Use the instructions from the coupling manufacturer in order to lubricate and install the coupling. Refer to driver/coupling/gear manufacturers IOM for specific instructions and recommendations.

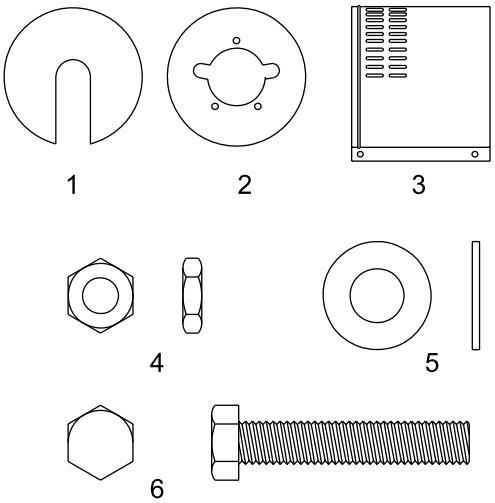
Install the coupling guard

WARNING:

- Running a pump without safety devices exposes operators to risk of serious personal injury or death. Never operate a unit unless appropriate safety devices (guards, etc.) are properly installed.
- Failure to disconnect and lock out driver power may result in serious physical injury or death. Always disconnect and lock out power to the driver before performing any installation or maintenance tasks.
  - Electrical connections must be made by certified electricians in compliance with all international, national, state, and local rules.
  - Refer to driver/coupling/gear manufacturer's installation and operation manuals (IOM) for specific instructions and recommendations.

WARNING:
The coupling guard used in an ATEX classified environment must be constructed from a spark resistant material.

Required parts:



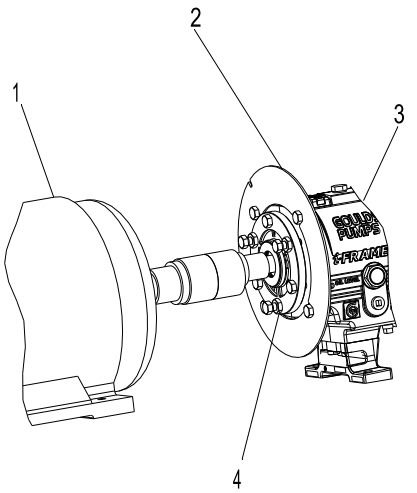
1. End plate, drive end
2. End plate, pump end
3. Guard half, 2 required
4. 3/8-16 nut, 3 required
5. 3/8 in. washer
6. 3/8-16 x 2 in. hex head bolt, 3 required

Figure 36: Required parts

1. De-energize the motor, place the motor in a locked-out position, and place a caution tag at the starter that indicates the disconnect.
2. Put the pump-side end plate in place.
   If the pump-side end plate is already in place, make any necessary coupling adjustments and then proceed to the next step.

If the pump size is...	Then...
STi, MTi, LTi	Align the pump-side end plate to the bearing frame. You do not need to adjust the impeller.

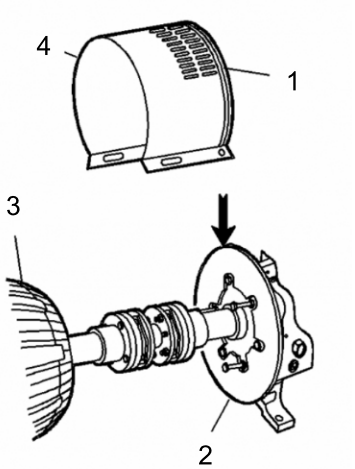
If the pump size is...	Then...
XLT-i	1. Align the end plate on the pump side to the bearing housing so that you meet these conditions: 1. The large slots on the end plate do not touch the bearing housing tap bolts. 2. The small slots align with the impeller adjusting bolts. 2. Fasten the end plate to the bearing housing using the jam nuts on the impeller adjusting bolts. 3. Check the impeller clearance. Refer to the impeller clearance table for the correct impeller clearance.



1. Driver
2. Pump end plate
3. Bearing housing
4. Jam nut

Figure 37: Pump-side end plate placement

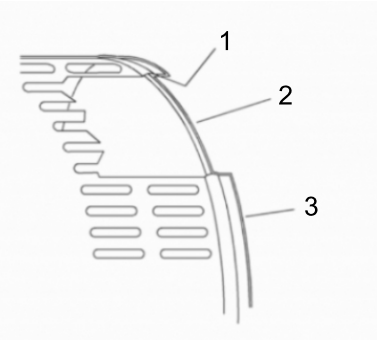
3. Put the pump-half of the coupling guard in place:
   a) Slightly spread the bottom apart.
   b) Place the coupling guard half over the pump-side end plate.



1. Annular groove
2. Pump-side end plate
3. Driver
4. Pump half of the coupling guard

Figure 38: Guard half installation

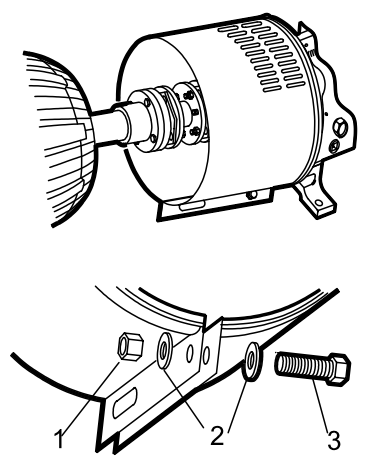
The annular groove in the coupling guard half must fit around the end plate.



1. Annular groove
2. End plate (pump end)
3. Guard half

Figure 39: Annular groove in coupling guard

4. Use a bolt, a nut, and two washers to secure the coupling guard half to the end plate. Tighten securely.



1. Nut
2. Washer
3. Bolt

Figure 40: Secure coupling guard half to end plate

5. Put the driver half of the coupling guard in place:
   a) Slightly spread the bottom apart.

b) Place the driver half of the coupling guard over the pump half of the coupling guard. The annular groove in the coupling guard half must face the motor.

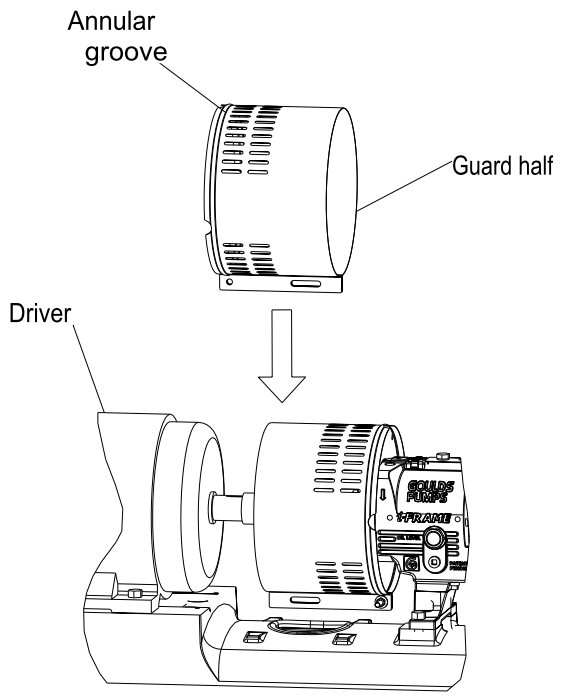


Figure 41: Placement of driver half of coupling guard

6. Place the driver-side end plate over the motor shaft.

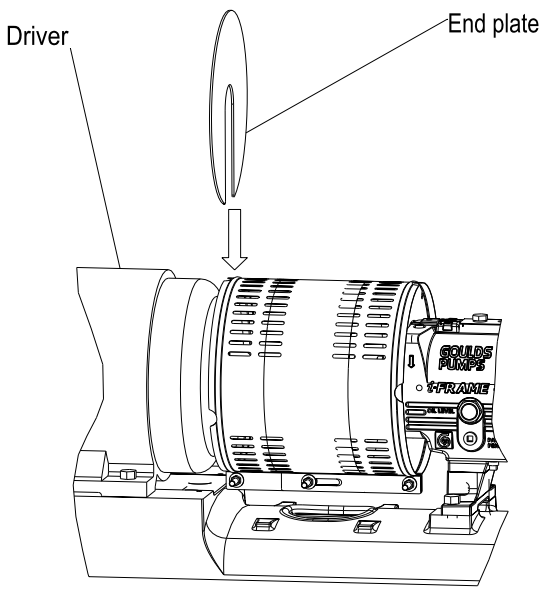


Figure 42: Placement of driver half of coupling guard

7. Place the driver-side end plate in the annular groove of the driver-half of the coupling guard.
8. Use a bolt, a nut, and two washers to secure the coupling guard half to the end plate. Hand-tighten only.
   The hole is located on the driver-side of the coupling guard half.

9. Slide the driver-half of the coupling guard towards the motor so that the coupling guard completely covers the shafts and coupling.

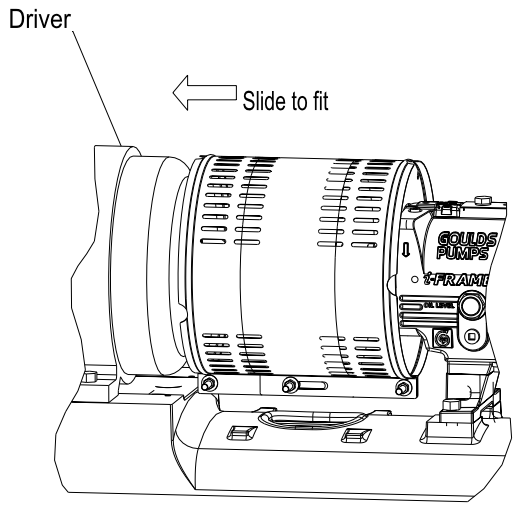


Figure 43: Slide driver-half of coupling guard towards motor

10. Use a nut, a bolt, and two washers to secure the coupling guard halves together.
11. Tighten all nuts on the guard assembly.

Bearing lubrication

WARNING:
Ex Risk of explosive hazard and premature failure from sparks and heat generation. Ensure bearings are properly lubricated prior to startup.

NOTICE:
Grease can settle in equipment left idle leaving bearings improperly lubricated. Check the greasing on a pump that has been out of service for a long period of time and re-grease if necessary.

Pumps are shipped without oil. You must lubricate oil-lubricated bearings at the job site.

Grease-lubricated bearings are lubricated at the factory.

The bearing manufacturer fills greased-for-life bearings with grease and seals them at the factory. You do not need to lubricate or seal these bearings.

Oil volumes

Oil volume requirements

This table shows the required amount of oil for oil-lubricated bearings.

Frame	ml	Qts.	Oz.
STi	400	0.5	16
MTi	1400	1.5	47
LTi	1400	1.5	48
XLT-i and i17	3000	3	96

Lubricating-oil requirements

Oil requirements based on temperature

For the majority of operating conditions, bearing temperatures run between 49°C | 120°F and 82°C | 180°F, and you can use an oil of ISO viscosity grade 68 at 38°C | 100°F. If temperatures exceed 82°C | 180°F, refer to the table for temperature requirements.

Temperature	Oil requirement
Bearing temperatures exceed 82°C | 180°F	Use ISO viscosity grade 100 with bearing-frame cooling or finned-tube oil cooler. The finned-tube oil cooler is standard with the HT 3196 model and optional for all other models.
Pumped-fluid temperatures exceed 177°C | 350°F	Use synthetic lubrication.

Acceptable oil for lubricating bearings

Acceptable lubricants

Examples of acceptable high quality turbine oils with rust and oxidation inhibitors.

Brand	Lubricant type
Chevron	GST Oil 68
Exxon	Teresstic EP 68
Mobil	DTE 68 Heavy Medium
Phillips 66	Turbine Oil VG68
Shell	Turbo T 68
Sunoco	Sunvis 968
Royal Purple	SYNFILM ISO VG 68 Synthetic Oil

Lubricate the bearings with oil



WARNING:

Ⓔx Risk of explosive hazard and premature failure from sparks and heat generation. Ensure bearings are properly lubricated prior to startup.

Use a high-quality turbine oil with rust and oxidation inhibitors.

1. Remove the fill plug.
2. Fill the bearing frame with oil through the filler connection, which is located on top of the bearing frame.
   Fill the bearing frame with oil until the oil level reaches the middle of the sight glass (319).
   The correct volume of oil required for each size of bearing frame can be found in the ‘Oil

Volume Requirements' section in the 'Bearing Maintenance' / 'Maintenance' portion of the IOM.

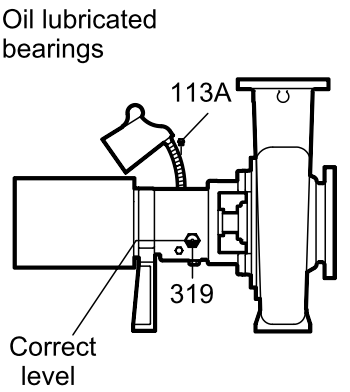


Figure 44: Oil filler connection

3. Replace the fill plug.

Lubricate the bearings with pure oil mist

Oil mist is an optional feature for this pump.

- To lubricate bearings with pure oil mist, follow the instructions provided by the manufacturer of the oil-mist generator.
  The inlet connections are on the top of the bearing frame.

Greased-for-life bearing lubrication

The bearing manufacturer fills greased-for-life bearings with grease and seals them at the factory. You do not need to lubricate or seal these bearings. Refer to the Maintenance chapter for re-greasing and maintenance procedures for these bearings.

Shaft-sealing options

In most cases, the manufacturer seals the shaft before shipping the pump. If your pump does not have a sealed shaft, see the Shaft-seal maintenance section in the Maintenance chapter.

This model uses these types of shaft seals:

- Cartridge mechanical seal
- Conventional inside-component mechanical seal
- Conventional outside-component mechanical seal
- Dynamic seal
- Packed-stuffing-box option

Mechanical seal options

Pumps are usually shipped with mechanical seals installed. If they are not, then refer to the mechanical seal manufacturer's installation instructions.

These are the mechanical seal options for this pump:

- Cartridge mechanical seal
- Conventional inside component mechanical seal
- Conventional outside component mechanical seal

Connection of sealing liquid for mechanical seals

Seal lubrication is required

Seal faces must have liquid film between them for proper lubrication. Locate the taps using the illustrations shipped with the seal.

Seal flushing methods

You can use these methods in order to flush or cool the seal:

Method	Description
Product flush	Run the piping so that the pump pushes the pumped fluid from the casing and injects it into the seal gland. If necessary, an external heat exchanger cools the pumped fluid before it enters the seal gland.
External flush	Run the piping so that the pump injects a clean, cool, compatible liquid directly into the seal gland. The pressure of the flushing liquid must be 0.35 to 1.01 kg/cm^2 | 5 to 15 psi greater than the seal chamber pressure. The injection rate must be 2 to 8 lpm | 0.5 to 2 gpm.
Other	You can use other methods that employ multiple gland or seal chamber connections. Refer to the mechanical seal reference drawing and piping diagrams.

Packed stuffing box option

WARNING:

Ex Packed stuffing boxes are not allowed in an ATEX-classified environment.

The factory does not install the packing, lantern ring, or split gland.

These parts are included with the pump in the box of fittings. Before you start the pump, you must install the packing, lantern ring, and split gland according to the Packed stuffing box maintenance section in the Maintenance chapter.

Connection of sealing liquid for a packed stuffing box

NOTICE:

Make sure to lubricate the packing. Failure to do so may result in shortening the life of the packing and the pump.

You must use an external sealing liquid under these conditions:

- The pumped fluid includes abrasive particles.
- The stuffing-box pressure is below atmospheric pressure when the pump is running with a suction lift or when the suction source is in a vacuum. Under these conditions, packing is not cooled and lubricated and air is drawn into pump.

Conditions for application of an external liquid

Condition	Action
The stuffing box pressure is above atmospheric pressure and the pumped fluid is clean.	Normal gland leaks of 40 to 60 drops per minute is usually sufficient to lubricate and cool the packing. You do not need sealing liquid.
The stuffing box pressure is below atmospheric pressure or the pumped fluid is not clean.	An outside source of clean compatible liquid is required.
An outside source of clean compatible liquid is required.	You must connect the piping to the lantern ring connection with a 40 to 60 drops-per-minute leak rate. The pressure must be 1.01 kg/cm^2 | 15 psi above the stuffing box pressure.

Dynamic-seal option

WARNING:

Ex Dynamic seals are not allowed in an ATEX-classified environment.

The dynamic seal consists of two parts:

- Repeller seal
- Secondary seal (one of the following):
  - Graphite packing
  - Elastomenic face seal

Table 12: Dynamic seal part function

Part	Function
Repeller seal	A repeller seal prevents liquid from entering the stuffing box during operation. The repeller normally does not require a flush. However, for services that allow a build-up of solids on the repeller, you must install a flush connection. If a danger of freezing exists, then you must install a drain connection to drain the repeller chamber.
Secondary seal (graphite packing)	This secondary seal prevents leaks during pump shutdown and is comprised of the following: · Graphite packing – Graphite packing provides adequate life running dry but can provide longer performance if lubricated with clean water or grease. · If you lubricate with clean water, then the repeller reduces both the quantity and pressure of seal water that is necessary. If the suction head is less than the repeller capability, then the stuffing box pressure is the same as the atmospheric pressure. Water pressure for the seal must be high enough to overcome static head when the pump is not operating to keep pumped fluid out of the packing. There must be enough flow to cool the packing. · If you lubricate with grease, then you must use spring-loaded grease lubricators to maintain a constant supply. · Elastomeric face seal – The elastomeric face seal consists of an elastomer rotary fitted to the shaft and a ceramic stationary seat fitted in the gland. To set an elastomeric face seal, refer to Set an elastomeric face seal. This seal is designed to run dry, so no flush is necessary.

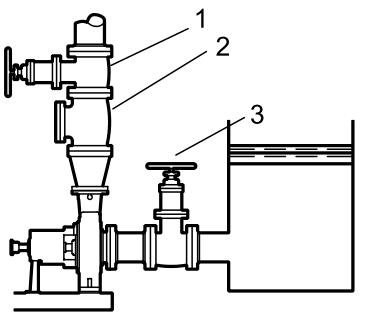
Set an elastomeric face seal

This procedure ensures that the elastomeric seal attains proper contact. No other adjustments are necessary.

1. Remove the gland nuts.
2. Slide the gland back on the sleeve.
3. Pull the rotary back on the sleeve until the rotary is about 25 mm | 1 in. beyond the stuffing box face.
4. Push the gland back onto the studs, pushing the rotary back along the sleeve.
5. Tighten the gland nuts.

Prime the pump with the suction supply above the pump

1. Slowly open the suction isolation valve.
2. Open the air vents on the suction and discharge piping until the pumped fluid flows out.
3. Close the air vents.



1. Discharge isolation valve
2. Check valve
3. Suction isolation valve

Figure 45: Suction supply above pump

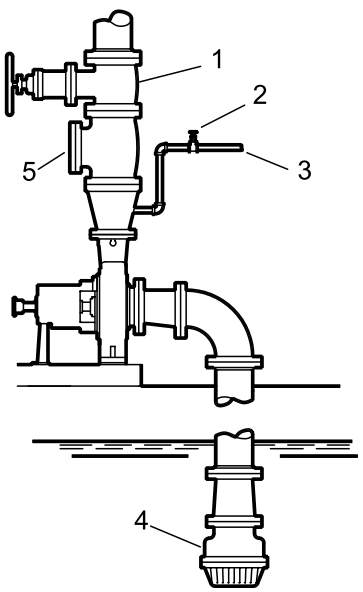
Prime the pump with the suction supply below the pump

Use a foot valve and an outside source of liquid in order to prime the pump. The liquid can come from one of these sources:

- A priming pump
- A pressurized discharge line
- Another outside supply

1. Close the discharge isolation valve.
2. Open the air vent valves in the casing.
3. Open the valve in the outside supply line until only liquid escapes from the vent valves.
4. Close the vent valves.
5. Close the outside supply line.

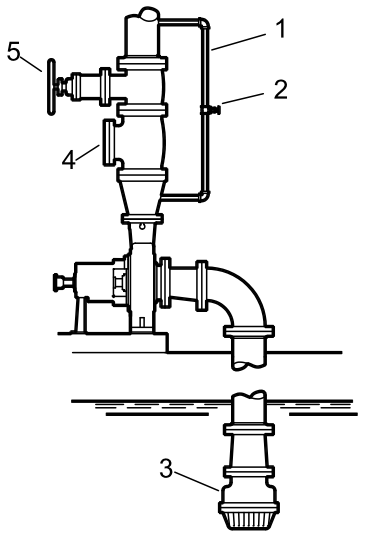
This illustration is an example of priming the pump with a foot valve and an outside supply:



1. Discharge isolation valve
2. Shutoff valve
3. From outside supply
4. Foot valve
5. Check valve

Figure 46: Pump priming with suction supply below pump

This illustration is an example of priming the pump with a foot valve using a bypass around the check valve:



1. By-pass line
2. Shutoff valve
3. Foot valve
4. Check valve
5. Discharge isolation valve

Figure 47: Pump priming with suction supply below pump with foot valve using bypass around check valve

Other methods of priming the pump

You can also use these methods in order to prime the pump:

- Prime by ejector
- Prime by automatic priming pump

Start the pump

WARNING:
Risk of equipment damage, seal failure and breach of containment. Ensure all flush and cooling systems are operating correctly prior to starting pump.

NOTICE:

- Risk of equipment damage due to dry operation. Immediately observe the pressure gauges. If discharge pressure is not quickly attained, stop the driver immediately, reprime, and attempt to restart the pump.
- To avoid risk of equipment damage, observe the pump for vibration levels, bearing temperature, and excessive noise. If normal levels are exceeded, shut down the pump and resolve the issue.

NOTICE:
Risk of equipment damage on pure or purge-oil mist-lubricated units. Remove the viewing port plugs to verify that oil mist is flowing properly. Reinstall the plugs after confirming.

Before you start the pump, you must perform these tasks:

- Open the suction valve.
- Open any recirculation or cooling lines.

1. Fully close or partially open the discharge valve, depending on system conditions.
2. Start the driver.
3. Slowly open the discharge valve until the pump reaches the desired flow.
4. Immediately check the pressure gauge to ensure that the pump quickly reaches the correct discharge pressure.
5. If the pump fails to reach the correct pressure, perform these steps:
   a) Stop the driver.
   b) Prime the pump again.
   c) Restart the driver.
6. Monitor the pump while it is operating:
   a) Check the pump for bearing temperature, excessive vibration, and noise.
   b) If the pump exceeds normal levels, then shut down the pump immediately and correct the problem.
      A pump can exceed normal levels for several reasons. See Troubleshooting for information about possible solutions to this problem.
7. Repeat steps 5 and 6 until the pump runs properly.

Activate the i-*ALERT*® Condition Monitor

WARNING:
Explosive hazard and risk of personal injury. Heating to high temperatures could cause combustion of the condition monitor. Never heat the condition monitor to temperatures in excess of 149°C | 300°F or dispose of in a fire.

By using the i-*ALERT*® Condition monitor or the i-*ALERT*®*2* Bluetooth Equipment Health Monitor, you agree to be bound by the Terms and Conditions of the *Software License Agreement* (page 18)

The condition monitor is ready for activation when the pump is running and has reached a steady flow, pressure, and temperature. This process only takes a few minutes.

1. Place a small magnet on the condition monitor over the ITT logo and then remove it, as this example shows.

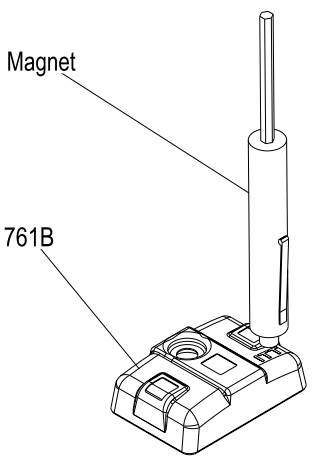


Figure 48: i-*ALERT*® condition monitor

When the condition monitor is activated it:

1. Displays a series of red LEDs followed by a solid green LED.
2. Collects eight samples that are spaced one second apart.
3. Averages these readings to establish the baseline vibration level.
4. Flashes a green LED after approximately twelve seconds.

For the first ten minutes, the green LED flashes every second for five consecutive flashes and then pauses to take a vibration reading. More frequent measurements (every six seconds) are taken in this startup period so that an alarm can be immediately detected.

i-*ALERT*® Condition Monitor routine operation

To install and/or activate the i-*ALERT*®*2* monitor, please refer to the i-*ALERT*®*2* IOM or*http://www.ittproservices.com/aftermarket-products/monitoring/i-alert2/* (i-ALERT2.com). Routine operation instructions are also included in the i-*ALERT*®*2* IOM.

Measurement interval

This table shows the measurement intervals for the condition monitor during normal operation and when the monitor is in alarm mode.

Mode	Measurement interval
Normal operating mode	Five minutes
Alarm mode	Two minutes

When the condition monitor measures a reading beyond the specified temperature and vibration limits, the appropriate red LED flashes. After the process or pump condition that causes the alarm is corrected, the condition monitor returns to normal mode after one normal-level measurement.

Alarm mode

When the condition monitor is in alarm mode, you should investigate the cause of the condition and make necessary corrections in a timely manner.

Magnetic device considerations

Be careful when you use magnetic devices in close proximity of the condition monitor, such as magnetic vibration-monitoring probes or dial indicators. These magnetic devices can accidentally activate or deactivate the condition monitor resulting in improper alarm levels or loss of monitoring.

Pump operation precautions

General considerations

NOTICE:

- Vary the capacity with the regulating valve in the discharge line. Never throttle the flow from the suction side. This action can result in decreased performance, unexpected heat generation, and equipment damage.
- Risk of equipment damage from unexpected heat generation. Do not overload the driver. Ensure that the pump operating conditions are suitable for the driver. The driver can overload in these circumstances:
  - The specific gravity or viscosity of the fluid is greater than expected
  - The pumped fluid exceeds the rated flow rate.
- Make sure to operate the pump at or near the rated conditions. Failure to do so can result in pump damage from cavitation or recirculation.

Operation at reduced capacity



WARNING:

- Risk of breach of containment and equipment damage. Excessive vibration levels can cause damage to bearings, stuffing box, seal chamber, and/or mechanical seal. Observe pump for vibration levels, bearing temperature, and excessive noise. If normal levels are exceeded, shut down and resolve.
- Risk of explosion and serious physical injury. Do not operate pump with blocked system piping or with suction or discharge valves closed. This can result in rapid heating and vaporization of pumpage.
- Risk of equipment damage and serious physical injury. Heat build-up can cause rotating parts to score or seize. Observe pump for excessive heat build-up. If normal levels are exceeded, shut down and resolve.

NOTICE:

Cavitation can cause damage to the internal surfaces of the pump. Ensure net positive suction head available ($NPSH_A$) always exceeds NPSH required ($NPSH_3$) as shown on the published performance curve of the pump.

Operation under freezing conditions

NOTICE:

Do not expose an idle pump to freezing conditions. Drain all liquid that is inside the pump and any auxiliary equipment. Failure to do so can cause liquid to freeze and damage the pump.

Shut down the pump



WARNING:

Precautions must be taken to prevent physical injury. The pump may handle hazardous and/or toxic fluids. Proper personal protective equipment should be worn. Pumpage must be handled and disposed of in conformance with applicable environmental regulations.

1. Slowly close the discharge valve.
2. Shut down and lock out the driver to prevent accidental rotation.

Deactivate the i-*ALERT*® Condition Monitor

NOTICE:

Always deactivate the condition monitor when the pump is going to be shut down for an extended period of time. Failure to do so will result in reduced battery life.

1. Touch and hold a small magnet to the condition monitor over the ITT logo until the red LEDs blink three times.
   This should take 10-15 seconds if the condition monitor is in normal operating mode and approximately five seconds if the condition monitor is in alarm mode.
2. Remove the magnet.

If the deactivation is successful, solid red LEDs will be displayed.

Reset the i-*ALERT*® Condition Monitor

To deactivate or reset the i-*ALERT*®*2* monitor, please refer to the i-*ALERT*®*2* IOM or i-ALERT2.com, *http://www.ittproservices.com/aftermarket-products/monitoring/i-alert2/*

Always reset the condition monitor when the pump is started after maintenance, system change, or being shut down for an extended period of time. Failure to do so may result in false baseline levels that could cause the condition monitor to alert in error.

1. Touch a magnet to the condition monitor over the ITT logo to turn the power on.The condition monitor begins to establish a new baseline vibration level.

Make the final alignment of the pump and driver



WARNING:

- Failure to disconnect and lock out driver power may result in serious physical injury or death. Always disconnect and lock out power to the driver before performing any installation or maintenance tasks.
  - Electrical connections must be made by certified electricians in compliance with all international, national, state, and local rules.
  - Refer to driver/coupling/gear manufacturer's installation and operation manuals (IOM) for specific instructions and recommendations.
- Misalignment can cause decreased performance, equipment damage, and even catastrophic failure of frame-mounted units leading to serious injury. Proper alignment is the responsibility of the installer and the user of the unit. Check the alignment of all drive components prior to operating the unit.
  - Follow the coupling installation and operation procedures from the coupling manufacturer.

You must check the final alignment after the pump and driver are at operating temperature. For initial alignment instructions, see the Installation chapter.

1. Run the unit under actual operating conditions for enough time to bring the pump, driver, and associated system to operating temperature.
2. Shut down the pump and the driver.
3. Remove the coupling guard.
   See Remove the coupling guard in the Maintenance chapter.
4. Check the alignment while the unit is still hot.
   See Pump-to-driver alignment in the Installation chapter.
5. Reinstall the coupling guard.
6. Restart the pump and driver.

Maintenance

Maintenance schedule

Maintenance inspections

A maintenance schedule includes these types of inspections:

- Routine maintenance
- Routine inspections
- Three-month inspections
- Annual inspections

Shorten the inspection intervals appropriately if the pumped fluid is abrasive or corrosive or if the environment is classified as potentially explosive.

Routine maintenance

Perform these tasks whenever you perform routine maintenance:

- Lubricate the bearings.
- Inspect the seal.

Routine inspections

Perform these tasks whenever you check the pump during routine inspections:

- Check the level and condition of the oil through the sight glass on the bearing frame.
- Check for unusual noise, vibration, and bearing temperatures.
- Check the pump and piping for leaks.
- Analyze the vibration.
- Inspect the discharge pressure.
- Inspect the temperature.
- Check the seal chamber and stuffing box for leaks.
  - Ensure that there are no leaks from the mechanical seal.
  - Adjust or replace the packing in the stuffing box if you notice excessive leaking.

Three-month inspections

Perform these tasks every three months:

- Check that the foundation and the hold-down bolts are tight.
- Check the packing if the pump has been left idle, and replace as required.
- Change the oil every three months (2000 operating hours) at minimum.
  - Change the oil more often if there are adverse atmospheric or other conditions that might contaminate or break down the oil.
- Check the shaft alignment, and realign as required.

Annual inspections

Perform these inspections one time each year:

- Check the pump capacity.
- Check the pump pressure.
- Check the pump power.

If the pump performance does not satisfy your process requirements, and the process requirements have not changed, then perform these steps:

1. Disassemble the pump.
2. Inspect it.

3. Replace worn parts.

Bearing maintenance

 These bearing lubrication sections list different temperatures of the pumped fluid. If the pump is ATEX-certified and the temperature of the pumped fluid exceeds the permitted temperature values, then consult your ITT representative.

Bearing lubrication schedule

Type of bearing	First lubrication	Lubrication intervals
Oil-lubricated bearings	Add oil before you install and start the pump. Change the oil after 200 hours for new bearings.	After the first 200 hours, change the oil every 2000 operating hours or every three months.
Grease-lubricated bearings	Grease-lubricated bearings are initially lubricated at the factory.	Regrease bearings every 2000 operating hours or every three months.

Lubricating-oil requirements

Oil requirements based on temperature

For the majority of operating conditions, bearing temperatures run between 49°C | 120°F and 82°C | 180°F, and you can use an oil of ISO viscosity grade 68 at 38°C | 100°F. If temperatures exceed 82°C | 180°F, refer to the table for temperature requirements.

Temperature	Oil requirement
Bearing temperatures exceed 82°C	180°F	Use ISO viscosity grade 100 with bearing-frame cooling or finned-tube oil cooler. The finned-tube oil cooler is standard with the HT 3196 model and optional for all other models.
Pumped-fluid temperatures exceed 177°C	350°F	Use synthetic lubrication.

Oil volumes

Oil volume requirements

This table shows the required amount of oil for oil-lubricated bearings.

Frame	ml	Qts.	Oz.
STi	400	0.5	16
MTi	1400	1.5	47
LTi	1400	1.5	48
XLT-i and i17	3000	3	96

Acceptable oil for lubricating bearings

Acceptable lubricants

Examples of acceptable high quality turbine oils with rust and oxidation inhibitors.

Brand	Lubricant type
Chevron	GST Oil 68
Exxon	Teresstic EP 68
Mobil	DTE 68 Heavy Medium
Phillips 66	Turbine Oil VG68
Shell	Turbo T 68
Sunoco	Sunvis 968
Royal Purple	SYNFILM ISO VG 68 Synthetic Oil

Regrease the grease-lubricated bearings

NOTICE:
Risk of equipment damage. Ensure that the grease container, the greasing device, and the fittings are clean. Failure to do so can result in impurities entering the bearing housing while regreasing the bearings.

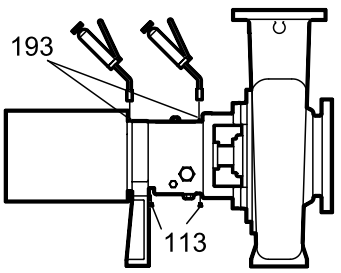


Figure 49: Bearing lubrication

1. Wipe dirt from the grease fittings.
2. Remove the two grease-relief plugs from the bottom of the frame.
3. Fill both of the grease cavities through the fittings with a recommended grease until the fresh grease comes out of the relief holes.
4. Make sure that the frame seals are seated in the bearing housing.
   If they are not, press them in place with the drains located at the bottom.
5. Reinstall the grease-relief plugs.
6. Wipe off any excess grease.
7. Recheck the alignment.

The bearing temperature usually rises after you regrease due to an excess supply of grease. Temperatures return to normal in about two to four operating hours as the pump runs and purges the excess grease from the bearings.

Lubricating-grease requirements

Precautions

NOTICE:

- Avoid equipment damage or decreased performance. Never mix greases of different consistencies (NLGI 1 or 3 with NLGI 2) or with different thickeners. For example, never mix a lithium-based grease with a polyurea based grease. If it is necessary to change the grease type or consistency, remove the rotor and old grease from the housing before regreasing.

Bearing temperature

Bearing temperatures are generally about 18°C | 20°F greater than bearing-housing outer surface temperatures.

This table shows the type of grease required for the operating temperature of the pump.

Bearing temperature	Type of grease
-15°C to 110°C | 5°F to 230°F	Use a lithium-based mineral-oil grease with a consistency of NLGI 2.
Exceed 177°C | 350°F	Use a high-temperature grease. Mineral-oil greases should have oxidation stabilizers and a consistency of NGLI 3.

Grease recommendations based on temperature

Most pumps use Sunoco 2EP grease. High temperature units that can pump fluids with a temperature greater than 177°C | 350°F use Mobil SCH32.

This table shows which brand of grease to use when lubricating the pump.

Brand	When temperature of pumped fluid is less than 177°C | 350°F NLGI consistency 2	When temperature of pumped fluid is greater than177°C | 350°F NLGI consistency 3
Mobil	Mobilux EP2	SCH32
Exxon	Unirex N2	Unirex N3
Sunoco	Mutipurpose 2EP	N/A
SKF	LGMT 2	LGMT 3

Lubricate the bearings after a shutdown period

1. Flush out the bearings and bearing frame with a light oil to remove contaminants. During flushing, make sure to rotate the shaft slowly by hand.
2. Flush the bearing housing with the proper lubricating oil to ensure oil quality after cleaning.
3. Refer to "Reassembly" section for proper bearing greasing procedure.

Mechanical-seal maintenance



WARNING:

The mechanical seal used in an Ex-classified environment must be properly certified.



CAUTION:

Running a mechanical seal dry, even for a few seconds, can cause seal failure and physical injury. Never operate the pump without liquid supplied to the mechanical seal.

Cartridge-type mechanical seals

Cartridge-type mechanical seals are commonly used. Cartridge seals are preset by the seal manufacturer and require no field settings. Cartridge seals installed by the user require disengagement of the holding clips prior to operation, allowing the seal to slide into place. If the seal has been installed in the pump by ITT, these clips have already been disengaged.

Other mechanical seal types

For other types of mechanical seals, refer to the instructions provided by the seal manufacturer for installation and setting.

Reference drawing

The manufacturer supplies a reference drawing with the data package. Keep this drawing for future use when you perform maintenance and seal adjustments. The seal drawing specifies the required flush fluid and attachment points.

Before you start the pump

Check the seal and all flush piping.

Mechanical seal life

The life of a mechanical seal depends on the cleanliness of the pumped fluid. Due to the diversity of operating conditions, it is not possible to give definite indications as to the life of a mechanical seal.

Packed stuffing-box maintenance



WARNING:

- Packed stuffing boxes are not allowed in an ATEX-classified environment.
- Failure to disconnect and lock out driver power may result in serious physical injury. Never attempt to replace the packing until the driver is properly locked out.

Accepted leakage rate

It is not necessary to shut down or disassemble the pump to inspect the packing operation. During normal operation, the packing should leak approximately one drop per second.

Adjustment of gland

Adjust the gland if the leakage rate is greater than or less than the specified rate.

Evenly adjust each of the two gland bolts with a one-quarter (1/4) turn until the desired leakage rate is obtained. Tighten the bolts to decrease the rate. Loosen the bolts to increase the rate.

Tightening of packing

NOTICE:

Never over-tighten packing to the point where less than one drop per second is observed. Over-tightening can cause excessive wear and power consumption during operation.

If you cannot tighten the packing to obtain less than the specified leakage rate, then replace the packing.

Dynamic-seal maintenance



WARNING:

Dynamic seals are not allowed in an ATEX-classified environment.

About the dynamic seal

Dynamic seal parts do not wear substantially to affect operation and do not require maintenance unless the service is particularly abrasive or corrosive.

Repeller

The dynamic repeller prevents pumpage leaks through the stuffing box when the pump operates under published acceptable conditions.

Static seal

A static seal prevents leakage when the pump is shut down. A static seal is either of the following:

- a lip seal
- an elastomeric-face seal
- graphite packing

The only maintenance that the lip seal and the elastomeric-face seal require is replacement when leakage becomes excessive.

The graphite packing should be installed as stuffing-box packing and is designed to run dry.

Disassembly precautions



WARNING:

- Risk of serious physical injury or death from rapid depressurization. Ensure pump is isolated from system and pressure is relieved before disassembling pump, removing plugs, opening vent or drain valves, or disconnecting piping.
- Risk of serious personal injury. Applying heat to impellers, propellers, or their retaining devices can cause trapped liquid to rapidly expand and result in a violent explosion. This manual clearly identifies accepted methods for disassembling units. These methods must be adhered to. Never apply heat to aid in their removal unless explicitly stated in this manual.
- Failure to disconnect and lock out driver power may result in serious physical injury or death. Always disconnect and lock out power to the driver before performing any installation or maintenance tasks.
  - Electrical connections must be made by certified electricians in compliance with all international, national, state, and local rules.
  - Refer to driver/coupling/gear manufacturer's installation and operation manuals (IOM) for specific instructions and recommendations.
- Handling heavy equipment poses a crush hazard. Use caution during handling and wear appropriate Personal Protective Equipment (PPE, such as steel-toed shoes, gloves, etc.) at all times.
- Precautions must be taken to prevent physical injury. The pump may handle hazardous and/or toxic fluids. Proper personal protective equipment should be worn. Pumpage must be handled and disposed of in conformance with applicable environmental regulations.
- Risk of serious personal injury from exposure to hazardous or toxic liquids. A small amount of liquid will be present in certain areas like the seal chamber upon disassembly.
- Risk of severe physical injury or death from explosion of trapped liquid. Never use heat to remove parts unless explicitly stated in this manual.

CAUTION:

- Avoid injury. Worn pump components can have sharp edges. Wear appropriate gloves while handling these parts.

Tools required

In order to disassemble the pump, you need these tools:

- Bearing puller
- Brass drift punch
- Cleaning agents and solvents
- Dial indicators
- Feeler gauges
- Hex wrenches
- Hydraulic press
- Induction heater
- Leveling blocks and shims
- Lifting sling
- Micrometer
- Rubber mallet
- Screwdriver
- Snap-ring pliers
- Torque wrench with sockets
- Wrenches
- Lifting eyebolt (dependent on pump size)

Drain the pump

CAUTION:

- Risk of physical injury. Allow all system and pump components to cool before handling.
- If the pumped fluid is non-conductive, drain and flush the pump with a conductive fluid under conditions that will not allow for a spark to be released to the atmosphere.

1. Leave the drain valve open and remove the drain plug located on the bottom of the pump housing.
   Do not reinstall the plug or close the drain valve until the reassembly is complete.
2. Remove the coupling guard.

Remove the coupling

1. Disconnect the coupling.
2. Remove the C-face adapter.
3. Remove the coupling-guard pump end-plate.

Remove the back pull-out assembly

WARNING:
Lifting and handling heavy equipment poses a crush hazard. Use caution during lifting and handling and wear appropriate Personal Protective Equipment (PPE, such as steel-toed shoes, gloves, etc.) at all times. Seek assistance if necessary.

1. Is your bearing frame oil lubricated?
   - If No: Proceed to step 2.
   - If Yes:
     1. Remove the bearing-frame drain plug (408A) in order to drain oil from the bearing frame.
     2. Replace the plug after the oil is drained.
     3. Remove the oil reservoir, if equipped.

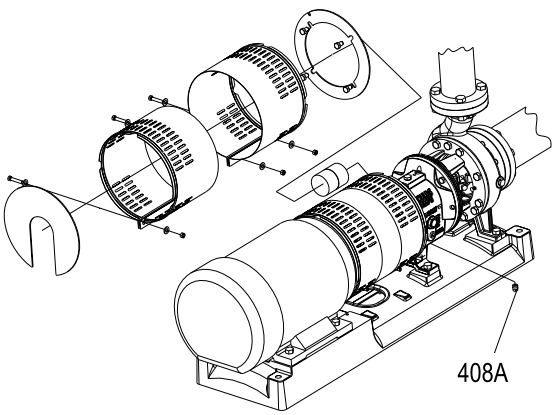


Figure 50: Back pull-out assembly removal (oil lubricated bearing frame)

Oil analysis should be part of a preventive maintenance program that determines the cause of a failure. Save the oil in a clean container for inspection.

2. Does your pump use a C-face adapter?
   - If Yes: Place one sling from the hoist through the frame adapter (108) or frame (228A) for the STi and a second sling from the hoist through the C-face adapter.

- If No: Place a sling from the hoist through the frame adapter (108) or the frame (228A) for the STi.

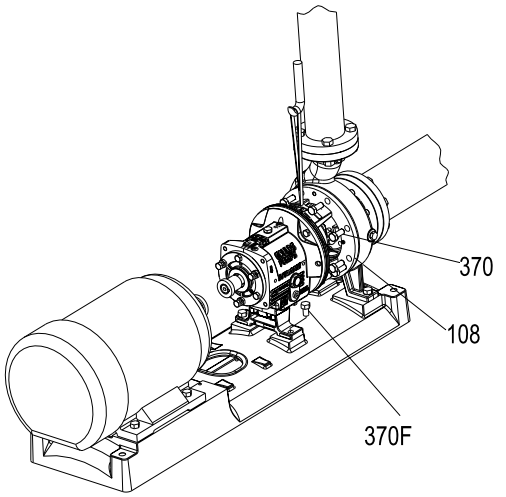


Figure 51: Back pull-out assembly removal (with C-face adapter)

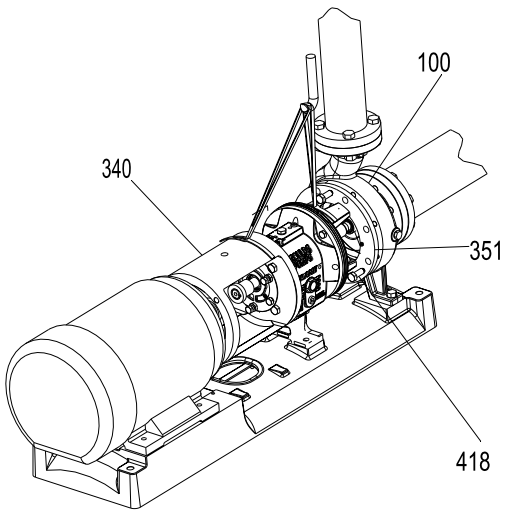


Figure 52: Back pull-out assembly removal (without C-face adapter)

3. Remove the hold-down bolts of the bearing frame foot.
4. Remove the casing bolts.

WARNING:

- Risk of severe physical injury or death from explosion of trapped liquid. Never use heat to remove parts unless explicitly stated in this manual.

5. Tighten the jackscrews evenly, using an alternating pattern, in order to remove the back pull-out assembly.
   You can use penetrating oil if the adapter to the casing joint is corroded.
6. Remove the back pull-out assembly from the casing (100).
7. Mark and remove the shims from under the frame foot and save them for reassembly.
8. Remove and discard the casing gasket.
   You will insert a new casing gasket during reassembly.
9. Remove the jackscrews.
10. Clean all gasket surfaces.

Clean surfaces prevent the casing gasket from partially adhering to the casing due to binders and adhesives in the gasket material.

Remove the coupling hub

1. Clamp the frame adapter securely to the workbench.
2. Remove the coupling hub.
   Mark the shaft for relocation of the coupling hub during reassembly.

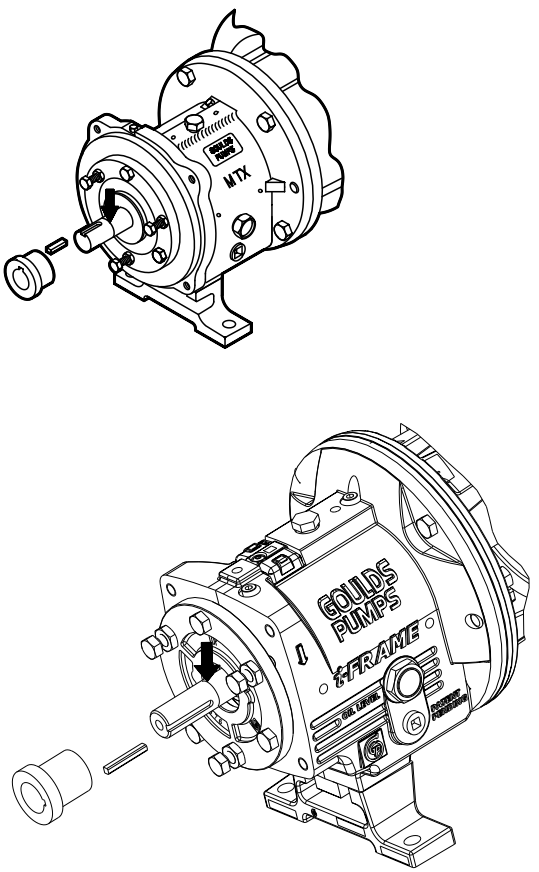


Figure 53: Coupling hub removal

Impeller removal

Remove the impeller (STi, MTi, and LTi)

WARNING:
Risk of severe physical injury or death from explosion of trapped liquid. Never use heat to remove parts unless explicitly stated in this manual.

CAUTION:
Risk of physical injury from sharp edges. Wear heavy work gloves when handling impellers.

1. Slide the shaft wrench (A05107A or A01676A) over the shaft (122) and key.
2. Rotate the impeller (101) clockwise (viewed from the impeller end of the shaft) and raise the wrench off of the work surface.

3. To loosen the impeller, quickly turn it counter-clockwise (viewed from the impeller end of the shaft) while impacting the wrench handle on the workbench or a solid block.

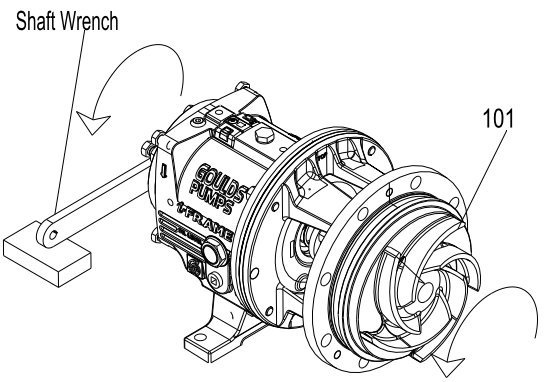


Figure 54: Loosen impeller

4. Repeat step 3 until the impeller becomes loose.
5. Remove and discard the impeller O-ring (412A). You will insert a new O-ring during reassembly.

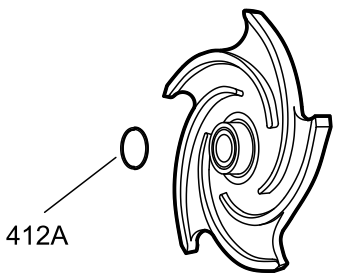


Figure 55: O-ring for models 3196, HT 3196, NM 3196, 3198, and 3796

If the impeller cannot be removed by the previous methods, cut the shaft between the gland and the frame, remove the impeller, stuffing-box cover, gland, sleeve, and shaft end as a unit. Do not apply heat.

Remove the impeller (XLT-i, and i17)



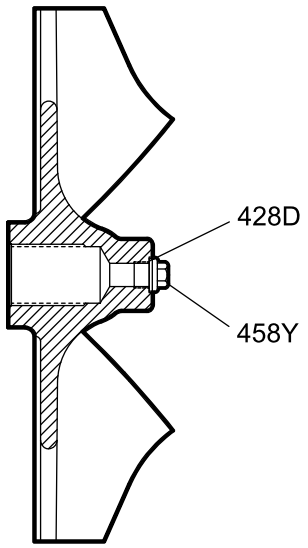
WARNING:
Risk of severe physical injury or death from explosion of trapped liquid. Never use heat to remove parts unless explicitly stated in this manual.



CAUTION:
Risk of physical injury from sharp edges. Wear heavy work gloves when handling impellers.

Clamp the frame foot (241) to the workbench when you use this method to remove the impeller.

1. Remove the impeller plug (458Y) from the front of the impeller (101) and discard the PTFE gasket (428D).



2. Spray penetrating oil through the plug hole into the cavity at the end of the shaft and let it penetrate for 15 minutes.
3. While waiting, rotate the shaft several times to distribute the oil.
4. Slide the shaft wrench (A05107A) over the shaft (122) and key.
5. Rotate the impeller clockwise (viewed from the impeller end of the shaft) and raise the wrench off of the work surface.
6. To loosen the impeller, quickly turn the impeller counter-clockwise (viewed from the impeller end of the shaft) while impacting the wrench handle on the workbench or a solid block.
7. Repeat step 6 until the impeller becomes loose.
8. If step 6 and 7 do not work then do this:
   a) Place a socket wrench over the cast nut on the impeller hub.
   b) Turn the impeller counter-clockwise (viewed from the impeller end of the shaft).

   Be sure that the impeller wrench rests on the workbench or a solid block and that the power end is secure on the work surface.
9. Remove and discard the impeller O-ring (412A).
   You will insert a new O-ring during reassembly.

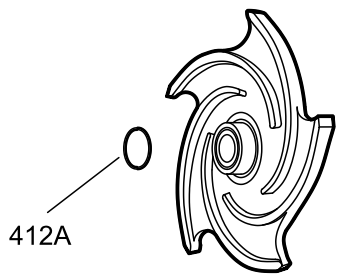


Figure 56: O-ring for models 3196 and HT 3196

If the impeller cannot be removed by the previous methods, cut the shaft between the gland and the frame, remove the impeller, stuffing-box cover, gland, sleeve, and shaft end as a unit. Do not apply heat.

Seal-chamber cover removal

Seal-chamber removal procedures

Choose from one of these procedures to remove the seal-chamber cover.

Table 13: Procedures for seal-chamber cover removal by model

Model	Procedure
3196, CV 3196, HT 3196, LF 3196, 3796	Remove the seal-chamber cover.
NM 3196, 3198	Remove the seal-chamber cover and/or backplate.

Remove the seal-chamber cover (3196, CV 3196, HT 3196, LF 3196, 3796)

1. Remove the gland stud nuts (355).
2. Remove the seal-chamber stud nuts (370H).
3. Remove the seal chamber (184).

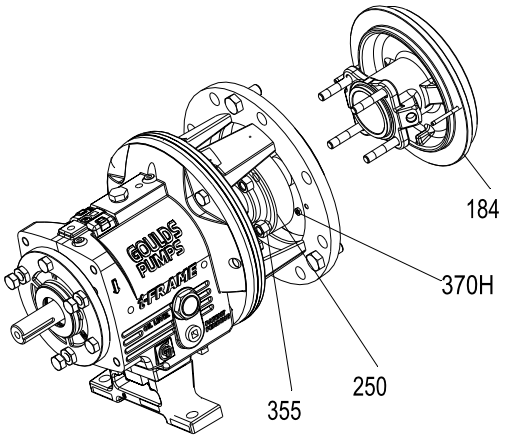


Figure 57: Seal chamber cover removal

4. Remove the shaft sleeve (126) if it is used.
   The mechanical seal is attached to the sleeve.

NOTICE:
Be careful with the mechanical seal. Carbon or ceramic components are brittle and easily broken.

5. Remove the rotary portion of the seal from the sleeve by loosening the setscrews and sliding it off the sleeve.
   Refer to the mechanical-seal instructions for more information.

6. Remove the gland (250), the stationary portion of the seal, and the O-ring (360Q).

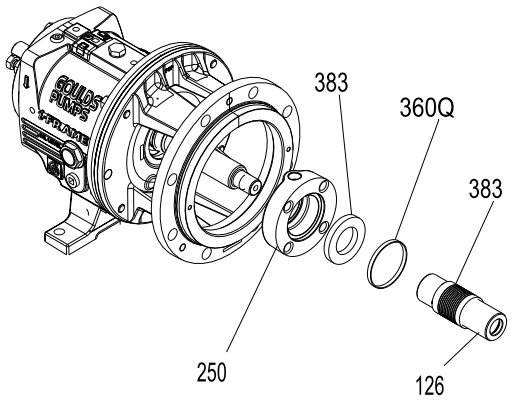


Figure 58: Gland removal

Remove the stuffing-box cover (3196, CV 3196, HT 3196, LF 3196, 3796)

1. Remove the gland nuts (355) and the gland (107).
2. Remove the stuffing-box-cover nuts (370H).
3. Remove the stuffing-box cover (184).

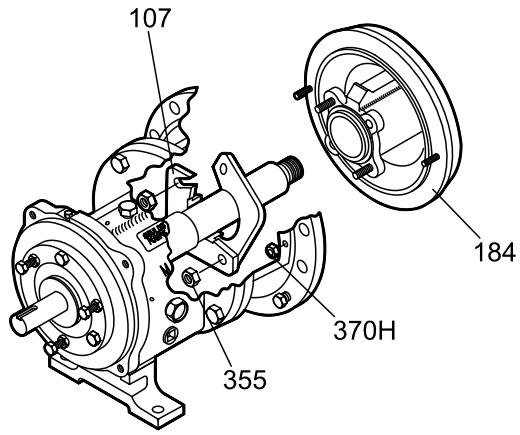


Figure 59: Stuffing box cover removal

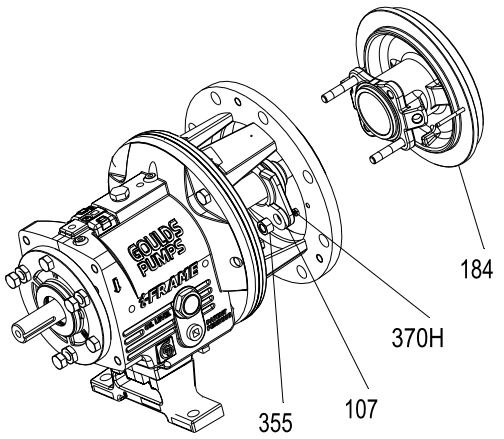


Figure 60: Stuffing box cover removal

4. Remove the shaft sleeve (126).

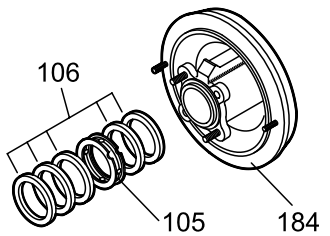


Figure 61: Remove the shaft sleeve

5. Remove the packing (106) and lantern ring (105) from the stuffing-box cover (184). A lantern ring does not come with self-lubricating graphite packing.

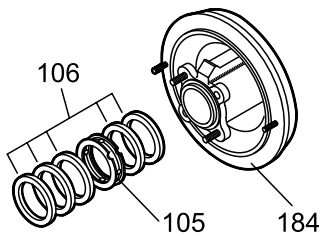


Figure 62: Packing and lantern ring removal

Remove the dynamic seal

1. Remove the stud nuts (370H).

2. Remove the dynamic-seal assembly.

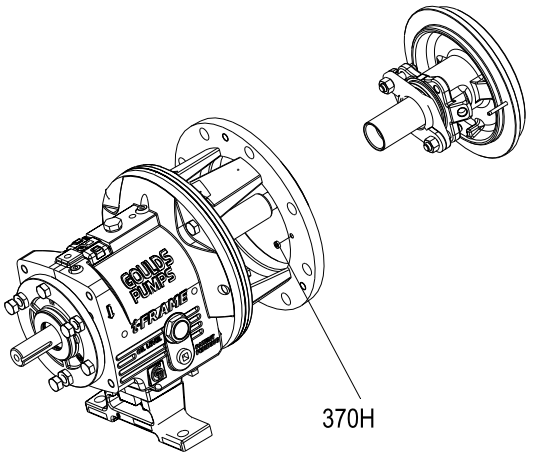


Figure 63: Dynamic seal removal

3. Remove the socket head cap screws (265).
4. Remove the packed stuffing box cover (184) and gasket (264).
5. Remove the repeller (262) from the backplate (444).

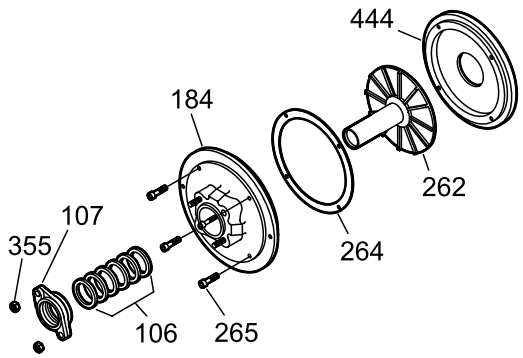


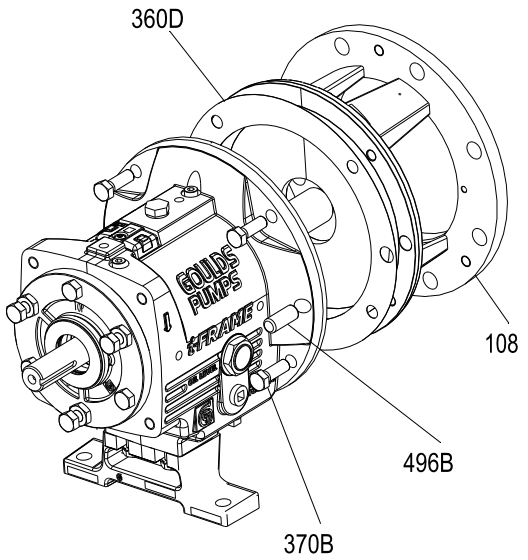
Figure 64: Repeller removal

Remove the frame adapter (MTi, LTi, XLT-i, i17)

The 3198 frame adapter is not interchangeable with the adapter of any other model.

1. Remove the dowel pins (469B) and the bolts (370B).
2. Remove the frame adapter (108).
3. Remove and discard the gasket (360D).

You will install a new gasket during reassembly.



Remove the inboard labyrinth oil seal

Labyrinth oil-seal O-rings are part of the 3196 maintenance kits, and they are sold separately.

1. Determine the fit of your labyrinth oil seal.

Table 14: Labyrinth oil-seal fit

Model	Type of fit
STi	O-ring fit into the bearing-frame adapter (228A)
MTi, LTi, XLT-i and i17	O-ring fit into the frame adapter

2. Remove the O-rings (497H and 497J) and the seal (333A).

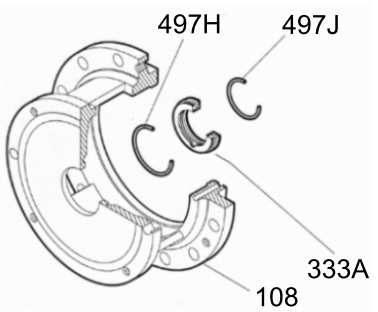


Figure 65: O-ring removal

Disassemble the power end (STi, MTi)

1. Remove the clamp screws (370C) and back off the jam nuts (423).
2. Tighten the jack screws (370D) evenly to move the bearing housing (134) out of the bearing frame (228A).

3. Remove the shaft assembly from the bearing frame (228A).

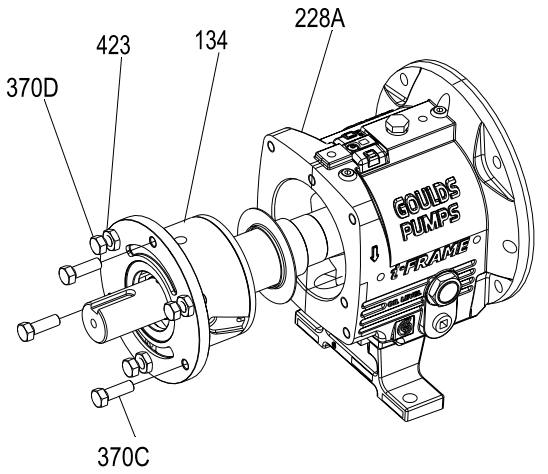


Figure 66: Shaft assembly removal

4. Remove the jack screws (370D) with nuts (423).
5. Remove the bearing housing O-ring (496) and the bearings.
6. Remove the outboard bearing retaining snap ring (361A).

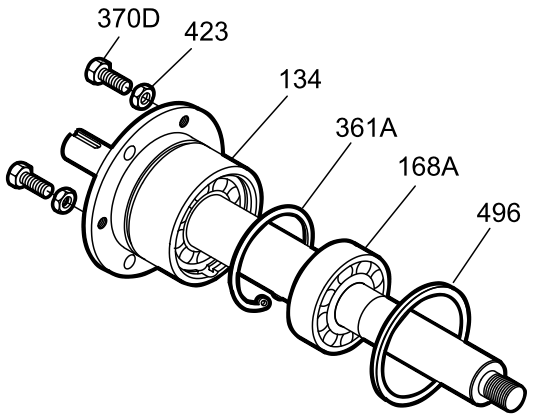


Figure 67: Outboard bearing retaining snap ring removal

7. Remove the bearing housing (134) and bearings (112A and 168A) from the shaft (122).

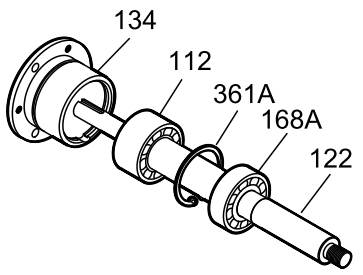


Figure 68: Bearing housing and bearings removal

8. Remove the bearing locknut (136) and bearing lock washer (382).
9. Remove the inboard bearing (168A).
10. Remove the outboard bearing (112A).

NOTICE:
Use force only on the inner race when pressing bearings from the shaft. Failure to do so may result in equipment damage.

NOTICE:
Do not reuse bearings if removed from shaft. Doing so may result in equipment damage. Replace the bearings before reassembly.

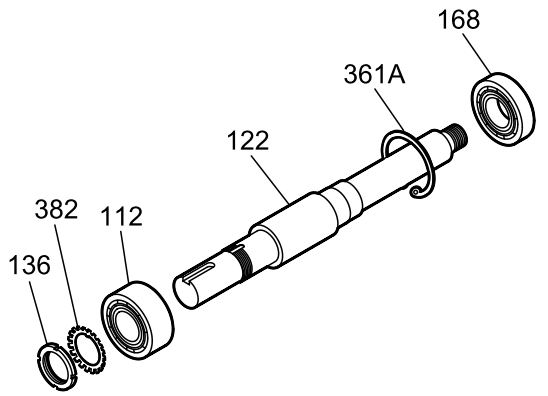


Figure 69: Outboard bearing removal

Disassemble the power end (STi and MTi with duplex bearings)

1. Remove the clamp screws (370C) and back off the jam nuts (423).
2. Tighten the jack screws (370D) evenly to move the bearing housing (134) out of the bearing frame (228A).
3. Remove the shaft assembly from the bearing frame (228A).

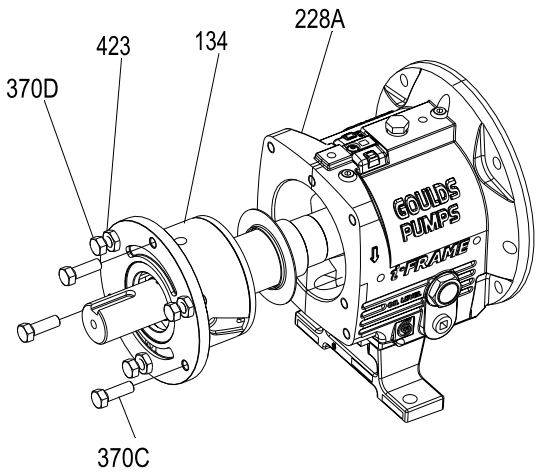


Figure 70: Shaft assembly removal

4. Remove the jack screws (370D) with the nuts (423).

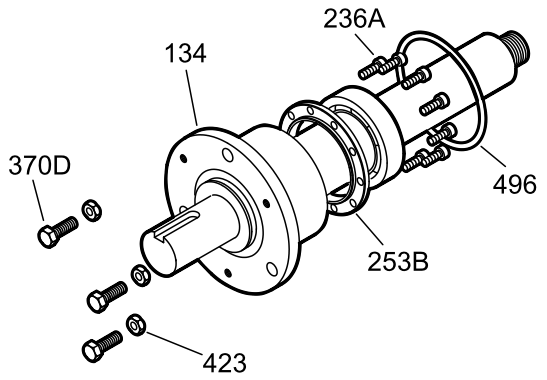


Figure 71: Jack screw removal

5. Remove the bearing housing O-ring (496).
6. Remove the clamp ring screws (236A) and separate the clamp ring (253B) from the bearing housing (134).
   You must remove the bearings before you can remove the clamp ring from the shaft.
7. Remove the bearing housing (134) and the bearings (112A and 168A) from the shaft (122).

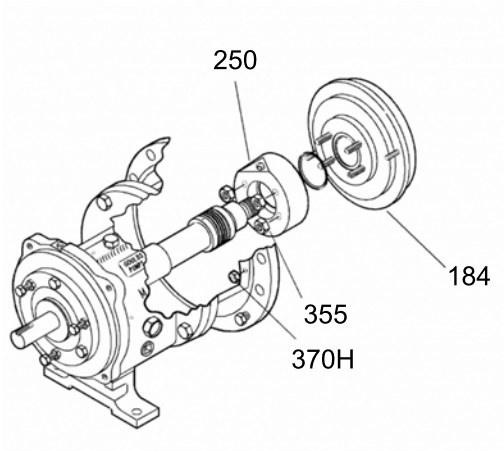


Figure 72: Bearing housing and bearing removal

8. Remove the inboard bearing (168A).

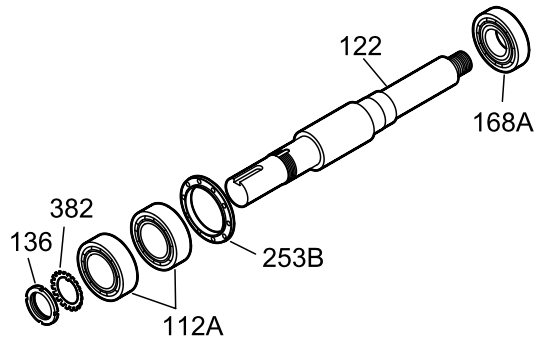


Figure 73: Inboard bearing removal

9. Remove the bearing locknut (136) and bearing lockwasher (382).
10. Remove the outboard bearings (112A).

NOTICE:
Use force only on the inner race when pressing bearings from the shaft. Failure to do so may result in equipment damage.

NOTICE:
Do not reuse bearings if removed from shaft. Doing so may result in equipment damage. Replace the bearings before reassembly.

11. Remove the outboard labyrinth oil seal (332A) from the bearing housing (134). Remove the O-rings (497F and 497G) if it is necessary. Labyrinth oil seal O-rings are part of the 3196 maintenance kits and they are sold separately.

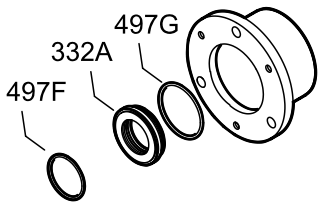


Figure 74: Outboard labyrinth oil seal removal

Disassemble the power end (LTi)

1. Remove the clamp screws (370C) and back off the jam nuts (423).
2. Evenly tighten the jack screws (370D) to move the bearing housing (134) out of the bearing frame (228A).
3. Remove the shaft assembly from the bearing frame (228A).

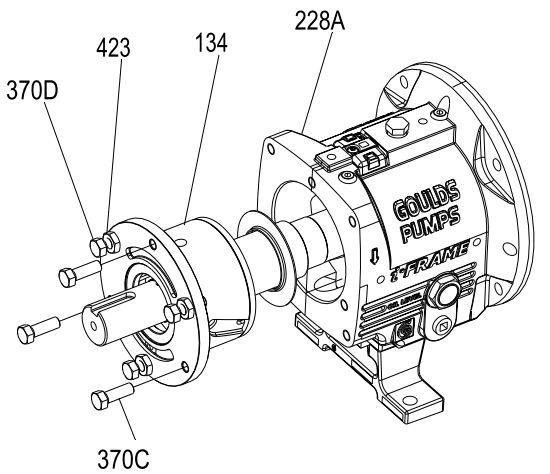


Figure 75: Shaft assembly removal

4. Remove the jack screws (370D) with the nuts (423).
5. Remove the clamp-ring screws (236A) and separate the clamp ring (253B) from the bearing housing (134).

You must remove the bearings before you can remove the clamp ring from the shaft.

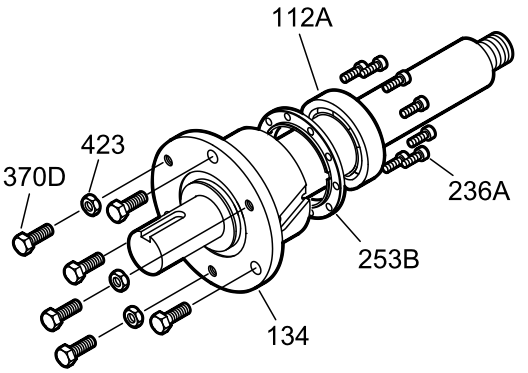


Figure 76: Clamp ring removal

6. Remove the bearing housing (134) and the bearings (112A and 168A) from the shaft (122).

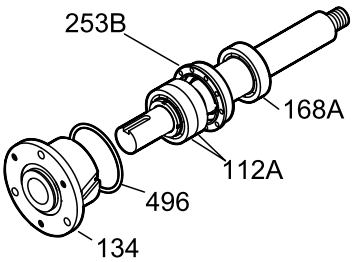


Figure 77: Bearing housing and bearing removal

7. Remove the bearing housing O-ring (496) and the inboard bearing (168A).

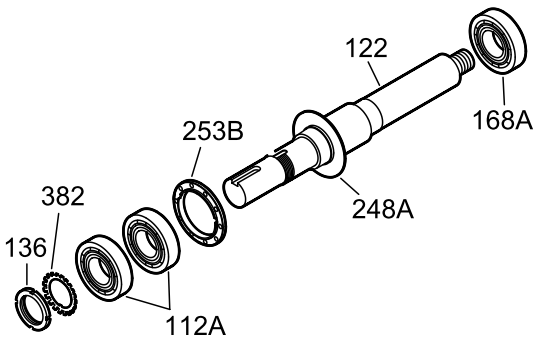


Figure 78: O-ring removal

8. Remove the flinger so that the flinger seating surface on the shaft can be cleaned.
9. Remove the bearing locknut (136) and the bearing lockwasher (382).
10. Remove the outboard bearings (112A) and the clamp ring (253B).

NOTICE:
Use force only on the inner race when pressing bearings from the shaft. Failure to do so may result in equipment damage.

NOTICE:
Do not reuse bearings if removed from shaft. Doing so may result in equipment damage. Replace the bearings before reassembly.

11. Remove the outboard labyrinth oil seal (332A) from the bearing housing (134).
12. Remove the O-rings (497F and 497G) if it is necessary.
    Labyrinth oil-seal O-rings are part of the 3196 maintenance kits, and they are sold separately.

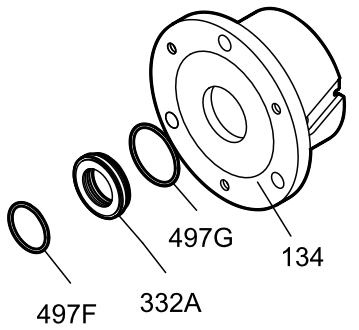
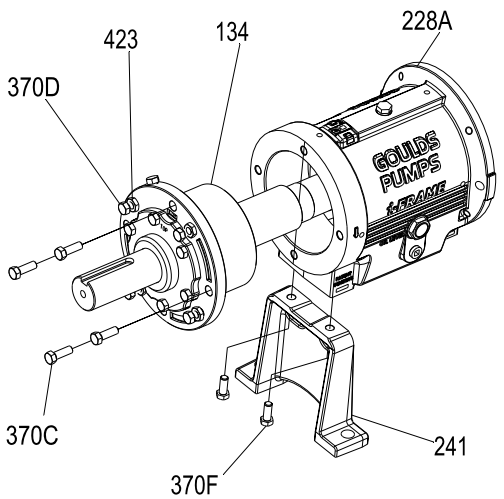


Figure 79: O-ring removal

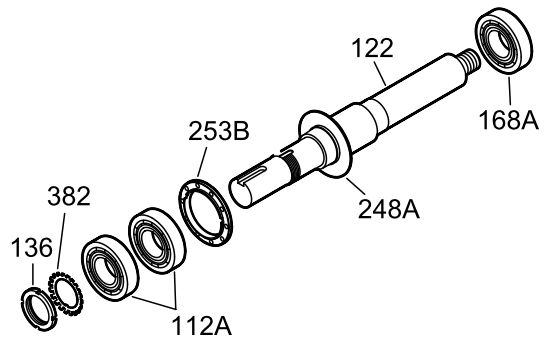
Disassemble the power end (XLT-i and i17)

1. Remove the bearing frame from the frame foot (241) using the frame-foot bolts (370F).

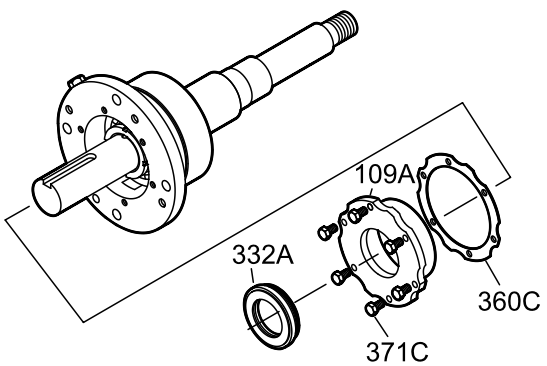


2. Remove the clamp screws (370C) and back off the jam nuts (423).
3. Tighten the jack screws (370D) evenly to move the bearing housing (134) out of the bearing frame (228A).
4. Remove the shaft assembly from the bearing frame (228A).
5. Remove the jack screws (370D), the nuts (423), and the bearing housing O-ring.

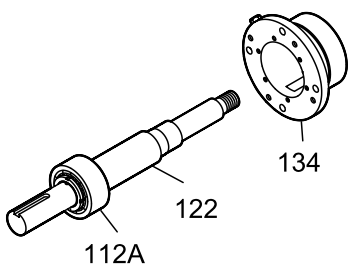
6. Remove the inboard bearing (168A).



7. Remove the bolts (371C), the bearing end cover (109A), and the gasket (360C).
8. Remove the outboard labyrinth oil seal (332A) from the end cover (109A).
9. Remove the O-rings (497F and 497G) if it is necessary.
   Labyrinth oil-seal O-rings are part of the 3196 maintenance kits, and they are sold separately.



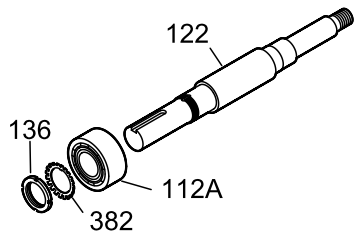
10. Remove the bearing housing (134) and the bearing (112A) from the shaft (122).



11. Remove the bearing locknut (136), the bearing lockwasher (382), and the outboard bearing (112A).

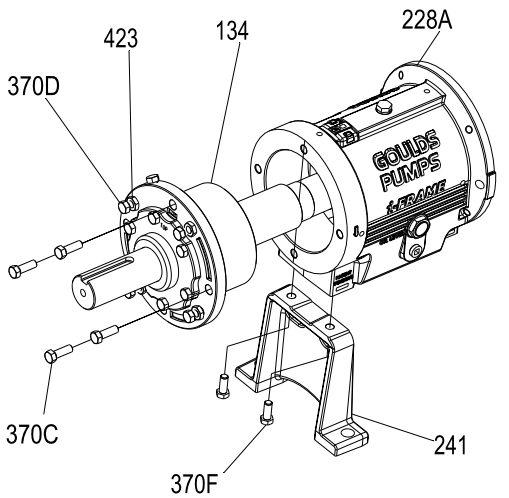
NOTICE:
Use force only on the inner race when pressing bearings from the shaft. Failure to do so may result in equipment damage.

NOTICE:
Do not reuse bearings if removed from shaft. Doing so may result in equipment damage. Replace the bearings before reassembly.

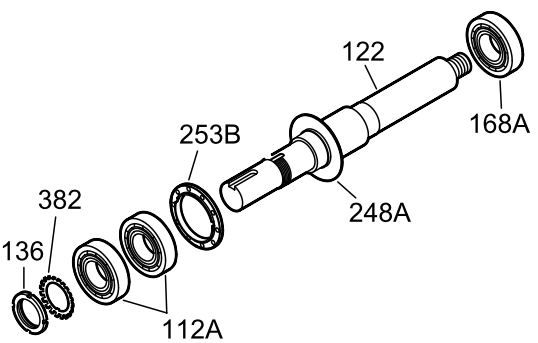


Disassemble the power end (XLT-i and i17 with duplex bearings)

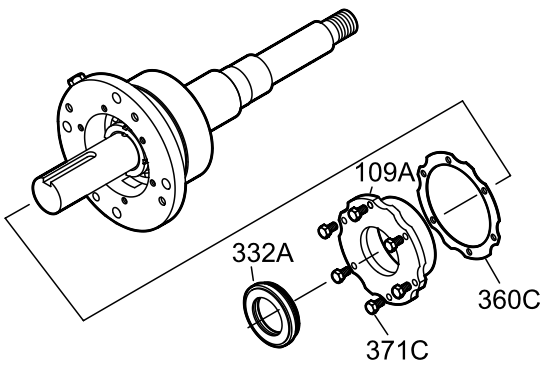
1. Remove the bearing frame to frame foot (241) using the frame-foot bolts (370F).



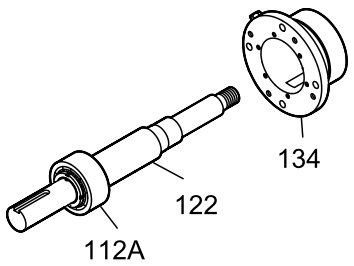
2. Remove the clamp screws (370C) and back off the jam nuts (423).
3. Tighten the jack screws (370D) evenly to move the bearing housing (134) out of the bearing frame (228A).
4. Remove the shaft assembly from the bearing frame (228A).
5. Remove the jack screws (370D) and the nuts (423).
6. Remove the bearing housing O-ring (496) and the inboard bearing (168A).



7. Remove the bolts (371C), the end cover (109A), and the gasket (360C).
8. If necessary, remove the outboard labyrinth oil seal (332A) from the end cover (109A) and remove the O-rings (497F and 497G).
   Labyrinth oil-seal O-rings are part of the 3196 maintenance kits, or they are sold separately.



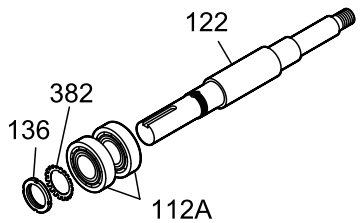
9. Remove the bearing housing (134) and bearings (112A) from the shaft (122) .



10. Remove the bearing locknut (136), the bearing lockwasher (382), and the outboard bearing (112A).

NOTICE:
Use force only on the inner race when pressing bearings from the shaft. Failure to do so may result in equipment damage.

NOTICE:
Do not reuse bearings if removed from shaft. Doing so may result in equipment damage. Replace the bearings before reassembly.



Disassemble the bearing frame

1. Remove these plugs from the bearing frame (228A).
   - oil-fill plug (113A)

- oil-drain plug (408A)
- sight-oiler plug (408J)
- four oil mist/grease connection plugs (408H)
- oil-cooler inlet and outlet plugs (408L and 408M) or oil cooler

2. For the MTi and LTi models, remove the bearing frame foot-to-frame bolts (370F) and the frame foot (241).

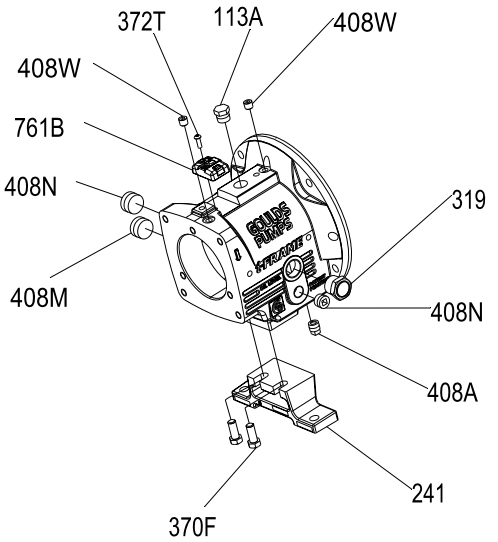


Figure 80: Plug removal

Guidelines for i-*ALERT*® Condition Monitor disposal

Precautions

WARNING:

- Explosive hazard and risk of personal injury. Heating to high temperatures could cause combustion of the condition monitor. Never heat the condition monitor to temperatures in excess of 149°C | 300°F or dispose of in a fire.

Guidelines

The battery contained in the condition monitor does not contain enough lithium to qualify as reactive hazardous waste. Use these guidelines when disposing of the condition monitor.

- The condition monitor is safe for disposal in the normal municipal waste stream.
- Adhere to local laws when you dispose of the condition monitor.

Disassemble the C-face adapter

WARNING:
Risk of personal injury and equipment damage from dropping or tipping motor. The motor must be properly supported with a clean, uncorroded eye bolt or a strap under both ends.

1. Loosen the motor-mounting bolts and remove the motor.

Table 15: Required number of motor-mounting bolts

This table shows the number of motor-mounting bolts.

Pump frame	Motor frame	Number of bolts
STi	All	4

Pump frame	Motor frame	Number of bolts
MTi and LTi	143-286	4
	324-365	8

2. Loosen the bolts attached to the bearing-frame flange and remove the C-face adapter from the bearing frame.

Pre-assembly inspections

Guidelines

Before you assemble the pump parts, make sure you follow these guidelines:

- Inspect the pump parts according to the information in these pre-assembly topics before you reassemble your pump. Replace any part that does not meet the required criteria.
- Make sure that the parts are clean. Clean the pump parts in solvent in order to remove oil, grease, and dirt.

NOTICE:
Protect machined surfaces while cleaning the parts. Failure to do so may result in equipment damage.

Replacement guidelines

Casing check and replacement



WARNING:
Risk of death or serious injury. Leaking fluid can cause fire and/or burns. Inspect and ensure gasket sealing surfaces are not damaged and repair or replace as necessary.

Inspect the casing for cracks and excessive wear or pitting. Thoroughly clean gasket surfaces and alignment fits in order to remove rust and debris.

Repair or replace the casing if you notice any of these conditions:

- Localized wear or grooving that is greater than 3.2 mm | 1/8 in. deep
- Pitting that is greater than 3.2 mm | 1/8 in. deep
- Irregularities in the casing-gasket seat surface

Casing areas to inspect

The arrows point to the areas to inspect for wear on the casing:

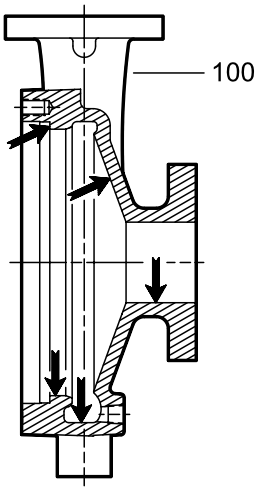


Figure 81: 3196, HT 3196, LF 3196, NM 3196, and 3198 casing

Impeller replacement

This table shows the criteria for replacing the impeller:

Impeller parts	When to replace
Impeller vanes	· When grooved deeper than 1.6 mm | 1/16 in., or · When worn evenly more than 0.8 mm | 1/32 in.
Pumpout vanes	When worn or bent more than 0.8 mm | 1/32 in.
Vane edges	When you see cracks, pitting, or corrosion damage

Impeller areas to inspect

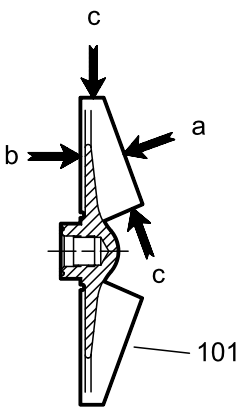


Figure 82: Areas to inspect for wear on the 3196 impeller.

Frame adapter check and replacement

- Replace the frame adapter if it has cracks or excessive corrosion damage.
- Make sure the gasket surface is clean.

Dynamic-seal repeller replacement

This table shows the criteria for replacing dynamic-seal repeller parts for the 3196, CV 3196, and LF 3196 pump models.

Dynamic seal part	When to replace
Dynamic-seal repeller vane	The grooves are deeper than 1.6 mm | 1/16 in. or are worn evenly more than 0.8 mm | 1/32 in..
Sleeve surface	The surface has grooves, pitting, or other damage.

Labyrinth seal replacement

Replace the labyrinth-seal O-ring if it has cuts and cracks.

Gaskets, O-rings, and seats replacement

WARNING:
Risk of death or serious injury. Leaking fluid can cause fire and/or burns. Replace all gaskets and O-rings at each overhaul or disassembly.

- Replace all gaskets and O-rings at each overhaul and disassembly.
- Inspect the seats. They must be smooth and free of physical defects.
  In order to repair worn seats, skin cut them in a lathe while you maintain dimensional relationships with other surfaces.
- Replace parts if the seats are defective.

Fastening

WARNING:
Risk of serious personal injury or property damage. Fasteners such as bolts and nuts are critical to the safe and reliable operation of the product. Ensure appropriate use of fasteners during installation or reassembly of the unit.

- Use fasteners of the proper size and material only.
- Replace all corroded fasteners.
- Ensure that all fasteners are properly tightened and that there are no missing fasteners.

Shaft and sleeve replacement guidelines

Two types of sleeves

The 3198 is offered with either a metallic sleeve that uses the standard 3196 shaft or a PTFE sleeve. The PTFE sleeve requires a special shaft and a different inboard labyrinth oil seal.

Shaft measurements check

Replace the shaft (122) if any measurements exceed acceptable values. See Bearing fits and tolerances.

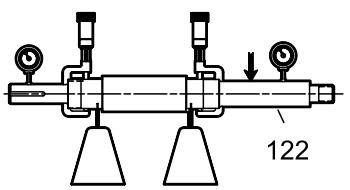


Figure 83: Shaft measurements check

Straightness check

Replace the shaft (122) if runout exceeds the values in this table:

Table 16: Shaft runout tolerances for sleeve fit and coupling fit

	Sleeve fit in millimeters | inches	Coupling fit in millimeters | inches
With sleeve	0.025 | 0.001	0.025 | 0.001
Without sleeve	0.051 | 0.002	0.025 | 0.001

Shaft and sleeve check

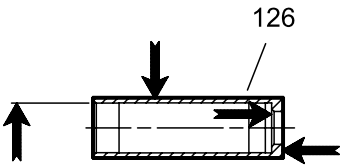


Figure 84: Shaft and sleeve check

- Check the shaft and sleeve (126) surface for grooves and pitting.
- Replace the shaft and sleeve if any grooves or pits are found.

Bearing-frame inspection

Checklist

Check the bearing frame for these conditions:

- Visually inspect the bearing frame and frame foot for cracks.
- Check the inside surfaces of the frame for rust, scale, or debris. Remove all loose and foreign material.
- Make sure that all lubrication passages are clear.
- If the frame has been exposed to pumped fluid, inspect the frame for corrosion or pitting.
- Inspect the inboard-bearing bores.
  If any bores are outside the measurements in the Bearing fits and tolerances table, replace the bearing frame.

Surface inspection locations

This figure shows the areas to inspect for wear on the bearing frame outside surface.

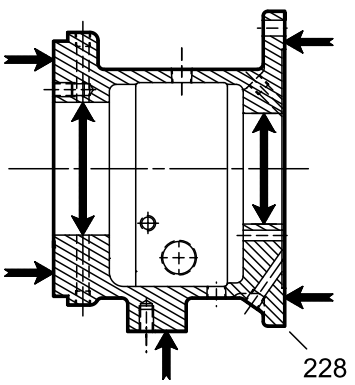


Figure 85: Outside surface inspection locations

This figure shows the areas to inspect for wear on the bearing frame inside surface.

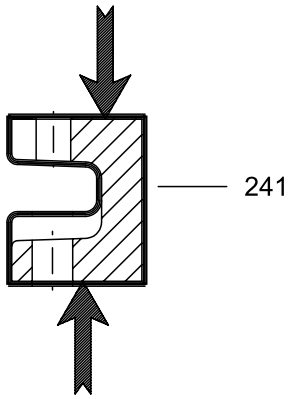


Figure 86: Inside surface inspection locations

C-face adapter inspection

Checklist

- Visually inspect the C-face adapter (340) for cracks.
- Check all surfaces for rust, scale, or debris and remove all loose and foreign material.
- Check for corrosion or pitting.

This figure shows the areas to inspect for cracks on the C-face adapter.

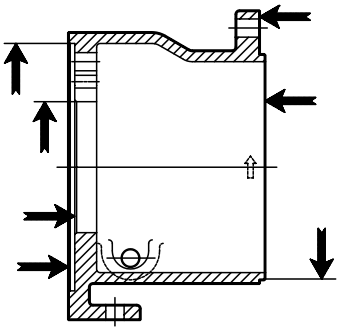


Figure 87: C-face adapter inspection locations

Seal chamber and stuffing box cover inspection

Checklist

Perform these checks when you inspect the seal chamber and stuffing box cover:

- Make sure that these surfaces are clean:
  - Seal chamber and stuffing box cover
  - Dynamic-seal backplate gasket
  - Mounting
- Make sure there is no pitting or wear greater than 3.2 mm | 1/8 in. deep. Replace the seal chamber and stuffing box cover if pitting or wear exceeds this measurement.
- Inspect the machined surfaces and mating faces noted in the figures.

These images point to the areas to inspect:

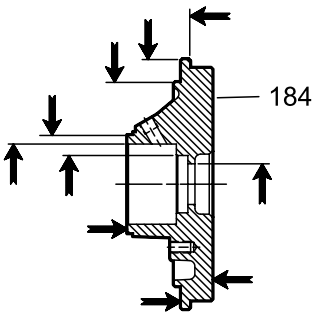


Figure 88: BigBore™ chamber

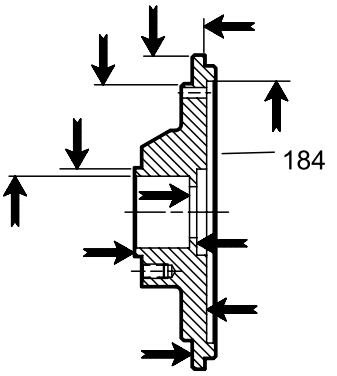


Figure 89: Stuffing box cover

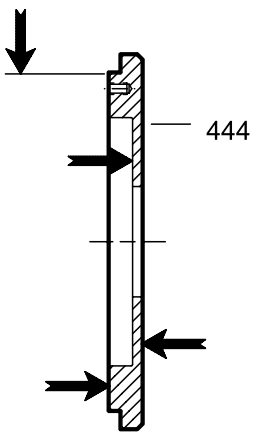


Figure 90: Dynamic-seal backplate

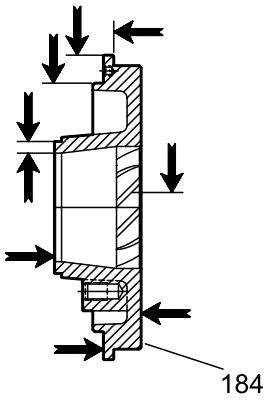


Figure 91: TaperBore™ Plus

Bearings inspection

Condition of bearings

Do not reuse bearings. The condition of the bearings provides useful information on operating conditions in the bearing frame.

Checklist

Perform these checks when you inspect the bearings:

- Inspect the bearings for contamination and damage.
- Note any lubricant condition and residue.
- Inspect the ball bearings to see if they are loose, rough, or noisy when you rotate them.
- Investigate any bearing damage to determine the cause. If the cause is not normal wear, correct the issue before you return the pump to service.

Bearing-housing inspection

Checklist

- Inspect the bearing-housing (134) bore according to the bearing fits and tolerances table.
- Replace the bearing housing if the dimensions exceed acceptable values. Reference: see Bearings fits and tolerances.
- Visually inspect the bearing housing for cracks and pits.

Checklist for specific models

This table shows bearing-housing checks that are required for specific models of pump.

Frame	Bearing-housing check
STi and MTi	Ensure that the snap-ring groove is not cracked.
LTi	Clear all grooves and holes.
XLT-i and i17	Clean the gasket surface.

Inspection locations

The following images point to the areas to inspect on the bearing housing.

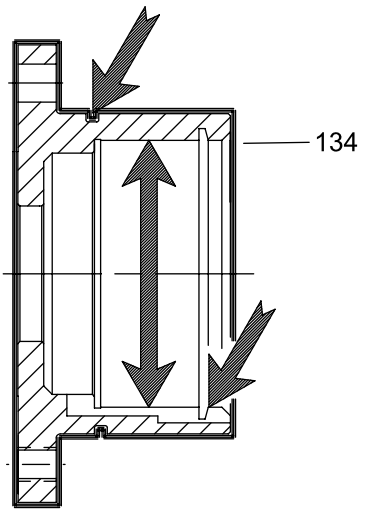


Figure 92: STi and MTi bearing housing

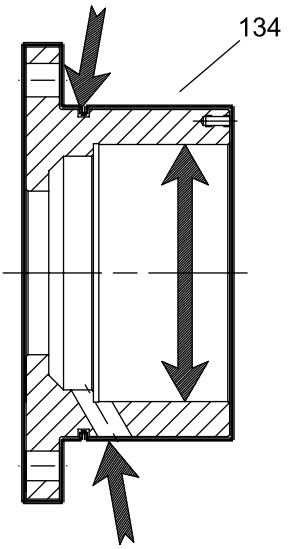


Figure 93: LTi bearing housing

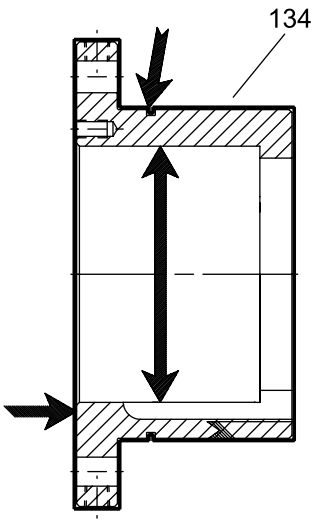


Figure 94: XLT-i and i17 bearing housing

Bearing fits and tolerances

Table 17: Bearing fits and tolerances table

This table references the bearing fits and tolerances according to the ABEC I standard.

	STi millimeters | inches	MTi millimeters | inches	LTi millimeters | inches	XLT-i, i-17 millimeters | inches
Shaft OD Inboard	35.014 | 1.3785 35.004 | 1.3781	45.014 | 1.7722 45.004 | 1.7718	55.016 | 2.1660 55.004 | 2.1655	65.016 | 2.5597 65.004 | 2.5592
Clearance	0.025 | 0.0010 tight 0.003 | 0.0001 tight	0.025 | 0.0010 tight 0.003 | 0.0001 tight	0.030 | 0.0012 tight 0.003 | 0.0001 tight	0.030 | 0.0012 tight 0.003 | 0.0001 tight
Bearing ID Inboard	35.001 | 1.3780 34.989 | 1.3775	45.001 | 1.7717 44.988 | 1.7712	55.001 | 2.1654 54.986 | 2.1648	65.001 | 2.5591 64.986 | 2.5585
Frame ID Inboard	72.000 | 2.8346 72.017 | 2.8353	100.000 | 3.9370 100.023 | 3.9379	120.000 | 4.7244 120.023 | 4.7253	140.000 | 5.5118 140.025 | 5.5128
Clearance	0.031 | 0.0012 loose 0.000 | 0.0000 loose	0.038 | 0.0015 loose 0.000 | 0.0000 loose	0.038 | 0.0015 loose 0.000 | 0.0000 loose	0.043 | 0.0017 loose 0.000 | 0.0000 loose
Bearing OD Inboard	72.000 | 2.8346 71.986 | 2.8341	100.000 | 3.9370 99.985 | 3.9364	120.000 | 4.7244 119.985 | 4.7238	140.000 | 5.5118 139.982 | 5.5111
Shaft OD Outboard	30.010 | 1.1815 30.002 | 1.1812	45.014 | 1.7722 45.004 | 1.7718	50.013 | 1.9690 50.003 | 1.9686	65.016 | 2.5597 65.004 | 2.5592
Clearance	0.020 | 0.0008 tight 0.003 | 0.0001 tight	0.025 | 0.0010 tight 0.003 | 0.0001 tight	0.025 | 0.0010 tight 0.003 | 0.0001 tight	0.030 | 0.0012 tight 0.003 | 0.0001 tight
Bearing OD Outboard	30.000 | 1.1811 29.990 | 1.1807	45.001 | 1.7717 44.988 | 1.7712	50.000 | 1.9685 49.987 | 1.9680	65.001 | 2.5591 64.986 | 2.5585
Housing OD Outboard	72.000 | 2.8346 72.017 | 2.8353	100.000 | 3.9370 100.022 | 3.9379	110.000 | 4.3307 110.023 | 4.3316	140.000 | 5.5118 140.025 | 5.5128
Clearance	0.031 | 0.0012 loose 0.000 | 0.0000 loose	0.038 | 0.0015 loose 0.000 | 0.0000 loose	0.038 | 0.0015 loose 0.000 | 0.0000 loose	0.043 | 0.0017 loose 0.000 | 0.0000 loose
Bearing OD Outboard	72.000 | 2.8346 71.986 | 2.8341	100.000 | 3.9370 99.985 | 3.9364	110.000 | 4.3307 109.985 | 4.3301	140.000 | 5.5118 139.982 | 5.5111

Assemble the rotating element and the bearing frame (STi and MTi)



CAUTION:
Risk of physical injury from hot bearings. Wear insulated gloves when using a bearing heater.

NOTICE:
Ensure that the pipe threads are clean. Apply thread sealant to the plugs and fittings. Failure to do so may result in oil leaks and equipment damage.

NOTICE:
There are several methods used to install bearings. The recommended method is to use an induction heater that heats as well as demagnetizes the bearings. Failure to use this method may result in equipment damage.

1. Prepare the bearing frame (228) as follows (see the illustration):
   a) Install the oil-fill plug (113A).
   b) Install the oil-drain plug (408A).
   c) Install the sight glass (319).
   d) Install the sight oiler plug (408J).
   e) Install the plug for the oil-cooler inlet (408L).
   f) Install the plug for the oil-cooler outlet (408M).

g) Install four oil-mist connection plugs (408H).
Or: Install two grease fittings (193) and two grease-relief plugs (113).

h) Attach the bearing-frame foot (241) and fasten the bolts (370F) by hand.

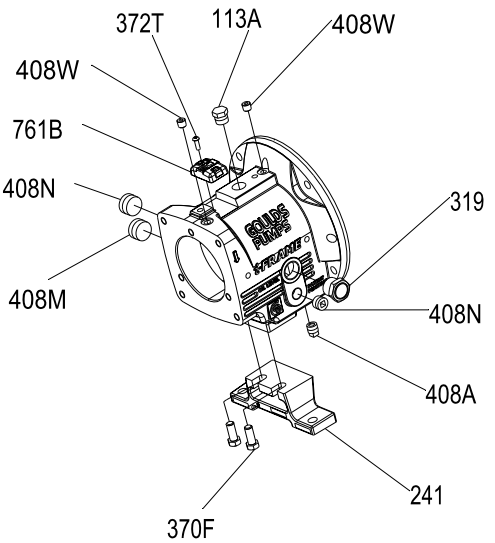


Figure 95: Oil mist connection plugs

2. Install the outboard bearing (112A) on the shaft (122).
The regreaseable bearing has a single shield. The outboard bearing is installed with the shield toward the impeller.
   a) Inspect the shaft (122) to ensure that it is clean, dimensionally correct, and is free of nicks and burrs.
   b) Lightly coat the bearing seating with a thin film of oil.
   c) Remove the bearing (112) from its packaging.
   d) Wipe the preservative from the bearing (112) bore and outer diameter.
   e) Use an induction heater with a demagnetizing cycle to heat the bearing (112) to an inner ring temperature of 110 °C | 230 °F.
   f) Position the bearing (112) on the shaft (122) against the shoulder and snug the locknut (136) against the bearing until it is cool.
   The locknut prevents the bearing from moving away from the shaft shoulder as it cools.
   g) Remove the bearing locknut (136) after the bearing (112) cools.
3. Put the lockwasher (382) onto the shaft (122).
4. Thread the locknut (136) onto the shaft (122) and tighten it until it is snug.
5. Bend the tangs of the lockwasher into the slots of the locknut.
6. Put the bearing-retaining ring (361A) onto the shaft (122).
Make sure that the flat side of the ring is towards the bearing.
7. Coat the inner surfaces of the bearings with lubricant.
8. Put the inboard bearing (168) onto the shaft (122).

The regreasable bearing has a single shield. Make sure that the bearing is installed with the shield away from the impeller.

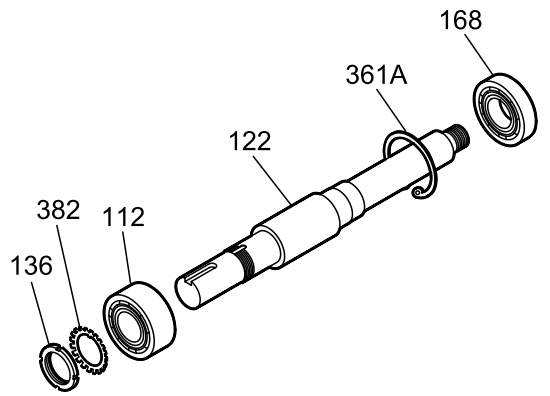


Figure 96: Inboard bearing reassembly

9. Prepare the shaft for assembly as follows (see the illustration):
   a) Install a new O-ring (496).
   b) Coat the outside of the outboard bearing (112A) with oil.
   c) Coat the bore of the bearing housing (134) with oil.
   d) Put the bearing housing (134) onto the shaft.
      Do not use force.
   e) Insert the bearing-retaining ring (361A) into the bore groove of the bearing housing (134).

NOTICE:
Ensure that the space between the ends of the retaining ring are located in the oil return groove. Failure to do so will cause oil-flow obstruction and result in equipment damage.

      Make sure that the shaft rotates freely.
   f) Install the outboard labyrinth oil-seal (332A) into the bearing housing (134).
      Place the drain slots of the oil seal at the bottom position (6 o'clock).
      Make sure that the edges of the keyway are free from burrs. To protect the O-ring, cover the keyway lengthwise with a piece of electrical tape before you install the oil seal.

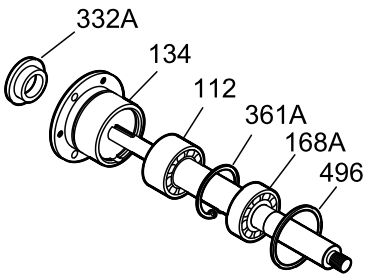


Figure 97: Outboard labyrinth oil-seal reassembly

10. Install the shaft assembly into the bearing frame as follows (see the illustration):
    a) Coat the outside of the bearing housing (134) with oil.
    b) Coat all the internal surfaces of the bearing frame (228) with oil.
    c) Install the shaft assembly into the bearing frame (228).
       Make sure that the shaft rotates freely.
    d) Install the clamp bolts (370C) in the bearing housing (134) and tighten by hand.

e) Install the jack bolts (370D) with the locknuts (423) in the bearing housing (134) and tighten by hand.

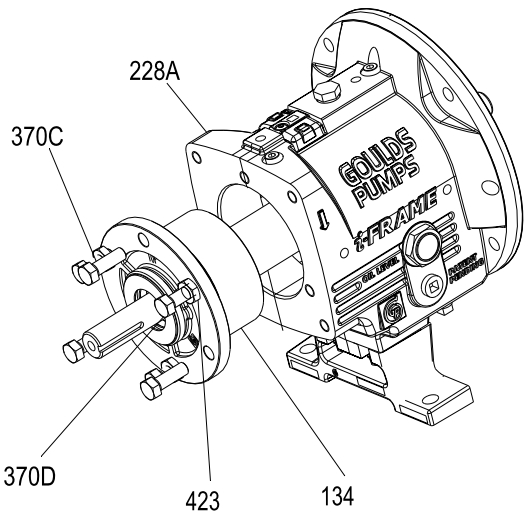


Figure 98: Jack bolt and locknut reassembly

Assemble the rotating element and the bearing frame (STi and MTi with duplex bearings)

WARNING:
Lifting and handling heavy equipment or components poses a crush hazard. Use caution during lifting and handling and wear appropriate Personal Protective Equipment (PPE, such as steel-toed shoes, gloves, etc.) at all times. Seek assistance if necessary.

CAUTION:
Risk of physical injury from hot bearings. Wear insulated gloves when using a bearing heater.

NOTICE:
Ensure that the pipe threads are clean. Apply thread sealant to the plugs and fittings. Failure to do so may result in oil leaks and equipment damage.

NOTICE:
There are several methods used to install bearings. The recommended method is to use an induction heater that heats as well as demagnetizes the bearings. Failure to use this method may result in equipment damage.

1. Prepare the bearing frame (228) as follows (see the illustration):
   a) Install the oil-fill plug (113A).
   b) Install the oil-drain plug (408A).
   c) Install the sight glass (319).
   d) Install the sight oiler plug (408J).
   e) Install the plug for the oil-cooler inlet (408L).
   f) Install the plug for the oil-cooler outlet (408M).

g) Install four oil-mist connection plugs (408H).
Or: Install two grease fittings (193) and two grease-relief plugs (113).

h) Attach the bearing-frame foot (241) and fasten the bolts (370F) by hand.

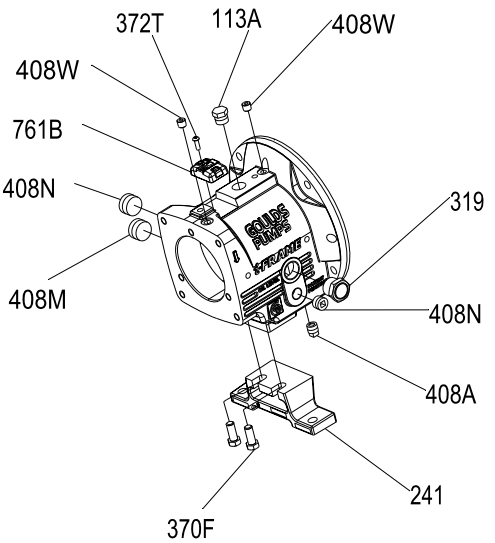


Figure 99: Bearing frame foot reassembly

2. Install the outboard bearings (112A) on the shaft (122).
The regreasable bearing has a single shield. Make sure that the bearing is installed with the shield away from the impeller.
The duplex bearings are mounted back-to-back. Make sure that the orientation of the bearings are correct.

a) Inspect the shaft (122) to ensure that it is clean, dimensionally correct, and is free of nicks and burrs.

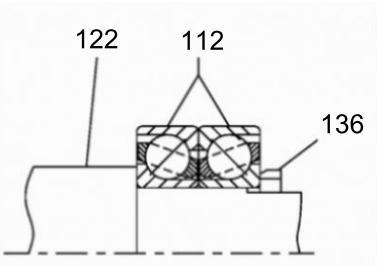


Figure 100: Shaft inspection

b) Lightly coat the bearing seating with a thin film of oil.

c) Remove the bearings (112) from their packaging.

d) Wipe the preservative from the bearing (112) bore and outer diameter.

e) Use an induction heater with a demagnetizing cycle to heat both bearings (112) to an inner ring temperature of 110 °C | 230 °F.

f) Place both bearings (112) on the shaft (122) with the large outer races together (back-to-back).

g) Position the bearings (112) on the shaft (122) against the shoulder and snug the locknut (136) against the bearings until they are cool.
The locknut prevents the bearings from moving away from the shaft shoulder as they cool. Rotate the outer bearing rings relative to each other as they are placed on the shaft to assure good alignment.

h) Remove the bearing locknut (136) after the bearings (112) are cool.

3. Put the lockwasher (382) onto the shaft (122).

4. Thread the locknut (136) onto the shaft (122) and tighten it until it is snug.

5. Bend the tangs of the lockwasher into the slots of the locknut.
6. Place the bearing-clamp ring (253B) onto the shaft (122).
   Make sure that the orientation of the bearing-clamp ring is correct.
7. Coat the inner surfaces of the bearings with lubricant.
8. Put the inboard bearing (168) onto the shaft (122).

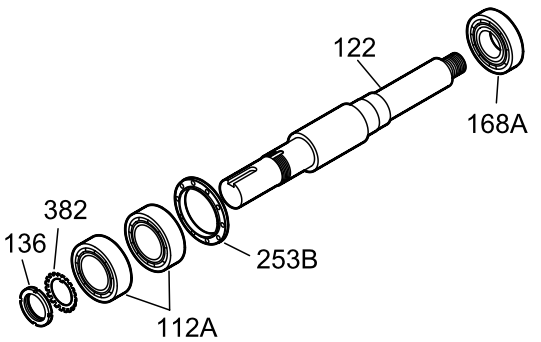


Figure 101: Inboard bearing reassemby

9. Install the bearing housing as follows (see the illustration):
   a) Coat the outside of the outboard bearing (112A) with oil.
   b) Coat the bore of the bearing housing (134) with oil.
   c) Put the bearing housing (134) onto the shaft.
      Do not use force.

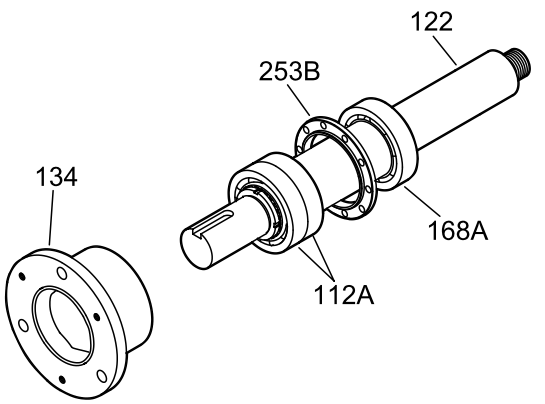


Figure 102: Bearing housing reassembly

10. Prepare the shaft for assembly as follows (see the illustration):
    a) Place the bearing-clamp ring (253B) onto the shaft (122).
    b) Fasten the clamp-ring bolts (236A) crosswise.
       See the specified torque values.
       Make sure that the shaft rotates freely.
    c) Install a new O-ring (496).

d) Install the outboard labyrinth oil-seal (332A) into the bearing housing (134).
Place the drain slots of the oil seal at the bottom position (6 o'clock).
Make sure that the edges of the keyway are free from burrs. To protect the O-ring, cover the keyway lengthwise with a piece of electrical tape before you install the oil seal.

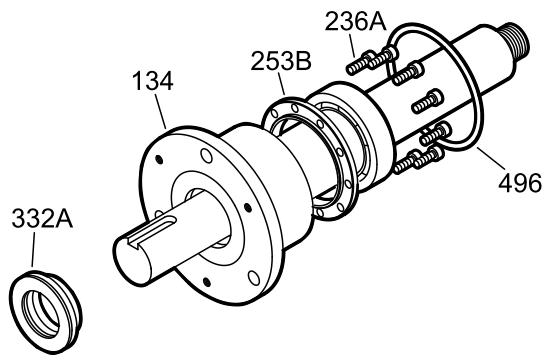


Figure 103: Outboard labyrinth oil seal reassembly

11. Install the shaft assembly into the bearing frame as follows (see the illustration):
    a) Coat the outside of the bearing housing (134) with oil.
    b) Coat all the internal surfaces of the bearing frame (228) with oil.
    c) Install the shaft assembly into the bearing frame (228).
    Make sure that the shaft rotates freely.
    d) Install the clamp bolts (370C) in the bearing housing (134) and tighten by hand.
    e) Install the jack bolts (370D) with the locknuts (423) in the bearing housing (134) and tighten by hand.

Assemble the rotating element and the bearing frame (LTi)

WARNING:
Lifting and handling heavy equipment poses a crush hazard. Use caution during lifting and handling and wear appropriate Personal Protective Equipment (PPE, such as steel-toed shoes, gloves, etc.) at all times. Seek assistance if necessary.

CAUTION:
Risk of physical injury from hot bearings. Wear insulated gloves when using a bearing heater.

NOTICE:
Ensure that the pipe threads are clean. Apply thread sealant to the plugs and fittings. Failure to do so may result in oil leaks and equipment damage.

NOTICE:
There are several methods used to install bearings. The recommended method is to use an induction heater that heats as well as demagnetizes the bearings. Failure to use this method may result in equipment damage.

1. Prepare the bearing frame (228) as follows (see the illustration):
    a) Install the oil-fill plug (113A).
    b) Install the oil-drain plug (408A).

c) Install the sight glass (319).

d) Install the sight oiler plug (408J).

e) Install the plug for the oil-cooler inlet (408L).

f) Install the plug for the oil-cooler outlet (408M).

g) Install four oil-mist connection plugs (408H).
Or: Install two grease fittings (193) and two grease-relief plugs (113).

h) Attach the bearing-frame foot (241) and fasten the bolts (370F) by hand.

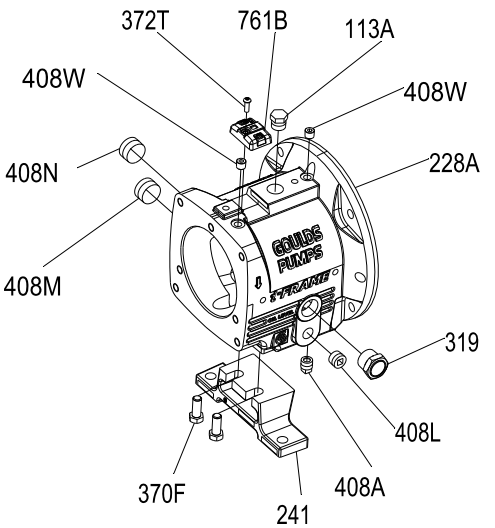


Figure 104: Attach the bearing-frame foot

2. Install the oil flinger (248A) onto the shaft (122).

NOTICE:
The oil flinger is press fitted onto the shaft. Use a properly sized driver. Failure to do so may result in damage to the oil flinger.

3. Place the bearing-clamp ring (253B) onto the shaft (122).
Make sure that the orientation of the bearing-clamp ring is correct.

4. Install outboard bearings (112A) on shaft (122).
The regreasable bearing has a single shield. Make sure that the bearing is installed with the shield away from the impeller.
The duplex bearings are mounted back-to-back. Make sure that the orientation of the bearings are correct.

a) Inspect the shaft (122) to ensure that it is clean, dimensionally correct, and is free of nicks and burrs.

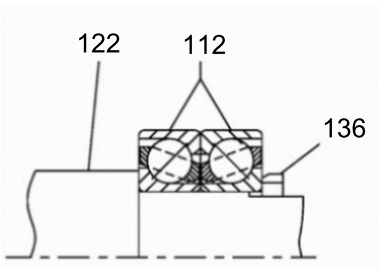


Figure 105: Shaft inspection

b) Lightly coat the bearing seating with a thin film of oil.

c) Remove the bearings (112) from their packaging.

d) Wipe the preservative from the bearing (112) bore and outer diameter.

e) Use an induction heater with a demagnetizing cycle to heat both bearings (112) to an inner ring temperature of 110 °C | 230 °F.

f) Place both bearings (112) on the shaft (122) with the large outer races together (back-to-back).

g) Position the bearings (112) on the shaft (122) against the shoulder and snug the locknut (136) against the bearings until they are cool.
The locknut prevents the bearings from moving away from the shaft shoulder as they cool. Rotate the outer bearing rings relative to each other as they are placed on the shaft to assure good alignment.

h) Remove the bearing locknut (136) after the bearings (112) are cool.

5. Put the lockwasher (382) onto the shaft (122).
6. Thread the locknut (136) onto the shaft (122) and tighten it until it is snug.
7. Bend the tangs of the lockwasher into the slots of the locknut.
8. Coat the inner surfaces of the bearings with lubricant.
9. Put the inboard bearing (168) onto the shaft (122).

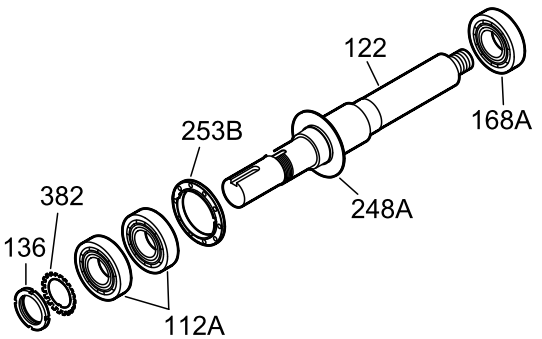


Figure 106: Inboard bearing reassembly

10. Install the bearing housing as follows (see the illustration):
    a) Coat the outside of the outboard bearing (112A) with oil.
    b) Coat the bore of the bearing housing (134) with oil.
    c) Put the bearing housing (134) onto the shaft.
    Do not use force.

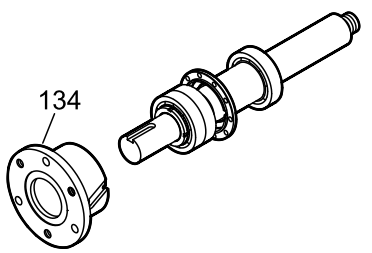


Figure 107: Bearing housing reassembly

11. Prepare the shaft for assembly as follows (see the illustration):
    a) Fasten the clamp-ring bolts (236A) crosswise.
    See the specified torque values.
    Make sure that the shaft rotates freely.
    b) Install a new O-ring (496).

c) Install the outboard labyrinth oil-seal (332A) into the bearing housing (134).
Place the drain slots of the oil seal at the bottom position (6 o'clock).
Make sure that the edges of the keyway are free from burrs. To protect the O-ring, cover the keyway lengthwise with a piece of electrical tape before you install the oil seal.

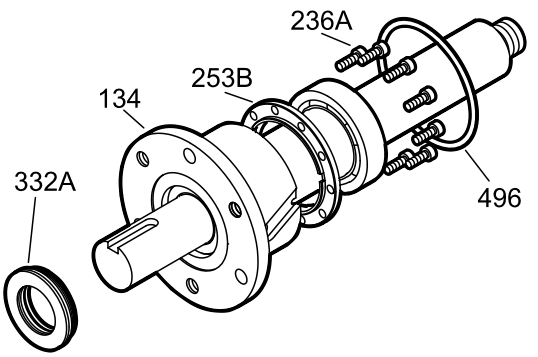


Figure 108: Outboard labyrinth oil-seal reassembly

12. Install the shaft assembly into the bearing frame as follows (see the illustration):
    a) Coat the outside of the bearing housing (134) with oil.
    b) Coat all the internal surfaces of the bearing frame (228) with oil.
    c) Install the shaft assembly into the bearing frame (228).
    Make sure that the shaft rotates freely.
    d) Install the clamp bolts (370C) in the bearing housing (134) and tighten by hand.
    e) Install the jack bolts (370D) with the locknuts (423) in the bearing housing (134) and tighten by hand.

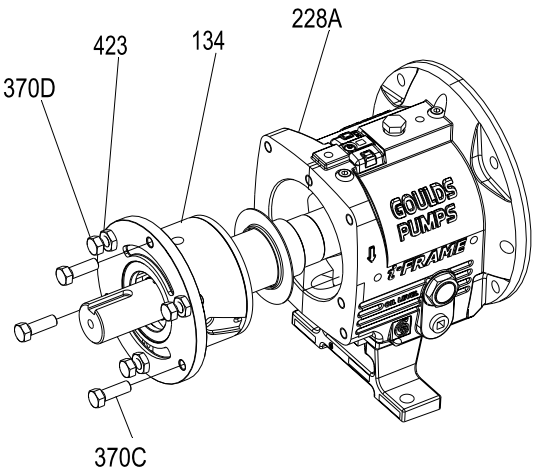


Figure 109: Jack bolt and locknut installation

Assemble the rotating element and the bearing frame (XLT-i and i17)

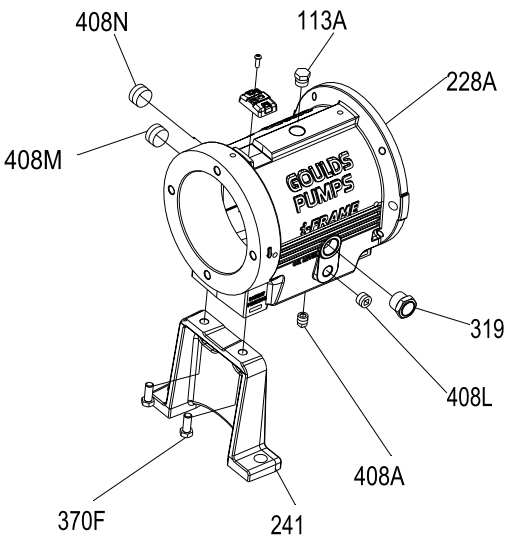
WARNING:
Lifting and handling heavy equipment or components poses a crush hazard. Use caution during lifting and handling and wear appropriate Personal Protective Equipment (PPE, such as steel-toed shoes, gloves, etc.) at all times. Seek assistance if necessary.

CAUTION:
Risk of physical injury from hot bearings. Wear insulated gloves when using a bearing heater.

NOTICE:
Ensure that the pipe threads are clean. Apply thread sealant to the plugs and fittings. Failure to do so may result in oil leaks and equipment damage.

NOTICE:
There are several methods used to install bearings. The recommended method is to use an induction heater that heats as well as demagnetizes the bearings. Failure to use this method may result in equipment damage.

1. Prepare the bearing frame (228) as follows (see the illustration):
   a) Install the oil-fill plug (113A).
   b) Install the oil-drain plug (408A).
   c) Install the sight glass (319).
   d) Install the sight oiler plug (408J).
   e) Install the plug for the oil-cooler inlet (408L).
   f) Install the plug for the oil-cooler outlet (408M).
   g) Install four oil-mist connection plugs (408H).
      Or: Install two grease fittings (193) and two grease-relief plugs (113).

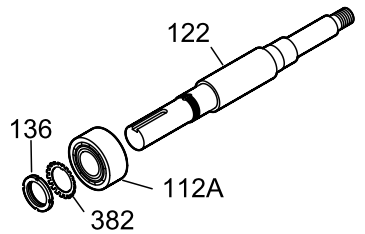


2. Install the outboard bearings (112A) on the shaft (122).
   The regreaseable bearing has a single shield. The outboard bearing is installed with the shield toward the impeller.
   a) Inspect the shaft (122) to ensure that it is clean, dimensionally correct, and is free of nicks and burrs.
   b) Lightly coat the bearing seating with a thin film of oil.
   c) Remove the bearing (112) from its packaging.
   d) Wipe the preservative from the bearing (112) bore and outer diameter.
   e) Use an induction heater with a demagnetizing cycle to heat the bearing (112) to an inner ring temperature of 110 °C | 230 °F.

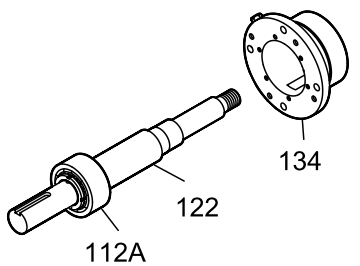
f) Position the bearing (112) on the shaft (122) against the shoulder and snug the locknut (136) against the bearing until it is cool.
The locknut prevents the bearing from moving away from the shaft shoulder as it cools.

g) Remove the bearing locknut (136) after the bearing (112) cools.

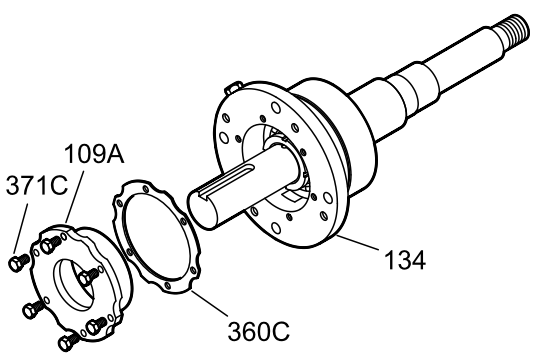
3. Put the lockwasher (382) onto the shaft (122).
4. Thread the locknut (136) onto the shaft (122) and tighten it until it is snug.
5. Bend the tangs of the lockwasher into the slots of the locknut.



6. Install the bearing housing as follows (see the illustration):
   a) Coat the outside of the outboard bearing (112A) with oil.
   b) Coat the bore of the bearing housing (134) with oil.
   c) Put the bearing housing (134) onto the shaft.
   Do not use force.

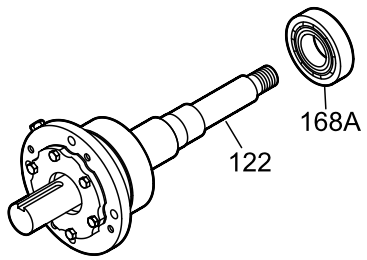


7. Fasten the gasket (360C) and the end cover (109A) with the bolts (371C).
   See the specified torque values.
   Make sure that the shaft rotates freely.

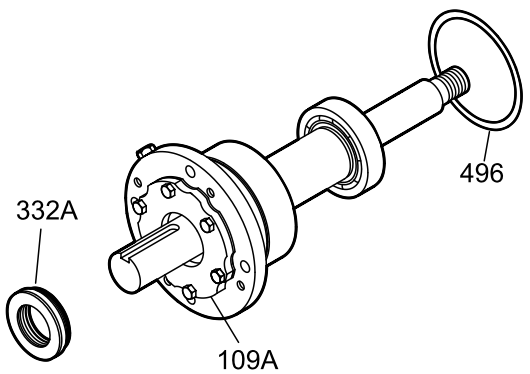


8. Install the inboard bearing as follows (see the illustration):
   a) Coat the inner surfaces of the bearings with lubricant.

b) Put the inboard bearing (168) onto the shaft (122).
The regreasable bearing has a single shield. Make sure that the bearing is installed with the shield away from the impeller.

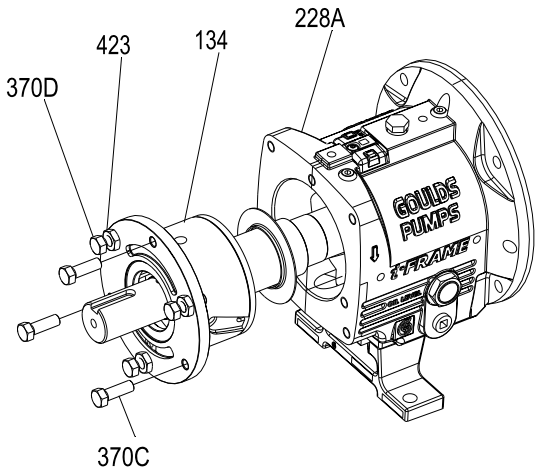


9. Install the remaining parts onto the bearing shaft as follows (see the illustration):
   a) Install a new O-ring (496).
   b) Install the outboard labyrinth oil-seal (332A) into the end cover (109A).
   Place the drain slots of the oil seal at the bottom position (6 o'clock).
   Make sure that the edges of the keyway are free from burrs. To protect the O-ring, cover the keyway lengthwise with a piece of electrical tape before you install the oil seal.



10. Install the shaft assembly into the bearing frame as follows (see the illustration):
   a) Coat the outside of the bearing housing (134) with oil.
   b) Coat all the internal surfaces of the bearing frame (228) with oil.
   c) Install the shaft assembly into the bearing frame (228).
   Make sure that the shaft rotates freely.
   d) Install the clamp bolts (370C) in the bearing housing (134) and tighten by hand.
   e) Install the jack bolts (370D) with the locknuts (423) in the bearing housing (134) and tighten by hand.

f) Attach the bearing-frame foot (241) and fasten the bolts (370F) by hand.



Assemble the rotating element and the bearing frame (XLT-i and i17 with duplex bearings)

WARNING:
Lifting and handling heavy equipment or components poses a crush hazard. Use caution during lifting and handling and wear appropriate Personal Protective Equipment (PPE, such as steel-toed shoes, gloves, etc.) at all times. Seek assistance if necessary.

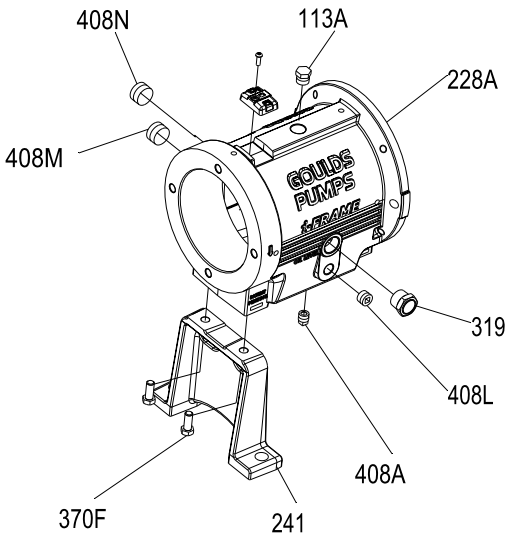
CAUTION:
Risk of physical injury from hot bearings. Wear insulated gloves when using a bearing heater.

NOTICE:
Ensure that the pipe threads are clean. Apply thread sealant to the plugs and fittings. Failure to do so may result in oil leaks and equipment damage.

NOTICE:
There are several methods used to install bearings. The recommended method is to use an induction heater that heats as well as demagnetizes the bearings. Failure to use this method may result in equipment damage.

1. Prepare the bearing frame (228) as follows (see the illustration):
   a) Install the oil-fill plug (113A).
   b) Install the oil-drain plug (408A).
   c) Install the sight glass (319).
   d) Install the sight oiler plug (408J).
   e) Install the plug for the oil-cooler inlet (408L).
   f) Install the plug for the oil-cooler outlet (408M).

g) Install four oil-mist connection plugs (408H).
Or: Install two grease fittings (193) and two grease-relief plugs (113).



2. Install the outboard bearings (112A) on the shaft (122).
The regreasable bearing has a single shield. Make sure that the bearing is installed with the shield away from the impeller.
The duplex bearings are mounted back-to-back. Make sure that the orientation of the bearings are correct.
   a) Inspect the shaft (122) to ensure that it is clean, dimensionally correct, and is free of nicks and burrs.

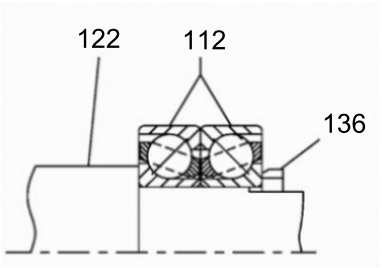
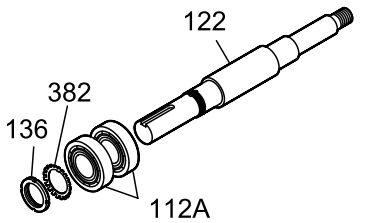


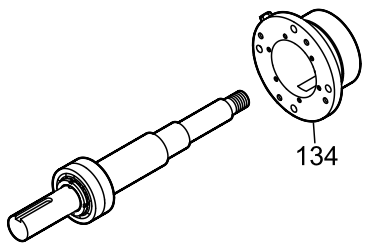
Figure 110: Shaft inspection

   b) Lightly coat the bearing seating with a thin film of oil.
   c) Remove the bearings (112) from their packaging.
   d) Wipe the preservative from the bearing (112) bore and outer diameter.
   e) Use an induction heater with a demagnetizing cycle to heat both bearings (112) to an inner ring temperature of 110 °C | 230 °F.
   f) Place both bearings (112) on the shaft (122) with the large outer races together (back-to-back).
   g) Position the bearings (112) on the shaft (122) against the shoulder and snug the locknut (136) against the bearings until they are cool.
   The locknut prevents the bearings from moving away from the shaft shoulder as they cool. Rotate the outer bearing rings relative to each other as they are placed on the shaft to assure good alignment.
   h) Remove the bearing locknut (136) after the bearings (112) are cool.
3. Put the lockwasher (382) onto the shaft (122).
4. Thread the locknut (136) onto the shaft (122) and tighten it until it is snug.

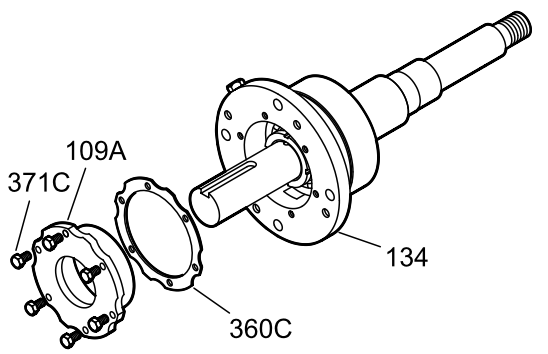
5. Bend the tangs of the lockwasher into the slots of the locknut.



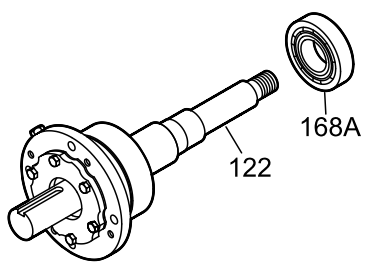
6. Install the bearing housing as follows (see the illustration):
   a) Coat the outside of the outboard bearing (112A) with oil.
   b) Coat the bore of the bearing housing (134) with oil.
   c) Put the bearing housing (134) onto the shaft.
      Do not use force.



7. Fasten the gasket (360C) and the end cover (109A) with the bolts (371C).
   See the specified torque values.
   Make sure that the shaft rotates freely.

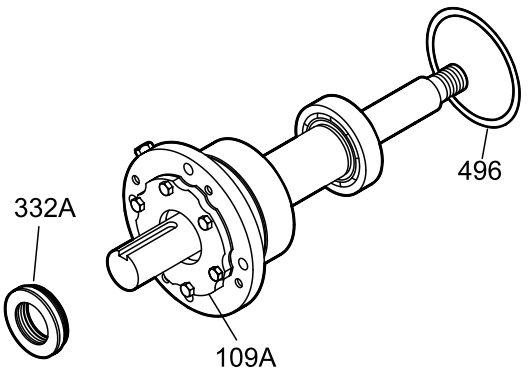


8. Install the inboard bearing as follows (see the illustration):
   a) Coat the inner surfaces of the bearings with lubricant.
   b) Put the inboard bearing (168) onto the shaft (122).
      The regreasable bearing has a single shield. Make sure that the bearing is installed with the shield away from the impeller.

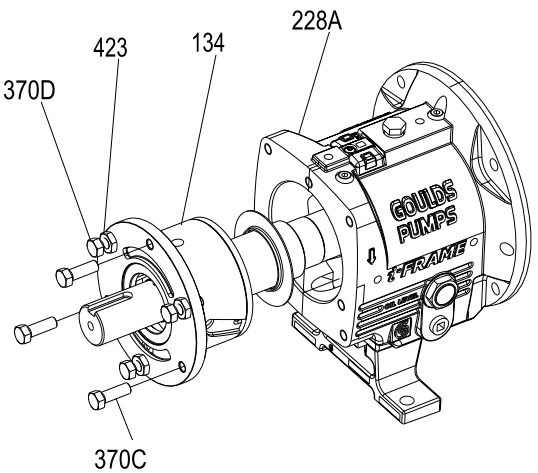


9. Install the remaining parts onto the bearing shaft as follows (see the illustration):
   a) Install a new O-ring (496).

b) Install the outboard labyrinth oil-seal (332A) into the end cover (109A).
Place the drain slots of the oil seal at the bottom position (6 o'clock).
Make sure that the edges of the keyway are free from burrs. To protect the O-ring, cover the keyway lengthwise with a piece of electrical tape before you install the oil seal.



10. Install the shaft assembly into the bearing frame as follows (see the illustration):
    a) Coat the outside of the bearing housing (134) with oil.
    b) Coat all the internal surfaces of the bearing frame (228) with oil.
    c) Install the shaft assembly into the bearing frame (228).
    Make sure that the shaft rotates freely.
    d) Install the clamp bolts (370C) in the bearing housing (134) and tighten by hand.
    e) Install the jack bolts (370D) with the locknuts (423) in the bearing housing (134) and tighten by hand.
    f) Attach the bearing-frame foot (241) and fasten the bolts (370F) by hand.



Assemble the frame

1. Support the frame assembly in a horizontal position.
2. Check the shaft-end play by moving the shaft forward and backward by hand, and note any indicator movement.
   If the total indicator reading is greater than the values in this table, then disassemble the shaft and determine the cause.

Table 18: Shaft-end play

Use this table as a reference for shaft-end play values.

Frame	Double row bearing	Duplex bearing
STi millimeters | inches	0.028 | 0.0011 0.048 | 0.0019	0.018 | 0.0007 0.025 | 0.0010
MTi millimeters | inches	0.033 | 0.0013 0.053 | 0.0021	0.023 | 0.0009 0.030 | 0.0012
LTi millimeters | inches	Not applicable	0.025 | 0.0010 0.038 | 0.0015
XLT-i, i-17 millimeters | inches	0.036 | 0.0014 0.058 | 0.0023	0.025 | 0.0010 0.038 | 0.0015

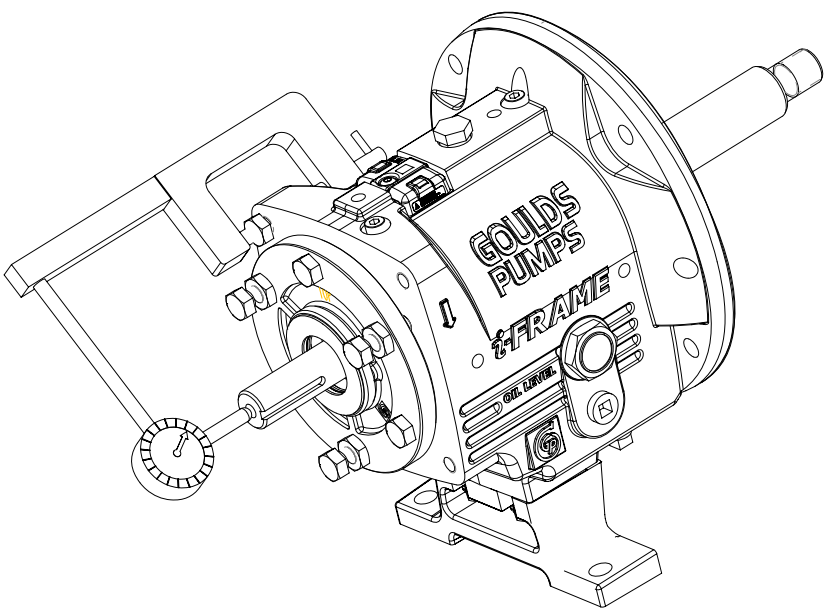


Figure 111: Check shaft end play

3. Check the shaft-sleeve (126) runout.
   a) Install the shaft sleeve.
   b) Thread the impeller on the shaft until hand tight.
   c) Rotate the shaft 360º.
   d) If the total indicator reading is greater than 0.051 mm | 0.002 in., then disassemble the shaft sleeve and determine the cause.

e) Remove the impeller and shaft sleeve.

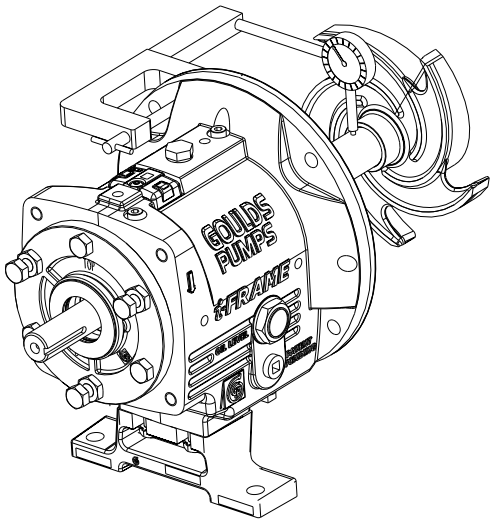


Figure 112: Remove impeller and shaft sleeve

4. Check the frame-face run-out by rotating the shaft so that the indicator measures the fit for 360º.
   If the total indicator reading is greater than 0.025 mm | 0.001 in., then disassemble and determine the cause.

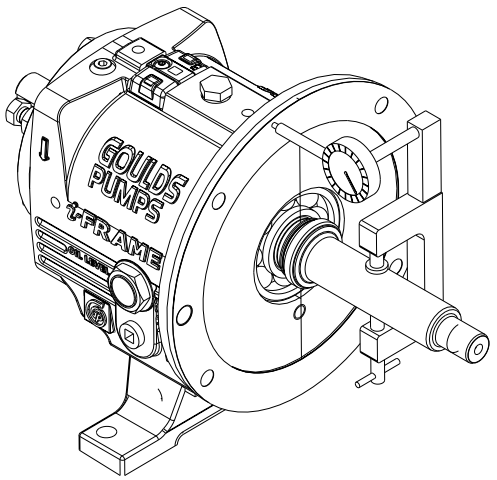


Figure 113: Check frame-face run-out

5. Place the manila gasket (360D) on the frame (228), and hold the gasket in place by inserting the dowel pins (469B) in their holes.
   The gasket is designed to fit only one way.
6. Install the frame adapter.
   a) Place the frame adapter (108) onto the frame assembly.

b) Align the bolt holes and dowel locations on the frame adapter with the bolt holes and dowel locations on the frame.

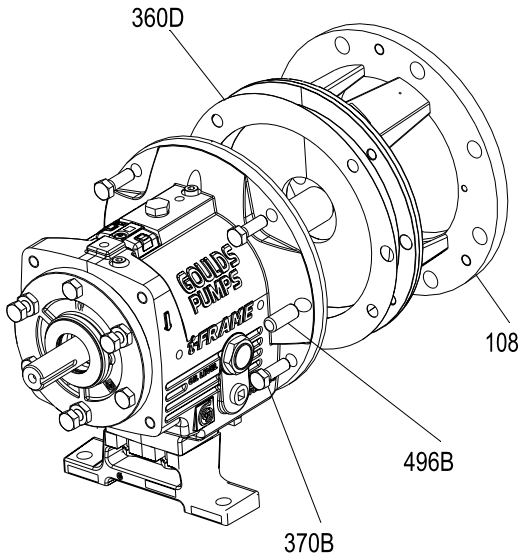


Figure 114: Align bolt holes and dowel locations

c) Install the dowel pins (469B) and bolts (370B). Tighten the bolts in a criss-cross pattern according to the specifications in the bolt torque values table.

d) Rotate the shaft 360º to check the adapter fit.
If the total indicator reading is greater than 0.13 mm | 0.005 in., then determine the cause and correct it before you proceed.

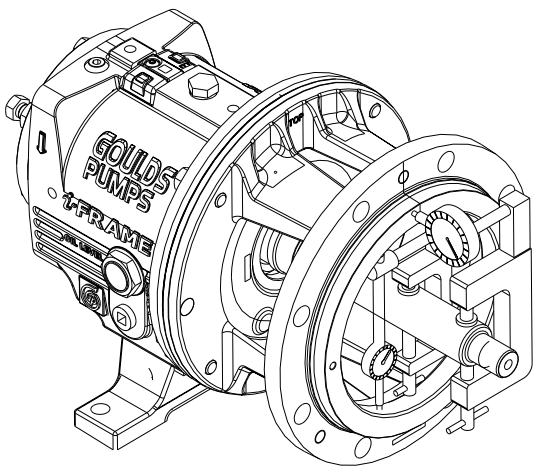


Figure 115: Check adapter fit

7. Install the labyrinth oil-seal (333A) into the adapter (108) and the bearing frame (228). The labyrinth oil seal is an O-ring fit.
8. Position the labyrinth oil-seal drain slots at the bottom (6 o'clock) position.

Refer to Assemble the INPRO labyrinth oil-seal for more information on the labyrinth oil-seal installation.

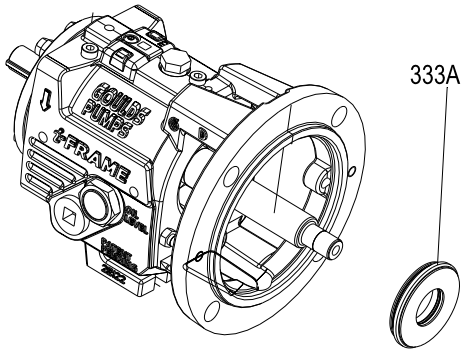


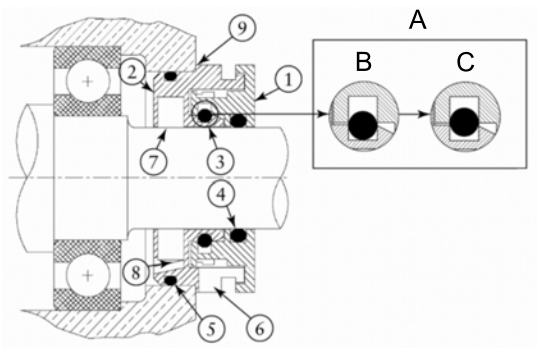
Figure 116: Position labyrinth oil-seal drain slots

INPRO labyrinth oil seal description

Description

The INPRO VBXX-D Labyrinth Oil Seal consists of the rotor (1), the stator (2), and the VBX Ring (3). The rotor (1) fits over the shaft and is held in place by an elastomeric drive ring (4). The drive ring causes the rotor to turn with the shaft and provides a positive, static seal against the shaft. Since there is no metal-to-metal contact, there are no friction or wear concerns.

NOTICE:
The labyrinth seal is a one-piece design. Do not attempt to separate the rotor from the stator. Doing so will damage the seal.



A	"VBX" O-ring action
B	Static
C	Dynamic
1	Rotor
2	Stator
3	"VBX" ring
4	Rotor drive ring
5	Stator gasket
6	Expulsion port
7	D groove
8	Lube return
9	Location shoulder

Figure 117: INPRO labyrinth oil seal

Assemble the INPRO labyrinth oil seal

1. Wrap electrical tape around the coupling end of the shaft to cover the keyway.

NOTICE:
The edges of the keyway can be sharp. Cover the keyway with tape. Failure to do so may result in damaging the o-ring and/or labyrinth seal.

2. Lightly lube the shaft and the drive ring (4) with lubricant.
   Lubricant helps in the installation process. Be sure that the lubricant is compatible with the O-ring material and the pump-system standards.
3. Use an arbor press to install the outboard INPRO VBXX-D into the bearing cover with the expulsion port (6) at the 6 o'clock position.
   Press the outboard INPRO VBXX-D down to where the stator location ramp (9) starts to avoid angular misalignment. There is a nominal 0.051 mm | 0.002 in. interference fit.
4. Discard any residual material from the stator gasket (5).
5. Complete the applicable step in this table depending on the model of your pump.

Pump model	Action
STi	Press the inboard seal along the shaft into the bearing frame.
All other models	After you install the frame adapter on the bearing frame, press the inboard seal over the shaft and into the adapter.

Assemble the C-face adapter

1. Mount the pump and the motor-coupling hubs if they are not already mounted.
2. Slide the C-face adapter over the pump shaft and mount it against the bearing-frame flange using four bolts.
3. Mount the motor to the C-face adapter using either four or eight motor bolts.

Table 19: Motor-bolt torque values for C-face adapter to frame

This table contains the motor-bolt torque values for assembling the C-face adapter to a frame.

Frame	Lubricated threads	Dry threads
STi	27 Nm | 20 ft-lb	41 Nm | 30 ft-lb
MTi	27 Nm | 20 ft-lb	41 Nm | 30 ft-lb
LTi	27 Nm | 20 ft-lb	41 Nm | 30 ft-lb

Table 20: Motor-bolt torque values for C-face adapter to motor

This table contains the motor-bolt torque values for assembling the C-face adapter to a motor.

Frame	Lubricated threads	Dry threads
143TC-145TC	11 Nm | 8 ft-lb	16 Nm | 12 ft-lb
182TC-286TC	20 ft-lb (27 Nm)	41 Nm | 30 ft-lb
324TC-365TC	39 ft-lb (53 Nm)	80 Nm | 59 ft-lb

Shaft sealing



WARNING:
The mechanical seal used in an Ex-classified environment must be properly certified.



CAUTION:
Running a mechanical seal dry, even for a few seconds, can cause seal failure and physical injury. Never operate the pump without liquid supplied to the mechanical seal.

Methods for sealing the shaft

These sections discuss the methods that you can use to seal the shaft.

- Seal the shaft with a dynamic seal.
- Seal the shaft with a cartridge-mechanical seal.
- Seal the shaft with a conventional inside-component mechanical seal.
- Seal the shaft with a conventional outside-component mechanical seal.
- Seal the shaft with a packed stuffing box.

Seal the shaft with a dynamic seal

1. Place the backplate (444) with the flat side down on the bench.

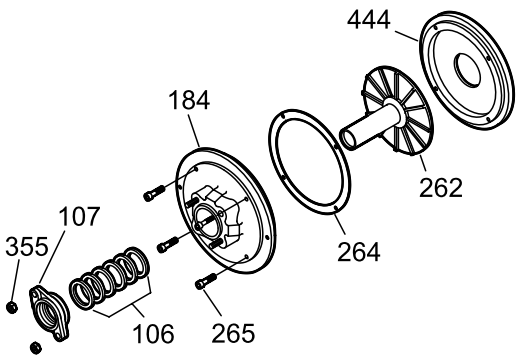


Figure 118: Backplate placement

2. Place the repeller (262) in the backplate (444) with the sleeve side up.
3. Place a PTFE gasket (264) on the backplate (444) and align the holes in the gasket with the holes in the backplate.
4. Place a stuffing-box cover (184) on the backplate (444) and align the holes in the gasket with the holes in the backplate.
5. Install four socket-head capscrews (265) and tighten them securely.
6. Install a new sealing element into the gland.
7. Install a gasket (360Q) and gland (107) on the stuffing-box cover (184).
8. Install the nuts (355).
9. Install a dynamic-seal assembly and nuts (370H).

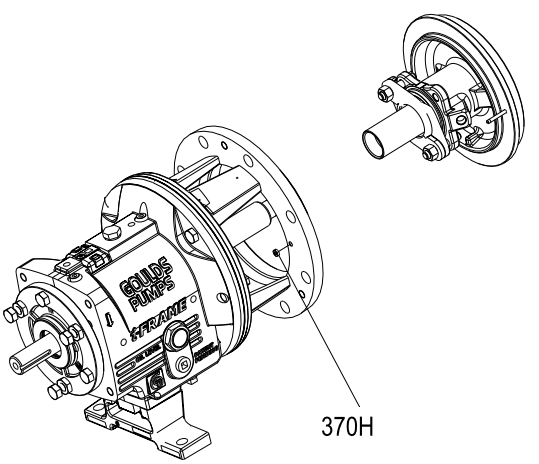


Figure 119: Dynamic seal installation

10. Check the stuffing-box-cover runout and rotate the indicator through 360 degrees.

An indicator reading that is greater than 0.013 mm | 0.005 in. indicates a problem.

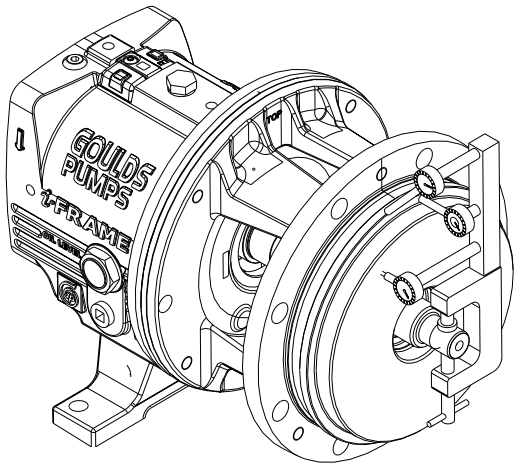


Figure 120: Checking for stuffing-box-cover runout

Seal the shaft with a packed stuffing box

WARNING:

Ex Packed stuffing boxes are not allowed in an ATEX-classified environment.

Pumps are shipped without the packing, lantern ring, or split gland installed. These parts are included with the box of fittings shipped with each pump and must be installed before startup.

1. Carefully clean the stuffing-box bore.
2. Twist the packing enough to get it around the shaft.

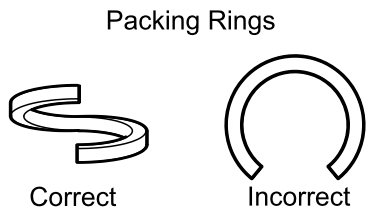


Figure 121: Packing rings

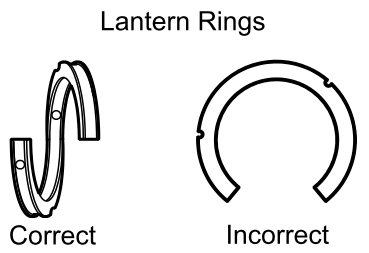


Figure 122: Lantern rings

3. Insert the packing and stagger the joints in each ring by 90°.
   Install the stuffing-box parts in this order:
   a) Two packing rings
   b) One lantern ring (two-piece)
   c) Three packing rings

NOTICE:
Make sure that the lantern ring is located at the flushing connection to ensure that flush is obtained. Failure to do so may result in decreased performance.

4. Install the gland halves and evenly hand-tighten the nuts.

Seal the shaft with a cartridge mechanical seal



WARNING:
The mechanical seal used in an Ex-classified environment must be properly certified.



CAUTION:
Running a mechanical seal dry, even for a few seconds, can cause seal failure and physical injury. Never operate the pump without liquid supplied to the mechanical seal.

1. Slide the cartridge seal onto the shaft or sleeve until it contacts the inboard labyrinth oil seal.
2. Assemble the seal chamber.
3. Slide the cartridge seal into the seal chamber and secure using the four studs and nuts.
4. Continue with the pump reassembly.
5. Set the impeller clearance.
   Refer to the Impeller clearance setting topic for more information.
6. Tighten the setscrews in the seal locking ring in order to secure the seal to the shaft.
7. Remove the centering clips from the seal.

Seal the shaft with a conventional inside-component mechanical seal



WARNING:
The mechanical seal used in an Ex-classified environment must be properly certified.



CAUTION:
Running a mechanical seal dry, even for a few seconds, can cause seal failure and physical injury. Never operate the pump without liquid supplied to the mechanical seal.

1. Assemble the seal chamber:

a) Install a seal-chamber cover or a backplate (184) and fasten with nuts (370H) with .

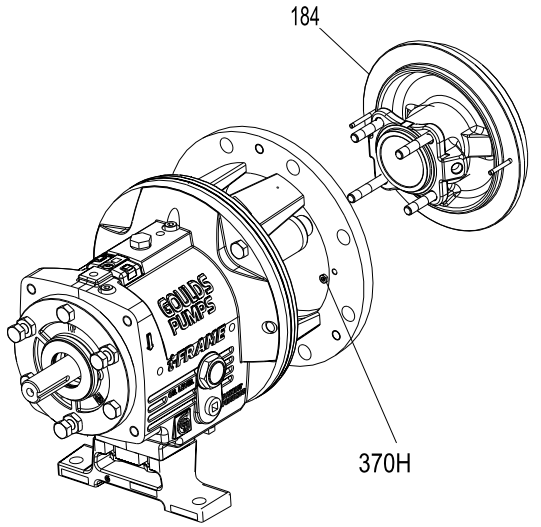


Figure 123: Assemble seal-chamber

b) Check the seal-chamber cover runout.

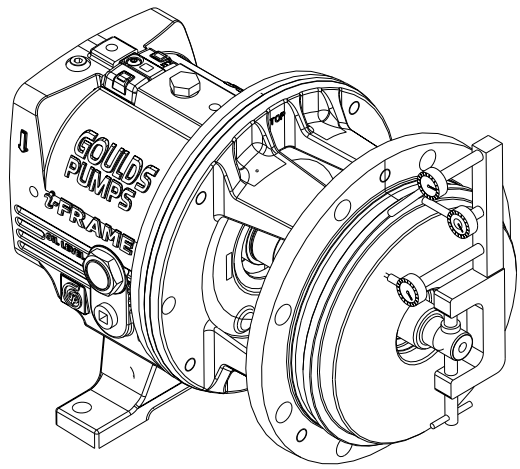


Figure 124: Check seal-chamber cover runout

Rotate the indicator through 360º. If the total indicator reading is greater than 0.13 mm | 0.005 inches, determine the cause and correct the issue before you proceed.

c) Install the shaft sleeve (126).

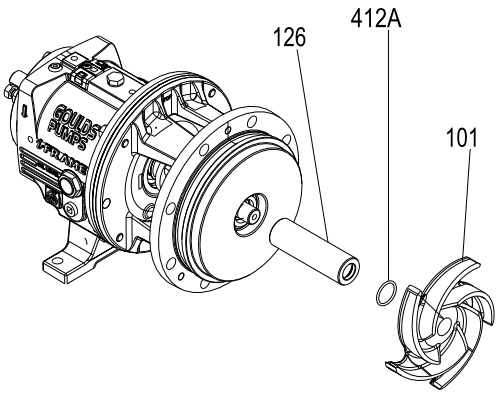


Figure 125: Install shaft sleeve

2. Mark the shaft and sleeve at the face of the seal chamber.
3. Continue the complete reassembly of the pump, except for the mechanical seal.
4. Set the impeller clearance.
   Refer to the Impeller Clearance Setting section for more information.
5. Scribe a line on the marked shaft and sleeve at the face of the seal chamber.
6. Remove the casing, the impeller, and the seal chamber.
7. If applicable, slide the gland, with the stationary seat and gland gasket installed, onto the shaft until it contacts the inboard labyrinth oil seal.
8. Install the mechanical-seal rotary unit according to the manufacturer's instructions.
   Use the scribed line and the seal-reference dimension.
9. Reinstall the seal chamber.
10. Slide the gland on the seal-chamber studs and secure them with the gland nuts.
    Tighten the nuts evenly so that the gland is seated on the seal-chamber pilot and is perpendicular to the shaft.
11. Complete the reassembly of the pump.

Seal the shaft with a conventional outside-component mechanical seal

WARNING:
The mechanical seal used in an Ex-classified environment must be properly certified.

CAUTION:
Running a mechanical seal dry, even for a few seconds, can cause seal failure and physical injury. Never operate the pump without liquid supplied to the mechanical seal.

1. Assemble the seal chamber.

a) Install the seal-chamber cover or backplate (184) and fasten with nuts (370H).

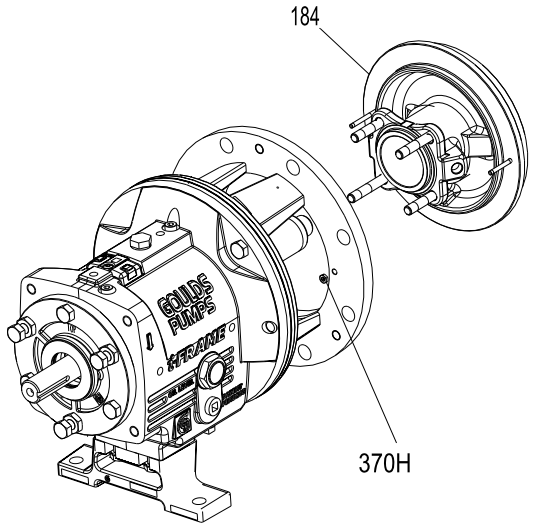


Figure 126: Seal-chamber cover or backplate installation

b) Check the seal-chamber cover runout.

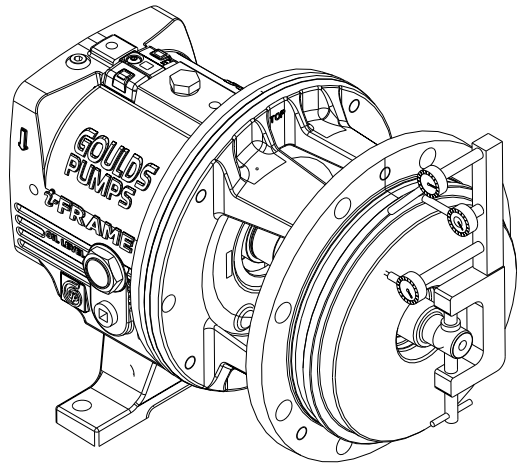


Figure 127: Check seal-chamber cover runout

Rotate the indicator through 360 degrees. If the total indicator reading is greater than 0.13 mm | 0.005 in., determine the cause and correct the issue before you proceed.

c) Install the shaft sleeve (126).

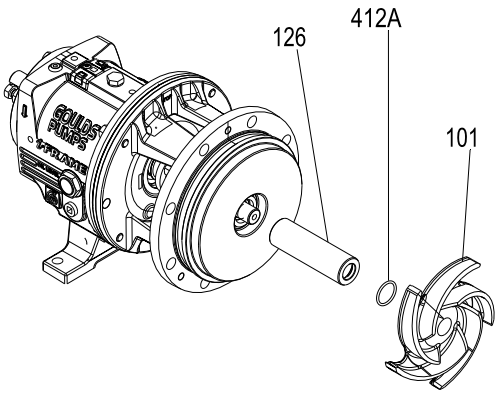


Figure 128: Install shaft sleeve

2. Mark the shaft and sleeve at the face of the seal chamber.
3. Continue the complete reassembly of the pump, except for the mechanical seal.
4. Set the impeller clearance.
   Refer to the Impeller clearance setting section for more information.
5. Scribe a line on the marked shaft and sleeve at the face of the seal chamber.
6. Remove the casing, the impeller, and the seal chamber.
7. Install the mechanical-seal rotary unit per the manufacturer's instructions.
   Use the scribed line as the seal-reference dimension. Be sure to secure the rotary unit in place using the set screws in the locking ring.
8. Install the gland, with the stationary seat and gland gaskets installed, on the seal chamber.
9. Reinstall the seal chamber.
10. Complete the reassembly of the pump.

Install the impeller

CAUTION:
Risk of physical injury from sharp edges. Wear heavy work gloves when handling impellers.

1. Install the impeller.

Pump size	Action
STi, MTi, and LTi	Install the impeller (101). Use a new impeller O-ring (412A).
XLT-i and i17	Install the impeller (101) and a PTFE washer (428D) on the plug (458Y). Use a new impeller O-ring (412A).

2. Attach a shaft wrench and a coupling key on the shaft.
   a) When the impeller (101) makes firm contact with the sleeve (126), raise the shaft wrench (counterclockwise, viewed from the impeller end of the shaft) off of the bench and slam it down (clockwise, viewed from the impeller end of shaft).
   b) Apply a few sharp raps to tighten the impeller (101).

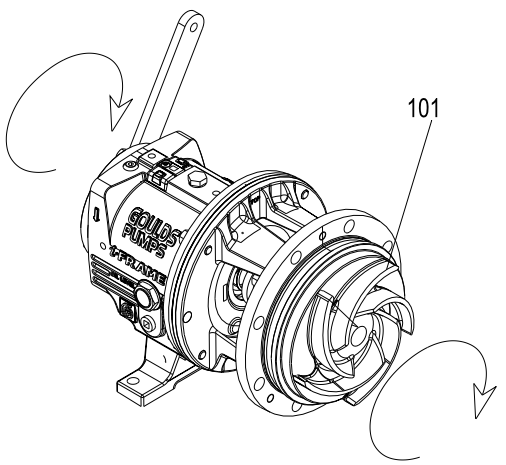


Figure 129: Tighten the impeller

3. Loosen the clamp bolts (370C) and the jack bolts (370D).

4. Measure the gap between the impeller (101) and the seal chamber and stuffing-box cover (184) with a feeler gauge.

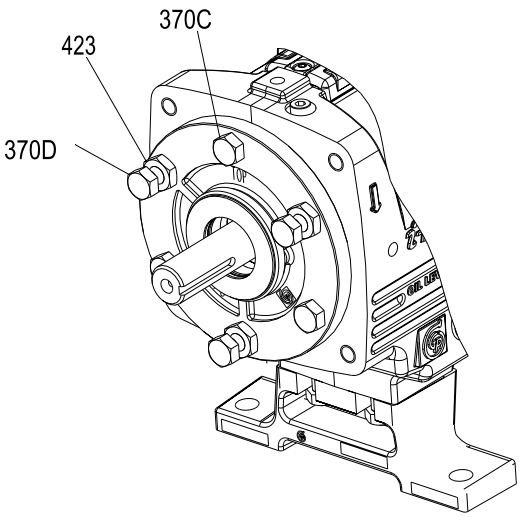


Figure 130: Loosen clamp bolts

5. When you reach a 0.76 mm | 0.030 in. clearance, tighten the clamp bolts (370C), jack bolts (370D), and lock nuts (423).
   This approximates the impeller position when it is set to 0.38 mm | 0.015 in. from the casing. Perform a final impeller adjustment after you install the impeller into the casing.
6. Check the impeller (101) runout.
   Check vane tip to vane tip. If the total indicator reading is greater than 0.13 mm | 0.005 in., determine the cause and correct the issue before you proceed.

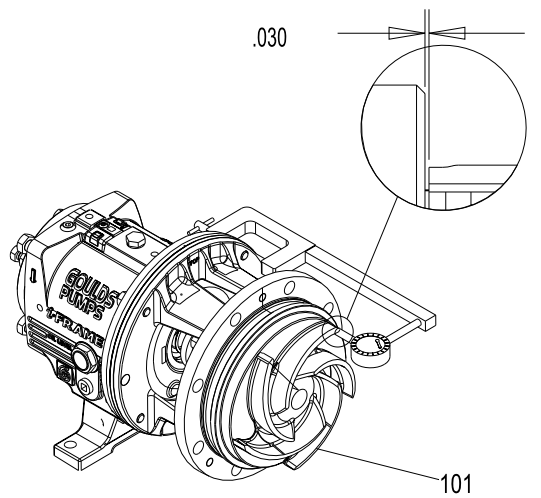


Figure 131: Check impeller run out

For more information on how to set the impeller clearances, refer to the Impeller-clearance checks and Impeller-clearance setting sections in Commissioning, Startup, Operation, and Shutdown.

Attach the i-*ALERT*® Condition Monitor to the pump

Tools required:

- 5/32 inch hex wrench

1. Attach the condition monitor (761B) to the bearing frame (228A) using the hex-head screw (372T) provided.

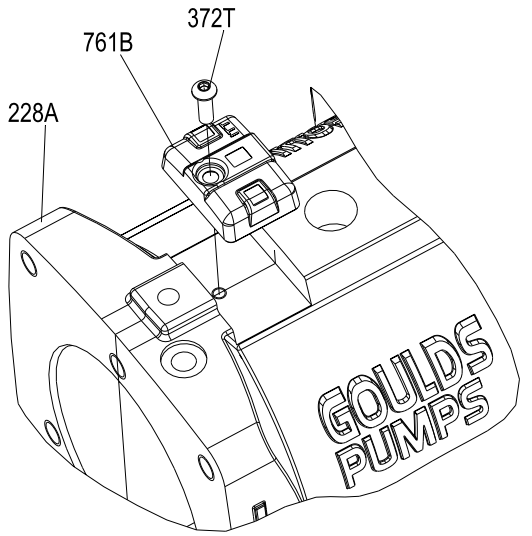


Figure 132: Attach condition monitor to bearing frame

2. Tighten the hex-head screw with a 5/32 inch hex wrench to 8 Nm | 6 ft-lbs.

Post-assembly checks

Perform these checks after you assemble the pump, then continue with pump startup:

- Rotate the shaft by hand in order to make sure that it rotates easily and smoothly and that there is no rubbing.
- Open the isolation valves and check the pump for leaks.

Install the back pull-out assembly (except HT 3196)

WARNING:
Lifting and handling heavy equipment poses a crush hazard. Use caution during lifting and handling and wear appropriate Personal Protective Equipment (PPE, such as steel-toed shoes, gloves, etc.) at all times. Seek assistance if necessary.

1. Clean the casing fit and install the casing gasket (351) on the seal chamber and stuffing-box cover.

2. Loosen the clamping bolts (370C) and jack bolts (370D) on the bearing housing.

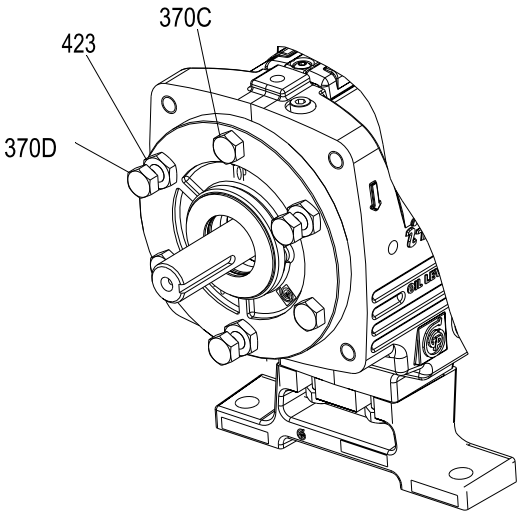


Figure 133: Loosen clamp bolts and jack bolts on bearing housing

3. Install the back pull-out assembly in the casing.

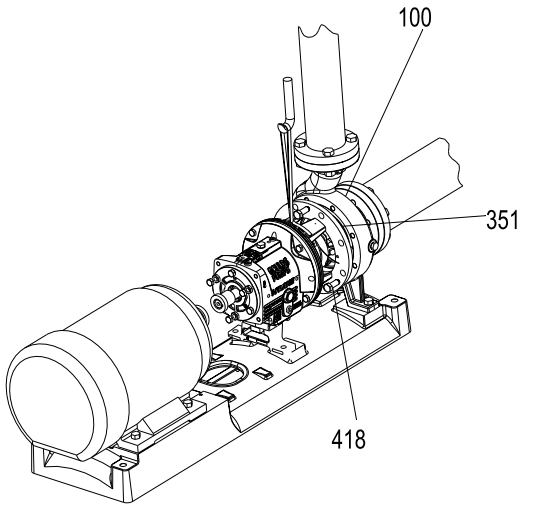


Figure 134: Install back pull-out assembly

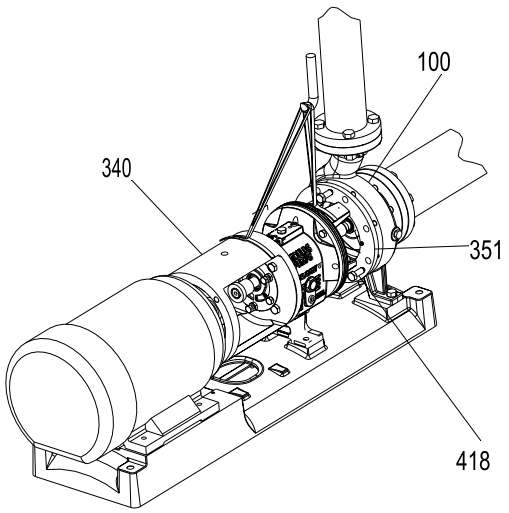


Figure 135: Install back pull-out assembly

4. Install and then hand-tighten the casing bolts (370).
   Refer to the bolt torque values for information on how to tighten the casing bolts.
5. Install and tighten the casing jackscrews (418).

NOTICE:
Do not overtighten the casing jackscrews. Doing so may result in equipment damage.

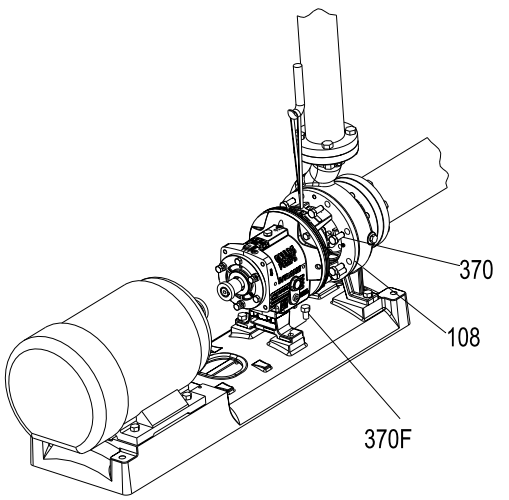


Figure 136: Install and tighten casing jackscrews

6. Reinstall the shims under the frame foot and tighten the frame foot to the baseplate.
   Make sure that you use the proper shim. Mount a dial indicator in order to measure the distance between the top of the frame and the baseplate. Make sure that the distance does not change as you tighten the frame-foot bolts.
7. Check the total clearance of the impeller in the casing.
   With new parts, an acceptable range is 0.76 mm | 0.030 in. to 1.65 mm | 0.065 in. If the impeller clearance is outside of this range, you either have the incorrect parts, an improper installation, or too much pipe strain. Determine the cause and correct the problem before you proceed.
8. Adjust the impeller clearance.
   Refer to the Impeller clearance setting section for more information.
9. Replace the auxiliary piping.

10. Fill the pump with the proper lubricant. See Lubricating-oil requirements.
11. Reinstall the coupling guard.
    See Install the coupling guard for more information.

NOTICE:
When a cartridge mechanical seal is used, ensure that the set screws in the seal locking ring are tightened and that the centering clips have been removed prior to startup. This prevents seal or shaft sleeve damage by ensuring that the seal is properly installed and centered on the sleeve.

Bolt torque values

Table 21: Bolt torque, Nm | lb-ft

This table provides the bolt torque values.

Location	Frame	3196, CV 3196, LF 3196, 3796		NM 3196		3198	
		Lube	Dry	Lube	Dry	Lube	Dry
Casing bolts (370) or casing nuts (425)	6-in. STi	Refer to the maximum torque values in Nm | lb-ft for casing bolts table.		36 | 27	53 | 40	N/A	N/A
	8-in. STi			27 | 20	40 | 30	47 | 35	71 | 53
	MTi, LTi			36 | 27	53 | 40	47 | 35	71 | 53
	XLT-i, i17			N/A	N/A	N/A	N/A
Frame-to-adapter bolts	All	27 | 20	40 | 30	27 | 20	40 | 30	27 | 20	40 | 30
Bearing-clamp ring bolts (236A) - duplex bearing only	STi, MTi	1.1* | 10	1.9* | 17	1.1* | 10	1.9* | 17	1.1* | 10	1.9* | 17
	LTi	6.2* | 55	9.4* | 83	6.2* | 55	9.4* | 83	6.2* | 55	9.4* | 83
Bearing end cover bolts (371C)	XLT-i, i17	12 | 9	16 | 12	N/A	N/A	N/A	N/A
Dynamic seal cap-screws (265)	STi, MTi, LTi	6.2* | 55	9.4 * | 83	N/A	N/A	N/A	N/A
	XLT-i, i17	12 | 9	16 | 12	N/A	N/A	N/A	N/A
* Values are in Nm | lb-in.							

Table 22: Maximum torque values in Nm | lb-ft for casing bolts

This table provides the maximum torque values for casing bolts.

		Models 3196, CV 3196 LF 3196, 3796 with 68 kg | 150 lb casing flanges				Model HT 3196 and all models with 136 kg | 300 lb casing flanges	
		Material specification					
		Ductile iron casing with A307 Grade B casing bolts		Alloy casing with (304SS) F593 Grade 1 or (316SS F593) Grade 2 casing bolts		Ductile iron and alloy casings with A193 grade B7 casing bolts	
Frame	Casing bolt diameter (in.)	Lube	Dry	Lube	Dry	Lube	Dry
8 in. STi	0.50	27 | 20	41 | 30	47 | 35	73 | 54	79 | 58	118 | 87
6 in. STi	0.625	53 | 39	80 | 59	96 | 71	145 | 107	156 | 115	235 | 173
MTi	0.625	53 | 39	80 | 59	96 | 71	145 | 107	156 | 115	235 | 173
LTi	0.625	53 | 39	80 | 59	96 | 71	145 | 107	156 | 115	235 | 173
XLT-i	0.625	53 | 39	80 | 59	96 | 71	145 | 107	156 | 115	235 | 173
i17	7/8	153 | 113	230 | 170	191 | 141	287 | 212	447 | 330	671 | 495

Shaft-end play

Table 23: Shaft-end play

Use this table as a reference for shaft-end play values.

Frame	Double row bearing	Duplex bearing
STi millimeters | inches	0.028 | 0.0011 0.048 | 0.0019	0.018 | 0.0007 0.025 | 0.0010
MTi millimeters | inches	0.033 | 0.0013 0.053 | 0.0021	0.023 | 0.0009 0.030 | 0.0012
LTi millimeters | inches	Not applicable	0.025 | 0.0010 0.038 | 0.0015
XLT-i, i-17 millimeters | inches	0.036 | 0.0014 0.058 | 0.0023	0.025 | 0.0010 0.038 | 0.0015

Bearing types

Table 24: Bearing types

Frame	Inboard bearing	Outboard bearing	
		Double row	Duplex
STi	6207	3306	7306
MTi	6309	3309	7309
LTi	6311	Not applicable	7310
XLT-i, i17	6313	3313	7313

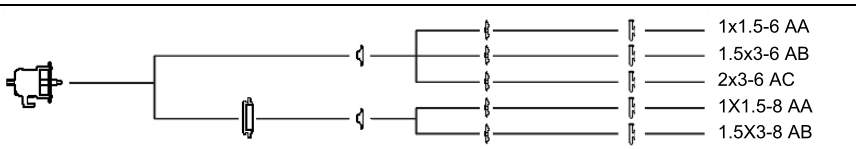
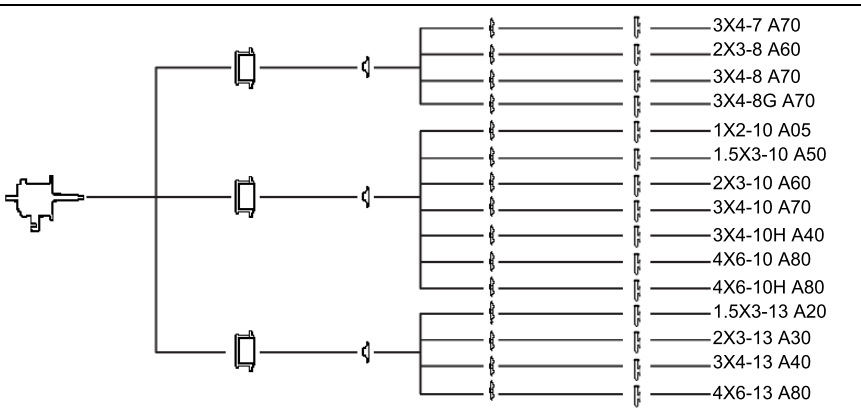
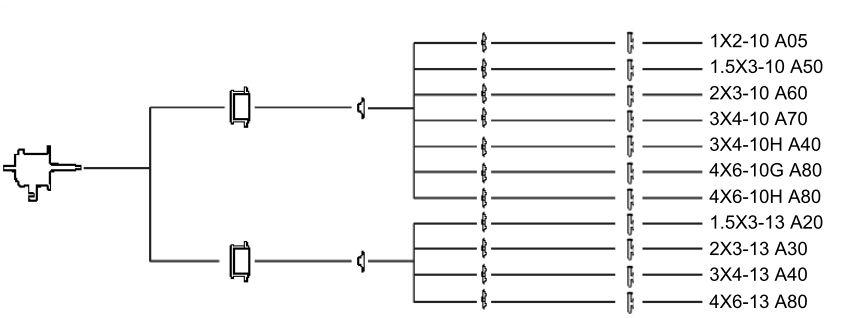
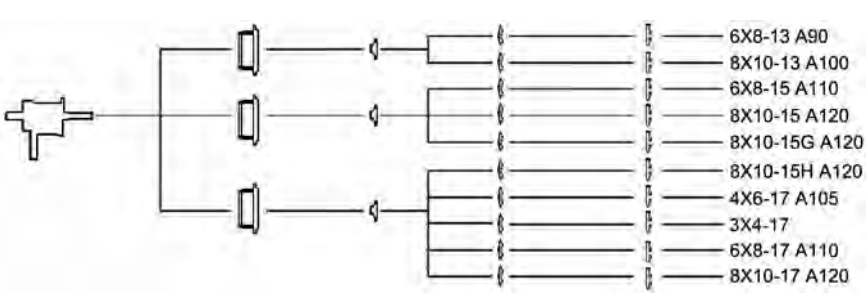
Spare parts

Always state the serial number and indicate the part name and item number from the relevant sectional drawing when you order spare parts. It is imperative for service reliability to have a sufficient stock of readily available spare parts.

- Impeller (101)
- Shaft (122A)
- Shaft sleeve (126)
- Outboard bearing (112A)
- Inboard bearing (168A)
- Casing gasket (351)
- Frame-to-adapter gasket (360D)
- Bearing-housing retaining ring (361A)
- Bearing lockwasher (382)
- Bearing locknut (136)
- Impeller O-ring (412A)
- Bearing-housing O-ring (496)
- Outboard labyrinth-seal rotary O-ring (497F)
- Outboard labyrinth-seal stationary O-ring (497G)
- Inboard labyrinth-seal rotary O-ring (497H)
- Inboard labyrinth-seal stationary O-ring (497J)
- Lantern ring half (105) (packed stuffing box)
- Stuffing box packing (106) (packed stuffing box)
- Packing gland (107) (packed stuffing box)
- Impeller gasket (428D) (XLT-i and i17 only)

3196 interchangeability

Table 25: 3196 interchangeability drawing

Description	Shaft and Bearing Frame Assembly	Adapter	Seal Chamber	Impeller	Casing	Size
Model 3196 STi 1–3/8 in. Shaft Dia. Max BHP-40 HP						1x1.5-6 AA 1.5x3-6 AB 2x3-6 AC 1X1.5-8 AA 1.5X3-8 AB
Model 3196 MTi 1–3/4 in. Shaft Dia. Max BHP-122 HP						3X4-7 A70 2X3-8 A60 3X4-8 A70 3X4-8G A70 1X2-10 A05 1.5X3-10 A50 2X3-10 A60 3X4-10 A70 3X4-10H A40 4X6-10 A80 4X6-10H A80 1.5X3-13 A20 2X3-13 A30 3X4-13 A40 4X6-13 A80
Model 3196 LTi 2–1/8 in. Shaft Dia. Max BHP-200 HP						1X2-10 A05 1.5X3-10 A50 2X3-10 A60 3X4-10 A70 3X4-10H A40 4X6-10G A80 4X6-10H A80 1.5X3-13 A20 2X3-13 A30 3X4-13 A40 4X6-13 A80
Model 3196 XLT-i 2–1/2 in. Shaft Dia. Max BHP-250 HP 17 in. XLT-i has 2–3/4 in. Shaft Dia. Max BHP-350 HP						6X8-13 A90 8X10-13 A100 6X8-15 A110 8X10-15 A120 8X10-15G A120 8X10-15H A120 4X6-17 A105 3X4-17 6X8-17 A110 8X10-17 A120

Frame lubrication conversion

NOTICE:

- Avoid equipment damage or decreased performance. Never mix greases of different consistencies (NLGI 1 or 3 with NLGI 2) or with different thickeners. For example, never mix a lithium-based grease with a polyurea based grease. If it is necessary to change the grease type or consistency, remove the rotor and old grease from the housing before regreasing.

Use a grease that is suitable for high temperatures when you have frame pumpage temperatures greater than 177°C | 350°F. Ensure that mineral-oil greases have oxidation stabilizers and a consistency of NLGI 3.

Table 26: Lubricating-grease requirements

Most pumps use Sunoco 2EP grease. High temperature units with a pumpage temperature greater than 177°C | 350° F use Mobil SCH32.

This table shows which brand of grease to use when lubricating the pump.

	Pumpage temperature less than 177°C | 350°F	Pumpage temperature greater than 177°C | 350°F
NGLI consistency	2	3
Mobil	Mobilux EP2	SCH32
Exxon	Unirex N2	Unirex N3
Sunoco	Mutipurpose 2EP	N/A
SKF	LGMT 2	LGMT 3

Convert from greased-for-life or regreaseable to oil-lubricated bearings

1. Remove the plug from the oil-return slot in the frame located under the radial bearing. Use this table as a guide.

Pump model	Action
STi	Remove the epoxy from the return slot.
MTi, LTi, XLT-i, and i-17	Remove the set screw installed in the oil-return hole.

2. Remove the plug from the oil-return hole in the bearing housing (134).

NOTICE:
For the LTi, the bearing housing (134) and clamp ring (253B) require replacement with alternate parts. Failure to do so will cause oil-flow obstruction and result in equipment damage.

3. Replace both bearings with unshielded, oil-lubricated bearings.

Table 27: Bearing types

Frame	Inboard bearing	Outboard bearing	
		Double row	Duplex
STi	6207	3306	7306
MTi	6309	3309	7309
LTi	6311	Not applicable	7310
XLT-i, i17	6313	3313	7313

4. Remove the grease fittings (193) to prevent accidental greasing.
Two plugs (408H) are required to replace the two grease fittings.

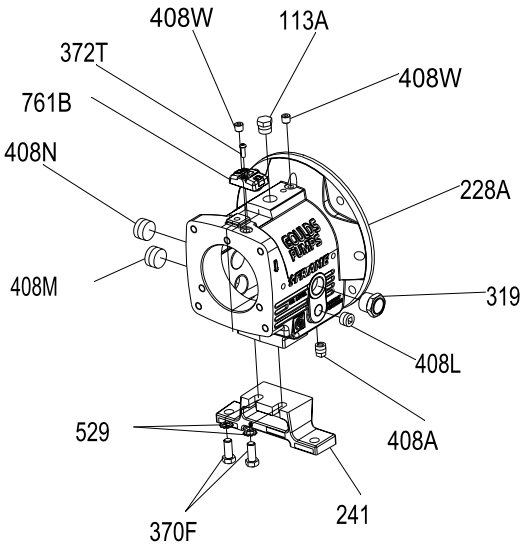


Figure 137: Replace two grease fittings with two plugs

Item Number	Size	Description	Quantity
113	1/4"-18 NPT	External hex/square head pipe plug	2
113A	1/2"-14 NPT	External hex/square head pipe plug	1
193	1/4"-18 NPT	Grease fitting	2
228	- - - -	Bearing frame	1
241	- - - -	Frame foot	1
370F	1/2"	Hex cap screw	2
408A	3/8"-18 NPT	External square head pipe plug (magnetic)	1
408J	1/4"-18 NPT	External hex/square head pipe plug	1
408L	1/2"-14 NPT	Square countersunk headless pipe plug	1
408M	1" 11-1/2" NPT	Square countersunk headless pipe plug	1
529	1/2"	Light helical spring lock washer	2

Conversion from flood-oil to pure-oil mist

NOTICE:
The LTX requires that you change the bearing housing when you make the conversion from flood oil to oil mist lubrication. After you install the proper bearing housing, follow the instructions as they apply to STX, MTX, XLT-X, and X17. Failure to do so may result in equipment damage or decreased performance.

Consult your local ITT representative for further information on this topic.

Oil-mist systems

The ITT X-Series Power Ends accept a variety of oil-mist systems. These are the two popular systems that you can use:

- vented oil-mist system
- non-vented oil-mist system

Convert from flood oil to regreaseable

Consult your local ITT representative for further information on this topic.

Troubleshooting

Operation troubleshooting

Symptom	Cause	Remedy
The pump is not delivering liquid.	The pump is not primed.	Re-prime the pump and check that the pump and suction line are full of liquid.
	The suction line is clogged.	Remove the obstructions.
	The impeller is clogged.	Back-flush the pump in order to clean the impeller.
	The shaft is rotating in the wrong direction.	Change the rotation. The rotation must match the arrow on the bearing housing or pump casing.
	The foot valve or suction pipe opening is not submerged enough.	Consult an ITT representative for the proper submersion depth. Use a baffle in order to eliminate vortices.
	The suction lift is too high.	Shorten the suction pipe.
The pump is not producing the rated flow or head.	The gasket or O-ring has an air leak.	Replace the gasket or O-ring.
	The stuffing box has an air leak.	Replace or readjust the mechanical seal.
	The impeller is partly clogged.	Back-flush the pump in order to clean the impeller.
	The clearance between the impeller and the pump casing is excessive.	Adjust the impeller clearance.
	The suction head is not sufficient.	Make sure that the suction-line shutoff valve is fully open and that the line is unobstructed.
	The impeller is worn or broken.	Inspect and replace the impeller if necessary.
The pump starts and then stops pumping.	The pump is not primed.	Re-prime the pump and check that the pump and suction line are full of liquid.
	The suction line has air or vapor pockets.	Rearrange the piping in order to eliminate air pockets.
	The suction line has an air leak.	Repair the leak.
The bearings are running hot.	The pump and driver are not aligned properly.	Realign the pump and driver.
	There is not sufficient lubrication.	Check the lubricant for suitability and level.
	The lubrication was not cooled properly.	Check the cooling system.
The pump is noisy or vibrates.	The pump and driver are not aligned properly.	Realign the pump and driver.
	The impeller is partly clogged.	Back-flush the pump in order to clean the impeller.
	The impeller or shaft is broken or bent.	Replace the impeller or shaft as necessary.
	The foundation is not rigid.	Tighten the hold-down bolts of the pump and motor. Make sure the baseplate is properly grouted without voids or air pockets.
	The bearings are worn.	Replace the bearings.
	The suction or discharge piping is not anchored or properly supported.	Anchor the suction or discharge piping as necessary according to recommendations in the Hydraulic Institute Standards Manual.
	The pump is cavitating.	Locate and correct the system problem.
The mechanical seal is leaking excessively.	The packing gland is not adjusted properly.	Tighten the gland nuts.
	The stuffing box is not packed properly.	Check the packing and repack the box.
	The mechanical seal parts are worn.	Replace the worn parts.
	The mechanical seal is overheating.	Check the lubrication and cooling lines.
	The shaftor shaft sleeve is scored.	Machine or replace the shaft sleeve as necessary.
The motor requires excessive power.	The discharge head has dropped below the rated point and is pumping too much liquid.	Install a throttle valve. If this does not help, then trim the impeller diameter. If this does not help, then contact your ITT representative.
	The liquid is heavier than expected.	Check the specific gravity and viscosity.
	The stuffing-box packing is too tight.	Readjust the packing. If the packing is worn, then replace the packing.
	Rotating parts are rubbing against each other.	Check the parts that are wearing for proper clearances.
	The impeller clearance is too tight.	Adjust the impeller clearance.

Alignment troubleshooting

Symptom	Cause	Remedy
Horizontal (side-to-side) alignment cannot be obtained (angular or parallel).	The driver feet are bolt-bound.	Loosen the pump's hold-down bolts, and slide the pump and driver until you achieve horizontal alignment.
	The baseplate is not leveled properly and is probably twisted.	1. Determine which corners of the base-plate are high or low. 2. Remove or add shims at the appropri-ate corners. 3. Realign the pump and driver.

Assembly troubleshooting

Symptom	Cause	Remedy
There is excessive shaft end play.	The internal clearance of the bearings ex-ceeds the recommended amount.	Replace the bearings with a bearing of the correct type.
	The snap ring is loose in the bearing-housing groove.	Re-seat the snap ring.
There is excessive shaft and sleeve runout.	The sleeve is worn.	Replace the sleeve.
	The shaft is bent.	Replace the shaft.
There is excessive bearing-frame flange runout.	The shaft is bent.	Replace the shaft.
	The flange of the bearing frame is distorted.	Replace the bearing-frame flange.
There is excessive frame-adapter runout.	There is corrosion on the frame adapter.	Replace the frame adapter.
	The adapter-to-frame gasket is not seated properly.	Re-seat the frame adapter and make sure that the adapter-to-frame gasket is seated properly.
There is excessive seal chamber or stuffing-box cover runout.	The seal chamber or the stuffing-box cover is not properly seated in the frame adapter.	Re-seat the seal chamber or stuffing-box cover.
	There is corrosion or wear on the seal chamber or stuffing-box cover.	Replace the seal chamber or stuffing-box cover.
There is excessive vane-tip runout of the impeller.	The vane is bent.	Replace the impeller.

i-ALERT® Condition Monitor troubleshooting

To troubleshoot t the i-ALERT®2 monitor, please refer to the i-ALERT®2 IOM or i-ALERT2.com.

Symptom	Cause	Remedy
There are no green or red flashing LEDs.	The battery is dead.	Replace the condition monitor.
	The unit is deactivated.	Activate the condition monitor.
	The unit is malfunctioning.	Consult your ITT representative for a warranty replacement.
The red LEDs are flashing, but the temperature and vibration are at acceptable levels.	The baseline is bad.	Check the temperature and vi-bration levels and reset the con-dition monitor.
	The unit is malfunctioning.	Consult your ITT representative for a warranty replacement.

Parts Listings and Cross-Sectionals

Parts list

Table 28: Construction material and quantity

Item	Quantity	Part name	Pump Material				
			All D.I.	D.I. With 316 SS impeller	All 316SS	All CD4MCu	All Alloy 20
100	1	Casing	1012	1012	1203	1216	1204
101	1	Impeller	1013	1203	1203	1216	1204
105	1	Lantern Ring	PTFE				
106	1 set	Stuffing Box Packing	Non-asbestos braid				
107	1	Gland—Packed Box	1203			1204	
108	1	Frame Adapter	1013				
109C	1***	Outboard Bearing End Cover	1001				
112A	1	Outboard Bearing	Double row angular contact (duplex pair for LTi)				
113	2	Plug—Grease Relief	2210				
113B	1	Plug—Oil Fill	2210				
122	1	Shaft—Without Sleeve	2229			2230	
122	1	Shaft—With Sleeve	2238				
126	1	Shaft Sleeve	2229				2230
134	1	Bearing Housing	1001				
136	1	Bearing Locknut	Steel				
168A	1	Radial Bearing	Single row ball				
184	1	Seal Chamber/Stuffing Box Cover	1012	1012	1203	1216	1204
193	2	Grease Fitting	Steel				
228	1	Bearing Frame	STi 1013, All others - 1001				
236A	10	Cap Screw—Bearing Clamp Ring	2210				
239	1	Support, Casing	–	–	2201*	2201*	2201*
241	1	Frame Foot	1001				
248	1	Oil Thrower	2210				
250	1	Gland—Mechanical Seal	Material varies				
253B	1	Bearing Clamp Ring	2210				
319	1	Sight Glass	Glass/steel				
332A	1	Outboard Labyrinth Seal w/O-rings	Brass ASTM B505-96				
333A	1	Inboard Labyrinth Seal w/O-rings	Brass ASTM B505-96				
351	1	Casing Gasket	Aramid fiber w/EPDM				
353	4	Gland Stud	2228				
355	4	Gland Stud Nut	2228				
358	1	Plug—Casing Drain	2210		2229	2230	
358Y	1 ***	Plug, Impeller	2229			2230	
360C	1 ***	Gasket—Thrust End Cover	Buna				
360D	1	Gasket—Frame-to-Adapter	Buna				
360Q	1	Gasket—Gland-to-Stuffing Box Cover	Material varies				
361A	1	Retaining Ring	Steel				
370	****	Bolt—Adapter to Case	2210		2228		
370B	4	Bolt—Frame-to-Adapter	2210				
370C	**	Clamp Bolt —Bearing Housing	2210				
370D	**	Jack Bolt—Bearing Housing	2210				
370F	2	Bolt—Frame Foot to Frame	2210				
370H	2	Stud—Stuffing Box Cover-to-Adapter	2228				
370Y	2	Bolt—Cap Casing to Support	–	–	2210*		
371C	6 ***	Cap Screw-End Cover to Bearing Housing	2210				
382	1	Bearing Lockwasher	Steel				
383	1	Mechanical Seal	Material varies				
400	1	Coupling Key	2210				

Item	Quantity	Part name	Pump Material				
			All D.I.	D.I. With 316 SS impeller	All 316SS	All CD4MCu	All Alloy 20
408A	1	Plug—Oil Drane	2210				
408H	4	Plug—Oil Mist Connection	2210				
408J	1	Plug—Oiler	2210				
408L	1	Plug—Oil Cooler Inlet	2210				
408M	1	Plug—Oil Cooler Outlet	2210				
408N	1	Plug—Sight Glass	2210				
412A	1	O-Ring, Graphoil Impeller	–	–	*		
418	3	Jack Bolt—Adapter-to-Case	2228				
423	3	Jam Nut—Bearing Housing Jack Bolt	2210				
423B	2	Hex Nut—Stuffing Box Cover to Adapter	2228				
428	1	Gasket, Plug	PTFE				
437	1	Lockwasher, Casing to Support	–	–	2210*		
458Y	1 ***	Plug, Impeller	2229			2230	
469B	2	Dowel Pin—Frame-to-Adapter	Steel				
494	1	Tube Element, Finned Cooled	304SS / Copper				
496	1	O-Ring Bearing Housing	Buna N				
412A	1	O-Ring—Impeller	Viton				
497F	1	O-Ring—Outboard Labyrinth Rotor	Viton				
497G	1	O-Ring—Outboard Labyrinth Stator	Viton				
497H	1	O-Ring—Inboard Labyrinth Rotor	Viton				
497J	1	O-Ring—Inboard Labyrinth Stator	Viton				
497L	1	O-Ring Internal (inboard)	Viton				
497N	1	O-Ring Internal (outboard)	Viton				
503	1	Adapter Ring	1013				
529	1	Lockwasher—Frame Foot-to-Bearing Frame	Steel				
555	1	Tube, Finned Cooling Assembly	304AA / Copper				
555A	1	Tube, Ftg Male (Frame Cooling)	Brass				
555B	2	Connector, Thermocouple (Frame Cooling)	Brass				
555C	2	Elbow, Female (Frame Cooling)	Brass				
555D	1	Conn TC Sealed PWR	Cast iron				
761B	1	i-*ALERT*® Condition Monitor	Stainless steel/epoxy				

Table 29: Construction material and quantity (continued)

Item	Quantity	Part name	Pump Material				
			All 317SS	All Monel	All Nickel	All Hastelloy C	All Hastelloy B
100	1	Casing	1209	1119	1601	1215	1217
101	1	Impeller	1209	1119	1601	1215	1217
105	1	Lantern Ring	PTFE				
106	1 set	Stuffing Box Packing	Non-asbestos braid				
107	1	Gland—Packed Box	1209	1119	1601	1215	1217
108	1	Frame Adapter	1013				
109C	1***	Outboard Bearing End Cover	1001				
112A	1	Outboard Bearing	Double row angular contact (duplex pair for LTi)				
113	2	Plug—Grease Relief	2210				
113B	1	Plug—Oil Fill	2210				
122	1	Shaft—Less Sleeve	2232	2150	2155	2248	2247
122	1	Shaft—With Sleeve	2229				
126	1	Shaft Sleeve	2232	2150	2155	2248	2247
134	1	Bearing Housing	1001				
136	1	Bearing Locknut	Steel				
168A	1	Radial Bearing	Single row ball				
184	1	Seal Chamber/Stuffing Box Cover	1209	1119	1601	1215	1217
193	2	Grease Fitting	Steel				

Item	Quantity	Part name	Pump Material				
			All 317SS	All Monel	All Nickel	All Hastelloy C	All Hastelloy B
228	1	Bearing Frame	STi-1013, All others - 1001				
236A	10	Cap Screw—Bearing Clamp Ring	2210				
239	1	Support, Casing	–	–	–	2201*	–
241	1	Frame Foot	1001				
248	1	Oil Thrower	2210				
250	1	Gland—Mechanical Seal	Material varies				
253B	1	Bearing Clamp Ring	2210				
319	1	Sight Glass	Glass/steel				
332A	1	Outboard Labyrinth Seal w/O-rings	Brass ASTM B505-96				
333A	1	Inboard Labyrinth Seal w/O-rings	Brass ASTM B505-96				
351	1	Casing Gasket	Aramid fiber w/EPDM				
353	4	Gland Stud	2232	2150	2155	2248	2247
355	4	Gland Stud Nut	2232	2150	2155	2248	2247
358	1	Plug—Casing Drain	2232	2150	2156	2248	2247
358Y	1 ***	Plug, Impeller	2232	2150	2156	2248	2156
360C	1 ***	Gasket—Thrust End Cover	Buna				
360D	1	Gasket—Frame-to-Adapter	Buna				
360Q	1	Gasket—Gland-to-Stuffing Box Cover	Material varies				
361A	1	Retaining Ring	Steel				
370	****	Bolt—Adapter to Case	2228				
370B	4	Bolt—Frame-to-Adapter	2210				
370C	**	Clamp Bolt —Bearing Housing	2210				
370D	**	Jack Bolt—Bearing Housing	2210				
370F	2	Bolt—Frame Foot to Frame	2210				
370H	2	Stud—Stuffing Box Cover-to-Adapter	2228				
370H	2	Bolt—Cap Casing to Support	–	–	–	2210*	–
371C	6 ***	Cap Screw-End Cover to Bearing Housing	2210				
382	1	Bearing Lockwasher	Steel				
383	1	Mechanical Seal	Material varies				
400	1	Coupling Key	2210				
408A	1	Plug—Oil Drane	2210				
408H	4	Plug—Oil Mist Connection	2210				
408J	1	Plug—Oiler	2210				
408L	1	Plug—Oil Cooler Inlet	2210				
408M	1	Plug—Oil Cooler Outlet	2210				
408N	1	Plug—Sight Glass	2210				
412A	1	O-Ring, Graphoil Impeller	–	–	–	*	–
418	3	Jack Bolt—Adapter-to-Case	2228				
423	3	Jam Nut—Bearing Housing Jack Bolt	2210				
423B	2	Hex Nut—Stuffing Box Cover to Adapter	2228				
428	1	Gasket, Plug	PTFE				
437	1	Lockwasher, Casing to Support	–	–	–	2210*	–
458Y	1***	Plug, Impeller	2232	2150	2155	2248	2247
469B	2	Dowel Pin—Frame-to-Adapter	Steel				
494	1	Tube Element, Finned Cooled	304SS / Copper				
496	1	O-Ring Bearing Housing	Buna N				
412A	1	O-Ring—Impeller	Viton				
497F	1	O-Ring—Outboard Labyrinth Rotor	Viton				
497G	1	O-Ring—Outboard Labyrinth Stator	Viton				
497H	1	O-Ring—Inboard Labyrinth Rotor	Viton				
497J	1	O-Ring—Inboard Labyrinth Stator	Viton				
497L	1	O-Ring Internal (inboard)	Viton				
497N	1	O-Ring Internal (outboard)	Viton				
503	1	Adapter Ring	1013				

Item	Quantity	Part name	Pump Material				
			All 317SS	All Monel	All Nickel	All Hastelloy C	All Hastelloy B
529	1	Lockwasher— Frame Foot-to-Bearing Frame	Steel				
555	1	Tube, Finned Cooling Assembly	304AA / Copper				
555A	1	Tube, Ftg Male (Frame Cooling)	Brass				
555B	2	Connector, Thermocouple (Frame Cooling)	Brass				
555C	2	Elbow, Female (Frame Cooling)	Brass				
555D	1	Conn TC Sealed PWR	Cast iron				
761B	1	i-*ALERT*® Condition Monitor	Stainless steel/epoxy				

Table 30: Construction material and quantity (continued)

Item	Quantity	Part name	Pump Material (3196, HT 3196, CV 3196, 3796)	Pump Material (NM 3196)	Pump Material (3198)
			All Titanium	Vinylester	D.I./PFA
100	1	Casing	1220	6929	9639
101	1	Impeller	1220	6929	6944
105	1	Lantern Ring	PTFE	–	–
106	1 set	Stuffing Box Packing	Non-asbestos braid	–	–
107	1	Gland— Packed Box	1220	–	–
108	1	Frame Adapter	1013		
109C	1***	Outboard Bearing End Cover	1001		
112A	1	Outboard Bearing	Double row angluar contact (duplex pair for LTi)		
113	2	Plug— Grease Relief	2210		
113B	1	Plug— Oil Fill	2210		
122	1	Shaft— Less Sleeve	2156	2229	–
122	1	Shaft— With Sleeve	2229		6947
126	1	Shaft Sleeve	2156	2229	–
134	1	Bearing Housing	1001		
136	1	Bearing Locknut	Steel		
168A	1	Radial Bearing	Single row ball		
184	1	Seal Chamber/Stuffing Box Cover	1220	6929	9639
193	2	Grease Fitting	Steel		
228	1	Bearing Frame	STi - 1013, All others - 1001		
236A	10	Cap Screw— Bearing Clamp Ring	2210		
239	1	Support, Casing	–	–	–
241	1	Frame Foot	1001		
248	1	Oil Thrower	2210		
250	1	Gland— Mechanical Seal	Material varies		
253B	1	Bearing Clamp Ring	2210		
319	1	Sight Glass	Glass/steel		
332A	1	Outboard Labyrinth Seal w/O-rings	Brass ASTM B505-96		
333A	1	Inboard Labyrinth Seal w/O-rings	Brass ASTM B505-96		
351	1	Casing Gasket	Aramid fiber w/EPDM		
353	4	Gland Stud	2156	2229	2229
355	4	Gland Stud Nut	2156	2229	2229
358	1	Plug— Casing Drain	2156	–	–
358Y	1 ***	Plug, Impeller	2156	–	–
360C	1 ***	Gasket— Thrust End Cover	Buna		
360D	1	Gasket— Frame-to-Adapter	Buna		
360Q	1	Gasket— Gland-to-Stuffing Box Cover	Material varies		
361A	1	Retaining Ring	Steel		
370	****	Bolt— Adapter to Case	2228		
370B	4	Bolt— Frame-to-Adapter	2210		
370C	**	Clamp Bolt — Bearing Housing	2210		
370D	**l	Jack Bolt— Bearing Housing	2210		
370F	2	Bolt— Frame Foot to Frame	2210		

Item	Quantity	Part name	Pump Material (3196, HT 3196, CV 3196, 3796)	Pump Material (NM 3196)	Pump Material (3198)
			All Titanium	Vinylester	D.I./PFA
370H	2	Stud—Stuffing Box Cover-to-Adapter	2228		
370Y	2	Bolt—Cap Casing to Support	–	–	–
371C	6 ***	Cap Screw-End Cover to Bearing Housing	2210		
382	1	Bearing Lockwasher	Steel		
383	1	Mechanical Seal	Material varies		
400	1	Coupling Key	2210		
408A	1	Plug—Oil Drane	2210		
408H	4	Plug—Oil Mist Connection	2210		
408J	1	Plug—Oiler	2210		
408L	1	Plug—Oil Cooler Inlet	2210		
408M	1	Plug—Oil Cooler Outlet	2210		
408N	1	Plug—Sight Glass	2210		
412A	1	O-Ring, Graphoil Impeller	–	–	–
418	3	Jack Bolt—Adapter-to-Case	2228		
423	3	Jam Nut—Bearing Housing Jack Bolt	2210		
423B	2	Hex Nut—Stuffing Box Cover to Adapter	2228		
428	1	Gasket, Plug	PTFE		
437	1	Lockwasher, Casing to Support	–	–	–
458Y	1 ***	Plug, Impeller	2156	–	–
469B	2	Dowel Pin—Frame-to-Adapter	Steel		
494	1	Tube Element, Finned Cooled	304SS / Copper		
496	1	O-Ring Bearing Housing	Buna N		
412A	1	O-Ring—Impeller	Viton		
497F	1	O-Ring—Outboard Labyrinth Rotor	Viton		
497G	1	O-Ring—Outboard Labyrinth Stator	Viton		
497H	1	O-Ring—Inboard Labyrinth Rotor	Viton		
497J	1	O-Ring—Inboard Laybrinth Stator	Viton		
497L	1	O-Ring Internal (inboard)	Viton		
497N	1	O-Ring Internal (outboard)	Viton		
503	1	Adapter Ring	1013		
529	1	Lockwasher—Frame Foot-to-Bearing Frame	Steel		
555	1	Tube, Finned Cooling Assembly	304AA / Copper		
555A	1	Tube, Ftg Male (Frame Cooling)	Brass		
555B	2	Connector, Thermocouple (Frame Cooling)	Brass		
555C	2	Elbow, Female (Frame Cooling)	Brass		
555D	1	Conn TC Sealed PWR	Cast iron		
761B	1	i-*ALERT*® Condition Monitor	Stainless steel/epoxy		

Table 31: Key to table symbols

–	Not applicable
*	Only applicable for HT 3196
**	3 for STi, MTi, LTi 4 for XLT-i, i17
***	XLT-I and i17 only
****	4 for 6 in. STi 8 for 8 in. STi and MTi 16 for 13 in. MTi, LTi , XLT-I 24 for 15 in. XLT-I 12 for 10 in. MTi, LTi , i17

Table 32: Material-code reference

Material	Goulds material code	ASTM	Din	ISO	JIS
Cast Iron	1001	A48 CLASS 20			
Ductile Iron	1012	A395 Gr60-40-18			
Ductile Iron	1013	A536 Gr60-42-10			
CD4MCu	1041	A744 CD4MCU			
Monel	1119	A494 GrM-35-1			
316SS	1203	A744 CF-8M	1.4408		G5121 (SC514)
Alloy 20	1204	A744CN-7M	1.4500		
317SS	1209	A744CG-8M	1.4448		
Hastelloy C	1215	A494 CW-6M			
CD4MCu	1216	A744CD4MCU	9.4460		
Hastelloy B	1217	A494 N-7M			
Titanium	1220	B367 GrC-3			
Nickel	1601	A494 GrCZ100			
Monel	2150	B164 UNS N04400			
Nickel	2155	B160 UNS N02200			
Titanium	2156	B348 Gr2			
Carbon Steel	2201	A576 Gr. 1018 and 1020			
Carbon Steel	2210	A108Gr1211			
304SS	2228	A276 Type 304			
316SS	2229	A276 Type 316			
Alloy 20	2230	B473 (N08020)			
317SS	2232	A276			
4150 Steel	2237	A322Gr4150			
4140 Steel	2238	A434Gr4140			
4140 Steel	2239	A193 Gr. B7			
Alloy B-2	2247	B335 (N10665)			
Alloy C-276	2248	B574 (N10276)			
GMP-2000	6929	N/A			
PFA Lined Steel	6944	N/A			
PFA Lined 316SS	6947	N/A			
PFA Lined Ductile Iron	9639	N/A			

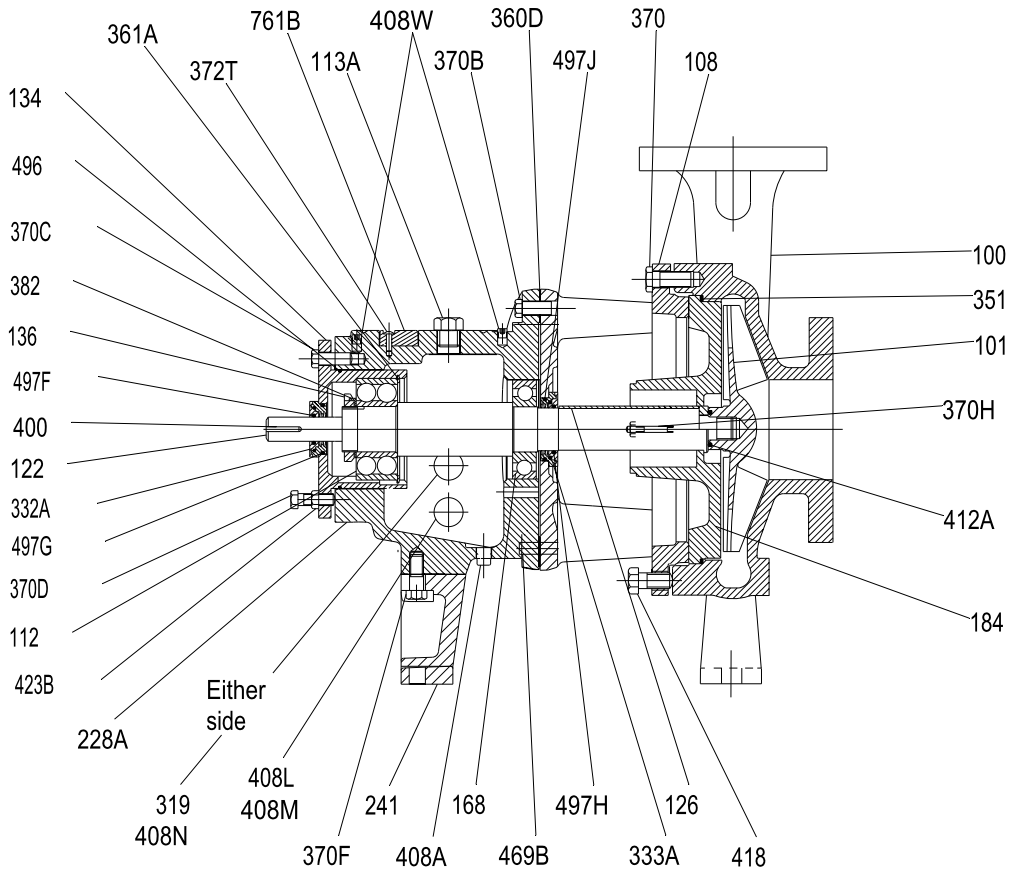


Figure 138: 3196 cross-sectional drawing

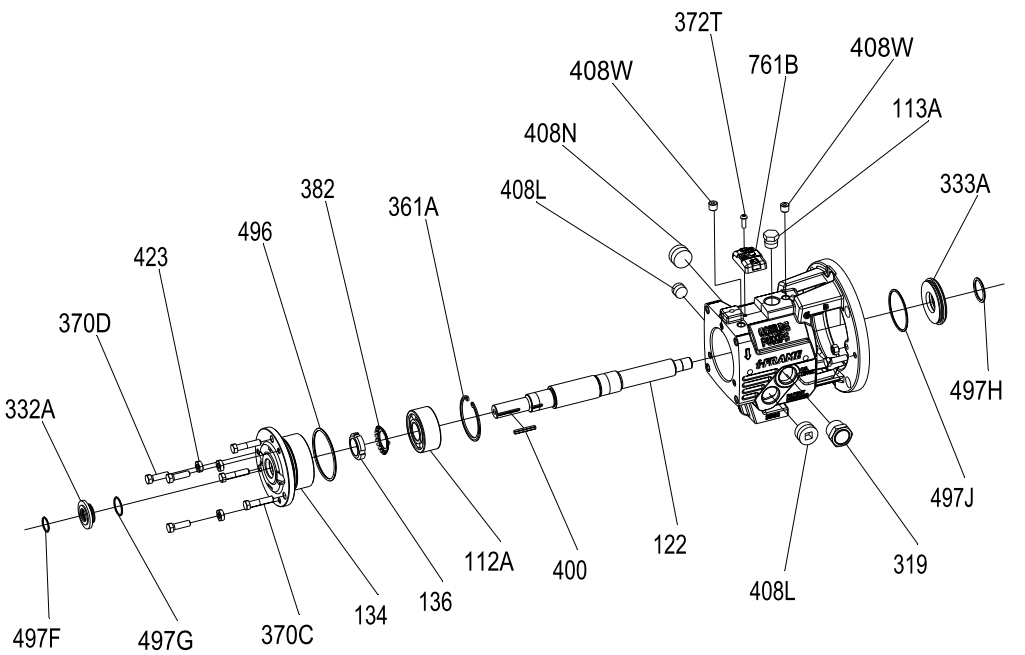


Figure 139: STi bearing-frame exploded view

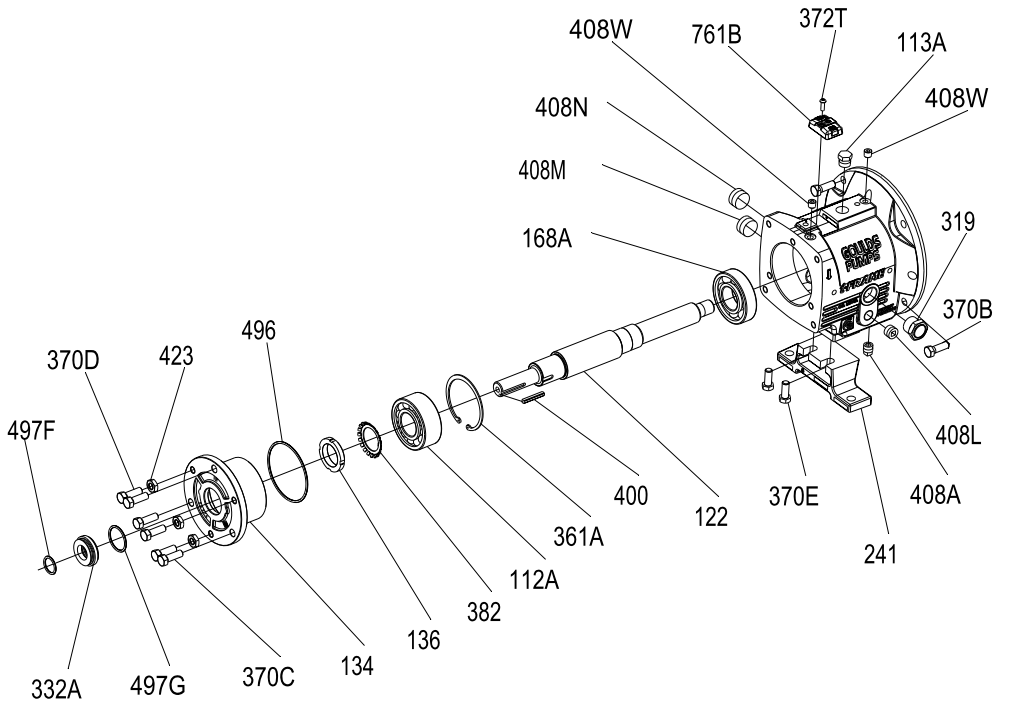


Figure 140: MTi bearing-frame exploded view

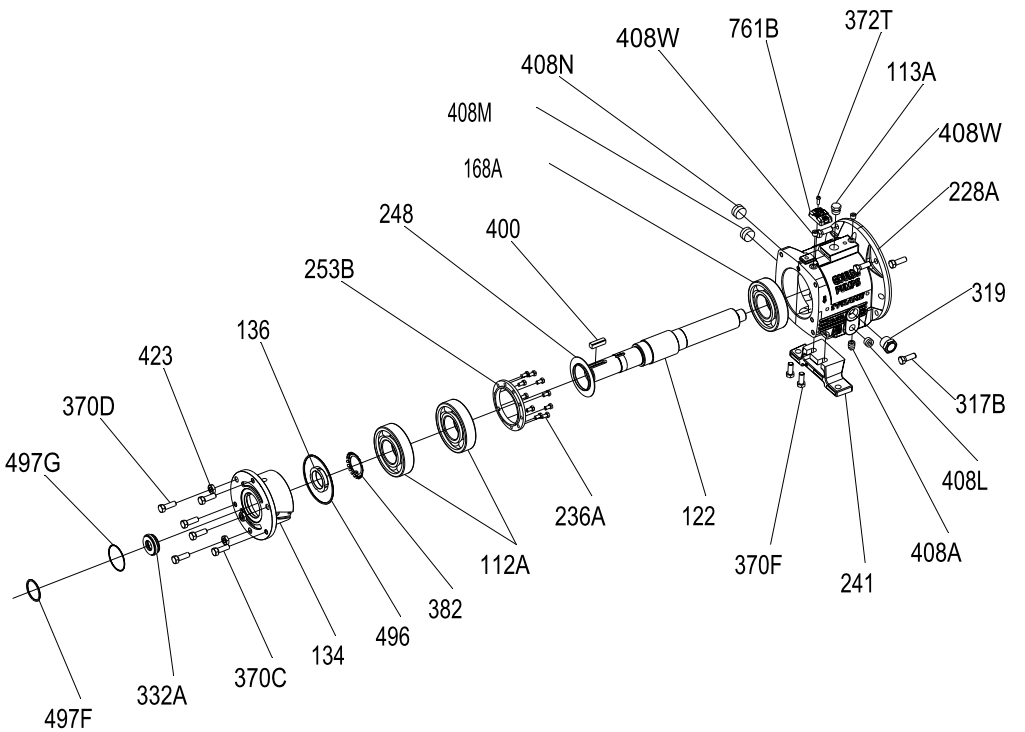


Figure 141: LTi bearing-frame exploded view

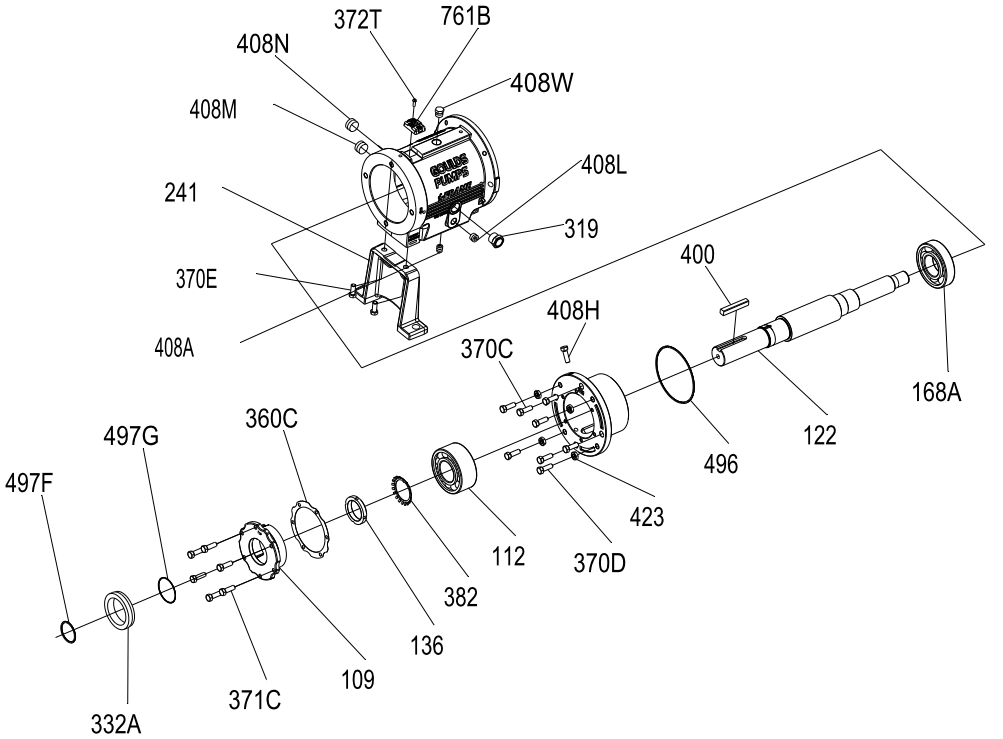


Figure 142: XLT-i bearing-frame exploded view

The finned-tube oil cooler is standard on HT 3196 and optional on all other models.

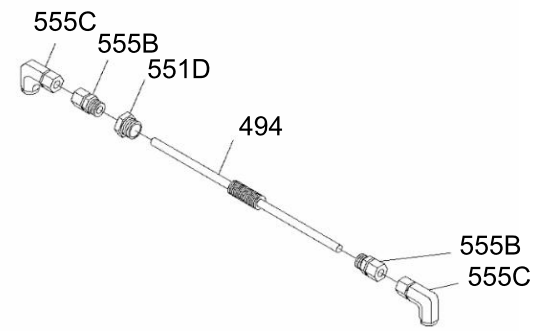


Figure 143: Finned-tube oil cooler exploded view

Certification: CE or CE ATEX

Certificates of conformance

CSA Certificate



CSA INTERNATIONAL

Certificate of Compliance

Certificate: 1992883 Master Contract: 236924

Project: 2254252 Date Issued: 2009/12/16

Issued to: ITT Corporation
240 Fall St
Seneca Falls, NY 13148
USA
Attention: Anthony Stavale

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

C SA US

D. Simpson, Certifier

Issued by: D. Simpson, Certifier

PRODUCTS

CLASS 2258 03 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe and Non-Incendive Systems - For Hazardous Locations

CLASS 2258 83 - PROCESS CONTROL EQUIPMENT-Intrinsically Safe and Non-Incendive - Systems-For Hazardous Locations-Certified to U.S. Standards

Class I, Division 1, Group A, B, C and D, Class II, Group E, F and G; Class III

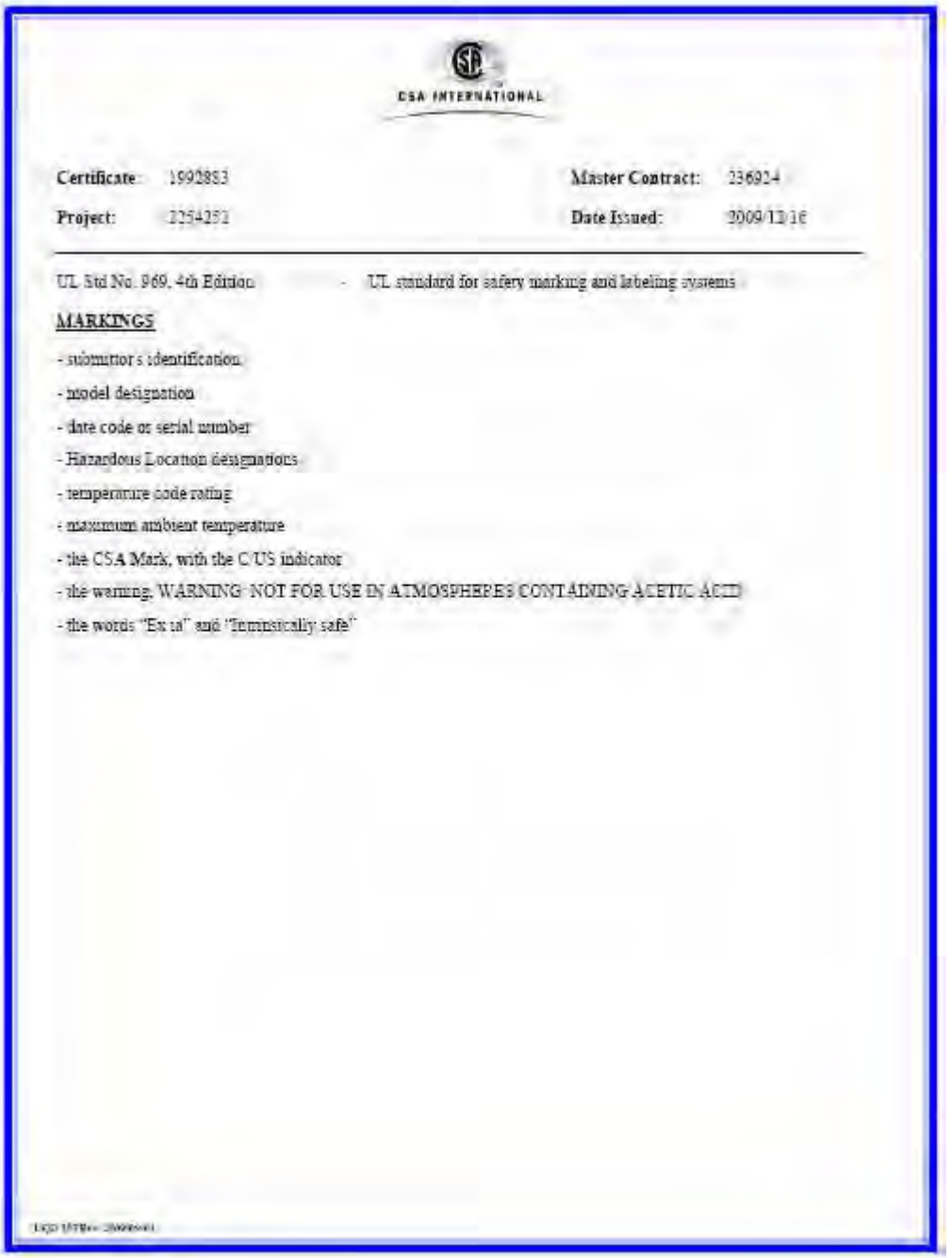
- Condition Monitor, Model LCCM, p/n C07657A, battery operated (non-replaceable, non-rechargeable), intrinsically safe, temperature code T4 (at max ambient of 100C)

APPLICABLE REQUIREMENTS

CAN/CSA-C22.2 No. 0-M91 - General Requirements – Canadian Electrical Code, Part II

CAN/CSA-C22.2 No.157-92 - Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations

UL Std.No.913, Ed. 7 - Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II and III, Division 1, Hazardous Locations



CSA INTERNATIONAL

Certificate: 1992883 **Master Contract:** 236924

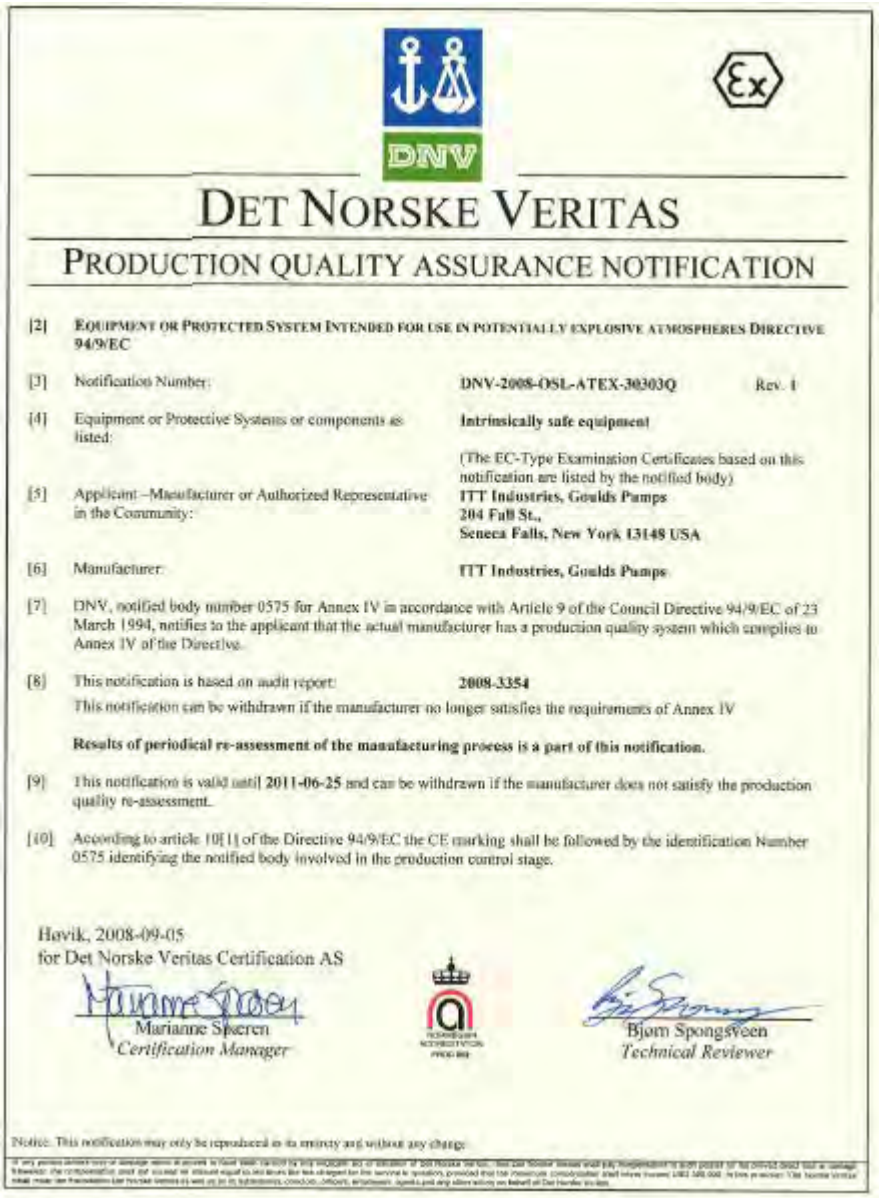
Project: 2254251 **Date Issued:** 2009/12/16

UL Std No. 969, 4th Edition - UL standard for safety marking and labeling systems

MARKINGS

- submittor's identification
- model designation
- date code or serial number
- Hazardous Location designations
- temperature code rating
- maximum ambient temperature
- the CSA Mark, with the C/US indicator
- the warning: WARNING: NOT FOR USE IN ATMOSPHERES CONTAINING ACETIC ACID
- the words "Ex ia" and "Intrinsically safe"

ATEX notification



DET NORSKE VERITAS

PRODUCTION QUALITY ASSURANCE NOTIFICATION

[2] EQUIPMENT OR PROTECTED SYSTEM INTENDED FOR USE IN POTENTIALLY EXPLOSIVE ATMOSPHERES DIRECTIVE 94/9/EC

[3] Notification Number: **DNV-2008-OSL-ATEX-30303Q** Rev. 1

[4] Equipment or Protective Systems or components as listed: **Intrinsically safe equipment**

(The EC-Type Examination Certificates based on this notification are listed by the notified body)

[5] Applicant –Manufacturer or Authorized Representative in the Community: **ITT Industries, Goulds Pumps**
204 Fall St.,
Seneca Falls, New York 13148 USA

[6] Manufacturer: **ITT Industries, Goulds Pumps**

[7] DNV, notified body number 0575 for Annex IV in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, notifies to the applicant that the actual manufacturer has a production quality system which complies to Annex IV of the Directive.

[8] This notification is based on audit report: **2008-3354**
This notification can be withdrawn if the manufacturer no longer satisfies the requirements of Annex IV

Results of periodical re-assessment of the manufacturing process is a part of this notification.

[9] This notification is valid until **2011-06-25** and can be withdrawn if the manufacturer does not satisfy the production quality re-assessment.

[10] According to article 10[1] of the Directive 94/9/EC the CE marking shall be followed by the identification Number 0575 identifying the notified body involved in the production control stage.

Høvik, 2008-09-05
for Det Norske Veritas Certification AS

Marianne Sperren
Certification Manager

Bjørn Spongsveen
Technical Reviewer

Notice: This notification may only be reproduced in its entirety and without any change.

IECEx Certificate of Conformity



IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx LCI 08.0038	Issue No.: 0	Certificate history:
Status:	Current		
Date of Issue:	2008-09-16	Page 1 of 3	

Applicant: **ITT Corp.**
Goulds pumps
240 Fall Street
Seneca Falls, NY 13148
United States of America

Electrical Apparatus: **Condition Monitor**
Optional accessory:

Type of Protection: **Ia**

Marking: **ITT Corp.**
Goulds pumps
240 Fall Street
Seneca Falls, NY 13148
U.S.A.
Condition Monitor
Type : LCCM, p/n C07967A
Ex ia IIC T4
Tamb : -40°C à 106°C

Approved for issue on behalf of the IECEx Certification Body: Marc Gilleux

Position: Ex Certification Manager

Signature: (for printed version)

Date: le 16 September 2008

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

Laboratoire Central des Industries Electriques (LCIE)
33 Avenue du General Leclerc
FR-92260 Fontenay-aux-Roses
France



IECEx Certificate of Conformity

Certificate No.: IECEx LCI 08.0038

Date of Issue: 2008-09-16 Issue No.: 0

Page 2 of 3

Manufacturer: ITT Corp.
Goulds pumps
240 Fall Street
Seneca Falls, NY 13148
United States of America

Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

STANDARDS:
The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

IEC 60079-0 : 2004 Electrical apparatus for explosive gas atmospheres - Part 0: General requirements
Edition: 4.0
IEC 60079-11 : 2006 Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
Edition: 5

This Certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:
A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

FR/LCIE/ExTR08.0003/00

Quality Assessment Report:
NO/DNV/QAR08.0006/00

Chinese Certificate of Conformity



CONFORMITY CERTIFICATE OF EXPLOSION-PROOF

PCEC

Certificate No.: CE082171

Name of Product:	Condition Monitor
Type of Product:	LCCM, p/n C07667A
Marking:	Ex ia II CT4
Technical Documents:	/
Drawing No.:	C07667A
Note (s):	1.The power is supplied by PANASONIC battery. The battery type is BR2477A 3V. 2.The manufacturer address: Goulds pumps, 240 Fall Street, Seneca Falls, NY 13148, U.S.A.

By verifying the drawings and technical documents and checking samples, the product complies with the following standards currently valid in P.R.China:

GB3836.1-2000 GB3836.4-2000

Issued to: ITT Corp.

Date of Expire: 2013-12-22

Date of Issue: 2008-12-22

Center seal

Director

Xu Gang

PCEC has been approved by

Supervision & Test Center of Ex- products of China Petroleum & Chemical Industry

Note: This certificate is only valid for the products that are in accord with sample(s) tested and verified.

Center Add: No.85 No.3 Road DongGe Tianjin China Post code: 300131

E-mail:sec@pcec.com.cn

Tel/ Fax: 022-2665106/26649116

http://www.pcec.com.cn

Other Relevant Documentation or Manuals

For additional documentation

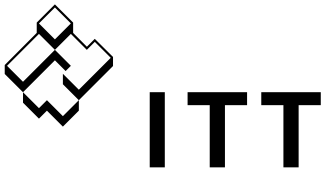
For any other relevant documentation or manuals, contact your ITT representative.

Local ITT Contacts

Regional offices

Region	Address	Telephone	Fax
North America (Headquarters)	ITT - Goulds Pumps 240 Fall Street Seneca Falls, NY 13148 USA	+1 315-568-2811	+1 315-568-2418
Asia Pacific	ITT Industrial Process 10 Jalan Kilang #06-01 Singapore 159410	+65 627-63693	+65 627-63685
Europe	ITT - Goulds Pumps Millwey Rise Industrial Estate Axminster, Devon, England EX13 5HU	+44 1297-630250	+44 1297-630256
Latin America	ITT - Goulds Pumps Camino La Colina # 1448 Condominio Industrial El Rosal Huechuraba Santiago 8580000 Chile	+562 544-7000	+562 544-7001
Middle East and Africa	ITT - Goulds Pumps Achileos Kyrou 4 Neo Psychiko 115 25 Athens Greece	+30 210-677-0770	+30 210-677-5642

Visit our website for the latest version of this document and more information:
http://www.gouldspumps.com



ENGINEERED FOR LIFE

240 Fall Street
Seneca Falls, NY 13148
USA

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The original instruction is in English. All non-English instructions are translations of the original instruction.

Form IOM.3196.i-FRAME.en-US.2017-10

Driving efficiency and sustainability

Manual geral de instalação, operação e manutenção de motores elétricos

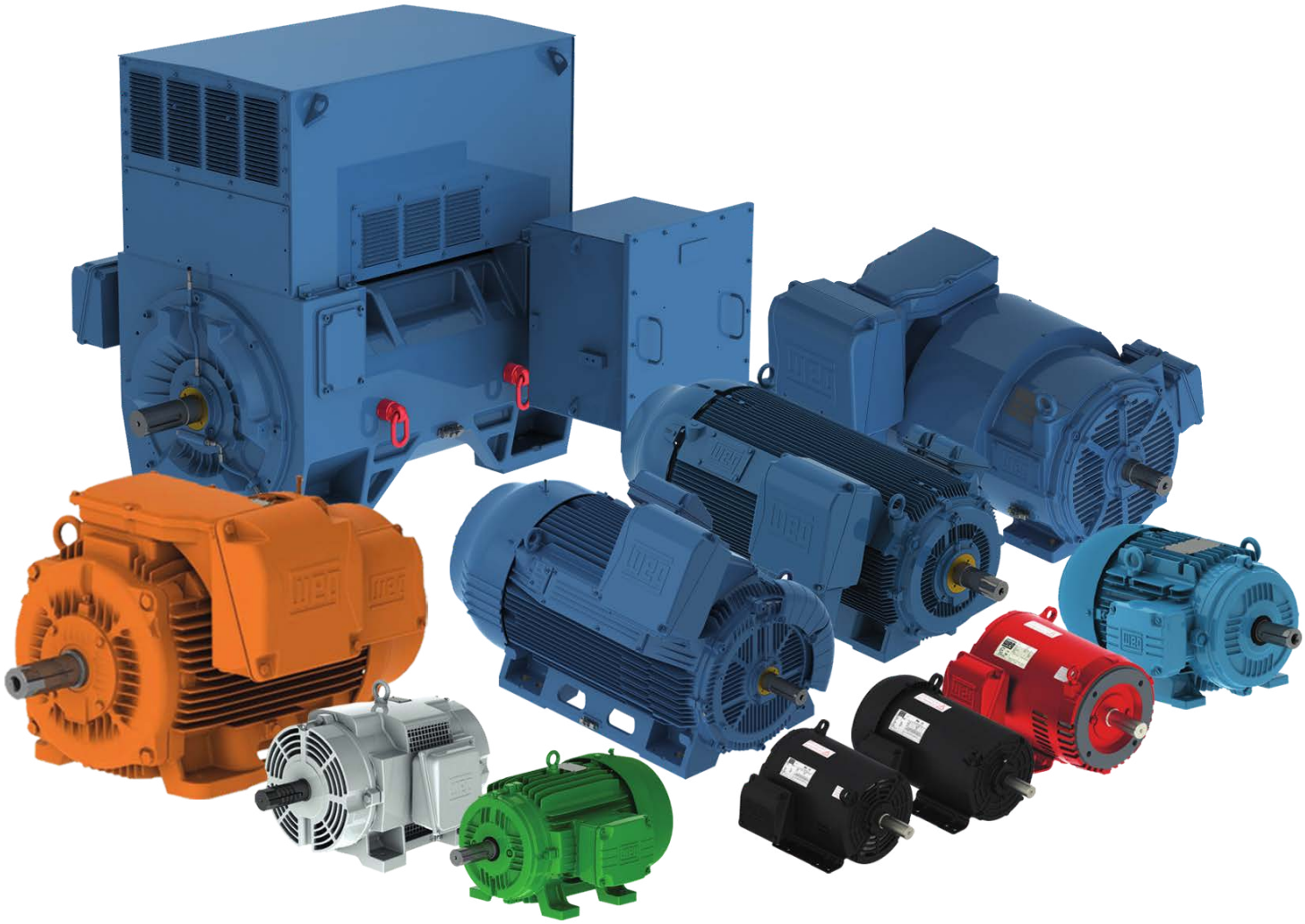
PT

Installation, operation and maintenance manual of electric motors

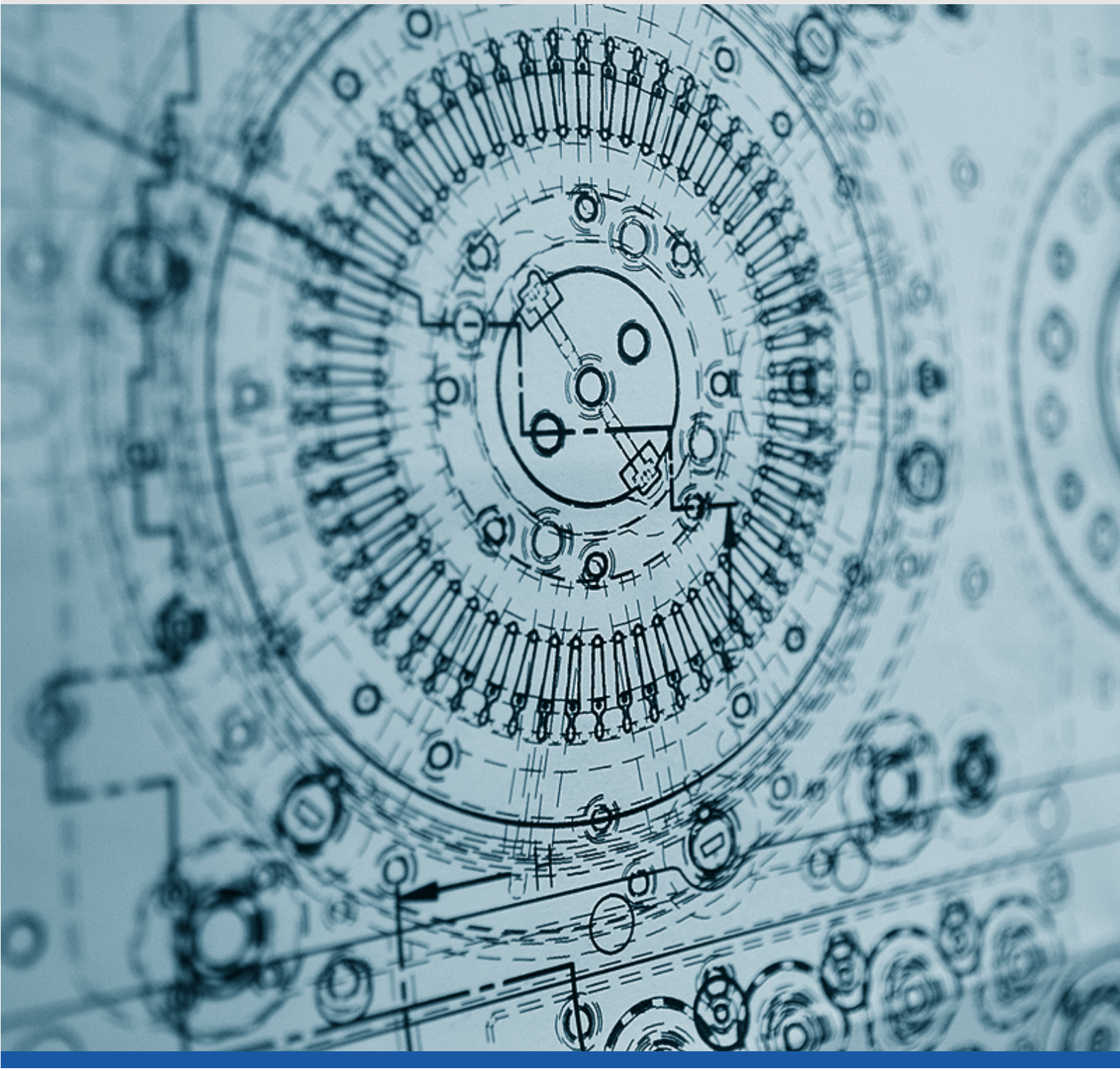
EN

Manual general de instalación, operación y mantenimiento de motores eléctricos

ES



Português	PT	2
English	EN	56
Español	ES	112



MANUAL GERAL DE INSTALAÇÃO, OPERAÇÃO E MANUTENÇÃO DE MOTORES ELÉTRICOS

Este manual apresenta informações referentes aos motores elétricos WEG de indução com rotor de gaiola, com rotor de ímãs permanentes ou híbridos, de baixa e alta tensão, nas carcaças IEC 56 a 630 e NEMA 42 a 9606/10.
As linhas listadas abaixo possuem informações adicionais, encontradas em manuais específicos:

- Motores para extração de fumaça (*Smoke Extraction Motor*);
- Motores com freio eletromagnético;
- Motores para áreas classificadas.

Estes produtos estão de acordo com as seguintes normas, quando aplicáveis:

- NBR 17094-1: Máquinas Elétricas Girantes - Motores de Indução Parte 1: trifásicos.
- NBR 17094-2: Máquinas Elétricas Girantes - Motores de Indução - Parte 2: monofásicos.
- IEC 60034-1: Rotating Electrical Machines - Part 1: Rating and Performance.
- NEMA MG 1: Motors and Generators.
- CSA C 22.2 N°100: Motors and Generators.
- UL 1004-1: Rotating Electrical Machines - General Requirements.

Em caso de dúvidas sobre a aplicabilidade desse material, contate a WEG.

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1. DEFINIÇÕES

Balanceamento: procedimento pelo qual a distribuição de massa de um corpo é verificada e, se necessário, ajustada para garantir que o desbalanceamento residual ou as vibrações e forças nos mancais na frequência de rotação mecânica estejam dentro de limites especificados nas normas internacionais.
Grau de balanceamento: indica a amplitude de pico da velocidade de vibração, expressa em mm/s, de um rotor girando livre no espaço e é produto de um desbalanceamento específico e a velocidade angular do rotor na velocidade máxima de operação.
Parte aterrada: partes metálicas eletricamente conectadas ao sistema de aterramento.
Parte viva: condutor ou parte condutora destinada para ser energizada em condições normais de uso, incluindo o condutor neutro.
Pessoal autorizado: trabalhador que tem anuência formal da empresa.
Pessoal capacitado: trabalhador que atenda as seguintes condições, simultaneamente:
- Receba capacitação sob orientação e responsabilidade de profissional habilitado e autorizado;
- Trabalhe sob responsabilidade de profissional habilitado e autorizado.

Nota: a capacitação só é válida para a empresa que o capacitou e nas condições estabelecidas pelo profissional habilitado e autorizado responsável pela capacitação.

Pessoal habilitado: trabalhador previamente qualificado e com registro no conselho de classe competente.
Pessoal qualificado: trabalhador que comprovar conclusão de curso específico na área elétrica pelo sistema oficial de ensino.

2. RECOMENDAÇÕES INICIAIS

Motores elétricos possuem circuitos energizados, componentes girantes e superfícies quentes durante sua operação normal que podem causar danos às pessoas. Dessa forma, todas as atividades relacionadas ao seu transporte, armazenagem, instalação, operação e manutenção devem ser realizadas por pessoal capacitado. Devem ser observadas as normas e procedimentos vigentes no país de instalação. A não observação das instruções indicadas neste manual e demais referenciadas no site pode resultar em sérios danos pessoais e materiais e anular a garantia do produto.

Neste manual não são apresentadas todas as informações detalhadas sobre possíveis variantes construtivas e nem considerados todos os casos de montagem, operação ou manutenção. Este documento contém informações necessárias para que pessoas capacitadas possam executar o serviço. As imagens apresentadas são meramente ilustrativas.
Para aplicações e condições especiais de operação (manual 50026367 para motores Smoke Extraction, manual 50021973 para Motofreios, manual 50078700 para Motores Eletronicamente Controlados, manual 14629920 para motores Roller Table, manual 50106963 para motores WEG Lift Gearless) é necessário consultar o manual no site www.weg.net ou entrar em contato com a WEG.
Para motores fornecidos com sensor WEG Motor Scan, consulte as orientações de instalação através do Manual de Visão Geral do Recebimento à Operação (10008475131) disponível em www.weg.net.
Para informações sobre cargas radias e axiais admissíveis no eixo consultar o catálogo técnico do produto.

A correta definição das características do ambiente e da aplicação é de responsabilidade do usuário.

Durante o período de garantia do motor, os serviços de reparo, revisão e recuperação devem ser realizados por Assistentes Técnicos autorizados WEG para continuidade do termo de garantia.

2.1 SINAL DE ADVERTÊNCIA

Advertência sobre segurança e garantia.

VERIFICAÇÃO NO RECEBIMENTO

Todos os motores são testados durante o processo de fabricação.
No recebimento do motor, verificar se ocorreram danos durante o transporte. Na ocorrência de qualquer dano, registrar por escrito junto ao agente transportador, e comunicar imediatamente a companhia seguradora e a WEG. A não comunicação pode resultar no cancelamento da garantia.
Deve-se realizar uma inspeção completa no produto:
- Verificar se os dados contidos na placa de identificação estão de acordo com o pedido de compra;
- Remover os dispositivos de travamento de eixo (caso existam) e girar manualmente o eixo para verificar se o mesmo gira livremente. Nos motores Magnet e WQuattro, o eixo não gira livremente devido torque de alinhamento dos ímãs. Pode ser necessário o uso de uma alavanca para girar o eixo;

Ao girar o eixo de um motor Magnet ou WQuattro, deve-se garantir a isolação dos terminais da máquina, devido risco de choque elétrico causado pela tensão induzida durante o procedimento.

- Assegurar que o motor não tenha sido exposto à poeira e umidade excessiva durante o transporte;
- Não remover graxa de proteção da ponta do eixo, nem os tampões que fecham os furos da caixa de ligação, caso existam. Estes itens de proteção devem ser mantidos até que a instalação completa seja concluída.

2.2 PLACAS DE IDENTIFICAÇÃO

A placa de identificação contém as informações que descrevem as características construtivas e o desempenho do motor. Na Figura 1, Figura 2 e Figura 3 são apresentados exemplos de layouts das placas de identificação.

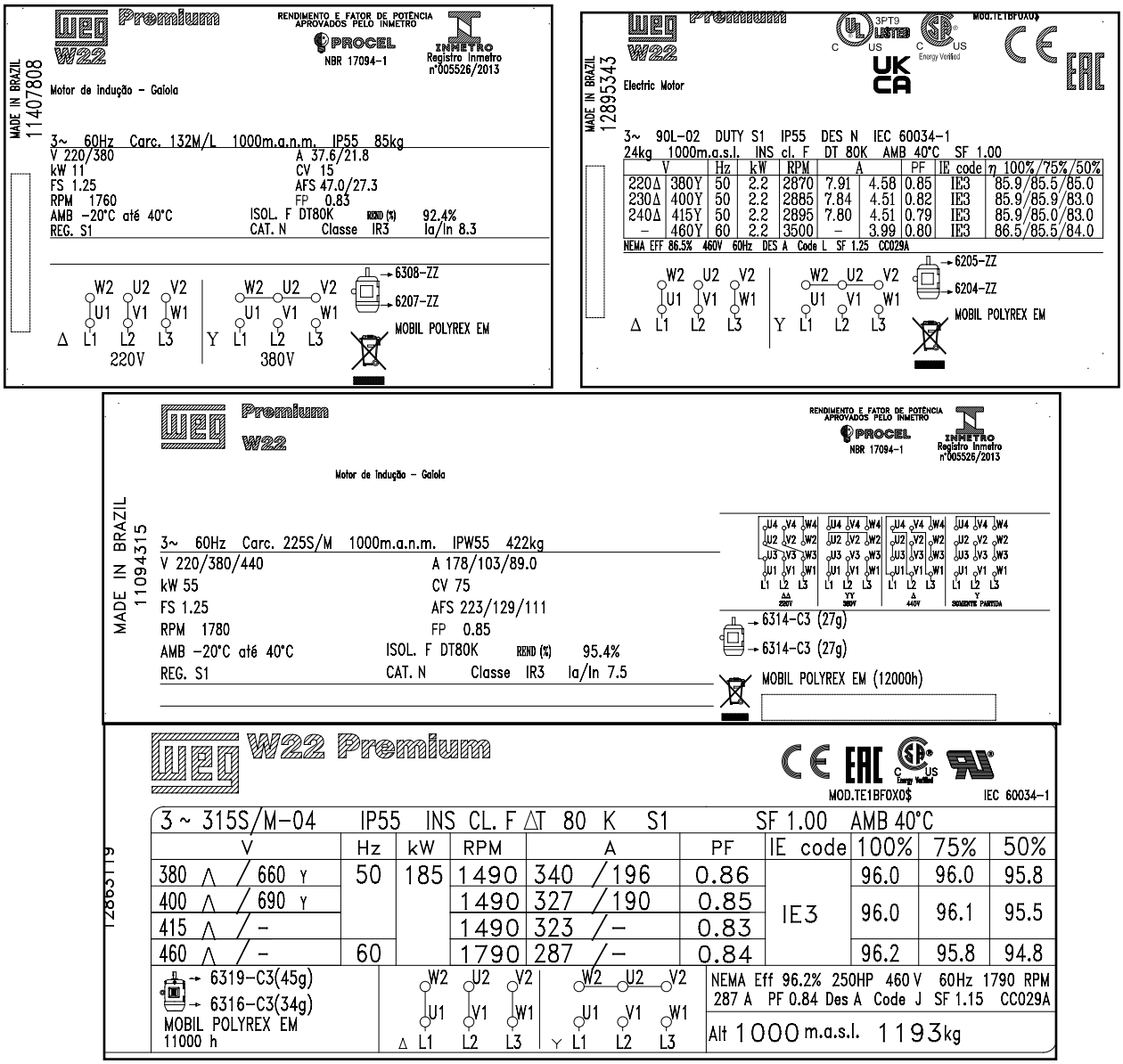
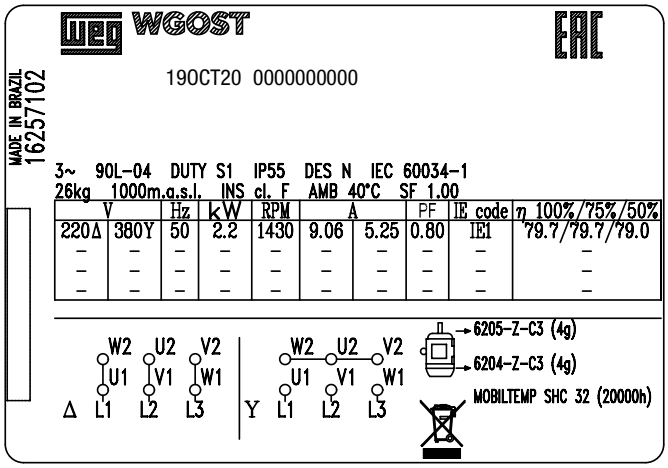
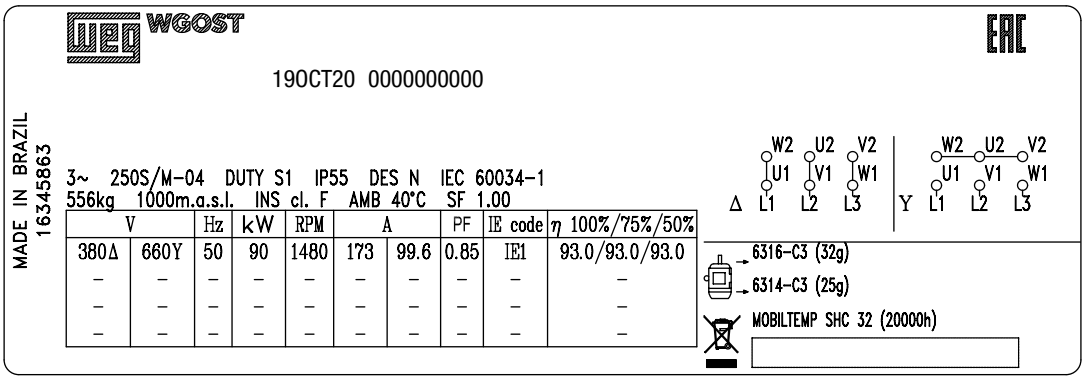
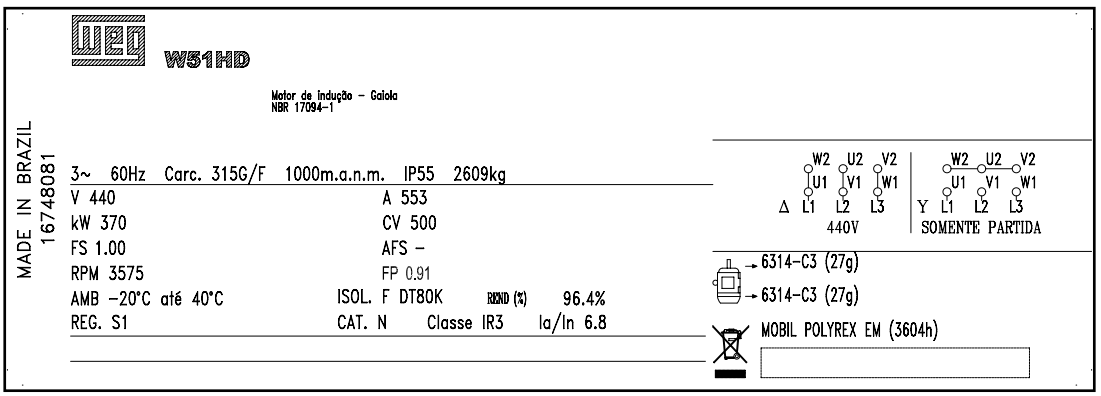


Figura 1 - Placa de identificação de motores IEC







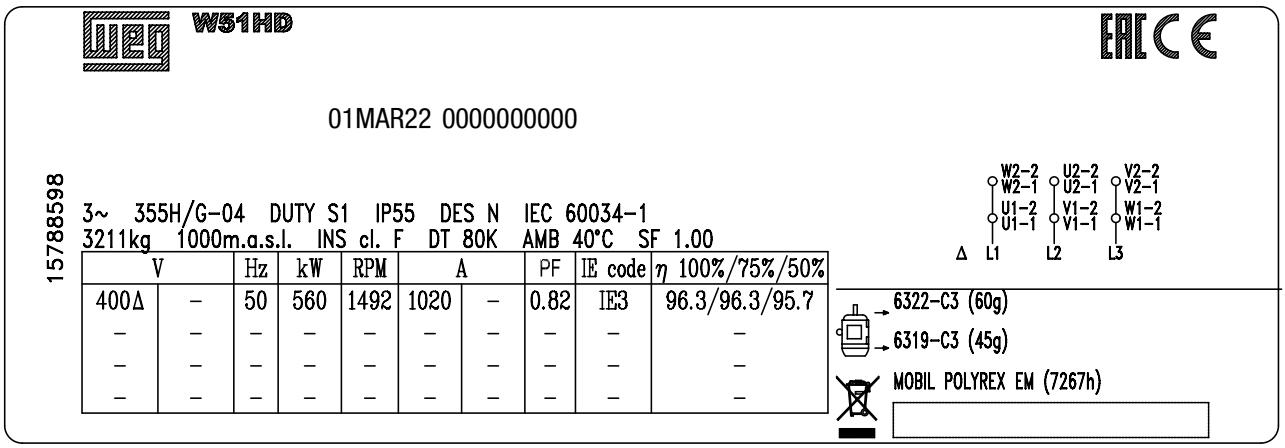


Figura 2 - Placa de identificação de motores IEC

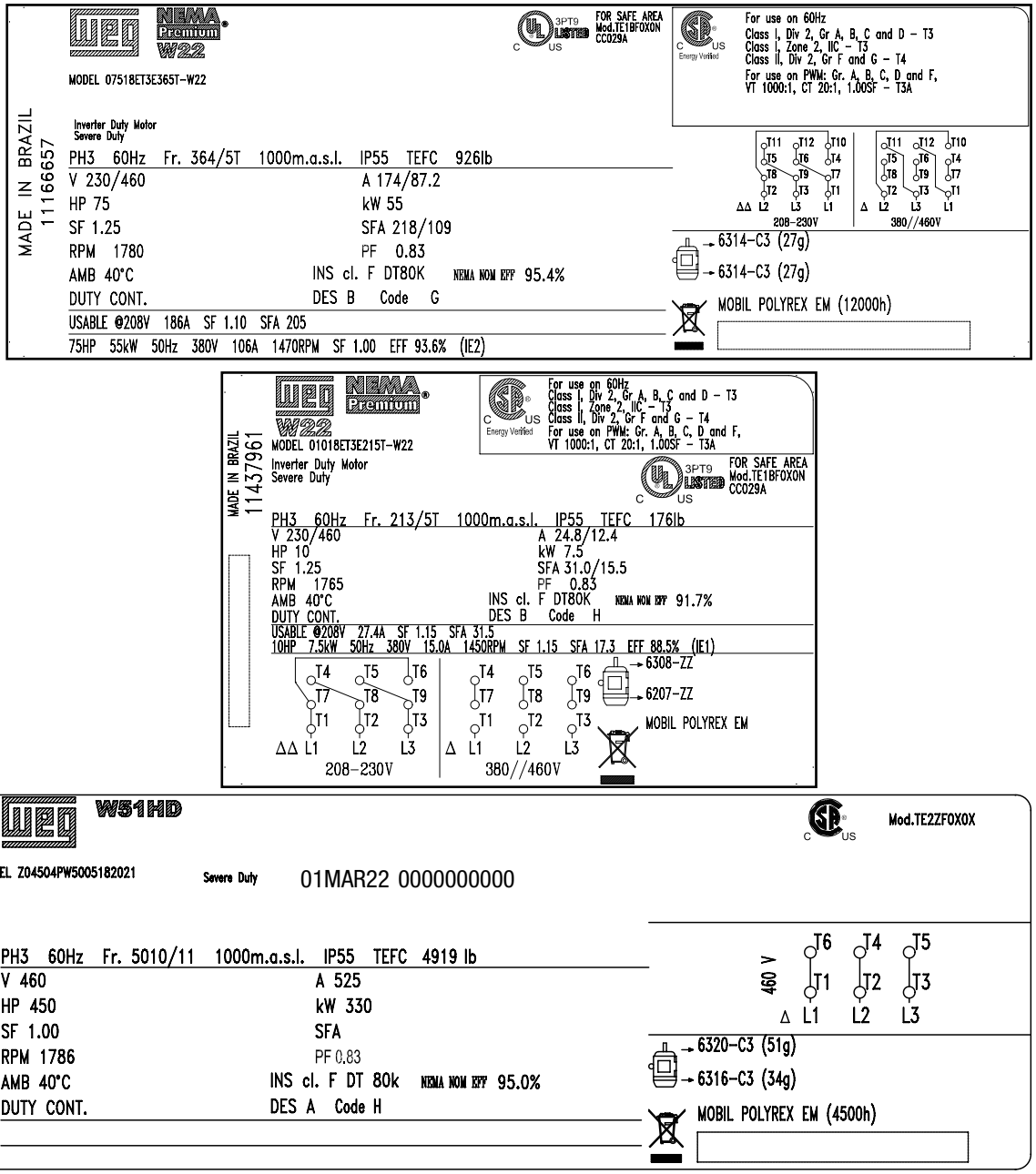


Figura 3 - Placa de identificação de motores NEMA

3. SEGURANÇA

Durante a instalação e manutenção, os motores devem estar desconectados da rede, estar completamente parados e cuidados adicionais devem ser tomados para evitar partidas acidentais.

Os profissionais que trabalham em instalações elétricas, seja na montagem, na operação ou na manutenção, devem utilizar ferramentas apropriadas e serem instruídos sobre a aplicação das normas e prescrições de segurança, inclusive sobre o uso de Equipamentos de Proteção Individual (EPI), que devem ser cuidadosamente observados.

Motores elétricos possuem circuitos energizados, componentes girantes e superfícies quentes durante sua operação normal que podem causar danos às pessoas. Dessa forma, todas as atividades relacionadas ao seu transporte, armazenagem, instalação, operação e manutenção devem ser realizadas apenas por pessoal capacitado.

Usuários de marca passo e pessoal não qualificado não devem abrir motores WMagnet e WQuattro, pois são utilizados ímãs de alta energia.

Sempre seguir as instruções de segurança, instalação, manutenção e inspeção de acordo com as normas vigentes em cada país.

4. MANUSEIO E TRANSPORTE

Motores embalados individualmente não devem ser içados pelo eixo ou embalagem, mas sim pelo(s) olhal(is) de içamento (quando existentes) e com dispositivos adequados. Os olhais de içamento são dimensionados para suportar apenas a massa do motor indicada na placa de identificação. Motores fornecidos em *pallets* devem ser içados pela base do *pallet*.

Em nenhuma circunstância, a embalagem deve ser tombada.

Não utilizar os olhais de içamento para suspender o motor em conjunto com outros equipamentos, como por exemplo: bases, polias, ventiladores, bombas, redutores, etc..
Olhais danificados, por exemplo, com trincas, deformações, etc., não devem ser utilizados. Verificar suas condições antes de utilizá-los.
Os olhais de içamento em componentes como tampas, kit de ventilação forçada, entre outros, devem ser utilizados somente para o içamento destes componentes de maneira isolada e nunca do motor completo.

Toda a movimentação deve ser realizada de forma suave, sem impactos, caso contrário os rolamentos podem ser danificados bem como os olhais serem expostos a esforços excessivos, podendo provocar o rompimento dos olhais.

Nunca manuseie os motores pelos componentes poliméricos: tampa defletora, chapéu, caixa de ligação e/ou tampa da caixa de ligação.

Os dispositivos de travamento do eixo (utilizados para proteção durante o transporte), em motores com rolamentos de rolos ou contato angular, devem ser utilizados para todo e qualquer transporte do motor, mesmo que isso requeira o desacoplamento da máquina acionada.
Todos os motores HGF, W50, W51 HD e W60, independentemente do tipo de mancal, devem ter seu rotor travado para transporte.
Motores verticais com mancais lubrificados a óleo devem ser transportados na posição vertical. Caso necessário transportar o motor na posição horizontal, utilizar o dispositivo de travamento do eixo em ambos os lados (dianteiro/traseiro) do motor.

4.1 IÇAMENTO

Antes de iniciar qualquer processo de içamento, certificar-se que os olhais estejam adequadamente fixos, totalmente parafusados e com sua base em contato com a superfície a ser içada, conforme Figura 4 (a Figura 5 exemplifica o uso incorreto).
Certificar-se que o equipamento utilizado no içamento e suas dimensões sejam adequados ao tamanho do olhal e da massa do motor.



Figura 4 - Maneira correta de fixação do olhal de içamento



Figura 5 - Maneira incorreta de fixação do olhal de içamento

O centro de gravidade pode mudar dependendo do projeto do motor e acessórios. Durante os procedimentos de içamento, o ângulo máximo de inclinação permitido nunca deve ser excedido, conforme especificado nos próximos itens.

4.1.1 Motores horizontais com um olhal de içamento

Para motores com um olhal de içamento, o ângulo máximo resultante durante o processo de içamento não poderá exceder 30° em relação ao eixo vertical, conforme Figura 6.

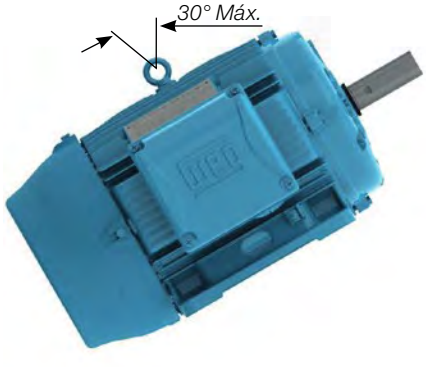


Figura 6 - Ângulo máximo resultante para motores com um olhal de içamento

4.1.2 Motores horizontais com dois ou mais olhais de içamento

Para motores que possuem dois ou mais olhais para o içamento, todos os ollhais fornecidos devem ser utilizados simultaneamente para o içamento.

Existem duas disposições de olhais possíveis (verticais e inclinados), conforme apresentadas a seguir:

- Motores com olhais verticais, conforme Figura 7, o ângulo máximo resultante deve ser de 45° em relação ao eixo vertical. Recomenda-se a utilização de uma barra separadora (spreader beam), para manter o elemento de içamento (corrente ou cabo) no eixo vertical e evitando danos à superfície do motor.



Figura 7 - Ângulo máximo resultante para motores com dois ou mais olhais de içamento

Para motores HGF, W40, W50 e W51 HD, conforme Figura 8, o ângulo máximo resultante deve ser de 30° em relação ao eixo vertical;



Figura 8 - Ângulo máximo resultante para motores HGF, W40, W50 e W51 HD horizontais

Para motores W60, conforme Figura 9, é necessária a utilização de uma barra separadora (spreader beam) para manter o elemento de içamento (corrente, cabo) no eixo vertical e assim também evitar danos à superfície do motor.



Figura 9 - Içamento de motores W60 com correntes paralelas

- Motores com olhais inclinados, conforme Figura 10, é necessária a utilização de uma barra separadora (spreader beam), para manter o elemento de içamento (corrente, cabo, etc.) no eixo vertical e assim também evitar danos à superfície do motor.



Figura 10 - Uso de barra separadora no içamento

4.1.3 Motores verticais

Para motores verticais é necessária a utilização de uma barra separadora (*spreader beam*), para manter o elemento de içamento (corrente, cabo) no eixo vertical e assim também evitar danos à superfície do motor (conforme Figura 11).



Figura 11 - Içamento de motores verticais

Utilizar sempre os olhais que estão dispostos na parte superior do motor em relação à posição de montagem e diametralmente opostos (ver Figura 12).



Figura 12 - Içamento de motores HGF, W50 e W51 HD

4.1.3.1. Procedimento para colocação de motores W22/WEG General Purpose/WIN na posição vertical

De forma geral, por questões de segurança durante o transporte, os motores verticais são embalados e fornecidos na posição horizontal.
Para a colocação de motores W22/WEG General Purpose/WIN com olhais inclinados (ver Figura 10) na vertical, devem ser seguidos os passos a seguir:

1. Certificar-se que os olhais estão adequadamente fixos (ver Figura 4);
2. Remover o motor da embalagem utilizando os olhais superiores (conforme Figura 13);



Figura 13 - Remoção do motor da embalagem

3. Instalar o segundo par de olhais (conforme Figura 14);



Figura 14 - Instalação do segundo par de olhais

4. Reduzir a carga sobre o primeiro par de olhais para iniciar a rotação do motor (conforme Figura 15). Esse procedimento deve ser realizado de forma lenta e cautelosa.



Figura 15 - Resultado final: motor posicionado na vertical

Para os motores da carcaça IEC 112 a 200 (e NEMA equivalentes), a WEG possui um kit de dispositivos para facilitar o tombamento do motor para a vertical, sendo ele ponta para cima ou para baixo (conforme Figura 16 e Figura 17).



Figura 16 - Olhal para tombamento na ponta de eixo, vertical ponta para cima (V6/V36)



Figura 17 - Olhais com prolongador fixos na tampa traseira, vertical ponta para baixo (V5/V35)

4.1.3.2. Procedimento para colocação de motores HGF, W50 e W51 HD na posição vertical

Os motores verticais HGF são fornecidos com oito pontos de içamento, sendo quatro na parte dianteira e quatro na parte traseira. Já os motores verticais W50 e W51 HD são fornecidos com nove pontos de içamento, sendo quatro na parte dianteira, uma na parte central e quatro na parte traseira. Geralmente são transportados na posição horizontal, mas para a instalação precisam ser colocados na posição vertical.
Para a colocação destes motores na posição vertical, devem ser seguidos os passos a seguir:
1. Levantar o motor através dos quatro olhais laterais, utilizando duas talhas (conforme Figura 18);

Olhal para tombamento na ponta de eixo, vertical ponta para cima (V6/V36)



Figura 18 - Içamento dos motores HGF, W50 e W51 HD utilizando duas talhas

2. Baixar a talha que está presa à parte dianteira do motor e ao mesmo tempo levantar a talha que está presa no lado traseiro do motor até que o motor atinja o equilíbrio (conforme Figura 19);

Olhais com prolongador fixos na tampa traseira, vertical ponta para baixo (V5/V35).



Figura 19 - Colocação dos motores HGF, W50 e W51 HD na vertical

3. Soltar a talha presa na parte dianteira do motor e girar o motor 180° para possibilitar a fixação da talha solta nos outros dois olhais da parte traseira do motor (conforme Figura 20);



Figura 20 - Suspensão de motores HGF, W50 e W51 HD pelos olhais traseiros

4. Fixar a talha solta nos outros dois olhais da parte traseira do motor e levantá-la até que o motor fique na posição vertical (conforme Figura 21).



Figura 21 - Motores HGF, W50 e W51 HD na posição vertical

Estes procedimentos servem para movimentação de motores construídos para a montagem na posição vertical. Estes mesmos procedimentos podem ser utilizados para a colocação do motor da posição horizontal para a posição vertical e vice-versa.

4.2 PROCEDIMENTO PARA TOMBAMENTO DE MOTORES W22/WEG GENERAL PURPOSE/WIN VERTICAIS

Para realizar o tombamento de motores W22/WEG General Purpose/WIN originalmente na vertical, siga os passos mostrados a seguir:

1. Certificar-se que os olhais estão adequadamente fixos (ver Figura 4);
2. Instalar o primeiro par de olhais e suspender o motor (conforme Figura 22);



Figura 22 - Instalação do primeiro par de olhais

3. Instalar o segundo par de olhais (conforme Figura 23);



Figura 23 - Instalação do segundo par de olhais

4. Reduzir a carga sobre o primeiro par de olhais para iniciar a rotação do motor (conforme Figura 24). Esse procedimento deve ser realizado de forma lenta e cautelosa.



Figura 24 - Motor está sendo girado para a posição horizontal

5. Remover o primeiro par de olhais (conforme Figura 25).



Figura 25 - Resultado final: motor posicionado na posição horizontal

Para os motores da carcaça IEC 112 a 200 (NEMA equivalente), a WEG possui um kit de dispositivos para facilitar o tombamento do motor para a vertical, sendo ele ponta para cima ou para baixo.

Para motores Easy Maintenance, Wash, Motofreio, com ventilação forçada, encoder ou planos de pintura 212 e 213, favor entrar em contato com a WEG.

5. ARMAZENAMENTO

Se os motores não forem instalados imediatamente, recomenda-se armazená-los em local seco com umidade relativa do ar de até 60%, com temperatura ambiente acima de 5 °C e abaixo de 40 °C, isento de poeira, vibrações, gases, agentes corrosivos, com temperatura uniforme, em posição normal e sem apoiar sobre eles outros objetos. Remova polias (caso existam) da ponta de eixo, e as mantenha livre e com graxa protetiva para evitar corrosão. Caso o motor possua resistência de aquecimento, esta deverá ser energizada sempre que o motor não estiver em operação. Isto se aplica também para os casos em que o motor estiver instalado, porém fora de uso por um longo período. Nestas situações, dependendo das condições do ambiente, poderá ocorrer condensação de água no interior do motor, provocando queda na resistência de isolamento. Os motores devem ser armazenados de tal modo que a drenagem seja facilitada (informações adicionais estão disponíveis no item 6).

As resistências de aquecimento nunca devem estar energizadas enquanto o motor estiver operando.

5.1 SUPERFÍCIES USINADAS EXPOSTAS

Todas as superfícies usinadas expostas (por exemplo, ponta de eixo e flange) são protegidas na fábrica por um inibidor de oxidação temporário. Esta película protetora deve ser reaplicada periodicamente durante o período de armazenagem (pelo menos a cada seis meses) ou quando for removida ou estiver deteriorada.

5.2 EMPILHAMENTO

O empilhamento de embalagens durante o armazenamento não deve ultrapassar 5 metros de altura, obedecendo-se aos critérios da Tabela 1:

Tipo de embalagem	Carcaças	Quantidade máxima de empilhamento
Caixa de papelão	IEC 56 a 132 NEMA 143 a 215	Indicada na aba superior da caixa de papelão
Engradado de madeira	IEC 56 a 315 NEMA 48 a 504/5	06
	IEC 355 NEMA 586/7 e 588/9	03
	W40 / W50 / W51 HD / W60 / HGF IEC 315 a 630 W40 / W50 / W51 HD / HGF NEMA 5000 a 9600	Indicado na própria embalagem

Tabela 1 - Empilhamento máximo recomendado

Notas:

1) Não empilhar embalagens maiores sobre menores;

2) Posicionar corretamente uma embalagem sobre a outra (ver Figura 26 e Figura 27);

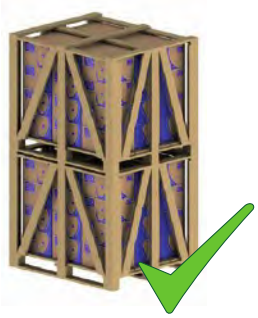


Figura 26 - Montagem adequada



Figura 27 - Montagem inadequada

3) Os pés das embalagens superiores devem estar apoiados sobre calços de madeiras (Figura 28) e não sobre as fitas de aço e nem tampouco ficar sem apoio (Figura 29);



Figura 28 - Empilhamento adequado

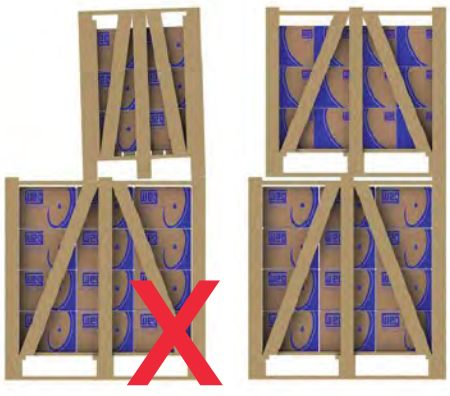


Figura 29 - Empilhamento inadequado

PORTUGUÊS

4) Para o empilhamento de um volume menor sobre um volume maior, acrescentar sarrafos transversais entre os mesmos, quando o maior não oferecer resistência ao peso do menor (ver Figura 30). Esta situação normalmente ocorre com os volumes dos motores de carcaça acima da IEC 225S/M (NEMA 364/5T).



Figura 30 - Utilização de sarrafos adicionais para empilhamento

5.3 MANCAIS

5.3.1 Mancais de rolamento lubrificados a graxa

Recomenda-se girar o eixo do motor pelo menos uma vez ao mês (manualmente, no mínimo cinco voltas, deixando o eixo em posição diferente da original). Nos motores WMagnet e WQuattro, o eixo não gira livremente devido torque de alinhamento dos ímãs. Pode ser necessário o uso de uma alavanca para girar o eixo.

Ao girar o eixo de um motor WMagnet ou WQuattro, deve-se garantir a isolação dos terminais da máquina, devido risco de choque elétrico causado pela tensão induzida durante o procedimento.

Obs.: Caso o motor possua dispositivo de travamento do eixo, este deve ser retirado antes de girar o eixo e ser recolocado novamente antes de transportar o motor.
Motores verticais podem ser armazenados na posição vertical ou na posição horizontal.
Para motores com rolamento aberto armazenados por mais de seis meses, os rolamentos devem ser relubrificados, conforme item 8.2, antes da entrada em operação.
Caso o motor permaneça armazenado por um período superior a dois anos, recomenda-se substituir os rolamentos ou então estes devem ser removidos, lavados, inspecionados e relubrificados (conforme item 8.2).

5.3.2 Mancais de rolamento com lubrificação a óleo

O motor deve ser armazenado na sua posição original de funcionamento e com óleo nos mancais. O nível do óleo deve ser respeitado, permanecendo na metade do visor de nível.
Durante o período de armazenagem, deve-se retirar o dispositivo de travamento do eixo e, mensalmente, rotacionar o eixo manualmente (cinco voltas), para recircular o óleo e conservar o mancal em boas condições. Sendo necessário movimentar o motor, o dispositivo de travamento do eixo deve ser reinstalado.
Para motores armazenados por período igual ou superior ao intervalo de troca de óleo, o óleo deverá ser trocado (conforme item 8.2), antes da entrada em operação.
Caso o motor permaneça armazenado por um período maior que dois anos, recomenda-se substituir os rolamentos ou então estes devem ser removidos, lavados, inspecionados e relubrificados (conforme item 8.2).
O óleo dos mancais dos motores verticais é retirado para evitar vazamento durante o transporte. Após o recebimento, os mancais devem ser lubrificados.

5.3.3 Mancais de rolamento com lubrificação do tipo *Oil Mist*

O motor deve ser armazenado na posição horizontal. Preencher os mancais com óleo mineral ISO VG 68 com a quantidade de óleo indicada na Tabela 2 (também válida para rolamentos com dimensões equivalentes). Após a colocação de óleo nos mancais, gire o eixo (mínimo de cinco voltas).
Durante o período de armazenagem, deve-se retirar o dispositivo de travamento do eixo (quando fornecido) e, semanalmente, rotacionar o eixo manualmente (cinco voltas), deixando o eixo em posição diferente da original. Sendo necessário movimentar o motor, o dispositivo de travamento do eixo deve ser reinstalado.
Caso o motor permaneça armazenado por um período maior que dois anos, recomenda-se substituir os rolamentos ou então estes devem ser removidos, lavados, inspecionados e relubrificados (conforme item 8.2).

Tamanho de rolamento	Quantidade de óleo (ml)	Tamanho de rolamento	Quantidade de óleo (ml)
6201	15	6309	65
6202	15	6311	90
6203	15	6312	105
6204	25	6314	150
6205	25	6315	200
6206	35	6316	250
6207	35	6317	300
6208	40	6319	350
6209	40	6320	400
6211	45	6322	550
6212	50	6324	600
6307	45	6326	650
6308	55	6328	700

Tabela 2 - Quantidade de óleo por rolamento

Durante qualquer manuseio do motor, os mancais devem estar sem óleo. Dessa forma, antes da entrada em operação, todo o óleo dos mancais deve ser drenado. Após a instalação, caso o sistema de névoa não esteja em operação, o óleo deve ser recolocado para garantir a conservação do mancal. Neste caso, deve-se também proceder com o giro semanal do eixo.

5.3.4 Mancais de deslizamento

O motor deve ser armazenado na sua posição original de funcionamento, e com óleo nos mancais. O nível do óleo deve ser respeitado, permanecendo na metade do visor de nível.
Durante o período de armazenagem, deve-se retirar o dispositivo de travamento do eixo e, mensalmente, rotacionar o eixo manualmente (cinco voltas) (e a 30 rpm, no mínimo) para recircular o óleo e conservar o mancal em boas condições de operação. Caso seja necessário movimentar o motor, o dispositivo de travamento do eixo deve ser reinstalado.
Para motores armazenados por período igual ou superior ao intervalo de troca de óleo, o óleo deverá ser trocado, (conforme item 8.2) antes da entrada em operação.
Caso o motor fique armazenado por um período maior que o intervalo de troca de óleo, ou não seja possível rotacionar o eixo do motor, o óleo deve ser drenado e aplicada uma proteção anticorrosiva e desumidificadores.

5.4 RESISTÊNCIA DE ISOLAMENTO

Recomenda-se medir periodicamente a resistência de isolamento dos motores, para assim avaliar as condições de armazenamento sob o ponto de vista elétrico. Se forem observadas quedas nos valores de resistência de isolamento, as condições do armazenamento devem ser analisadas, avaliadas e corrigidas, quando necessário.

5.4.1 Procedimento para medição da resistência de isolamento



A medição da resistência de isolamento deve ser realizada em área segura.

A resistência de isolamento deve ser medida com um megômetro e com o motor parado, frio e completamente desconectado da rede elétrica.



Para evitar o risco de choque elétrico, descarregue os terminais imediatamente antes e depois de cada medição. Caso o motor possua capacitores, estes devem ser descarregados.

É recomendável que cada fase seja isolada e testada separadamente, permitindo que seja feita uma comparação entre a resistência de isolamento em cada fase. Para testar uma das fases, as demais fases devem estar aterradas.
O teste de todas as fases simultaneamente avalia apenas a resistência de isolamento contra o terra. Neste caso não é avaliada a resistência de isolamento entre as fases.
Os cabos de alimentação, chaves, capacitores, e outros equipamentos externos ligados ao motor podem influenciar consideravelmente a medição da resistência de isolamento. Ao realizar estas medições, todos os equipamentos externos devem estar desconectados e aterrados.
A leitura da resistência de isolamento deve ser realizada após a tensão ser aplicada pelo período de um minuto (1 min). A tensão a ser aplicada deve obedecer a Tabela 3.

Tensão nominal do motor (V)	Tensão aplicada para a medição da resistência de isolamento (V)
< 1000	500
1000 - 2500	500 - 1000
2501 - 5000	1000 - 2500
5001 - 12000	2500 - 5000
> 12000	5000 - 10000

Tabela 3 - Tensão para medição da resistência de isolamento

A medição da resistência de isolamento deve ser corrigida para a temperatura de 40 °C conforme Tabela 4.

Temperatura de medição da resistência de isolamento (°C)	Fator de correção da resistência de isolamento para 40 °C	Temperatura de medição da resistência de isolamento (°C)	Fator de correção da resistência de isolamento para 40 °C
10	0,125	30	0,500
11	0,134	31	0,536
12	0,144	32	0,574
13	0,154	33	0,616
14	0,165	34	0,660
15	0,177	35	0,707
16	0,189	36	0,758
17	0,203	37	0,812
18	0,218	38	0,871
19	0,233	39	0,933
20	0,250	40	1,000
21	0,268	41	1,072
22	0,287	42	1,149
23	0,308	43	1,231
24	0,330	44	1,320
25	0,354	45	1,414
26	0,379	46	1,516
27	0,406	47	1,625
28	0,435	48	1,741
29	0,467	49	1,866
30	0,500	50	2,000

Tabela 4 - Avaliação do sistema de isolamento

A condição do isolamento do motor deverá ser avaliada comparando-se o valor medido com os valores da Tabela 5 (referenciados a 40 °C):

Valor limite para tensão nominal até 1,1 kV (MΩ)	Valor limite para tensão nominal acima de 1,1 kV (MΩ)	Situação
Até 5	Até 100	Perigoso, o motor não deve operar nessa condição.
Entre 5 e 100	Entre 100 e 500	Regular
Entre 100 e 500	Acima de 500	Bom
Acima de 500	Acima de 1000	Excelente

Tabela 5 - Avaliação do sistema de isolamento

Os dados indicados na Tabela 5 servem apenas como valores de referências. Sugere-se manter o histórico da resistência de isolamento do motor durante toda a sua vida.
Se a resistência de isolamento estiver baixa, o estator do motor pode estar úmido. Nesse caso, recomenda-se levá-lo até um Assistente Técnico Autorizado WEG para que sejam realizados a avaliação e o reparo adequado. Este serviço não é coberto pelo Termo de Garantia.
Para procedimento de adequação da resistência de isolamento, ver item 8.4.

6. INSTALAÇÃO

A instalação de motores deve ser feita por profissionais capacitados com conhecimentos sobre as normas e as prescrições de segurança.

Antes de continuar com o procedimento de instalação alguns pontos devem ser avaliados:

1. Resistência de isolamento: deve estar dentro dos valores aceitáveis (ver item 5.4).
2. Mancais: Caso o motor seja instalado e não entre em operação imediatamente, proceder com as orientações do item 5.3.
3. Condição dos capacitores de partida: para motores monofásicos armazenados por um período maior que dois anos, é recomendado que seus capacitores de partida sejam substituídos.
4. Caixa de ligação:
   a. Devem estar limpas e secas no seu interior.
   b. Os elementos de contato devem estar isentos de oxidação e corretamente conectados (ver itens 6.9 e 6.10).
   c. As entradas de cabos não utilizadas devem estar corretamente seladas, a tampa da caixa de ligação deve ser fechada e as vedações devem estar em condições apropriadas para atender o grau de proteção do motor.
5. Ventilação: as aletas, a entrada e a saída de ar devem estar limpas e desobstruídas. A distância de instalação recomendada entre as entradas de ar do motor e a parede não deve ser inferior a ¼ (um quarto) do diâmetro da entrada de ar. Deve-se assegurar espaço suficiente para realização de serviços de limpeza (ver item 7).

6. Acoplamento: remover o dispositivo de travamento do eixo (caso exista) e a graxa de proteção contra corrosão da ponta do eixo, incluindo a região da escova de aterramento, e do flange somente pouco antes de instalar o motor (ver item 6.4).
7. Dreno: devem sempre estar posicionados de forma que a drenagem seja facilitada (no ponto mais baixo do motor. Caso exista uma seta indicativa no corpo do dreno, o dreno deve ser montado para que a seta aponte para baixo). Motores com bujões de dreno de borracha, drenos roscados e demais drenos do tipo abre/fecha saem de fábrica na posição fechada e devem ser abertos periodicamente para permitir a saída da água condensada. Para ambientes com elevada condensação de água e motores com grau de proteção IP55, os drenos podem ser montados na posição aberta (ver Figura 31).
   Para motores com grau de proteção IP56, IP65 ou IP66, os drenos devem permanecer na posição fechada (ver Figura 31), sendo abertos apenas durante a manutenção do motor.
   Motores com lubrificação do tipo *Oil Mist* devem ter seus drenos conectados a um sistema de coleta específico (ver Figura 43).

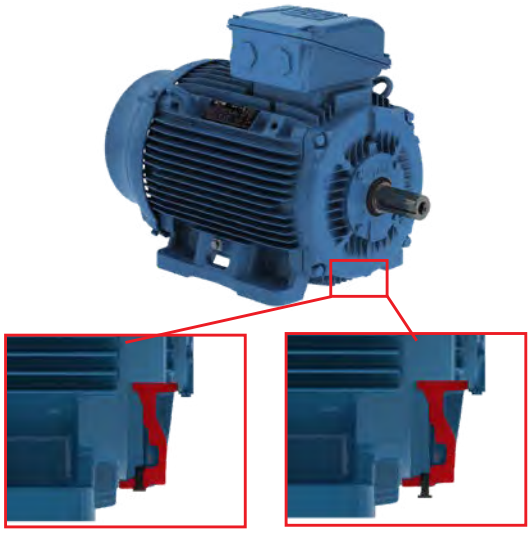


Figura 31 - Detalhe do dreno de borracha montado na posição fechado e aberto.

8. Recomendações adicionais:

a. Confira o sentido de rotação do motor, ligando-o a vazio antes de acoplá-lo à carga.
b. Para motores montados na vertical com a ponta de eixo para baixo, recomenda-se o uso de chapéu para evitar a penetração de corpos estranhos no interior do motor.
c. Para motores montados na vertical com a ponta de eixo para cima, recomenda-se o uso de um defletor de água (water slinger ring) para evitar a penetração de água pelo eixo.
d. Os elementos de fixação montados nos furos roscados passantes no invólucro do motor (como, por exemplo, no flange) devem ser vedados para assegurar o grau de proteção indicado na placa de identificação do motor.

Remova ou fixe completamente a chaveta antes de ligar o motor.

Qualquer alteração construtiva no motor, como instalação de graxeiras prolongadas ou modificação do sistema de lubrificação, instalação de acessórios em pontos alternativos, etc., somente pode ser realizada com prévio consentimento por escrito da WEG.

6.1 FUNDAÇÕES PARA O MOTOR

Fundação é o elemento estrutural, base natural ou preparada, destinada a suportar os esforços produzidos pelos equipamentos instalados, permitindo a operação destes com estabilidade, desempenho e segurança.
O projeto das fundações deve considerar as estruturas adjacentes para evitar influência de um equipamento sobre o outro, a fim de que não ocorra a propagação de vibrações.
A fundação deve ser plana e a sua escolha, detalhamento e execução exige as características:

a) Da construção do próprio equipamento, envolvendo não somente os valores e forma de atuação das cargas, como ainda sua finalidade e limites máximos das deformações e vibrações compatíveis em cada caso (exemplo, motores com valores reduzidos de: nível de vibração, planicidade dos pés, concentricidade do flange, batimento do flange, etc.);
b) Das construções vizinhas, compreendendo o estado de conservação, estimativa das cargas máximas aplicadas, tipo da fundação e fixação empregadas e níveis de vibração transmitidos por estas construções.

Quando o motor for fornecido com parafuso de alinhamento/nivelamento, deverá ser previsto na base uma superfície que permita o alinhamento/nivelamento.

Esforços gerados durante a operação pela carga acionada devem ser considerados como parte do dimensionamento das fundações.
O usuário é totalmente responsável pelo projeto, preparação e execução da fundação.

Os esforços do motor sobre a fundação podem ser calculados pelas equações (ver Figura 32):

$$F_1 = 0,5 * g * m - (4 * C_{máx.} / A)$$
$$F_2 = 0,5 * g * m + (4 * C_{máx.} / A)$$

Onde:

F_1 e F_2 = esforços em cada lado do motor (N);
g = aceleração da gravidade (9,8 m/s^2);
m = massa do motor (kg);
$C_{máx.}$ = torque máximo do motor (Nm);
A = distância entre furos de fixação nos pés do motor (vista frontal) (m).

Os motores podem ser montados sobre:
- Bases de concreto: mais recomendadas e usuais para os motores de grande porte (ver Figura 32);
- Bases metálicas: mais comuns para motores de pequeno porte (ver Figura 33).

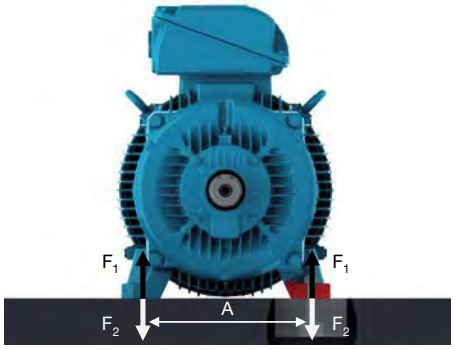
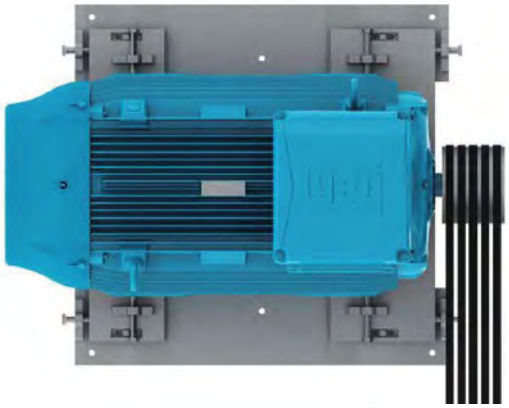


Figura 32 - Motor instalado sobre base de concreto


Figura 33 - Motor instalado sobre base metálica

Nas bases metálicas e de concreto pode existir um sistema de deslizamento. Normalmente são utilizados em aplicações em que o acionamento ocorre por polias e correias. São mais flexíveis permitindo montagens e desmontagens mais rápidas, além de permitir ajustes na tensão da correia. Outro aspecto importante é a posição dos parafusos de travamento da base, que devem ser opostos e na diagonal. O trilho mais próximo da polia motora é colocado de forma que o parafuso de posicionamento fique entre o motor e a máquina acionada. O outro trilho deve ser colocado com o parafuso na posição oposta (diagonal), como apresentado na Figura 34.
Para facilitar a montagem, as bases podem possuir características como:
- Ressaltos e/ou reentrâncias;
- Parafusos de ancoragem com placas soltas;
- Parafusos fundidos no concreto;
- Parafusos de nivelamento;
- Parafusos de posicionamento;
- Blocos de ferro ou de aço, placas com superfícies planas.


Figura 34 - Motor instalado sobre base deslizante.

Recomenda-se também que após a instalação do motor, as partes metálicas expostas sejam protegidas contra oxidação.

6.2 FIXAÇÃO DO MOTOR

Motores sem pés fornecidos com dispositivos de transporte, de acordo com a Figura 35, devem ter seus dispositivos retirados antes de iniciar a instalação do motor.

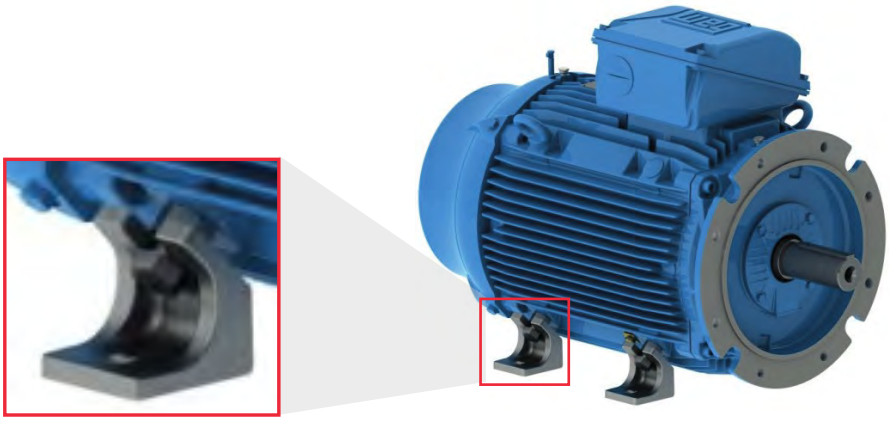


Figura 35 - Detalhe do dispositivo de transporte para motores sem pés

6.2.1 Fixação pelos pés

O dimensional da furação dos pés, baseado nas normas IEC ou NEMA, é informado no catálogo técnico do produto. O motor deve ser apoiado sobre a base, alinhado e nivelado a fim de que não provoque vibrações e esforços excessivos no eixo e nos mancais. Para mais detalhes, consultar item 6.3 e 6.6.
Recomenda-se que o parafuso de fixação tenha comprimento roscado livre de 1,5 vezes o diâmetro do parafuso. Em aplicações severas, pode ser necessária a utilização de um comprimento roscado livre maior. A Figura 36 representa a fixação do motor com pés indicando o comprimento livre mínimo do parafuso.

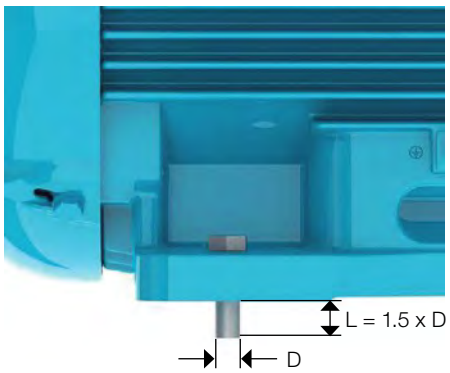


Figura 36 - Representação da fixação do motor por pés

6.2.2 Fixação por flange

O dimensional do flange, baseado nas normas IEC ou NEMA, é informado no catálogo eletrônico ou no catálogo técnico do produto. O flange do motor deve ser apoiado na base, que deve possuir dimensional de encaixe adequado para o tamanho do flange do motor, assegurando assim a a concentricidade do conjunto.
Dependendo do tipo do flange, a fixação pode ser realizada do motor para a base (flange FF (IEC) ou D (NEMA)) ou da base para o motor (flange C (DIN ou NEMA)). Para fixação da base para o motor, a determinação do comprimento do parafuso deve levar em consideração a espessura da base do usuário e a profundidade da rosca do flange do motor.

Nos casos que utilizam flanges de polímero com porca incorporada ou o flange em alumínio com furo sextavado, o comprimento do parafuso de fixação do motor não pode exceder o comprimento do furo, evitando assim desalinhamento e folga do acoplamento.

Nos casos onde a furação do flange é passante, o comprimento do parafuso de fixação do motor não deve exceder o comprimento roscado do flange, evitando assim contato com a bobina do motor.

Motores com com carcaça e/ou flange em alumínio podem ser fornecidos com furos sextavados para fixação do flange, estes furos estão aptos à receber parafusos cilíndricos compatíveis com as dimensões de acoplamento normalizadas, devendo-se atentar à classe mínima de resistência do parafuso, conforme catálogo do produto.
Para fixação do motor à base, recomenda-se que o parafuso de fixação tenha comprimento roscado livre de 1,5 vezes o diâmetro do parafuso. Em aplicações severas, pode ser necessária a utilização de um comprimento roscado livre maior.

Para fixação de motores de grande porte e/ou em aplicações severas, recomenda-se que além da fixação por flange, o motor seja apoiado (por pés ou *pad*). O motor nunca pode ser apoiado sobre suas aletas (ver Figura 37).

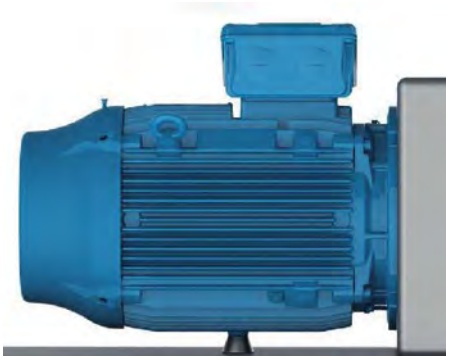


Figura 37 - Representação da fixação do motor com flange e apoio na base da carcaça

Para aplicação de motores com a presença de líquidos no interior do flange (ex.: óleo), a vedação do motor deve ser adequada para impedir a penetração de líquidos para o interior do motor.

Os torques de aperto indicados na Tabela 6 devem ser respeitados para:
- a fixação do pé e/ou flange de polímero no equipamento do cliente para motores W12/WEG General Purpose.
- a instalação de tampas defletoras de polímero de motores WEG General Purpose/WIN e/ou mudança de posição da caixa de ligação de motores W12/WEG General Purpose.

Para instalação de motores W12/WEG General Purpose nas carcaças IEC56, W63 e W71 na posição vertical com ponta de eixo para cima, o pé deve ser travado axialmente através da fixação de um parafuso de cabeça escareada conforme indicado na Tabela 6. O furo hexagonal nos flanges C-DIN de motores W12/WEG General Purpose nas carcaças IEC56/W63/W71 são aptos aos parafusos indicados na Tabela 6.

Carcaça	Componente	Especificação do Parafuso (bitola x comprimento)	Torque (Nm)
IEC56	Pé Polímero	M5x12	8
W63/W71		M5x16	8
IEC56/W63/ W71	Flange Polímero	-	8
	C-80	M5	5
	C-105	M6	6
160/180/200/W225/225/250/W280	Tampa defletora	M8 / M10	6 a 8
IEC 56/W63/W71	Caixa de ligação/Aterramento	M5	1,8 a 2,4
71/W80/90/W100/112/132	Caixa de ligação/Aterramento	M5	5

Tabela 6 - Torques de aperto e parafusos a serem utilizados em motores W12/WEG General Purpose

Para motores da linha WFL, o flange possui furos hexagonais aptos a parafusos M6 (torque máximo 8 Nm), os parafusos devem ter classe de resistência mínima de 5,6. O comprimento dos parafusos utilizados para fixar o motor no equipamento, não deve ultrapassar a espessura das paredes da tampa onde os mesmos são fixos, com risco de danificar a cabeça de bobina do motor e risco de choque elétrico. O parafuso da aplicação deve ser engastado na tampa com profundidade mínima de 7 mm e máxima de 9 mm, conforme indicado na Figura 38.



Figura 38 - Limites de profundidade do engaste

6.2.3 Fixação por *pad*

Esse tipo de fixação é normalmente utilizado em dutos de ventilação. A fixação do motor é feita através de furos roscados na estrutura do motor, cujo dimensional é informado no catálogo eletrônico ou no catálogo técnico do produto.
O dimensionamento da haste de fixação/parafuso do motor deve levar em consideração o dimensional do duto de ventilação ou a base de instalação e a profundidade da rosca no motor. As hastes de fixação e a parede do duto devem ter rigidez suficiente para evitar a vibração excessiva do conjunto (motor e ventilador). A Figura 39 representa a fixação por *pads*.

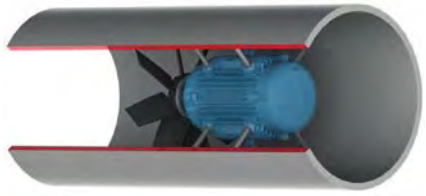


Figura 39 - Representação da fixação do motor no interior de um duto de ventilação

6.3 BALANCEAMENTO

Equipamentos desbalanceados geram vibrações que podem causar danos ao motor. Os motores WEG são balanceados dinamicamente com “meia chaveta” em vazio (desacoplados). Balanceamentos especiais devem ser solicitados no ato da compra.

Os elementos de transmissão tais como polias, acoplamentos, etc., devem ser balanceados antes de serem instalados nos eixos dos motores.

O grau de qualidade de balanceamento do motor segue as normas vigentes para cada linha de produto.
Recomenda-se que os desvios máximos de balanceamento sejam registrados no relatório de instalação.

6.4 ACOPLAMENTOS

Os acoplamentos são utilizados para a transmissão do torque do motor para a máquina acionada. Ao utilizar um acoplamento, devem ser observados os tópicos a seguir:

- Utilizar ferramentas apropriadas para a montagem e desmontagem dos acoplamentos e assim evitar danos ao motor;
- Recomenda-se a utilização de acoplamentos flexíveis, capazes de absorver pequenos desalinhamentos durante a operação do equipamento;
- As cargas máximas e limites de velocidade informados nos catálogos dos fabricantes dos acoplamentos e do motor não devem ser excedidos;
- Realizar o nivelamento e alinhamento do motor conforme itens 6.5 e 6.6, respectivamente.

6.4.1 Acoplamento direto

O acoplamento direto é caracterizado quando o eixo do motor está acoplado diretamente ao eixo da carga acionada, sem o uso de elementos de transmissão. O acoplamento direto apresenta menor custo, maior segurança contra acidentes e ocupa menos espaço.

Em aplicações com acoplamento direto, recomenda-se o uso de rolamentos de esferas.

6.4.2 Acoplamento por engrenagem

O acoplamento por engrenagens é utilizado quando há a necessidade de uma redução de velocidade.
É imprescindível que os eixos estejam perfeitamente alinhados, rigorosamente paralelos (no caso de engrenagens retas) e no ângulo de engrenamento (no caso de engrenagens cônicas ou helicoidais).

6.4.3 Acoplamento por polias e correias

É um tipo de transmissão utilizado quando há a necessidade de uma relação de velocidades entre o motor e a carga acionada.

Uma tensão excessiva nas correias danifica os rolamentos e pode provocar a ruptura do eixo do motor.

6.4.4 Acoplamento de motores equipados com mancais de deslizamento

Motores equipados com mancais de deslizamento devem estar acoplados diretamente à máquina acionada ou por meio de um redutor. Mancais de deslizamento não permitem o acoplamento através de polias e correias.
Os motores equipados com mancais de deslizamento possuem 3 (três) marcas na ponta do eixo, sendo que a marca central é a indicação do centro magnético e as outras 2 (duas) marcas externas indicam os limites de movimento axial permitidos para o rotor, conforme Figura 40.
O motor deve ser acoplado de maneira que a seta fixada na carcaça do mancal fique posicionada sobre a marca central, quando o motor está em operação. Durante a partida, ou mesmo em operação, o rotor pode mover-se livremente entre as duas ranhuras externas, caso a máquina acionada exerça algum esforço axial sobre o eixo do motor. No entanto, em hipótese alguma o motor pode operar de maneira constante com esforço axial sobre o mancal.

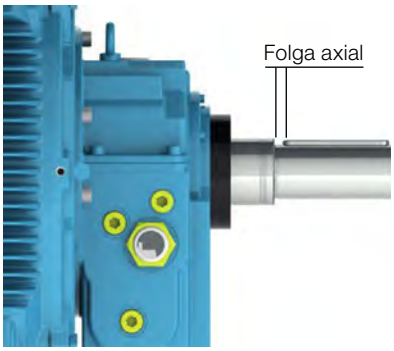


Figura 40 - Folga axial em motor equipado com mancal de deslizamento

Ao avaliar o acoplamento, deve-se considerar a folga axial máxima do mancal (conforme Tabela 7). As folgas axiais da máquina acionada e do acoplamento influenciam na folga máxima do mancal.

Tamanho do mancal	Folga axial total (mm)
9*	3 + 3 = 6
11*	4 + 4 = 8
14*	5 + 5 =10
18	7,5 + 7,5 = 15

Tabela 7 - Folgas utilizadas em mancais de deslizamento

** Para motores conforme a norma API 541, a folga axial total é 12,7 mm.*

Os mancais de deslizamento utilizados pela WEG não foram projetados para suportar esforço axial contínuo. Não é recomendada a operação contínua da máquina nos seus limites da folga axial.

6.5 NIVELAMENTO

O nivelamento do motor deve ser realizado para corrigir eventuais desvios de planicidade, que possam existir provenientes de outros processos e acomodações dos materiais. O nivelamento pode ser feito por meio de um parafuso de nivelamento fixo no pé ou flange do motor ou por meio de finas chapas de compensação. Após o nivelamento, a diferença de altura entre a base de fixação do motor e o motor não deve exceder 0,1 mm.
Caso uma base metálica seja utilizada para ajustar a altura da ponta de eixo do motor com a ponta de eixo da máquina acionada, esta deve ser nivelada na base de concreto.
Recomenda-se que os desvios máximos de nivelamento sejam registrados e armazenados no relatório de instalação.

6.6 ALINHAMENTO

O alinhamento entre a máquina motora e a acionada é uma das variáveis que mais contribuem para prolongar a vida do motor. O desalinhamento entre os acoplamentos geram elevadas cargas que reduzem a vida útil dos mancais, provocam vibrações e, em casos extremos, podem causar a ruptura do eixo. A Figura 41 ilustra o desalinhamento entre o motor e o equipamento acionado.

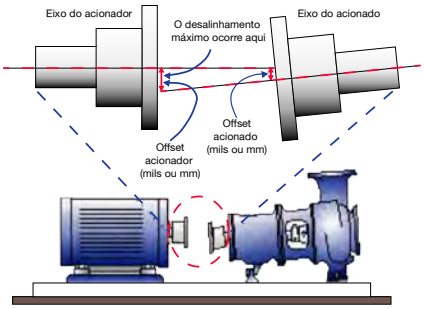


Figura 41 - Condição típica de desalinhamento

Para se efetuar um bom alinhamento do motor, devem-se utilizar ferramentas e dispositivos adequados, como relógio comparador, instrumento de alinhamento a laser, entre outros. O eixo deve ser alinhado axialmente e radialmente com o eixo da máquina acionada

O valor lido em relógios comparadores para o alinhamento, de acordo com a Figura 42, não deve exceder 0,03 mm, considerando um giro completo do eixo. Deve existir uma folga entre os acoplamentos, para compensar a dilatação térmica dos eixos, conforme especificação do fabricante do acoplamento.

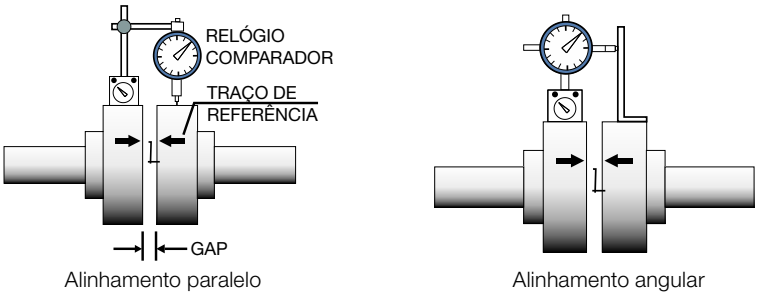


Figura 42 - Alinhamento com relógio comparador

Caso o alinhamento seja realizado através de um instrumento a laser, devem ser seguidas as instruções e recomendações fornecidas pelo fabricante do instrumento.
A verificação do alinhamento deve ser realizada na temperatura ambiente e na temperatura de trabalho dos equipamentos.

É recomendado que o alinhamento dos acoplamentos seja verificado periodicamente.

Para acoplamento por polias e correias, o alinhamento deve ser realizado de tal modo que o centro da polia motora esteja no mesmo plano do centro da polia movida e os eixos do motor e da máquina estejam perfeitamente paralelos.
Após a realização dos procedimentos descritos anteriormente, deve-se certificar de que os dispositivos de montagem do motor não permitam alterações no alinhamento e no nivelamento e não causem danos ao equipamento.
Recomenda-se que os desvios máximos de alinhamento sejam registrados e armazenados no relatório de instalação.

6.7 CONEXÃO DE MOTORES LUBRIFICADOS A ÓLEO OU DO TIPO *OIL MIST*

Nos motores com lubrificação a óleo ou do tipo *oil mist*, deve-se conectar os tubos de lubrificação existentes (entrada, saída do mancal e dreno do motor), conforme indicado na Figura 43.
O sistema de lubrificação deve garantir lubrificação contínua do mancal de acordo com as especificações do fabricante deste sistema.

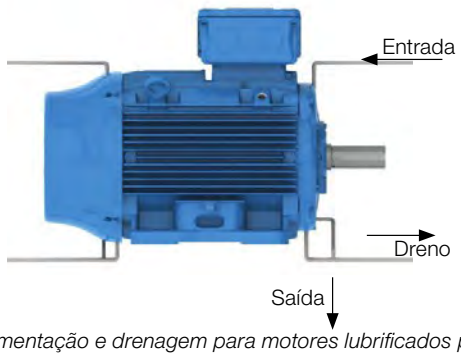


Figura 43 - Sistema de alimentação e drenagem para motores lubrificados por óleo ou do tipo Oil Mist

6.8 CONEXÃO DO SISTEMA DE REFRIGERAÇÃO À ÁGUA

Nos motores com refrigeração à água, deve ser prevista a instalação de dutos na entrada e saída de água do motor para garantir a sua refrigeração. Deve-se observar (conforme item 7.2), a vazão mínima e temperatura da água na instalação.

6.9 CONEXÃO ELÉTRICA

Para o dimensionamento dos cabos de alimentação e dispositivos de manobra e proteção devem ser considerados: corrente nominal do motor, fator de serviço, corrente de partida, condições do ambiente e da instalação, a máxima queda de tensão, etc., conforme as normas vigentes.
Todos os motores devem ser instalados com sistemas de proteção contra sobrecarga. Para motores trifásicos recomenda-se também a instalação de sistemas de proteção contra falta de fase.

Antes de conectar o motor, verificar se a tensão e a frequência da rede são as mesmas marcadas na placa de identificação do motor. Seguir o diagrama de ligação indicado na placa de identificação do motor. Como referência, podem ser seguidos os diagramas de ligação apresentados nas Tabela 8 e Tabela 10. Para evitar acidentes, verificar se o aterramento foi realizado conforme as normas vigentes.

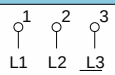
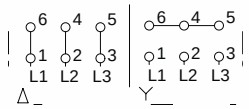
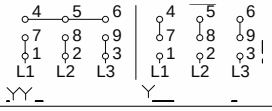
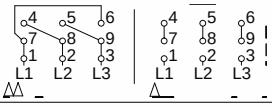
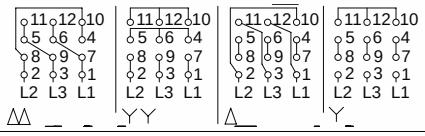
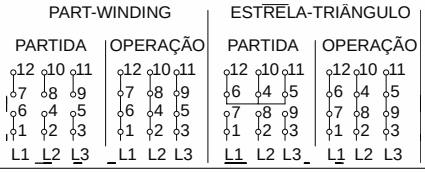
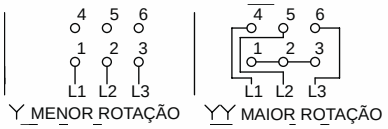
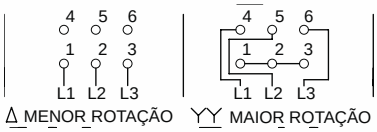
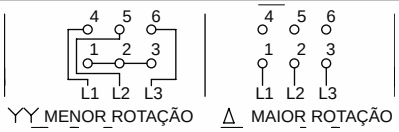
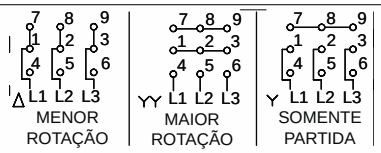
Configuração	Quantidade de cabos	Tipo de ligação	Diagrama de ligação
Velocidade única	3	-	
	6	Δ - Y	
	9	YY - Y	
		ΔΔ - Δ	
	12	ΔΔ - YY - Δ - Y	
		Δ - PWS Partida Part-winding	
Duas velocidades Dahlander	6	YY - Y Torque Variável	
		Δ - YY Torque Constante	
		YY - Δ Potência Constante	
	9	Δ - Y - YY	
Duas velocidades Duplo enrolamento	6	-	

Tabela 8 - Diagramas de ligação usuais para motores trifásicos

Identificação dos cabos no diagrama de ligação		1	2	3	4	5	6	7	8	9	10	11	12
Velocidade única	NEMA MG 1 Parte 2	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
	IEC 60034-8	U1	V1	W1	U2	V2	W2	U3	V3	W3	U4	V4	W4
Duas velocidades (Dahlander e Duplo enrolamento)	NEMA MG 1 Parte 2[1)]	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W
	IEC 60034-8	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W

Tabela 9 - Tabela de equivalências para identificação dos cabos

1) A norma NEMA MG 1 Parte 2 define T1 a T12 para dois ou mais enrolamentos, porém a WEG adota 1U a 4W.

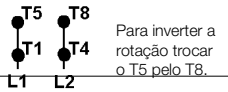
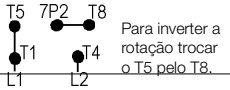
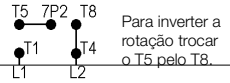
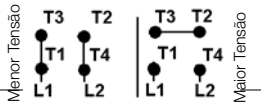
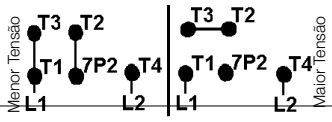
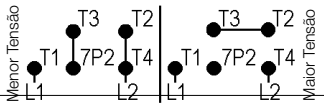
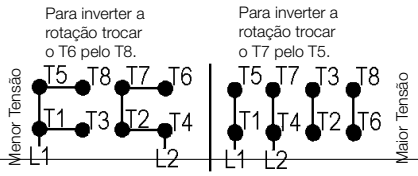
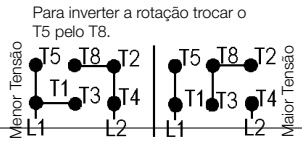
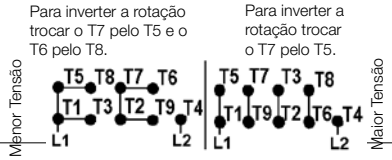
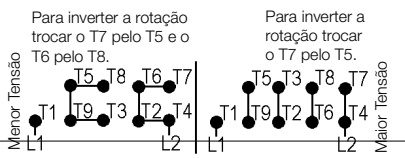
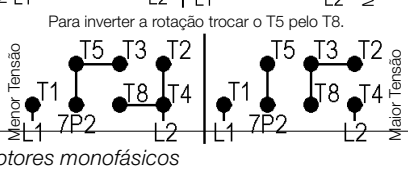
Tensão	Sentido de rotação	Proteção Térmica	Tipo	Diagrama de ligação
Única	Anti-horário ou Horário	Com ou Sem	Capacitores Partida / Permanente / Dois valores	
	Ambos	Sem		 Para inverter a rotação trocar o T5 pelo T8.
		Protetor Térmico Fenólico		 Para inverter a rotação trocar o T5 pelo T8.
		Termostato		 Para inverter a rotação trocar o T5 pelo T8.
Dupla	Anti-horário ou Horário	Sem	Capacitores Partida / Permanente / Dois valores ou Split Phase	
		Protetor Térmico Fenólico		
		Termostato		
	Ambos	Sem	Split Phase (sem capacitor)	 Para inverter a rotação trocar o T6 pelo T8. Para inverter a rotação trocar o T7 pelo T5.
			Capacitores Partida / Permanente / Dois valores	 Para inverter a rotação trocar o T5 pelo T8.
		Protetor Térmico Fenólico	Split Phase (sem capacitor)	 Para inverter a rotação trocar o T7 pelo T5 e o T6 pelo T8. Para inverter a rotação trocar o T7 pelo T5.
			Capacitores Partida / Permanente / Dois valores	 Para inverter a rotação trocar o T5 pelo T8.
		Termostato	Split Phase (sem capacitor)	 Para inverter a rotação trocar o T7 pelo T5 e o T6 pelo T8. Para inverter a rotação trocar o T7 pelo T5.
			Capacitores Partida / Permanente / Dois valores	 Para inverter a rotação trocar o T5 pelo T8.

Tabela 10 - Diagramas de ligação usuais para motores monofásicos

Motores da plataforma W12/WEG General Purpose com tampa da caixa de ligação em polímero tem o esquema de ligação impresso no seu interior e, para realizar a conexão dos cabos, observar na etiqueta de identificação o código do esquema que deve ser utilizado.

Para abrir a tampa da caixa de ligação use uma chave de fenda ou ferramenta similar, posicionando na região do encaixe como uma alavanca e levante o encaixe com cuidado, um de cada vez até que a tampa seja removida.

Assegurar que o motor esteja conectado corretamente à rede de alimentação elétrica através de contatos seguros e permanentes.

AVISO - Normas locais tem prioridade na definição dos padrões de conexão.

As conexões apresentadas abaixo são uma referência para a ligação dos cabos de alimentação do cliente em motores de baixa tensão com placas de bornes. As placas de bornes apresentadas abaixo são o padrão de cada linha, porém variações podem ocorrer. Recomenda-se sempre o uso de terminais em cobre eletrolítico ou latão, similares aos terminais utilizados nos cabos dos motores.

Placa de bornes K1M

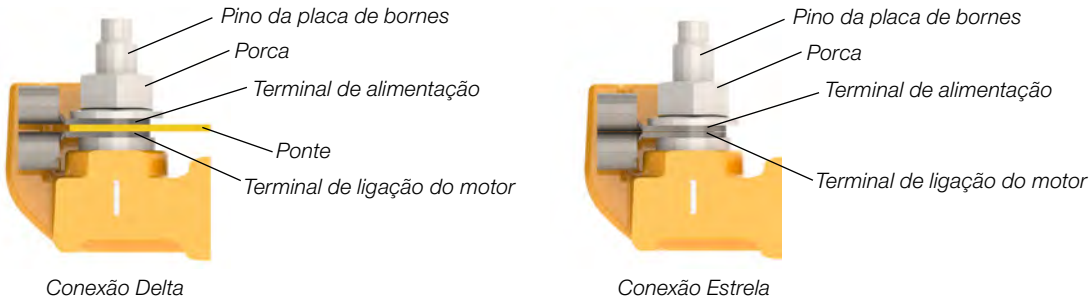


Figura 44 - Conexão dos cabos para motores com placa de bornes K1M

Placas de bornes KWLV e KWMV

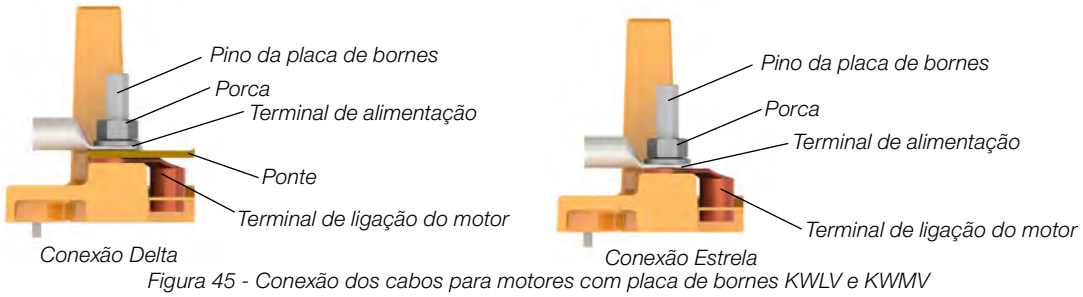


Figura 45 - Conexão dos cabos para motores com placa de bornes KWLV e KWMV

Para motores sem placa de bornes, isolar os cabos terminais do motor, utilizando materiais isolantes compatíveis com a tensão de alimentação e classe de isolamento informadas na placa de identificação.
Para a conexão do cabo de alimentação e do sistema de aterramento devem ser respeitados os torques de aperto indicados na Tabela 44.
A distância de isolação (ver Figura 46) entre partes vivas não isoladas entre si e entre partes vivas e partes aterradas deve respeitar a os valores indicados na Tabela 11.

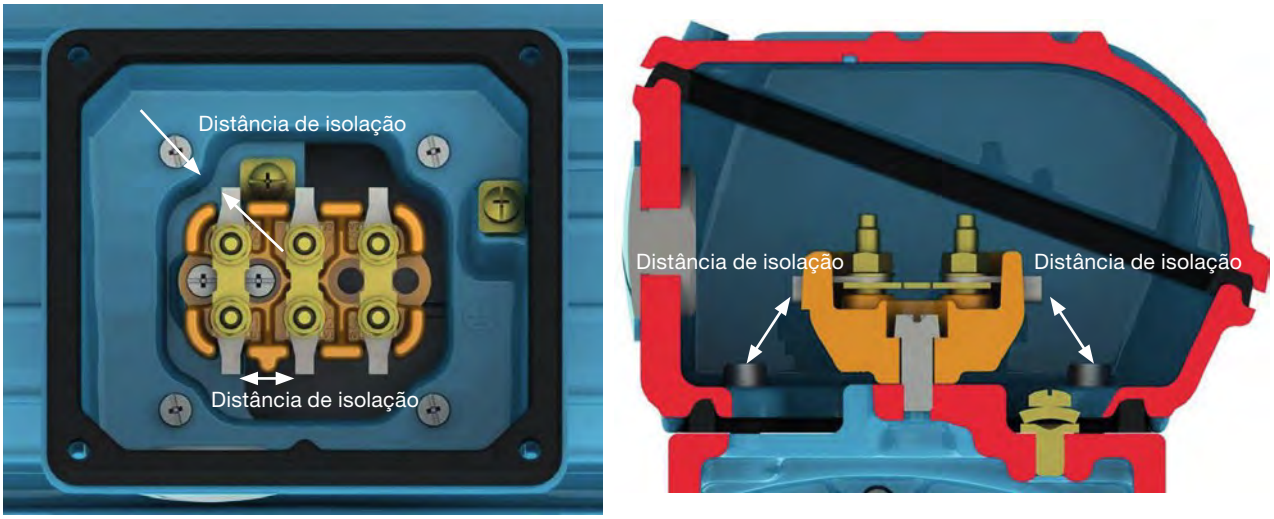


Figura 46 - Representação da distância de isolação.

Tensão	Distância mínima de isolação (mm)
U ≤ 440 V	4
440 < U ≤ 690 V	5.5
690 < U ≤ 1000 V	8
1000 < U ≤ 6900 V	45
6900 < U ≤ 11000 V	70
11000 < U ≤ 16500 V	105

Tabela 11 - Distância mínima de isolação (mm) x tensão de alimentação.

Mesmo com o motor desligado, pode existir energia elétrica no interior da caixa de ligação utilizada para a alimentação das resistências de aquecimento ou inclusive para energizar o enrolamento, quando este estiver sendo utilizado como elemento de aquecimento.
Os capacitores de motores podem reter energia elétrica, mesmo com o motor desligado. Não toque os capacitores e/ou os terminais do motor sem antes verificar a existência de tensão nos mesmos. Para as linhas WMagnet e WQuattro, mesmo com o motor desconectado da alimentação, pode haver tensão nos terminais de ligação caso o rotor se mova.

Após fazer a conexão do motor, certifique-se que nenhum corpo estranho permaneceu no interior da caixa de ligação.

Tomar as medidas necessárias para assegurar o grau de proteção indicado na placa de identificação do motor:
- nas entradas de cabos não utilizadas de caixas de ligação, que devem ser devidamente fechadas com bujões;
- nos componentes fornecidos em avulso (como, por exemplo, caixas de ligação montadas em separado).
As entradas de cabos utilizadas para alimentação e controle devem empregar componentes (como, por exemplo, prensa-cabos e eletrodutos) que atendem as normas e regulamentações vigentes em cada país.

Caso existam acessórios, como freio e ventilação forçada, estes devem ser conectados à rede de alimentação, seguindo as informações de suas placas de identificação e os cuidados indicados anteriormente.

Nos motores com caixa/tampa de ligação em polímero deve-se assegurar que os encaixes e as travas destes componentes estejam corretamente montados após executar a conexão dos cabos.

Em motores que tem knockouts na caixa de ligação, para remover os knockouts em alumínio use uma chave de fenda ou ferramenta similar e um martelo para destacar o knockout, martelando com a chave algumas vezes até remover o knockout. Remova primeiro o knockout interno e depois, se necessário, o externo de acordo com o tamanho do prensa cabos utilizado. Para caixas de ligação de polímero pode ser necessário o uso de uma lâmina ou furadeira para não danificar a caixa. Cuidado, não bata no interior da caixa de ligação e remova os resíduos do knockout destacado do interior da caixa.
Todas as proteções, inclusive as contra sobrecorrente, devem ser ajustadas com base nas condições nominais da máquina. Esta proteção também terá que proteger o motor em caso de curto-circuito, falta de fase, ou rotor bloqueado.
Os ajustes dos dispositivos de segurança dos motores devem ser feitos segundo as normas vigentes.

Verificar o sentido de rotação do motor. Caso não haja nenhuma limitação devido à utilização de ventiladores unidirecionais, é possível mudar o sentido de giro de motores trifásicos, invertendo duas fases de alimentação. Para motores monofásicos, verificar o esquema de ligação na placa de identificação.

6.10 CONEXÃO DOS DISPOSITIVOS DE PROTEÇÃO TÉRMICA

Quando fornecido com dispositivos de proteção ou de monitoramento de temperatura, como: protetor térmico bimetálico (termostatos), termistores, protetores térmicos do tipo Automático, Pt-100 (RTD), etc., seus terminais devem ser conectados aos dispositivos de controle correspondentes, de acordo com as placas de identificação dos acessórios. A não observação desse procedimento pode resultar em cancelamento da garantia e risco para a instalação.

Não aplicar tensão de teste superior a 2,5 V para termistores e corrente maior do que 1 mA para RTDs (Pt-100) de acordo com a norma IEC 60751.

O esquema de ligação dos protetores térmicos bimetálicos (termostatos) e termistores é mostrado nas Figura 47 e Figura 48, respectivamente.

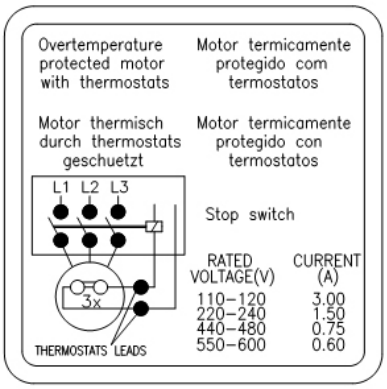


Figura 47 - Conexão dos protetores térmicos bimetálicos (termostatos)

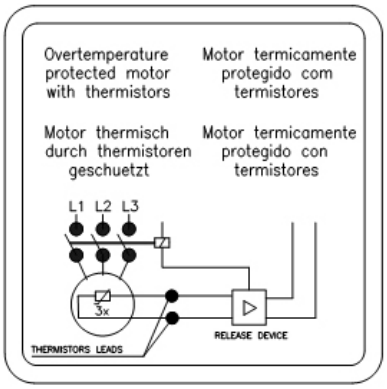


Figura 48 - Conexão dos termistores

Os limites de temperatura de alarme e desligamento das proteções térmicas podem ser definidos de acordo com a aplicação, porém não devem ultrapassar os valores indicados na Tabela 12.

Componente	Classe de isolamento	Temperatura máxima de operação (°C)	
		Alarme	Desligamento
Enrolamento	B	-	130
	F	130	155
	H	155	180
Mancal	Todas	110	120

Tabela 12 - Temperatura máxima de atuação das proteções térmicas

Notas:
1) A quantidade e o tipo de proteção térmica instalados no motor são informados nas placas de identificação dos acessórios do mesmo.
2) No caso de proteção térmica com resistência calibrada (por exemplo, Pt-100), o sistema de proteção deve ser ajustado nas temperaturas de operação indicada na Tabela 12.

6.11 TERMORRESISTORES (Pt-100)

São elementos, cuja operação está baseada na característica de variação da resistência com a temperatura, intrínseca em alguns materiais (geralmente platina, níquel ou cobre).
Possuem resistência calibrada, que varia linearmente com a temperatura, possibilitando um acompanhamento contínuo do processo de aquecimento do motor pelo *display* do controlador, com alto grau de precisão e sensibilidade de resposta. Sua aplicação é ampla nos diversos setores de técnicas de medição e automatização de temperatura das indústrias. Geralmente, aplica-se em instalações de grande responsabilidade, como por exemplo, em regime intermitente muito irregular. O mesmo detector pode servir tanto para alarme como para desligamento. A equivalência entre a resistência do Pt-100 e temperatura é apresentada na Tabela 13 e Figura 50. Na Figura 49 é apresentado o esquema de conexão do Pt-100 para enrolamento.

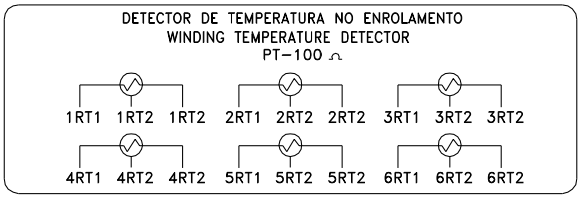


Figura 49 - Esquema de ligação do Pt-100 para enrolamento.

°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-29	88.617	17	106.627	63	124.390	109	141.908	155	159.180
-28	89.011	18	107.016	64	124.774	110	142.286	156	159.553
-27	89.405	19	107.404	65	125.157	111	142.664	157	159.926
-26	89.799	20	107.793	66	125.540	112	143.042	158	160.298
-25	90.193	21	108.181	67	125.923	113	143.420	159	160.671
-24	90.587	22	108.570	68	126.306	114	143.797	160	161.043
-23	90.980	23	108.958	69	126.689	115	144.175	161	161.415
-22	91.374	24	109.346	70	127.072	116	144.552	162	161.787
-21	91.767	25	109.734	71	127.454	117	144.930	163	162.159
-20	92.160	26	110.122	72	127.837	118	145.307	164	162.531
-19	92.553	27	110.509	73	128.219	119	145.684	165	162.903
-18	92.946	28	110.897	74	128.602	120	146.061	166	163.274
-17	93.339	29	111.284	75	128.984	121	146.438	167	163.646
-16	93.732	30	111.672	76	129.366	122	146.814	168	164.017
-15	94.125	31	112.059	77	129.748	123	147.191	169	164.388
-14	94.517	32	112.446	78	130.130	124	147.567	170	164.760
-13	94.910	33	112.833	79	130.511	125	147.944	171	165.131
-12	95.302	34	113.220	80	130.893	126	148.320	172	165.501
-11	95.694	35	113.607	81	131.274	127	148.696	173	165.872
-10	96.086	36	113.994	82	131.656	128	149.072	174	166.243
-9	96.478	37	114.380	83	132.037	129	149.448	175	166.613
-8	96.870	38	114.767	84	132.418	130	149.824	176	166.984
-7	97.262	39	115.153	85	132.799	131	150.199	177	167.354
-6	97.653	40	115.539	86	133.180	132	150.575	178	167.724
-5	98.045	41	115.925	87	133.561	133	150.950	179	168.095
-4	98.436	42	116.311	88	133.941	134	151.326	180	168.465
-3	98.827	43	116.697	89	134.322	135	151.701	181	168.834
-2	99.218	44	117.083	90	134.702	136	152.076	182	169.204
-1	99.609	45	117.469	91	135.083	137	152.451	183	169.574
0	100.000	46	117.854	92	135.463	138	152.826	184	169.943
1	100.391	47	118.240	93	135.843	139	153.200	185	170.313
2	100.781	48	118.625	94	136.223	140	153.575	186	170.682
3	101.172	49	119.010	95	136.603	141	153.950	187	171.051
4	101.562	50	119.395	96	136.982	142	154.324	188	171.420
5	101.953	51	119.780	97	137.362	143	154.698	189	171.789
6	102.343	52	120.165	98	137.741	144	155.072	190	172.158
7	102.733	53	120.550	99	138.121	145	155.446	191	172.527
8	103.123	54	120.934	100	138.500	146	155.820	192	172.895
9	103.513	55	121.319	101	138.879	147	156.194	193	173.264
10	103.902	56	121.703	102	139.258	148	156.568	194	173.632
11	104.292	57	122.087	103	139.637	149	156.941	195	174.000
12	104.681	58	122.471	104	140.016	150	157.315	196	174.368
13	105.071	59	122.855	105	140.395	151	157.688	197	174.736
14	105.460	60	123.239	106	140.773	152	158.061	198	175.104
15	105.849	61	123.623	107	141.152	153	158.435	199	175.472
16	106.238	62	124.007	108	141.530	154	158.808	200	175.840

Tabela 13 - Equivalência entre a resistência do Pt-100 e temperatura

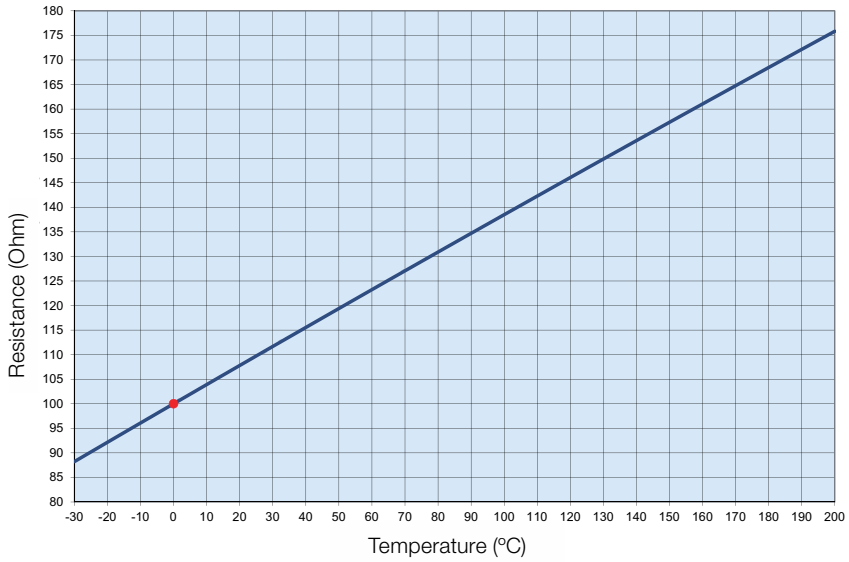


Figura 50 - Resistência ôhmica do Pt-100 x temperatura

6.12 CONEXÃO DA RESISTÊNCIA DE AQUECIMENTO

Antes de ligar a resistência de aquecimento, deve ser observado o esquema de ligação da resistência de aquecimento disponível na placa de identificação adicional. Para motores fornecidos com resistência de aquecimento que permite a sua ligação em duas tensões, ver Figura 51.

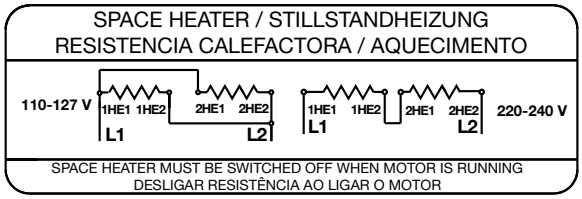


Figura 51 - Esquema de ligação da resistência de aquecimento para tensão 110-127/220-240 V.

As resistências de aquecimento nunca devem estar energizadas enquanto o motor estiver operando.

6.13 MÉTODOS DE PARTIDA

Sempre que possível, a partida do motor deve ser direta (em plena tensão). É o método mais simples, no entanto, somente é viável quando a corrente de partida não afeta a rede de alimentação. É importante seguir as regras vigentes da concessionária de energia elétrica.

Nos casos em que a corrente de partida do motor é alta, podem ocorrer as seguintes consequências:

a) Elevada queda de tensão no sistema de alimentação da rede, provocando interferência nos equipamentos instalados neste sistema;

b) O superdimensionamento do sistema de proteção (cabos, contatores), o que eleva os custos da instalação.

Caso a partida direta não seja possível devido aos problemas citados acima, pode-se usar o método de partida indireta compatível com a carga e a tensão do motor, para reduzir a corrente de partida.

Quando é utilizado um método de partida com tensão reduzida, o torque de partida do motor também será reduzido.

A Tabela 14 indica os métodos de partida indireta possíveis de serem utilizados de acordo com a quantidade de cabos do motor.

Quantidade de cabos	Métodos de partidas possíveis
3 cabos	Chave Compensadora Soft-starter
6 cabos	Chave Estrela - Triângulo Chave Compensadora Soft-starter
9 cabos	Chave Série - Paralela Chave Compensadora Soft-starter
12 cabos	Chave Estrela - Triângulo Chave Série - Paralela Chave Compensadora Soft-starter

Tabela 14 - Métodos de partida x quantidade de cabos

A Tabela 15 indica exemplos de métodos de partida indireta possíveis de serem utilizados, de acordo com a tensão indicada na placa de identificação do motor e a tensão da rede elétrica.

Tensão da placa de identificação	Tensão da rede elétrica	Partida com chave Estrela - Triângulo	Partida com chave Compensadora	Partida com chave Série - Paralela	Partida com Soft-Starter
220/380 V	220 V 380 V	SIM NÃO	SIM SIM	NÃO NÃO	SIM SIM
220/440 V	220 V 440 V	NÃO NÃO	SIM SIM	SIM NÃO	SIM SIM
230/460 V	230 V 460 V	NÃO NÃO	SIM SIM	SIM NÃO	SIM SIM
380/660 V	380 V	SIM	SIM	NÃO	SIM
220/380/440 V	220 V 380 V 440 V	SIM NÃO SIM	SIM SIM SIM	SIM SIM NÃO	SIM SIM SIM

Tabela 15 - Métodos de partida x tensão

Outro método de partida possível que não sobrecarregue a rede de alimentação é a utilização de um inversor de frequência. Para mais informações sobre motores alimentados com inversor de frequência ver item 6.14.

6.14 MOTORES ALIMENTADOS POR INVERSOR DE FREQUÊNCIA

A operação com inversor de frequência deve ser informada no momento da compra devido a possíveis diferenças construtivas necessárias para esse tipo de acionamento.

Motores WMagnet devem ser acionados somente por inversor de frequência. Os motores WQuattro devem ser acionados diretamente a partir da rede ou ser acionados por inversor de frequência em modo escalar.

O conversor utilizado para acionar motores com tensão de alimentação até 690 V deve possuir modulação PWM com controle vetorial.
Quando um motor opera com inversor de frequência abaixo da frequência nominal, é necessário reduzir o torque fornecido pelo motor a fim de evitar sobreaquecimento. Os valores de redução de torque (derating torque) podem ser encontrados no item 6.4 do "Guia Técnico Motores de Indução Alimentados por Inversores de Frequência PWM" disponível em www.weg.net.

Para operação acima da frequência nominal deve ser observado:
- Operação com potência constante;
- O motor pode fornecer no máximo 95% da potência nominal;
- Respeitar a rotação máxima, considerando os seguintes critérios:
  - Máxima frequência de operação informada na placa adicional;
  - Limite de rotação mecânica do motor.

Para motores WMagnet acionados por inversores que não sejam WEG, além do limite de rotação informado na folha de dados do motor, deve ser verificado o limite máximo de rotação permitida para evitar queima do inversor no caso de falta de energia. Deve ser considerado conforme equação abaixo:

$$RPM_{máx} = \frac{0.9 * V_{rmsMáx} * 1000}{ke}$$

Sendo,
$RPM_{máx}$ – Rotação máxima permitida para evitar queima do inversor no caso de falta de energia em [RPM].
$V_{rmsMáx}$ – Tensão rms de entrada máxima do inversor, conforme informado pelo fabricante do inversor em [V].
ke – Parâmetro informado na placa e na folha de dados do motor em [V/kRPM].

Recomendações para os cabos de conexão entre motor e inversor são indicadas no item 6.8 do "Guia Técnico Motores de Indução Alimentados por Inversores de Frequência PWM" disponível em www.weg.net.

6.14.1 Uso de filtros (dV/dt)

6.14.1.1. Motor com fio circular esmaltado

Motores com tensão nominal de até 690 V, quando alimentados por inversores de frequência, não requerem filtros, se observados os critérios da Tabela 16.

Tensão de operação do motor[1]	Tensão de pico no motor (max)	dV/dt na saída do conversor (max)	Rise Time[2] do conversor (mín)	MTBP[2] Tempo entre pulsos (min)
Vnom < 460 V	≤ 1600 V	≤ 5200 V/µs	≥ 0,1 µs	≥ 6 µs
460 ≤ Vnom < 575 V	≤ 2000 V	≤ 6500 V/µs		
575 ≤ Vnom ≤ 1000 V	≤ 2400 V	≤ 7800 V/µs		

Tabela 16 - Critérios para utilização de motores de fio circular esmaltado alimentados por inversor de frequência

1. Para motores com dupla tensão, exemplo 380/660 V, devem ser observados os critérios da tensão menor (380 V).
2. Informações fornecidas pelo fabricante do inversor.

6.14.1.2. Motor com bobina pré-formada

Motores com bobina pré-formada (média e alta tensão, independente do tamanho da carcaça e baixa tensão a partir da carcaça IEC 315 / NEMA 50) específicos para utilização com inversor de frequência não requerem filtros, se observados os critérios da Tabela 17.

Tensão de operação do motor	Tipo de modulação	Isolação da espira (fase-fase)		Isolação principal (fase-terra)	
		Tensão de pico nos terminais do motor	dV/dt nos terminais do motor	Tensão de pico nos terminais do motor	dV/dt nos terminais do motor
690 < Vnom ≤ 4160 V	Senoidal	≤ 5900 V	≤ 500 V/µs	≤ 3400 V	≤ 500 V/µs
	PWM	≤ 9300 V	≤ 2700 V/µs	≤ 5400 V	≤ 2700 V/µs
4160 < Vnom ≤ 6600 V	Senoidal	≤ 9300 V	≤ 500 V/µs	≤ 5400 V	≤ 500 V/µs
	PWM	≤ 14000 V	≤ 1500 V/µs	≤ 8000 V	≤ 1500 V/µs

Tabela 17 - Critérios para utilização de motores com bobina pré-formada alimentados com inversor de frequência

6.14.2 Isolamento dos mancais

Recomenda-se isolar os mancais para operação com inversor de frequência de acordo com a Tabela 18.

Carcaça	Recomendação
IEC 315 e 355 NEMA 445/7 a L5810/11	Um mancal isolado Aterramento entre eixo e carcaça por meio de escova
IEC 400 e acima NEMA 6800 e acima	Mancal traseiro isolado Aterramento entre eixo e carcaça por meio de escova

Tabela 18 - Recomendação sobre o isolamento dos mancais para motores acionados por inversor de frequência

Para motores fornecidos com sistema de aterramento do eixo, deve ser observado constantemente o estado de conservação da escova e, ao chegar ao fim de sua vida útil, a mesma deve ser substituída por outra de mesma especificação.
Se um motor é fornecido com uma escova de aterramento interna, identificado por uma etiqueta no produto, é necessário que esta seja verificada toda vez que ocorrer manutenção dos rolamentos ou qualquer parte interna do motor.
Motores das carcaças IEC 315, NEMA 445/7 e acima, quando acionados por inversor de frequência, devem ser equipados com kits de aterramento para o eixo.

Para motores de área segura e para fins de testes de verificação, pinos de contato podem ser instalados dos dois lados do isolamento do mancal, de modo a permitir a realização de medições da tensão sobre o mancal, ou, caso os pinos sejam conectados por um cabo ou cordoalha metálica (curto-circuitando o isolamento do mancal), da corrente pelo mancal. Deve-se observar, porém, que durante a operação normal do motor o isolamento do mancal não deve estar curto-circuitado (Figura 52).



Figura 52 - Cordoalha metálica

6.14.3 Frequência de chaveamento

A frequência mínima de chaveamento do inversor deverá ser de 2 kHz.
Recomenda-se que a frequência máxima de chaveamento do conversor seja de 5 kHz.

A não observação dos critérios e recomendações expostos neste manual pode resultar na anulação da garantia do produto.

6.14.4 Limite da rotação mecânica

As Tabela 19, Tabela 20, Tabela 21, Tabela 22 e Tabela 23 mostram as rotações máximas permitidas para motores acionados por inversor de frequência. Para motores WMagnet, consultar a folha de dados do motor ou entrar em contato com a WEG.

Carcaça		Polaridade	Rotação máxima
NEMA	IEC		
5810/11	315	2	3600
		4	2000
		6	
L5810/11	355	2	3600
		4	1800
		6	
6810/11	400	2	3600
		4	1800
		6	1700

Tabela 19 - Rotação máxima dos motores W60 (em RPM)

Carcaça		Polaridade	Rotação máxima
NEMA	IEC		
5009/10	315	2	3600
		4	2200
		6	
5809/10	355	2	3600
		4	1900
		6	
6806/07-6808/09	400	2	3600
		4	1800
		6	1700

Tabela 20 - Rotação máxima dos motores W50 (em RPM)

Carcaça		Polaridade	Rotação máxima
NEMA	IEC		
254	160	2	5.200
		4	
		6	
284	180	2	4.800
		4	4.400
		6	
324/6	200L	2	3.700
		4	
		6	
364/5	225	2	3.600
		4	
		6	
404/5	250	2	3.700
		4	3.200
		6	
444/5 - 447/9	280	2	3.700
		4	2.400
		6	
5010/11	315	2	3.600
		4	2.400
L5010/11	355	2	3.600
		4	2.000
L5810/11	400	2	3.600
		4	1.800

Tabela 21 - Rotação máxima dos motores W40 (em RPM)

Carcaça		Polaridade	Rotação máxima
NEMA	IEC		
-	63	2	12.300
		4	
		6	
-	71	2	11.300
		4	
		6	
-	80	2	10.300
		4	
		6	
143/5	90S	2	8.600
		4	
		6	
-	100L	2	7.800
		4	
		6	
182/4	112	2	7.600
		4	7.100
		6	
213/5	132	2	6.000
		4	5.900
		6	
254/6	160	2	5.300
		4	5.000
		6	
284/6	180	2	4.400
		4	
		6	
324/6	200L	2	4.200
		4	4.000
		6	
364/5	225	2	3.600
		4	3.200
		6	
404/5	250	2	3.600
		4	3.200
		6	
444/5 - 445/7	280	2	3.600
		4	3.200
		6	
447/9 - L447/9	-	2	-
		4	
		6	
504/5	315	2	3.600
		4	2.300
		6	
586/7 - 588/9	355	2	3.600
		4	1.900
		6	

Tabela 23 - Rotação máxima dos motores W22 (em RPM)

Carcaça	Polaridade	Rotação máxima
NEMA		
W56	2	13600
	4	13600
56	2	12000
	4	12000
	6	13600
56H	2	12000
	4	12000
	6	10900
143/5T	2	10400
	4	10400
	6	10400
182/4T	2	8800
	4	8800
	6	8800
213/5T	2	6800
	4	6800
	6	6800
254/6T	2	5300
	4	5300
	6	5300

Tabela 22 - Rotação máxima dos motores W01 (em RPM)

Notas:
1. *Quando o motor possuir vedações do tipo retentor ou Inproseal, entrar em contato com a WEG.*
2. *Para rotações acima da nominal, medir a vibração e a temperatura do mancal, se a temperatura e níveis de vibração ultrapassarem os limites especificados, contatar a WEG.*
3. *Verificar modelo do rolamento dianteiro na placa do motor*
4. *Condições diferentes das descritas nas Tabelas 19 a 23, consultar WEG.*

Para mais informações sobre o uso de inversor de frequência, ou como dimensioná-lo corretamente para a sua aplicação, favor contatar a WEG ou o "Guia Técnico Motores de Indução Alimentados por Inversores de Frequência PWM" disponível em www.weg.net.

7. OPERAÇÃO

7.1 PARTIDA DO MOTOR

Após executar os procedimentos de instalação, alguns aspectos devem ser verificados antes da partida inicial do motor, principalmente se o motor não foi colocado imediatamente em operação após sua instalação. Aqui devem ser verificados os seguintes itens:

- Se os dados que constam na placa de identificação (tensão, corrente, esquema de ligação, grau de proteção, refrigeração, fator de serviço, entre outras) estão de acordo com a aplicação;
- A correta montagem e alinhamento do conjunto (motor + máquina acionada);
- O sistema de acionamento do motor, considerando que a rotação do motor não ultrapasse a velocidade máxima estabelecida na Tabela 19, Tabela 20, Tabela 21, Tabela 22 e Tabela 23;
- A resistência de isolamento do motor, conforme item 5.4;
- O sentido de rotação do motor;
- A integridade da caixa de ligação, que deve estar limpa e seca, seus elementos de contato isentos de oxidação, suas vedações em condições apropriadas de uso e suas entradas de cabos corretamente fechadas/protegidas de acordo com o grau de proteção;
- As conexões do motor, verificando se foram corretamente realizadas, inclusive aterramento e cabos auxiliares, conforme recomendações do item 6.9;
- O correto funcionamento dos acessórios (freio, encoder, proteção térmica, ventilação forçada, etc.) instalados no motor;
- A condição dos rolamentos. Para motores armazenados e/ou instalados há mais de dois anos, mas que não entraram em operação, recomenda-se trocar os rolamentos, ou então, removê-los, lavá-los, inspecioná-los, e relubrificá-los antes de serem colocados em operação.
  Caso o armazenamento e/ou instalação tenham sido realizados conforme recomendações do item 5.3, realizar o procedimento de relubrificação conforme descrito no item 8.2. Para uma avaliação dos rolamentos podem ser utilizadas as técnicas de análise de vibração através de envelope ou demodulação;
- Nos motores com mancais de rolamento com lubrificação a óleo deve ser assegurado:
  - O nível correto de óleo do mancal. O mesmo deve estar na metade do visor (ver Figura 54 e Figura 55);
  - Que quando o motor for armazenado por período igual ou maior ao intervalo de troca de óleo, o óleo deverá ser trocado antes da colocação em funcionamento;
- Nos motores com mancais de deslizamento deve ser assegurado:
  - O nível correto de óleo do mancal. O mesmo deve estar na metade do visor (ver Figura 56);
  - Que o motor não parte e nem opere com cargas radiais ou axiais;
  - Que quando o motor for armazenado por período igual ou maior ao intervalo de troca de óleo, o óleo deverá ser trocado antes da colocação em funcionamento;
- A análise da condição dos capacitores, se existirem. Para motores instalados por um período superior a dois anos, mas que não entraram em operação, recomenda-se a substituição de seus capacitores de partida de motores monofásicos;
- Que entradas e saídas de ar estejam completamente desobstruídas. O mínimo espaço livre até a parede mais próxima (L) deve ser ¼ do diâmetro da entrada de ar da defletora (D), conforme Figura 53. O ar na entrada do motor deve estar na temperatura ambiente.

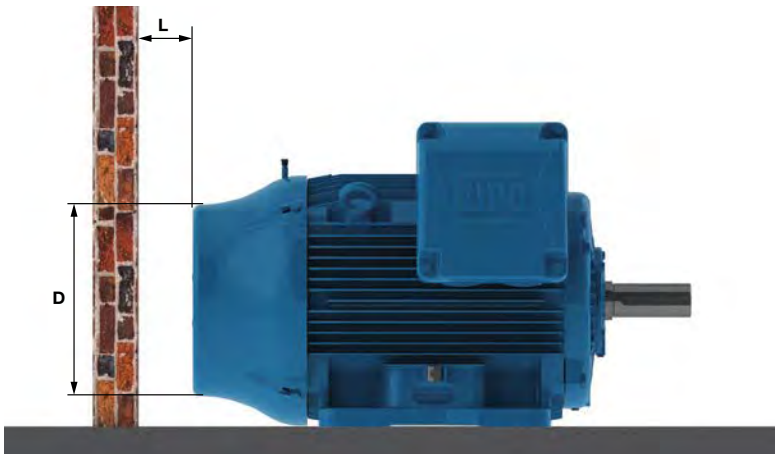


Figura 53 - Distancia mínima do motor até a parede

Como referência, podem ser seguidas as distâncias mínimas apresentadas na Tabela 24:

Carcaça		Distância entre a tampa defletora e a parede (L)	
IEC	**NEMA**	**mm**	**Inches**
63	-	25	0,96
71	-	26	1,02
80	-	30	1,18
90	143/5	33	1,30
100	-	36	1,43
112	182/4	41	1,61
132	213/5	50	1,98
160	254/6	71	2,79
180	284/6	72	2,83
200 / W225	324/6	83	3,27
225 250	364/5 404/5	92	3,62
280	444/5 445/7 447/9	108	4,23
315	L447/9 504/5 5006/7/8 5009/10/11	122	4,80
355	586/7 588/9 5807/8/9 5810/11/12	136	5,35
400	6806/7/8 6809/10/11	147	5,79
450	7006/10	159	6,26
500	8006/10	171	6,73
560	8806/10	185	7,28
630	9606/10	200	7,87

Tabela 24 - Rotação máxima dos motores W22 (em RPM)

- Que as vazões e temperaturas da água estejam corretas, quando uitlizadas na refrigeração do motor. Ver item 7.2.
- Que todas as partes girantes, como polias, acoplamentos, ventiladores externos, eixo, etc., estejam protegidas contra toques acidentais.

Outros testes e verificações que não constam nesta relação podem se fazer necessários, em função das características específicas da instalação, aplicação e/ou do motor.

Após todas as verificações terem sido realizadas, seguir o procedimento a seguir para efetuar a partida do motor:

- Ligar a máquina sem nenhuma carga (quando possível), acionando a chave de partida como se fosse um pulso, verificando o sentido de rotação, a presença de ruído, vibração ou outra condição anormal de operação;
- Religar o motor, que deve partir e funcionar de maneira suave. Caso isso não ocorra, desligue o motor, verifique novamente o sistema de montagem e conexões antes de uma nova partida.
- No caso de vibrações excessivas, verificar se os parafusos de fixação estão adequadamente apertados ou se a vibração é proveniente de máquinas adjacentes. Verificar periodicamente a vibração, respeitando os limites apresentados no item 7.2.1;
- Operar o motor sob carga nominal por um pequeno período de tempo e comparar a corrente de operação com a corrente indicada na placa de identificação;
- Recomenda-se ainda que algumas variáveis do motor sejam acompanhadas até seu equilíbrio térmico: corrente, tensão, temperatura nos mancais e na superfície externa da carcaça, vibração e ruído;
- Recomenda-se que os valores de corrente e tensão sejam registrados no relatório de instalação.

Devido ao valor elevado da corrente de partida dos motores de indução, o tempo gasto na aceleração nas cargas de inércia apreciável resulta na elevação rápida da temperatura do motor. Se o intervalo entre partidas sucessivas for muito reduzido, isso resultará no aumento da temperatura nos enrolamentos, danificando-os ou reduzindo a sua vida útil. Caso não seja especificado regime de serviço diferente de S1 / CONT. na placa de identificação do motor, os motores estão aptos para:

- Duas partidas sucessivas, sendo a primeira feita com o motor frio, isto é, com seus enrolamentos na temperatura ambiente e uma segunda partida logo a seguir, porém após o motor ter desacelerado até atingir seu repouso;
- Uma partida com o motor a quente, ou seja, com os enrolamentos na temperatura de regime.

O item 10 lista alguns problemas de mau funcionamento do motor, com suas possíveis causas.

7.2 CONDIÇÕES DE OPERAÇÃO

Caso nenhuma outra condição seja informada no momento da compra, os motores elétricos são projetados para operar a uma altitude limitada a 1000 m acima do nível do mar e em temperatura ambiente entre -20 °C e +40 °C. Qualquer variação das condições do ambiente, onde o motor irá operar, deve estar indicada na placa de identificação do motor.

Alguns componentes precisam ser trocados quando a temperatura ambiente é diferente da indicada acima. Favor contatar a WEG para verificar as características especiais.

Para temperaturas e altitudes diferentes das indicadas acima, deve-se utilizar a Tabela 25 para encontrar o fator de correção que deverá ser utilizado para definir a potência útil disponível (Pmax = Pnom x Fator de correção).

T (°C)	Altitude (m)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
10							0,97	0,92	0,88
15						0,98	0,94	0,90	0,86
20					1,00	0,95	0,91	0,87	0,83
25				1,00	0,95	0,93	0,89	0,85	0,81
30			1,00	0,96	0,92	0,90	0,86	0,82	0,78
35		1,00	0,95	0,93	0,90	0,88	0,84	0,80	0,75
40	1,00	0,97	0,94	0,90	0,86	0,82	0,80	0,76	0,71
45	0,95	0,92	0,90	0,88	0,85	0,81	0,78	0,74	0,69
50	0,92	0,90	0,87	0,85	0,82	0,80	0,77	0,72	0,67
55	0,88	0,85	0,83	0,81	0,78	0,76	0,73	0,70	0,65
60	0,83	0,82	0,80	0,77	0,75	0,73	0,70	0,67	0,62
65	0,79	0,76	0,74	0,72	0,70	0,68	0,66	0,62	0,58
70	0,74	0,71	0,69	0,67	0,66	0,64	0,62	0,58	0,53
75	0,70	0,68	0,66	0,64	0,62	0,60	0,58	0,53	0,49
80	0,65	0,64	0,62	0,60	0,58	0,56	0,55	0,48	0,44

Tabela 25 - Fatores de correção considerando a altitude e a temperatura ambiente

O ambiente no local de instalação deverá ter condições de renovação de ar da ordem de 1 m³ por segundo para cada 100 kW ou fração de potência do motor. Para motores ventilados, que não possuem ventilador próprio, a ventilação adequada do motor é de responsabilidade do fabricante do equipamento. Caso não haja especificação da velocidade de ar mínima entre as aletas do motor em uma placa de identificação, devem ser seguidos os valores indicados na Tabela 26. Os valores apresentados na Tabela 26 são válidos para motores aletados alimentados na frequência de 60 Hz. Para obtenção das velocidades mínimas de ar em 50 Hz deve-se multiplicar os valores da tabela por 0,83.

Carcaça		Polos			
IEC	NEMA	2	4	6	8
56 a 90	143/5	13	7	5	4
100 a 132	182/4 e 213/5	18	12	8	6
160 a 200	254/6 a 324/6	20	15	10	7
225 a 280	364/5 a 444/5	22	20	15	12
315 a 450	445/7 a 7008/9	25	25	20	15

Tabela 26 - Velocidade mínima de ar entre as aletas do motor (m/s)

As variações da tensão e frequência de alimentação podem afetar as características de desempenho e a compatibilidade eletromagnética do motor. Estas variações de alimentação devem seguir os valores estabelecidos nas normas vigentes. Exemplos:

- ABNT NBR 17094 - Partes 1 e 2. O motor está apto a fornecer torque nominal, sob as seguintes zonas de variação de tensão e frequência:
  - Zona A: ±5% de tensão e ±2% de frequência;
  - Zona B: ±10% de tensão e +3% -5% de frequência.

Quando operado na Zona A ou B, o motor pode apresentar variações de desempenho e atingir temperaturas mais elevadas. Estas variações são maiores para a operação na zona B. Não é recomendada uma operação prolongada do motor na zona B.

- IEC 60034-1. O motor está apto a fornecer torque nominal, sob as seguintes zonas de variação de tensão e frequência:
  - Zona A: ±5% de tensão e ±2% de frequência;
  - Zona B: ±10% de tensão e +3% -5% de frequência.

Quando operado na Zona A ou B, o motor pode apresentar variações de desempenho e atingir temperaturas mais elevadas. Estas variações são maiores para a operação na zona B. Não é recomendada a operação prolongada do motor na zona B. Para motores multitensão (exemplo 380-415/660 V) é permitida uma variação de tensão de ±5%.

- NEMA MG 1 Parte 12. O motor está apto a operar em uma das seguintes variações:
  - ±10% de tensão, com frequência nominal;
  - ±5 de frequência, com tensão nominal;
  - Uma combinação de variação de tensão e frequência de ±10%, desde que a variação de frequência não seja superior a ±5%.

Para motores que são resfriados através do ar ambiente, as entradas e saídas de ar devem ser limpas em intervalos regulares para garantir uma livre circulação do ar, já que o ar quente não deve retornar para o motor. O ar utilizado para refrigeração do motor deve estar na temperatura ambiente, limitada a faixa de temperatura indicada na placa de identificação do motor (quando não indicado, considerar uma faixa de temperatura entre -20 °C e +40 °C).
Para motores refrigerados à água, os valores da vazão da água para cada tamanho de carcaça, bem como a máxima elevação de temperatura da água após circular pelo motor são mostrados na Tabela 27. A temperatura da água na entrada não deve exceder 40 °C.

Carcaça		Vazão (litros/minuto)	Máxima elevação de temperatura de água (°C)
IEC	NEMA		
180	284/6	12	5
200	324/6	12	5
225	364/5	12	5
250	404/5	12	5
280	444/5 445/7 447/9	15	6
315	504/5	16	6
355	586/7 588/9	25	6

Tabela 27 - Vazão e máxima elevação de temperatura de água

Para motores da Linha W60, consultar os dados na placa fixa no radiador.
Para motores com lubrificação do tipo *Oil Mist*, em caso de falha do sistema de bombeamento de óleo, é permitida uma operação em regime contínuo com o tempo máximo de uma hora de operação.
Considerando-se que o calor do sol causa aumento da temperatura de operação, motores instalados externamente devem sempre estar protegidos contra a incidência direta dos raios solares.
Possíveis desvios em relação à operação normal (atuação de proteções térmicas, aumento do nível de ruído, vibração, temperatura e corrente) devem ser examinados e eliminados por pessoal capacitado. Em caso de dúvidas, desligar o motor imediatamente e contatar um Assistente Técnico Autorizado WEG.



A não observação dos critérios e recomendações expostos neste manual pode resultar na anulação da garantia do produto.

7.2.1 Limites da severidade de vibração

A severidade de vibração é o máximo valor de vibração encontrada, dentre todos os pontos e direções recomendados .
A Tabela 28 indica os valores admissíveis da severidade de vibração recomendados na norma IEC 60034-14 para as carcaças IEC 56 a 400, para os graus de vibração A e B.
Os limites de severidade da Tabela 28 são apresentados em termos do valor médio quadrático (= valor RMS ou valor eficaz) da velocidade de vibração em mm/s medidos em condição de suspensão livre (base elástica).

Altura do eixo [mm]	56 ≤ H ≤ 132	H ≥132
Grau de vibração	Severidade de vibração em base elástica [mm/s RMS]	
A	2.8	2.8
B	1.1	1.8

Tabela 28 - Limites recomendados para a severidade de vibração de acordo com a norma IEC 60034-14.

Notas:
1 - Os valores da Tabela 28 são válidos para medições realizadas com a máquina desacoplada e sem carga, operando na frequência e tensão nominais.
2 - Os valores da Tabela 28 são válidos independentemente do sentido de rotação da máquina.
3 - A Tabela 28 não se aplica para motores trifásicos com comutador, motores monofásicos, motores trifásicos com alimentação monofásica ou para máquinas fixadas no local de instalação, acopladas em suas cargas de acionamento ou cargas acionadas.

Para motor padrão, de acordo com a norma NEMA MG 1, o limite de vibração é de 0.15 in/s (polegadas/segundo pico), na mesma condição de suspensão livre e desacoplado.
Nota:
Para condição de operação em carga recomenda-se o uso da norma ISO 10816-3 para avaliação dos limites de vibração do motor. Na condição em carga, a vibração do motor será influenciada por vários fatores, entre eles, tipo de carga acoplada, condição de fixação do motor, condição de alinhamento com a carga, vibração da estrutura ou base devido a outros equipamentos, etc..

8. MANUTENÇÃO

A finalidade da manutenção é prolongar ao máximo possível a vida útil do equipamento. A não observância de um dos itens relacionados a seguir pode levar a paradas não desejadas do equipamento.
Caso, durante a manutenção, houver necessidade de transporte dos motores com rolamentos de rolos ou contato angular, devem ser utilizados os dispositivos de travamento do eixo fornecidos com o motor. Todos os motores HGF, W50, W51 HD e W60 independente do tipo de mancal, devem ter seu eixo travado durante o transporte.
Qualquer serviço em máquinas elétricas deve ser realizado apenas por pessoal capacitado, utilizando somente ferramentas e métodos adequados. Antes de iniciar qualquer serviço, as máquinas devem estar completamente paradas e desconectadas da rede de alimentação, inclusive os acessórios (resistência de aquecimento, freio, etc.).
Assistentes técnicos ou pessoal não capacitado e sem autorização para fazer manutenção e/ou reparar motores são totalmente responsáveis pelo trabalho executado e pelos eventuais danos que possam ocorrer durante o seu funcionamento.

Motores WMagnet e WQuattro possuem ímãs de alta energia e não devem ser abertos por pessoal não capacitado e por portadores de marca passo.

8.1 INSPEÇÃO GERAL

A frequência com que devem ser realizadas as inspeções depende do tipo do motor, da aplicação e das condições do local da instalação. Durante a inspeção, recomenda-se:

- Fazer uma inspeção visual do motor e do acoplamento, observando os níveis de ruído, da vibração, alinhamento, sinais de desgastes, oxidação e peças danificadas. Substituir as peças, quando for necessário;
- Medir a resistência de isolamento conforme descrito no item 5.4;
- Manter a carcaça limpa, eliminando todo acúmulo de óleo ou de pó na parte externa do motor para assim facilitar a troca de calor com o meio ambiente;
- Verificar a condição do ventilador e das entradas e saídas de ar, assegurando um livre fluxo do ar;
- Verificar o estado das vedações e efetuar a troca, se necessário;
- Drenar o motor. Após a drenagem, recolocar os drenos para novamente garantir o grau de proteção do motor. Os drenos devem estar sempre posicionados de tal forma que a drenagem seja facilitada (conforme item 6);
- Verificar a conexão dos cabos de alimentação, respeitando as distâncias de isolação entre partes vivas não isoladas entre si e entre partes vivas e partes aterradas de acordo com a Tabela 10.
- Verificar se o aperto dos parafusos de conexão, sustentação e fixação está de acordo com o indicado na Tabela 44;
- Verificar o estado da passagem dos cabos na caixa de ligação, as vedações dos prensa-cabos e as vedações nas caixas de ligação e efetuar a troca, se necessário;
- Verificar o estado dos mancais, observando o aparecimento de ruídos e níveis de vibração não habituais, verificando a temperatura dos mancais, o nível do óleo, a condição do lubrificante e o monitoramento das horas de operação versus a vida útil informada;
- Registrar e arquivar todas as modificações realizadas no motor.

Não reutilizar peças danificadas ou desgastadas. Substitua-as por novas, originais de fábrica.

8.2 LUBRIFICAÇÃO

A correta lubrificação é de vital importância para o bom funcionamento do motor.
Utilizar o tipo e quantidade de graxa ou óleo especificados e seguir os intervalos de relubrificação recomendados para os mancais. Estas informações podem ser encontradas na placa de identificação e este procedimento deve ser realizado conforme o tipo de lubrificante (óleo ou graxa).
Quando o motor utilizar proteção térmica no mancal, devem ser respeitados os limites de temperatura de operação indicados na Tabela 12.
Motores para aplicações especiais podem apresentar temperaturas máximas de operação diferentes das indicadas na tabela. O descarte da graxa e/ou óleo deve seguir as recomendações vigentes de cada país.

A utilização de motor em ambientes e/ou aplicações especiais sempre requer uma consulta prévia à WEG.

8.2.1 Mancais de rolamento lubrificados a graxa

Graxa em excesso provoca aquecimento do mancal e sua consequente falha.

Os intervalos de lubrificação especificados na Tabela 29, Tabela 30, Tabela 31, Tabela 32, Tabela 32, Tabela 34, Tabela 35, Tabela 36, Tabela 36, Tabela 38 e Tabela 39 consideram uma temperatura absoluta do mancal de 70 °C (até a carcaça IEC 200 / NEMA 324/6) e 85 °C (a partir da carcaça IEC 225 / NEMA 364/5), rotação nominal do motor, instalação horizontal e graxa Mobil Polyrex EM. Qualquer variação dos parâmetros indicados acima deve ser avaliada pontualmente.

Carcaça		Polos	Rolamento	Quantidade de graxa (g)	Intervalos de relubrificação (horas)					
					ODP (invólucro aberto)		W21 (invólucro Fechado)		W22 (invólucro Fechado)	
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
90	143/5	2	6205	4	-	-	20000	20000	25000	25000
		4								
		6								
		8								
100	-	2	6206	5	-	-	20000	20000		
		4								
		6								
		8								
112	182/4	2	6207/ 6307	9	-	-	20000	20000		
		4								
		6								
		8								
132	213/5	2	6308	11	-	-	20000	18400		
		4					20000	20000		
		6								
		8								
160	254/6	2	6309	13	20000	20000	18100	15700		
		4					20000	20000		
		6								
		8								
180	284/6	2	6311	18	20000	20000	13700	11500		
		4					20000	20000		
		6								
		8								
200	324/6	2	6312	21	20000	20000	11900	9800		
		4					20000	20000		
		6								
		8								
225 250 280 315 355	364/5 404/5 444/5 445/7 447/9 L447/9 504/5 5008 5010/11 586/7 588/9	2	6314	27	18000	14400	4500	3600	5000	4000
		4			20000	20000	11600	9700	14000	12000
		6					16400	14200	20000	17000
		8					19700	17300	24000	20000
		2	6316	34	14000	*Mediante consulta	3500	*Mediante consulta	4000	*Mediante consulta
		4			20000	20000	10400	8500	13000	10000
		6					14900	12800	18000	16000
		8					18700	15900	20000	20000
		2	6319	45	*Mediante consulta					
		4			20000	20000	9000	7000	11000	8000
		6					13000	11000	16000	13000
		8					17400	14000	20000	17000
		4	6322	60	20000	20000	7200	5100	9000	6000
		6					10800	9200	13000	11000
		8					15100	11800	19000	14000

Tabela 29 - Intervalo de lubrificação para rolamentos de esferas.

Carcaça		Polos	Rolamento	Quantidade de graxa (g)	Intervalos de relubrificação (horas)					
					ODP (invólucro aberto)		W21 (invólucro Fechado)		W22 (invólucro Fechado)	
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
160	254/6	2	NU309	13	20000	19600	13300	9800	16000	12000
		4				20000	20000	20000	25000	25000
		6								
		8								
180	284/6	2	NU311	18	18400	12800	9200	6400	11000	8000
		4			20000	20000	20000	19100	25000	25000
		6						20000		
		8								
200	324/6	2	NU312	21	15200	10200	7600	5100	9000	6000
		4			20000	20000	20000	17200	25000	21000
		6						20000		25000
		8								
225 250 280 315 355	364/5 404/5 444/5 445/7 447/9 L447/9 504/5 5008 5010/11 586/7 588/9	4	NU314	27	17800	14200	8900	7100	11000	9000
		6			20000	20000	13100	11000	16000	13000
		8					16900	15100	20000	19000
		4	NU316	34	15200	12000	7600	6000	9000	7000
		6			20000	19000	11600	9500	14000	12000
		8				20000	15500	13800	19000	17000
		4	NU319	45	12000	9400	6000	4700	7000	5000
		6			19600	15200	9800	7600	12000	9000
		8			20000	20000	13700	12200	17000	15000
		4	NU322	60	8800	6600	4400	3300	5000	4000
		6			15600	11800	7800	5900	9000	7000
		8			20000	20000	11500	10700	14000	13000

Tabela 30 - Intervalo de lubrificação para rolamentos de rolos

Carcaça		Polos	Rolamento	Quantidade de graxa (g)	Intervalos de lubrificação (horas)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B e 315C/D/E	5006/7/8T e 5009/10/11T	2	6314	27	3100	2100
		4 - 8	6320	50	4500	4500
			6316	34	4500	4500
355L/A/B e 355C/D/E	5807/8/9T e 5810/11/12T	2	6314	27	3100	2100
		4 - 8	6322	60	4500	4500
			6319	45	4500	4500
400L/A/B e 400 C/D/E	6806/7/8T e 6809/10/11T	2	6315	30	2700	1800
		4 - 8	6324	72	4500	4500
			6319	45	4500	4500
450	7006/10	2	6220	31	2500	1400
		4	6328	93	4500	3300
			6322	60	4500	4500
		6 - 8	6328	93	4500	4500
			6322	60	4500	4500
500	8006/10	4	6330	104	4200	2800
			6324	72	4500	4500
		6 - 8	6330	104	4500	4500
			6324	72	4500	4500
560	8806/10	4 - 8	*Mediante consulta			
630	9606/10	4 - 8				

Tabela 31 - Intervalo de lubrificação para rolamento de esferas - linha HGF

Carcaça		Polos	Rolamento	Quantidade de graxa (g)	Intervalos de lubrificação (horas)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B e 315C/D/E	5006/7/8 e 5009/10/11	4	NU320	50	4300	2900
		6 - 8			4500	4500
355L/A/B e 355C/D/E	5807/8/9 e 5810/11/12	4	NU322	60	3500	2200
		6 - 8			4500	4500
400L/A/B e 400C/D/E	6806/7/8 e 6809/10/11	4	NU324	72	2900	1800
		6 - 8			4500	4500
450	7006/10	4	NU328	93	2000	1400
		6			4500	3200
		8			4500	4500
500	8006/10	4	NU330	104	1700	1000
		6			4100	2900
		8			4500	4500
560	8806/10	4	NU228 + 6228	75	2600	1600
		6 - 8		106	4500	4500
630	9606/10	4	NU232 + 6232	92	1800	1000
		6		120	4300	3100
		8		140	4500	4500

Tabela 32 - Intervalo de lubrificação para rolamento de rolos - linha HGF

	Carcaça		Número de polos	Rolamento dianteiro	Graxa (g)	50 Hz (h)	60 Hz (h)	Rolamento traseiro	Graxa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem horizontal Rolamento de esferas	315 H/G	5009/10	2	6314	27	4500	3500	6314	27	4500	3500
			4 - 8	6320	50		4500	6316	34		4500
	355 J/H	5809/10	2	6314	27		3500	6314	27		3500
			4 - 8	6322	60		4500	6319	45		4500
	400 L/K e 400 J/H	6806/07 e 6808/09	2	6218	24	3800	2500	6218	24	3800	1800
			4 - 8	6324	72	4500	4500	6319	45	4500	4500
	450 L/K e 450 J/H	7006/07 e 7008/09	2	6220	31	3000	2000	6220	31	3000	2000
			4	6328	93	4500	3300	6322	60	4500	4500
			6 - 8				4500				
Montagem vertical Rolamento de esferas	315 H/G	5009/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6320	50	4200	3200	6316	34	4500	4500
			6 - 8			4500	4500				
	355 J/H	5809/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6322	60	3600	2700	6319	45	4500	3600
			6 - 8			4500	4500				4500
	400 L/K e 400 J/H	6806/07 e 6808/09	2	7218	24	2000	1300	6218	24	2000	1300
			4	7324	72	3200	2300	6319	45	4500	3600
			6			4500	4300				4500
			8				4500				
	450 L/K e 450 J/H	7006/07 e 7008/09	2	7220	31	1500	1000	6220	31	1500	1000
			4	7328	93	2400	1700	6322	60	3500	2700
			6			4100	3500			4500	4500
			8			4500	4500				

Tabela 33 - Intervalo de lubrificação para rolamento de esferas - linha W50

	Carcaça		Número de polos	Rolamento dianteiro	Graxa (g)	50 Hz (h)	60 Hz (h)	Rolamento traseiro	Graxa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem horizontal Rolamento de rolos	315 H/G	5009/10	4	NU320	50	4300	2900	6316	34	4500	4500
			6 -8			4500	4500				
	355 J/H	5809/10	4	NU322	60	3500	2200	6319	45		
			6 - 8			4500	4500				
	400 L/K e 400 J/H	6806/07 e 6808/09	4	NU324	72	2900	1800				
			6 - 8			4500	4500				
	450 L/K e 450 J/H	7006/07 e 7008/09	4	NU328	93	2000	1400	6322	60		
			6			4500	3200				
			8				4500				

Tabela 34 - Intervalo de lubrificação para rolamento de rolos - linha W50

PORTUGUÊS

	Carcaça		Número de polos	Rolamento dianteiro	Quantidade de Graxa (g)	50 Hz (h)	60 Hz (h)	Rolamento traseiro	Quantidade de Graxa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem Horizontal Rolamento de esferas	160M/L	254/6	2 - 8	6309	13	20000	20000	6209	9	20000	20000
				6311	18			6211	11		
	180M/L	284/6		6312	21						
	200M/L	324/6		6314	27	18000	14400	6212	13		
	225S/M	364/5	2								
			4 – 8								
	250S/M	404/5	2								
			4 – 8	6316	34	20000	20000				
	280S/M	444/5	2	6314	27	18000	14400				
			4 – 8	6319	45	20000	20000	6314	27	18000	14400
	280L	447/9	2	6314	27	18000	14400			20000	20000
			4 – 8	6319	45	20000	20000				
	315G/F	5010/11	2	6314	27	4500	4500			4500	4500
			4 – 8	6319	45						
	355J/H	L5010/11	2	6218	24	2200	2200	6218	24	2200	2200
			4 – 8	6224	43	4500	4500			4500	4500
	400J/H	L5810/11	2	6220	31	2200	2200	6220	31	2200	2200
			4 – 8	6228	52	4500	4500			4500	4500
	450K/J	L6808/09	2	6220	31	2200	2200			2200	2200
			4 – 8	6228	52	4500	4500			4500	4500

Tabela 35 - Intervalo de lubrificação para rolamento de esferas - linha W40

	Carcaça		Número de polos	Rolamento dianteiro	Quantidade de Graxa (g)	50 Hz (h)	60 Hz (h)	Rolamento traseiro	Quantidade de Graxa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem Horizontal Rolamento de rolos	225S/M	364/5	4 – 8	NU314	27	20000	20000	6314	27	20000	20000
	250S/M	404/5		NU316	34						
	280S/M	444/5		NU319	45		18800				
	280L	447/9									
	315G/F	5010/11				4500	4500			4500	4500
	355J/H	L5010/11		NU224	43			6218	24		
	400J/H	L5810/11		NU228	52		3300	6220	31		
	450K/J	L6808/09									

Tabela 36 - Intervalo de lubrificação para rolamento de rolos - linha W40

	Carcaça		Número de polos	Rolamento dianteiro	Graxa (g)	50 Hz (h)	60 Hz (h)	Rolamento traseiro	Graxa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem horizontal Rolamento de esferas	355H/G	5810/11	2	6218	24	2300	1500	6218	24	2300	1500
			4/8	6224	43	4500	4500			4500	4500
	400J/H	L5810/11	2	6220	31	1800	1200	6220	31	1800	1200
			4/8	6228	52	4500	4500			4500	4500
	400G/F	6810/11	2	6220	31	1800	1200			1800	1200
			4/8	6228	52	4500	4500			4500	4500
Montagem horizontal Rolamento de rolos	355H/G	5810/11	4	NU224	43			6218	24		
			6/8								
	400J/H	L5810/11	4	NU228	52	4500	1500		31	4500	1500
			6/8				4500	6220			4500
	400G/F	6810/11	4				1500				1500
			6/8				4500				4500

Tabela 37 - Intervalo de lubrificação para rolamento de esferas e de rolos - linha W60

	Carcaça		Número de polos	Rolamento dianteiro	Graxa (g)	50 Hz (h)	60 Hz (h)	Rolamento traseiro	Graxa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem horizontal Rolamento de esferas	315 G/F	5010/11	2	6314	27	4500	3500	6314	27	4500	3500
			4-12	6320	50		4500	6316	34		4500
	355H/G	5810/11	2	6314	27		3500	6314	27		3500
			4-12	6322	60		4500	6319	45		4500
	400H/G	6809/10	2	6220	24	2700	2000	6220	24	2700	2000
			4-12	6324	72	4500	3800	6319	45	4500	4500
	450H/G	7009/10	2	6220	31	3500	-	6220	31	3500	-
			4	6328	93	4500	3800	6322	60	4500	4500
			6-12				4500				
Montagem vertical Rolamento de esferas	315 G/F	5010/11	2	7314	27	Mediante consulta		6314	27	Mediante consulta	
			4	7320	50	2700	2100	6316	34	4500	4200
			6-12			4500	4500				4500
	355H/G	5810/11	2	7314	27	Mediante consulta		6314	27	Mediante consulta	
			4	7322	60	1600	1600	6319	45	3500	3500
			6			3900	2900			4500	4500
			8-12			4500	4500				
	400H/G	6809/10	2	7220	24	Mediante consulta		6220	24	Mediante consulta	
			4	7324	72	1700	1200	6319	45	4500	3500
			6			3300	2500				4500
			8-12			4500	4500				
	450H/G	7009/10	2	7220	31	Mediante consulta		6220	31	Mediante consulta	
			4	7328	93	2900	2000	6322	60	4300	3200
			6			4500	4200			4500	4500
			8-12				4500				

Tabela 38 - Intervalo de lubrificação para rolamento de esferas - linha W51 HD

	Carcaça		Número de polos	Rolamento dianteiro	Graxa (g)	50 Hz (h)	60 Hz (h)	Rolamento traseiro	Graxa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem horizontal Rolamento de rolos	315 G/F	5010/11	4	NU320	50	4500	4200	6316	34	4500	4500
			6 -12			4500	4500				
	355H/G	5810/11	4	NU322	60	3300	3300	6319	45		
			6 -12			4500	4500				
	400H/G	6809/10	4	NU324	72	3500	2400				
			6 -12			4500	4500				
	450H/G	7009/10	4	NU328	93	1100	600	6322	60		
			6			2900	2000				
			8 -12			4500	4500				

Tabela 39 - Intervalo de lubrificação para rolamento de rolos - linha W51 HD

Os motores da linha WGOST utilizam por padrão a graxa Mobiltemp SHC 32, adequada para operação em baixas temperaturas conforme escopo de temperatura ambiente entre -45 °C e +40 °C. A Tabela 39 indica os intervalos de lubrificação para estes motores.

Carcaça IEC	Número de polos	50 Hz (h)	Carcaça IEC	Número de polos	50 Hz (h)	Carcaça IEC	Número de polos	50 Hz (h)	Carcaça IEC	Número de polos	50 Hz (h)
71	2	20.000	112	2	20.000	200	2	20.000	315	2	7.000
	4			4			4			4	18.000
	6			6			6			6	20.000
	8			8			8			8	
80	2		132	2		225	2	9.000	355	2	6.000
	4			4			4	20.000		4	14.000
	6			6			6			6	20.000
	8			8			8			8	
90	2		160	2		250	2	9.000			
	4			4			4	20.000			
	6			6			6				
	8			8			8				
100	2		180	2		280	2	7.000			
	4			4			4	18.000			
	6			6			6	20.000			
	8			8			8				

Tabela 40 - Intervalo de lubrificação para rolamento de esferas - WGOST

Os intervalos de lubrificação especificados na Tabela 41, consideram a rotação nominal do motor, instalação horizontal e graxa Mobil Polyrex EM. Qualquer variação dos parâmetros indicados acima deve ser avaliada pontualmente.

Carcaça	Número de polos	Rolamento dianteiro	Graxa (g)	Rolamento traseiro	Graxa (g)	Temperatura ambiente 40 °C		Temperatura ambiente 50 °C	
IEC						50 Hz (h)	60 Hz (h)	50 Hz (h)	60 Hz (h)
225S/M	2	6214	15	6212	12	8800	6600	6600	4400
	4					13200	13200	13200	8800
250S/M	2					8800	6600	6600	4400
	4					13200	13200	13200	8800
W280S/M	2	6314	26			6600	4400	4400	3000
	4	6316	33			13200	8800	8800	6600
280S/M	2	6314	26	6314	26	6600	4400	4400	3000
	4	6316	33			13200	8800	8800	6600
	6						13200	8800	8800
W315S/M	2	6314	26			6600	4400	4400	3000
	4	6319	45			8800	8800	6600	4400
	6					13200	13200	8800	6600
315S/M	2	6314	26			6600	4400	4400	3000
	4	6319	45	6316	33	8800	8800	6600	4400
	6					13200	13200	8800	6600
315L	2	6314	26	6314	26	4400	3000	3000	3000
	4	6319	45	6316	33	8800	6600	4400	4400
	6						8800	6600	6600
355M/L	2	6316	33	6314	26	4400	3000	3000	3000
	4	6322	60	6319	45	8800	6600	4400	4400
	6						8800	6600	6600

Tabela 41 - Intervalo de lubrificação para rolamento de esferas - linhas WEG General Purpose e WIN

Os motores da linha WEG General Purpose e WIN com sistema de relubrificação (graxeira e rolamentos abertos) nas carcaças 225S/M, 250S/M e W280S/M dispõem de um local de armazenamento da graxa no interior do motor e não possuem abertura para saída da mesma. O volume interno destinado a armazenar a graxa usada possui capacidade para atender até 7 (sete) lubrificações, limitado a 5 anos de operação, sendo necessário a remoção da graxa após este período.

Para cada incremento de 15 °C na temperatura do mancal, o intervalo de relubrificação deverá ser reduzido pela metade. Motores originais de fábrica para posição horizontal, porém instalados na posição vertical (com autorização da WEG) devem ter seu intervalo de relubrificação reduzido pela metade.
Para aplicações especiais, tais como: altas e baixas temperaturas, ambientes agressivos, variação de velocidade (acionamento por inversor de frequência), etc., entre em contato com a WEG para obter informações referentes ao tipo de graxa e intervalos de lubrificação a serem utilizados.

8.2.1.1. Motores sem graxeira

Nos motores sem graxeira, a lubrificação deve ser efetuada conforme plano de manutenção preventiva existente. A desmontagem e montagem do motor deve ser feita conforme item 8.3.
Motores com rolamentos blindados (por exemplo, ZZ, DDU, 2RS, VV) devem ter os rolamentos substituídos ao final da vida útil da graxa.

8.2.1.2. Motores com graxeira

Para relubrificação dos rolamentos com o motor parado, deve-se proceder da seguinte maneira:
- Limpar as proximidades do orifício de entrada de graxa;
- Abrir a proteção da entrada de graxa;
- Remover a tampa de saída de graxa (não é necessária a remoção no caso de sistema de relubrificação automático, como motores IEEE Std 841);
- Colocar aproximadamente metade da graxa total recomendada na placa de identificação do motor e girar o motor durante aproximadamente 1 (um) minuto na rotação nominal;
- Desligar o motor e colocar o restante da graxa;
- Recolocar a proteção de entrada de graxa e a tampa da saída de graxa.

Para relubrificação dos rolamentos com o motor em operação, deve-se proceder da seguinte maneira:
- Limpar as proximidades do orifício de entrada de graxa;
- Abrir a proteção da entrada de graxa;
- Se possível e seguro, remover a tampa de saída de graxa;
- Colocar a quantidade total de graxa recomendada na placa de identificação do motor;
- Recolocar a proteção de entrada de graxa e a tampa da saída de graxa (caso tenha sido removida).

Para lubrificação, é indicado o uso de lubrificador manual.

Devido a espaços internos presentes no motor, é possível que, nas primeiras re-lubrificações dos mancais, a graxa não saia pela saída de graxa. Portanto, não aplique graxa em excesso esperando que a ela saia.

Nos motores fornecidos com dispositivo de mola, o excesso de graxa deve ser removido, puxando a vareta da mola e limpando a mola até que a mesma não contenha mais graxa.

8.2.1.3. Compatibilidade da graxa Mobil Polyrex EM com outras graxas

A graxa Mobil Polyrex EM possui espessante de poliuréia e óleo mineral, e não é compatível com outras graxas. Caso necessite de outro tipo de graxa, contate a WEG.
Não é recomendada a mistura de graxas, portanto é necessário a limpeza dos rolamentos e canais de lubrificação antes de aplicar uma nova graxa.
A graxa aplicada deve possuir em sua formulação aditivos inibidores de corrosão e oxidação.

8.2.2 Mancais de rolamento lubrificados a óleo

Nos motores com rolamento lubrificados a óleo, a troca de óleo deve ser feita com o motor parado, seguindo os procedimento a seguir:

- Abrir o respiro da entrada de óleo;
- Retirar o tampão de saída de óleo;
- Abrir a válvula e drenar todo o óleo;
- Fechar a válvula;
- Recolocar o tampão;
- Preencher com a quantidade e especificação do óleo indicados na placa de identificação;
- Verificar se o nível do óleo está na metade do visor;
- Fechar o respiro da entrada de óleo;
- Certificar-se que não há vazamento e que todos os furos roscados não utilizados estejam fechados.

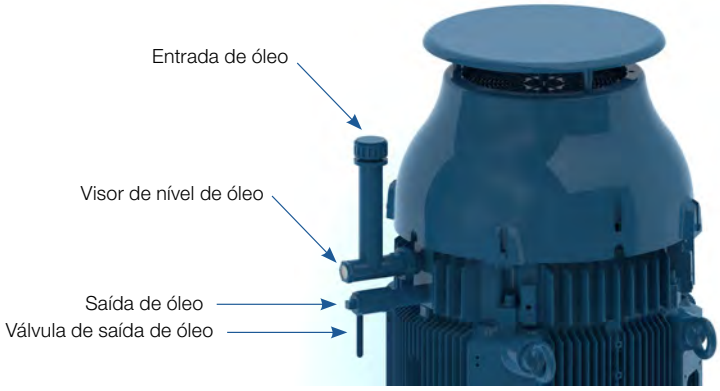


Figura 54 - Mancal vertical de rolamento lubrificado a óleo.

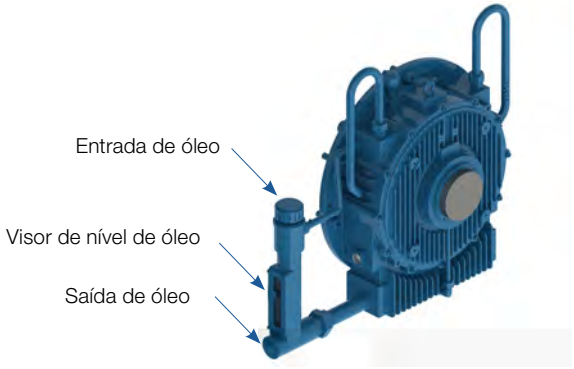


Figura 55 - Mancal horizontal de rolamento lubrificado a óleo.

A troca de óleo dos mancais deve ser realizada no intervalo indicado na placa de identificação ou sempre que o lubrificante apresentar alterações em suas características (viscosidade, pH, etc.).
O nível de óleo deve ser mantido na metade do visor de óleo e acompanhado diariamente.
O uso de lubrificantes com outras viscosidades requer contato prévio com a WEG.

Obs: motores HGF verticais para alto empuxo são fornecidos com mancais dianteiros lubrificados a graxa e com mancais traseiros, a óleo. Os mancais dianteiros devem seguir as recomendações do item 8.2.1. A Tabela 42 apresenta a quantidade e especificação de óleo para essa configuração.

Montagem alto empuxo	Carcaça		Polos	Rolamento	Óleo (L)	Intervalo (h)	Lubrificante	Especificação lubrificante
	IEC	NEMA						
	315L/A/B e 315C/D/E	5006/7/8T e 5009/10/11T	4 - 8	29320	20	8000	FUCHS Renolin DTA 40 / Mobil SHC 629	Óleo mineral ISO VG150 com aditivos anti-espuma e antioxidantes
	355L/A/B e 355C/D/E	5807/8/9T e 5810/11/12T	4 - 8	29320	26			
	400L/A/B e 400C/D/E	6806/7/8T e 6809/10/11T	4 - 8	29320	37			
	450	7006/10	4 - 8	29320	45			

Tabela 42 - Características de lubrificação para motores HGF vertical de alto empuxo e Vertical High Thrust

8.2.3 Mancais de rolamento com lubrificação do tipo *Oil Mist*

Verificar o estado das vedações e, sempre que for necessária alguma troca, usar apenas peças originais.
Realizar a limpeza dos componentes antes da montagem (anéis de fixação, tampas, etc.).
Aplicar veda juntas resistente ao óleo lubrificante utilizado, entre os anéis de fixação e as tampas.
A conexão dos sistemas de entrada, saída e dreno de óleo devem ser realizados conforme Figura 43.

8.2.4 Mancais de deslizamento

Para os mancais de deslizamento, a troca de óleo deve ser feita nos intervalos indicados na Tabela 43 e deve ser realizada, adotando os seguintes procedimentos:

- Para o mancal traseiro, retirar a tampa de inspeção da defletora;
- Drenar o óleo através do dreno localizado na parte inferior da carcaça do mancal (conforme Figura 56);
- Fechar a saída de óleo;
- Retirar o bujão da entrada de óleo;
- Preencher com o óleo especificado e com a quantidade indicada na Tabela 43;
- Verificar se o nível do óleo está na metade do visor;
- Fechar a entrada de óleo;
- Certificar-se que não há vazamento.

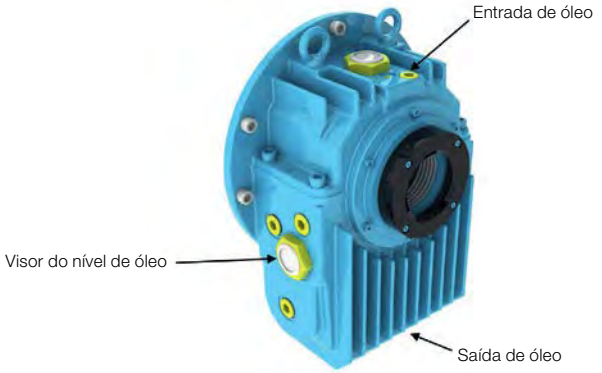


Figura 56 - Mancal de deslizamento

Carcaça		Polos	Mancal	Óleo (L)	Intervalo (h)	Lubrificante	Especificação lubrificante
IEC	NEMA						
315	5000	2	9-80	3.6	8000	FUCHS Renolin DTA 10	Óleo mineral ISO VG32 com aditivos anti-espuma e antioxidantes
355	5800						
400	6800						
450	7000						
315	5000	4 - 8	9-90		8000	FUCHS Renolin DTA 15	Óleo mineral ISO VG46 com aditivos anti-espuma e antioxidantes
355	5800		9-100				
400	6800		11-110	4.7			
450	7000		11-125				
500	8000						

Tabela 43 - Características de lubrificação para mancais de deslizamento

A troca de óleo dos mancais deve ser realizada no intervalo indicado na placa de identificação ou sempre que o lubrificante apresentar alterações em suas características (viscosidade, pH, etc.).
O nível de óleo deve ser mantido na metade do visor e acompanhado diariamente.
Não poderão ser usados lubrificantes com outras viscosidades sem antes consultar a WEG.

8.3 DESMONTAGEM E MONTAGEM



Serviços de reparo em motores devem ser efetuados apenas por pessoal capacitado seguindo as normas vigentes no país. Devem ser utilizados somente ferramentas e métodos adequados.



Qualquer serviço de desmontagem e montagem deve ser realizado com o motor totalmente desenergizado e completamente parado.

Mesmo o motor desligado pode apresentar energia elétrica no interior da caixa de ligação, nas resistências de aquecimento, no enrolamento e nos capacitores.

Motores acionados por inversor de frequência podem estar energizados mesmo com o motor parado.

Antes de iniciar o procedimento de desmontagem, registrar as condições atuais da instalação, tais como conexões dos terminais de alimentação do motor e alinhamento/nivelamento que devem ser considerados durante a posterior montagem.
Realizar a desmontagem de maneira cuidadosa, sem causar impactos contra as superfícies usinadas e/ou nas roscas.
Montar o motor em uma superfície plana para garantir uma boa base de apoio. Motores sem pés devem ser calçados/travados para evitar acidentes.
Cuidados adicionais devem ser tomados para não danificar as partes isoladas que operam sob tensão elétrica, como por exemplo, enrolamentos, mancais isolados, cabos de alimentação, etc.
Elementos de vedação, por exemplo, juntas e vedações dos mancais devem ser trocados sempre que apresentarem desgaste ou estiverem danificados.
Motores com grau de proteção superior ao IP55 são fornecidos com produto vedante Loctite 5923 (Henkel) nas juntas e parafusos. Antes de montar os componentes, limpar as superfícies e aplicar uma nova camada deste produto.

Na montagem de componentes poliméricos, deve ser respeitados os torques de aperto especificados na Tabela 6.



Para motores com rotor de ímãs permanentes (motores WQuattro e WMagnet), a montagem e desmontagem do motor requerem a utilização de dispositivos adequados devido a forças de atração ou de repulsão que ocorrem entre peças metálicas. Este serviço somente deve ser realizado por Assistente Técnico Autorizado WEG com treinamento específico para tal operação.
Pessoas que utilizam marca-passo não podem manusear estes motores. Os ímãs permanentes também podem causar distúrbios ou danos em outros equipamentos elétricos e componentes durante a manutenção.



Para motores das linhas W40, W50, W51 HD e HGF, fornecidos com ventiladores axiais, o motor e o ventilador axial possuem indicações de sentido de rotação distintas, para prevenir uma montagem incorreta. O ventilador deve ser montado de tal modo que a seta indicativa do sentido de rotação esteja sempre visível, olhando do lado externo do motor (no lado não acionado). A marcação indicada na pá do ventilador, CW para sentido de rotação horário ou CCW para sentido de rotação anti-horário, indica o sentido de rotação do motor (olhando para o lado acionado).



Em motores que utilizam encoder, o batimento da região do assento deste componente deve ser verificada antes da montagem do mesmo. O valor não deve ultrapassar o limite especificado pelo fabricante do encoder.

Em motores que utilizam tampa defletora de polímero, para retirar a tampa defletora, use duas chaves de fenda ou ferramenta similar posicionadas próximo dos encaixes e levante um encaixe de cada vez, repetindo o procedimento para cada lado até remover completamente a tampa defletora.

Motores com ventilador fixo somente por interferência no eixo, se desmontado, o componente deverá ser substituído por um novo.
Para motores que possuem tampas injetadas de alumínio sem usinagem, é necessário aquecer as tampas para montagem e desmontagem.

8.3.1 Caixa de ligação

Ao retirar a tampa da caixa de ligação para a conexão/desconexão dos cabos de alimentação e acessórios, devem ser adotados os seguintes cuidados:

- Assegurar que durante a remoção dos parafusos, a tampa da caixa não danifique os componentes instalados em seu interior;
- Caso a caixa de ligação seja fornecida com olhal de suspensão, este deve ser utilizado para movimentar a tampa da caixa de ligação;
- Para motores fornecidos com placa de bornes, devem ser assegurados os torques de aperto especificados na Tabela 44;



Para motores sem placa de bornes, não empurrar o comprimento excedente dos cabos de ligação para o interior do motor para evitar que os mesmos encostem no rotor.

- Assegurar que os cabos não entrem em contato com superfícies com cantos vivos;
- Adotar os devidos cuidados para garantir que o grau de proteção inicial, indicado na placa de identificação do motor não seja alterado. As entradas de cabos para a alimentação e controle devem utilizar sempre componentes (como por exemplo, prensa-cabos e eletrodutos) que atendam as normas e regulamentações vigentes de cada país;
- Assegurar que a janela de alívio de pressão (quando houver) não esteja danificada. As juntas de vedação da caixa de ligação devem estar em perfeito estado para reutilização e devem ser posicionadas corretamente para garantir o grau de proteção;
- Assegurar os torques de aperto dos parafusos de fixação da tampa da caixa conforme Tabela 44.

Tipo de parafuso e Junta	M4	M5	M6	M8	M10	M12	M14	M16	M20
Parafuso sextavado externo/ interno (junta rígida)	-	3,5 a 5	6 a 9	14 a 20	28 a 40	45 a 70	75 a 110	115 a 170	230 a 330
Parafuso fenda combinada (junta rígida)	1,5 a 3	3 a 5	5 a 10	10 a 18	-	-	-	-	-
Parafuso sextavado externo/ interno (junta flexível)	-	3 a 5	4 a 8	8 a 15	18 a 30	25 a 40	30 a 45	35 a 50	-
Parafuso fenda combinada (junta flexível)	-	3 a 5	4 a 8	8 a 15	-	-	-	-	-
Placa de Bornes	1 a 1,5	2 a 4[1)]	4 a 6,5	6,5 a 9	10 a 18	15,5 a 30	-	30 a 50	50 a 75
Aterramento	1,5 a 3	3 a 5	5 a 10	10 a 18	28 a 40	45 a 70	-	115 a 170	-

Tabela 44 - Torques de aperto para elementos de fixação [Nm]

Notas: 1) Para placa de bornes 12 pinos, aplicar o torque mínimo de 1,5 Nm e máximo 2,5 Nm.

8.4 PROCEDIMENTO PARA ADEQUAÇÃO DA RESISTÊNCIA DE ISOLAMENTO

O motor deve ser desmontado e suas tampas, rotor completo (com eixo), ventilador, defletora e caixa de ligação devem ser separados, de modo que apenas a carcaça com o estator passe por um processo de secagem em uma estufa apropriada, por um período de duas horas, a uma temperatura não superior a 120 ºC. Para motores maiores, pode ser necessário aumentar o tempo de secagem. Após esse período de secagem, deixar o estator resfriar até a temperatura ambiente e repetir a medição da resistência de isolamento, conforme item 5.4. Caso necessário, deve-se repetir o processo de secagem do estator.
Se, mesmo após repetidos processos de secagem do estator, a resistência de isolamento não voltar aos níveis aceitáveis, recomenda-se fazer uma análise criteriosa das causas que levaram à queda do isolamento do enrolamento e, eventualmente poderá culminar com o rebobinamento do motor.

Para evitar o risco de choque elétrico, descarregue os terminais imediatamente antes e depois de cada medição. Caso o motor possua capacitores, estes devem ser descarregados.

Motores WMagnet e WQuattro possuem ímãs de alta energia e não devem ser abertos por pessoal não capacitado e por portadores de marca passo.

8.5 PARTES E PEÇAS

Ao solicitar peças para reposição, informar a designação completa do motor, bem como seu código e número de série, que podem ser encontrados na placa de identificação do motor.
Partes e peças devem ser adquiridas da rede de Assistência Técnica Autorizada WEG. O uso de peças não originais pode resultar na queda do desempenho e causar a falha no motor.
As peças sobressalentes devem ser armazenadas em local seco com uma umidade relativa do ar de até 60%, com temperatura ambiente maior que 5 °C e menor que 40 °C, isento de poeira, vibrações, gases, agentes corrosivos, sem variações bruscas da temperatura, em sua posição normal e sem apoiar sobre as mesmas outros objetos.

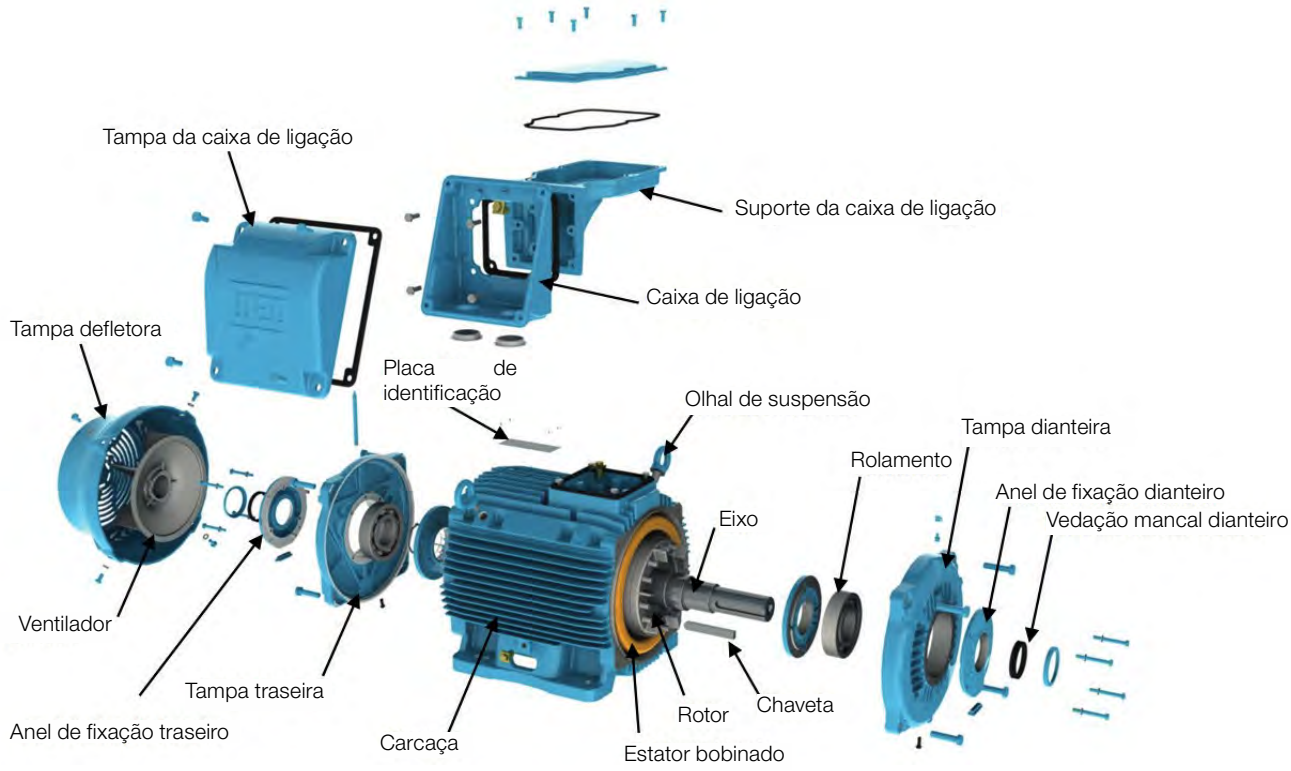


Figura 57 - Vista explodida dos componentes de um motor W22

PORTUGUÊS

9. INFORMAÇÕES AMBIENTAIS

9.1 EMBALAGEM

Os motores elétricos são fornecidos em embalagens de papelão, plástico ou de madeira. Estes materiais são recicláveis ou reutilizáveis e devem receber o destino certo conforme as normas vigentes de cada país. Toda a madeira utilizada nas embalagens dos motores WEG provém de reflorestamento e não é submetida a nenhum tratamento químico para a sua conservação.

9.2 PRODUTO

Os motores elétricos, sob o aspecto construtivo, são fabricados essencialmente com metais ferrosos (aço, ferro fundido), metais não ferrosos (cobre, alumínio) e plástico.
O motor elétrico, de maneira geral, é um produto que possui vida útil longa, porém quando for necessário seu descarte, a WEG recomenda que os materiais da embalagem e do produto sejam devidamente separados e encaminhados para reciclagem.
Os materiais não recicláveis devem, como determina a legislação ambiental, ser dispostos de forma adequada, ou seja, em aterros industriais, co-processados em fornos de cimento ou incinerados. Os prestadores de serviços de reciclagem, disposição em aterro industrial, co-processamento ou incineração de resíduos devem estar devidamente licenciados pelo órgão ambiental de cada estado para realizar estas atividades.

10. PROBLEMAS X SOLUÇÕES

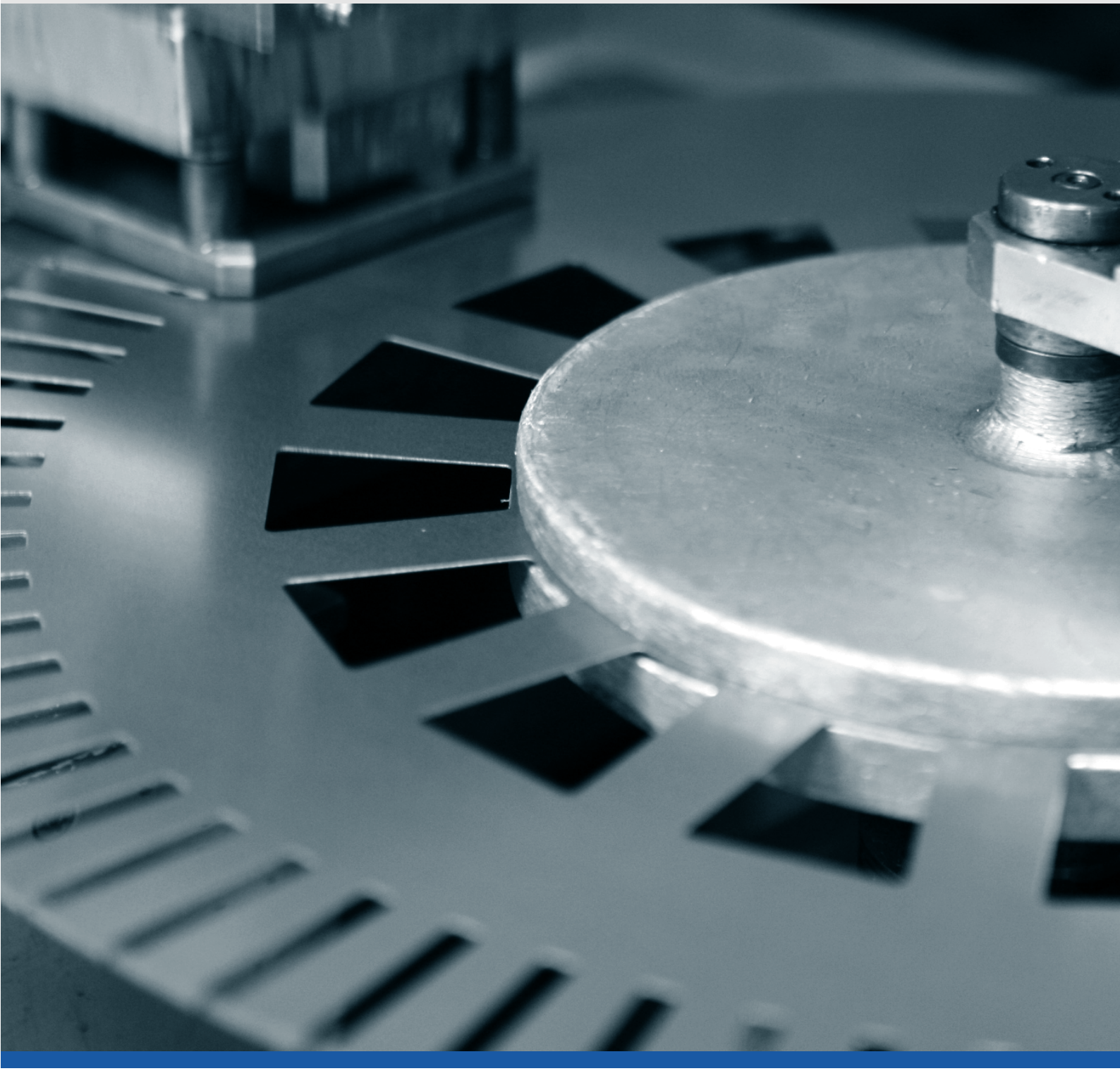
As instruções a seguir apresentam uma relação de problemas comuns com possíveis soluções. Em caso de dúvida, contatar o Assistente Técnico Autorizado ou a WEG.

Problema	Possíveis causas	Solução
Motor não parte, nem acoplado e nem desacoplado	Interrupção na alimentação do motor	Verificar o circuito de comando e os cabos de alimentação do motor.
	Fusíveis queimados	Substituir os fusíveis.
	Erro na conexão do motor	Corrigir as conexões do motor conforme diagrama de conexão.
	Mancal travado	Verificar se o mancal gira livremente.
Quando acoplado com carga, o motor não parte ou parte muito lentamente e não atinge rotação nominal	Carga com torque muito elevado durante a partida	Não aplicar carga na máquina acionada durante a partida.
	Queda de tensão muito alta nos cabos de alimentação	Verificar o dimensionamento da instalação (transformador, seção dos cabos, relés, disjuntores, etc.).
Ruído elevado/anormal	Defeito nos componentes de transmissão ou na máquina acionada	Verificar a transmissão de força, o acoplamento e o alinhamento.
	Base desalinhada/desnivelada	Realinhar/nivelar o motor e a máquina acionada.
	Desbalanceamento dos componentes ou da máquina acionada	Refazer balanceamento.
	Tipos diferentes de balanceamento entre motor e acoplamento (meia chaveta, chaveta inteira)	Refazer balanceamento.
	Sentido de rotação do motor errado	Inverter o sentido de rotação do motor.
	Parafusos de fixação soltos	Reapertar os parafusos.
	Ressonância da fundação	Verificar o projeto da fundação.
	Rolamentos danificados	Substituir o rolamento.
Aquecimento excessivo no motor	Refrigeração insuficiente	Limpar as entradas e saídas de ar da defletora e da carcaça.
		Verificar as distâncias mínimas entre a entrada da defletora de ar e paredes próximas (conforme item 7).
		Verificar temperatura do ar na entrada.
	Sobrecarga	Medir a corrente do motor, analisando sua aplicação e, se necessário, diminuir a carga.
	Excessivo número de partidas ou momento de inércia da carga muito elevado	Reduzir o número de partidas.
	Tensão muito alta	Verificar a tensão de alimentação do motor. Não ultrapassar a tolerância conforme item 7.2.
	Tensão muito baixa	Verificar a tensão de alimentação e a queda de tensão no motor. Não ultrapassar a tolerância (conforme item 7.2).
	Interrupção de um cabo de alimentação	Verificar a conexão de todos os cabos de alimentação
	Desequilíbrio de tensão nos terminais de alimentação do motor	Verificar se há fusíveis queimados, comandos errados, desequilíbrio nas tensões da rede de alimentação, falta de fase ou nos cabos de ligação.
	Sentido de rotação não compatível com o ventilador unidirecional	Verificar sentido de rotação conforme marcação do motor
Aquecimento do mancal	Graxa/óleo em demasia	Fazer limpeza do mancal e lubrificar segundo as recomendações.
	Envelhecimento da graxa/óleo	
	Utilização de graxa/óleo não especificados	
	Falta de graxa/óleo	Lubrificar segundo as recomendações.
	Excessivo esforço axial ou radial	Reduzir tensão nas correias.
		Redimensionar a carga aplicada ao motor.

Português PT 2

English EN 56

Español ES 112



INSTALLATION, OPERATION AND MAINTENANCE MANUAL OF ELECTRIC MOTORS

This manual provides information about WEG induction motors fitted with squirrel cage, permanent magnet or hybrid rotors, low, medium and high voltage, in frame sizes IEC 56 to 630 and NEMA 42 to 9606/10.
The motor lines indicated below have additional information that can be checked in their respective manuals:

- Smoke Extraction Motors;
- Electromagnetic Brake Motors;
- Hazardous Area Motors.

These motors meet the following standards, if applicable:

- NBR 17094-1: Máquinas Elétricas Girantes - Motores de Indução - Parte 1: trifásicos.
- NBR 17094-2: Máquinas Elétricas Girantes - Motores de Indução - Parte 2: monofásicos.
- IEC 60034-1: Rotating Electrical Machines - Part 1: Rating and Performance.
- NEMA MG 1: Motors and Generators.
- CSA C 22.2 N°100: Motors and Generators.
- UL 1004-1: Rotating Electrical Machines - General Requirements.

If you have any questions regarding this manual please contact your local WEG branch, contact details can be found at www.weg.net.

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1. TERMINOLOGY

Balancing: the procedure by which the mass distribution of a rotor is checked and, if necessary, adjusted to ensure that the residual unbalance or the vibration of the journals and/or forces on the bearings at a frequency corresponding to service speed are within specified limits in International Standards.
[ISO 1925:2001, definition 4.1]
Balance quality grade: indicates the peak velocity amplitude of vibration, given in mm/s, of a rotor running free-in-space and it is the product of a specific unbalance and the angular velocity of the rotor at maximum operating speed.
Grounded Part: metallic part connected to the grounding system.
Live Part: conductor or conductive part intended to be energized in normal operation, including a neutral conductor.
Authorized personnel: employee who has formal approval of the company.
Qualified personnel: employee who meets the following conditions simultaneously:
- Receives training under the guidance and responsibility of a qualified and authorized professional;
- Works under the responsibility of a qualified and approved professional.

Qualified personnel: employee previously qualified and registered with the competent class council.
Qualified personnel: employee who proves completion of a specific course in the electrical area by the official education system.

Note*: The qualification is only valid for the company that trained the employee in the conditions set out by the authorized and qualified professional responsible for training.*

2. INITIAL RECOMMENDATIONS

Electric motors have energized circuits, exposed rotating parts and hot surfaces that may cause serious injury to people during normal operation. Therefore, it is recommended that transportation, storage, installation, operation and maintenance services are always performed by qualified personnel.
Also the applicable procedures and relevant standards of the country where the machine will be installed must be considered.
Noncompliance with the recommended procedures in this manual and other references on the WEG website may cause severe personal injuries and/or substantial property damage and may void the product warranty.

For practical reasons, it is not possible to include in this Manual detailed information that covers all construction variables nor covering all possible assembly, operation or maintenance alternatives.
This Manual contains only the required information that allows qualified and trained personnel to carry out their services. The product images are shown for illustrative purpose only.
For special applications and operating conditions(50026367 manual for Smoke Extraction Motors, 50021973 manual for Brake Motors, 50078700 manual for Electronically Conmutated Motors, 14629920 manual for Roller Table motors, 50106963 manual for WEG Lift Gearless motors) refer to the applicable manual on the website www.weg.net or contact WEG.
For motors supplied with WEG Motor Scan sensor, see installation guidelines Overview of Receipt to Operation Manual (10008475131) available on www.weg.net.

For information about permissible radial and axial shaft loads, please check the product technical catalogue.

The user is responsible for the correct definition of the installation environment and application characteristics.

During the warranty period, all repair, overhaul and reclamation services must be carried out by WEG authorized Service Centers to maintain validity of the warranty.

2.1 WARNING SYMBOL

Warning about safety and warranty.

2.2 RECEIVING INSPECTION

All motors are tested during the manufacturing process.
The motor must be checked when received for any damage that may have occurred during the transportation. All damages must be reported in writing to the transportation company, to the insurance company and to WEG. Failure to comply with such procedures will void the product warranty.
You must inspect the product:

- Check if nameplate data complies with the purchase order;
- Remove the shaft locking device (if any) and rotate the shaft by hand to ensure that it rotates freely. The shaft might not rotate freely in WMagnet and WQuattro motors, due to alignment torque from the magnets. It might be necessary to use a lever;

When rotating the shaft, it is necessary to certify that the terminals are insulated to eliminate the risc of electric shock from induced voltage.

- Check that the motor has not been exposed to excessive dust and moisture during the transportation.

Do not remove the protective grease from the shaft, or the plugs from the cable entries. These protections must remain in place until the installation has been completed.

2.3 NAMEPLATES

The nameplate contains information that describes the construction characteristics and the performance of the motor. Figure 1, Figure 2 and Figure 3 show nameplate layout examples.



Figure 1 - IEC motor nameplate

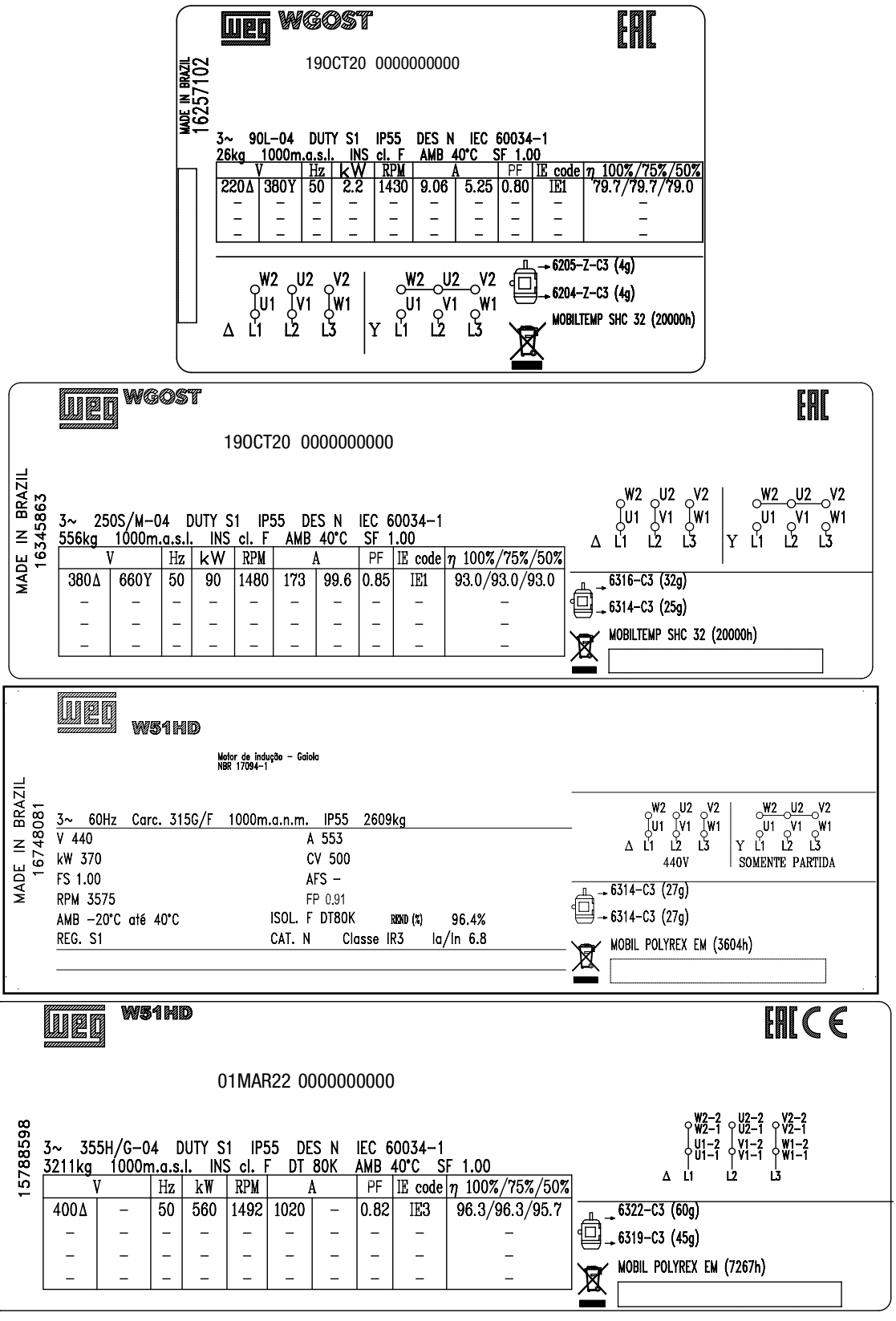
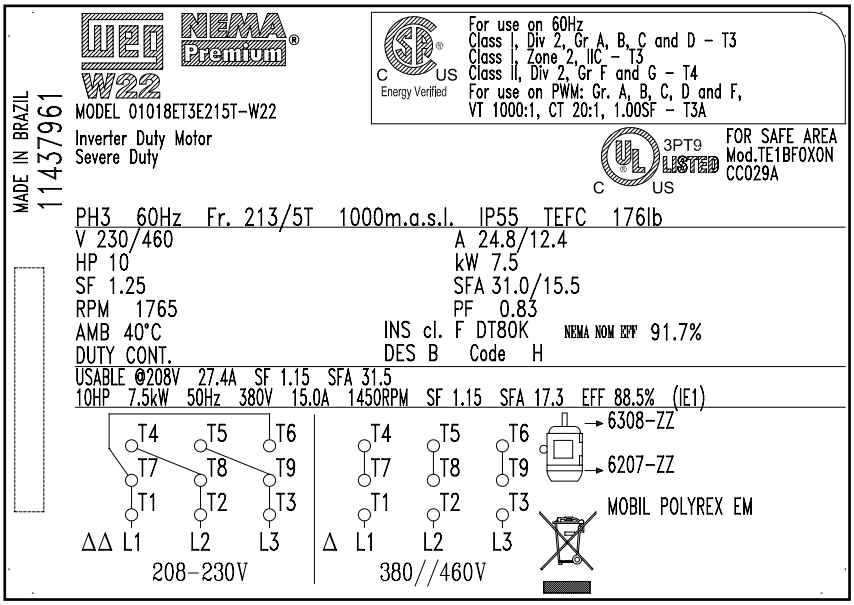
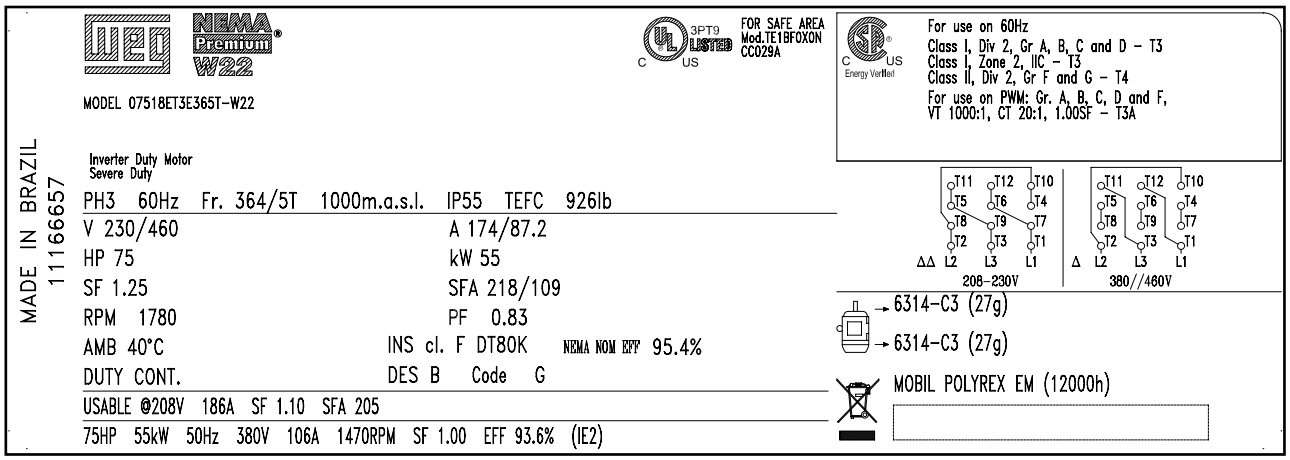


Figure 2 - IEC motor nameplate





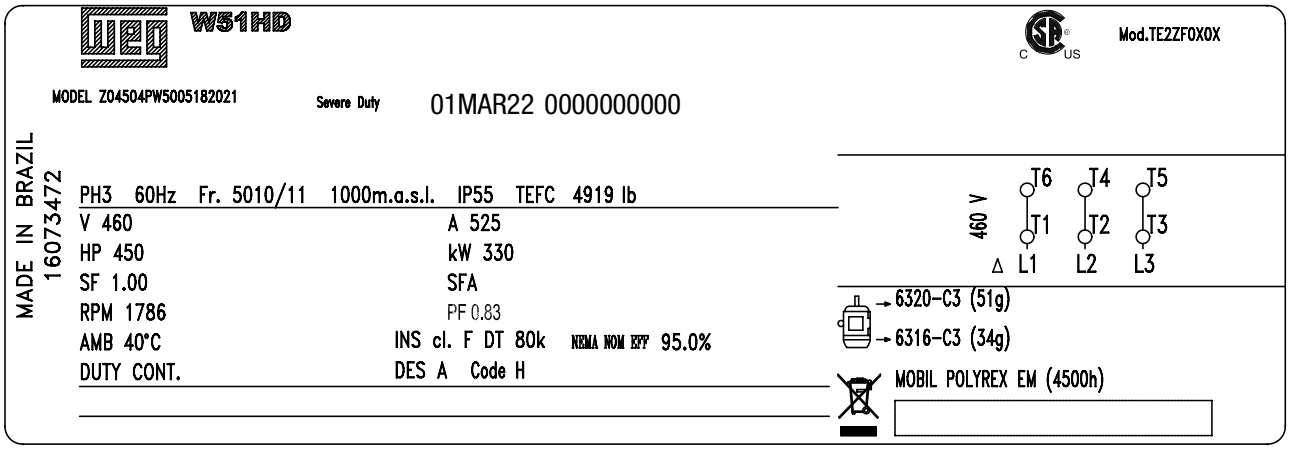


Figure 3 - NEMA motor nameplate

3. SAFETY INSTRUCTIONS

The motor must be disconnected from the power supply and be completely stopped before conducting any installation or maintenance procedures. Additional measures should be taken to avoid accidental motor starting.

Professionals working with electrical installations, either in the assembly, operation or maintenance, should use proper tools and be instructed on the application of standards and safety requirements, including the use of Personal Protective Equipment (PPE) that must be carefully observed in order to reduce risk of personal injury during these services.

Electric motors have energized circuits, exposed rotating parts and hot surfaces that may cause serious injury to people during normal operation. It is recommended that transportation, storage, installation, operation and maintenance services are always performed by qualified personnel.

Pacemaker users and unqualified personnel shall not open WMagnet and WQuattro motors, because high energy magnets are used.

Always follow the safety, installation, maintenance and inspection instructions in accordance with the applicable standards in each country.

4. HANDLING AND TRANSPORT

Individually packaged motors should never be lifted by the shaft or by the packaging. They must be lifted only by means of the eyebolts, when supplied. Use always suitable lifting devices to lift the motor. Eyebolts on the frame are designed for lifting the machine weight only as indicated on the motor nameplate. Motors supplied on pallets must be lifted by the pallet base with lifting devices fully supporting the motor weight. The package should never be dropped. Handle it carefully to avoid bearing damage.

Eyebolts provided on the frame are designed for lifting the machine only. Do not use these eyebolts for lifting the motor with coupled equipment such as bases, pulleys, pumps, reducers, etc..

Never use damaged, bent or cracked eyebolts. Always check the eyebolt condition before lifting the motor.

Eyebolts mounted on components, such as on end shields, forced ventilation kits, etc. must be used for lifting these components only. Do not use them for lifting the complete machine set.

Handle the motor carefully without sudden impacts to avoid bearing damage and prevent excessive mechanical stresses on the eyebolts resulting in its rupture.

Do not handle the motors by the polymeric components: fan cover, drip cover, terminal box and / or terminal box cover.

To move or transport motors with cylindrical roller bearings or angular contact ball bearings, use always the shaft locking device provided with the motor.
All HGF, W50, W51 HD and W60 motors, regardless of bearing type, must be transported with shaft locking device fitted.
Vertical mounted motors with oil-lubricated bearings must be transported in the vertical position. If necessary to move or transport the motor in the horizontal position, install the shaft locking device on both sides (drive end and non-drive end) of the motor.

4.1 LIFTING

Before lifting the motor ensure that all eyebolts are tightened properly and the eyebolt shoulders are in contact with the base to be lifted, as shown in Figure 4. Figure 5 shows an incorrect tightening of the eyebolt.
Ensure that lifting machine has the required lifting capacity for the weight indicated on the motor nameplate.



Figure 4 - Correct tightening of the eyebolt



Figure 5 - Incorrect tightening of the eyebolt

The center-of-gravity may change depending on motor design and accessories. During the lifting procedures the maximum allowed angle of inclination should never be exceeded as specified below.

4.1.1 Horizontal motors with one eyebolt

For horizontal motors fitted with only one eyebolt, the maximum allowed angle-of-inclination during the lifting process should not exceed 30° in relation to the vertical axis, as shown in Figure 6.



Figure 6 - Maximum allowed angle-of-inclination for motor with one eyebolt

4.1.2 Horizontal motor with two eyebolts

When motors are fitted with two or more eyebolts, all supplied eyebolts must be used simultaneously for the lifting procedure.
There are two possible eyebolt arrangements (vertical and inclined), as shown below:

- For motors with vertical lifting eyebolts, as shown in Figure 7, the maximum allowed lifting angle should not exceed 45° in relation to the vertical axis. We recommend to use a spreader beam for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface;



Figure 7 - Maximum resulting angle for motors with two or more lifting eyebolts

- For HGF, W40, W50 and W51 HD motors, as shown in Figure 8, the maximum resulting angle should not exceed 30° in relation to the vertical axis;



Figure 8 - Maximum resulting angle for horizontal HGF, W40, W50 and W51 HD motors

For W60 motors, as shown in Figure 9, the use of a spreader beam is required for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface.

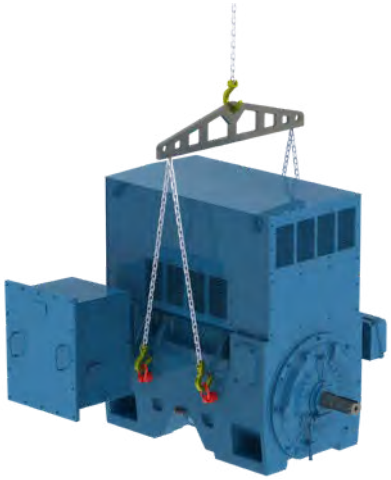


Figure 9 - Lifting for W60 motors with paralel chains

- For motors fitted with inclined eyebolts, as shown in Figure 10, the use of a spreader beam is required for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface.



Figure 10 - Use of a spreader beam for lifting

4.1.3 Vertical motors

For vertical mounted motors, as shown in Figure 11, the use of a spreader beam is required for maintaining the lifting element (chain or rope) in vertical position and thus preventing damage to the motor surface.



Figure 11 - Lifting of vertical mounted motors

Always use the eyebolts mounted on the top side of the motor, diametrically opposite, considering the mounting position. See Figure 12.



Figure 12 - Lifting of HGF, W50 and W51 HD motors.

4.1.3.1 Procedures to place W22/WEG General Purpose/WIN motors in the vertical position

For safety reasons during the transport, vertical mounted Motors are usually packed and supplied in horizontal position.
To place W22/WEG General Purpose/WIN motors fitted with eyebolts (see Figure 10), to the vertical position, proceed as follows:

1. Ensure that the eyebolts are tightened properly, as shown in Figure 4;
2. Remove the motor from the packaging, using the top mounted eyebolts, as shown in Figure 13;



Figure 13 - Removing the motor from the packaging

3. Install a second pair of eyebolts, as shown in Figure 14;



Figure 14 - Installation of the second pair of eyebolts

4. Reduce the load on the first pair of eyebolts to start the motor rotation, as shown in Figure 15. This procedure must be carried out slowly and carefully.



Figure 15 - End result: motor placed in vertical position

These procedures will help you to move motors designed for vertical mounting. These procedures are also used to place the motor from the horizontal position into the vertical position and vertical to horizontal.

For motors of IEC 112 to 200 frame (and equivalent NEMA), WEG has a kit of devices to facilitate the motor tipping to the vertical, with the point up or down (as shown in Figure 16 and Figure 17).



Figure 16 - Eyebolt to place the motor in vertical position, with the shaft end up (V6/V36)



Figure 17 - Eyebolts with extension fixed at NDE side to place the motor in vertical position, with the shaft end down (V5/V35)

4.1.3.2 Procedures to place HGF, W50 and W51 HD motors in the vertical position

HGF motors are fitted with eight lifting points: four at drive end and four at non-drive end. W50 and W51 HD motors are fitted with nine lifting points: four at drive end, one in the central part and four at non-drive end. The motors are usually transported in horizontal position, however for the installation they must be placed in the vertical position.

To place an these motors in the vertical position, proceed as follows:

1. Lift the motor by using the four lateral eyebolts and two hoists, see Figure 18;



Figure 18 - Lifting of HGF, W50 and W51 HD motors with two hoists

2. Lower the hoist fixed to motor drive end while lifting the hoist fixed to motor non-drive end until the motor reaches its equilibrium, see Figure 19;



Figure 19 - Placing HGF, W50 and W51 HD motors in vertical position

3. Remove the hoist hooks from the drive end eyebolts and rotate the motor 180° to fix the removed hooks into the two eyebolts at the motor non-drive end, see Figure 20;



Figure 20 - Lifting HGF, W50 and W51 HD motors by the eyebolts at the non-drive end

4. Fix the removed hoist hooks in the other two eyebolts at the non-drive end and lift the motor until the vertical position is reached, see Figure 21.



Figure 21 - HGF, W50 and W51 HD motors in the vertical position

These procedures will help you to move motors designed for vertical mounting. These procedures are also used to place the motor from the horizontal position into the vertical position and vertical to horizontal.

4.2 PROCEDURES TO PLACE W22/WEG GENERAL PURPOSE/WIN VERTICAL MOUNT MOTORS IN HORIZONTAL POSITION

To place W22/WEG General Purpose/WIN vertical mount motor in horizontal position, proceed as follows:
1. Ensure that all eyebolts are tightened properly, as shown in Figure 4;

2. Install the first pair of eyebolts and lift the motor as shown in Figure 22;



Figure 22 - Install the first pair of eyebolts

3. Install the second pair of eyebolts, as shown in Figure 23;



Figure 23 - Install the second pair of eyebolts

4. Reduce the load on the first pair of eyebolts for rotating the motor, as shown in Figure 24. This procedure must be carried out slowly and carefully;



Figure 24 - Motor is being rotated to horizontal position

5. Remove the first pair of eyebolts, as shown in Figure 25.



Figure 25 - Final result: motor placed in horizontal position

For IEC 112 to 200 (and NEMA equivalents), WEG has a device kit available to facilitate the procedure of tipping the motor for instalation in a vertical shaft up or shaft down position.

For Easy Maintenance, Wash, Brake motors, motors with forced ventilation, encoder or painting plan 212 or 213, please contact WEG.

5. STORAGE

If the motor is not installed immediately, it must be stored in a dry and clean environment, with relative humidity not exceeding 60%, with an ambient temperature between 5 °C and 40 °C, without sudden temperature changes, free of dust, vibrations, gases or corrosive agents. The motor must be stored in horizontal position, unless specifically designed for vertical operation, without placing objects on it. Do not remove the protection grease from shaft end to prevent rust.

If the motor are fitted with space heaters, they must always be turned on during the storage period or when the installed motor is out of operation. Space heaters will prevent water condensation inside the motor and keep the winding insulation resistance within acceptable levels. Store the motor in such position that the condensed water can be easily drained. If fitted, remove pulleys or couplings from the shaft end (more information are given on item 6).

The space heaters should never be energized when the motor is in operation.

5.1 EXPOSED MACHINED SURFACES

All exposed machined surfaces (like shaft end and flange) are factory-protected with temporary rust inhibitor. A protective film must be reapplied periodically (at least every six months), or when it has been removed and/or damaged.

5.2 STORAGE

The stacking height of the motor packaging during the storage period should not exceed 5 m, always considering the criteria indicated in Table 1:

Packaging type	Frame sizes	Maximum stacking quantity
Cardboard box	IEC 56 to 132 NEMA 143 to 215	Indicated on the top side of the cardboard box
Wood crate	IEC 56 to 315 NEMA 48 to 504/5	06
	IEC 355 NEMA 586/7 and 588/9	03
	W40 / W50 / W60 / W51 HD / HGF IEC 315 to 630 W40 / W50 / W51 HD / HGF NEMA 5000 to 9600	Indicated on the packaging

Table 1 - Maximum recommended stacking height

Notes:
1) Never stack larger packaging onto smaller packaging;
2) Align the packaging correctly (see Figure 26 and Figure 26);

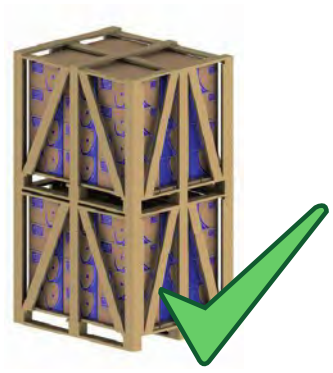


Figure 26 - Correct stacking

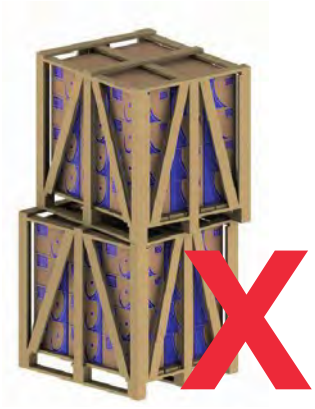


Figure 26 - Incorrect stacking

3) The feet of the crates above should always be supported by suitable wood battens (Figure 27) and never stand on the steel tape or without support (Figure 27);

ENGLISH



Figure 27 - Correct stacking



Figure 27 - Incorrect stacking

4) When stacking smaller crates onto longer crates, always ensure that suitable wooden supports are provided to withstand the weight (see Figure 28). This condition usually occurs with motor packaging above IEC 225S/M (NEMA 364/5T) frame sizes.



Figure 28 - Use of additional battens for stacking

5.3 BEARINGS

5.3.1 Grease lubricated bearings

We recommend rotating the motor shaft at least once a month (by hand, at least five revolutions, stopping the shaft at a different position from the original one). The shaft might not rotate freely in WMagnet and WQuattro motors, due to alignment torque from the magnets. It might be necessary to use a lever.

When rotating the shaft, it is necessary to certify that the terminals are insulated to eliminate the risc of electric shock from induced voltage.

If the motor is fitted with shaft locking device, remove it before rotating the shaft and install it again before performing any handling procedure.

Vertical motors may be stored in the vertical or in horizontal position. If motors with open bearings are stored longer than six months, the bearings must be relubricated according to item 8.2 before commissioning of the motor.

If the motor is stored for longer than 2 years, the bearings must be replaced or removed, washed, inspected and relubricated according to item 8.2.

5.3.2 Oil lubricated bearings

The motor must be stored in its original operating position and with oil in the bearings. Correct oil level must be ensured. It should be in the center of the sight glass.

During the storage period, remove the shaft locking device and rotate the shaft by hand every month, at least five revolutions, thus achieving an even oil distribution inside the bearing and maintaining the bearing in good operating conditions. Reinstall the shaft locking device every time the motor has to be moved.

If the motor is stored for a period equal or longer than the oil change interval, the oil must be replaced according to Item 8.2, before starting the operation. If the motor is stored for a period of over two years, the bearings must be replaced or removed, washed according to manufacturer instructions, checked and relubricated according to Item 8.2. The oil of vertical mounted motors is removed to prevent oils leaks during the transport. After receiving the motor the bearings must be lubricated.

5.3.3 Oil Mist lubricated bearings

The motor must be stored in horizontal position. Lubricate the bearings with ISO VG 68 mineral oil in the amount indicated in the Table 2 (this is also valid for bearings with equivalent dimensions). After filling with oil, rotate the shaft by hand, at least five revolutions)
During the storage period, remove the shaft locking device (if any) and rotate the shaft by hand every week, at least five revolutions, stopping it at a different position from the original one. Reinstall the shaft locking device every time the motor has to be moved. If the motor is stored for a period of over two years, the bearings must be replaced or removed, washed according to manufacturer instructions, checked and relubricated according to item 8.2.

Bearing size	Amount of oil (ml)	Bearing size	Amount of oil (ml)
6201	15	6309	65
6202	15	6311	90
6203	15	6312	105
6204	25	6314	150
6205	25	6315	200
6206	35	6316	250
6207	35	6317	300
6208	40	6319	350
6209	40	6320	400
6211	45	6322	550
6212	50	6324	600
6307	45	6326	650
6308	55	6328	700

Table 2 - Amount of oil per bearing

The oil must always be removed when the motor has to be handled. If the oil mist system is not operating after installation, fill the bearings with oil to prevent bearing rusting. During the storage period, rotate the shaft by hand, at least five revolutions, stopping it at a different position from the original one. Before starting the motor, all bearing protection oil must be drained from the bearing and the oil mist system must be switched ON.

5.3.4 Sleeve bearing

The motor must be stored in its original operating position and with oil in the bearings. Correct oil level must be ensured. It should be in the middle of the sight glass. During the storage period, remove the shaft locking device and rotate the shaft by hand every month, at least five revolutions, and at 30 rpm, thus achieving an even oil distribution inside the bearing and maintaining the bearing in good operating conditions. Reinstall the shaft locking device every time the motor has to be moved.
If the motor is stored for a period equal or longer than the oil change interval, the oil must be replaced, according to Item 8.2, before starting the operation.
If the motor is stored for a period longer than the oil change interval, or if it is not possible to rotate the motor shaft by hand, the oil must be drained and a corrosion protection and dehumidifiers must be applied.

5.4 INSULATION RESISTANCE

We recommend measuring the winding insulation resistance at regular intervals to follow-up and evaluate its electrical operating conditions. If any reduction in the insulation resistance values are recorded, the storage conditions should be evaluated and corrected, where necessary.

5.4.1 Insulation resistance measurement



The insulation resistance must be measured in a safe environment.

The insulation resistance must be measured with a megohmmeter. The machine must be in cold state and disconnected from the power supply.



To prevent the risk of an electrical shock, ground the terminals before and after each measurement. Ground the capacitor (if any) to ensure that it is fully discharged before the measurement is taken.

It is recommended to insulate and test each phase separately. This procedure allows the comparison of the insulation resistance between each phase. During the test of one phase, the other phases must be grounded.
The test of all phases simultaneously evaluates the insulation resistance to ground only but does not evaluate the insulation resistance between the phases.

The power supply cables, switches, capacitors and other external devices connected to the motor may considerably influence the insulation resistance measurement. Thus all external devices must be disconnected and grounded during the insulation resistance measurement.
Measure the insulation resistance one minute after the voltage has been applied to the winding. The applied voltage should be as shown in Table 3.

Winding rated voltage (V)	Testing voltage for measuring the insulation resistance (V)
< 1000	500
1000 - 2500	500 - 1000
2501 - 5000	1000 - 2500
5001 - 12000	2500 - 5000
> 12000	5000 - 10000

Table 3 - Voltage for the insulation resistance

The reading of the insulation resistance must be corrected to 40 °C as shown in the Table 4.

Measuring temperature of the insulation resistance (°C)	Correction factor of the insulation resistance corrected to 40 °C	Measuring temperature of the insulation resistance (°C)	Correction factor of the insulation resistance corrected to 40 °C
10	0.125	30	0.500
11	0.134	31	0.536
12	0.144	32	0.574
13	0.154	33	0.616
14	0.165	34	0.660
15	0.177	35	0.707
16	0.189	36	0.758
17	0.203	37	0.812
18	0.218	38	0.871
19	0.233	39	0.933
20	0.250	40	1.000
21	0.268	41	1.072
22	0.287	42	1.149
23	0.308	43	1.231
24	0.330	44	1.320
25	0.354	45	1.414
26	0.379	46	1.516
27	0.406	47	1.625
28	0.435	48	1.741
29	0.467	49	1.866
30	0.500	50	2.000

Table 4 - Correction factor for the insulation resistance corrected to 40 °C

The motor insulation condition must be evaluated by comparing the measured value with the values indicated in Table 5 (corrected to 40 °C):

Limit value for rated voltage up to 1.1 kV (MΩ)	Limit value for rated voltage above 1.1 kV (MΩ)	Situation
Up to 5	Up to 100	Dangerous. The motor can not be operated in this condition
5 to 100	100 to 500	Regular
100 to 500	Higher than 500	Good
Higher than 500	Higher than 1000	Excellent

Table 5 - Evaluation of the insulation system

The values indicated in the table should be considered only as reference values. It is advisable to log all measured values to provide a quick and easy overview on the machine insulation resistance.
If the insulation resistance is low, moisture may be present in the stator windings. In this case the motor should be removed and transported to a WEG authorized Service Center for proper evaluation and repair (This service is not covered by the warranty). To improve the insulation resistance through the drying process, see section 8.4.

6. INSTALLATION

The insulation resistance must be measured in a safe environment.

Check some aspects before proceeding with the installation:

1. Insulation resistance: must be within the acceptable limits. See item 5.4.
2. Bearings:
   If the motor is installed without running immediately, proceed as described in item 5.3.
3. Operating conditions of the start capacitors: If single-phase motors are stored for a period of over two years, it is recommended to change the start capacitors before motor starting since they lose their operating characteristics.
4. Terminal box:
   a. the inside of the terminal box must be clean and dry;
   b. the contacts must be correctly connected and corrosion free. See 6.9 and 6.10;
   c. the cable entries must be correctly sealed and the terminal box cover properly mounted in order to ensure the degree of protection indicated on the motor nameplate.
5. Cooling: the cooling fins, air inlet and outlet openings must be clean and unobstructed. The distance between the air inlet openings and the wall should not be shorter than ¼ (one quarter) of the diameter of the air inlet. Ensure sufficient space to perform the cleaning services. See item 7.
6. Coupling: remove the shaft locking device (where fitted) and the corrosion protection grease from the shaft end, including the grounding brush area, and flange immediately before installing the motor. See item 6.4.
7. Drain hole: the motor must always be positioned so the drain hole is at the lowest position (If there is any indication arrow on the drain, the drain must be so installed that the arrow points downwards).
   Motors supplied with rubber drain, threaded drain or any other open/close drain plugs must be opened periodically to allow the exit of condensed water. For environments with high water condensation levels and motor with degree of protection IP55, the drain plugs can be mounted in open position (see Figure 29).
   For motors with degree of protection IP56, IP65 or IP66, the drain plugs must remain at closed position (see Figure 29), being opened only during the motor maintenance procedures.
   The drain system of motors with Oil Mist lubrication system must be connected to a specific collection system (see Figure 29).

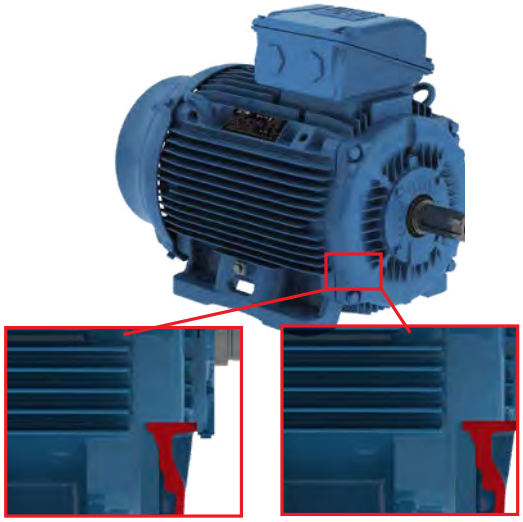


Figure 29 - Detail of the rubber drain plug mounted in closed and open position

8. Additional recommendations:
   a. Check the direction of motor rotation, starting the motor at no-load before coupling it to the load;
   b. Vertical mounted motors with shaft end down must be fitted with drip cover to protect them from liquids or solids that may drop onto the motors;
   c. Vertical mounted motors with shaft end up should be fitted with water slinger ring to prevent water ingress inside the motor.
   d. The fixing elements mounted in the threaded through holes in the motor enclosure (for example, the flange) must be properly sealed.

Remove or fix the shaft key before starting the motor.

Changes on the motor construction (features), such as installation of extended grease fittings or modification of the lubrication system, installation of accessories at alternative locations, etc., can be carried out only after prior written consent from WEG.

6.1 FOUNDATIONS

The foundation is the structure, structural element, natural or prepared base, designed to withstand the stresses produced by the installed equipment, ensuring safe and stable performance during operation. The foundation design should consider the adjacent structures to avoid the influences of other installed equipment and no vibration is transferred through the structure

The foundation must be flat and its selection and design must consider the following characteristics:

a) The features of the machine to be installed on the foundation, the driven loads, application, maximum allowed deformations and vibration levels (for instance, motors with reduced vibration levels, foot flatness, flange concentricity, axial and radial loads, etc. lower than the values specified for standard motors).

b) Adjacent buildings, conservation status, maximum applied load estimation, type of foundation and fixation and vibrations transmitted by theses constructions.

If the motor is supplied with leveling/alignment bolts, this must be considered in the base design.

Please consider for the foundation dimensioning all stresses that are generated during the operation of the driven load.
The user is responsible for the foundation designing and construction.

The foundation stresses can be calculated by using the following equations (see Figure 6.2):

$$F_1 = 0,5 * g * m - (4 * T_b / A)$$
$$F_2 = 0,5 * g * m + (4 * T_b / A)$$

Where:

F_1 and F_2 = lateral stresses (N);
g = gravitational acceleration (9,8 m/s^2);
m = motor weight (kg);
T_b = breakdown torque (Nm);
A = distance between centerlines of mounting holes in feet or base of the machine (end view) (m).

The motors may be mounted on:

- Concrete bases: are most used for large-size motors (Figure 30);
- Metallic bases: are generally used for small-size motors (Figure 31).

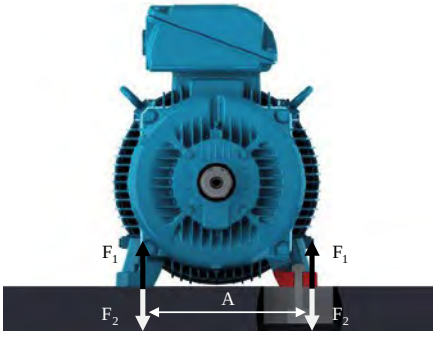


Figure 30 - Motor installed on concrete base



Figure 31 - Motor installed on metallic base

The metallic and concrete bases may be fitted with sliding system. These types of foundations are generally used where the power transmission is achieved by belts and pulleys. This power transmission system is easier to assemble/disassemble and allows the belt tension adjustment. Other important aspect of this foundation type is the location of the base locking screws that must be diagonally opposite. The rail nearest the drive pulley is placed in such a way that the positioning bolt is between the motor and the driven machine. The other rail must be placed with the bolt on the opposite side (diagonally opposite), as shown in Figure 32.

To facilitate assembly, the bases may have the following features:

- Shoulders and/or recesses;
- Anchor bolts with loose plates;
- Bolts cast in the concrete;
- Leveling screws;
- Positioning screws;
- Steel & cast iron blocks, plates with flat surfaces.

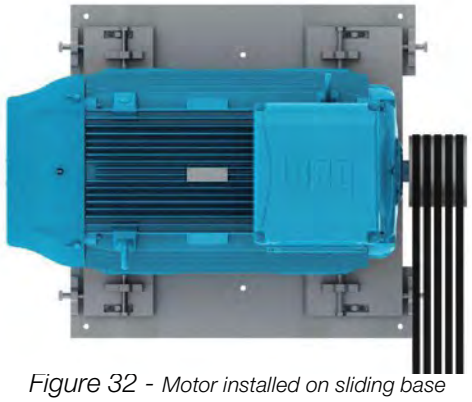


Figure 32 - Motor installed on sliding base

After completing the installation, it is recommended that all exposed machined surfaces are coated with suitable rust inhibitor.

6.2 MOTOR MOUNTING

Footless motors supplied with transportation devices, according to Figure 33, must have their devices removed before starting the motor installation.

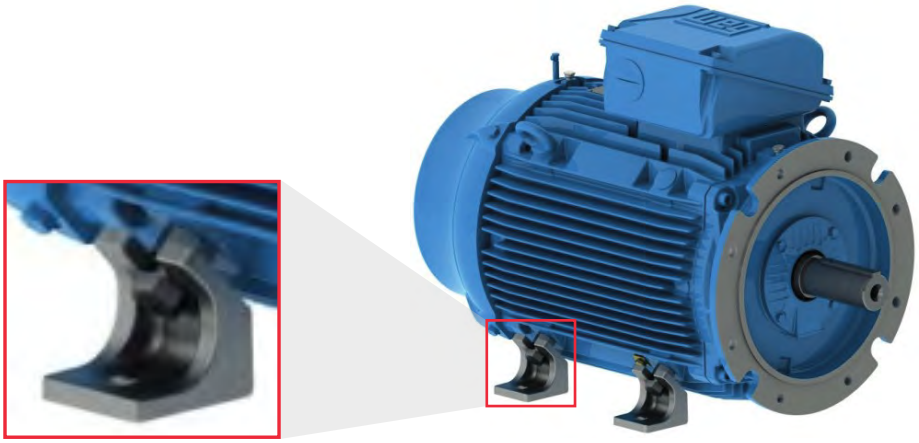


Figure 33 - Detail of the transportation devices for footless motors

6.2.1 Foot mounted motors

The drawings of the mounting hole dimensions for NEMA or IEC motors can be checked in the respective technical catalogue.
The motor must be correctly aligned and leveled with the driven machine. Incorrect alignment and leveling may result in bearing damage, generate excessive vibration and even shaft distortion/breakage.
For more details, see section 6.3 and 6.6. The thread engagement length of the mounting bolt should be at least 1.5 times the bolt diameter. This thread engagement length should be evaluated in more severe applications and increased accordingly.
Figure 6.6 shows the mounting system of a foot mounted motor indicating the minimum required thread engagement length.

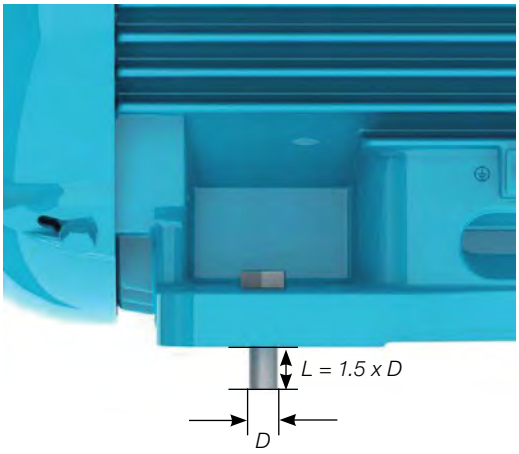


Figure 34 - Mounting system of a foot mounted motor

6.2.2 Flange mounted motors

The drawings of the flange mounting dimensions, IEC and NEMA flanges, can be checked in the technical catalogue. The coupling of the driven equipment to the motor flange must be properly dimensioned to ensure the required concentricity of the assembly.
Depending on the flange type, the mounting can be performed from the motor to the driven equipment flange (flange FF (IEC) or D (NEMA)) or from the driven equipment flange to the motor (flange C (DIN or NEMA)).
For the mounting process from the driven equipment flange to the motor, you must consider the bolt length, flange thickness and the thread depth of the motor flange.

In cases that use polymer flanges with a built-in nut or the aluminum flange with hexagonal hole, the length of the motor fixing screw must not exceed the length of the hole, thus avoiding misalignment and clearance of the coupling.

If the motor flange has tapped through-holes, the length of the mounting bolts must not exceed the tapped through-hole length of the motor flange, thus preventing damage to the winding head.

Motors with aluminum frame and/or flange can be supplied with hexagonal holes for flange mounting. These holes are suitable for receiving cylindrical screws compatible with standardized coupling dimensions, with attention to the minimum screw strength class according to the product catalog.
For flange mounting the thread engagement length of the mounting bolt should be at least 1.5 times the bolt diameter. In severe applications, longer thread engagement length may be required.

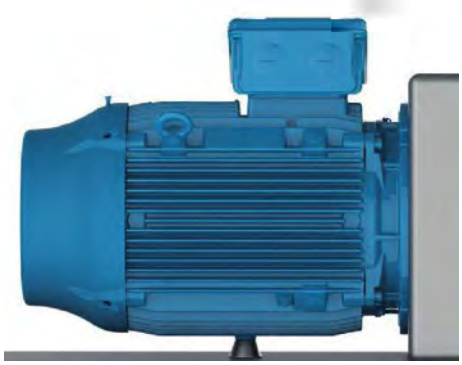


Figure 35 - Mounting method of flange mounted motors with frame base support

In severe applications or if large motors are flange mounted, a foot or pad mounting may be required in addition to the flange mounting (Figure 35). The motor must never be supported on its cooling fins.

The tightening torques indicated in Table 6 must be respected when:
- fixing a polymeric foot and/or flange to the customer equipment for W12/WEG General Purpose motors;
- installing polymeric fan covers for WEG General Purpose and WIN motors and/or changing/rotating the position of the terminal box for W12/WEG General Purpose motors.

For installation of W12/WEG General Purpose motors in frame sizes IEC56, W63 and W71 in the vertical position with the shaft upwards, the foot must be locked axially by the fixing of a flat head screw as indicated.
The hexagonal holes in the C-DIN flanges of W12/WEG General Purpose motors in frame sizes IEC56/W63/W71 are suitable for the screws indicated in Table 6.

Frame	Component	Bolt/Screw specification (Thread size x length)	Torque (Nm)
IEC56	Polymeric Foot	M5x12	8
W63/W71		M5x16	8
IEC56/W63/ W71	Polymeric Flange	-	8
	C-80	M5	5
	C-105	M6	6
160/180/200/W225/225/250/W280	Fan cover	M8 / M10	6 to 8
IEC 56/W63/W71	Terminal box/Grounding	M5	1,8 to 2,4
71/W80/90/W100/112/132	Terminal box/Grounding	M5	5

Table 6 - Tightening torque and screw specification for W12/WEG General Purpose motors.

Note:
When liquid (for example oil) is likely to come into contact with the shaft seal, please contact your local WEG representative.

For WFL motors, the flange has hexagonal holes suitable for M6 screws (maximum torque 8 Nm), and the screws must have at least a 5.6 resistance class. The length of the screws that will be used in the application to fix the motor to the equipment must not exceed the thickness of the endshield wall where they are mounted, at the risk of damaging the motor coil head and causing electric shock. The application screw must be embedded into the endshield with a minimum depth of 7 mm and a maximum of 9 mm.

6.2.3 Pad mounted motors

Typically, this method of mounting is used in axial fans. The motor is fixed by tapped holes in the frame. The dimensions of these tapped holes can be checked in the respective product catalogue. The selection of the motor mounting rods/bolts must consider the dimensions of the fan case, the installation base and the thread depth in the motor frame.
The mounting rods and the fan case wall must be sufficiently stiff to prevent the transmission of excessive vibration to the machine set (motor & fan). Figure 35 shows the pad mounting system.

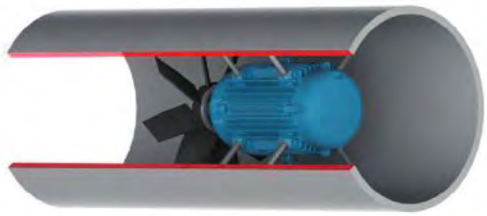


Figure 36 - Mounting of the motor inside the cooling duct

6.3 BALANCING

Unbalanced machines generate vibration which can result in damage to the motor. WEG motors are dynamically balanced with “half key” and without load (uncoupled). Special balancing quality level must be stated in the Purchase Order.

The transmission elements, such as pulleys, couplings, etc., must balanced with “half key” before they are mounted on the motor shaft.

The balance quality grade meets the applicable standards for each product line.
The maximum balancing deviation must be recorded in the installation report.

6.4 COUPLINGS

Couplings are used to transmit the torque from the motor shaft to the shaft of the driven machine. The following aspects must be considered when couplings are installed:

- Use proper tools for coupling assembly & disassembly to avoid damages to the motor and bearings;
- Whenever possible, use flexible couplings, since they can absorb eventual residual misalignments during the machine operation;
- The maximum loads and speed limits informed in the coupling and motor manufacturer catalogues cannot be exceeded;
- Level and align the motor as specified in sections 6.5 and 6.6, respectively.

Remove or fix the shaft key firmly when the motor is operated without coupling in order to prevent accidents.

6.4.1 Direct coupling

Direct coupling is characterized when the Motor shaft is directly coupled to the shaft of the driven machine without transmission elements. Whenever possible, use direct coupling due to lower cost, less space required for installation and more safety against accidents.

Do not use roller bearings for direct coupling, unless sufficient radial load is expected.

6.4.2 Gearbox coupling

Gearbox coupling is typically used where speed reduction is required.
Make sure that shafts are perfectly aligned and strictly parallel (in case of straight spur gears) and in the right meshing angle (in case of bevel and helical gears).

6.4.3 Pulley and belt coupling

Pulleys and belts are used when speed increase or reduction between motor shaft and driven load is required.

Excessive belt tension will damage the bearings and cause unexpected accidents such as breakage of the motor shaft.

6.4.4 Coupling of sleeve bearing motors

Motors designed with sleeve bearings must be operated with direct coupling to the driven machine or a gearbox. Pulley and belts can not be applied for sleeve bearing motors.

Motors designed with sleeve bearings have 3 (three) marks on the shaft end. The center mark is the indication of the magnetic center and the 2 (two) outside marks indicate the allowed limits of the rotor axial movement, as shown in Figure 36
The motor must be so coupled that during operation the arrow on the frame is placed over the central mark indicating the rotor magnetic center. During start-up, or even during operation, the rotor may freely move between the two outside marks when the driven machine exerts an axial load on the motor shaft. However, under no circumstance, the motor can operate continuously with axial forces on the bearing.

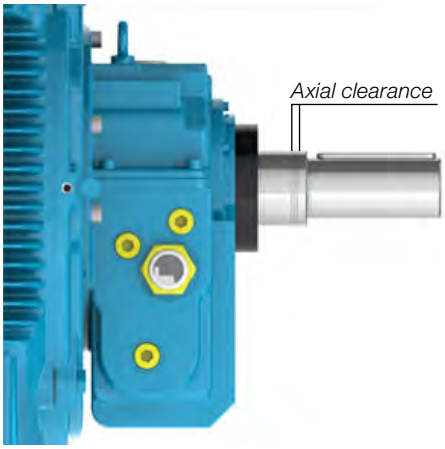


Figure 37 - Axial clearance of motor designed with sleeve bearing.

For coupling evaluation consider the maximum axial bearing clearance as shown in Table 7.
The axial clearance of the driven machine and coupling influence the maximum bearing clearance.

Bearing size	Total axial clearance (mm)
9*	3 + 3 = 6
11*	4 + 4 = 8
14*	5 + 5 =10
18	7,5 + 7,5 = 15

Table 7 - Clearance used for sleeve bearings

** For Motors in accordance with API 541, the total axial clearance is 12.7 mm*

The sleeve bearings used by WEG were not designed to support axial load continuously.
Under no circumstance must the motor be operated continuously at its axial clearance limits.

6.5 LEVELING

The motor must be leveled to correct any deviations in flatness arising from the manufacturing process and the material structure rearrangement. The leveling can be carried out by a leveling screw fixed on the motor foot or on the flange or by means of thin compensation shims. After the leveling process, the leveling height between the motor mounting base and the motor cannot exceed 0.1 mm.
If a metallic base is used to level the height of the motor shaft end and the shaft end of the driven machine, level only the metallic base relating to the concrete base.

Record the maximum leveling deviations in the installation report.

6.6 ALIGNMENT

The correct alignment between the motor and the driven machine is one of the most important variables that extends the useful service life of the motor. Incorrect coupling alignment generates high loads and vibrations reducing the useful life of the bearings and even resulting in shaft breakages. Figure38 illustrates the misalignment between the motor and the driven machine.

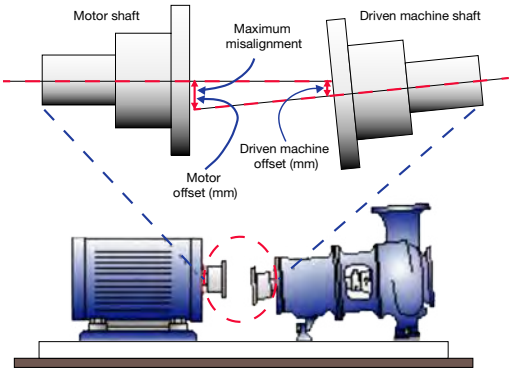
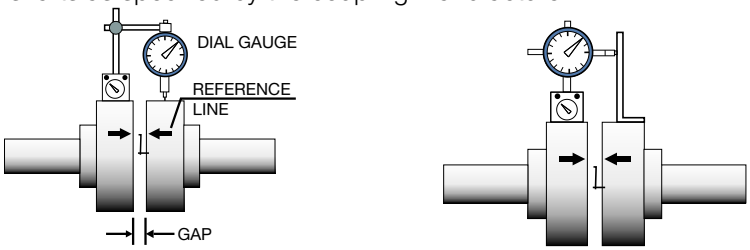


Figure 38 - Typical misalignment condition

Alignment procedures must be carried out using suitable tools and devices, such as dial gauge, laser alignment instruments, etc.. The motor shaft must be aligned axially and radially with the driven machine shaft.

The maximum allowed eccentricity for a complete shaft turn should not exceed 0.03 mm, when alignment is made with dial gauges, as shown in Figure 39. Ensure a gap between couplings to compensate the thermal expansion between the shafts as specified by the coupling manufacturer.



Parallel alignment *Angular alignment*

Figure 39 - Alignment with dial gauge

If alignment is made by a laser instrument, please consider the instructions and recommendations provided by the laser instrument manufacturer.
The alignment should be checked at ambient temperature with machine at operating temperature.

The coupling alignment must be checked periodically.

Pulley and belt couplings must be so aligned that the driver pulley center lies in the same plane of the driven pulley center and the motor shaft and the shaft of the driven machine are perfectly parallel.
After completing the alignment procedures, ensure that mounting devices do not change the motor and machine alignment and leveling resulting into machine damage during operation.

It is recommended to record the maximum alignment deviation in the Installation Report.

6.7 CONNECTION OF OIL LUBRICATED OR OIL MIST LUBRICATED MOTORS

When oil lubricated or oil mist lubricated motors are installed, connect the existing lubricant tubes (oil inlet and oil outlet tubes and motor drain tube), as shown in Figure 40. The lubrication system must ensure continuous oil flow through the bearings as specified by the manufacturer of the installed lubrication system.

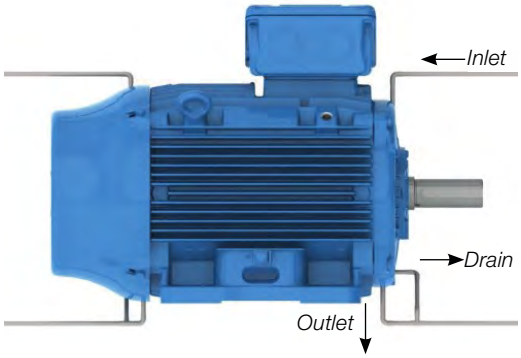


Figure 40 - Oil supply and drain system of oil lubricated or oil mist lubricated motors

6.8 CONNECTION OF THE COOLING WATER SYSTEM

When water cooled motors are installed, connect the water inlet and outlet tubes to ensure proper motor cooling. According to item 7.2, ensure correct cooling water flow rate and water temperature in the motor cooling system.

6.9 ELECTRICAL CONNECTION

Consider the rated motor current, service factor, starting current, environmental and installation conditions, maximum voltage drop, etc. to select appropriate power supply cables and switching and protection devices.
All motors must be installed with overload protection systems. Three-phase motors should be fitted with phase fault protection systems.

Before connecting the motor, check if the power supply voltage and the frequency comply with the motor nameplate data. All wiring must be made according to the connection diagram on the motor nameplate. Please consider the connection diagrams in the Tables 8 and 10 as reference value.
To prevent accidents, check if motor has been solidly grounded in accordance with the applicable standards.

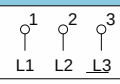
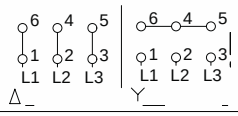
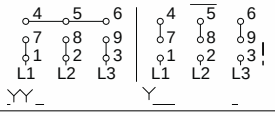
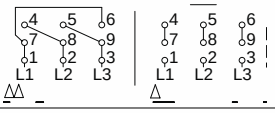
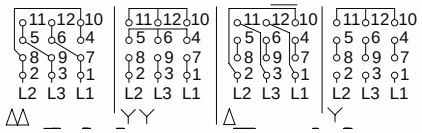
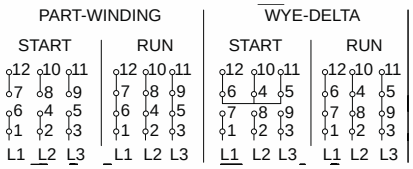
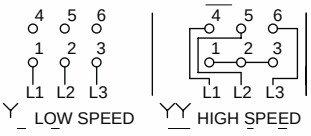
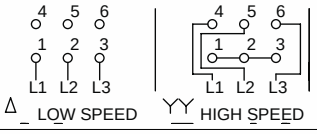
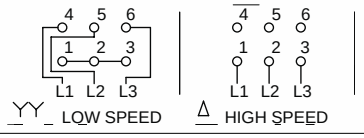
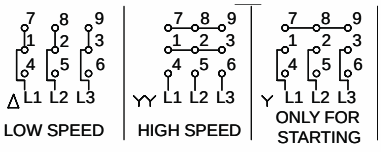
Configuration	Quantity of leads	Type of connection	Connection diagram
Single speed	3	-	
	6	Δ - Y	
	9	YY - Y	
		ΔΔ - Δ	
	12	ΔΔ - YY - Δ - Y	
		Δ - PWS Part-winding start	
Double speed Dahlander	6	YY - Y Variable Torque	
		Δ - YY Constant Torque	
		YY - Δ Constant Output	
	9	Δ - Y - YY	
Double speed Double winding	6	-	

Table 8 - Typical connection diagram for three-phase motors.

Lead identification on the wiring diagram		1	2	3	4	5	6	7	8	9	10	11	12
Single speed	NEMA MG 1 Part 2	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
	IEC 60034-8	U1	V1	W1	U2	V2	W2	U3	V3	W3	U4	V4	W4
Double speed (Dahlander / Double winding)	NEMA MG 1 Part 2[1)]	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W
	IEC 60034-8	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W

Table 9 - Equivalent table for lead identification

1) NEMA MG 1 Part 2 defines T1 to T12 for two or more winding, however WEG adopts 1U to 4W.

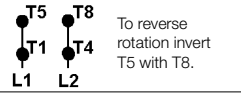
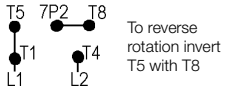
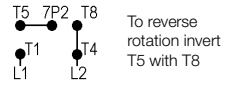
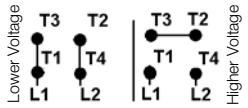
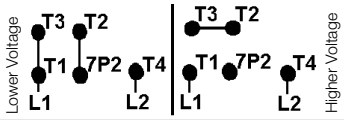
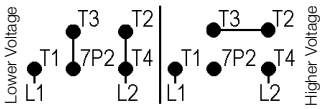
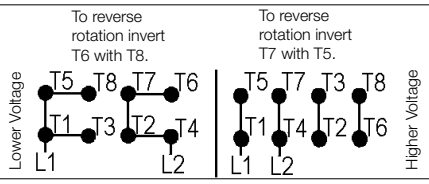
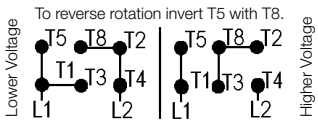
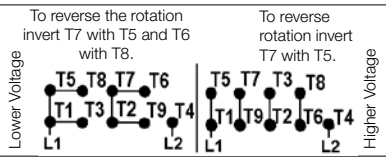
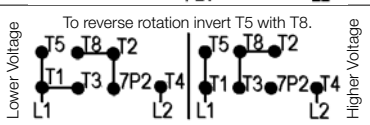
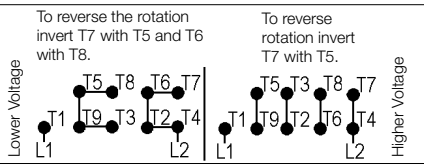
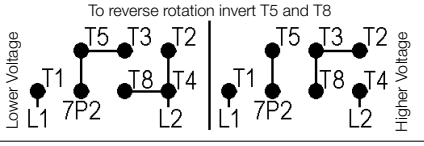
Voltage	Direction of Rotation	Thermal Protection	Type	Connection diagram
Single	CW or CCW	With or Without	Run / Permanent Capacitors Two values	
	Both	Without		
		Phenolic Thermal Protector		
		Thermostat		
Double	CW or CCW	Without	Run / Permanent Capacitors Two values or Split Phase	
		Phenolic Thermal Protector		
		Thermostat		
	Both	Without	Split Phase (without capacitor)	
			Run / Permanent Capacitors Two values	
		Phenolic Thermal Protector	Split Phase (without capacitor)	
			Run / Permanent Capacitors Two values	
		Thermostat	Split Phase (without capacitor)	
			Run / Permanent Capacitors Two values	

Table 10 - Typical connection diagram for single-phase motors.

W12/WEG General Purpose motors with polymeric terminal box cover have the connection diagram printed on its interior. To connect the cables, check on the nameplate the diagram code that must be used.

For motors with polymeric fan cover assembled by snap fit, to remove the polymeric fan cover use two crewdrivers or similar tool positioned near the snap fit region and remove one side by lifting carefully, repeat for the other sides until the complete removal of the fan cover.

Make sure that the motor is correctly connected to the power supply through safe and permanent contacts.

WARNING - Local Standards have priority on the definition of the connection standards.

The connections presented below are a reference for the connection of the customer's power cables on low voltage motors with terminal block. The terminal blocks presented below are the standard for each product line, however variations may occur.
It is recommended the use of terminals made of electrolytic copper or brass, similar to the terminals used on the motors cables.

K1M* terminal block

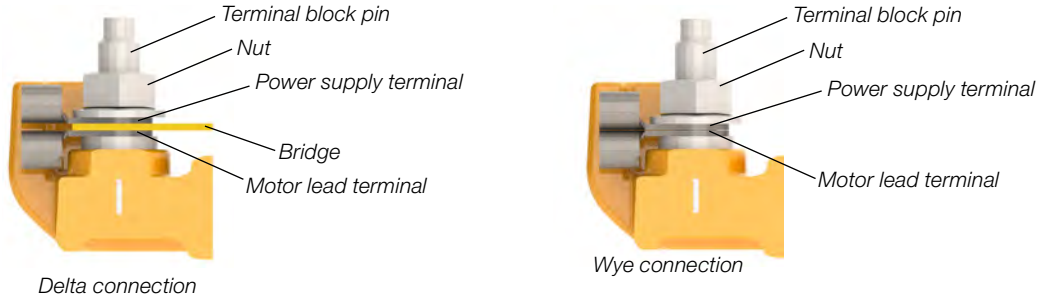


Figure 41 - Connetion for K1M terminal blocks*

KWLV* and KWMV* terminal blocks

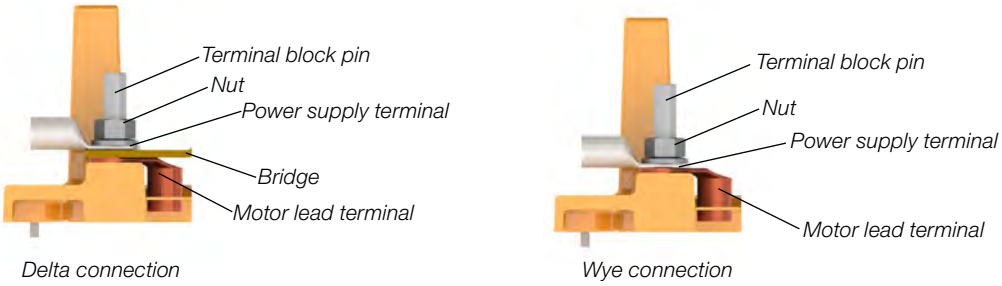


Figure 42 - Connetion for KWLV and KWMV* terminal blocks*

If motors are supplied without terminal blocks, insulate the cable terminals with suitable insulation material that meets the power supply voltage and the insulation class indicated on the motor nameplate.

Ensure correct tightening torque for the power cable and grounding connections as specified in Table 11.
The clearance distance (see Figure 6.15) between non-insulated live parts with each other and between grounded parts must be as indicated in Table 6.4.



Figure 43 - Minimum clearance distance (mm) x supply voltage

Voltage	Minimum clearance distance (mm)
U ≤ 440 V	4
440 < U ≤ 690 V	5.5
690 < U ≤ 1000 V	8
1000 < U ≤ 6900 V	45
6900 < U ≤ 11000 V	70
11000 < U ≤ 16500 V	105

Table 11 - Minimum clearance distance (mm) x supply voltage

Even when the motor is off, dangerous voltages may be present inside the terminal box used for the space heater supply or winding energization when the winding is used as heating element.
Motor capacitors will hold a charge even after the power has been cut off. Do not touch the capacitors and/or motor terminals, before discharging the capacitors completely. For WMagnet and WQuattro motors, even when the motor is disconnected from the power supply, there may be voltage in the motor's terminals if the rotor moves.

After the motor connection has been completed, ensure that no tool or foreign body has been left inside the terminal box.

Take the required measures in order to ensure the degree of protection indicated on the motor nameplate:
- unused cable inlet holes in the terminal boxes must be properly closed with threaded blanking plugs;
- components supplied loose (for example, terminal boxes mounted separately) must be properly closed and sealed.

The cable inlets used for power supply and control must be fitted with components (for example, cable-glands and conduits) that meet the applicable standards and regulations in each country.

If the motor is fitted with accessories, such as brakes and forced cooling systems, these devices must be connected to the power supply according to the information provided on their nameplates and with special care as indicated above.

In motors with polymeric terminal box and/or its cover, ensure that the fittings and locks of these components are correctly assembled after performing the cable connection.

For motors with terminal box knockouts, it is necessary to use a flathead screwdriver or similar tool and a hammer to detach the knockout, hammering the screwdriver several times until the knockout is removed. First, break the inside knockout, then if necessary, the external according to the cable gland size to be used. For the T-box polymeric knockouts, it can be necessary to use a blade or a driller to machine the hole and to not damage the auxiliary T-box. Caution, do not knock through to the inside of the terminal box and remove all material detached from the internal side of the t-box.
All protection devices, including overcurrent protection, must be set according to the rated machine conditions. These protection devices must protect the machine against short circuit, phase fault or locked rotor condition. The motor protection devices must be set according to the applicable standards.

Check the direction of rotation of the motor shaft. If there is no limitation for the use of unidirectional fans, the shaft rotation direction can be changed by reversing any two of the phase connections. For single-phase motor, check the connection diagram indicated on the motor nameplate.

6.10 CONNECTION OF THE THERMAL PROTECTION DEVICES

If the motor is supplied with temperature monitoring devices, such as, thermostat, thermistors, automatic thermal protectors, Pt-100 (RTD), etc., they must be connected to the corresponding control devices as specified on the accessory nameplates. The non-compliance with this procedure may void the product warranty and cause serious material damages.

Do not apply test voltage above 2.5 V on thermistors and current above 1 mA on RTDs (Pt-100) according to IEC 60751 standard.

Figure 43 and Figure 44 show the connection diagram of the bimetal thermal protector (thermostats) and thermistors, respectively.

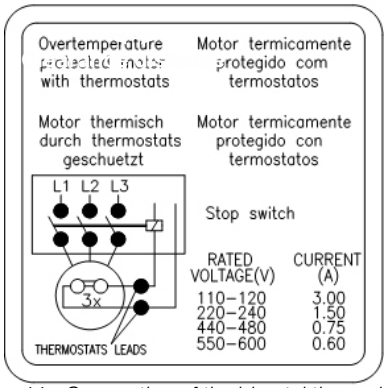


Figure 44 - Connection of the bimetal thermal protectors (thermostats)

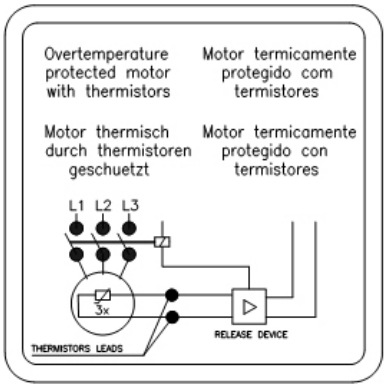


Figure 45 - Thermistor connection

The alarm temperature limits and thermal protection shutdowns can be defined according to the application; however these temperature limits can not exceed the values in Table 12

Component	Insulation class	Maximum temperature of the protection setting (°C)	
		Alarm	Tripping
Winding	B	-	130
	F	130	155
	H	155	180
Bearing	All	110	120

Table 12 - Maximum activation temperature of the thermal protections

Notes:
1) The number and type of the installed protection devices are stated on the accessory nameplate of the motor.
2) If the motor is supplied with calibrated resistance, (for example, Pt-100), the motor protection system must be set according to the operating temperatures indicated in Table 6.5.

6.11 RESISTANCE TEMPERATURE DETECTORS (PT-100)

The thermocouples Pt-100 are made of materials, whose resistance depends on the temperature variation, intrinsic property of some materials (usually platinum, nickel or copper), calibrated resistance. Its operation is based on the principle that the electric resistance of a metallic conductor varies linearly with the temperature, thus allowing a continuous monitoring of the motor warm-up through the controller display ensuring a high level of precision and answer stability. These devices are widely used for measuring temperatures in various industry sectors.
In general these devices are used in installations where precise temperature control is required, for example, in installation for irregular or intermittent duty. The same detector may be used for alarm and tripping purposes. Table 13 and Figure 45 show the equivalence between the Pt-100 resistance and the temperature. The Figure 46 shows the connection of a winding Pt-100.

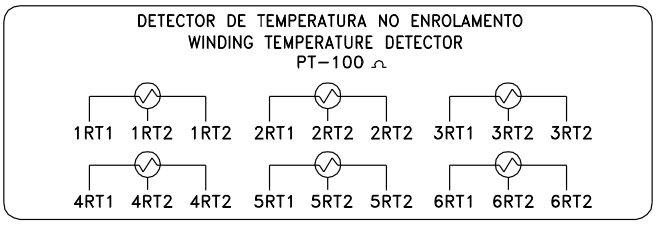


Figure 46 - Connection of winding Pt-100

°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-29	88.617	17	106.627	63	124.390	109	141.908	155	159.180
-28	89.011	18	107.016	64	124.774	110	142.286	156	159.553
-27	89.405	19	107.404	65	125.157	111	142.664	157	159.926
-26	89.799	20	107.793	66	125.540	112	143.042	158	160.298
-25	90.193	21	108.181	67	125.923	113	143.420	159	160.671
-24	90.587	22	108.570	68	126.306	114	143.797	160	161.043
-23	90.980	23	108.958	69	126.689	115	144.175	161	161.415
-22	91.374	24	109.346	70	127.072	116	144.552	162	161.787
-21	91.767	25	109.734	71	127.454	117	144.930	163	162.159
-20	92.160	26	110.122	72	127.837	118	145.307	164	162.531
-19	92.553	27	110.509	73	128.219	119	145.684	165	162.903
-18	92.946	28	110.897	74	128.602	120	146.061	166	163.274
-17	93.339	29	111.284	75	128.984	121	146.438	167	163.646
-16	93.732	30	111.672	76	129.366	122	146.814	168	164.017
-15	94.125	31	112.059	77	129.748	123	147.191	169	164.388
-14	94.517	32	112.446	78	130.130	124	147.567	170	164.760
-13	94.910	33	112.833	79	130.511	125	147.944	171	165.131
-12	95.302	34	113.220	80	130.893	126	148.320	172	165.501
-11	95.694	35	113.607	81	131.274	127	148.696	173	165.872
-10	96.086	36	113.994	82	131.656	128	149.072	174	166.243
-9	96.478	37	114.380	83	132.037	129	149.448	175	166.613
-8	96.870	38	114.767	84	132.418	130	149.824	176	166.984
-7	97.262	39	115.153	85	132.799	131	150.199	177	167.354
-6	97.653	40	115.539	86	133.180	132	150.575	178	167.724
-5	98.045	41	115.925	87	133.561	133	150.950	179	168.095
-4	98.436	42	116.311	88	133.941	134	151.326	180	168.465
-3	98.827	43	116.697	89	134.322	135	151.701	181	168.834

°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-2	99.218	44	117.083	90	134.702	136	152.076	182	169.204
-1	99.609	45	117.469	91	135.083	137	152.451	183	169.574
0	100.000	46	117.854	92	135.463	138	152.826	184	169.943
1	100.391	47	118.240	93	135.843	139	153.200	185	170.313
2	100.781	48	118.625	94	136.223	140	153.575	186	170.682
3	101.172	49	119.010	95	136.603	141	153.950	187	171.051
4	101.562	50	119.395	96	136.982	142	154.324	188	171.420
5	101.953	51	119.780	97	137.362	143	154.698	189	171.789
6	102.343	52	120.165	98	137.741	144	155.072	190	172.158
7	102.733	53	120.550	99	138.121	145	155.446	191	172.527
8	103.123	54	120.934	100	138.500	146	155.820	192	172.895
9	103.513	55	121.319	101	138.879	147	156.194	193	173.264
10	103.902	56	121.703	102	139.258	148	156.568	194	173.632
11	104.292	57	122.087	103	139.637	149	156.941	195	174.000
12	104.681	58	122.471	104	140.016	150	157.315	196	174.368
13	105.071	59	122.855	105	140.395	151	157.688	197	174.736
14	105.460	60	123.239	106	140.773	152	158.061	198	175.104
15	105.849	61	123.623	107	141.152	153	158.435	199	175.472
16	106.238	62	124.007	108	141.530	154	158.808	200	175.840

Table 13 - Equivalence between the Pt-100 resistance and the temperature

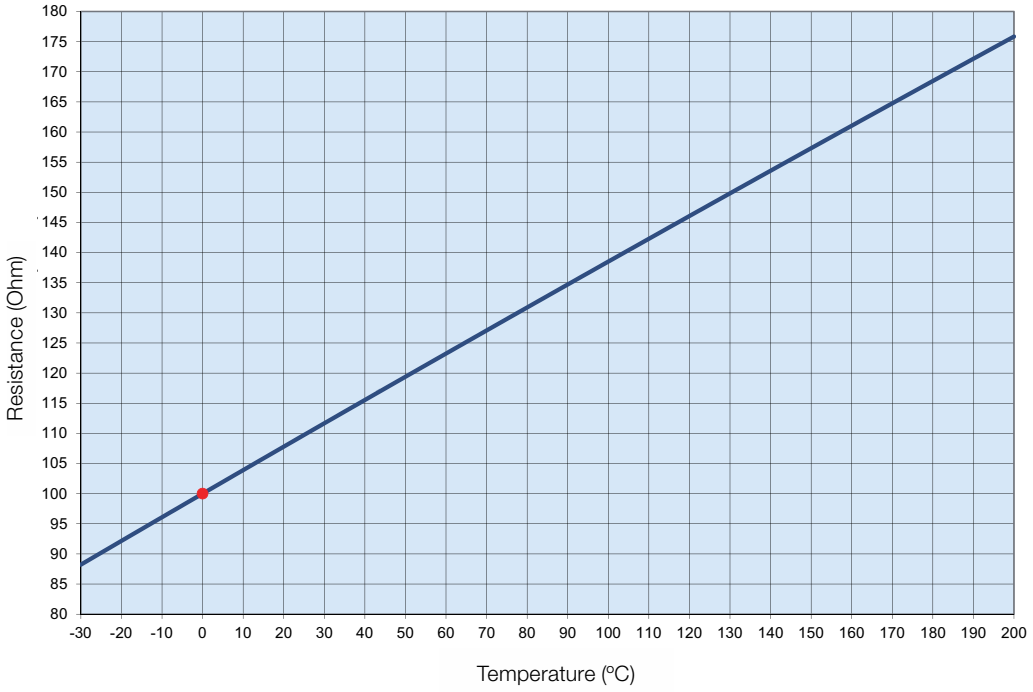


Figure 47 - Ohmic resistance of the Pt-100 x temperature

6.12 CONNECTION OF THE SPACE HEATERS

Before switching ON the space heaters, check if the space heaters connection have been made according to the connection diagram shown on the space heater nameplate. For motors supplied with dual voltage space heaters (110-127/220-240 V), see Figure 48.

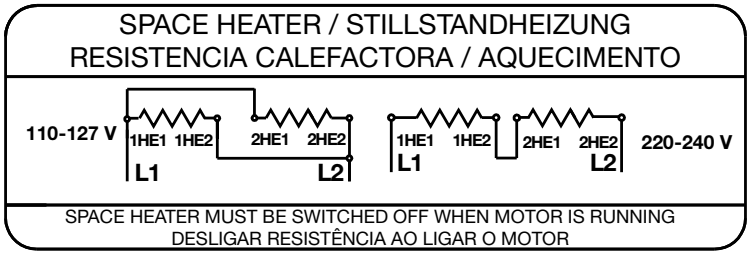


Figure 48 - Dual voltage space heater connection

The space heaters should never be energized when the motor is in operation.

6.13 STARTING METHODS

Whenever possible, the motor starting must be Direct On Line (DOL) at rated voltage. This is the most simple and feasible starting method. However, it must only be applied when the starting current does not affect the power supply. Please consider the local electric utility regulations when installing a motor.
High inrush current may result in:
a) high voltage drop in the power supply line creating unacceptable line disturbance on the distribution system; b) requiring oversized protection system (cables and contactor) increasing the installation costs.

If DOL starting is not allowed due to the reasons mentioned above, an indirect starting method compatible with the load and motor voltage to reduce the starting current may be used.
If reduced voltage starters are used for starting, the motor starting torque will also be reduced.

Table 14 shows the possible indirect starting methods that can be used depending on the number of the motor leads.

Number of leads	Possible starting methods
3 leads	Autotransformer Soft-starter
6 leads	Star-Delta Autotransformer Soft-starter
9 leads	Series/Parallel Part winding Autotransformer Soft-starter
12 leads	Star-Delta Series/Parallel Part winding Autotransformer Soft-starter

Table 14 - Starting method x number of motor leads

Table 15 shows examples of possible indirect starting methods to be used according to the voltage indicated on the motor nameplate and the power supply voltage.

Nameplate voltage	Operating voltage	Star-delta	Autotransformer starting	Starting by series/ parallel switch	Part-winding starting	Starting by Soft-starter
220/380 V	220 V 380 V	YES NO	YES YES	NO NO	NO NO	YES YES
220/440 V	220 V 440 V	NO NO	YES YES	YES NO	YES NO	YES YES
230/460 V	230 V 460 V	NO NO	YES YES	YES NO	YES NO	YES YES
380/660 V	380 V	YES	YES	NO	NO	YES
220/380/440 V	220 V 380 V 440 V	YES NO YES	YES YES YES	YES YES NO	YES YES NO	YES YES YES

Table 15 - Starting methods x voltage

Another possible starting method that does not overload the power supply network is the use of an inverter of frequency. For more information on motors powered by a frequency inverter, see item 6.14.

6.14 MOTORS DRIVEN BY FREQUENCY INVERTER

The operation with frequency inverter must be stated in the Purchase Order since this drive type may require some changes of the motor design.

The frequency inverter used to drive motors up to 690 V must be fitted with Pulse With Modulation (PWM) with vector control.
When a motor is driven by a frequency inverter at lower frequencies than the rated frequency, you must reduce the motor torque to prevent motor overheating. The torque reduction (derating torque) can be found in the item 6.4 of the “Technical Guidelines for Induction Motors driven by PWM Frequency inverters” available on the site www.weg.net.

If the motor is operated above the rated frequency, please note:
- That the motor must be operated at constant output;
- That the motor can supply max. 95% of its rated output;
- Do not exceed the maximum speed and please consider:
  - max. operating frequency stated on the additional nameplate;
  - mechanical speed limitation of the motor.

For WMagnet motors driven by non-WEG inverters, in addition to the speed limit stated in the motor data sheet, the maximum permitted speed limit must be checked to avoid burning the inverter in the event of a power failure. It should be considered according to the equation below:

$$RPM_{max} = \frac{0.9 * V_{rmsMax} * 1000}{ke}$$

Being,
RPM_{max} – Maximum speed allowed to avoid burning the inverter in the event of a power failure in [RPM].
V_{rmsMax} – Maximum input rms voltage of the inverter, as informed by the inverter manufacturer in [V].
ke – Parameter informed on the nameplate and in the motor data sheet in [V / kRPM].

Information on the selection of the power cables between the frequency inverter and the motor can be found in the item 6.4 of the "Technical Guidelines for Induction Motors driven by PWM Frequency inverters" available at www.weg.net.

6.14.1 Use of dV/dt filter

6.14.1.1 Motor with enameled round wire

Motors designed for rated voltages up to 690 V, when driven by frequency inverter, do not require the use of dV/dT filters, provided they comply with the criteria in Table 16.

Motor rated votage [1]	Peak voltage at the motor terminals (max)	dV/dt inverter output (max)	Inverter Rise Time [2] (min.)	MTBP [2] Time between pulses (min)
Vnom < 460 V	≤ 1600 V	≤ 5200 V/µs	≥ 0,1 µs	≥ 6 µs
460 ≤ Vnom < 575 V	≤ 2000 V	≤ 6500 V/µs		
575 ≤ Vnom ≤ 1000 V	≤ 2400 V	≤ 7800 V/µs		

Table 16 - Criteria for the selection of motors with round enameled wire when driven by frequency inverter

Notes:
1. For the application of dual voltage motors, example 380/660 V, consider the lower voltage (380 V).
2. Information supplied by the inverter manufacturer.

6.14.1.2 Motor with prewound coils

Motors with prewound coils (medium and high voltage motors regardless of frame sizes, and low voltage motors from IEC 500 / NEMA 800 frame on), designed for the use with frequency inverters, do not require the use of filters, provided they comply with the criteria in Table 17.

Motor rated voltage	Type of modulation	Turn to turn insulation (phase-phase)		Phase-ground insulation	
		Peak voltage at the motor terminals	dV/dt at the motor terminals	Peak voltage at the motor terminals	dV/dt at the motor terminals
690 < Vnom ≤ 4160 V	Sinusoidal	≤ 5900 V	≤ 500 V/µs	≤ 3400 V	≤ 500 V/µs
	PWM	≤ 9300 V	≤ 2700 V/µs	≤ 5400 V	≤ 2700 V/µs
4160 < Vnom ≤ 6600 V	Sinusoidal	≤ 9300 V	≤ 500 V/µs	≤ 5400 V	≤ 500 V/µs
	PWM	≤ 14000 V	≤ 1500 V/µs	≤ 8000 V	≤ 1500 V/µs

Table 17 - Criteria to be considered when using motor with prewound coils to be drive by frequency inverters

6.14.2 Bearing insulation

If motor must be driven by frequency inverter, insulate the bearing according to Table 18.

Frame size	Recommendation
IEC 315 and 355 NEMA 445/7 to L5810/11	■ Insulated bearing/end shield ■ Grounding between shaft and frame by grounding brush
IEC 400 and larger NEMA 680 and larger	■ Insulated NDE bearing ■ Grounding between shaft and frame by grounding brush

Table 18 - Recommendation on the bearing insulation for inverter driven motors

When motors are supplied with shaft grounding system, monitor the grounding brush constantly during its operation and, when it reaches the end of its useful life, it must be replaced by another brush with the same specification.
If a motor is supplied with an internal grounding brush, indicated by a tag in the product, it must be verified each time the bearings or any internal part of the motor is maintained.
Motors of frame sizes IEC 315, NEMA 445/7 and above, when inverter fed, must be equipped with shaft grounding kits.

For safe area motors and for verification testing purposes, contact pins can be installed on both sides of the bearing insulation, so that voltage measurements can be taken on the bearing, or, if the pins are connected by a cable or metallic strand (shorting-circuiting the bearing insulation), of the current through the bearing. It should be noted, however, that during the normal motor operation the bearing insulation must not be short-circuited.



Figure 49 - Metal flexible braid

6.14.3 Switching frequency

The minimum inverter switching frequency must not be lower than 2 kHz and should not exceed 5 kHz.

The non-compliance with the criteria and recommendations indicated in this manual may void the product warranty.

6.14.4 Mechanical speed limitation

Table below shows the maximum speeds allowed for motors driven by frequency inverter. For WMagnet motors, see the motor's data sheet or contact WEG.

Frame size		Polarity	Maximum speed for standard motors
NEMA	IEC		
254	160	2	5.200
		4	
		6	
284	180	2	4.800
		4	4.400
		6	
324/6	200L	2	3.700
		4	
		6	
364/5	225	2	
		4	3.600
		6	
404/5	250	2	3.700
		4	3.200
		6	
444/5 - 447/9	280	2	3.700
		4	2.400
		6	
5010/11	315	2	3.600
		4	2.400
L5010/11	355	2	3.600
		4	2.000
L5810/11	400	2	3.600
		4	1.800

Table 19 - Maximum motor speed W40 (em RPM)

Frame size		Polarity	Maximum speed for standard motors
NEMA	IEC		
5810/11	315	2	3600
		4	2000
		6	
L5810/11	355	2	3600
		4	1800
		6	
6810/11	400	2	3600
		4	1800
		6	1700

Table 20 - Maximum motor speed W60 (em RPM)

ENGLISH

Frame size		Polarity	Maximum speed for standard motors
NEMA	IEC		
-	63	2	12.300
		4	
		6	
-	71	2	11.300
		4	
		6	
-	80	2	10.300
		4	
		6	
143/5	90S	2	8.600
		4	
		6	
-	100L	2	7.800
		4	
		6	
182/4	112	2	7.600
		4	7.100
		6	
213/5	132	2	6.000
		4	5.900
		6	
254/6	160	2	5.300
		4	5.000
		6	
284/6	180	2	4.400
		4	
		6	
324/6	200L	2	4.200
		4	4.000
		6	
364/5	225	2	3.600
		4	3.200
		6	
404/5	250	2	3.600
		4	3.200
		6	
444/5 - 445/7	280	2	3.600
		4	3.200
		6	
447/9 - L447/9	-	2	-
		4	
		6	
504/5	315	2	3.600
		4	2.300
		6	
586/7 - 588/9	355	2	3.600
		4	1.900
		6	

Table 21 - Maximum motor speed W22 (em RPM)

Frame size	Polarity	Maximum speed for standard motors
NEMA		
W56	2	13600
	4	13600
56	2	12000
	4	12000
	6	13600
56H	2	12000
	4	12000
	6	10900
143/5T	2	10400
	4	10400
	6	10400
182/4T	2	8800
	4	8800
	6	8800
213/5T	2	6800
	4	6800
	6	6800
254/6T	2	5300
	4	5300
	6	5300

Table 22 - Maximum motor speed W01 (em RPM)

Frame size		Polarity	Maximum speed for standard motors
NEMA	IEC		
5009/10	315	2	3600
		4	2200
		6	
5809/10	355	2	3600
		4	1900
		6	
6806/07-6808/09	400	2	3600
		4	1800
		6	1700

Table 23 - Maximum motor speed W50 (em RPM)

Notes:
1. *When the motor has lip seals or Inproseals, contact WEG.*
2. *For speeds above the nominal one, measure the bearing vibration and temperature; if the temperature and vibration levels exceed the specified limits, contact WEG.*
3. *Check the DE bearing model on the motor plate.*
4. *For conditions other than those described in Tables 18 to 22, consult WEG.*

For more information on the application of frequency inverters, contact WEG or check the “Technical Guidelines for Induction Motors driven by PWM Frequency inverters” available at www.weg.net.

7. COMMISSIONING

7.1 INITIAL START-UP

After finishing the installation procedures and before starting the motor for the first time or after a long period without operation, the following items must be checked:

- If the nameplate data (voltage, current, connection diagram, degree of protection, cooling system, service factor, etc.) meet the application requirements;
- If the machine set (motor + driven machine) has been mounted and aligned correctly;
- If the motor driving system ensures that the motor speed does not exceed the max. allowed speed indicated in Table 6.12;
- Measure the winding insulation resistance, making sure it complies with the specified values in item 5.4;
- Check the motor rotation direction;
- Inspect the motor terminal box for damage and ensure that it is clean and dry and all contacts are rust-free, the seals are in perfect operating conditions and all unused threaded holes are properly closed thus ensuring the degree of protection indicated on the motor nameplate;
- Check if the motor wiring connections, including grounding and auxiliary equipment connection, have been carried out properly and are in accordance with the recommendations in item 6.9;
- Check the operating conditions of the installed auxiliary devices (brake, encoder, thermal protection device, forced cooling system, etc.);

- Check bearing operating conditions. If the motors are stored and/or installed for more than two years without running, it is recommended to change the bearings, or to remove, wash, inspect and relubricate them before the motor is started. If the motor is stored and/or installed according to the recommendations described in item 5.3, lubricate the bearings as described in item 8.2. For the bearing condition evaluation, it is recommended to use of the vibration analysis techniques: Envelope Analysis or Demodulation Analysis.
- For roller bearing motors with oil lubrication, ensure:
  - The oil level should be in the center of the sight glass (see Figure 51 and Figure 52);
  - That if the motor is stored for a period equal or longer than the oil change interval, the oil must be changed before starting the motor.
- When motors are fitted with sleeve bearings, ensure:
  - Correct oil level for the sleeve bearing. The oil level should be in the center of the sight glass (see Figure 8.3);
  - That the motor is not started or operated with axial or radial loads;
  - That if the motor is stored for a period equal or longer than the oil change interval, the oil must be changed before starting the motor.
- Inspect the capacitor operating condition, if any. If motors are installed for more than two years, but were never commissioned, it is recommended to change the start capacitors since they lose their operating characteristics;
- Ensure that the air inlet and outlet opening are not blocked. The minimum clearance to the nearest wall (L) should be at least ¼ of the fan cover diameter (D), see Figure 50. The intake air temperature must be at ambient temperature.

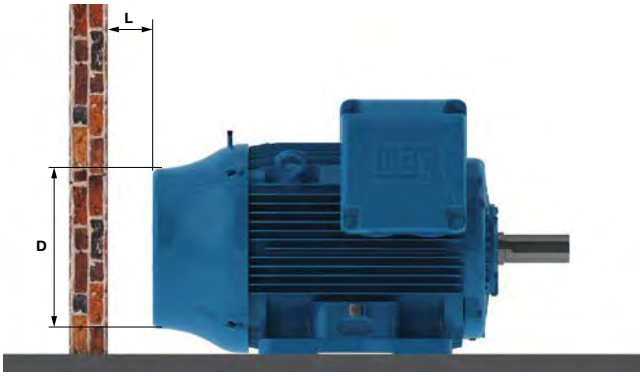


Figure 50 - Minimum clearance to the wall

Please consider the minimum distances shown in the Table 24 as reference value;

Frame size		Distance between the fan cover and the wall (L)	
IEC	**NEMA**	**mm**	**inches**
63	-	25	0.96
71	-	26	1,02
80	-	30	1.18
90	143/5	33	1.30
100	-	36	1.43
112	182/4	41	1.61
132	213/5	50	1.98
160	254/6	71	2,79
180	284/6	72	2,83
200 / W225	324/6	83	3,27
225 250	364/5 404/5	92	3,62
280	444/5 445/7 447/9	108	4.23
315	L447/9 504/5 5006/7/8 5009/10/11	122	4.80
355	586/7 588/9 5807/8/9 5810/11/12	136	5.35
400	6806/7/8 6809/10/11	147	5.79
450	7006/10	159	6.26
500	8006/10	171	6.73
560	8806/10	185	7.28
630	9606/10	200	7.87

Table 24 - Minimum distance between the fan cover and wall

- Ensure correct water flow rate and water temperature when water cooled motors are used. See item 7.2;
- Ensure that all rotating parts, such as pulleys, couplings, external fans, shaft, etc. are protected against accidental contact.

Other tests and inspections not included in the manual may be required, depending on the specific installation, application and/or motor characteristics.

After all previous inspections have been carried out, proceed as follows to start the motor:

- Start the motor on no-load (if possible) and check the motor direction of rotation. Check for the presence of any abnormal noise, vibration or other abnormal operating conditions;
- Ensure the motor starts smoothly. If any abnormal operating condition is noticed, switch off the motor, check the assembly system and connections before the motor is started again;
- If excessive vibrations are noticed, check if the motor mounting bolts are well tightened or if the vibrations are not generated and transmitted from adjacent installed equipment. Check the motor vibration periodically and ensure that the vibration limits are as specified in item 7.2.1;
- Start the motor at rated load during a short time and compare the operating current with the rated current indicated on the nameplate;
- Continue to measure the following motor variables until thermal equilibrium is reached: current, voltage, bearing and motor frame temperature, vibration and noise levels;
- Record the measured current and voltage values on the Installation Report for future comparisons.

As induction motors have high inrush currents during start-up, the acceleration of high inertia load requires an extended starting time to reach full speed resulting in fast motor temperature rise. Successive starts within short intervals will result in winding temperature increases and can lead to physical insulation damage reducing the useful life of the insulation system. If the duty cycle S1 / CONT. is specified on the motor nameplate, this means that the motor has been designed for:

- Two successive starts: first start from cold condition, i. e., the motor windings are at room temperature and the second start immediately after the motor stops;
- One start from hot condition, i. e., the motor windings are at rated temperature.

The Troubleshooting Chart in section 10 provides a basic list of unusual cases that may occur during motor operation with the respective corrective actions.

7.2 OPERATING CONDITIONS

Unless otherwise stated in the Purchase Order, electric motors are designed and built to be operated at altitudes up to 1000 meters above sea level and in a temperature range from -20 °C to +40 °C. Any deviation from the normal condition of motor operation must be stated on the motor nameplate. Some components must be changed if the ambient temperature is different from the specified one. Please contact WEG to check the required special features.

For operating temperatures and altitudes differing from those above, the factors indicated in Table 25 must be applied to the nominal motor power rating in order to determine the derated available output (Pmax = Pnom x correction factor).

T (°C)	Altitude (m)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
10							0.97	0.92	0.88
15						0.98	0.94	0.90	0.86
20					1.00	0.95	0.91	0.87	0.83
25				1.00	0.95	0.93	0.89	0.85	0.81
30			1.00	0.96	0.92	0.90	0.86	0.82	0.78
35		1.00	0.95	0.93	0.90	0.88	0.84	0.80	0.75
40	1.00	0.97	0.94	0.90	0.86	0.82	0.80	0.76	0.71
45	0.95	0.92	0.90	0.88	0.85	0.81	0.78	0.74	0.69
50	0.92	0.90	0.87	0.85	0.82	0.80	0.77	0.72	0.67
55	0.88	0.85	0.83	0.81	0.78	0.76	0.73	0.70	0.65
60	0.83	0.82	0.80	0.77	0.75	0.73	0.70	0.67	0.62
65	0.79	0.76	0.74	0.72	0.70	0.68	0.66	0.62	0.58
70	0.74	0.71	0.69	0.67	0.66	0.64	0.62	0.58	0.53
75	0.70	0.68	0.66	0.64	0.62	0.60	0.58	0.53	0.49
80	0.65	0.64	0.62	0.60	0.58	0.56	0.55	0.48	0.44

Table 25 - Correction factors for altitude and ambient temperature

Motors installed inside enclosures (cubicles) must be ensured an air renewal rate in the order of one cubic meter per second for each 100 kW installed power or fraction of installed power. Totally Enclosed Air Over motors - TEAO (fan and exhaust / smoke extraction) are supplied without cooling fan and the manufacturer of the driven machine is responsible for sufficient motor cooling. If no minimum required air speed between motor fins is indicated on the motor nameplate, ensure the air speed indicated in the table 21 is provided. The values shown in Table 26 are valid for 60 Hz motors. To obtain the minimum air speed for 50 Hz motors, multiply the values in the table by 0.83.

Frame		Poles			
IEC	NEMA	2	4	6	8
56 to 90	143/5	13	7	5	4
100 to 132	182/4 to 213/5	18	12	8	6
160 to 200	254/6 to 324/6	20	15	10	7
225 to 280	364/5 to 444/5	22	20	15	12
315 to 450	445/7 to 7008/9	25	25	20	15

Table 26 - Minimum required air speed between motor fins (metres/second)

The voltage and frequency variations may affect the performance characteristics and the electromagnetic compatibility of the motor. The power supply variations should not exceed the values specified in the applicable standards. Examples:

- ABNT NBR 17094 - Parts 1 and 2. The motor has been designed to supply the rated torque for a combined variation in voltage and frequency:
  - Zone A: ±5% of the rated voltage and ±2% of the rated frequency;
  - Zone B: ±10% of the rated voltage and +3% -5% of the rated frequency.

When operated continuously in Zone A or B, the motor may show performance variations and the operating temperature may increase considerably. These performance variations will be higher in Zone B. Thus it is not recommended to operate the motor in Zone B during extended periods.

- IEC 60034-1. The motor has been designed to supply the rated torque for combined variation in voltage and frequency:
  - Zone A: ±5% of the rated voltage and ±2% of the rated frequency;
  - Zone B: ±10% of the rated voltage and +3% -5% of the rated frequency.

When operated continuously in Zone A or B, the motor may show performance variations and the operating temperature may increase considerably. These performance variations will be higher in Zone B. Thus it is not recommended to operate the motor in Zone B during extended periods. For multivoltage motors (example 380-415/660 V), a ±5% voltage variation from the rated voltage is allowed.

- NEMA MG 1 Part 12. The motor has been designed to be operated in one of the following variations:
  - ±10% of the rated voltage, with rated frequency;
  - ±5% of the rated frequency, with rated voltage;
  - A combined variation in voltage and frequency of ±10%, provided the frequency variation does not exceed ±5%.

If the motor is cooled by ambient air, clean the air inlet and outlet openings and cooling fins at regular intervals to ensure a free airflow over the frame surface. The hot air should never be returned to the motor. The cooling air must be at room temperature limited to the temperature range indicated on the motor nameplate (if no room temperature is specified, please consider a temperature range between -20 °C and +40 °C).

Table 22 shows the minimum required water flow for water cooled motors considering the different frame sizes and the maximum allowed temperature rise of the cooling water after circulating through the motor. The inlet water temperature should not exceed 40 °C.

Frame size		Flow rate (litres/minute)	Maximum allowed water temperature rise (°C)
IEC	NEMA		
180	284/6	12	5
200	324/6	12	5
225	364/5	12	5
250	404/5	12	5
280	444/5 445/7 447/9	15	6
315	504/5	16	6
355	586/7 588/9	25	6

Table 27 - Minimum required water flow and the maximum allowed temperature rise of the cooling water after circulating through the motor

For W60 motors, please see the nameplate at heat-exchanger.
Motors fitted with oil mist lubrication systems can be operated continuously for a maximum of one hour after the failure of the oil pumping system.

Considering the sun's heat increases the operating temperature, externally mounted motors must always be protected from direct sunlight exposure.

Each and every deviation from the normal operating condition (tripping of the thermal protection, noise and vibration level increase, temperature and current rise) should be investigated and corrected by WEG Authorized Service Centers.

Failure to observe the criteria and recommendations set out in this manual may result in the cancellation of the product warranty.

7.2.1 Limits of vibration

The vibration severity is the maximum vibration value measured at all positions and in all directions as recommended in the standard IEC 60034-14. Table 28 specifies the limits of the maximum vibrations magnitudes according to standard IEC 60034-14 for shaft heights IEC 56 to 400, for vibrations grades A and B. The vibration severity limits in Table 28 are given as RMS values (Root Mean Square values or effective values) of the vibration speed in mm/s measured in free suspension condition.

Shaft height [mm]	56 ≤ H ≤ 132	H ≥ 132
Vibration grade	Vibration severity on elastic base [mm/s RMS]	
A	2.8	2.8
B	1.1	1.8

Table 28 - Recommended limits for the vibration severity according to standard IEC 60034-14

Notes:
1 - The values in valid for measurements carried out with decoupled machines (without load) operated at rated voltage and frequency.
2 - The values in valid regardless of the direction of rotation of the machine.
3 - The values in not applicable to single-phase motors, three-phase motors powered by a single-phase system or to machines mounted in situ or coupled with inertia flywheels or to loads.

According to NEMA MG 1, the allowed vibration limit for standard motors is 0.15 in/s (peak vibration in in/s).

Note:
For the load operation condition, the use of the standard ISO 10816-3 is recommended for evaluating the motor vibration limits. In the load condition the motor vibration will be influenced by several factors, such as, type of the coupled load, condition of the motor fixation, alignment condition under load, structure or base vibration due to other equipments, etc..

ENGLISH

8. MAINTENANCE

The purpose of the maintenance is to extend the useful life of the equipment. The non-compliance with one of these previous items can cause unexpected machine failures.
If motors with cylindrical roller or angular contact bearings are to be transported during the maintenance procedures, the shaft locking device must always be fitted. All HGF, W50, W51 HD and W60 motors, regardless of the bearing type, must always be transported with the shaft locking device fitted.
All repairs, disassembly and assembly related services must be carried out only by qualified and well-trained personnel by using proper tools and techniques. Make sure that the machine has stopped and it is disconnected from the power supply, including the accessory devices (space heater, brake, etc.), before any servicing is undertaken.
The company does not assume any responsibility or liability for repair services or maintenance operations executed by non-authorized Service Centers or by non qualified service personnel. The company shall have no obligation or liability whatsoever to the buyer for any indirect, special, consequential or incidental loss or damage caused or arising from the company's proven negligence.

Pacemaker users and unqualified personnel shall not open WMagnet and WQuattro motors, because high energy magnets are used.

8.1 GENERAL INSPECTION

The inspection intervals depend on the motor type, application and installation conditions. Proceed as follows during inspection:

- Visually inspect the motor and coupling. Check if abnormal noises, vibrations, excessive heating, wear signs, misalignment or damaged parts are noticed. Replace the damaged parts as required;
- Measure the insulation resistance according to the item 5.4;
- Clean the motor enclosure. Remove oil spills and dust accumulation from the motor frame surface to ensure a better heat transfer to the surrounding ambient;
- Check cooling fan condition and clean the air inlet & outlet openings to ensure a free air flow over the motor;
- Investigate the actual condition of the seals and replace them, if required;
- Drain the condensed water from inside the motor. After draining, reinstall the drain plugs to ensure the degree of protection as indicated on the motor nameplate. The motor must always be positioned so the drain hole is at the lowest position (see item 6);
- Check the connections of the power supply cables, ensuring the correct clearance distance between live and grounded parts, as specified in Figure 31.

- Check if the tightening torque of the bolted connections and mounting bolts meets the tightening torque specified in Table 44;
- Check the status of the cable passages, the cable gland seals and the seals inside the terminal box and replace them, if required;
- Check the bearing operating conditions. Check for the presence of any abnormal noise, vibration or other abnormal operating conditions, like motor temperature rise. Check the oil level, the lube oil condition and compare the workings hours with the informed life time;
- Record and file all changes performed on the motor.



Do not reuse damaged or worn parts. Damaged or worn parts must be replaced by parts supplied by the manufacturer and must be installed as if they were the original parts.

8.2 LUBRICATION

Proper lubrication plays a vital role in the motor performance. Only use the grease or oil types, amounts and lubrication intervals recommended for the bearings. This information is available on the motor nameplate and the lubrication procedures must be carried out according to the type of lubricant (oil or grease).
When the motor is fitted with thermal protection devices for bearing temperature control, consider the operating temperature limits shown in Table 12.
The maximum operating temperature of motors used in special applications may differ from those shown in Table 31. The grease and oil disposal should be made in compliance with applicable laws in each country.



Please contact WEG when motors are to be installed in special environments or used for special applications.

8.2.1 Grease lubricated rolling bearings



Excess grease causes bearing overheating, resulting in bearing failure.

The lubrication intervals specified in Table 29, Table 30, Table 31, Table 32, Tabla 34, Table 34 Table 35, Table 36 and Table 37, Table 38, andTable 39 consider an absolute temperature on the bearing of 70 °C (up to frame size IEC 200 / NEMA 324/6) and 85 °C (for frame size IEC 225 / NEMA 364/5 and above), the motor running at rated speed, a motor mounted in horizontal position and greased with Mobil Polyrex EM grease. Any variation of the parameters listed above must be evaluated.

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)					
					ODP (Open Drip Proof)		W21 TEFC (Totally Enclosed Fan Cooled)		W22 TEFC (Totally Enclosed Fan Cooled)	
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
90	143/5	2	6205	4	-	-	20000	20000	25000	25000
		4								
		6								
		8								
100	-	2	6206	5						
		4								
		6								
		8								
112	182/4	2	6207/ 6307	9						
		4								
		6								
		8								
132	213/5	2	6308	11				18400		
		4						20000		
		6								
		8								
160	254/6	2	6309	13	20000	20000	18100	15700		
		4					20000	20000		
		6								
		8								
180	284/6	2	6311	18			13700	11500		
		4					20000	20000		
		6								
		8								
200	324/6	2	6312	21			11900	9800		
		4					20000	20000		
		6								
		8								
225 250 280 315 355	364/5 404/5 444/5 445/7 447/9 L447/9 504/5 5008 5010/11 586/7 588/9	2	6314	27	18000	14400	4500	3600	5000	4000
		4			20000	20000	11600	9700	14000	12000
		6					16400	14200	20000	17000
		8					19700	17300	24000	20000
		2	6316	34	14000	*Upon request	3500	*Upon request	4000	*Upon request
		4			20000	20000	10400	8500	13000	10000
		6					14900	12800	18000	16000
		8					18700	15900	20000	20000
		2	6319	45	*Upon request					
		4			20000	20000	9000	7000	11000	8000
		6					13000	11000	16000	13000
		8					17400	14000	20000	17000
		4	6322	60			7200	5100	9000	6000
		6					10800	9200	13000	11000
		8					15100	11800	19000	14000

Table 29 - Lubrication intervals for ball bearings

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)					
					ODP (Open Drip Proof)		W21 TEFC (Totally Enclosed Fan Cooled)		W22 TEFC (Totally Enclosed Fan Cooled)	
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
160	254/6	2	NU309	13	20000	19600	13300	9800	16000	12000
		4				20000	20000	20000	25000	25000
		6								
		8								
180	284/6	2	NU311	18	18400	12800	9200	6400	11000	8000
		4			20000	20000	20000	19100	25000	25000
		6						20000		
		8								
200	324/6	2	NU312	21	15200	10200	7600	5100	9000	6000
		4			20000	20000	20000	17200	25000	21000
		6						20000		25000
		8								
225 250 280 315 355	364/5 404/5 444/5 445/7 447/9 L447/9 504/5 5008 5010/11 586/7 588/9	4	NU314	27	17800	14200	8900	7100	11000	9000
		6			20000	20000	13100	11000	16000	13000
		8					16900	15100	20000	19000
		4	NU316	34	15200	12000	7600	6000	9000	7000
		6			20000	19000	11600	9500	14000	12000
		8				20000	15500	13800	19000	17000
		4	NU319	45	12000	9400	6000	4700	7000	5000
		6			19600	15200	9800	7600	12000	9000
		8			20000	20000	13700	12200	17000	15000
		4	NU322	60	8800	6600	4400	3300	5000	4000
		6			15600	11800	7800	5900	9000	7000
		8			20000	20000	11500	10700	14000	13000

Table 30 - Lubrication intervals for cylindrical roller bearings

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B and 315C/D/E	5006/7/8T and 5009/10/11T	2	6314	27	3100	2100
		4 - 8	6320	50	4500	4500
			6316	34		
355L/A/B and 355C/D/E	5807/8/9T and 5810/11/12T	2	6314	27	3100	2100
		4 - 8	6322	60	4500	4500
			6319	45		
400L/A/B and 400 C/D/E	6806/7/8T and 6809/10/11T	2	6315	30	2700	1800
		4 - 8	6324	72	4500	4500
			6319	45		
450	7006/10	2	6220	31	2500	1400
		4	6328	93	4500	3300
			6322	60		4500
		6 - 8	6328	93		
			6322	60		
500	8006/10	4	6330	104	4200	2800
			6324	72	4500	4500
		6 - 8	6330	104		
			6324	72		
560	8806/10	4 - 8	*Upon request			
630	9606/10	4 - 8				

Table 31 - - Lubrication intervals for ball bearings - HGF line

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B and 315C/D/E	5006/7/8 and 5009/10/11	4	NU320	50	4300	2900
		6 - 8			4500	4500
355L/A/B and 355C/D/E	5807/8/9 and 5810/11/12	4	NU322	60	3500	2200
		6 - 8			4500	4500
400L/A/B and 400C/D/E	6806/7/8 and 6809/10/11	4	NU324	72	2900	1800
		6 - 8			4500	4500
450	7006/10	4	NU328	93	2000	1400
		6			4500	3200
		8			4500	4500
500	8006/10	4	NU330	104	1700	1000
		6			4100	2900
		8			4500	4500
560	8806/10	4	NU228 + 6228	75	2600	1600
		6 - 8		106	4500	4500
630	9606/10	4	NU232 + 6232	92	1800	1000
		6		120	4300	3100
		8		140	4500	4500

Table 32 - Lubrication intervals for cylindrical roller bearings - HGF line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Ball bearings	315 H/G	5009/10	2	6314	27	4500	3500	6314	27	4500	3500
			4 - 8	6320	50		4500	6316	34		4500
	355 J/H	5809/10	2	6314	27		3500	6314	27		3500
			4 - 8	6322	60		4500	6319	45		4500
	400 L/K and 400 J/H	6806/07 and 6808/09	2	6218	24	3800	2500	6218	24	3800	1800
			4 - 8	6324	72	4500	4500	6319	45	4500	4500
	450 L/K and 450 J/H	7006/07 and 7008/09	2	6220	31	3000	2000	6220	31	3000	2000
			4	6328	93	4500	3300	6322	60	4500	4500
			6 - 8				4500				
Vertical mounting Ball bearings	315 H/G	5009/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6320	50	4200	3200	6316	34	4500	4500
			6 - 8			4500	4500				
	355 J/H	5809/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6322	60	3600	2700	6319	45	4500	3600
			6 - 8			4500	4500				4500
	400 L/K and 400 J/H	6806/07 and 6808/09	2	7218	24	2000	1300	6218	24	2000	1300
			4	7324	72	3200	2300	6319	45	4500	3600
			6			4500	4300				4500
			8				4500				
	450 L/K and 450 J/H	7006/07 and 7008/09	2	7220	31	1500	1000	6220	31	1500	1000
			4	7328	93	2400	1700	6322	60	3500	2700
			6			4100	3500			4500	4500
			8			4500	4500				

Table 33 - Lubrication intervals for ball bearings - W50 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Roller bearings	315 H/G	5009/10	4	NU320	50	4300	2900	6316	34	4500	4500
			6 -8			4500	4500				
	355 J/H	5809/10	4	NU322	60	3500	2200	6319	45		
			6 - 8			4500	4500				
	400 L/K and 400 J/H	6806/07 and 6808/09	4	NU324	72	2900	1800				
			6 - 8			4500	4500				
	450 L/K and 450 J/H	7006/07 and 7008/09	4	NU328	93	2000	1400	6322	60		
			6			4500	3200				
			8				4500				

Table 34 - Lubrication intervals for cylindrical roller bearings - W50 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Ball bearings	160M/L	254/6	2 - 8	6309	13	20000	20000	6209	9	20000	20000
	180M/L	284/6		6311	18			6211	11		
	200M/L	324/6		6312	21						
	225S/M	364/5	2	6314	27	18000	14400	6212	13		
			4 – 8								
	250S/M	404/5	2								
			4 – 8	6316	34	20000	20000				
	280S/M	444/5	2	6314	27	18000	14400				
			4 – 8	6319	45	20000	20000	6314	27		
	280L	447/9	2	6314	27	18000	14400			18000	14400
			4 – 8	6319	45	20000	20000			20000	20000
	315G/F	5010/11	2	6314	27	4500	4500			4500	4500
			4 – 8	6319	45						
	355J/H	L5010/11	2	6218	24	2200	2200	6218	24	2200	2200
			4 – 8	6224	43	4500	4500			4500	4500
	400J/H	L5810/11	2	6220	31	2200	2200	6220	31	2200	2200
			4 – 8	6228	52	4500	4500			4500	4500
	450K/J	L6808/09	2	6220	31	2200	2200			2200	2200
			4 – 8	6228	52	4500	4500			4500	4500

Table 35 - Lubrication intervals for ball bearings - W40 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Roller bearings	225S/M	364/5	4 – 8	NU314	27	20000	20000	6314	27	20000	20000
	250S/M	404/5		NU316	34						
	280S/M	444/5		NU319	45		18800				
	280L	447/9				4500	4500			4500	4500
	315G/F	5010/11									
	355J/H	L5010/11		NU224	43			6218	24		
	400J/H	L5810/11		NU228	52		3300	6220	31		
	450K/J	L6808/09									

Table 36 - Lubrication intervals for cylindrical roller bearings - W40 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Ball bearings	355H/G	5810/11	2	6218	24	2300	1500	6218	24	2300	1500
			4/8	6224	43	4500	4500			4500	4500
	400J/H	L5810/11	2	6220	31	1800	1200	6220	31	1800	1200
			4/8	6228	52	4500	4500			4500	4500
	400G/F	6810/11	2	6220	31	1800	1200			1800	1200
			4/8	6228	52	4500	4500			4500	4500
Horizontal mounting Roller bearings	355H/G	5810/11	4	NU224	43	4500	4500	6218	24		
			6/8								
	400J/H	L5810/11	4	NU228	52		1500		31	4500	1500
			6/8				4500	6220			4500
	400G/F	6810/11	4				1500				1500
			6/8				4500				4500

Table 37 - Lubrication intervals for ball bearings and for cylindrical roller bearings - W60 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	Rolamento traseiro	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem horizontal Rolamento de esferas	315 G/F	5010/11	2	6314	27	4500	3500	6314	27	4500	3500
			4-12	6320	50		4500	6316	34		4500
	355H/G	5810/11	2	6314	27		3500	6314	27		3500
			4-12	6322	60		4500	6319	45		4500
	400H/G	6809/10	2	6220	24	2700	2000	6220	24	2700	2000
			4-12	6324	72	4500	3800	6319	45	4500	4500
	450H/G	7009/10	2	6220	31	3500	-	6220	31	3500	-
			4	6328	93	4500	3800	6322	60	4500	4500
			6-12				4500				
Montagem vertical Rolamento de esferas	315 G/F	5010/11	2	7314	27	Mediante consulta		6314	27	Mediante consulta	
			4	7320	50	2700	2100	6316	34	4500	4200
			6-12			4500	4500				4500
	355H/G	5810/11	2	7314	27	Mediante consulta		6314	27	Mediante consulta	
			4	7322	60	1600	1600	6319	45	3500	3500
			6			3900	2900			4500	4500
			8-12			4500	4500				
	400H/G	6809/10	2	7220	24	Mediante consulta		6220	24	Mediante consulta	
			4	7324	72	1700	1200	6319	45	4500	3500
			6			3300	2500				4500
			8-12			4500	4500				
	450H/G	7009/10	2	7220	31	Mediante consulta		6220	31	Mediante consulta	
			4	7328	93	2900	2000	6322	60	4300	3200
			6			4500	4200			4500	4500
			8-12				4500				

Table 38 - Lubrication interval for ball bearings - W51 HD line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem horizontal Rolamento de rolos	315 G/F	5010/11	4	NU320	50	4500	4200	6316	34	4500	4500
			6 -12			4500	4500				
	355H/G	5810/11	4	NU322	60	3300	3300	6319	45		
			6 -12			4500	4500				
	400H/G	6809/10	4	NU324	72	3500	2400				
			6 -12			4500	4500				
	450H/G	7009/10	4	NU328	93	1100	600	6322	60		
			6			2900	2000				
			8 -12			4500	4500				

Table 39 - Lubrification interval for roller bearings - W51 HD line

WGOST motors use Mobiltemp SHC 32 grease as standard, suitable for operation at low temperatures, with the ambient temperature ranging from -45°C to +40°C. Table 40 indicates the lubrication intervals for these motors.

Frame IEC	Poles	50 Hz (h)	Frame IEC	Poles	50 Hz (h)	Frame IEC	Poles	50 Hz (h)	Frame IEC	Poles	50 Hz (h)
71	2	20.000	112	2	20.000	200	2	20.000	315	2	7.000
	4			4			4			4	18.000
	6			6			6			6	20.000
	8			8			8			8	
80	2		132	2		225	2	9.000	355	2	6.000
	4			4			4	20.000		4	14.000
	6			6			6			6	20.000
	8			8			8			8	
90	2		160	2		250	2	9.000			
	4			4			4	20.000			
	6			6			6				
	8			8			8				
100	2		180	2		280	2	7.000			
	4			4			4	18.000			
	6			6			6	20.000			
	8			8			8				

Table 40 - Lubrication interval for ball bearings - WGOST line

The lubrication intervals specified in Table 41 consider the rated motor speed, horizontal installation and Mobil Polyrex EM grease. Any variation in the parameters indicated above must be assessed from time to time.

Frame IEC	Poles	DE Bearing	Amount of grease (g)	NDE Bearing	Amount of grease (g)	Ambient Temperature 40 °C		Ambient Temperature 50 °C	
						50 Hz (h)	60 Hz (h)	50 Hz (h)	60 Hz (h)
225S/M	2	6214	15	6212	12	8800	6600	6600	4400
	4					13200	13200	13200	8800
250S/M	2					8800	6600	6600	4400
	4					13200	13200	13200	8800
W280S/M	2	6314	26			6600	4400	4400	3000
	4	6316	33			13200	8800	8800	6600
280S/M	2	6314	26	6314	26	6600	4400	4400	3000
	4	6316	33			13200	8800	8800	6600
	6						13200	8800	8800
W315S/M	2	6314	26			6600	4400	4400	3000
	4	6319	45			8800	8800	6600	4400
	6					13200	13200	8800	6600
315S/M	2	6314	26			6600	4400	4400	3000
	4	6319	45	6316	33	8800	8800	6600	4400
	6					13200	13200	8800	6600
315L	2	6314	26	6314	26	4400	3000	3000	3000
	4	6319	45	6316	33	8800	6600	4400	4400
	6						8800	6600	6600
355M/L	2	6316	33	6314	26	4400	3000	3000	3000
	4	6322	60	6319	45	8800	6600	4400	4400
	6						8800	6600	6600

Table 41 - Lubrication interval for ball bearings - WEG General Purpose and WIN lines

The WEG General Purpose and WIN motor lines with relubrication system (grease fitting and open bearings) in frame sizes 225S/M, 250S/M and W280S/M is provided with a grease storage chamber inside the motor and do not have an opening for its exit. The internal volume destined to store the old grease has the capacity to reach to 7 (seven) relubrications, limited to 5 years of operation, being necessary the grease removal after this period. For each increment of 15 ºC above the bearing temperature, the relubrication intervals given in the Table must be halved. The relubrication interval of motors designed by the manufacturer for mounting in horizontal position, but installed in vertical position (with WEG authorization), must be halved.

For special applications, such as: high and low temperatures, aggressive environments, driven by frequency inverter (VFD - frequency inverter), etc., please contact WEG about the required amount of grease and the relubrication intervals.

8.2.1.1 Motor without grease fitting

Motors without grease fittings must be lubricated in accordance with the existing Maintenance Plan. Motor disassembly must be carried out as specified in Item 8.3. If motors are fitted with shielded bearings (for example, ZZ, DDU, 2RS, VV), these bearings must be replaced at the end of the grease service life.

8.2.1.2 Motor with grease fitting

To lubricate the bearings with the motor stopped, proceed as follows:
- Before lubricating, clean the grease nipple and immediate vicinity thoroughly;
- Lift grease inlet protection;
- Remove the grease outlet plug (not required for motors with automatic grease relief fittings, such as IEEE Std 841);
- Pump in approximately half of the total grease indicated on the motor nameplate and run the motor for about 1 (one) minute at rated speed;
- Switch-off the motor and pump in the remaining grease;
- Lower again the grease inlet protection and reinstall the grease outlet plug.

To grease the motor while running, proceed as follows:
- Before lubricating, clean the grease nipple and immediate vicinity thoroughly;
- Lift grease inlet protection;
- If safe and possible, remove the grease outlet plug;
- Pump the total grease indicated on the motor nameplate;
- Lower again the grease inlet protection and reinstall the grease outlet plug (if removed).

For lubrication, use only manual grease gun.

Due to internal clearances in the motor, it is possible that, in the first re-lubrication of the bearings, the grease will not come out of the grease outlet. Therefore, do not apply excess grease expecting for it to come out.

If Motors are provided with a spring device for grease removal, the grease excess must be removed by pulling the rod and cleaning the spring until the spring does not remove more grease.

8.2.1.3 Compatibility of the Mobil Polyrex EM grease with other greases

The Mobil Polyrex EM grease has a polyurea thickener and a mineral oil and it is not compatible with other greases.
If you need another type of grease, contact WEG.
It is not recommended to mix different types of greases. In such a case, clean the bearings and lubrication channels before applying new grease.
The used grease must have in its formulation corrosion and oxidation inhibitors.

8.2.1.4 Oil lubricated bearings

To change the oil of oil lubricated motor proceed as follows:
- Switch-off the motor;
- Remove threaded oil drain plug;
- Open the valve and drain the oil;
- Close the drain valve again;
- Reinstall the threaded oil drain plug;
- Fill-up with the type and amount of oil as specified on the nameplate;
- Check oil level. The oil level is OK when the lubricant can be viewed approximately in the center of the sight glass;
- Reinstall oil inlet plug;
- Check for oil leaks and ensure that all not used threaded plugs are closed with plugs.

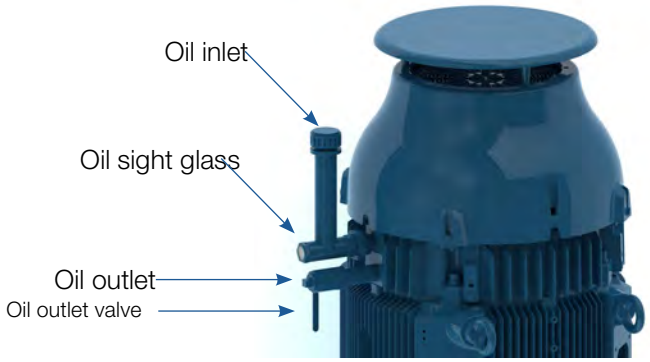


Figure 51 - Oil lubricated bearing - vertical mounting

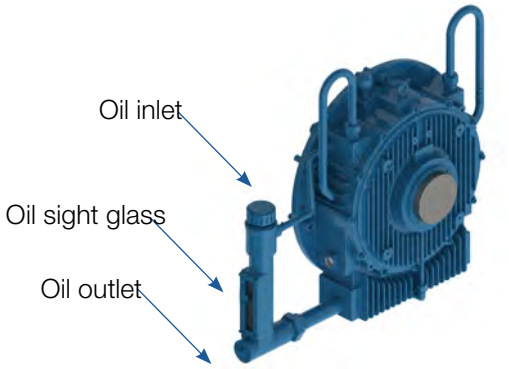


Figure 52 - Oil lubricated bearing - horizontal mounting

The bearing lubricating oil must be replaced as specified on the nameplate or whenever changes in the oil properties are noticed. The oil viscosity and pH must be checked periodically. The oil level must be checked every day and must be kept in the center of the sight glass.
Please contact WEG, when oils with different viscosities should be used.
Note:
The HGF vertical mounted motors with high axial thrust are supplied with grease lubricated DE-bearings and with oil lubricated NDE-bearings. The DE-bearings must be lubricated according to recommendations in item 8.2.1. Table 8.10 specifies the oil type and the amount of oil required for this motor lubrication.

Mounting - high axial thrust	Frame		Poles	Bearing designation	Oil (liters)	Interval (h)	Lubricant	Lubricant specification
	IEC	NEMA						
	315L/A/B and 315C/D/E	5006/7/8T and 5009/10/11T	4 - 8	29320	20	8000	FUCHS Renolin DTA 40 / Mobil SHC 629	ISO VG150 mineral oil with antifoam and antioxidant additives
	355L/A/B and 355C/D/E	5807/8/9T and 5810/11/12T			26			
	400L/A/B and 400C/D/E	6806/7/8T and 6809/10/11T			37			
	450	7006/10			45			

Table 42 - Oil properties for HGF vertical mounted motors with high axial thrust and Vertical High Thrust

8.2.1.5 Oil mist lubricated bearings

Check the service conditions of the seals and if replacement is required use only original components. Clean the seal components before assembly (bearing caps, end shields, etc.).
Apply joint sealant between the bearing caps and end shields. The joint sealant must be compatible with the used lubricating oil. Connect the oil lubricant tubes (oil inlet and oil outlet tubes and motor drain tube), as shown in Figure 40

8.2.1.6 Sleeve bearings

The lubricating oil of sleeve bearings must be changed at the intervals specified in Table 43 To replace the oil, proceed as follows:

- NDE-bearing: remove the protection plate from the fan cover;
- Drain the oil through the drain hole located at the bottom of the bearing (see Figure 53);
- Close the oil drain hole;
- Remove the oil inlet plug;
- Fill the sleeve bearing with the specified oil and with the amount of oil specified in the Table 43;
- Check the oil level and ensure it is kept close to the center of the sight glass;
- Install the oil inlet plug;
- Check for oil leaks.

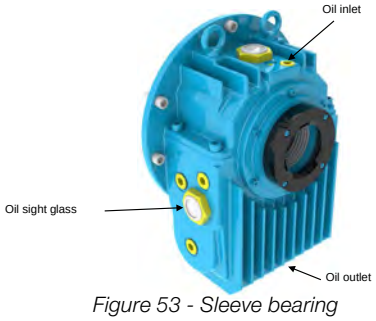


Figure 53 - Sleeve bearing

Frame		Poles	Bearing designation	Oil (liters)	Interval (h)	Lubricant	Lubricant specification
IEC	NEMA						
315	5000	2	9-80	3.6	8000	FUCHS Renolin DTA 10	ISO VG32 mineral oil with antifoam and antioxidant additives
355	5800						
400	6800						
450	7000						
315	5000	4 - 8	9-90		8000	FUCHS Renolin DTA 15	ISO VG46 mineral oil with antifoam and antioxidant additives
355	5800		9-100				
400	6800		11-110	4.7			
450	7000		11-125				
500	8000						

Table 43 - Oil properties for sleeve bearings

The lubricating oil must be replaced as specified on the nameplate or whenever changes on the oil properties are noticed. The oil viscosity and pH must be checked periodically. The oil level must be checked every day and kept in the center of the sight glass.
Please contact WEG, when oils with different viscosities are to be used.

8.3 MOTOR ASSEMBLY AND DISASSEMBLY

All repair services on motors should be always performed by qualified personnel and in accordance with the applicable laws and regulations in each country. Always use proper tools and devices for motor disassembly and assembly.

Disassembly and assembly services can be carried out only after the motor has been disconnected from the power supply and is completely stopped.
Dangerous voltages may be present at the motor terminals inside the terminal box since capacitors can retain electrical charge for long periods of time even when they are not connected directly to a power source or when space heaters are connected to the motor or when the motor windings are used as space heaters.
Dangerous voltages may be present at the motor terminals when they are driven by frequency inverter even when they are completely stopped.

Record the installation conditions such as terminal connection diagram, alignment / leveling conditions before starting the disassembly procedures. These records should be considered for later assembly.
Disassemble the motor carefully without causing scratches on machined surfaces or damaging the threads.
Assemble the motor on a flat surface ensuring a good support base. Footless motors must be fixed/locked on the base to prevent accidents.
Handle the motor carefully to not damage the insulated components such as windings, insulated rolling bearings, power cables etc..
Seal elements, such as joint seals and bearing seals should always be replaced when wear or damage is noticed.
Motors with degree of protection higher than IP55 are supplied with joint and screw seal Loctite 5923 (Henkel)
Clean the components and apply a new coat of Loctite 5923 on the surfaces before assembly.

For motors with permanent magnet rotor (WQuattro and WMagnet motors), the motor assembly and disassembly require the use of proper devices due to the attracting or repelling forces that occur between metallic parts. This work must only be performed by a WEG Authorized service center specifically trained for such an operation. People with pacemakers cannot handle these motors.
The permanent magnets can also cause disturbances or damages to other electric equipment and components during maintenance.

For the W40, W50, W51 HD and HGF motor lines provided with axial fans, the motor and the axial fan have different markings for indicating the direction of rotation for prevent incorrect assembly.
The axial fan must be assembled so that the indicative arrow for direction of rotation is always visible, viewing the non-drive end side. The marking indicated on the axial fan blade, CW for clockwise direction of rotation or CCW for counterclockwise direction of rotation, indicates the direction of rotation of the motor viewing the drive end side.

For motors with encoder, it is necessary to check the radial run out of the encoder seat. The runout should not exceed the limit specified by the encoder manufacturer.

For motors with polymeric fan cover assembled by snap fit, to remove the polymeric fan cover use two screwdrivers or similar tool positioned near the snap fit region and remove one side by lifting carefully, repeat for the other sides until the complete removal of the fan cover.
When assembling polymeric components, the tightening torques specified in Table 28 must be respected.

Engines with fans fixed only by interference on the shaft, if disassembled, the component must be replaced with a new one. For engines that have aluminum injected covers without machining, it is necessary to heat the covers for assembly and disassembly.

8.3.1.1 Terminal box

Proceed as follows to remove the terminal box cover and to disconnect/connect the power supply cables and the cables of the accessory devices:

- Ensure that during the screw removal the terminal box cover does not damage the components installed inside the terminal box;
- If the terminal box cover is fitted with lifting eyebolt, lift the terminal box cover always by its lift eyebolt;
- If motors are supplied with terminal blocks, ensure the correct tightening torque on the motor terminals as specified in Table 44;



For flying leads motors, do not push the overlength of leads into the motor in order to prevent that they touch the rotor.

  - Ensure that the cables do not contact sharp edges;
- Ensure that the original IP degree of protection is not changed and is maintained as indicate on the motor nameplate. The power supply cables and the control cables must always be fitted with components (cable glands, conduits) that meet the applicable standards and regulations of each country;
- Ensure that the pressure relief device is in perfect operating condition, if provided. The seals in the terminal box must be in perfect condition for reuse and must be reinstalled correctly to ensure the specified degree of protection;
- Ensure the correct tightening torque for the securing bolts of the terminal box cover as specified in Table 44.

Screw type and seal	M4	M5	M6	M8	M10	M12	M14	M16	M20
Hex bolt/hex socket bolt (rigid joint)	-	3,5 to 5	6 to 9	14 to 20	28 to 40	45 to 70	75 to 110	115 to 170	230 to 330
Combined slotted screw (rigid joint)	1,5 to 3	3 to 5	5 to 10	10 to 18	-	-	-	-	-
Hex bolt/hex socket bolt (flexible joint)	-	3 to 5	4 to 8	8 to 15	18 to 30	25 to 40	30 to 45	35 to 50	-
Combined slotted screw (flexible joint)	-	3 to 5	4 to 8	8 to 15	-	-	-	-	-
Terminal blocks	1 to 1,5	2 to 4 1)	4 to 6,5	6,5 to 9	10 to 18	15,5 to 30	-	30 to 50	50 to 75
Grounding terminals	1,5 to 3	3 to 5	5 to 10	10 to 18	28 to 40	45 to 70	-	115 to 170	-

Table 44 - Tightening torque for the securing bolts [Nm]

Note: 1) For 12-pin terminal block, apply the minimum torque of 1.5 Nm and maximum torque of 2.5 Nm.

8.4 DRYING THE STATOR WINDING INSULATION

Dismantle the motor completely. Remove the end shields, the rotor with the shaft, the fan cover, the fan and the terminal box before the wound stator with the frame is transferred to the oven for the drying process. Place the wound stator in the oven heated to max. 120 °C for two hours. For larger motors a longer drying time may be required. After the drying process has been concluded, allow the stator to cool to room temperature. Measure the insulation resistance again as described in item 5.4. Repeat the stator drying process if the required insulation resistance does not meet the values specified in Table 3. If the insulation resistance does not improve despite several drying processes, evaluate the causes of the insulation resistance drop carefully and an eventual replacement of the motor winding may be required. If in doubt contact WEG.



To prevent electrical shock, discharge the motor terminals immediately before, and after each measurement. If the motor is equipped with capacitors, these must be discharged before beginning any repair.



Pacemaker users and unqualified personnel shall not open WMagnet and WQuattro motors, because high energy magnets are used.

8.5 SPARE PARTS

When ordering spare parts, always provide complete motor designation, indicating the motor type, the code number and the serial number, which are stated on the motor nameplate.
Spare parts must always be purchased from WEG authorized Service Centers. The use of non-original spare parts can cause motor failure, performance drop and void the product warranty.
The spare parts must be stored in a clean, dry and properly ventilated room, with relative air humidity not exceeding 60%, with ambient temperature between 5 °C and 40 °C, free of dust, vibrations, gases, corrosive smokes and at constant temperature. The spare parts must be stored in their normal mounting position without placing other components onto them.

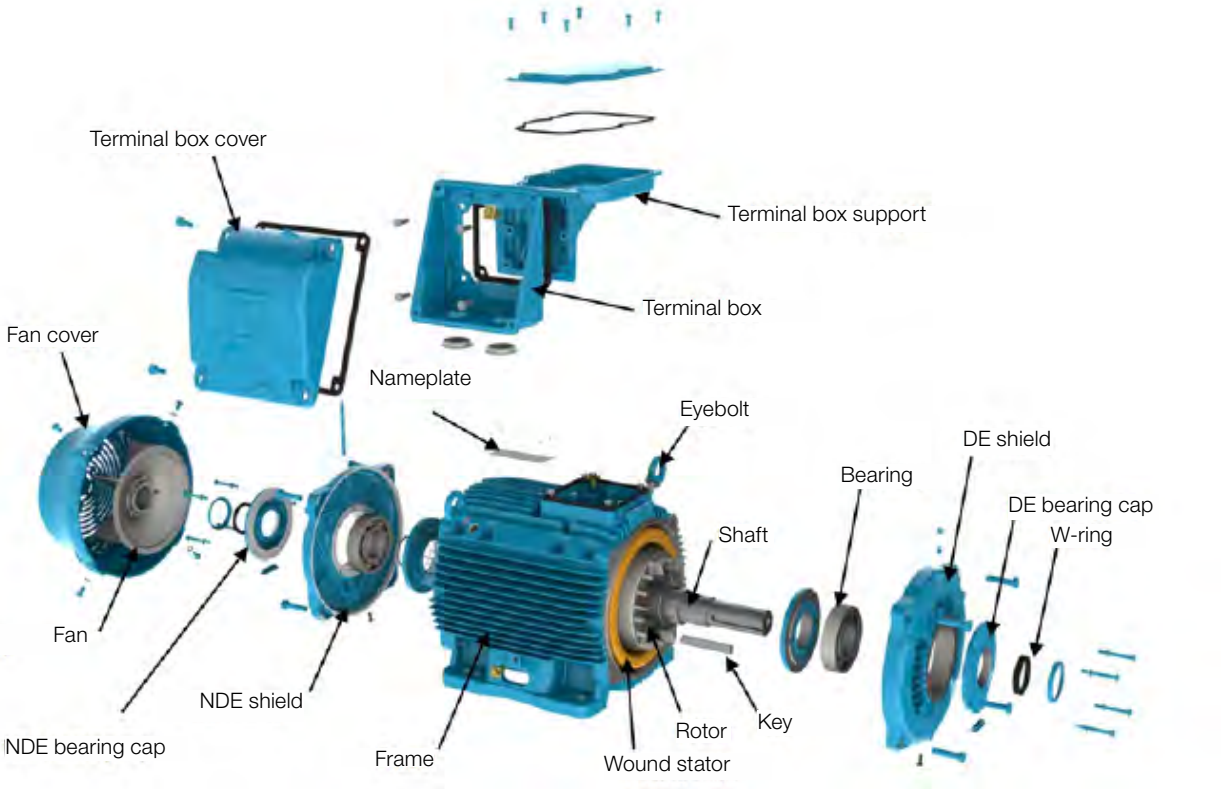


Figure 54 - Exploded view of the components of a W22 motor

9. ENVIRONMENTAL INFORMATION

9.1 PACKAGING

WEG electric motors are supplied in cardboard, plastic or wooden packaging. These materials can be recycled and must be disposed according to the applicable laws and regulations in each country. All wood used in the packaging of WEG motors come from the company reforestation program and is not submitted to any chemical conservation treatment.

9.2 PRODUCT

Electric motors consist mainly of ferrous metals (steel plates and cast iron), non ferrous metals (copper and aluminum) and plastic materials.
In general, electric motors have relatively long service live. However when they must be discarded, WEG recommends to dismantle the motor, sort the different materials and send them for recycling.
No-recyclable materials should be disposed of at industrial landfills according to the applicable environmental laws and regulations in each country, or co-processed in cement kilns or incinerated.
The recycling service providers, the disposal in industrial landfills, the waste co-processing or the incineration process must be properly authorized by the state environment agency to carry out these activities.

10. TROUBLESHOOTING CHART X SOLUTIONS

This troubleshooting chart provides a basic list of problems that may occur during motor operation, possible causes and recommended corrective actions. In case of doubts, please contact WEG Service Center.

Problem	Possible cause	Corrective action
Motor does not start, neither coupled nor decoupled	Power cables are interrupted	Check the control panel and the motor power supply cables
	Blown fuses	Replace blown fuses
	Wrong motor connection	Correct the motor connection according to connection diagram
	Locked rotor	Check motor shaft to ensure that it rotates freely
The motor starts at no-load, but fails when load is applied. It starts very slowly and does not reach the rated speed	Load toque is too high during start-up	Do not start the motor on load
	Too high voltage drop in the power cables	Check the installation dimensioning (transformer, cable cross section, relays, circuit breakers, etc.)
Abnormal/excessive noise	Defective transmission component or defective driven machine	Check the transmission force, the coupling and the alignment
	Misaligned / unleveled base	Align / level the motor with the driven machine
	Unbalanced components or unbalanced driven machine	Balance the machine set again
	Different balancing methods used for motor and coupling balancing (halve key, full key)	Balance the motor again
	Wrong motor direction of rotation	Reverse the direction of rotation
	Loose bolts	Retighten the bolts
	Foundation resonance	Check the foundation design
	Damaged bearings	Replace the bearings
Motor overheating	Insufficient cooling	Clean air inlet and outlet and cooling fins
		Check the minimum required distance between the fan cover and nearest walls. See item 7
		Check air temperature at inlet
	Overload	Measure motor current, evaluate motor application and if required, reduce the load
	Number of starts per hour is too high or the load inertia moment is too high	Reduce the number of starts per hour
	Power supply voltage too high	Check the motor power supply voltage. Power supply voltage must not exceed the tolerance specified in item 7.2
	Power supply voltage too low	Check the motor power supply voltage and the voltage drop. Power supply voltage must not exceed the tolerance specified in item 7.2
	Interrupted power supply	Check the connection of the power cables
	Voltage unbalance at the motor terminals	Check for blown fuses, wrong commands, voltage unbalance in the power line, phase fault or interrupted power cables
	Direction of rotation is not compatible with the unidirectional fan	Check if the direction of rotation matches the rotation arrow indicated on end shield
Bearing overheating	Excessive grease/oil	Clean the bearing and lubricate it according to the provided recommendations
	Grease/oil aging	
	The used grease/oil does not matches the specified one	
	Lack of grease/oil	Lubricate the bearing according to the provided recommendations
	Excessive axial or radial forces due to the belt tension	Reduce the belt tension
		Reduce the load applied to the motor

Português PT 2

English EN 56

Español ES 112



MANUAL GENERAL DE INSTALACIÓN, OPERACIÓN Y MANTENIMIENTO DE MOTORES ELÉCTRICOS

Este manual presenta información de a los motores eléctricos WEG de inducción con rotor de jaula, con rotor de imanes permanentes o híbridos, de baja y alta tensión, en las carcasas IEC 56 a 630 y NEMA 42 a 9606/10.
A continuación se relacionan manuales específicos donde encontrar información adicional:

- Motores para extracción de humo *(Smoke Extraction Motor)*;
- Motores con freno electromagnético;
- Motores para Áreas Clasificadas.

Estos productos están de acuerdo con las siguientes normas, cuando son aplicables:

- NBR 17094-1: Máquinas Eléctricas Giratorias - Motores de Inducción - Parte 1: trifásicos.
- NBR 17094-2: Máquinas Eléctricas Giratorias - Motores de Inducción - Parte 2: monofásicos.
- IEC 60034-1: Máquinas Eléctricas Giratorias - Parte 1: Clasificación y Rendimiento
- NEMA MG 1: Motores y Generadores
- CSA C 22.2 N°100: Motores y Generadores
- UL 1004-1: Máquinas Eléctricas Giratorias - Requisitos Generales

En caso de dudas sobre la aplicabilidad de este material, póngase en contacto con WEG.

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1. DEFINICIONES

Equilibrado: procedimiento por el cual la distribución de masa de un cuerpo es verificada y, si es necesario, ajustada para garantizar que el desequilibrio residual o las vibraciones y fuerzas en los cojinetes en la frecuencia de rotación mecánica estén dentro de los límites especificados en las normas internacionales.

Grado de balanceo: indica la amplitud de pico de la velocidad de vibración, expresada en mm/s, de un rotor girando libre en el espacio y es producto de un desequilibrio específico y la velocidad angular del rotor a la velocidad máxima de operación.

Parte puesta a tierra: partes metálicas eléctricamente conectadas al sistema de puesta a tierra.

Parte viva: conductor o parte conductora destinada a ser energizada en condiciones normales de uso, incluyendo el conductor neutro.

Personal autorizado: trabajador que tiene autorización formal de la empresa.

Personal capacitado: trabajador que cumpla las siguientes condiciones:

- Reciba capacitación bajo orientación y responsabilidad de profesional habilitado y autorizado;
- Bajo responsabilidad de profesional habilitado y autorizado.

Nota: *La capacitación sólo es válida para la empresa que lo capacitó y en las condiciones establecidas por el profesional habilitado y autorizado responsable por la capacitación.*

Personal habilitado: trabajador previamente cualificado y con registro en el consejo de clase competente.

Personal cualificado: trabajador que compruebe conclusión de curso específico en el área eléctrica por el sistema oficial de enseñanza.

2. RECOMENDACIONES INICIALES

Los motores eléctricos poseen circuitos energizados, componentes giratorios y superficies calientes, durante su operación normal, que pueden causar daños personales. Por ello, todas las actividades relacionadas con su transporte, almacenamiento, instalación, operación y mantenimiento deben ser realizadas por personal capacitado.
Deben ser observadas las normas y procedimientos vigentes en el país de instalación.
La no observación de las instrucciones indicadas en este manual y demás referencias en el sitio web: www.weg.net puede resultar en graves lesiones y daños materiales y anular la garantía del producto.

En este manual no se presentan todas las informaciones detalladas sobre posibles variantes constructivas se consideran todos los casos de montaje, operación o mantenimiento. Este documento contiene informaciones necesarias para que las personas capacitadas puedan ejecutar el servicio. Las imágenes presentadas son meramente ilustrativas.
Para aplicaciones y condiciones especiales de trabajo (manual 50026367 para motores de extracción de humos, manual 50021973 para Motofrenos, manual 50078700 para Motores Controlados Electrónicamente, manual 14629920 para motores Roller Table, manual 50106963 para motores WEG Lift Gearless) se debe consultar el manual o entrar en contacto con WEG.
Para los motores suministrados con el sensor WEG Motor Scan, consulte las guías de instalación a través del Manual de Descripción General de la Recepción a la Operación (10008475131) disponible en www.weg.net.
Para informaciones sobre cargas radiales y axiales admisibles en el eje consultar el catálogo técnico del producto.

La correcta definición de las características del entorno y de la aplicación es de responsabilidad del usuario.

Durante el período de garantía del motor, los servicios de reparación, revisión y recuperación deben ser realizadas por Asistentes Técnicos autorizados WEG para que la garantía siga vigente.

2.1 SEÑALES DE ADVERTENCIA

Advertencia sobre seguridad y garantía.

2.2 VERIFICACION A LA RECEPCION

Todos los motores son testeados durante el proceso de fabricación.
A la recepción del motor, verifique si ocurrieron daños durante el transporte. Ante la ocurrencia de cualquier daño, regístrelo por escrito junto al transportista, y comuníquelo inmediatamente a la compañía aseguradora y a WEG. La no comunicación puede resultar en la cancelación de la garantía.
Se debe realizar una inspección completa en el producto:

- Verifique si los datos contenidos en la placa de características están de acuerdo con el pedido de compra;
- Remueva los dispositivos de trabado del eje (en caso que existan) y gire manualmente el eje para verificar si el mismo gira libremente. En los motores WMagnet y WQuattro, el eje no gira libremente debido al par de alineación de los imanes. Puede que sea necesario utilizar una palanca para girar el eje

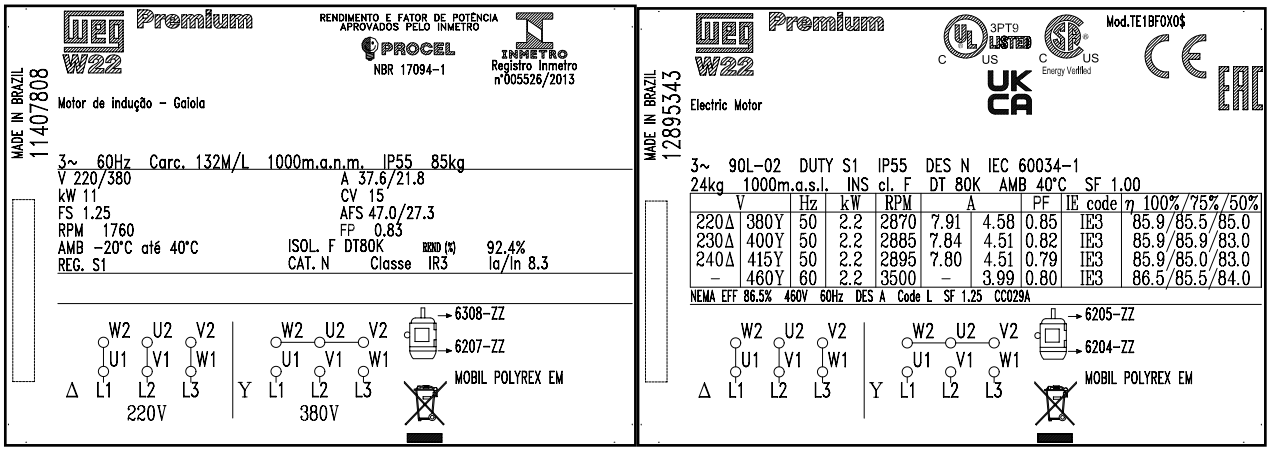
Al girar el eje de un motor WMagnet o WQuattro, se debe garantizar el aislamiento de los terminales de la máquina, debido al riesgo de descarga eléctrica provocada por la tensión inducida durante el procedimiento.

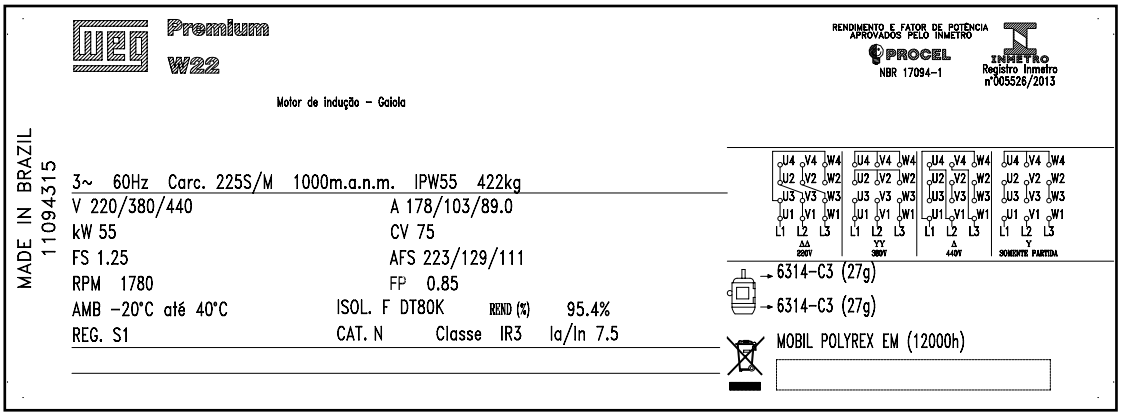
- Asegúrese que el motor no haya sido expuesto a polvareda y humedad excesiva durante el transporte.

No remueva la grasa de protección de la punta del eje, ni los tapones que cierran los agujeros de la caja de conexión, si existen. Estos ítems de protección deben ser mantenidos hasta que la instalación completa sea concluída

2.3 PLACAS DE CARACTERÍSTICAS

La placa de características contiene las informaciones que describen las características constructivas y el rendimiento del motor. En la Figura 1, Figura 2 y Figura 3 son presentados ejemplos de diseños de placas de características.





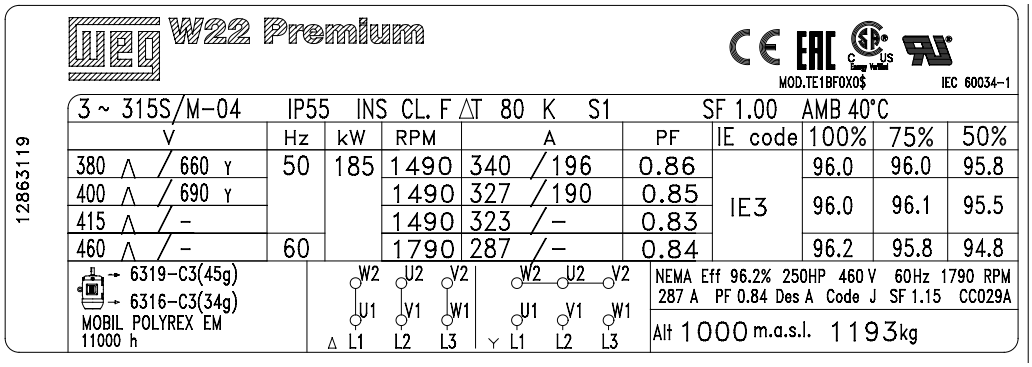


Figura 1 - Placa de características de motores IEC

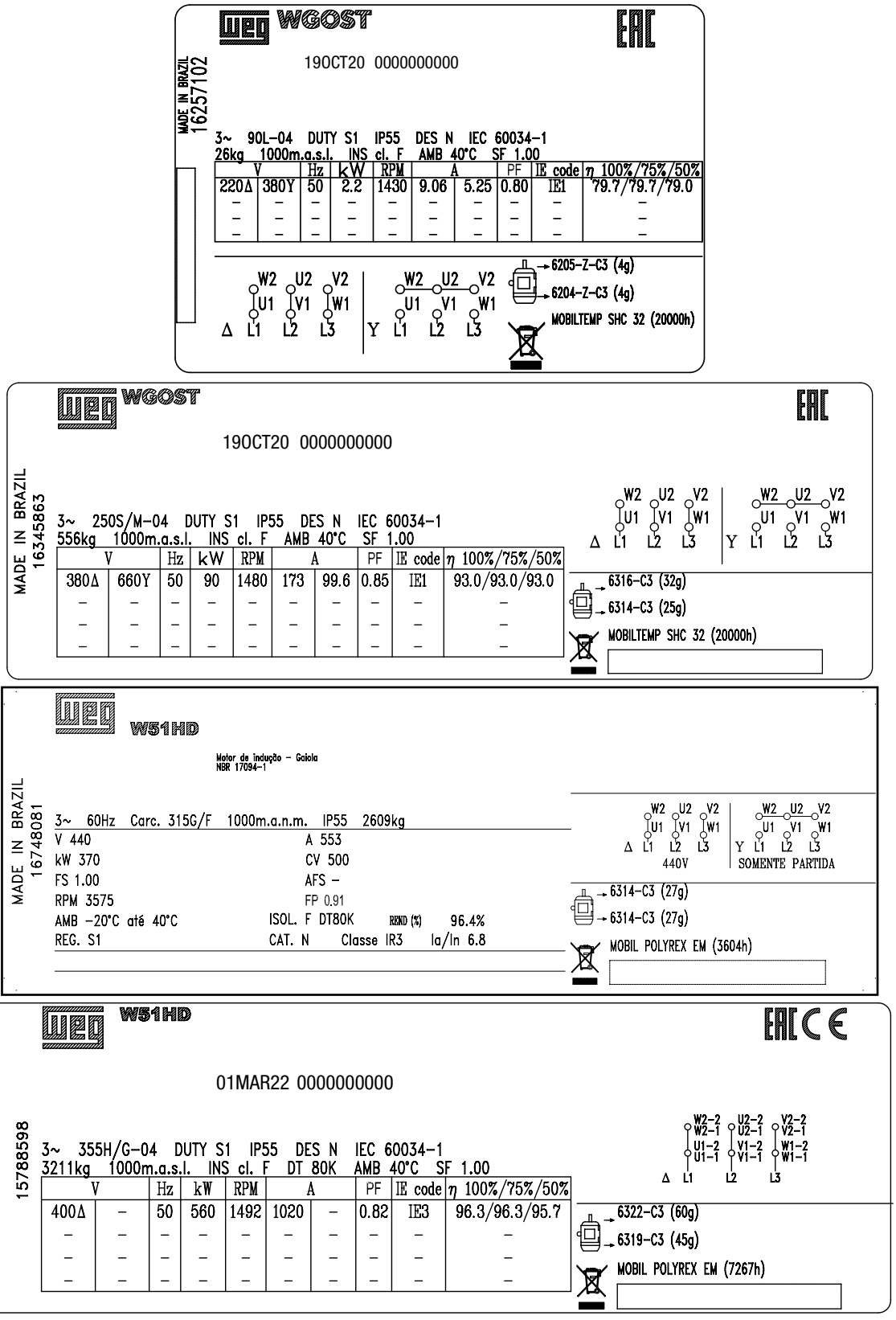
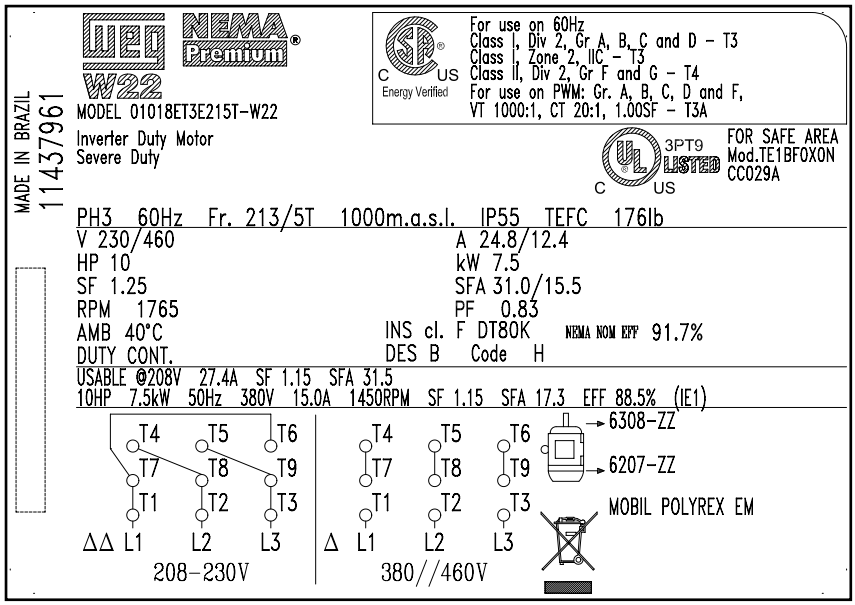
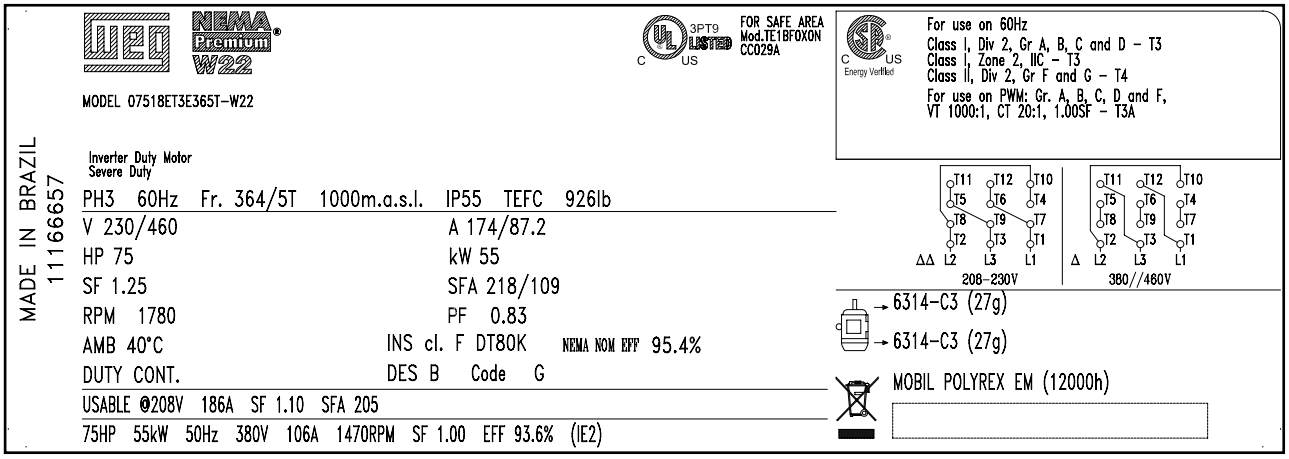


Figura 2 - Placa de características de motores IEC





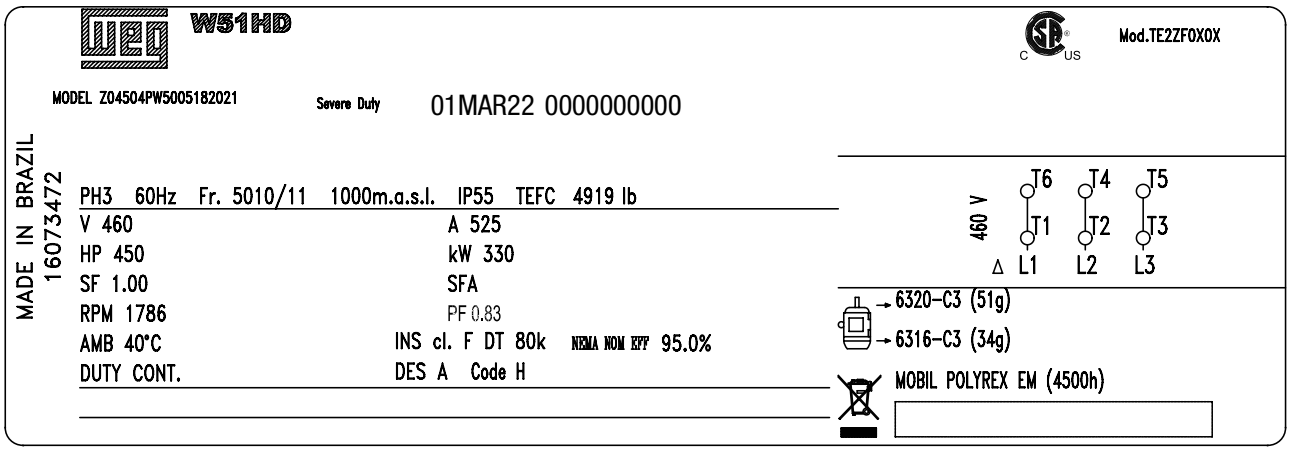


Figura 3 - Placa de características de motores NEMA

3. SEGURIDAD

Durante la instalación y mantenimiento, los motores deben estar desconectados de la red, completamente parados y deben ser tomados cuidados adicionales para evitar arranques accidentales.

Los profesionales que trabajan en instalaciones eléctricas, sea en el montaje, en la operación o en el mantenimiento, deben utilizar herramientas apropiadas y ser instruidos sobre la aplicación de las normas y prescripciones de seguridad, inclusive sobre el uso de Equipamientos de Protección Individual (EPI), los que deben ser cuidadosamente observados.

Los motores eléctricos poseen circuitos energizados, componentes giratorios y superficies calientes, durante su operación normal, que pueden causar lesiones. De esta forma, todas las actividades relacionadas a su transporte, almacenamiento, instalación, operación y mantenimiento deben ser realizadas por personal capacitado.

Los usuarios de marcapasos y el personal no calificado no deben abrir los motores WMagnet y WQuattro, ya que se utilizan imanes de alta energía.

Deben ser seguidas las instrucciones sobre seguridad, instalación, mantenimiento e inspección de acuerdo con las normas vigentes en cada país.

4. MANIPULACIÓN Y TRANSPORTE

Los motores embalados individualmente no deben ser izados por el eje o por el embalaje, sino por el(los) cáncamos de elevación (cuando existan) y con dispositivos adecuados. Los cáncamos de elevación están dimensionados para soportar tan solo la masa del motor indicada en la placa de características. Los motores suministrados en palés deben ser izados por la base de palé.
El embalaje no debe ser tumbado bajo ninguna circunstancia.

No utilice los cáncamos de elevación para suspender el motor en conjunto con otros equipamientos, como por ejemplo: bases, poleas, ventiladores, bombas, reductores, etc..

No deben ser utilizados cáncamos dañados, por ejemplo, con rajaduras, deformaciones, etc. Verificar sus condiciones antes de utilizarlos.

Los cáncamos de elevación en componentes como tapas, kit de ventilación forzada, entre otros, deben ser utilizados solamente para el elevación de estos componentes de manera aislada, nunca del motor completo.

Todo el movimiento debe ser realizado de forma suave, sin impactos, en caso contrario los rodamientos pueden ser dañados, así como los cáncamos ser expuestos a esfuerzos excesivos, pudiendo provocar la rotura de los mismos.

Nunca manipule los motores por los componentes poliméricos: tapa deflectora, sombrerete, caja de conexión y / o tapa de la caja de conexión.

Los dispositivos de trabado del eje (utilizados para protección durante el transporte), en motores con rodamientos de rodillos o contacto angular, deben ser utilizados para todo y cualquier transporte del motor, aunque eso requiera el desplazamiento de la máquina accionada.
Todos los motores HGF, W50, W51 HD y W60 independientemente del tipo de cojinete, deben tener su rotor trabado para transporte. Motores verticales con rodamientos lubricados por aceite deben ser transportados en posición vertical. En caso de necesidad de transporte en posición horizontal, utilice el dispositivo de trabado del eje en ambos lados (delantero / trasero) del motor.

4.1 ELEVACIÓN

Antes de iniciar cualquier proceso de elevación, asegúrese de que los cáncamos estén adecuadamente fijados, totalmente atornillados y con su base en contacto con la superficie a ser izada, conforme Figura 4. La Figura 5 ejemplifica el uso incorrecto.
Asegúrese de que el equipamiento utilizado en el elevación y sus dimensiones sean adecuados al tamaño del cáncamo y de la masa del motor.



Figura 4 - Manera correcta de fijación del cáncamo de elevación



Figura 5 - Manera incorrecta de fijación del cáncamo de elevación

El centro de gravedad de los motores varía en función de la potencia y los accesorios instalados. Respete los ángulos máximos, durante la elevación, informados en los subtemas a seguir.

4.1.1 Motores horizontales con un cáncamo de elevación

Para motores con un cáncamo de elevación, el ángulo máximo resultante durante el proceso de elevación no podrá exceder 30° en relación al eje vertical, conforme Figura 6.



Figura 6 - Ángulo máximo resultante para motores con un cáncamo de elevación

4.1.2 Motores horizontales con dos o más cáncamos de elevación

Para motores que poseen dos o más cáncamos para el elevación, todos los cáncamos suministrados deben ser utilizados simultáneamente para el elevación.

Existen dos disposiciones de cáncamos posibles (verticales e inclinados), conforme son presentadas a seguir:

- Motores con cáncamos verticales, conforme Figura 7, el ángulo máximo resultante debe ser de 45° en relación al eje vertical. Se recomienda la utilización de una barra separadora, para mantener el elemento de elevación (corriente o cable) en el eje vertical y evitar daños a la superficie del motor.



Figura 7 - Ángulo máximo resultante para motores con dos o más cáncamos de elevación

Para motores HGF, W51 HD, W40 y W50 conforme Figura 8, el ángulo máximo resultante debe ser de 30° en relación al eje vertical;

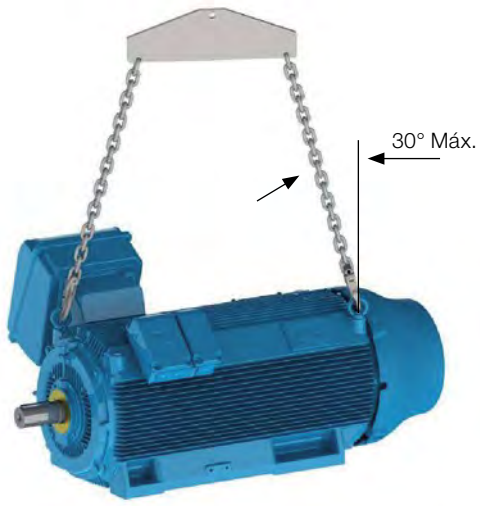


Figura 8 - Ángulo máximo resultante para motores HGF, W51 HD, W40 y W50 horizontales

Para motores W60, conforme Figura 9, es necesaria la utilización de una barra separadora, para mantener el elemento de elevación (corriente, cable, etc.) en el eje vertical y así también evitar daños a la superficie del motor.

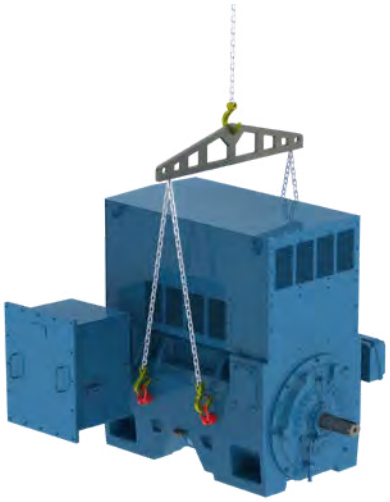


Figura 9 - Uso de barra separadora en la elevación de motores W60

- Motores con cáncamos inclinados, conforme Figura 10, es necesaria la utilización de una barra separadora, para mantener el elemento de elevación (corriente, cable, etc.) en el eje vertical y así también evitar daños a la superficie del motor.



Figura 10 - Uso de barra separadora en la elevación

4.1.3 Motores verticales

Para motores verticales, conforme Figura 11, es necesaria la utilización de una barra separadora, para mantener el elemento de elevación (corriente, cable) en el eje vertical y así también evitar daños a la superficie del motor.



Figura 11 - Elevación de motores verticales

Utilice siempre los cáncamos que están dispuestos en la parte superior del motor en relación a la posición de montaje y diametralmente opuestos. Ver Figura 12.



Figura 12 - Elevación de motores HGF, W51 HD y W50

4.1.3.1. Procedimiento para colocación de motores W22/WEG General Purpose/WIN en posición vertical

De forma general, por cuestiones de seguridad durante el transporte, los motores verticales son embalados y suministrados en la posición horizontal.

Para la colocación de motores W22/WEG General Purpose/WIN con cáncamos inclinados (ver Figura 10) en la vertical, deben ser seguidos los pasos abajo descritos:

1. Asegúrese de que los cáncamos están adecuadamente fijos, conforme Figura 4;

2. Remover el motor del embalaje, utilizando los cáncamos superiores, conforme Figura 13;



Figura 13 - Retirada del motor del embalaje

3. Instalar el segundo par de cáncamos, conforme Figura 14;



*Figura 14 - Instalación del segundo par de cáncamos*4.

Reducir la carga sobre el primer par de cáncamos para iniciar a rotación del motor, conforme Figura 15. Este procedimiento debe ser realizado de forma lenta y cuidadosa.



Figura 15 - Resultado final: motor posicionado de forma vertical

Para los motores de la carcasa IEC 112 a 200 (NEMA equivalente), WEG posee un kit de dispositivos para facilitar el vuelco del motor a la posición vertical, siendo de punta hacia arriba o hacia abajo (conforme las Figuras 16 y 17).



Figura 16 - - Ojal para vuelco en la punta de eje, vertical punta hacia arriba (V6/V36)



Figura 17 - Ojales con prolongador fijo en la tapa trasera, vertical punta hacia abajo (V5/V35)

4.1.3.2. Procedimiento para colocación de motores HGF, W51 HD y W50 en posición vertical

Los motores verticales HGF son suministrados con ocho puntos de elevación, cuatro en la parte delantera y cuatro en la parte trasera. Los motores verticales W50 y W51 HD son suministrados con nueve puntos de elevación, cuatro en la parte delantera, uno en la parte central y cuatro en la parte trasera. Ambos son generalmente transportados en la posición horizontal, no obstante, para la instalación precisan ser colocados en la posición vertical.
Para la colocación de motores en posición vertical, deben ser seguidos los pasos de abajo:

1. Levante el motor a través de los cuatro cáncamos laterales, utilizando dos grúas, ver Figura 18;



Figura 18 - Elevación del motor HGF, W51 HD y W50 utilizando dos grúas

2. Baje la grúa que está sujeta a la parte delantera del motor y al mismo tempo levante la grúa que está sujeta al lado trasero del motor hasta que el motor se equilibre, ver Figura 19;



Figura 19 - Colocación de motor HGF, W51 HD y W50 en posición vertical

3. Suelte la grúa sujeta a la parte delantera del motor y gire el motor 180° para posibilitar la fijación de la grúa suelta en los otros dos cáncamos de la parte trasera del motor, ver Figura 20;



Figura 20 - Suspensión de motor HGF, W51 HD y W50 por los cáncamos traseros

4. Fije la grúa suelta a los otros dos cáncamos de la parte trasera del motor y levántela hasta que el motor quede en la posición vertical, ver Figura 21.



Figura 21 - Motor HGF, W51 HD y W50 en posición vertical

Estos procedimientos sirven para movimientos de motores construidos con montaje en posición vertical. Estos mismos procedimientos pueden ser utilizados para la colocación del motor de posición horizontal a posición vertical y viceversa.

4.2 PROCEDIMIENTO PARA VIRADA DE MOTORES W22/WEG GENERAL PURPOSE/WIN VERTICALES

Para realizar la virada de motores W22/WEG General Purpose/WIN originalmente en la posición vertical, siga los pasos mostrados abajo:

1. Asegúrese que los cáncamos estén fijados adecuadamente, conforme ítem 4.1;
2. Instale el primer par de cáncamos y suspenda el motor, ver Figura 22;



Figura 22 - Instalación del primer par de cáncamos

3. Instalar el segundo par de cáncamos, ver Figura 23;



*Figura 23 - Instalación del segundo par de cáncamos*4.

4. Reduzca la carga sobre el primer par de cáncamos para iniciar la rotación del motor, conforme Figura 24. Este procedimiento debe ser realizado de forma lenta y cuidadosa;



Figura 24 - Motor está siendo rotado para hacia la posición horizontal

5. Remueva el primer par de cáncamos, ver Figura 25.



Figura 25 - Resultado final: motor posicionado de forma horizontal

5. ALMACENAMIENTO

Si los motores no fueran instalados de inmediato, se recomienda almacenarlos en local seco con humedad relativa del aire de hasta 60%, con temperatura ambiente por encima de 5 °C y por debajo de 40 °C, libre de polvo, vibraciones, gases, agentes corrosivos, con temperatura uniforme, en posición normal y sin apoyar otros objetos sobre los mismos. Quite las poleas, en caso que existan, de la punta del eje, la cual debe ser mantenida libre y con grasa protectora para evitar corrosión.

En caso que el motor posea resistencia de calentamiento, ésta deberá ser energizada siempre que el motor no esté en operación. Esto se aplica también a los casos en que el motor está instalado, pero fuera de uso por un largo período. En estas situaciones, dependiendo de las condiciones del ambiente, podrá ocurrir condensación de agua en el interior del motor, provocando una caída en la resistencia de aislamiento. Los motores deben ser almacenamientos de tal modo que el drenaje de agua condensada sea facilitado (informaciones adicionales están disponibles en el ítem 6).

Las resistencias de calentamiento nunca deben estar energizadas mientras el motor esté operando.

5.1 SUPERFICIES MECANIZADAS EXPUESTAS

Todas las superficies mecanizadas expuestas (por ejemplo, punta de eje y brida) son protegidas en la fábrica por un inhibidor de oxidación temporario. Esta película protectora debe ser reaplicada periódicamente durante el período de almacenamiento (por lo menos a cada seis meses) o cuando fuera retirada o estuviera deteriorada.

5.2 APILAMIENTO

El apilamiento de embalajes durante el almacenamiento no debe sobrepasar los 5 metros de altura, obedeciendo los criterios de la Tabla 1:

Tipo de embalaje	Carcasas	Cantidad máxima de apilamiento
Caja de cartón	IEC 56 a 132 NEMA 143 a 215	Indicada en la pestaña superior de la caja de cartón
Jaula de madera	IEC 56 a 315 NEMA 48 a 504/5	06
	IEC 355 NEMA 586/7 y 588/9	03
	W40 / W50 / W51 HD / W60 / HGF IEC 315 a 630 W40 / W50 / W51 HD / HGF NEMA 5000 a 9600	Indicado en el propio embalaje

Tabla 1 - Apilamiento máximo recomendado

Notas:

1) No apile embalajes mayores sobre menores;

2) Posicione correctamente un embalaje sobre el otro (ver Figura 26 y Figura 27);

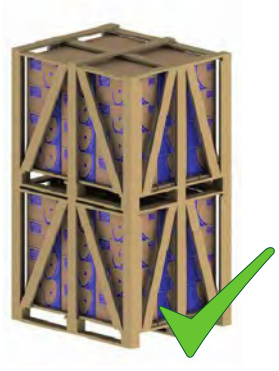


Figura 26 - Apilamiento adecuado

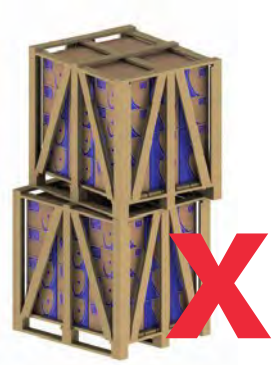


Figura 27 - Apilamiento inadecuado

3) Las patas de los embalajes superiores deben estar apoyadas sobre calces de madera (Figura 28) no sobre cintas de acero ni *pueden permanecer sin apoyo (Figura 29);*

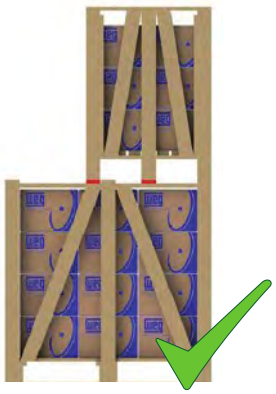


Figura 28 - Apilamiento adecuado



Figura 29 - Apilamiento inadecuado

4) Para el apilamiento de un volumen menor sobre un volumen mayor, agregue varas transversales entre los mismos cuando el mayor no ofrezca resistencia al peso del menor (ver Figura 30). Esta situación normalmente ocurre con los volúmenes de los motores de carcasa por encima de la IEC 225S/M (NEMA 364/5T).

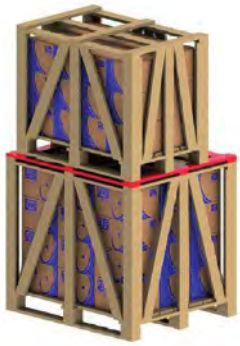


Figura 30 - Utilización de varas adicionales para apilamiento

5.3 COJINETES

5.3.3.1. Cojinetes de rodamiento lubricados con grasa

Se recomienda girar el eje del motor por lo menos una vez al mes (manualmente, al menos cinco vueltas, dejando el eje en posición diferente de la original). En los motores WMagnet y WQuattro, el eje no gira libremente debido al par de alineación de los imanes. Puede que sea necesario utilizar una palanca para girar el eje.

Al girar el eje de un motor WMagnet o WQuattro, se debe garantizar el aislamiento de los terminales de la máquina, debido al riesgo de descarga eléctrica provocada por la tensión inducida durante el procedimiento.

Obs.: en caso que el motor posea dispositivo de trabado del eje, el mismo debe ser retirado antes de girar el eje y ser colocado de nuevo antes de levantar el motor.
Los motores verticales pueden ser almacenamientos en posición vertical o en posición horizontal.
Para motores con rodamiento abierto almacenamientos por más de seis meses, los rodamientos deben ser relubricados, conforme el ítem 8.2, antes de la entrada en operación.
En caso que el motor permanezca almacenamiento por un período superior a dos años, se recomienda sustituir los rodamientos, o de otra forma, deben ser retirados, lavados, inspeccionados y relubricados conforme el ítem 8.2.

5.3.1 Cojinetes de rodamiento con lubricación por aceite

El motor debe ser almacenamiento en su posición original de funcionamiento, y con aceite en los cojinetes. El nivel de aceite debe ser respetado, permaneciendo en la mitad del visor de nivel.
Durante el período de almacenamiento, se debe retirar el dispositivo de trabado del eje y, mensualmente, girar el eje manualmente cinco vueltas, para hacer circular el aceite y conservar el cojinete en buenas condiciones. Siendo necesario mover el motor, el dispositivo de trabado del eje debe ser reinstalado.
Para los motores almacenamientos durante un periodo igual o mayor que el intervalo de cambio de aceite, el aceite deberá ser cambiado, conforme el ítem 8.2, antes de la puesta en funcionamiento.
En caso que el motor permanezca almacenamiento por un período superior a dos años, se recomienda sustituir los rodamientos o entonces retirarlos, lavarlos, inspeccionarlos y relubricarlos conforme el ítem 8.2.
El aceite de los cojinetes de los motores verticales, es retirado para evitar derramamiento durante el transporte. Tras la recepción, sus cojinetes deben ser lubricados.

5.3.1.1. Cojinetes de rodamiento con lubricación de tipo de neblina de aceite

El motor debe ser almacenamiento en posición horizontal. Rellene los cojinetes con aceite mineral ISO VG 68 con la cantidad de aceite indicada en la Tabla 2 (también válida para rodamientos con dimensiones equivalentes). Tras a colocación de aceite en los cojinetes, gire el eje (como mínimo cinco vueltas).
Durante el período de almacenamiento, se debe retirar el dispositivo de trabado del eje (cuando es suministrado) y semanalmente girar el eje manualmente 5 vueltas, dejando el mismo en posición diferente de la original. Siendo necesario mover el motor, el dispositivo de trabado del eje debe ser reinstalado.
En caso que el motor permanezca almacenamiento por un período superior a dos años, se recomienda sustituir los rodamientos o entonces retirarlos, lavarlos, inspeccionarlos y relubricarlos conforme el ítem 8.2.

Tamaño de rodamiento	Cantidad de aceite (ml)	Tamaño de rodamiento	Cantidad de aceite (ml)
6201	15	6309	65
6202	15	6311	90
6203	15	6312	105
6204	25	6314	150
6205	25	6315	200
6206	35	6316	250
6207	35	6317	300
6208	40	6319	350
6209	40	6320	400
6211	45	6322	550
6212	50	6324	600
6307	45	6326	650
6308	55	6328	700

Tabla 2 - Cantidad de aceite por rodamiento

Durante cualquier manipulación del motor, los cojinetes deben estar sin aceite. De esa forma, antes de la entrada en operación, todo el aceite de los cojinetes debe ser drenado. Después de la instalación, en caso que el sistema de neblina no esté en operación, el aceite debe ser recolocado para garantizar la conservación del cojinete. En este caso, se debe también proceder con el giro semanal del eje.

5.3.2 Cojinetes de deslelevación

El motor debe ser almacenamiento en su posición original de funcionamiento, y con aceite en los cojinetes. El nivel de aceite debe ser respetado, permaneciendo en la mitad del visor de nivel.
Durante el período de almacenamiento, se debe, retirar el dispositivo de trabado del eje y, mensualmente, girar el eje manualmente 5 vueltas (y a 30 rpm), para hacer circular el aceite y conservar el cojinete en buenas condiciones. En caso que sea necesario mover el motor, el dispositivo de trabado del eje debe ser reinstalado.
Para los motores almacenamientos durante un periodo igual o mayor que el intervalo de cambio de aceite, el aceite deberá ser cambiado, conforme el ítem 8.2, antes de la puesta en funcionamiento.
En caso que el motor permanezca almacenamiento por un período mayor que el intervalo de cambio de aceite, o no sea posible girar el eje del motor, el aceite debe ser drenado y debe ser aplicada una protección anticorrosiva y deshumidificadores.

5.3.3 Procedimiento para medición de la resistencia de aislamiento



La medición de la resistencia de aislamiento debe ser realizada en área segura.

La resistencia de aislamiento debe ser medida con un megóhmetro y con el motor parado, frío y completamente desconectado de la red eléctrica.



Para evitar el riesgo de shock eléctrico, descargue los terminales inmediatamente antes y después de cada medición. En caso que el motor posea capacitores, éstos deben ser descargados.

Es recomendable que cada fase sea aislada y testeada separadamente, permitiendo que sea hecha una comparación entre la resistencia de aislamiento entre cada fase. Para testear una de las fases, las demás fases deben estar puestas a tierra.
El test de todas las fases simultáneamente evalúa solamente la resistencia de aislamiento contra tierra. En este caso no es evaluada la resistencia de aislamiento entre las fases.
Los cables de alimentación, llaves, condensadores y otros equipamientos externos conectados al motor pueden influenciar considerablemente la medición de la resistencia de aislamiento. Al realizar estas mediciones, todos los equipamientos externos deben estar desconectados y puestos a tierra.
La lectura de la resistencia de aislamiento debe ser realizada después de ser aplicada la tensión durante un período de un minuto (1 min). La tensión a ser aplicada debe obedecer la Tabla 3.

Tensión nominal del motor (V)	Tensión aplicada para la medición de la resistencia de aislamiento (V)
< 1.000	500
1.000 - 2.500	500 - 1.000
2.501 - 5.000	1.000 - 2.500
5.001 - 1.2000	2.500 - 5.000
> 1.2000	5.000 - 1.0000

Tabla 3 - Tensión para medición de la resistencia de aislamiento

La medición de la resistencia de aislamiento debe ser corregida para la temperatura de 40 °C conforme Tabla 4.

Temperatura de medición de la resistencia de aislamiento (°C)	Factor de corrección de la resistencia de aislamiento para 40 °C
10	0,125
11	0,134
12	0,144
13	0,154
14	0,165
15	0,177
16	0,189
17	0,203
18	0,218
19	0,233
20	0,250
21	0,268
22	0,287
23	0,308
24	0,330
25	0,354
26	0,379
27	0,406
28	0,435
29	0,467
30	0,500

Temperatura de medición de la resistencia de aislamiento (°C)	Factor de corrección de la resistencia de aislamiento para 40 °C
30	0,500
31	0,536
32	0,574
33	0,616
34	0,660
35	0,707
36	0,758
37	0,812
38	0,871
39	0,933
40	1,000
41	1,072
42	1,149
43	1,231
44	1,320
45	1,414
46	1,516
47	1,625
48	1,741
49	1,866
50	2,000

Tabla 4 - Factor de Corrección de la Resistencia de Aislamiento para 40 °C

La condición del aislamiento del motor deberá ser evaluada comparándose el valor medido con los valores de la Tabla 5 (referenciados a 40 °C):

Valor límite para tensión nominal hasta 1,1 kV (MΩ)	Valor límite para tensión nominal por encima de 1,1 kV (MΩ)	Situación
Hasta 5	Hasta 100	Peligroso, el motor no debe operar en esa condición
Entre 5 y 100	Entre 100 y 500	Regular
Entre 100 y 500	Por encima de 500	Bueno
Por encima de 500	Por encima de 1.000	Excelente

Tabla 5 - Avaliação do sistema de isolamento

Los datos indicados de la tabla sirven simplemente como valores de referencia. Se sugiere mantener el histórico de la resistencia de aislamiento del motor durante toda su vida.

Si la resistencia de aislamiento estuviera baja, el estator del motor puede estar húmedo. En ese caso, se recomienda llevarlo a un Asistente Técnico Autorizado WEG para que sean realizadas la evaluación y la reparación adecuadas. Este servicio no está cubierto por el Término de Garantía.
Para procedimiento de adecuación de la resistencia de aislamiento, ver ítem 8.4.

6. INSTALACIÓN

La instalación de motores debe ser hecha por profesionales capacitados con conocimientos sobre las normas y las prescripciones de seguridad.

Antes de continuar con el procedimiento de instalación deben ser evaluados algunos puntos:

1. Resistencia de aislamiento: debe estar dentro de los valores aceptables. Ver ítem 5.4.
2. Cojinetes:
   Si el motor está instalado y no entra en funcionamiento inmediatamente, proceder con elas instrucciones del ítem 5.3
3. Condición de los condensadores de arranque: para motores monofásicos almacenamientos por un período mayor a dos años, se recomienda que sus condensadores de arranque sean sustituidos.
4. Caja de conexión:
   a. Deben estar limpias y secas en su interior;
   b. Los elementos de contacto deben estar libres de oxidación y correctamente conectados. Ver ítems 6.9 y 6.10;
   c. Las entradas de cables no utilizadas deben estar correctamente selladas, la tapa de la caja de conexión debe ser cerrada y los sellados deben estar en condiciones apropiadas para atender el grado de protección del motor.
5. Ventilación: las aletas, la entrada y la salida de aire deben estar limpias y desobstruidas. La distancia de instalación recomendada entre las entradas de aire del motor y la pared no debe ser inferior a ¼ (un cuarto) del diámetro de la entrada de aire. Se debe asegurar espacio suficiente para la realización de servicios de limpieza. Ver ítem 7.
6. Acoplamiento: retirar el dispositivo de trabado del eje (si existe) y la grasa de protección contra corrosión de la punta del eje, incluyendo el área del cepillo de tierra, y de la brida inmediatamente antes de instalar el motor. Ver ítem 6.4.
7. Drenaje: siempre deben estar posicionados de forma que el drenaje sea facilitado (en el punto más bajo del motor. En caso que exista una flecha indicadora en el cuerpo del drenaje, el drenaje debe ser montado para que la misma apunte hacia abajo).
   Motores con drenaje de goma, drenaje roscada y además drenajes abierto/cerrado salen de la fábrica en la posición y deben ser abiertos periódicamente para permitir la salida del agua condensado. Para ambientes con elevada condensación del agua y motores con grado de protección IP55, los drenajes pueden ser armados en posición abierta (ver Figura 31).
   Para motores con grado de protección IP56, IP65 o IP66, los drenajes deben permanecer en posición cerrada (ver Figura 6.1), siendo abiertos solamente durante el mantenimiento del motor.
   Los motores con lubricación de tipo neblina de aceite deben tener sus drenajes conectados a un sistema de recogida específico (ver Figura 31).

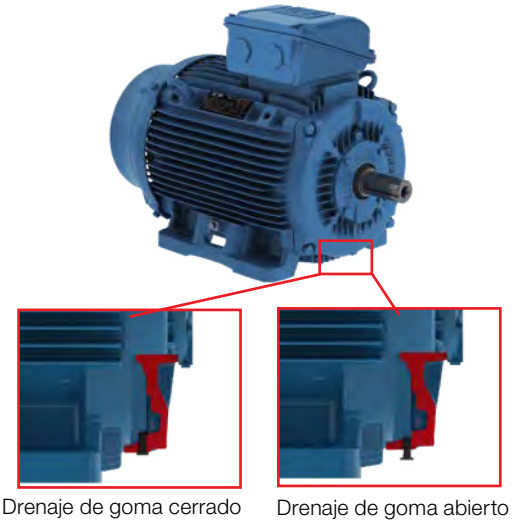


Figura 31 - Detalle del drenaje de goma montado en posición cerrada y abierta

8. Recomendaciones adicionales
   a. Verifique el sentido de rotación del motor, encendiéndolo a vacío antes de acoplarlo a la carga;
   b. Para motores montados a posición vertical con la punta de eje hacia abajo, se recomienda el uso de sombrerete para evitar a penetración de cuerpos extraños en el interior del motor;
   c. Para motores montados en la posición vertical con la punta de eje hacia arriba, se recomienda el uso de un deflector de agua (water slinger ring) para evitar la penetración de agua por el eje.
   d. Los elementos de fijación montados en agujeros roscados pasantes del involucro del motor (por ejemplo, en la brida) deben ser sellados para asegurar el grado de protección indicado en la placa de identificación del motor.

Retire o fije completamente la chaveta antes de encender el motor.

Cualquier modificación de las características constructivas del motor, como la instalación de accesorio de engrases prolongadas o modificación del sistema de lubricación, instalación de accesorios en puntos alternativos, etc., sólo puede ser realizada con aprobación previa por escrito de WEG.

6.1 CIMIENTOS PARA EL MOTOR

El cimiento es el elemento estructural, base natural o preparada, destinada a soportar los esfuerzos producidos por los equipamientos instalados, permitiendo la operación de éstos con estabilidad, buen rendimiento y seguridad.
El proyecto de cimientos debe considerar las estructuras adyacentes para evitar influencia de un equipamiento sobre el otro, a fin de que no ocurra propagación de vibraciones.
Los cimientos deben ser planos y su elección, detallado y ejecución, exige las características:
a) De la construcción del propio equipamiento, implicando no solamente los valores y forma de actuación de las cargas, sino que también su finalidad y los límites máximos de las deformaciones y vibraciones compatibles en cada caso (ejemplo, motores con valores reducidos de: nivel de vibración, planicidad de las patas, concentricidad de la brida, pulso de la brida, etc.);
b) De las construcciones vecinas, comprendiendo el estado de conservación, estimación de las cargas máximas aplicadas, tipo de cimiento y fijación empleadas, así como los niveles de vibración transmitidos por estas construcciones.
Cuando el motor sea suministrado con tornillo de alineamiento/nivelación, deberá ser prevista en la base una superficie que permita el alineamiento/nivelación.

Los esfuerzos generados durante la operación, por la carga accionada, deben ser considerados como parte del dimensionamiento de los cimientos.
El usuario es totalmente responsable del proyecto, preparación y ejecución de los cimientos.

Los esfuerzos sobre los cimientos pueden ser calculados por las ecuaciones:

$$F_1 = 0{,}5 * g * m - (4 * T_b / A)$$
$$F_2 = 0{,}5 * g * m + (4 * T_b / A)$$

Donde:
F_1 y F_2 = esfuerzos en un lado del motor (N)
g = aceleración de la gravedad (9,8 m/s^2)
m = peso del motor (kg)
T_b = par máximo del motor (Nm)
A = distancia entre los agujeros de montaje de las patas del motor (vista frontal) (m)
Los motores pueden ser montados sobre:
- Bases de concreto: más recomendadas y usuales para los motores de gran porte (ver Figura 32)
- Bases metálicas: más comunes para motores de pequeño tamaño (ver Figura 33)

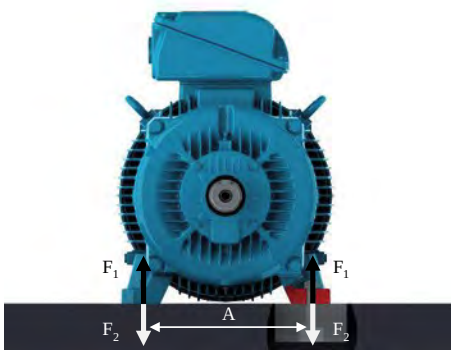


Figura 32 - Motor instalado sobre base de concreto


Figura 33 - Motor instalado sobre base metálica

En las bases metálicas y de hormigón puede existir un sistema de deslelevación. Normalmente son utilizados en aplicaciones en que el accionamiento ocurre por poleas y correas. Son más flexibles permitiendo montajes y desmontajes más rápidas, además de permitir ajustes en la tensión de la correa. Otro aspecto importante es la posición de los tornillos de trabado de la base, que deben ser opuestos y en posición diagonal. El riel más cercano a la polea motora es colocado de forma que el tornillo de posicionamiento permanezca entre el motor y la máquina accionada. El otro riel debe ser colocado con el tornillo en posición opuesta (diagonal), como es presentado en la Figura 34.

Para facilitar el montaje, las bases pueden poseer características como:
- Resaltes y/o huecos
- Tornillos de anclaje con placas sueltas
- Tornillos fundidos en el hormigón
- Tornillos de nivelación
- Tornillos de posicionamiento
- Bloques de hierro o de acero, placas con superficies planas

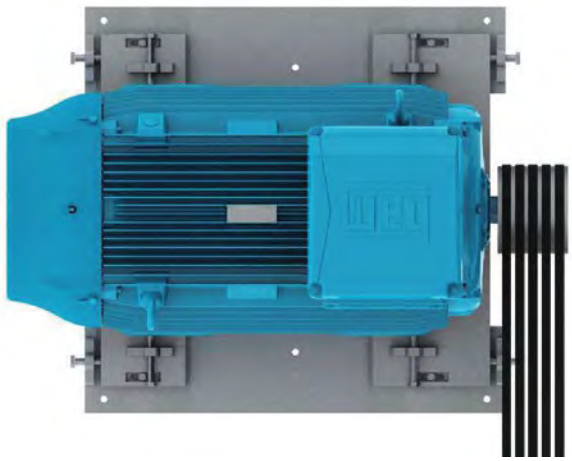


Figura 34 - Motor instalado sobre base deslizante

También se recomienda que después de la instalación del motor, las partes metálicas expuestas sean protegidas contra oxidación.

6.2 FIJACIÓN DEL MOTOR

Motores sin patas suministrados con dispositivos de transporte, de acuerdo con la Figura 35, deben tener sus dispositivos retirados antes de iniciar la instalación del motor.

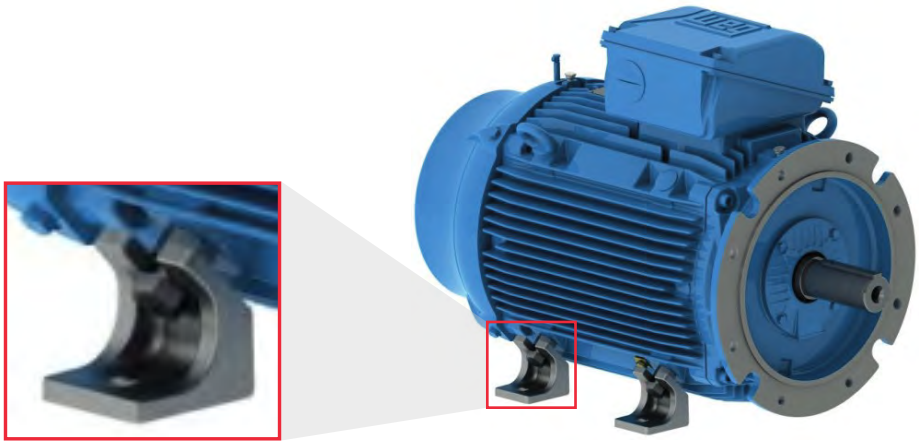


Figura 35 - Dispositivo de transporte para motores sin patas

6.2.1 Fijación por las patas

El dimensionamiento de la perforación de las patas, basado en las normas IEC o NEMA, es informado en el catálogo técnico del producto.
El motor debe ser apoyado sobre la base, alineado y nivelado a fin de que no provoque vibraciones ni esfuerzos excesivos en el eje o en los cojinetes. Para más detalles, consulte el ítem 6.3 y 6.6.
Se recomienda que el tornillo de fijación tenga longitud roscada libre de 1,5 veces el diámetro del tornillo. En aplicaciones de alto rendimiento, puede ser necesaria la utilización de una longitud roscada libre mayor. La Figura 36 representa la fijación del motor con patas indicando la longitud libre mínima del tornillo.

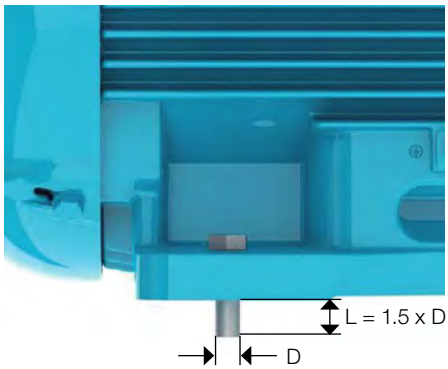


Figura 36 - Representación de la fijación del motor por patas

6.2.1.1. Fijación por brida

El dimensional de la brida, basado en las normas IEC o NEMA, es informado en el catálogo electrónico o en el catálogo técnico del producto.
La brida del motor debe ser apoyada en la base, que debe poseer un dimensionamiento de encaje adecuado para el tamaño de la brida del motor y así asegurar la concentricidad del conjunto.
Dependiendo del tipo de brida, la fijación puede ser realizada desde el motor hacia la base (brida FF e (IEC) o D (NEMA)) o desde la base hacia el motor (brida C (DIN o NEMA)).
Para fijación desde la base hacia el motor, la determinación de la longitud del tornillo debe tomar en consideración el grosor de la base del usuario y la profundidad de la rosca de la brida del motor.

En los casos en que se utilicen bridas de polímero con tuerca incorporada o brida de aluminio con orificio hexagonal, la longitud del tornillo de fijación del motor no debe exceder la longitud del orificio, evitando así la desalineación y holgura del acoplamiento.

En los casos que el agujero de la brida sea pasante, la longitud del tornillo de fijación del motor no debe exceder la longitud roscada de la brida para evitar contacto con la bobina del motor.

Los motores con carcasa y/o brida en aluminio pueden ser suministrados con agujeros hexagonales para fijación de la brida, estos agujeros pueden recibir tornillos cilíndricos compatibles con las dimensiones de acoplamiento estandarizadas, importante tener atención a la clase de resistencia mínima del tornillo, de acuerdo con el catálogo del producto.
Para fijación del motor a la base, se recomienda que el tornillo de fijación tenga longitud roscada libre de 1,5 veces el diámetro del tornillo. En aplicaciones severas, puede ser necesaria la utilización de una longitud roscada libre mayor.
Para fijación de motores de gran porte y/o en aplicaciones de alto rendimiento, se recomienda que, además de la fijación por brida, el motor sea apoyado (por patas o *pad*). El motor nunca puede ser apoyado sobre sus aletas. Ver Figura 37.

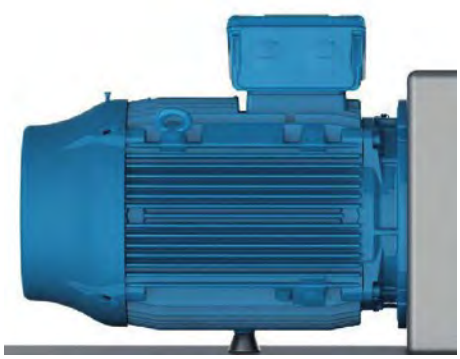


Figura 37 - Representación de la fijación del motor con brida y apoyo en la base de la carcasa

Para aplicación de motores con la presencia de líquidos en el interior de la brida (ej.: aceite), el sellado del motor debe ser adecuado para impedir la penetración de líquidos en el interior del motor.
Se debe respetar el par de apriete indicado en la Tabla 6 al fijar:
- la pata y / o brida de polímero al equipo;
- al instalar tapas deflectoras de polímero de motores WEG General Purpose y WIN y/o cambio/rotación de la caja de conexiones de motores W12/WEG General Purpose.
Para la instalación de motores W12 / WEG General Purpose en las carcasas IEC56, W63 y W71 en la posición vertical del eje hacia arriba, la pata debe bloquearse axialmente mediante la fijación de un tornillo de cabeza plana como se indica en la Tabla 6.
El agujero hexagonal en las bridas C-DIN de los motores W12/WEG General Purpose en las carcasas IEC56 / W63 / W71 son adecuados para los tornillos indicados en la Tabla 6.

Carcasa	Componente	Especificación del tornillo (calibre x largo)	Torque (Nm)
IEC56	Pata Polímero	M5x12	8
W63/W71		M5x16	8
IEC56/W63/ W71	Brida Polímero	-	8
	C-80	M5	5
	C-105	M6	6
160/180/200/W225/225/250/W280	Tapa deflectora	M8 / M10	6 a 8
IEC 56/W63/W71	Caja de conexión /Puesta a tierra	M5	1,8 a 2,4
71/W80/90/W100/112/132	Caja de conexión /Puesta a tierra	M5	5

Tabla 6 - Torque de apriete y tornillo a ser utilizados en motores W12/WEG General Purpose

Para motores de la línea WFL, la brida tiene orificios hexagonales, aptos para tornillos M6 (torque máximo 8Nm), los tornillos deben tener por lo menos clase de resistencia de 5,6. El largo de los tornillos que serán utilizados en la aplicación, para fijar el motor en el equipo, no debe sobrepasar el espesor de las paredes de la tapa donde éstos serán fijados, con riesgo de dañar la cabeza de la bobina del motor, así como de shock eléctrico. El tornillo de la aplicación debe ser engastado en la tapa con profundidad mínima de 7mm y máxima de 9mm (Figura 38).



Figura 38 - Límite de profundidad del engaste

6.2.2 Fijación por pad

Este tipo de fijación es normalmente utilizado en conductos de ventilación. La fijación del motor se hace a través de perforaciones roscadas en la estructura del motor, cuyas medidas se informan en el catálogo electrónico o en el catálogo técnico del producto.
El dimensionamiento de la varilla de fijación/tornillo del motor debe tomar en consideración las medidas del conducto de ventilación o base de instalación y la profundidad de la rosca en el motor. Las varillas de fijación y la pared del ducto deben tener rigidez suficiente para evitar la vibración excesiva del conjunto (motor y ventilador).
La Figura 39 representa la fijación por *pads*.

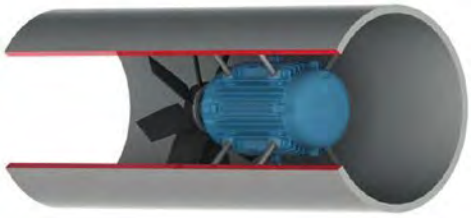


Figura 39 - Representación de la fijación del motor en el interior de un conducto de ventilación

6.3 . EQUILIBRADO

Los equipos desequilibrados generan vibraciones que pueden causar daños al motor. Los motores WEG están equilibrados dinámicamente con "media chaveta" en vacío (desacoplados). Deben ser solicitados equilibrados especiales en el momento de la compra.

Los elementos de transmisión tales como poleas, acoplamientos, etc., deben ser equilibrados antes de ser instalados en los ejes de los motores.

El grado de calidad de equilibrado del motor sigue las normas vigentes para cada línea de producto.
Se recomienda que los desvíos máximos de equilibrado sean registrados en el informe de instalación.

6.4 ACOPLAMIENTOS

Los acoplamientos son utilizados para la transmisión del par del motor hacia la máquina accionada. Al utilizar un acoplamiento, deben ser observados los aspectos siguientes:

- Utilice herramientas apropiadas para el montaje y desmontaje de los acoplamientos y así evitar daños al motor;
- Se recomienda la utilización de acoplamientos flexibles, capaces de absorber pequeños desalineamientos durante la funcionamiento del equipo
- Las cargas máximas y límites de velocidad informados en los catálogos de los fabricantes de los acoplamientos y del motor no deben ser excedidos;
- Realice la nivelación y el alineamiento del motor conforme ítems 6.5 y 6.6, respectivamente.

Los motores accionados sin elementos de transmisión acoplados deben tener su chaveta firmemente fijada o retirada, para prevenir accidentes.

6.4.1 Acoplamiento directo

Cuando el eje del motor está acoplado directamente al eje de la carga accionada, sin el uso de elementos de transmisión, presenta acoplamiento directo. El acoplamiento directo ofrece menor costo, mayor seguridad contra accidentes y ocupa menos espacio.

En aplicaciones con acoplamiento directo, se recomienda el uso de rodamientos de bolas.

6.4.2 Acoplamiento por engranaje

El acoplamiento por engranajes es utilizado cuando existe la necesidad de una reducción de velocidad.
Es imprescindible que los ejes estén perfectamente alineados, rigurosamente paralelos (en caso de engranajes rectos) y en el ángulo de engranaje (en caso de engranajes cónicos o helicoidales).

6.4.3 Acoplamiento por poleasy

Es un tipo de transmisión utilizado cuando existe la necesidad de una relación de velocidades entre el motor y la carga accionada.

Una tensión excesiva en las correas perjudica los rodamientos y puede provocar la ruptura del eje del motor.

6.4.4 Acoplamiento de motores equipados con cojinetes de deslelevación

Los motores equipados con cojinetes de deslelevación deben estar acoplados directamente a la máquina accionada o por medio de un reductor. Los cojinetes de deslelevación no permiten el acoplamiento a través de poleas y correas.

Los motores equipados con cojinetes de deslelevación poseen 3 marcas en la punta del eje, donde la marca central es la indicación del centro magnético y las otras 2 marcas externas indican los límites de movimiento axial permitidos para el rotor, conforme Figura 40.
El motor debe ser acoplado de manera que la flecha fijada en la carcasa del cojinete quede posicionada sobre la marca central, cuando el motor esté en operación. Durante la puesta en marcha, o incluso en operación, el rotor puede moverse libremente entre las dos ranuras externas, en caso que la máquina accionada ejerza algún esfuerzo axial sobre el eje del motor. No obstante, el motor no puede operar de manera constante con esfuerzo axial sobre el cojinete, bajo ningún concepto.

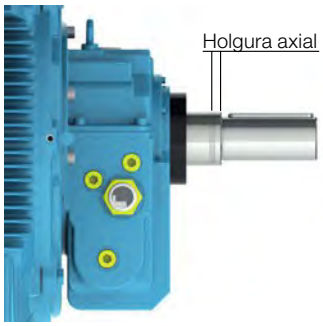


Figura 40 - Holgura axial en motor equipado con cojinete de deslelevación

Al evaluar el acoplamiento, se debe considerar la holgura axial máxima del cojinete conforme la Tabla 7. Las holguras axiales de la máquina accionada y del acoplamiento influyen en la holgura máxima del cojinete.

Tamaño del cojinete	Holgura axial total (mm)
9*	3 + 3 = 6
11*	4 + 4 = 8
14*	5 + 5 =10
18	7,5 + 7,5 = 15

Tabla 7 - Holguras utilizadas en cojinetes de deslelevación

Los cojinetes de deslelevación utilizados por WEG no fueron proyectados para soportar un esfuerzo axial continuo. La operación continua de la máquina, en sus límites de holgura axial, no es recomendada.

6.5 NIVELACIÓN

La nivelación del motor debe ser realizada para corregir eventuales desvíos de planicidad, que puedan existir provenientes de otros procesos y acomodaciones de los materiales. La nivelación puede ser realizada por medio de un tornillo de nivelación fijado a la pata o brida del motor, o por medio de finas chapas de compensación. Tras la nivelación, la diferencia de altura entre la base de fijación del motor y el motor no debe exceder 0,1 mm.
En caso que sea utilizada una base metálica para ajustar la altura de la punta de eje del motor con la punta de eje de la máquina accionada, ésta debe ser nivelada en la base de cemento.
Se recomienda que los desvíos máximos de nivelación sean registrados y almacenamientos en el informe de instalación.

6.6 ALINEAMIENTO

El alineamiento entre la máquina motriz y la accionada es una de las variables que más contribuyen para prolongar la vida del motor. El desalineamiento entre los acoplamientos genera elevadas cargas que reducen la vida útil de los cojinetes, provocan vibraciones y, en casos extremos, pueden causar la ruptura del eje. La Figura 41 ilustra el desalineamiento entre el motor y el equipamiento accionado.

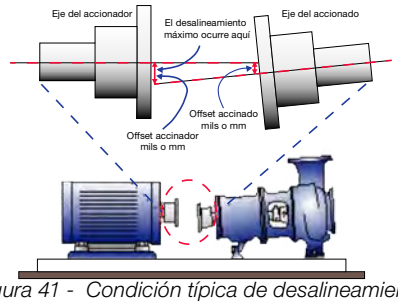
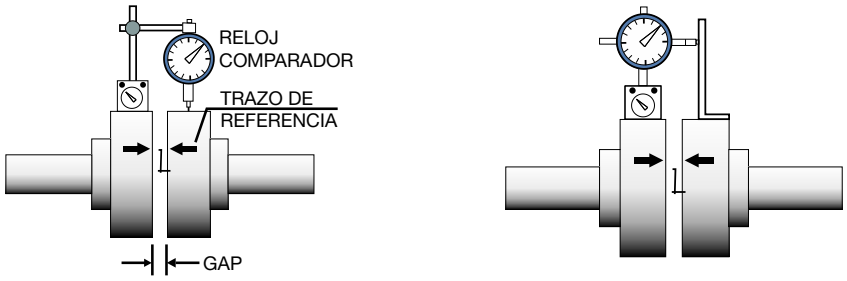


Figura 41 - Condición típica de desalineamiento

Para efectuar un buen alineamiento del motor, se deben utilizar herramientas y dispositivos adecuados, tales como reloj comparador, instrumento de alineamiento láser, entre otros. El eje debe ser alineado axialmente y radialmente con el eje de la máquina accionada.

El valor leído en relojes comparadores para el alineamiento, de acuerdo con la Figura 42, no debe exceder 0,03 mm, considerando un giro completo del eje. Debe existir una holgura entre los acoplamientos, para compensar la dilatación térmica de los ejes, conforme especificación del fabricante del acoplamiento.



Alineamiento paralelo *Alineamiento angular*

Figura 42 - Alineamiento con reloj comparador

En caso que el alineamiento sea realizado a través de un instrumento láser, deben ser seguidas las instrucciones y recomendaciones suministradas por el fabricante del instrumento.
La verificación del alineamiento debe ser realizada a temperatura ambiente y a la temperatura de trabajo de los equipamientos.

Es recomendable que el alineamiento de los acoplamientos sea verificado periódicamente.

Para acoplamiento por poleas y correas, el alineamiento debe ser realizado de tal modo que el centro de la polea motora esté en el mismo plano del centro de la polea movida y los ejes del motor y de la máquina estén perfectamente paralelos.
Después de la realización de los procedimientos descritos anteriormente, se debe certificar que los dispositivos de montaje del motor no permitan alteraciones en el alineamiento y en la nivelación y no causen daños al equipamiento.
Se recomienda que los desvíos máximos de alineamiento sean registrados y almacenamientos en el informe de instalación.

6.7 CONEXIÓN DE MOTORES LUBRICADOS POR ACEITE O DE TIPO NEBLINA DE ACEITE

En motores con lubricación a aceite o de tipo *oil mist*, se debe conectar los tubos de lubricación existentes (entrada, salida del cojinete y drenaje del motor), conforme se indica en la Figura 43.
El sistema de lubricación debe garantizar lubricación continua del cojinete, de acuerdo con las especificaciones del fabricante de este sistema.

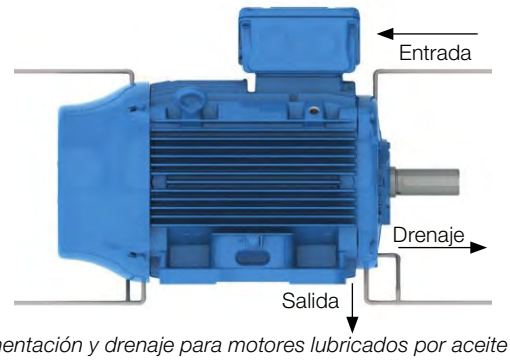


Figura 43 - Sistema de alimentación y drenaje para motores lubricados por aceite o de tipo Neblina de aceite

6.8 CONEXIÓN DEL SISTEMA DE REFRIGERACION POR AGUA

En motores con refrigeración a agua, debe ser prevista la instalación de conductos en la entrada y salida de agua del motor para garantizar su refrigeración. Se debe observar, conforme el ítem 7.2, el flujo mínimo y la temperatura del agua en la instalación.

6.9 CONEXIÓN ELECTRICA

Para el dimensionamiento de los cables de alimentación y dispositivos de maniobra y protección deben ser considerados: corriente nominal del motor, factor de servicio, corriente de arranque, condiciones del ambiente y de la instalación, la máxima caída de tensión, etc. conforme las normas vigentes.
Todos los motores deben ser instalados con sistemas de protección contra sobrecarga. Para motores trifásicos se recomienda la instalación de sistemas de protección contra falta de fase.

Antes de conectar el motor, verifique si la tensión y la frecuencia de la red son las mismas marcadas en la placa de características del motor. Siga el diagrama de conexión indicado en la placa de características del motor. Como referencia, pueden ser seguidas los diagramas de conexión presentados en la Tabla 8.
Para evitar accidentes, verifique si la puesta a tierra fue realizada conforme las normas vigentes.

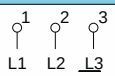
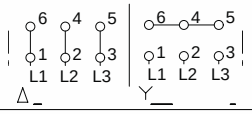
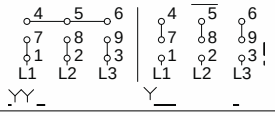
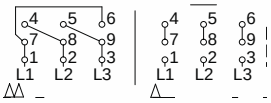
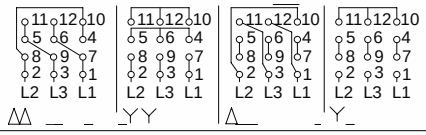
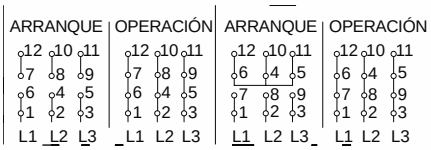
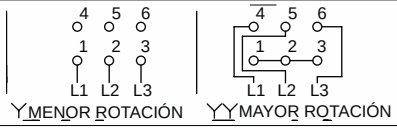
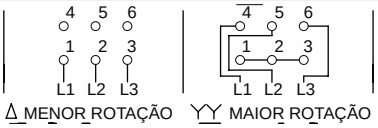
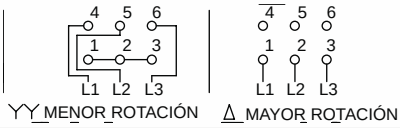
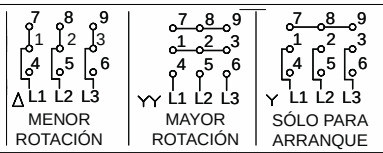
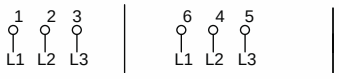
Configuración	Cantidad de cables	Tipo de conexión	Diagrama de conexión
Velocidad Única	3	-	
	6	Δ - Y	
	9	YY - Y	
		ΔΔ - Δ	
		ΔΔ - YY - Δ - Y	
	12	Δ - PWS Partida Devanado parcial	
Dos velocidades Dahlander	6	YY - Y Par Variable	
		Δ - YY Par Constante	
		YY - Δ Potencia Constante	
	9	Δ - Y - YY	
Dos velocidades Doble devanado	6	-	

Tabla 8 - Diagrama de conexión usuales para motores trifásicos

Características del cable en el diagrama de conexión		1	2	3	4	5	6	7	8	9	10	11	12
Velocidad única	NEMA MG 1 Parte 2	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
	IEC 60034-8	U1	V1	W1	U2	V2	W2	U3	V3	W3	U4	V4	W4
Dos velocidades (Dahlander / Doble bobinado)	NEMA MG 1 Parte 2[1)]	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W
	IEC 60034-8	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W

Tabla 9 - Tabla de equivalencias para la características del cable

1) La norma NEMA MG 1 Parte 2 define T1 hasta T12 para dos o más bobinados, pero WEG adopta 1U hasta 4W.

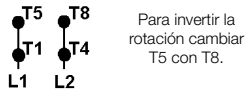
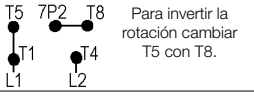
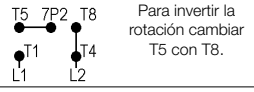
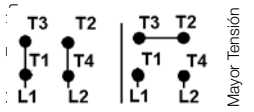
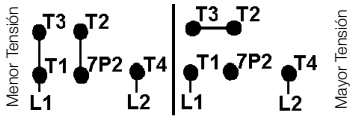
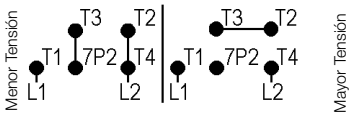
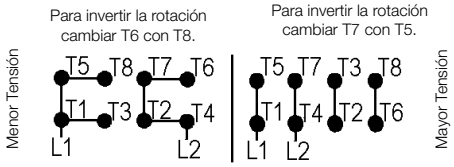
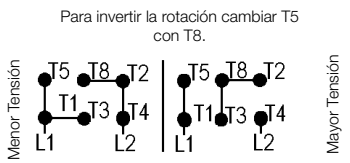
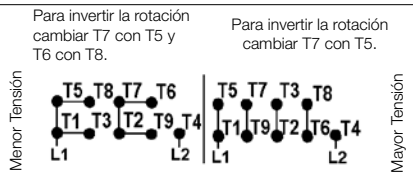
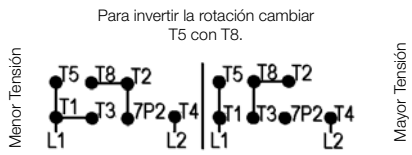
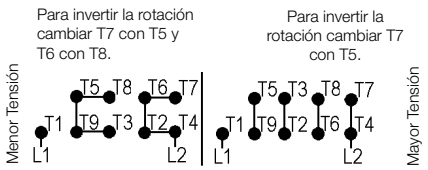
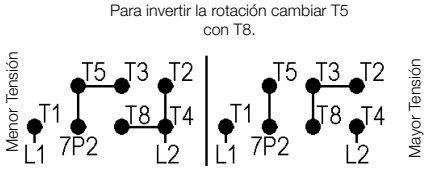
Tensión	Sentido de giro	Protección Térmica	Tipo	Diagrama de conexión
Única	Anti-horario o Horario	Con o Sin	Condensador de arranque / Condensador permanente Dos valores	
	Bidireccional	Sin		
		Con Protección Térmica Fenólica		
		Con Termostato		
Doble	Anti-horario o Horario	Sin	Condensador de arranque / Condensador permanente Dos valores o Split Phase	
		Con Protección Térmica Fenólica		
		Con Termostato		
	Bidireccional	Sin	Split Phase (sin condensador)	
			Condensador de arranque / Condensador permanente Dos valores	
		Con Protección Térmica Fenólica	Split Phase (sin condensador)	
			Condensador de arranque / Condensador permanente Dos valores	
		Con Termostato	Split Phase (sin condensador)	
			Condensador de arranque / Condensador permanente Dos valores	

Tabla 10 - Diagramas de ligação usuais para motores monofásicos

Los motores W12 y WEG General Purpose con la tapa de la caja de conexión polimérica tienen el diagrama de conexión impreso en su interior. Para conectar los cables, verifique en la placa de identificación el código del diagrama que debe usarse.

Para abrir la tapa de la caja de conexión use un destornillador de hendidura o alguna herramienta similar, posicionando en la región del encaje, como palanca y levante el encaje con cuidado, uno a la vez, hasta que la tapa sea removida.
Asegurarse de que el motor esté conectado correctamente a la red de alimentación eléctrica, a través de contactos seguros y permanentes.

AVISO – Las normas locales tienen prioridad en la definición de los estándares de conexión.

Las conexiones presentadas abajo son una referencia para la conexión de los cables de alimentación del cliente, en motores de baja tensión con placas de bornes. Las placas de bornes presentadas abajo son el estándar de cada línea, no obstante, pueden ocurrir variaciones.
Se recomienda siempre el uso de terminales en cobre electrolítico o latón, similares a los terminales utilizados en los cables de los motores.

Placa de bornes K1M

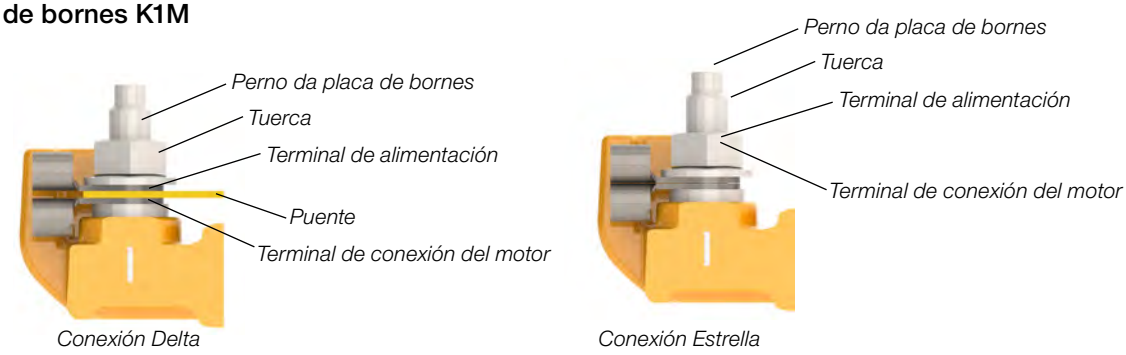


Figura 44 - Conexión para los motorescon placa de bornes K1M.*

Placa de bornes KWLV y KWMV

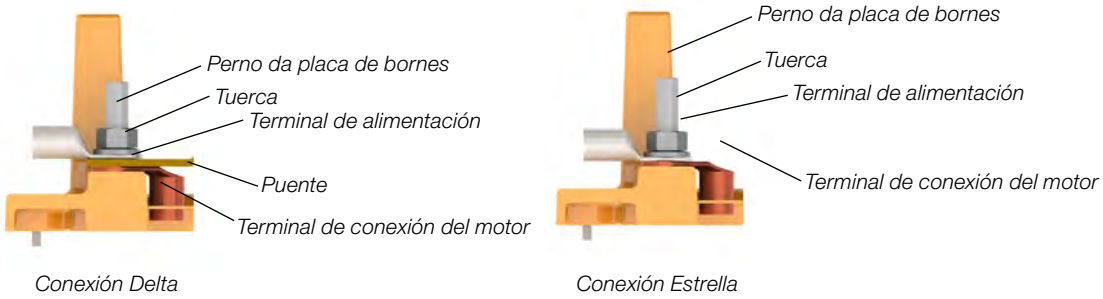


Figura 45 - Conexión para los motores con placa de bornes KWLV y KWMV.

Asegúrese de que el motor esté conectado correctamente a la red de alimentación eléctrica a través de contactos seguros y permanentes.
Para motores sin placa de bornes, aísle los cables terminales del motor, utilizando materiales aislantes compatibles con la tensión de alimentación y con la clase de aislamiento informada en la placa de características.
Para la conexión del cable de alimentación y del sistema de puesta a tierra deben ser respetados los pares de apriete indicados en la Tabla 43.
La distancia de aislamiento (ver Figura 46) entre partes vivas no aisladas entre sí y entre partes vivas y partes puestas a tierra debe respetar los valores indicados en la Tabla 11.

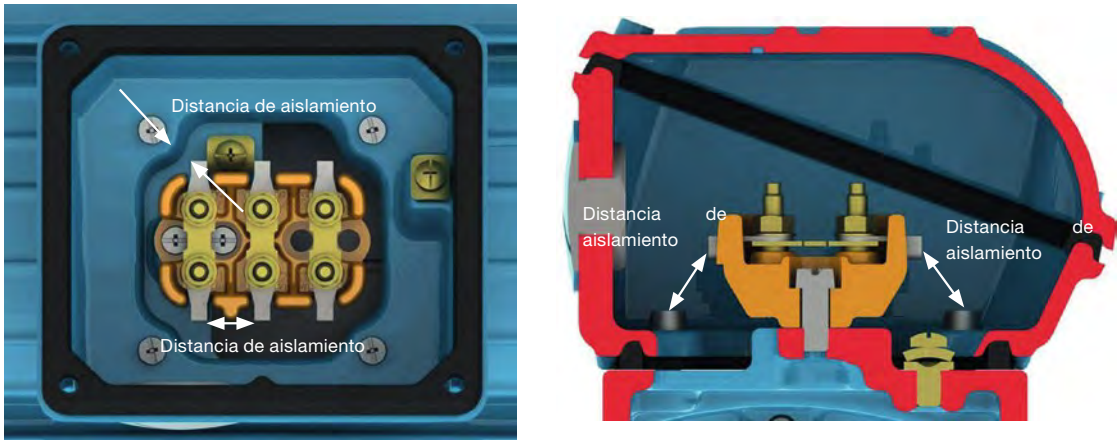


Figura 46 - Representación de la distancia de aislamiento

Tensión	Distancia mínima de aislamiento (mm)
U ≤ 440 V	4
440 < U ≤ 690 V	5.5
690 < U ≤ 1.000 V	8
1.000 < U ≤ 6.900 V	45
6.900 < U ≤ 1.1000 V	70
1.1000 < U ≤ 16.500 V	105

Tabla 11 - Distancia mínima de aislamiento (mm) x tensión de alimentación

Aunque el motor esté apagado, puede existir energía eléctrica en el interior de la caja de conexión utilizada para la alimentación de las resistencias de calentamiento o inclusive para energizar el devanado, cuando éste esté siendo utilizado como elemento de calentamiento.
Los condensadores de motores pueden retener energía eléctrica, incluso con el motor apagado. No toque los condensadores ni los terminales del motor sin antes verificar la existencia de tensión en los mismos. Para los motores WMagnet y WQuattro, incluso con la máquina desconectada de la energía, puede haber voltaje en los terminales de la máquina si el rotor se mueve.

Después de efectuar la conexión del motor, asegúrese de que ningún cuerpo extraño haya permanecido en el interior de la caja de conexión.

Tomar las medidas necesarias para asegurar el grado de protección indicado en la placa de identificación del motor:
- En las entradas de cables no utilizadas de la caja de conexiones, las cuales deben ser debidamente cerradas con tapón;
- En componentes suministrados de forma independiente (por ejemplo cajas de conexiones montadas por separado).
Las entradas de cables utilizadas para alimentación y control deben emplear componentes (como, por ejemplo, prensacables y conductos eléctricos) que cumplan las normas y reglamentaciones vigentes en cada país.

En caso que existan accesorios, como freno y ventilación forzada, los mismos deben ser conectados a la red de alimentación, siguiendo las informaciones de sus placas de características y los cuidados indicados anteriormente.

En motores con caja de conexión polimérica y / o su tapa, asegúrese de que los accesorios y bloqueos de estos componentes estén correctamente ensamblados después de realizar la conexión del cable.

En los motores que tienen tapas ciegas en la caja de terminales, para quitar las tapas ciegas de aluminio, use un destornillador o una herramienta similar y un martillo para separar la tapa ciega, golpeando con la llave varias veces hasta que se quite. Retire primero la interna y luego, si es necesario, la externa según el tamaño del prensaestopas utilizado. Para las cajas de conexiones de polímero, puede ser necesario utilizar una cuchilla o un taladro para evitar dañar la caja. Tenga cuidado, no golpee el interior de la caja de conexiones y elimine los residuos del troquelado desprendidos en el interior de la caja.
Todas las protecciones, inclusive las contra sobretensión, deben ser ajustadas tomando como base las condiciones nominales de la máquina. Esta protección también tendrá que proteger el motor en caso de cortocircuito, falta de fase, o rotor bloqueado.

Los ajustes de los dispositivos de seguridad de los motores deben ser hechos según las normas vigentes.
Verifique el sentido de rotación del motor. En caso que no haya ninguna limitación debido a la utilización de ventiladores unidireccionales, es posible cambiar el sentido de giro de motores trifásicos, invirtiendo dos fases de alimentación. Para motores monofásicos, verifique el esquema de conexión en la placa de características.

6.10 CONEXIÓN DE LOS DISPOSITIVOS DE PROTECCIÓN TERMICA

Cuando es suministrado con dispositivos de protección o de monitoreo de temperatura, como: protector térmico bimetálico (termostatos), termistores, protectores térmicos del tipo Automático, Pt-100 (RTD), etc., sus terminales deben ser conectados a los dispositivos de control correspondientes, de acuerdo con las placas de características de los accesorios. La no observación de este procedimiento puede resultar en la cancelación de la garantía y riesgo para la instalación.

No aplique tensión de test superior a 2,5 V para termistores y corriente superior a 1 mA para RTDs (Pt-100) de acuerdo con la norma IEC 60751.

El esquema de conexión de los protectores térmicos bimetálicos (termostatos) y termistores se muestra en la Figura 47 y Figura 48, respectivamente.

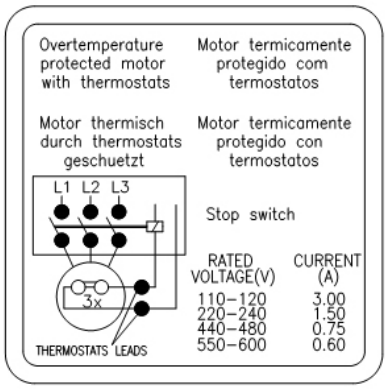


Figura 47 - Conexión de los protectores térmicos bimetálicos (termostatos)

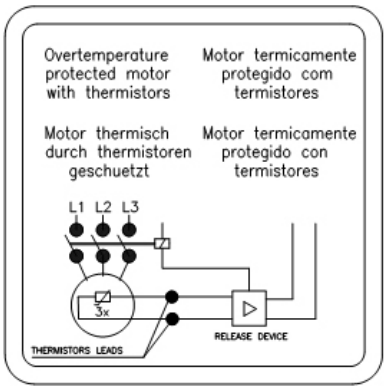


Figura 48 - Conexión de los termistores

Los límites de temperatura de alarma y desconexión de las protecciones térmicas pueden ser definidos de acuerdo con la aplicación, no obstante, no deben sobrepasar los valores indicados en la Tabla 12.

Componente	Clase de aislamiento	Temperatura máxima de operación (°C)	
		Alarma	Desconexión
Devanado	B	-	130
	F	130	155
	H	155	180
Cojinete	Todas	110	120

Tabla 12 - Temperatura máxima de actuación de las protecciones térmicas

Notas:

1) La cantidad y el tipo de protección térmica instalados en el motor son informados en las placas de características de los accesorios del mismo.

2) En el caso de protección térmica con resistencia calibrada (por ejemplo, Pt-100), el sistema de protección debe ser ajustado a la temperatura de operación indicada en la Tabla 12..

6.11 TERMORESISTORES (PT-100)

Son elementos cuya operación está basada en la característica de variación de la resistencia con la temperatura, intrínseca en algunos materiales (generalmente platina, níquel o cobre).
Poseen resistencia calibrada, que varía linealmente con la temperatura, posibilitando un acompañamiento continuo del proceso de calentamiento del motor por el display del controlador, con alto grado de precisión y sensibilidad de respuesta. Su aplicación es amplia en los diversos sectores de técnicas de medición y automatización de temperatura de las industrias. Generalmente, se aplica en instalaciones de gran responsabilidad como, por ejemplo, en régimen intermitente muy irregular. El mismo detector puede servir tanto para alarma como para apagado.

La equivalencia entre la resistencia del Pt-100 y la temperatura se presenta en la Tabla 13 y Figura 50. En la Figura 49 se presenta la conexión de Pt-100 de los bobinados.

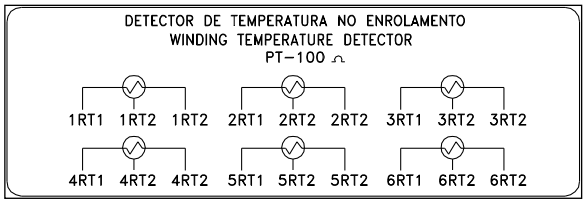


Figura 49 - Conexión de Pt-100 de los bobinados

°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-29	88.617	17	106.627	63	124.390	109	141.908	155	159.180
-28	89.011	18	107.016	64	124.774	110	142.286	156	159.553
-27	89.405	19	107.404	65	125.157	111	142.664	157	159.926
-26	89.799	20	107.793	66	125.540	112	143.042	158	160.298
-25	90.193	21	108.181	67	125.923	113	143.420	159	160.671
-24	90.587	22	108.570	68	126.306	114	143.797	160	161.043
-23	90.980	23	108.958	69	126.689	115	144.175	161	161.415
-22	91.374	24	109.346	70	127.072	116	144.552	162	161.787
-21	91.767	25	109.734	71	127.454	117	144.930	163	162.159
-20	92.160	26	110.122	72	127.837	118	145.307	164	162.531
-19	92.553	27	110.509	73	128.219	119	145.684	165	162.903
-18	92.946	28	110.897	74	128.602	120	146.061	166	163.274
-17	93.339	29	111.284	75	128.984	121	146.438	167	163.646
-16	93.732	30	111.672	76	129.366	122	146.814	168	164.017
-15	94.125	31	112.059	77	129.748	123	147.191	169	164.388
-14	94.517	32	112.446	78	130.130	124	147.567	170	164.760
-13	94.910	33	112.833	79	130.511	125	147.944	171	165.131
-12	95.302	34	113.220	80	130.893	126	148.320	172	165.501
-11	95.694	35	113.607	81	131.274	127	148.696	173	165.872
-10	96.086	36	113.994	82	131.656	128	149.072	174	166.243
-9	96.478	37	114.380	83	132.037	129	149.448	175	166.613
-8	96.870	38	114.767	84	132.418	130	149.824	176	166.984
-7	97.262	39	115.153	85	132.799	131	150.199	177	167.354
-6	97.653	40	115.539	86	133.180	132	150.575	178	167.724
-5	98.045	41	115.925	87	133.561	133	150.950	179	168.095
-4	98.436	42	116.311	88	133.941	134	151.326	180	168.465
-3	98.827	43	116.697	89	134.322	135	151.701	181	168.834
-2	99.218	44	117.083	90	134.702	136	152.076	182	169.204
-1	99.609	45	117.469	91	135.083	137	152.451	183	169.574
0	100.000	46	117.854	92	135.463	138	152.826	184	169.943
1	100.391	47	118.240	93	135.843	139	153.200	185	170.313
2	100.781	48	118.625	94	136.223	140	153.575	186	170.682
3	101.172	49	119.010	95	136.603	141	153.950	187	171.051
4	101.562	50	119.395	96	136.982	142	154.324	188	171.420
5	101.953	51	119.780	97	137.362	143	154.698	189	171.789
6	102.343	52	120.165	98	137.741	144	155.072	190	172.158
7	102.733	53	120.550	99	138.121	145	155.446	191	172.527
8	103.123	54	120.934	100	138.500	146	155.820	192	172.895
9	103.513	55	121.319	101	138.879	147	156.194	193	173.264
10	103.902	56	121.703	102	139.258	148	156.568	194	173.632
11	104.292	57	122.087	103	139.637	149	156.941	195	174.000
12	104.681	58	122.471	104	140.016	150	157.315	196	174.368
13	105.071	59	122.855	105	140.395	151	157.688	197	174.736
14	105.460	60	123.239	106	140.773	152	158.061	198	175.104
15	105.849	61	123.623	107	141.152	153	158.435	199	175.472
16	106.238	62	124.007	108	141.530	154	158.808	200	175.840

Tabla 13 - Equivalencia entre la resistencia del Pt-100 y la temperatura

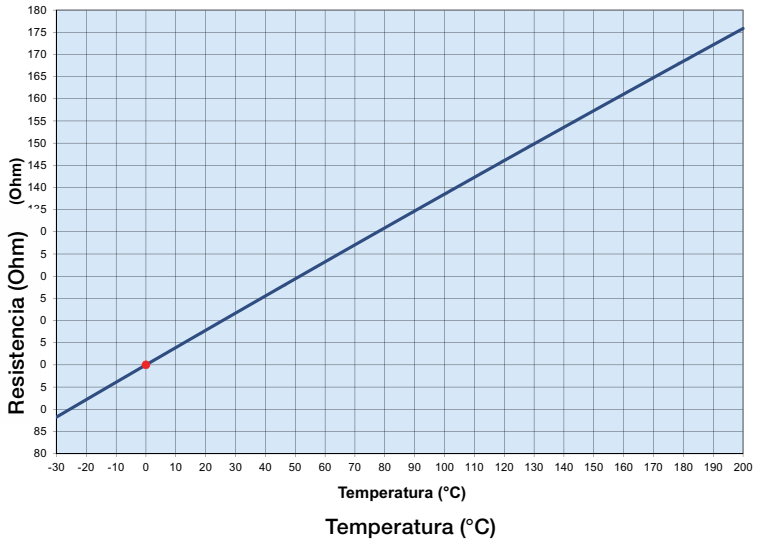


Figura 50 - - Resistencia óhmica del Pt-100 x temperatura

6.12 CONEXIÓN DE LAS RESISTENCIAS DE CALDEO

Antes de encender las resistencias de caldeo, verifique si sus conexiones fueron realizadas de acuerdo con el diagrama indicado en la placa de características de las resistencias de caldeo. Para motores suministrados con resistencias de caldeo de doble tensión (110-127/220-240 V), ver Figura 51.

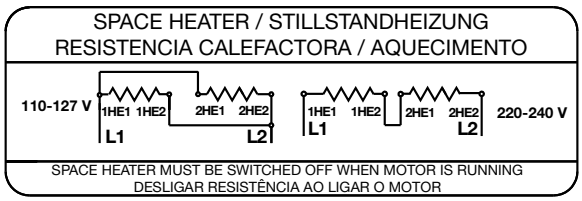


Figura 51 - - Conexión de las resistencias de caldeo de doble tensión

Las resistencias de caldeo nunca deben estar energizadas mientras el motor esté operando.

6.13 METODOS DE ARRANQUE

Siempre que sea posible, el arranque del motor debe ser directo (en plena tensión). Es el método más simple, sin embargo, solamente es viable cuando la corriente de arranque no afecta la red de alimentación. Es importante seguir las reglas vigentes de la concesionaria de energía eléctrica.

En los casos en que la corriente de arranque del motor es alta, pueden ocurrir las siguientes consecuencias:

a) Elevada caída de tensión en el sistema de alimentación de la red, provocando interferencia en los equipamientos instalados en este sistema;

b) El superdimensionamiento del sistema de protección (cables, contactores), lo que eleva los costos de la instalación.

En caso que la arranque directa no sea posible debido a los problemas citados arriba, se puede usar el método el arranque indirecto compatible con la carga y la tensión del motor, para reducir la corriente de arranque.

Cuando es utilizado un método de arranque con tensión reducida, el par de arranque del motor también será reducido.

La Tabla 14 indica los métodos de arranque indirecta posibles de ser utilizados, de acuerdo con la cantidad de cables del motor.

Cantidad de cables	Métodos de arranques posibles
3 cables	Llave Compensadora Soft-starter
6 cables	Llave Estrella - Triángulo Llave Compensadora Soft-starter
9 cables	Llave Serie - Paralela Llave Compensadora Soft-starter
12 cables	Llave Estrella - Triángulo Llave Serie - Paralela Llave Compensadora Soft-starter

Tabla 14 - Métodos de arranque - cantidad de cables

La Tabla 15 indica ejemplos de métodos de arranque indirecto que se pueden utilizar, de acuerdo con la tensión indicada en la placa de características del motor y la tensión de la red eléctrica.

Tensión de la placa de características	Tensión de la red	Arranque con llave Estrella - Triángulo	Arranque con llave compensadora	Arranque con llave Serie - Paralela	Arranque con Soft-starter
220/380 V	220 V 380 V	SÍ NO	SÍ SÍ	NO NO	SÍ SÍ
220/440 V	220 V 440 V	NO NO	SÍ SÍ	SÍ NO	SÍ SÍ
230/460 V	230 V 460 V	NO NO	SÍ SÍ	SÍ NO	SÍ SÍ
380/660 V	380 V	SÍ	SÍ	NO	SÍ
220/380/440 V	220 V 380 V 440 V	SÍ NO SÍ	SÍ SÍ SÍ	SÍ SÍ NO	SÍ SÍ SÍ

Tabla 15 - Métodos de arranque x tensión

Otro método de arranque posible que no sobrecargue la red de alimentación es la utilización de un convertidor de frecuencia. Para más informaciones sobre motores alimentados con convertidor de frecuencia ver ítem 6.14.

6.14 MOTORES ALIMENTADOS POR CONVERTIDOR DE FRECUENCIA

La operación con convertidor de frecuencia debe ser informada en el momento de la compra debido a posibles diferencias constructivas necesarias para ese tipo de accionamiento.

Los motores WMagnet deben ser accionados solamente por convertidor de frecuencia. Los motores WQuattro deben ser accionados directamente a partir de la red o por convertidor de frecuencia en modo escalar.

El convertidor utilizado para accionar motores con tensión de alimentación hasta 690 V debe poseer modulación PWM con control vectorial.

Cuando un motor opera con convertidor de frecuencia por debajo de la frecuencia nominal, es necesario reducir el torque suministrado por el motor, a fin de evitar sobrecalentamiento. Los valores de reducción de torque *(derating torque)* pueden ser encontrados en el ítem 6.4 de la "Guía Técnica Motores de Inducción Alimentados por Convertidores de Frecuencia PWM" disponible en www.weg.net.

Para operación por encima de la frecuencia nominal se debe observar:
- Operación con potencia constante;
- El motor puede suministrar como máximo 95% de la potencia nominal;
- Respetar la rotación máxima, considerando los siguientes criterios:
  - Máxima frecuencia de operación informada en la placa adicional;
  - Límite de rotación mecánica del motor.

Para los motores WMagnet accionados por inversores que no son WEG, además del límite de velocidad indicado en la hoja de datos del motor, se debe verificar el límite de velocidad máxima permitida para evitar quemar el inversor en caso de un corte de energía. Debe considerarse de acuerdo con la siguiente ecuación:

$$RPM_{máx} = 0.9 * V_{rmsMáx} * 1000$$
$$ke$$

Ser,
$RPM_{máx}$ – Velocidad máxima permitida para evitar quemar el inversor en caso de un corte de energía en [RPM].
$V_{rmsMáx}$ – Voltaje rms máximo de entrada del inversor, según lo informado por el fabricante del inversor en [V].
ke – Parámetro informado en la placa de características y en la hoja de datos del motor en [V / kRPM].

Los recomendaciones para los cables de conexión entre motor y convertidor son indicadas en el ítem 6.8 de la "Guía Técnica de Motores de Inducción alimentados por Convertidores de Frecuencia PWM" disponible en www.weg.net.

6.14.1 Uso de filtros (dV/dt)

6.14.1.1. Motor con alambre circular esmaltado

Los motores con tensión nominal de hasta 690 V, cuando son alimentados por convertidores de frecuencia, no requieren filtros, si son observados los criterios de la Tabla 16.

Tensión de operación del motor[1]	Tensión de pico en el motor (máx.)	dV/dt en la salida del convertidor (máx.)	Rise time[2] del convertidor (mín.)	MTBP[2] tiempo entre pulsos (min)
Vnom < 460 V	≤ 1.600 V	≤ 5200 V/µs	≥ 0,1 µs	≥ 6 µs
460 ≤ Vnom < 575 V	≤ 2.000 V	≤ 6500 V/µs		
575 ≤ Vnom ≤ 1000 V	≤ 2.400 V	≤ 7800 V/µs		

Tabla 16 - Criterios para utilización de motores de alambre circular esmaltado alimentados por convertidor de frecuencia

1. Para motores con doble tensión, ejemplo 380/660 V, deben ser observados los criterios de la tensión menor (380 V).
2. Informaciones suministradas por el fabricante del convertidor.

6.14.1.2. Motor con bobina preformada

Los motores con bobina preformada (media y alta tensión, independientemente del tamaño de la carcasa y baja tensión a partir de la carcasa IEC 500 / NEMA 80) especificados para utilización con convertidor de frecuencia no requieren filtros, si son observados los criterios de la Tabla 17.

Tensión de operación del motor	Tipo de modulación	Aislamiento de la espira (fase-fase)		Aislamiento principal (fase-tierra)	
		Tensión de pico en los terminales del motor	dV/dt en los terminales del motor	Tensión de pico en los terminales del motor	dV/dt en los terminales del motor
690 < Vnom ≤ 4160 V	Senoidal	≤ 5.900 V	≤ 500 V/µs	≤ 3.400 V	≤ 500 V/µs
	PWM	≤ 9.300 V	≤ 2700 V/µs	≤ 5.400 V	≤ 2.700 V/µs
4160 < Vnom ≤ 6600 V	Senoidal	≤ 9.300 V	≤ 500 V/µs	≤ 5.400 V	≤ 500 V/µs
	PWM	≤ 14.000 V	≤ 1.500 V/µs	≤ 8.000 V	≤ 1.500 V/µs

Tabla 17 - Criterios para utilización de motores con bobina preformada alimentados con convertidor de frecuencia

6.14.2 Aislamiento de los cojinetes

Se recomienda aislar los cojinetes para operación con convertidor de frecuencia de acuerdo con la Tabla 18.

Carcasa	Recomendación
IEC 315 e 355 NEMA 445/7 a L5810/11	Un cojinete aislado Puesta a tierra entre eje y carcasa por medio de escobilla
IEC 400 y superior NEMA 6800 y superior	Cojinete trasero aislado Puesta a tierra entre eje y carcasa por medio de escobilla

Tabla 18 - Recomendación sobre el aislamiento de los cojinetes para motores accionados por convertidor de frecuencia

Para motores suministrados con sistema de puesta a tierra del eje, debe ser observado constantemente el estado de conservación de la escobilla y, al llegar al fin de su vida útil, la misma debe ser sustituida por otra de su misma especificación.

Si un motor se suministra con una escobilla de puesta a tierra interna, indicada por una etiqueta en el producto, se debe verificar que cada vez se le dé mantenimiento a los cojinetes o cualquier parte interna del motor.

Los motores de carcasa IEC 315, NEMA 445/7 y superiores, cuando se alimentan por inversor, deben estar equipados con juegos de puesta a tierra del eje.

Para motores de área segura y para fines de pruebas de verificación, pueden ser instalados pernos terminales de contacto, de los dos lados del aislamiento del cojinete, de modo de permitir la realización de mediciones de la tensión sobre el cojinete, o, en caso de que los pernos terminales sean conectados por un cable o cable trenzado metálico (cortocircuitando el aislamiento del cojinete), de la corriente por el cojinete. Se debe observar, sin embargo, que durante la operación normal del motor, el aislamiento del cojinete no debe estar cortocircuitado figura 52.



Figura 52 - Alambre trenzado

6.14.3 Frecuencia de conmutación

La frecuencia mínima de conmutación del convertidor deberá ser de 2 kHz.
Se recomienda que la frecuencia máxima de conmutación del convertidor sea de 5 kHz.

La no observación de los criterios y recomendaciones expuestos en este manual puede resultar en la anulación de la garantía del producto.

6.14.4 Límite de la rotación mecánica

La Tabla below muestra las rotaciones máximas permitidas para motores accionados por convertidor de frecuencia.

Carcasa		Polaridad	Rotación máxima para motores estándar
NEMA	IEC		
5810/11	315	2	3600
		4	2000
		6	
L5810/11	355	2	3600
		4	1800
		6	
6810/11	400	2	3600
		4	1800
		6	1700

Tabla 19 - Rotación máxima de los motores W60 (en RPM)

Carcasa		Polaridad	Rotación máxima para motores estándar
NEMA	IEC		
5009/10	315	2	3600
		4	2200
		6	
5809/10	355	2	3600
		4	1900
		6	
6806/07-6808/09	400	2	3600
		4	1800
		6	1700

Tabla 20 - Rotación máxima de los motores W50 (en RPM)

Carcasa	Polaridad	Rotación máxima para motores estándar
NEMA		
W56	2	13600
	4	13600
56	2	12000
	4	12000
	6	13600
56H	2	12000
	4	12000
	6	10900
143/5T	2	10400
	4	10400
	6	10400
182/4T	2	8800
	4	8800
	6	8800
213/5T	2	6800
	4	6800
	6	6800
254/6T	2	5300
	4	5300
	6	5300

Tabla 21 - Rotación máxima de los motores W01 (en RPM)

Carcasa		Polaridad	Rotación máxima para motores estándar
NEMA	IEC		
-	63	2	12.300
		4	
		6	
-	71	2	11.300
		4	
		6	
-	80	2	10.300
		4	
		6	
143/5	90S	2	8.600
		4	
		6	
-	100L	2	7.800
		4	
		6	
182/4	112	2	7.600
		4	7.100
		6	
213/5	132	2	6.000
		4	5.900
		6	
254/6	160	2	5.300
		4	5.000
		6	
284/6	180	2	4.400
		4	
		6	
324/6	200L	2	4.200
		4	4.000
		6	
364/5	225	2	3.600
		4	3.200
		6	
404/5	250	2	3.600
		4	3.200
		6	
444/5 - 445/7	280	2	3.600
		4	3.200
		6	
447/9 - L447/9	-	2	-
		4	
		6	
504/5	315	2	3.600
		4	2.300
		6	
586/7 - 588/9	355	2	3.600
		4	1.900
		6	

Carcasa		Polaridad	Rotación máxima para motores estándar
NEMA	IEC		
254	160	2	5.200
		4	
		6	
284	180	2	4.800
		4	4.400
		6	
324/6	200L	2	3.700
		4	
		6	
364/5	225	2	3.600
		4	
		6	
404/5	250	2	3.700
		4	3.200
		6	
444/5 - 447/9	280	2	3.700
		4	2.400
		6	
5010/11	315	2	3.600
		4	2.400
L5010/11	355	2	3.600
		4	2.000
L5810/11	400	2	3.600
		4	1.800

Tabla 22 - Rotación máxima de los motores W22 (en RPM)

Tabla 23 - Rotación máxima de los motores W40 (en RPM)

Notas:

1. *Cuando el motor tenga sellados del tipo retén o Inproseal, entre en contacto con WEG.*
2. *Para rotaciones superiores a la nominal, medir la vibración y la temperatura del cojinete, si la temperatura y los niveles de vibración sobrepasaran los límites especificados, contacte a WEG.*
3. *Verificar el modelo del rodamiento delantero en la placa del motor.*

Por condiciones diferentes de las descritas en las tablas 18 a 22, consultar a WEG.

Para más informaciones sobre el uso de convertidor de frecuencia, o acerca de cómo dimensionarlo correctamente para su aplicación, contacte a WEG o consulte la “Guía Técnica de Motores de Inducción Alimentados por Convertidores de Frecuencia PWM” disponible en www.weg.net.

7. OPERACIÓN

7.1 ARRANQUE DEL MOTOR

Después de ejecutar los procedimientos de instalación, algunos aspectos deben ser verificados antes de la arranque inicial del motor, principalmente si el motor no fue colocado inmediatamente en operación tras su instalación. Aquí deben ser verificados los siguientes ítems:

- Si los datos que constan en la placa de características (tensión, corriente, esquema de conexión, grado de protección, refrigeración, factor de servicio, entre otras) están de acuerdo con la aplicación;
- El correcto montaje y alineamiento del conjunto (motor + máquina accionada);
- El sistema de accionamiento del motor, considerando que la rotación del motor no sobrepase la velocidad máxima establecida en la Tabla 18, 19, 20, 21 y 22;

- La resistencia de aislamiento del motor, conforme ítem 5.4;
- El sentido de rotación del motor;
- La integridad de la caja de conexión, que debe estar limpia y seca, sus elementos de contacto libres de oxidación, sus sellados en condiciones apropiadas de uso y sus entradas de cables correctamente cerradas/protegidas de acuerdo con el grado de protección.
- Las conexiones del motor, verificando si fueron correctamente realizadas, inclusive puesta a tierra y cables auxiliares, conforme recomendaciones del ítem 6.9;
- El correcto funcionamiento de los accesorios (freno, encoder, protección térmica, ventilación forzada, etc.) instalados en el motor;
- La condición de los rodamientos. Para los motores almacenados y/o instalados hace más de dos años sin funcionamento, se recomienda cambiar los rodamientos, o como alternativa, desmontarlos, lavarlos, revisarlos y lubricarlos nuevamente antes de hacer trabajar el motor. Si el almacenamiento y/o instalación se realizó de acuerdo con las recomendaciones del ítem 5.3, realice el procedimiento de relubricación como se describe en el ítem 8.2. Para una evaluación de los cojinetes se pueden utilizar técnicas de análisis de vibración: análisis de envolvente o demodulación.
- En motores con cojinetes de rodillos y lubricación por aceite debe ser verificado:
  - El nivel correcto de aceite del cojinete. El mismo debe estar en la mitad del visor (ver Figura 54 y 55);
  - Que cuando el motor sea almacenamiento por un período igual o mayor al intervalo de cambio de aceite, el aceite deberá ser cambiado antes de la puesta en funcionamiento.
- En motores con cojinetes de deslelevación debe ser verificado:
  - El nivel correcto de aceite del cojinete. El mismo debe estar en la mitad del visor (ver Figura 56);
  - Que el motor no arranque ni opere con cargas radiales o axiales;
  - Que cuando el motor sea almacenamiento por un período igual o mayor al intervalo de cambio de aceite, el aceite deberá ser cambiado antes de la puesta en funcionamiento.
- El análisis de la condición de los condensadores, si existen. Para motores instalados por un período superior a dos años, pero que no entraron en operación, se recomienda la sustitución de sus condensadores de arranque de motores monofásicos;
- Que entradas y salidas de aire estén completamente desobstruidas. El mínimo espacio libre hasta la pared más próxima (L) debe ser ¼ del diámetro de la entrada de aire de la deflectora (D), ver Figura 53. El aire en la entrada del motor debe estar a temperatura ambiente.

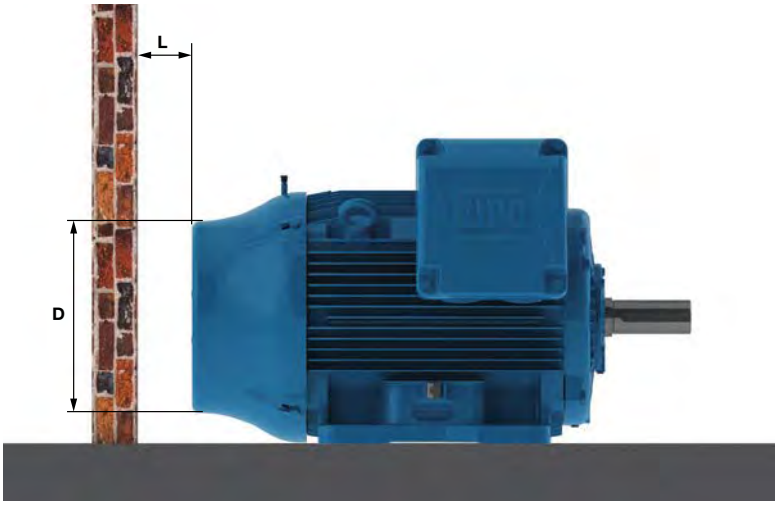


Figura 53 - - Distancia mínima del motor hasta la pared

Como referencia, pueden ser seguidas las distancias mínimas presentadas en la Tabla 24.

Carcasa		**Distancia entre la tapa deflectora y la pared (L)**	
IEC	NEMA	mm	pulgadas
63	-	25	0,96
71	-	26	1,02
80	-	30	1,18
90	143/5	33	1,30
100	-	36	1,43
112	182/4	41	1,61
132	213/5	50	1,98
160	254/6	71	2,79
180	284/6	72	2,83

200 / W225	324/6	83	3,27
225 250	364/5 404/5	92	3,62
280	444/5 445/7 447/9	108	4,23
315	L447/9 504/5 5006/7/8 5009/10/11	122	4,80
355	586/7 588/9 5807/8/9 5810/11/12	136	5,35
400	6806/7/8 6809/10/11	147	5,79
450	7006/10	159	6,26
500	8006/10	171	6,73
560	8806/10	185	7,28
630	9606/10	200	7,87

Tabla 24 - Distancia mínima entre la tapa deflectora y la pared

- Que los flujos y las temperaturas del agua estén correctas, cuando es utilizada en la refrigeración del motor. Ver ítem 7.2;
- Que todas las partes giratorias, como poleas, acoplamientos, ventiladores externos, eje, etc., estén protegidas contra toques accidentales.

Otros ensayos y verificaciones que no constan en esta relación pueden hacerse necesarios, en función de las características específicas de la instalación, aplicación y/o del motor.

Despuésde haber sido realizadas todas las verificaciones, siga el procedimiento de abajo para efectuar el arranque de motor:

- Encienda la máquina sin ninguna carga (cuando sea posible), accionando la llave de arranque como si fuese un pulso, verificando el sentido de rotación, la presencia de ruido, vibración u otra condición anormal de operación;
- Encienda nuevamente el motor, debiendo arrancar y funcionar de manera suave. En caso que eso no ocurra, apáguelo y verifique nuevamente el sistema de montaje y las conexiones antes de arrancarlo de nuevo;
- En caso de vibraciones excesivas, verifique si los tornillos de fijación están adecuadamente apretados o si la vibración es proveniente de máquinas adyacentes. Verifique periódicamente la vibración, respetando los límites presentados en el ítem 7.2.1;
- Opere el motor bajo carga nominal por un pequeño período de tiempo y compare la corriente de operación con la corriente indicada en la placa de características;
- Se recomienda que algunas variables del motor sean acompañadas hasta su equilibrio térmico: corriente, tensión, temperatura en los cojinetes y en la superficie externa de la carcasa, vibración y ruido;
- Se recomienda que los valores de corriente y tensión sean registrados en el informe de instalación.

Debido al valor elevado de la corriente de arranque de los motores de inducción, el tiempo gastado en la aceleración en las cargas de inercia apreciable resulta en la elevación rápida de la temperatura del motor. Si el intervalo entre arranques sucesivos es muy reducido, resultará en un aumento de la temperatura en los devanados, deteriorándolos o reduciendo su vida útil. En caso que no sea especificado régimen de servicio diferente a S1 / CONT. en la placa de características del motor, los motores son aptos para:

- Dos arranques sucesivos, siendo el primero realizado con el motor frío, es decir, con sus devanados a temperatura ambiente y un segundo arranque a seguir, no obstante, después de que el motor haya sido desacelerado hasta alcanzar su reposo;
- Un arranque con el motor a caliente, o sea, con los devanados a la temperatura de régimen.

El ítem 10 relaciona algunos problemas de mal funcionamiento del motor, con sus posibles causas.

7.2 CONDICIONES DE OPERACIÓN

En caso que ninguna otra condición sea informada en el momento de la compra, los motores eléctricos son proyectados para operar a una altitud limitada a 1000 m sobre el nivel del mar y en temperatura ambiente entre -20 °C y + 40 °C. Cualquier variación de las condiciones del entorno donde vaya a funcionar el moto, debe estar indicada en la placa de características del motor.

Algunos componentes se deben sustituir cuando la temperatura ambiente es diferente de la indicada arriba. Favor contactar a WEG para verificar las características especiales.

Para temperaturas y altitudes diferentes de las indicadas arriba, utilizar la Tabla 24 para encontrar el factor de corrección que deberá ser utilizado para definir la potencia útil disponible (Pmax = Pnom x Factor de corrección).

T (°C)	Altitud (m)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
10							0,97	0,92	0,88
15						0,98	0,94	0,90	0,86
20					1,00	0,95	0,91	0,87	0,83
25				1,00	0,95	0,93	0,89	0,85	0,81
30			1,00	0,96	0,92	0,90	0,86	0,82	0,78
35		1,00	0,95	0,93	0,90	0,88	0,84	0,80	0,75
40	1,00	0,97	0,94	0,90	0,86	0,82	0,80	0,76	0,71
45	0,95	0,92	0,90	0,88	0,85	0,81	0,78	0,74	0,69
50	0,92	0,90	0,87	0,85	0,82	0,80	0,77	0,72	0,67
55	0,88	0,85	0,83	0,81	0,78	0,76	0,73	0,70	0,65
60	0,83	0,82	0,80	0,77	0,75	0,73	0,70	0,67	0,62
65	0,79	0,76	0,74	0,72	0,70	0,68	0,66	0,62	0,58
70	0,74	0,71	0,69	0,67	0,66	0,64	0,62	0,58	0,53
75	0,70	0,68	0,66	0,64	0,62	0,60	0,58	0,53	0,49
80	0,65	0,64	0,62	0,60	0,58	0,56	0,55	0,48	0,44

Tabla 25 - Factores de corrección considerando la altitud y la temperatura ambiente

El ambiente en el local de instalación deberá tener condiciones de renovación de aire del orden de 1 m³ por segundo para cada 100 kW o fracción de potencia del motor. Para motores ventilados, que no poseen ventilador propio, la ventilación adecuada del motor es de responsabilidad del fabricante del equipamiento. En caso que no haya especificación de la velocidad de aire mínima entre las aletas del motor en una placa de características, deben ser seguidos los valores indicados en la Tabla 25. Los valores presentados en la Tabla 26 son válidos para motores aleteados alimentados en la frecuencia de 60 Hz. Para obtención de las velocidades mínimas de aire en 50 Hz se deben multiplicar los valores de la tabla por 0,83.

Carcasa		Polos			
IEC	NEMA	2	4	6	8
56 a 90	143/5	13	7	5	4
100 a 132	182/4 y 213/5	18	12	8	6
160 a 200	254/6 a 324/6	20	15	10	7
225 a 280	364/5 a 444/5	22	20	15	12
315 a 450	445/7 a 7008/9	25	25	20	15

Tabla 26 - Velocidad mínima de aire entre las aletas del motor (m/s)

Las variaciones de la tensión y frecuencia de alimentación pueden afectar las características derendimiento y la compatibilidad electromagnética del motor. Estas variaciones de alimentación deben seguir los valores establecidos en las normas vigentes. Ejemplos:

- ABNT NBR 17094 - Partes 1 y 2. El motor está apto para proveer torque nominal, bajo las siguientes zonas de variación de tensión y frecuencia:
  - Zona A: ±5% de tensión y ±2% de frecuencia;
  - Zona B: ±10% de tensión y +3% -5% de frecuencia.

Cuando es operado en la Zona A o B, el motor puede presentar variaciones de rendimiento y alcanzar temperaturas más elevadas. Estas variaciones son mayores para la operación en la zona B. No es recomendada una operación prolongada del motor en la zona B.

- IEC 60034-1. El motor es apto para suministrar el par nominal bajo las siguientes zonas de variación de tensión y frecuencia:
  - Zona A: ±5% de tensión y ±2% de frecuencia;
  - Zona B: ±10% de tensión y +3% -5% de frecuencia.

Cuando es operado en la Zona A o B, el motor puede presentar variaciones de rendimiento y alcanzar temperaturas más elevadas. Estas variaciones son mayores para la operación en la zona B. No es recomendada la operación prolongada del motor en la zona B. Para motores multitensión (ejemplo 380-415/660 V) se permite una variación de tensión de ±5%.

- NEMA MG 1 Parte 12. El motor es apto para operar en una de las siguientes variaciones:
  - ±10% de tensión, con frecuencia nominal
  - ±5 de frecuencia, con tensión nominal
  - Una combinación de variación de tensión y frecuencia de ±10%, siempre que la variación de frecuencia no sea superior a ±5%.

Para motores que son enfriados a través del aire ambiente, las entradas y salidas de aire deben ser limpiadas en intervalos regulares para garantizar una libre circulación del aire. El aire caliente no debe retornar hacia el motor. El aire utilizado para refrigeración del motor debe estar a temperatura ambiente, limitada a la franja de temperatura indicada en la placa de características del motor (cuando no sea indicado, considere una franja de temperatura entre -20 °C y +40 °C).

Para motores refrigerados a agua, los valores del flujo de agua para cada tamaño de carcasa, así como la máxima elevación de temperatura del agua después de circular por el motor, son mostrados en la Tabla 27. La temperatura del agua en la entrada no debe exceder 40 °C.

Carcasa		Flujo (litros/minuto)	Máxima elevación de temperatura del agua (°C)
IEC	NEMA		
180	284/6	12	5
200	324/6	12	5
225	364/5	12	5
250	404/5	12	5
280	444/5 445/7 447/9	15	6
315	504/5	16	6
355	586/7 588/9	25	6

Tabla 27 - Flujo y máxima elevación de temperatura del agua

Para motores W60, consulte la placa de identificación en el intercambiador de calor.
Para motores con lubricación de tipo *Oil Mist*, en caso de fallo del sistema de bombeo de aceite, está permitida una operación en régimen continuo con el tiempo máximo de una hora de operación.
Considerando que el calor del sol causa aumento de la temperatura de operación, los motores instalados externamente deben siempre estar protegidos contra la incidencia directa de los rayos solares.
Posibles desvíos en relación a la operación normal (actuación de protecciones térmicas, aumento del nivel de ruido, vibración, temperatura y corriente) deben ser examinados y eliminados por personal capacitado. En caso de dudas, apague el motor inmediatamente y contacte a un Asistente Técnico Autorizado WEG.

El incumplimiento de los criterios y recomendaciones establecidos en este manual puede resultar en anulación de la garantía del producto.

7.3 LÍMITES DE LA GRAVEDAD DE LA VIBRACIÓN

La gravedad de la vibración es el máximo valor de vibración encontrada entre todos los puntos y direcciones recomendados.
La Tabla 28 indica los valores admisibles de la gravedad de la recomendados en la norma IEC 60034-14 para las carcasas IEC 56 a 400, para los grados de vibración A y B.
Los límites de gravedad de la Tabla 27 son presentados en términos del valor medio cuadrático (= valor RMS o valor eficaz) de la velocidad de vibración en mm/s medidos en condición de suspensión libre (base elástica).

Altura del eje [mm]	56 ≤ H ≤ 132	H ≥ 132
Grado de vibración	gravedad de la vibración en base elástica [mm/s RMS]	
A	2.8	2.8
B	1.1	1.1

Tabla 28 - Limites recomendados para la severidad de vibración de acuerdo con la norma IEC 60034-14

Notas:
1 - Los valores de la Tabla 7.5 son válidos para mediciones realizadas con la máquina desacoplada y sin carga, operando en la frecuencia y tensión nominales.
2 - Los valores de la Tabla 7.5 son válidos independientemente del sentido de giro de la máquina.
3 - La Tabla 7.5 no se aplica para motores trifásicos con conmutador, motores monofásicos, motores trifásicos con alimentación monofásica o para máquinas fijadas en el local de instalación, acopladas en sus cargas de accionamiento o cargas accionadas.

Para motor estándar, de acuerdo con la norma NEMA MG 1, el límite de vibración es de 0,15 pulg/s, en la misma condición de suspensión libre y desacoplado.

Nota:
Para condición de operación en carga se recomienda el uso de la norma ISO 10816-3 para evaluación de los limites de vibración del motor. En la condición en carga, la vibración del motor resultará influida por varios factores, entre ellos, tipo de carga acoplada, condición de fijación del motor, condición de alineamiento con la carga, vibración de la estructura o base debido a otros equipamientos, etc..

8. MANTENIMIENTO

La finalidad del mantenimiento es prolongar lo máximo posible la vida útil del equipo. La no observancia de uno de los ítems relacionados a seguir puede llevar a paradas no deseadas del equipo.
En caso que, durante el mantenimiento, hubiera necesidad de transporte de los motores con rodamientos de rodillos o contacto angular, deben ser utilizados los dispositivos de trabado del eje suministrados con el motor. Todos los motores HGF, W50, W51 HD y W60 independientemente del tipo de cojinete, deben tener su eje trabado durante el transporte.
Cualquier servicio en máquinas eléctricas debe ser realizado solamente por personal capacitado, utilizando sólo herramientas y métodos adecuados. Antes de iniciar cualquier servicio, las máquinas deben estar completamente paradas y desconectadas de la red de alimentación, inclusive los accesorios (resistencia de calentamiento, freno, etc.).
Asistentes técnicos o personal no capacitado, sin autorización para hacer mantenimiento y/o reparar motores, son totalmente responsables por el trabajo ejecutado y por los eventuales daños que puedan ocurrir durante su funcionamiento.

8.1 INSPECCIÓN GENERAL

La frecuencia con que deben ser realizadas las inspecciones depende del tipo de motor, de la aplicación y de las condiciones del local de la instalación. Durante la inspección, se recomienda:

- Hacer una inspección visual del motor y del acoplamiento, observando los niveles de ruido, de la vibración, alineamiento, señales de desgastes, oxidación y piezas deterioradas. Sustituir las piezas, cuando fuera necesario;
- Medir la resistencia de aislamiento conforme se describe en el ítem 5.4;
- Mantener la carcasa limpia, eliminando toda acumulación de aceite o de polvo en la parte externa del motor para de esta forma facilitar el intercambio de calor con el medio ambiente;
- Verificar la condición del ventilador y de las entradas y salidas de aire, asegurando un libre flujo del aire;
- Verificar el estado de los sellados y efectuar el cambio, si fuera necesario;
- Drenar el motor. Tras el drenaje, recolocar los drenajes para garantizar nuevamente el grado de protección del motor. Los drenajes deben estar siempre posicionados de tal forma que se facilite el drenaje (ver ítem 6);
- Verificar la conexión de los cables de alimentación, respetando las distancias de aislamiento entre partes vivas no aisladas entre sí y entre partes vivas y partes puestas a tierra de acuerdo con la Tabla 10;
- Verificar si el apriete de los tornillos de conexión, sustentación y fijación está de acuerdo con lo indicado en la Tabla 44;
- Verificar el estado del pasaje de los cables en la caja de conexión, los sellados de los prensacables y los sellados en las cajas de conexión y efectuar el cambio, se fuera necesario;
- Verificar el estado de los cojinetes, observando la aparición de ruidos y niveles de vibración no habituales, verificando la temperatura de los cojinetes, el nivel del aceite, la condición del lubricante y el monitoreo de las horas de operación en comparación con la vida útil informada;
- Registrar y archivar todas las modificaciones realizadas en el motor.



No reutilice piezas dañadas o desgastadas. Sustitúyalas por nuevas originales de fábrica.

8.2 LUBRICACIÓN

La correcta lubricación es de vital importancia para el buen funcionamiento del motor.
Utilice el tipo y cantidad de grasa o aceite especificados y siga los intervalos de relubricación recomendados para los cojinetes. Estas informaciones pueden ser encontradas en la placa de características y este procedimiento debe ser realizado conforme el tipo de lubrificante (aceite o grasa).
Cuando el motor utilice protección térmica en el cojinete, deben ser respetados los límites de temperatura de operación indicados en la Tabla 12.
Los motores para aplicaciones especiales pueden presentar temperaturas máximas de operación diferentes a las indicadas en la tabla.
El descarte de la grasa y/o aceite debe seguir las recomendaciones vigentes de cada país.



La utilización de motor en ambientes y/o aplicaciones especiales siempre requiere una consulta previa a WEG.

8.2.1 Cojinetes de rodamiento lubricados con grasa



Grasa en exceso provoca calentamiento del cojinete y su consecuente falla.

Los intervalos de lubricación especificados en la Tabla 28, Tabla 29, Tabla 30, Tabla 31, Tabla 32, Tabla 33, Tabla 34, Tabla 35 y Tabla 36 consideran una temperatura absoluta del cojinete de 70 °C (hasta carcasa IEC 200 / NEMA 324/6) y 85 °C (a partir de la carcasa IEC 225 / NEMA 364/5), rotación nominal del motor, instalación horizontal y grasa Mobil Polyrex EM. Cualquier variación de los parámetros indicados debe ser evaluada puntualmente.

Carcasa		Polos	Rodamiento	Cantidad de grasa (g)	Intervalos de relubricación (horas)					
					ODP (Carcasa abierta)		W21 (Carcasa cerrada)		W22 (Carcasa cerrada)	
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
90	143/5	2	6205	4	-	-	20000	20000	25000	25000
		4								
		6								
		8								
100	-	2	6206	5						
		4								
		6								
		8								
112	182/4	2	6207/ 6307	9						
		4								
		6								
		8								
132	213/5	2	6308	11				18400		
		4						20000		
		6								
		8								
160	254/6	2	6309	13	20000	20000	18100	15700		
		4					20000	20000		
		6								
		8								
180	284/6	2	6311	18			13700	11500		
		4					20000	20000		
		6								
		8								
200	324/6	2	6312	21			11900	9800		
		4					20000	20000		
		6								
		8								
225 250 280 315 355	364/5 404/5 444/5 445/7 447/9 L447/9 504/5 5008 5010/11 586/7 588/9	2	6314	27	18000	14400	4500	3600	5000	4000
		4			20000	20000	11600	9700	14000	12000
		6					16400	14200	20000	17000
		8					19700	17300	24000	20000
		2	6316	34	14000	*Mediante consulta	3500	*Mediante consulta	4000	*Mediante consulta
		4			20000	20000	10400	8500	13000	10000
		6					14900	12800	18000	16000
		8					18700	15900	20000	20000
		2	6319	45	*Mediante consulta					
		4			20000	20000	9000	7000	11000	8000
		6					13000	11000	16000	13000
		8					17400	14000	20000	17000
		4	6322	60			7200	5100	9000	6000
		6					10800	9200	13000	11000
		8					15100	11800	19000	14000

Tabla 29 - Intervalo de lubricación para rodamientos de bolas

Carcasa		Polos	Rodamiento	Cantidad de grasa (g)	Intervalos de relubricación (horas)					
					ODP (Carcasa abierta)		W21 (Carcasa cerrada)		W22 (Carcasa cerrada)	
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
160	254/6	2	NU309	13	20000	19600	13300	9800	16000	12000
		4				20000	20000	20000	25000	25000
		6								
		8								
180	284/6	2	NU311	18	18400	12800	9200	6400	11000	8000
		4			20000	20000	20000	19100	25000	25000
		6						20000		
		8								
200	324/6	2	NU312	21	15200	10200	7600	5100	9000	6000
		4			20000	20000	20000	17200	25000	21000
		6						20000		25000
		8								
225	364/5	4	NU314	27	17800	14200	8900	7100	11000	9000
250	404/5	6			20000	20000	13100	11000	16000	13000
280	444/5	8					16900	15100	20000	19000
315	445/7	4	NU316	34	15200	12000	7600	6000	9000	7000
355	447/9	6			20000	19000	11600	9500	14000	12000
	L447/9	8				20000	15500	13800	19000	17000
	504/5	4	NU319	45	12000	9400	6000	4700	7000	5000
	5008	6			19600	15200	9800	7600	12000	9000
		8			20000	20000	13700	12200	17000	15000
	5010/11	4	NU322	60	8800	6600	4400	3300	5000	4000
	586/7	6			15600	11800	7800	5900	9000	7000
	588/9	8			20000	20000	11500	10700	14000	13000

Tabla 30 - Intervalo de lubricación para rodamientos de rodillos

Carcasa		Polos	Rodamiento	Cantidad de grasa (g)	Intervalos de Lubricación (horas)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B y 315C/D/E	5006/7/8T y 5009/10/11T	2	6314	27	3100	2100
		4 - 8	6320	50	4500	4500
			6316	34		
355L/A/B y 355C/D/E	5807/8/9T y 5810/11/12T	2	6314	27	3100	2100
		4 - 8	6322	60	4500	4500
			6319	45		
400L/A/B y 400 C/D/E	6806/7/8T y 6809/10/11T	2	6315	30	2700	1800
		4 - 8	6324	72	4500	4500
			6319	45		
450	7006/10	2	6220	31	2500	1400
		4	6328	93	4500	3300
			6322	60		4500
		6 - 8	6328	93		
			6322	60		
500	8006/10	4	6330	104	4200	2800
			6324	72	4500	4500
		6 - 8	6330	104		
			6324	72		
560	8806/10	4 - 8	*Mediante consulta			
630	9606/10					

Tabla 31 - Intervalo de lubricación para rodamiento de bolas - línea HGF.

ESPAÑOL

Carcasa		Polos	Rodamiento	Cantidad de grasa (g)	Intervalos de lubricación (horas)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B y 315C/D/E	5006/7/8 y 5009/10/11	4	NU320	50	4300	2900
		6 - 8			4500	4500
355L/A/B y 355C/D/E	5807/8/9 y 5810/11/12	4	NU322	60	3500	2200
		6 - 8			4500	4500
400L/A/B y 400C/D/E	6806/7/8 y 6809/10/11	4	NU324	72	2900	1800
		6 - 8			4500	4500
450	7006/10	4	NU328	93	2000	1400
		6			4500	3200
		8				4500
500	8006/10	4	NU330	104	1700	1000
		6			4100	2900
		8			4500	4500
560	8806/10	4	NU228 + 6228	75	2600	1600
		6 - 8		106	4500	4500
630	9606/10	4	NU232 + 6232	92	1800	1000
		6		120	4300	3100
		8		140	4500	4500

Tabla 32 - Intervalo de lubricación para rodamiento de rodillos - línea HGF

	Carcasa		Polos	Rodamiento delantero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)	Rodamiento trasero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montaje horizontal Esferas	315 H/G	5009/10	2	6314	27	4500	3500	6314	27	4500	3500
			4 - 8	6320	50		4500	6316	34		4500
	355 J/H	5809/10	2	6314	27		3500	6314	27		3500
			4 - 8	6322	60		4500	6319	45		4500
	400 L/K y 400 J/H	6806/07 y 6808/09	2	6218	24	3800	2500	6218	24	3800	1800
			4 - 8	6324	72	4500	4500	6319	45	4500	4500
	450 L/K y 450 J/H	7006/07 y 7008/09	2	6220	31	3000	2000	6220	31	3000	2000
			4	6328	93	4500	3300	6322	60	4500	4500
			6 - 8				4500				
Montaje vertical – Esferas	315 H/G	5009/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6320	50	4200	3200	6316	34	4500	4500
			6 - 8			4500	4500				
	355 J/H	5809/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6322	60	3600	2700	6319	45	4500	3600
			6 - 8			4500	4500				4500
	400 L/K y 400 J/H	6806/07 y 6808/09	2	7218	24	2000	1300	6218	24	2000	1300
			4	7324	72	3200	2300	6319	45	4500	3600
			6			4500	4300				4500
			8				4500				
	450 L/K y 450 J/H	7006/07 y 7008/09	2	7220	31	1500	1000	6220	31	1500	1000
			4	7328	93	2400	1700	6322	60	3500	2700
			6			4100	3500			4500	4500
			8			4500	4500				

Tabla 33 - Intervalo de lubricación para rodamiento de bolas - línea W50

	Carcasa		Polos	Rodamiento delantero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)	Rodamiento trasero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montaje horizontal Rodillos	315 H/G	5009/10	4	NU320	50	4300	2900	6316	34	4500	4500
			6 -8			4500	4500				
	355 J/H	5809/10	4	NU322	60	3500	2200	6319	45		
			6 - 8			4500	4500				
	400 L/K y 400 J/H	6806/07 y 6808/09	4	NU324	72	2900	1800				
			6 - 8			4500	4500				
	450 L/K y 450 J/H	7006/07 y 7008/09	4	NU328	93	2000	1400	6322	60		
			6			4500	3200				
			8				4500				

Tabla 34 - Intervalo de lubricación para rodamiento de rodillos - línea W50

	Carcasa		Polos	Rodamiento delantero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)	Rodamiento trasero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montaje horizontal Rodamiento de Esferas	160M/L	254/6	2 - 8	6309	13	20000	20000	6209	9	20000	20000
	180M/L	284/6		6311	18			6211	11		
	200M/L	324/6		6312	21						
	225S/M	364/5	2	6314	27	18000	14400	6212	13		
			4 – 8								
	250S/M	404/5	2								
			4 – 8	6316	34	20000	20000				
	280S/M	444/5	2	6314	27	18000	14400				
			4 – 8	6319	45	20000	20000	6314	27		
	280L	447/9	2	6314	27	18000	14400			18000	14400
			4 – 8	6319	45	20000	20000			20000	20000
	315G/F	5010/11	2	6314	27	4500	4500			4500	4500
			4 – 8	6319	45						
	355J/H	L5010/11	2	6218	24	2200	2200	6218	24	2200	2200
			4 – 8	6224	43	4500	4500			4500	4500
	400J/H	L5810/11	2	6220	31	2200	2200	6220	31	2200	2200
			4 – 8	6228	52	4500	4500			4500	4500
	450K/J	L6808/09	2	6220	31	2200	2200			2200	2200
			4 – 8	6228	52	4500	4500			4500	4500

Tabla 35 - Intervalo de lubricación para rodamiento de esferas - línea W40

	Carcasa		Polos	Rodamiento delantero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)	Rodamiento trasero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montaje horizontal Rodillos	225S/M	364/5	4 – 8	NU314	27	20000	20000	6314	27	20000	20000
	250S/M	404/5		NU316	34						
	280S/M	444/5		NU319	45		18800				
	280L	447/9									
	315G/F	5010/11				4500	4500	6218	24	4500	4500
	355J/H	L5010/11		NU224	43						
	400J/H	L5810/11		NU228	52		3300	6220	31		
	450K/J	L6808/09									

Tabla 36 - Intervalo de lubricación para rodamiento de rodillos - línea W40

	Carcasa		**Polos**	Rodamiento delantero	Cantidad de grasa (g)	**50 Hz (h)**	**60 Hz (h)**	Rodamiento trasero	Cantidad de grasa (g)	**50 Hz (h)**	**60 Hz (h)**
	IEC	NEMA									
Montaje horizontal Rodamiento de Esferas	355H/G	5810/11	2	6218	24	2300	1500	6218	24	2300	1500
			4/8	6224	43	4500	4500			4500	4500
	400J/H	L5810/11	2	6220	31	1800	1200	6220	31	1800	1200
			4/8	6228	52	4500	4500			4500	4500
	400G/F	6810/11	2	6220	31	1800	1200			1800	1200
			4/8	6228	52	4500				4500	
Montaje horizontal Rodillos	355H/G	5810/11	4	NU224	43	4500	4500	6218	24	4500	4500
			6/8								
	400J/H	L5810/11	4	NU228	52		1500	6220	31		1500
			6/8				4500				4500
	400G/F	6810/11	4				1500				1500
			6/8				4500				4500

Tabla 37 - Intervalo de lubrificación para rodamiento de esferas y de rodillos - línha W60

	Carcasa		Polos	Rodamiento delantero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)	Rodamiento trasero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem horizontal Rolamento de esferas	315 G/F	5010/11	2	6314	27	4500	3500	6314	27	4500	3500
			4-12	6320	50		4500	6316	34		4500
	355H/G	5810/11	2	6314	27		3500	6314	27		3500
			4-12	6322	60		4500	6319	45		4500
	400H/G	6809/10	2	6220	24	2700	2000	6220	24	2700	2000
			4-12	6324	72	4500	3800	6319	45	4500	4500
	450H/G	7009/10	2	6220	31	3500	-	6220	31	3500	-
			4	6328	93	4500	3800	6322	60	4500	4500
			6-12				4500				
Montagem vertical Rolamento de esferas	315 G/F	5010/11	2	7314	27	Mediante consulta		6314	27	Mediante consulta	
			4	7320	50	2700	2100	6316	34	4500	4200
			6-12			4500	4500				4500
	355H/G	5810/11	2	7314	27	Mediante consulta		6314	27	Mediante consulta	
			4	7322	60	1600	1600	6319	45	3500	3500
			6			3900	2900			4500	4500
			8-12			4500	4500				
	400H/G	6809/10	2	7220	24	Mediante consulta		6220	24	Mediante consulta	
			4	7324	72	1700	1200	6319	45	4500	3500
			6			3300	2500				4500
			8-12			4500	4500				
	450H/G	7009/10	2	7220	31	Mediante consulta		6220	31	Mediante consulta	
			4	7328	93	2900	2000	6322	60	4300	3200
			6			4500	4200			4500	4500
			8-12				4500				

Tabla 38 - Intervalo de lubrificación para rodamiento de esferas - línea W51 HD

	Carcasa		Polos	Rodamiento delantero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)	Rodamiento trasero	Cantidad de grasa (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Montagem horizontal Rolamento de rolos	315 G/F	5010/11	4	NU320	50	4500	4200	6316	34	4500	4500
			6 -12			4500	4500				
	355H/G	5810/11	4	NU322	60	3300	3300	6319	45		
			6 -12			4500	4500				
	400H/G	6809/10	4	NU324	72	3500	2400				
			6 -12			4500	4500				
	450H/G	7009/10	4	NU328	93	1100	600	6322	60		
			6			2900	2000				
			8 -12			4500	4500				

Tabla 39 - Intervalo de lubrificación para rodamiento de rodillos - línea W51 HD

Los motores de la línea WGOST utilizan, de forma estándar, la grasa Mobiltemp SHC 32, adecuada para operación a bajas temperaturas, conforme el alcance de la temperatura ambiente entre -45°C y +40°C. La tabla 39 indica los intervalos de lubricación para estos motores.

Carcasa IEC	Polos	50 Hz (h)	Carcasa IEC	Poles	50 Hz (h)	Carcasa IEC	Polos	50 Hz (h)	Carcasa IEC	Polos	50 Hz (h)
71	2	20.000	112	2	20.000	200	2	20.000	315	2	7.000
	4			4			4			4	18.000
	6			6			6			6	20.000
	8			8			8			8	
80	2		132	2		225	2	9.000	355	2	6.000
	4			4			4	20.000		4	14.000
	6			6			6			6	20.000
	8			8			8			8	
90	2		160	2		250	2	9.000			
	4			4			4	20.000			
	6			6			6				
	8			8			8				
100	2		180	2		280	2	7.000			
	4			4			4	18.000			
	6			6			6	20.000			
	8			8			8				

Tabela 40 - Intervalo de lubrificación para rodamiento de esferas - línea WGOST

Los intervalos de lubricación especificados en la Tabla 41 consideran la rotación nominal del motor, instalación horizontal y grasa Mobil Polyrex EM. Cualquier variación de los parámetros indicados arriba deberá ser evaluada puntualmente.

Carcasa IEC	Polos	Rodamiento delantero	Cantidad de grasa (g)	Rodamiento trasero	Cantidad de grasa (g)	Temperatura Ambiente 40 °C		Temperatura Ambiente 50 °C	
						50 Hz (h)	60 Hz (h)	50 Hz (h)	60 Hz (h)
225S/M	2	6214	15	6212	12	8800	6600	6600	4400
	4					13200	13200	13200	8800
250S/M	2					8800	6600	6600	4400
	4					13200	13200	13200	8800
W280S/M	2	6314	26			6600	4400	4400	3000
	4	6316	33			13200	8800	8800	6600
280S/M	2	6314	26	6314	26	6600	4400	4400	3000
	4	6316	33			13200	8800	8800	6600
	6						13200	8800	8800
W315S/M	2	6314	26			6600	4400	4400	3000
	4	6319	45			8800	8800	6600	4400
	6					13200	13200	8800	6600
315S/M	2	6314	26			6600	4400	4400	3000
	4	6319	45	6316	33	8800	8800	6600	4400
	6					13200	13200	8800	6600
315L	2	6314	26	6314	26	4400	3000	3000	3000
	4	6319	45	6316	33	8800	6600	4400	4400
	6						8800	6600	6600
355M/L	2	6316	33	6314	26	4400	3000	3000	3000
	4	6322	60	6319	45	8800	6600	4400	4400
	6						8800	6600	6600

Tabla 41 - Intervalo de lubrificación para rodamiento de esferas - líneas WEG General Purpose y WIN

Las líneas de motores WEG General Purpose y WIN con sistema de relubricación (con acessório de engrase y cojinetes abiertos) en los tamaños de carcasa 225S/M, 250S/M y W280S/M tienen una cámara de almacenamiento de grasa dentro del motor y no tienen una abertura para su salida. El volumen interno destinado a almacenar la grasa vieja tiene la capacidad de cumplir hasta 7 (siete) relubricaciones, limitado a 5 anõs de operación, siendo necesaria la remoción de grasa después de este período.
Para cada incremento de 15 °C en la temperatura del cojinete, el intervalo de relubricación deberá ser reducido a la mitad.
Para aplicaciones especiales, tales como: altas y bajas temperaturas, ambientes agresivos, variación de velocidad (accionamiento por convertidor de frecuencia), etc., entre en contacto con WEG para obtener informaciones referentes al tipo de grasa e intervalos de lubricación a ser utilizados.

8.2.1.1. Motores sin accesorio de engrase

En motores sin accesorio de engrase, la lubricación debe ser efectuada conforme el plano de mantenimiento preventivo existente. El desmontaje y montaje del motor deben ser hechos conforme el ítem 8.3.
En motores con rodamientos blindados (por ejemplo, ZZ, DDU, 2RS, VV), los rodamientos deben ser substituidos al final de la vida útil de la grasa.

8.2.1.2. Motores con accesorio de engrase

Para relubricación de los rodamientos con el motor parado, proceder de la siguiente manera:
- Limpie las proximidades del orificio de entrada de grasa;
- Abrir la protección de entrada de grasa;
- Retirar la tapa de salida de grasa (la eliminación no es necesaria en el caso de sistema de relubricación automática, como los motores IEEE Std 841);
- Coloque aproximadamente mitad de la grasa total recomendada en la placa de características del motor y gire el motor durante aproximadamente 1 minuto en la rotación nominal;
- Apague el motor y coloque el resto de la grasa;
- Recoloque la protección de entrada de grasa y la tapa de salida de grasa.

Para relubricación de los rodamientos con el motor en funcionamiento, proceder de la siguiente manera:
- Limpie las proximidades del orificio de entrada de grasa;
- Abrir la protección de entrada de grasa;
- Si es posible y seguro, retirar la tapa de salida de grasa;
- Coloque la cantidad de grasa total recomendada en la placa de características del motor;
- Recoloque la protección de entrada de grasa y la tapa de salida de grasa (si ha sido eliminado).

Para lubricación, es indicado el uso de lubricador manual.

Debido a los espacios internos presentes en el motor, es posible que, en los primeros reengrases de los cojinetes, la grasa no va a salir de la salida de grasa. Por lo tanto, no aplique exceso de grasa esperando que salga.

En motores suministrados con dispositivo de resorte, el exceso de grasa debe ser retirado extrayendo la varilla del resorte y limpiándola hasta que no presente más grasa.

8.2.1.3. Compatibilidad de la grasa Mobil Polyrex EM con otras grasas

La grasa Mobil Polyrex EM posee espesante de poliurea y aceite mineral, no siendo compatible con otras grasas. En caso que necesite de otro tipo de grasa, contacte a WEG.
No es recomendada la mezcla de grasas. En tal caso, limpiar los cojinetes y los canales de lubricación antes de aplicar grasa nueva.
La grasa aplicada debe poseer, en su formulación, aditivos inhibidores de corrosión y oxidación.

8.2.2 Cojinetes de rodamiento lubricados por aceite

En motores con rodamientos lubricados por aceite, el cambio de aceite debe ser hecho con el motor parado, siguiendo los procedimientos siguientes:
- Abra la respiración de entrada de aceite;
- Retire el tapón de salida de aceite;
- Abra la válvula y drene todo el aceite;
- Cierre la válvula;
- Recoloque el tapón;
- Abastezca con la cantidad y especificación de aceite indicadas en la placa de características;
- verifique si el nivel del aceite está en la mitad del visor;
- cierre la respiración de la entrada de aceite;
- asegúrese de que no hay pérdida y que todos los orificios roscados no utilizados estén cerrados.

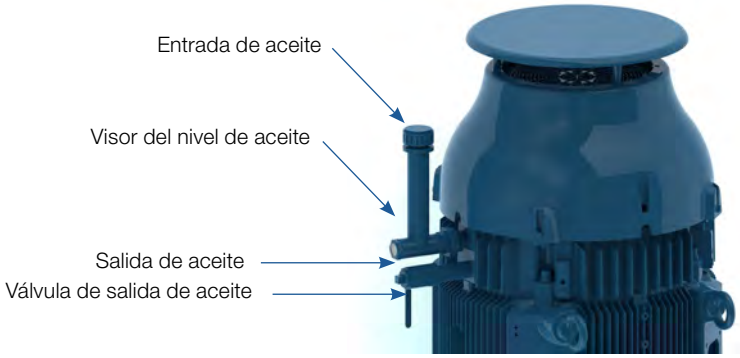


Figura 54 - Cojinete vertical de rodamiento lubrificado por aceite.

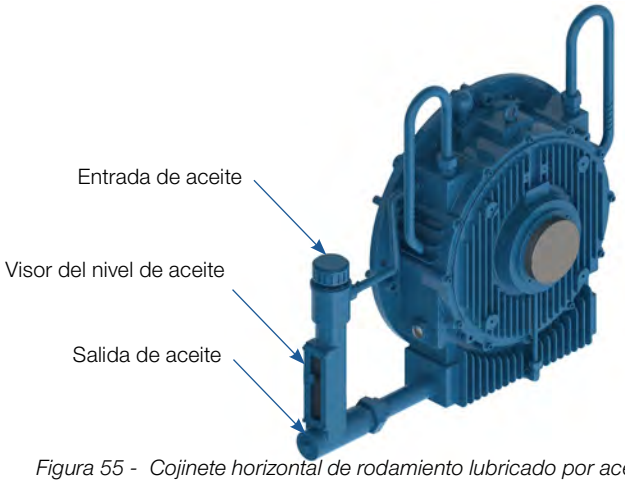


Figura 55 - Cojinete horizontal de rodamiento lubricado por aceite.

El cambio de aceite de los cojinetes debe ser realizado en el intervalo indicado en la placa de características o siempre que el lubrificante presente alteraciones en sus características (viscosidad, pH, etc.).
El nivel de aceite debe ser mantenido en la mitad del visor de aceite y comprobado diariamente.
El uso de lubricantes con otras viscosidades requiere contacto previo con WEG.

Obs.: los motores HGF verticales para alto empuje son suministrados con cojinetes delanteros lubricados a grasa y con cojinetes traseros por aceite. Los cojinetes delanteros deben seguir las recomendaciones del ítem 8.2.1. La Tabla 41 presenta la cantidad y especificación de aceite para esa configuración.

	Carcasa		Polos	Rodamiento	Aceite (l)	Intervalo (h)	Lubricante	Especificación lubricante
	IEC	NEMA						
Montaje alto empuje	315L/A/B y 315C/D/E	5006/7/8T y 5009/10/11T	4 - 8	29320	20	8000	FUCHS Renolin DTA 40 / Mobil SHC 629	Aceite mineral ISO VG150 con aditivos antiespuma y antioxidantes
	355L/A/B y 355C/D/E	5807/8/9T y 5810/11/12T	4 - 8	29320	26			
	400L/A/B y 400C/D/E	6806/7/8T y 6809/10/11T	4 - 8	29320	37			
	450	7006/10	4 - 8	29320	45			

Tabla 42 - Características de lubricación para motores HGF vertical de alto empuje y Vertical High Thrust.

8.2.3 Cojinetes de rodamiento con lubricación de tipo Neblina de aceite

Verifique el estado de los sellados y, siempre que fuera necesario algún cambio, use solamente piezas originales.
Realice la limpieza de los componentes antes del montaje (anillos de fijación, tapas, etc.).
Aplique sellajuntas resistente al aceite lubricante utilizado, entre los anillos de fijación y las tapas.
A conexión de los sistemas de entrada, salida y drenaje de aceite deben ser realizados conforme la Figura 43.

8.2.4 Cojinetes de deslelevación

Para los cojinetes de deslelevación, el cambio de aceite debe ser hecho en los intervalos indicados en la Tabla 8.11 y debe ser realizado, adoptando los siguientes procedimientos:

- Para el cojinete trasero, retire la tapa de inspección de la deflectora;
- Drene el aceite a través del drenaje localizado en la parte inferior de la carcasa del cojinete (ver Figura 56;
- Cierre la salida de aceite;
- Retire el tapón de la entrada de aceite;
- Abastezca con el aceite especificado y con la cantidad indicada en la Tabla 41;
- Verifique si el nivel del aceite está en la mitad del visor;
- Cierre la entrada de aceite;
- Asegúrese de que no existe pérdida.

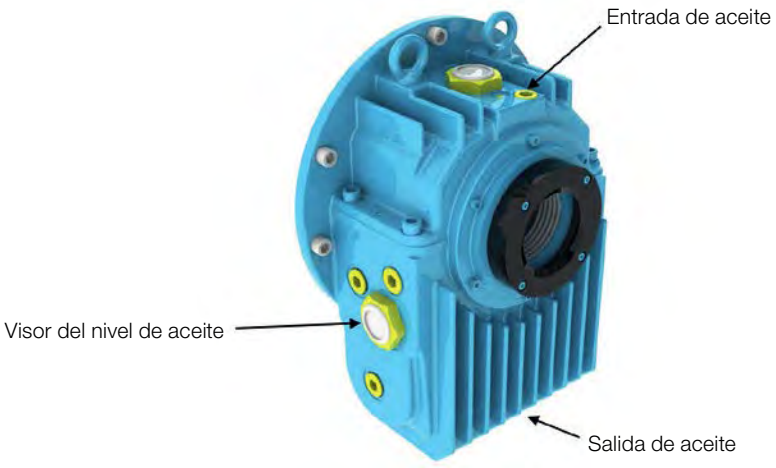


Figura 56 - Cojinete de deslelevación.

Carcasa		Polos	Cojinete	Aceite (L)	Intervalo (h)	Lubricante	Especificación lubrificante
IEC	NEMA						
315	5000	2	9-80	3.6	8000	FUCHS Renolin DTA 10	Aceite mineral ISO VG32 con aditivos antiespuma y antioxidantes
355	5800						
400	6800						
450	7000						
315	5000	4 - 8	9-90		8000	FUCHS Renolin DTA 15	Aceite mineral ISO VG46 con aditivos antiespuma y antioxidantes
355	5800		9-100				
400	6800		11-110	4.7			
450	7000		11-125				
500	8000						

Tabla 43 - Características de lubricación para cojinetes de deslelevación

El cambio de aceite de los cojinetes debe ser realizado en el intervalo indicado en la placa de características o siempre que el lubricante presente alteraciones en sus características (viscosidad, pH, etc.).
El nivel de aceite debe ser mantenido en la mitad del visor y seguido diariamente.
No podrán ser usados lubrificantes con otras viscosidades sin antes consultar a WEG.

8.3 DESMONTAJE Y MONTAJE

Los servicios de reparación en motores deben ser efectuados solamente por personal capacitado siguiendo las normas vigentes del país. Sólo deben ser utilizadas herramientas y métodos adecuados.

Cualquier servicio de desmontaje y montaje debe ser realizado con el motor totalmente desenergizado y completamente parado.
El motor apagado también puede presentar energía eléctrica en el interior de la caja de conexión:, en las resistencias de calentamiento, en el devanado y en los capacitores.
Los motores accionados por convertidor de frecuencia pueden estar energizados incluso con el motor parado.

Antes de iniciar el procedimiento de desmontaje, registre las condiciones actuales de la instalación, tales como conexiones de los terminales de alimentación del motor y alineamiento / nivelación, los que deben ser considerados durante el montaje posterior.
Realice el desmontaje de manera cuidadosa, sin causar impactos contra las superficies mecanizadas y / o en las roscas.
Monte el motor en una superficie plana para garantizar una buena base de apoyo. Los motores sin patas deben ser calzados/trabados para evitar accidentes.
Deben ser tomados cuidados adicionales para no dañar las partes aisladas que operan bajo tensión eléctrica, como por ejemplo, devanados, cojinetes aislados, cables de alimentación, etc..
Los elementos de sellado, como por ejemplo, juntas y sellados de los cojinetes deben ser cambiados siempre que presenten desgaste o estén damnificados.
Los motores con grado de protección superior a IP55 son suministrados con producto sellante Loctite 5923 (Henkel) en las juntas y tornillos. Antes de montar los componentes, limpie las superficies y aplique una nueva camada de este producto.

En el caso de motores con rotor de imanes permanentes (motores WQuattro y WMagnet), el montaje y desmontaje del motor requiere de la utilización de dispositivos adecuados debido a las fuerzas de atracción o de repulsión entre piezas metálicas. Este servicio solamente debe llevarse a cabo por un Servicio Técnico Autorizado WEG con formación específica para dicha operación.
Las personas que utilicen marcapasos no pueden manipular estos motores. Los imanes permanentes también pueden causar perturbaciones o daños en otros equipamientos eléctricos y componentes durante el mantenimiento.

En los motores de las líneas W40, W50, W51 HD y HGF, suministrados con ventiladores axiales, el motor y el ventilador axial tienen indicación de sentido de rotación distintas, para prevenir un montaje erróneo. El ventilador debe ser montado de tal forma que la flecha indicativa del sentido de rotación este siempre visible, cuando observadas desde el lado externo del motor (en el lado no accionado). La marca indicada en las aspas del ventilador, CW para sentido de rotación horario o CCW para sentido de rotación anti-horario, indica el sentido de rotación del motor.

En motores que utilizan codificador, es necesario verificar la excentricidad de la región de asiento de este componente antes de su montaje. La excentricidad no debe superar el límite especificado por el fabricante del enconder.

En los motores que utilizan una tapa deflector de polímero, para retirarla, utilice dos destornilladores o una herramienta similar colocada cerca de los enganches y levante uno a la vez, repitiendo el procedimiento para cada lado hasta retirar completamente la tapa deflector.
Al ensamblar componentes poliméricos, se deben respetar los pares de apriete especificados en la Tabla 6.
Motores con un ventilador fijo únicamente por interferencia en el eje, si se desmontan, el componente debe ser reemplazado por uno nuevo. Para motores que tienen tapas inyectadas de aluminio sin mecanizado, es necesario calentar las tapas para el montaje y desmontaje.

8.3.1 Caja de conexión

Al retirar la tapa de la caja de conexión para la conexión/desconexión de los cables de alimentación y accesorios, deben ser adoptados los siguientes cuidados:
- Asegúrese que durante la remoción de los tornillos, la tapa de la caja no dañe los componentes instalados en su interior;

- En caso que la caja de conexión sea suministrada con cáncamo de suspensión, éste debe ser utilizado para mover la tapa de la caja de conexión;
- Para motores suministrados con placa de bornes, deben ser asegurados los torques de apriete especificados en la Tabla 44;

Para motores sin placa de bornes, no forzar los cables de alimentación para el interior para evitar contacto con el rotor.

- Verifique que los cables no entren en contacto con superficies con esquinas vivas.
- Adopte los debidos cuidados para garantizar que el grado de protección inicial, indicado en la placa de características del motor no sea alterado. Las entradas de cables para la alimentación y control deben utilizar siempre componentes (como, por ejemplo, prensacables y conductos eléctricos) que atiendan las normas y reglamentaciones vigentes de cada país;
- Asegúrese que la ventana de alivio de presión, cuando exista, no esté dañada. Las juntas de sellado de la caja de conexión deben estar en perfecto estado para reutilización y deben ser posicionadas correctamente para garantizar el grado de protección;
- Verifique los torques de apriete de los tornillos de fijación de la tapa de la caja conforme Tabla 44.

Tipo de tornillo y junta	M4	M5	M6	M8	M10	M12	M14	M16	M20
Tornillo sextavado externo/ interno (junta rígida)	-	3,5 hasta 5	6 hasta 9	14 hasta 20	28 hasta 40	45 hasta 70	75 hasta 110	115 hasta 170	230 hasta 330
Tornillo ranura combinada (junta rígida)	1,5 hasta 3	3 hasta 5	5 hasta 10	10 hasta 18	-	-	-	-	-
Tornillo sextavado externo/ interno (junta flexible)	-	3 hasta 5	4 hasta 8	8 hasta 15	18 hasta 30	25 hasta 40	30 hasta 45	35 hasta 50	-
Tornillo ranura combinada (junta flexible)	-	3 hasta 5	4 hasta 8	8 hasta 15	-	-	-	-	-
Placa de Bornes	1 hasta 1,5	2 hasta 4 [1)]	4 hasta 6,5	6,5 hasta 9	10 hasta 18	15,5 hasta 30	-	30 hasta 50	50 hasta 75
Puesta a tierra	1,5 hasta 3	3 hasta 5	5 hasta 10	10 hasta 18	28 hasta 40	45 hasta 70	-	115 hasta 170	-

Tabla 44 - Torques de apriete para elementos de fijación [Nm]

Notas: *1) Para la placa de bornes 12 pines, aplicar el par mínimo de 1,5 Nm y máximo 2,5 Nm.*

8.4 PROCEDIMIENTO PARA ADECUACIÓN DE LA RESISTENCIA DE AISLAMIENTO

El motor debe ser desmontado y sus tapas, rotor completo (con eje), ventilador, deflectora y caja de conexión deben ser separados, de modo que apenas la carcasa con el estator pase por un proceso de secado en un horno apropiado, por un período de dos horas, a una temperatura no superior a 120 ºC. Para motores mayores, puede ser necesario aumentar el tiempo de secado. Luego de ese período de secado, deje el estator enfriar hasta que llegue a temperatura ambiente y repita la medición de la resistencia de aislamiento, conforme ítem 5.4. En caso necesario, se debe repetir el proceso de secado del estator.
Si, luego de repetidos los procesos de secado del estator, la resistencia de aislamiento no vuelve a los niveles aceptables, se recomienda hacer un análisis exhaustivo de las causas que llevaron a la caída del aislamiento del devanado y, eventualmente podrá culminar con el rebobinado del motor.

Para evitar el riesgo de shock eléctrico, descargue los terminales inmediatamente antes y después de cada medición. En caso que el motor posea condensadores, éstos deben ser descargados.

Los motores WMagnet y WQuattro tienen imanes de alta energía y no deben ser abiertos por personal no calificado y personas con marcapasos.

8.5 COMPONENTES Y PIEZAS

Al solicitar piezas para repuesto, informe la designación completa del motor, así como su código y número de serie, que pueden ser encontrados en la placa de características del motor.
Las partes y piezas deben ser adquiridas de la red de Asistencia Técnica Autorizada WEG. El uso de piezas no originales puede resultar en una disminución del rendimiento y causar fallos en el motor.
Las piezas sobresalientes deben ser almacenadas en un lugar seco con una humedad relativa del aire de hasta 60%, con temperatura ambiente mayor a 5 °C y menor a 40 °C, libre de polvo, vibraciones, gases, agentes corrosivos, sin variaciones bruscas de temperatura, en su posición normal y sin apoyar otros objetos sobre las mismas.

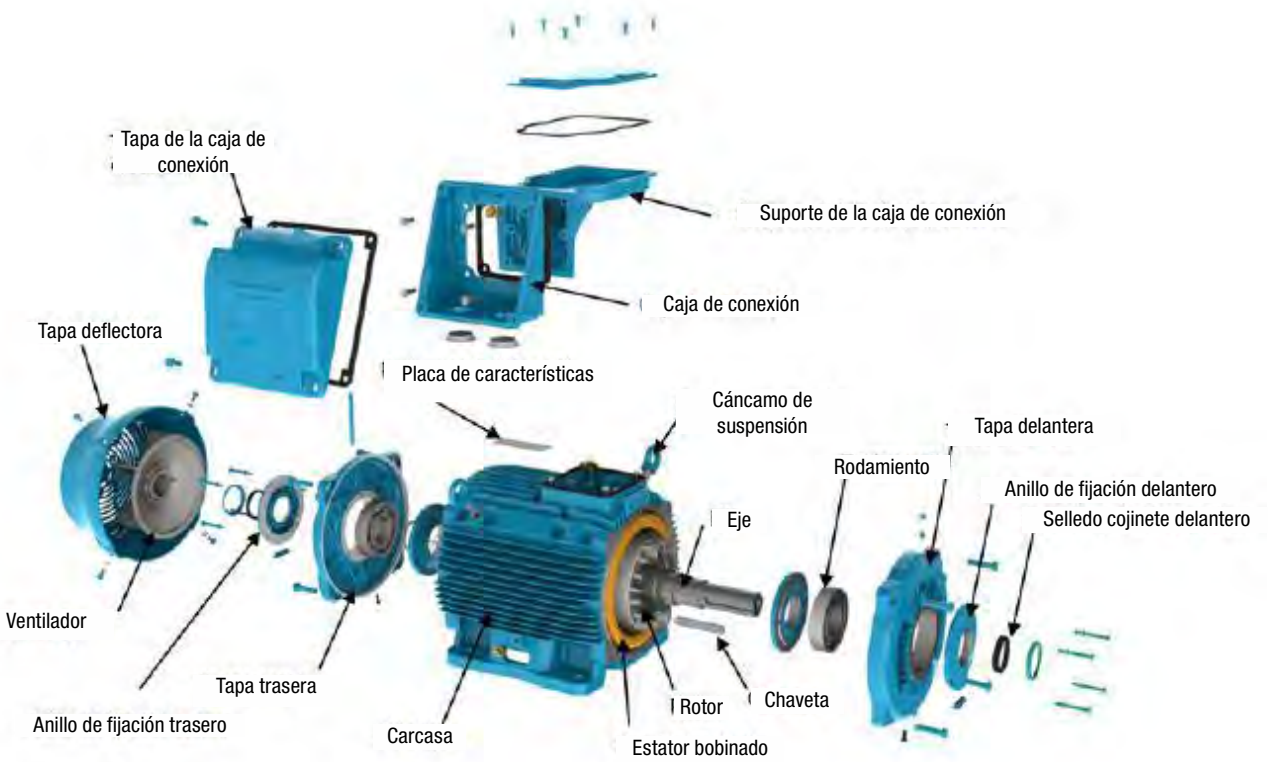


Figura 57 - Vista en despiece de los componentes de un motor W22

9. INFORMACIÓN MEDIO AMBIENTAL

9.1 EMBALAJE

Los motores eléctricos son suministrados en embalajes de cartón, plástico o madera. Estos materiales son reciclables o reutilizables y deben recibir el destino correcto, conforme las normas vigentes de cada país. Toda la madera utilizada en los embalajes de los motores WEG proviene de reforestación y no es sometida a ningún tratamiento químico para su conservación.

9.2 PRODUCTO

Los motores eléctricos, bajo el aspecto constructivo, son fabricados esencialmente con metales ferrosos (acero, hierro fundido), metales no ferrosos (cobre, aluminio) y plástico.

El motor eléctrico, de manera general, es un producto que posee una vida útil larga, no obstante en cuanto a su eliminación, WEG recomienda que los materiales del embalaje y del producto sean debidamente separados y enviados a reciclaje.

Los materiales no reciclables deben, como determina la legislación ambiental, ser dispuestos de forma adecuada, o sea, en vertederos industriales, coprocesados en hornos de cemento o incinerados. Los prestadores de servicios de reciclaje, disposición en vertederos industiales, coprocesamiento o incineración de residuos deben estar debidamente autorizados por el organismo responsable en materia medioambiental de cada país para realizar estas actividades.

10. PROBLEMAS Y SOLUCIONES

Las instrucciones siguientes presentan una relación de problemas comunes con posibles soluciones. En caso de duda, contacte al Asistente Técnico Autorizado, o a WEG.

Problema	Posibles Causas	Solución
El motor no arranca, ni acoplado ni desacoplado	Interrupción en la alimentación del motor	Verifique el circuito de comando y los cables de alimentación del motor.
	Fusibles quemados	Sustituya los fusibles.
	Error en la conexión del motor	Corrija las conexiones del motor conforme al diagrama de conexión.
	Cojinete trabado	Verifique si el cojinete gira libremente.
Cuando acoplado con carga, el motor no arranca o arranca muy lentamente y no alcanza la rotación nominal	Carga con torque muy elevado durante el arranque	No aplique carga en la máquina accionada durante la arranque.
	Caída de tensión muy alta en los cables de alimentación	Verifique el dimensionamiento de la instalación (transformador, sección de los cables, relés, disyuntores, etc.).
Ruido elevado/anormal	Defecto en los componentes de transmisión o en la máquina accionada	Verifique la transmisión de fuerza, el acoplamiento y el alineamiento.
	Base desalineada/desnivelada	Realinee/nivele el motor y la máquina accionada.
	Desequilibrio de los componentes o de la máquina accionada	Recupere el balanceo.
	Tipos diferentes de equilibrio entre motor y acoplamiento (media chaveta, chaveta entera)	Recupere el balanceo.
	Sentido de rotación del motor incorrecto	Invierta el sentido de rotación del motor.
	Tornillos de fijación sueltos	Reapriete los tornillos.
	Resonancia de los cimientos	Verifique el proyecto de los cimientos.
	Rodamientos deteriorados	Sustituya el rodamiento.
Calentamiento excesivo en el motor	Refrigeración insuficiente	Limpie las entradas y salidas de aire de la deflectora, y de la carcasa.
		Verifique las distancias mínimas entre la entrada de la deflectora de aire y las paredes cercanas. Ver ítem 7.
		Verifique la temperatura del aire en la entrada.
	Sobrecarga	Mida la corriente del motor, analizando su aplicación y, si fuera necesario, disminuya la carga.
	Excesivo número de arranques o momento de inercia de la carga muy elevado	Reduzca el número de arranques.
	Tensión muy alta	Verifique la tensión de alimentación del motor. No sobrepase la tolerancia conforme ítem 7.2.
	Tensión muy baja	Verifique la tensión de alimentación y la caída de tensión en el motor. No sobrepase la tolerancia conforme ítem 7.2.
	Interrupción de un cable de alimentación	Verifique la conexión de todos los cables de alimentación.
	Desequilibrio de tensión en los terminales de alimentación del motor	Verifique si hay fusibles quemados, comandos incorrectos, desequilibrio en las tensiones de la red de alimentación, falta de fase o en los cables de conexión.
	Sentido de rotación no compatible con el ventilador unidireccional	Verifique el sentido de rotación conforme la indicación del motor.
Calentamiento del cojinete	Grasa aceite en exceso	Realice la limpieza del cojinete y lubríquelo según las recomendaciones.
	Envejecimiento de la grasa/aceite	
	Utilización de grasa/aceite no especificados	
	Falta de grasa/aceite	Lubrique según las recomendaciones.
	Excesivo esfuerzo axial o radial	Reduzca la tensión en las correas.
		Redimensione la carga aplicada al motor.

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motores@weg.net

Jaraguá do Sul - SC - Brazil

Cod: 50033244 | Rev: 36 | Date (m/y):05/2024.

The values shown are subject to change without prior notice.
The information contained is reference values.

7.5 IOM for Temperature Transmitters

Reference Manual
00809-0200-4728, Rev SF
January 2023

Rosemount™ 644 Temperature Transmitter

with HART® Protocol



ROSEMOUNT™

EMERSON™

Safety messages

NOTICE

Read this document before working with the product. For personal and system safety, and for optimum product performance, ensure you thoroughly understand the contents before installing, using, or maintaining this product. For technical assistance, contacts are listed below:

Customer Central

Technical support, quoting, and order-related questions.
United States - 1-800-999-9307 (7:00 am to 7:00 pm Central Time)
Asia Pacific- 65 777 8211
Europe/Middle East/Africa - 49 (8153) 9390

North American Response Center

Equipment service needs.
1-800-654-7768 (24 hours—includes Canada)
Outside of these areas, contact your local Emerson representative.

⚠ WARNING

Follow instruction

Failure to follow these installation guidelines could result in death or serious injury.

Ensure only qualified personnel perform the installation.

Explosion

Explosions could result in death or serious injury.

Do not remove the connection head cover in explosive atmospheres when the circuit is live.
Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.
Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.
All connection head covers must be fully engaged to meet explosion-proof requirements.

Process leaks

Process leaks could result in death or serious injury.

Do not remove the thermowell while in operation.
Install and tighten thermowells and sensors before applying pressure.

Electric shock

Electrical shock could cause death or serious injury.

Use extreme caution when making contact with the leads and terminals.

The products described in this document are NOT designed for nuclear-qualified applications.

Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact your local Emerson Sales Representative.

⚠ WARNING

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

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1 Introduction

1.1 Using this manual

This manual is designed to assist in the installation, operation, and maintenance of Rosemount 644 Head Mount, Field Mount, and Rail Mount Transmitters with the HART® protocol.

Configuration provides instruction the commissioning and operating the Rosemount 644 HART Transmitter. The information explains how to configure software functions and many configuration parameters on an Asset Management System, a Field Communicator, and the Local Operator Interface display option.

Hardware Installation contains mechanical installation instructions for the transmitter.

Electrical Installation contains electrical installation instructions and considerations for the transmitter.

Operation and Maintenance contains common operation and maintenance techniques for the transmitter.

Troubleshooting provides troubleshooting techniques for the most common transmitter operating problems.

Safety Instrumented Systems (SIS) Certification provides identification, installation, configuration, operation and maintenance, and inspection information for Safety Instrumented Systems as it pertains to the Rosemount 644 Head Mount and Field Mount Temperature Transmitter.

Reference Data supplies procedure on how to get the specifications, ordering information, and product certification.

Field Communicator Menu Trees and Fast Keys contains Field Communicator menu trees and Field Communicator Fast Keys.

Local Operator Interface (LOI) contains instructions for number entry, text entry, as well as the LOI menu tree and LOI extended menu tree.

1.1.1 Transmitter overview

The Rosemount 644 Head Mount and Field Mount Temperature Transmitters support the following features:

- HART® configuration with Selectable HART revision capability (Revisions 5 or 7)
- Accepts either one or two inputs from a wide variety of sensor types (2-, 3-, and 4-wire RTD, thermocouple, mV and ohm)
- A compact transmitter size with electronics completely encapsulated in protective silicone and enclosed in a plastic housing ensuring long-term transmitter reliability
- Optional Safety Certification Option (IEC 61508 SIL 2)

- Optional enhanced accuracy and stability performance
- Optional LCD display with extended temperature ratings of -40 to 185 °F (-40 to 85 °C)
- Optional advanced LCD display with local operator interface (LOI)
- The Rosemount 644 Head Mount Transmitter is available in two housing materials (Aluminum and SST) and various housing options that allow for mounting flexibility in a variety of environmental conditions. The Rosemount 644 Field Mount is available in an aluminum housing.
- Special dual-sensor features include Hot Backup™, Sensor Drift Alert, first good, differential and average temperature measurements, and four simultaneous measurement variable outputs in addition to the analog output signal.
- Additional advanced features include: Thermocouple degradation diagnostic, which monitors thermocouple health, and process and transmitter minimum/maximum temperature tracking.

The Rosemount 644 Rail Mount Temperature Transmitter supports the following features:

- 4–20 mA/HART protocol (Revision 5)
- Accepts one sensor input from a wide variety of sensor types (2-, 3-, and 4-wire RTD, Thermocouple, mV and ohm)
- Completely encapsulated electronics to ensure long term transmitter reliability

Refer to the following literature for a full range of compatible connection heads, sensors, and thermowells provided by Emerson.

- Rosemount Volume 1 Temperature Sensors and Accessories (English) Product Data Sheet
- Rosemount DIN-Style Temperature Sensors and Thermowells (Metric) Product Data Sheet

Table 1-1 and Table 1-2 below summarize changes in the Rosemount 644 Head Mount and Rail Mount HART device revisions, respectively.

Table 1-1: Head Mount HART Revisions

Software release date	Identify device			Field device driver		Review instructions
	NAMUR software revision	NAMUR hardware revision(1)	HART software revision	HART universal revision(2)	Device revision	Manual document number
Jan-2023	1.1.3	1.0.2	5	7	9	00809-0200-4728
				5	8	
Feb-2020	1.1.2	1.0.1	4	7	9	00809-0200-4728
				5	8	

Table 1-1: Head Mount HART Revisions *(continued)*

Software release date	Identify device			Field device driver		Review instructions
	NAMUR software revision	NAMUR hardware revision(1)	HART software revision	HART universal revision(2)	Device revision	Manual document number
Aug-2012	1.1.1	1.0.0	3	7	9	00809-0200-4728

(1) NAMUR Software Revision is located in the hardware tag of the device. HART Software Revision can be read using a HART-capable configuration tool.

(2) Device Driver file names use Device and DD Revision (e.g. 10_07). HART Protocol is designed to enable legacy driver revisions to continue to communicate with new HART devices. To access this functionality, the new device driver must be downloaded. It is recommended to download the new device driver to ensure new functionality.

Table 1-2: Rail Mount HART Revisions

	Railmount
Rosemount 644 Hardware revision	31
Device revision	7
HART revision	5

2 Configuration

2.1 Overview

This section contains information on commissioning and tasks that should be performed on the bench prior to installation. Field Communicator, AMS Device Manager, and Local Operator Interface (LOI) instructions are given to perform configuration functions. For convenience, Field Communicator Fast Key sequences are labeled “Fast Keys,” and abbreviated LOI menus are provided for each function below. The LOI is only available on the Rosemount 644 Head Mount and Field Mount designs, and the configuration instructions referencing the interface will not apply to the rail mount form factor.

Full Field Communicator menu trees and Fast Key sequences are available in Field Communicator Menu Trees and Fast Keys. Local operator interface menu trees are available in Local Operator Interface (LOI).

2.2 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Follow instruction

Failure to follow these installation guidelines could result in death or serious injury.

Ensure only qualified personnel perform the installation.

Explosion

Explosions could result in death or serious injury.

Do not remove the connection head cover in explosive atmospheres when the circuit is live.

Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

All connection head covers must be fully engaged to meet explosion-proof requirements.

⚠ WARNING

Process leaks

Process leaks could result in death or serious injury.

Do not remove the thermowell while in operation.
Install and tighten thermowells and sensors before applying pressure.

Electric shock

Electrical shock could cause death or serious injury.

Use extreme caution when making contact with the leads and terminals.

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

2.3 System readiness

2.3.1 Confirm HART revision capability

If using HART®-based control or asset management systems, confirm the HART capability of those systems prior to transmitter installation. Not all systems are capable of communicating with HART Revision 7 protocol. This transmitter can be configured for either HART Revision 5 or 7.

For instructions on how to change the HART revision of your transmitter, see Switching HART Revision.

2.3.2 Confirm correct device driver

- Verify the latest Device Driver files are loaded on your systems to ensure proper communications.
- Download the latest Device Driver at Emerson.com/Rosemount or Fieldcomm.org.

Table 2-1: Rosemount 644 Device Revisions and Files

Software date	Identify device		Find device driver files		Review instructions	Review functionality
Date	NAMUR software revision	HART® software revision	HART Universal revision(1)	Device revision(2)	Document	Changes to software(3)
June 2012	1.1.1	01	5	8	Rosemount 644 Temperature Transmitter Reference Manual	See (3) for list of changes
			7	9		

(1) NAMUR Software Revision is located on the hardware tag of the device. HART Software Revision can be read using a HART Communication tool.

(2) Device Driver file names use Device and DD Revision (e.g. 10_01). HART Protocol is designed to enable legacy device driver revisions to continue to communicate with new HART devices. To access new functionality, the new Device Driver must be downloaded. It is recommended to download the new Device Driver files to ensure full functionality.

(3) HART Revision 5 and 7 Selectable. Dual Sensor support, Safety Certified, Advanced Diagnostics (if ordered), Enhanced Accuracy, and Stability (if ordered).

2.3.3 Surges/transients

The transmitter will withstand electrical transients of the energy level encountered in static discharges or induced switching transients. However, high-energy transients, such as those induced in wiring from nearby lightning strikes, welding, heavy electrical equipment, or switching gears, can damage both the transmitter and the sensor. To protect against high-energy transients, install the transmitter into a suitable connection head with the integral transient protector, option T1. Refer to the Rosemount 644 Product Data Sheet for more information.

2.4 Configuration methods

⚠ CAUTION

Commisioning

Set all transmitter hardware adjustments during commissioning to avoid exposing the transmitter electronics to the plant environment after installation.

The transmitter can be configured either before or after installation. Configuring the transmitter on the bench using either a Field Communicator, AMS Device

Manager, or LOI ensures all transmitter components are in working order prior to installation.

The transmitter can be configured either on-line or off-line using a Field Communicator, AMS Device Manager, or the optional LOI (head-mount and field-mount). During on-line configuration, the transmitter is connected to a Field communicator. Data is entered in the working register of the communicator and sent directly to the transmitter.

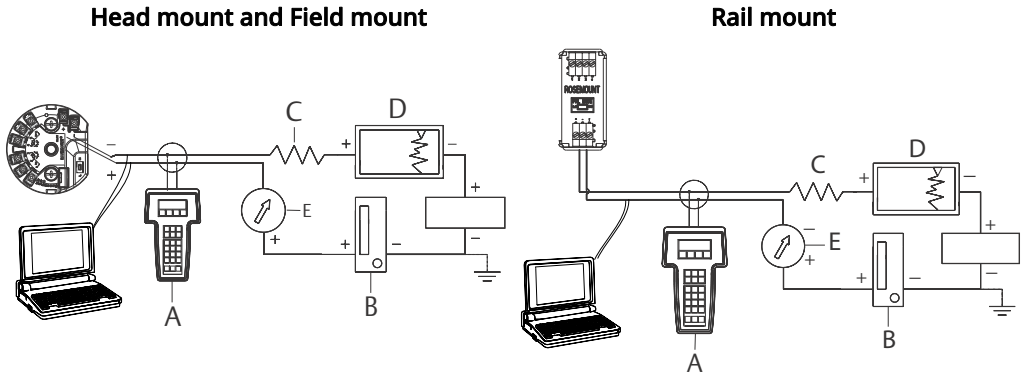
Off-line configuration consists of storing configuration data in a Field Communicator while it is not connected to a transmitter. Data is stored in nonvolatile memory and can be downloaded to the transmitter at a later time.

2.4.1 Configuring on the bench

To configure on the bench, required equipment includes a power supply, a digital multimeter (DMM), and Field Communicator, AMS Device Manager, or a LOI – option M4.

Connect the equipment as shown in Figure 2-1. Connect HART® Communication leads at any termination point in the signal loop. To ensure successful HART Communication, a resistance of at least 250 ohms must be present between the transmitter and the power supply. Connect the Field Communicator leads to the clips behind the power (+,–) terminals on the top of the device. Avoid exposing the transmitter electronics to the plant environment after installation by setting all transmitter jumpers during the commissioning stage on the bench.

Figure 2-1: Powering the Transmitter for Bench Configuration



A. Field communicator
B. Power supply
C. 248 Ω ≤ RL ≤ 1100 Ω
D. Recorder (optional)
E. Ammeter (optional)

Note

- Signal loop may be grounded at any point or left ungrounded.

- A Field Communicator may be connected at any termination point in the signal loop. The signal loop must have between 250 and 1100 ohms load for communications.
- Max torque is 6 in-lb (0.7 N-m).

2.4.2 Selecting a configuration tool

Field Communicator

The Field Communicator is a handheld device that exchanges information with the transmitter from the control room, the instrument site, or any wiring termination point in the loop. To facilitate communication, connect the Field Communicator, shown in this manual, in parallel with the transmitter (see Figure 2-1). Use the loop connection ports on the rear panel of the Field Communicator. The connections are non-polarized. Do not make connections to the serial port or the nickel cadmium (NiCd) recharger jack in explosive atmospheres. Before connecting the Field Communicator in an explosive atmosphere make sure the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.

There are two interfaces available with the Field Communicator: Traditional and Dashboard interfaces. All steps using a Field Communicator will be using Dashboard interfaces. Figure 2-2 shows the Device Dashboard interface. As stated in System readiness, it is critical that the latest DD's are loaded into the Field Communicator for optimal transmitter performance.

Visit Emerson.com/Rosemount to download latest DD library.

Turn on the Field Communicator by pressing the ON/OFF key. The Field Communicator will search for a HART®-compatible device and indicate when the connection is made. If the Field Communicator fails to connect, it indicates that no device was found. If this occurs, refer to Troubleshooting.

Figure 2-2: Field Communicator Device Dashboard Interface



Field Communicator menu trees and Fast Keys are available in Field Communicator Menu Trees and Fast Keys.

AMS Device Manager

With an AMS Device Manager software package, you can commission and configure instruments, monitor status and alerts, troubleshoot from the control room, perform advanced diagnostics, manage calibration, and automatically document activities with a single application.

Full configuration capability with AMS Device Manager requires loading the most current Device Descriptor (DD) for this device. Download the latest DD at Emerson.com/Rosemount or Fieldcomm.org.

Note
All steps listed in this product manual using AMS Device Manager assume the use of Version 11.5.

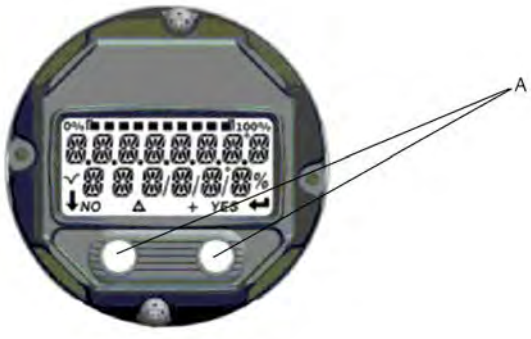
Local Operator Interface (LOI)

- The LOI requires option code M4 to be ordered.
- To activate the LOI, push either configuration button. Configuration buttons are located on the LCD display (remove the housing cover to access the interface. See Table 2-2 for configuration button functionality and Figure 2-3 for configuration button location).

When using the LOI for configuration, several features require multiple screens for a successful configuration. Data entered will be saved on a screen-by-screen basis; the LOI will indicate this by flashing SAVED on the LCD display each time.

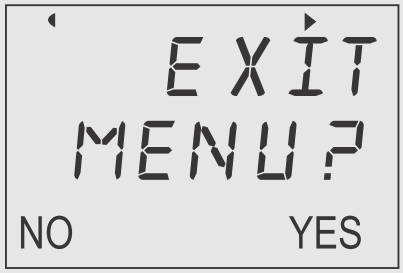
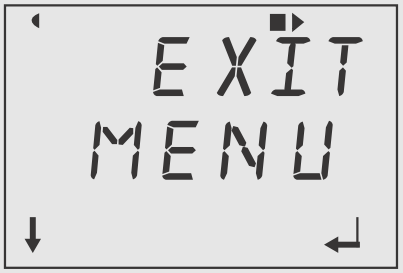
Note
Entering into the LOI menu effectively disables the ability to write to the device by any other host or configuration tool. Ensure this is communicated to necessary personnel before using the LOI for device configuration.

Figure 2-3: LOI Configuration Buttons



A. Configuration buttons

Table 2-2: LOI Button Operation

Button		
Left	No	SCROLL
Right	Yes	ENTER

LOI password

An LOI password can be entered and enabled to prevent review and modification of device configuration via the LOI. This does not prevent configuration from HART® or through the control system. The LOI password is a four-digit code that is to be set by the user. If the password is lost or forgotten the master password is “9307”. The LOI password can be configured and enabled/disabled by HART communication via a Field Communicator, AMS Device Manager, or the LOI.

2.4.3 Setting the loop to manual

When sending or requesting data that would disrupt the loop or change the output of the transmitter, set the process application loop to manual. The Field Communicator, AMS Device Manager, or LOI will prompt you to set the loop to manual when necessary. Acknowledging this prompt does not set the loop to manual. The prompt is only a reminder; set the loop to manual as a separate operation.

2.4.4 Failure mode

As part of normal operation, each transmitter continuously monitors its own performance. This automatic diagnostics routine is a timed series of checks repeated continuously. If diagnostics detect an input sensor failure or a failure in the transmitter electronics, the transmitter drives its output to low or high depending on the position of the failure mode switch. If the sensor temperature is outside the range limits, the transmitter saturates its output to 3.9 mA for standard configuration on the low end (3.8 mA if configured for NAMUR-compliant operation) and 20.5 mA on the high end (or NAMUR-compliant). These values are also custom configurable by the factory or using the Field Communicator. The values to which the transmitter drives its output in failure mode depend on whether it is configured to standard, NAMUR-compliant, or custom operation. See Rosemount 644 Temperature Transmitter Product Data Sheet for standard and NAMUR-compliant operation parameters.

2.4.5 HART software lock

The HART® software lock prevents changes to the transmitter configuration from all sources; all changes requested via HART by the Field Communicator, AMS Device manager or the LOI will be rejected. The HART Lock can only be set via HART Communication, and is only available in HART Revision 7 mode. The HART Lock can be enabled or disabled with a Field Communicator or AMS Device Manager.

Lock HART software using the Field Communicator

From the ***HOME*** screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	3, 2, 1

Lock HART software using the AMS Device Manager

Procedure

1. Right click on the device and select **Configure**.
2. Under Manual Setup select the **Security** tab.
3. Select the **Lock/Unlock** button under HART Lock (Software) and follow the screen prompts.

2.5 Verify configuration

It is recommended that various configuration parameters are verified prior to installation into the process. The various parameters are detailed out for each configuration tool. Depending on what configuration tool(s) are available, follow the steps listed relevant to each tool.

2.5.1 Verify configuration using the Field Communicator

Configuration parameters listed in Table 2-3 below are the basic parameters that should be reviewed prior to transmitter installation. A full list of configuration parameters that can be reviewed and configured using a Field Communicator are located in Field Communicator Menu Trees and Fast Keys. A Rosemount 644 Device Descriptor (DD) must be installed on the Field Communicator to verify configuration.

Verify device configuration using Fast Key sequences in Table 2-3.

From the ***HOME*** screen, enter the Fast Key sequences listed in Table 2-3.

Table 2-3: Device Dashboard Fast Key Sequences

Function	HART 5	HART 7
Alarm Values	2, 2, 5, 6	2, 2, 5, 6
Damping Values	2, 2, 1, 5	2, 2, 1, 6
Lower Range Value (LRV)	2, 2, 5, 5, 3	2, 2, 5, 5, 3

Table 2-3: Device Dashboard Fast Key Sequences *(continued)*

Function	HART 5	HART 7
Upper Range Value (URV)	2, 2, 5, 5, 2	2, 2, 5, 5, 2
Primary Variable	2, 2, 5, 5, 1	2, 2, 5, 5, 1
Sensor 1 Configuration	2, 1, 1	2, 1, 1
Sensor 2 Configuration (1)	2, 1, 1	2, 1, 1
Tag	2, 2, 7, 1, 1	2, 2, 7, 1, 1
Units	2, 2, 1, 5	2, 2, 1, 4

(1) Available only if option code (S) or (D) is ordered.

2.5.2 Verify configuration using the AMS Device Manager

Procedure

1. Right click on the device and select **Configuration Properties** from the menu.
2. Navigate the tabs to review the transmitter configuration data.

2.5.3 Verify configuration using the LOI

Procedure

1. Press any configuration button to activate the LOI.
2. Select **VIEW CONFIG** to review the below parameters.
3. Use the configuration buttons to navigate through the menu.

   The parameters to be reviewed prior to installation include:

   - Tag
   - Sensor configuration
   - Units
   - Alarm and saturation levels
   - Primary variable
   - Range values
   - Damping

2.5.4 Checking transmitter output

Before performing other transmitter on-line operations, review the transmitter digital output parameters to ensure that the transmitter is operating properly and is configured to the appropriate process variables.

Checking or setting process variables

The “Process Variables” menu displays process variables, including sensor temperature, percent of range, analog output, and terminal temperature. These process variables are continuously updated. The default primary variable is Sensor 1. The secondary variable is the transmitter terminal temperature by default.

Check or set process variables using the Field Communicator

From the ***HOME*** screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	3, 2, 1

Check or set process variables using the AMS Device Manager

Procedure

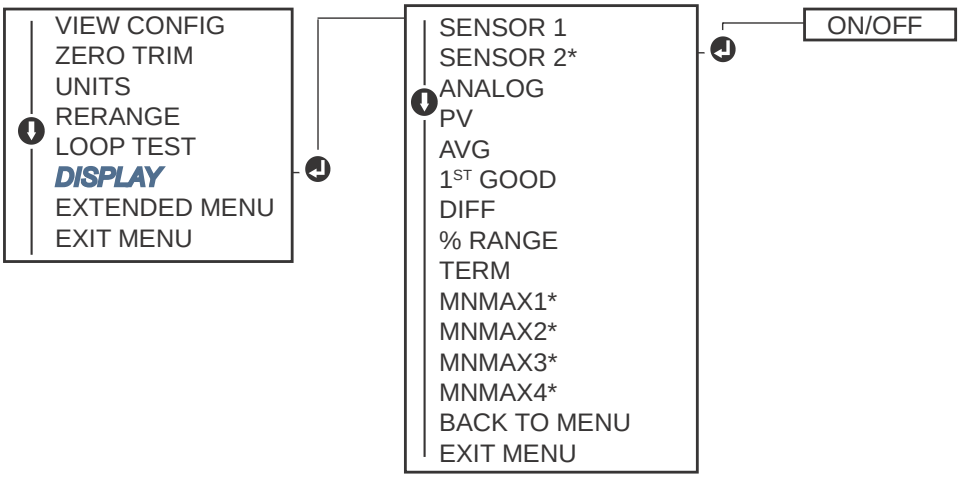
- Right click on the device and select **Service Tools** from the menu.
  The ***Variables*** tab displays the following process variables:
  - Primary, second, third, and fourth variables, as well as the analog output.

Check or set process variables using LOI

Procedure

1. To check the process variables from the LOI, the user must first configure the display to show the desired variables (see Configuring the LCD display).
2. Once the desired device variables are chosen, simply exit the LOI menu and view the alternating values on the display screen.

Figure 2-4: Check or set process variables using LOI



2.6 Basic configuration of the transmitter

The transmitter must be configured for certain basic variables in order to be operational. In many cases, all of these variables are pre-configured at the factory. Configuration may be required if the transmitter is not configured or if the configuration variables need revision.

2.6.1 Mapping the HART variables

Mapping HART variables using the Field Communicator

The “Variable Mapping” menu displays the sequence of the process variables. Select the sequence below to change this configuration. The transmitter single sensor input configuration screens allow selection of the primary variable (PV) and the secondary variable (SV). When the *Select PV screen* appears, **Snsr 1** must be selected.

The transmitter dual-sensor option configuration screens allow selection of the Primary Variable (PV), Secondary Variable (SV), Tertiary Variable (TV), and Quaternary Variable (QV). Variable choices are Sensor 1, Sensor 2, Differential Temperature, Average Temperature, Terminal Temperature, and Not Used. The 4–20 mA analog signal represents the Primary Variable.

From the ***HOME*** screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 2, 8, 6

Mapping HART variables using the AMS Device Manager

Procedure

1. Right click on the device and select the **Configure** menu.
2. In the left navigation pane, select **Manual Setup** then on the HART tab.
3. Map each variable individually or use the Re-map Variables method to guide you through the re-mapping process.
4. Select **Apply** when complete.

Mapping HART variables using LOI

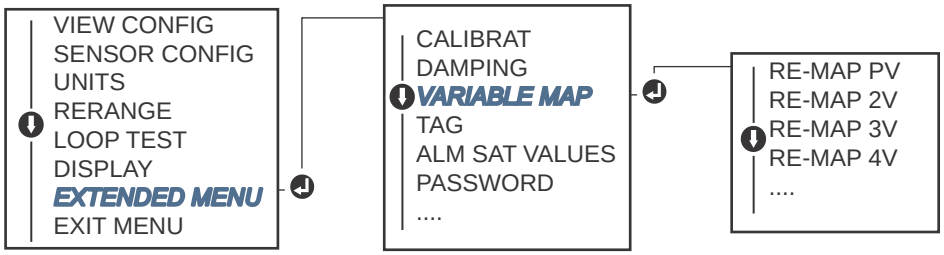
Follow flow chart to select the desired mapped variables.

Procedure

1. Use the **SCROLL** and **ENTER** buttons to select each variable.
2. Save by selecting **SAVE** as indicated on the LCD screen when prompted.

   See Figure 2-5 for an example of a mapped variable with the LOI.

Figure 2-5: Mapping Variables with LOI



2.6.2 Configuring the sensor(s)

Sensor configuration includes setting the information for:

- Sensor type
- Connection type
- Units
- Damping values
- Sensor serial number
- RTD 2-wire offset

Configure the sensors using a Field Communicator

The configure sensors method will guide you through the configuration of all necessary settings associated with configuring a sensor including:

For a full list of Sensor Types available with the Rosemount 644 Transmitter and their associated levels of accuracy.

From the ***HOME*** screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 1, 1

Configure the sensors using AMS Device Manager

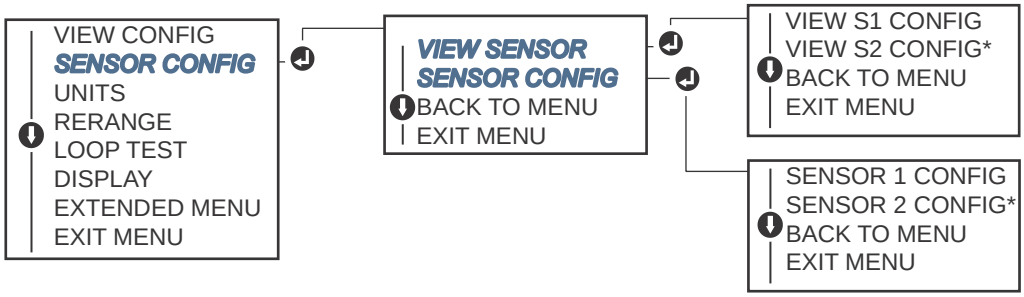
Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup** and select the **Sensor 1** or **Sensor 2** tab depending on the need.
3. Individually select the sensor type, connection, units and other sensor related information as desired from the drop down menus on the screen.
4. Select **Apply** when complete.

Configure sensors using LOI

Reference Figure 2-6 for guidance on where to find Sensor Configuration in the LOI menu.

Figure 2-6: Configuring Sensors with LOI



Note
Sensor 2 configuration is available only if option code (S) or (D) is ordered.

Contact an Emerson representative for information on the temperature sensors, thermowells, and accessory mounting hardware that is available through Emerson.

2.6.3 2-wire RTD offset

The 2-wire offset feature allows the measured lead wire resistance to be input and corrected for, which results in the transmitter adjusting its temperature measurement for the error caused by this added resistance. Because of a lack of lead wire compensation within the RTD, temperature measurements made with a 2-wire RTD are often inaccurate.

This feature can be configured as a subset of the sensor configuration process in the Field Communicator, AMS Device Manager, and the LOI.

To utilize this feature properly perform the following steps:

Procedure

1. Measure the lead wire resistance of both RTD leads after installing the 2-wire RTD and transmitter.
2. Navigate to the 2-wire RTD offset parameter.
3. Enter the total measured resistance of the two RTD leads at the 2-wire offset prompt to ensure proper adjustment. The transmitter will adjust its temperature measurement to correct the error caused by lead wire resistance.

Set 2-wire RTD offset using the Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 1, 1

Set 2-wire RTD offset using the AMS Device Manager

Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup** and select the **Sensor 1** or **Sensor 2** tab depending on the need. Find the 2-wire offset text field and enter the value.
3. Select **Apply** when complete.

2.6.4 Setting output units

The Units can be configured for a number of different parameters in the Rosemount 644 Transmitter. Individual Units can be configured for:

- Sensor 1
- Sensor 2
- Terminal temperature
- Differential temperature
- Average temperature
- First good temperature

Each of the base parameters and calculated outputs from those values can have a unit of measure associated with it. Set the transmitter output to one of the following engineering units:

- Celsius
- Fahrenheit
- Rankine
- Kelvin
- Ohms
- Millivolts

Set output limits using Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

	HART 5	HART 7
Device Dashboard Fast Keys	2, 2, 1, 4	2, 2, 1, 5

Set output limits using AMS Device Manager

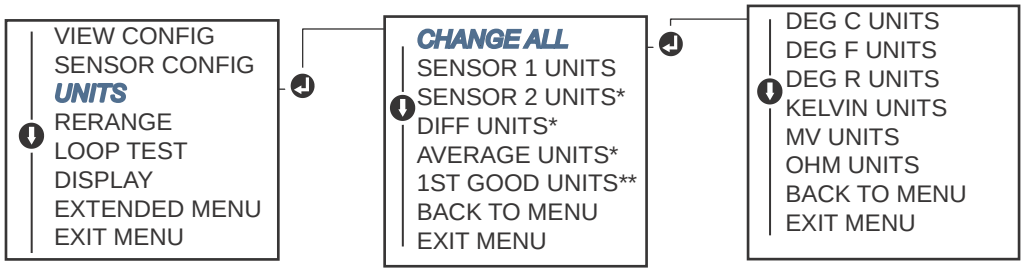
Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup**. The unit fields for various variables are spread over the Manual Setup tabs, click through the tabs and change the desired units.
3. Select **Apply** when complete.

Set output limits using LOI

Reference the below image for where to find the Units configuration in the LOI menu.

Figure 2-7: Configuring Units with LOI



* Available only if option code (S) or (D) is ordered.

** Available only if option codes (S) and (DC) are both ordered, or if option codes (D) and (DC) are both ordered.

Note
The list of choices available for Units after the primary menu is dependent on your Sensor configuration settings.

2.7 Configure dual sensor options

Dual-sensor configuration deals with the functions that can be used with a transmitter ordered with Dual Sensor inputs. In the Rosemount 644 Transmitter these functions include:

- Differential temperature
- Average temperature
- Hot Backup™ and sensor drift alert diagnostics (requires option code DC)
  - First good temperature (requires options S and DC, or options D and DC)

2.7.1 Differential temperature configuration

The Rosemount 644 Transmitter ordered and configured for dual-sensors can accept any two inputs then display the differential temperature between them. Use the following procedures to configure the transmitter to measure differential temperature.

Note
This procedure assumes the differential temperature is a calculated output of the device but does not re-assign it as the primary variable. If it desired for Differential to be the transmitter's primary variable see Mapping the HART variables to set it to PV.

Configure differential temperature configuration using Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 2, 3, 1

Configure differential temperature configuration using AMS Device Manager

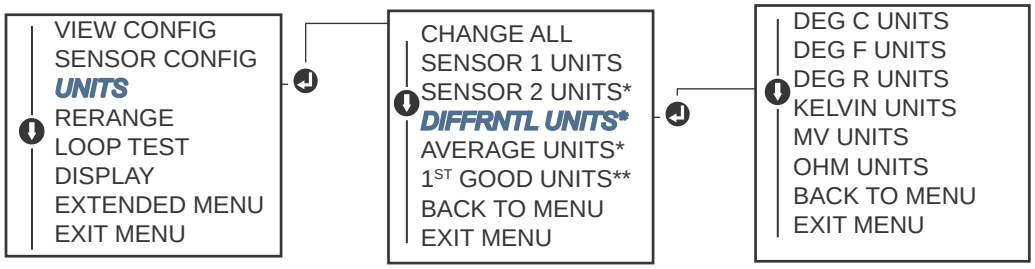
Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane choose **Manual Setup**.
3. On the **Calculated Output** Tab find the **Differential Temperature** group box.
4. Select Units and Damping settings then select **Apply** when complete.

Configure differential temperature configuration using LOI

To configure the Differential Temperature on the LOI, the Units and Damping values must be set separately. Reference figures below for where to find these in the menu.

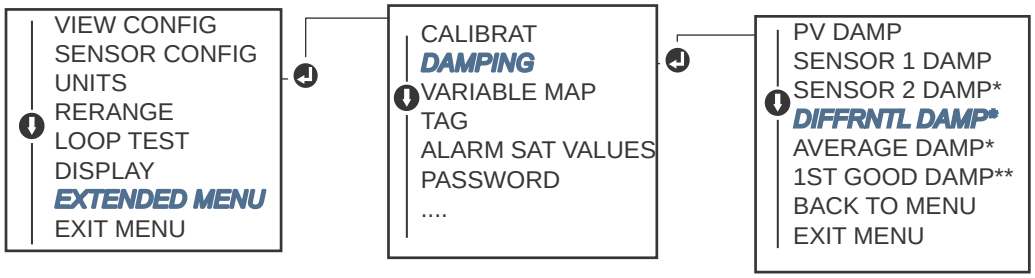
Figure 2-8: Configuring Differential Units with LOI



* Available only if option code (S) or (D) is ordered.

** Available only if option codes (S) and (DC) are both ordered, or if option codes (D) and (DC) are both ordered.

Figure 2-9: Configuring Differential Damping with LOI



* Available only if option code (S) or (D) is ordered.

** Available only if option codes (S) and (DC) are both ordered, or if option codes (D) and (DC) are both ordered.

2.7.2 Average temperature configuration

The Rosemount 644 Transmitter ordered and configured for dual-sensors can output and display the average temperature of any two inputs. Use the following procedures to configure the transmitter to measure the average temperature:

Note
This procedure assumes the average temperature is a calculated output of the device but does not reassign it as the primary variable. If it is desired for average to be the transmitter's primary variable see Mapping the HART variables to set it to PV.

Configure average temperature using Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 2, 3, 3

Configure average temperature using AMS Device Manager

Procedure

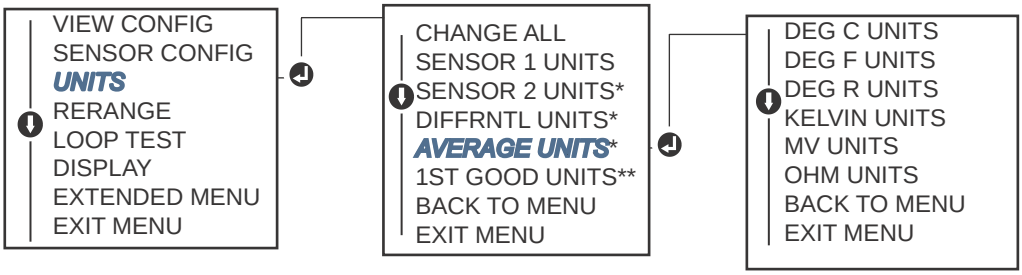
1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup**.
3. On the **Calculated Output** Tab find the Average Temperature group box.
4. Select Units and Damping settings then select **Apply** when complete.

Configure average temperature using LOI

Procedure

- To configure average temperature on the LOI, the units and damping values must be set separately. Reference Figure 2-10 and Figure 2-11 below for where to find these in the menu.

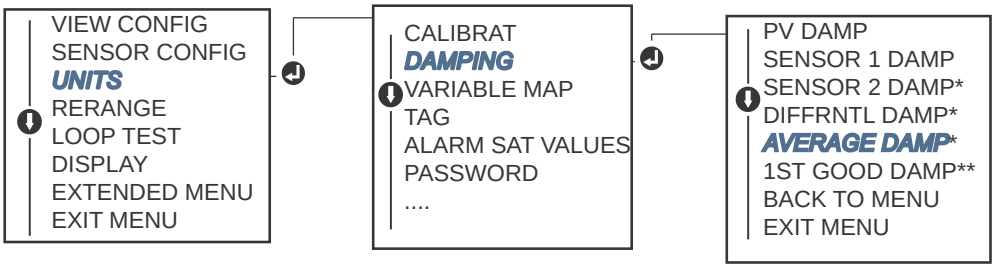
Figure 2-10: Configuring Average Units with LOI



* Available only if option code (S) or (D) is ordered.

** Available only if option codes (S) and (DC) are both ordered, or if option codes (D) and (DC) are both ordered.

Figure 2-11: Configuring Average Damping with LOI



* Available only if option code (S) or (D) is ordered.

** Available only if option codes (S) and (DC) are both ordered, or if option codes (D) and (DC) are both ordered.

Note

If Sensor 1 and/or Sensor 2 should fail while PV is configured for average temperature and Hot Backup™ is not enabled, the transmitter will go into alarm. For this reason, it is recommended when PV is Sensor Average, that Hot Backup be enabled when dual-element sensors are used, or when two temperature measurements are taken from the same point in the process. If a sensor failure occurs when Hot Backup is enabled, while PV is Sensor Average, three scenarios could result:

— If Sensor 1 fails, the average will only be reading from Sensor 2, the working sensor

— If Sensor 2 fails, the average will only be reading from Sensor 1, the working sensor

— If both sensors fail simultaneously, the transmitter will go into alarm and the status available (via HART®) states that both Sensor 1 and Sensor 2 have failed

In the first two scenarios, the 4–20 mA signal is not disrupted and the status available to the control system (via HART) specifies which sensor has failed.

2.7.3 Hot Backup configuration

The Hot Backup™ feature configures the transmitter to automatically use Sensor 2 as the primary sensor if Sensor 1 fails. With Hot Backup enabled, the primary variable (PV) must either be first good or average. See the Note for details on using Hot Backup when the PV is set to Sensor Average.

Sensors 1 or 2 can be mapped as the secondary variable (SV), tertiary variable (TV), or quaternary variable (QV). In the event of a primary variable (Sensor 1) failure, the transmitter enters Hot Backup mode and Sensor 2 becomes the PV. The 4–20 mA signal is not disrupted, and a status is available to the control system through HART® that Sensor 1 has failed. An LCD display, if attached, displays the failed sensor status.

While configured to Hot Backup, if Sensor 2 fails but Sensor 1 is still operating properly, the transmitter continues to report the PV 4–20 mA analog output signal, while a status is available to the control system through HART that Sensor 2 has failed.

Resetting Hot Backup

In Hot Backup™ mode, if Sensor 1 does fail and Hot Backup is initiated, the transmitter will not revert back to Sensor 1 to control the 4–20 mA analog output until the Hot Backup mode is reset by re-enabling through HART®, re-setting it through the LOI or by briefly powering down the transmitter.

Configure Hot Backup using Field Communicator

The Field Communicator will walk you through a method to correctly configure the necessary elements of the Hot Backup feature.

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 1, 5

Configure Hot Backup using AMS Device Manager

Procedure

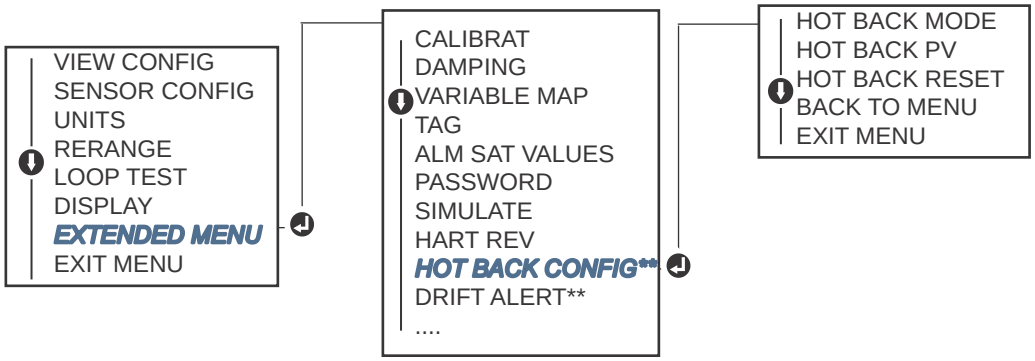
1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup**.
3. On the Diagnostics Tab find the **Hot Backup** group box.

4. Choose the button **Configure Hot Backup** or **Reset Hot Backup** depending on the desired function and walk through the guided steps.
5. Select **Apply** when complete.

Configure Hot Backup using LOI

To configure Hot Backup™ on the LOI, enable the mode and set the PV values. Reference Figure 2-12 for where to find these in the menu.

Figure 2-12: Configuring Hot Backup with LOI



* Available only if option code (S) or (D) is ordered.

** Available only if option codes (S) and (DC) are both ordered, or if option codes (D) and (DC) are both ordered.

For information on using Hot Backup with HART Tri-Loop™ see Using the transmitter with the HART Tri-Loop.

2.7.4 Sensor drift alert configuration

The sensor drift alert command allows the transmitter to set a warning flag (through HART), or go into analog alarm when the temperature difference between Sensor 1 and Sensor 2 exceeds a user-defined limit.

This feature is useful when measuring the same process temperature with two sensors, ideally when using a dual-element sensor. When sensor drift alert mode is enabled, the user sets the maximum allowable difference, in engineering units, between sensor 1 and sensor 2. If this maximum difference is exceeded, a sensor drift alert warning flag will be set.

Though it defaults to WARNING, when configuring the transmitter for sensor drift alert, the user also has the option of specifying the analog output of the transmitter go into ALARM when sensor drifting is detected.

Note
Using dual sensor configuration in the Rosemount 644 Transmitter, the transmitter supports the configuration and simultaneous use of Hot Backup and sensor drift alert. If one sensor fails, the transmitter switches output to use the remaining good sensor. Should the difference between the two sensor readings exceed the configured threshold, the AO will go to alarm indicating the sensor

drift condition. The combination of sensor drift alert and Hot Backup improves sensor diagnostic coverage while maintaining a high level of availability. Refer to the Rosemount 644 FMEDA report for the impact on safety.

Configure sensor drift alert using Field Communicator

The Field Communicator will guide you through a method to correctly configure the necessary elements of a sensor drift alert feature.

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 1, 6

Configure sensor drift alert using AMS Device Manager

Procedure

1. Right click on the device and select **Configure**.
2. On the **Diagnostics** Tab find the **Sensor Drift Alert** group box.
3. Select to **Enable** the **Mode** and fill in the **Units**, **Threshold** and **Damping** values from the drop downs provided or select the **Configure Sensor Drift Alert** button and walk through the guided steps.
4. Select **Apply** when complete.

Configure sensor drift alert using LOI

To configure sensor drift alert on the LOI, enable the mode, then set the PV, drift limit, and value for drift alert damping all separately. Reference figure below for where to find these in the menu.

Figure 2-13: Configuring Sensor Drift Alert with LOI



* Available only if option code (S) or (D) is ordered.

** Available only if option codes (S) and (DC) are both ordered, or if option codes (D) and (DC) are both ordered.

Note
Enabling the drift alert option to WARNING will set a flag (through the HART communications) whenever the maximum acceptable difference between Sensor 1 and Sensor 2 has been exceeded. For the transmitter's analog signal to go into ALARM when drift alert is detected, select alarm during the configuration process.

2.8 Configure device outputs

2.8.1 Re-range the transmitter

Re-ranging the transmitter sets the measurement range to the limits of the expected readings for a certain application. Setting the measurement range to the limits of expected readings maximizes transmitter performance; the transmitter is most accurate when operated within the expected temperature range for the application.

The range of expected readings is defined by the Lower Range Value (LRV) and Upper Range Value (URV). The transmitter range values can be reset as often as necessary to reflect changing process conditions. For a complete listing of Range and Sensor limits.

Note
The re-range functions should not be confused with the trim functions. Although the re-range function matches a sensor input to a 4–20 mA output, as in conventional calibration, it does not affect the transmitter's interpretation of the input.

Select from one of three methods to re-range the transmitter.

Re-range the transmitter using Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

	Lower range value	Upper range value
Device Dashboard Fast Keys	2, 2, 5, 5, 3	2, 2, 5, 5, 2

Re-range the transmitter using AMS Device Manager

Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup**.
3. On the **Analog Output** Tab find the Primary Variable Configuration group box.
4. Change the **Upper Range Value** and **Lower Range Value** to their desired settings.
5. Select **Apply** when complete.

Re-range the transmitter using LOI

Reference the image below to find the range value configuration path on the LOI.

Figure 2-14: Re-ranging the Transmitter with LOI



2.8.2 Damping

The damping function changes the response time of the transmitter to smooth variations in output readings caused by rapid changes in input. Determine the appropriate damping setting based on the necessary response time, signal stability, and other requirements of the loop dynamics of the system. The default damping value is 5.0 seconds and can be reset to any value between 1 and 32 seconds.

The value chosen for damping affects the response time of the transmitter. When set to zero (disabled), the damping function is off and the transmitter output reacts to changes in input as quickly as the intermittent sensor algorithm allows. Increasing the damping value increases transmitter response time.

With damping enabled, if the temperature change is within 0.2 percent of the sensor limits, the transmitter measures the change in input every 500 milliseconds (for a single sensor device) and outputs values according to the following relationship:

$$Damped\ value\ =\ (N-P)x\left(\frac{2T-U}{2T+U}\right)+P$$

P = previous damped value

N = new sensor value

T = damping time constant

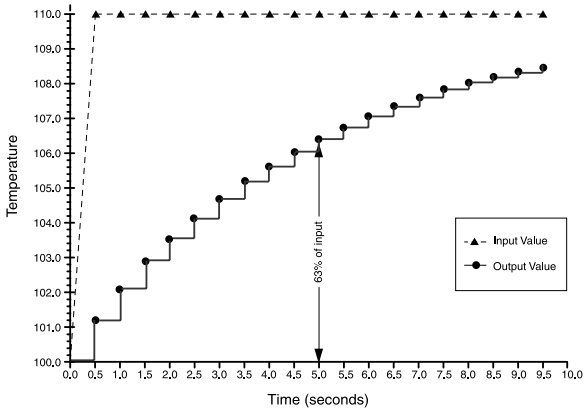
U = update rate

At the value to which the damping time constant is set, the transmitter output is at 63 percent of the input change and it continues to approach the input according to the damping equation above.

For example, as illustrated in Figure 2-15, if the temperature undergoes a step change—within 0.2 percent of the sensor limits—from 100 to 110 degrees, and the damping is set to 5.0 seconds, the transmitter calculates and reports a new reading every 500 milliseconds using the damping equation. At 5.0 seconds, the transmitter outputs 106.3 degrees, or 63 percent of the input change, and the output continues to approach the input curve according to the equation above.

For information regarding the damping function when the input change is greater than 0.2 percent of the sensor limits, refer to Intermittent sensor detection.

Figure 2-15: Change in Input vs. Change in Output with Damping Set to Five Seconds



Damping can be applied to a number of parameters in the Rosemount 644 Transmitter. Variables that can be damped are:

- Primary Variable (PV)
- Sensor 1
- Sensor 2
- Differential temperature
- Average temperature
- First good temperature

Note
The instructions below only refer to the damping of the Primary Variable (PV).

Set damping value using Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

	HART 5	HART 7
Device Dashboard Fast Keys	2, 2, 1, 5	2, 2, 1, 6

Set damping value using AMS Device Manager

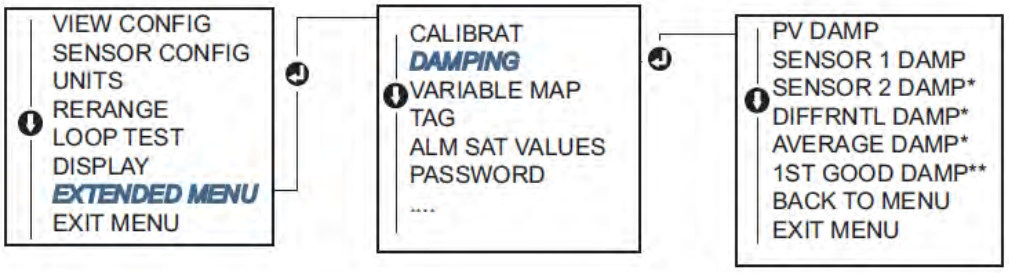
Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup**.
3. On the **Sensor 1** Tab find the Setup group box.
4. Change the **Damping Value** to the desired setting.
5. Select **Apply** when complete.

Set damping value using LOI

Reference the figure below to find the damping configuration path on the LOI.

Figure 2-16: Set damping value using LOI



2.8.3 Configure alarm and saturation levels

In normal operation, the transmitter will drive the output in response to measurements between the lower to upper saturation points. If the temperature goes outside the sensor limits, or if the output would be beyond the saturation points, the output will be limited to the associated saturation point.

The transmitter automatically and continuously performs self-diagnostic routines. If the self-diagnostic routines detect a failure, the transmitter drives the output to configured alarm value based on the position of the alarm switch. The Alarm and Saturation settings allow the alarm settings (Hi or Low) and saturation values to be viewed and changed.

Failure mode alarm and saturation levels can be configured using a Field Communicator, AMS Device Manager, and the LOI. The following limitations exist for custom levels:

- The low alarm value must be less than the Low Saturation level.
- The high alarm value must be higher than the High Saturation level.
- Alarm and Saturation levels must be separated by at least 0.1 mA

The configuration tool will provide an error message if the configuration rule is violated.

See table below for the common alarm and saturation levels.

Table 2-4: Rosemount Alarm and Saturation Values

Units - mA	Min	Max	Rosemount	NAMUR
High alarm	21	23	21.75	21.0
Low alarm(1)	3.5	3.75	3.75	3.6
High saturation	20.5	20.9(2)	20.5	20.5
Low saturation(1)	3.7(3)	3.9	3.9	3.8

(1) Requires 0.1 mA gap between low alarm and low saturation values.

(2) Rail mount transmitters have a high saturation max of 0.1 mA less than the high alarm setting, with a max value of 0.1 mA less than the high alarm max.
(3) Rail mount transmitters have a low saturation min of 0.1 mA greater than the low alarm setting, with a minimum of 0.1 mA greater than the low alarm min.

Note
Transmitters set to HART multidrop mode send all saturation and alarm information digitally; saturation and alarm conditions will not affect the analog output.

Configure alarm and saturation levels using Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 2, 5, 6

Configure alarm and saturation levels using AMS Device Manager

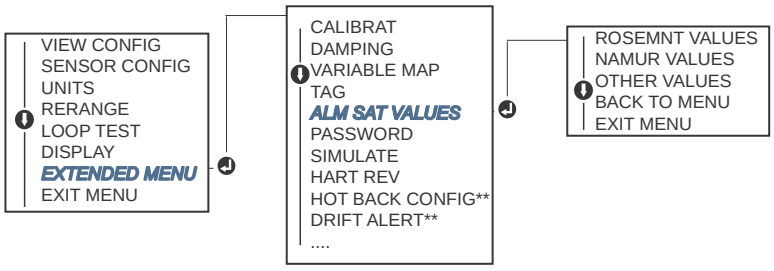
Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup**.
3. On the **Analog Output** Tab find the Alarm and Saturation Levels group box.
4. Enter the High Alarm, High Saturation, Low Saturation and Low Alarm levels to the desired vales.
5. Select **Apply** when complete.

Configure alarm and saturation levels using LOI

Reference the Figure 2-17 below to find the alarm and saturation value configuration path on the LOI.

Figure 2-17: Configuring Alarm and Saturation Values with LOI



* Available only if option code (S) or (D) is ordered.

** Available only if option codes (S) and (DC) are both ordered, or if option codes (D) and (DC) are both ordered.

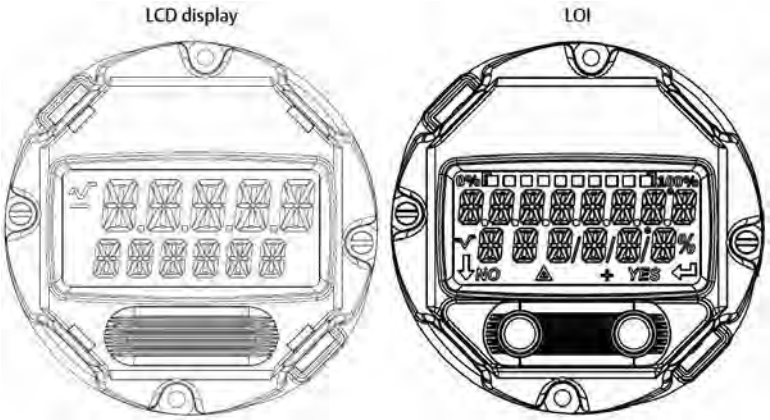
2.8.4 Configuring the LCD display

The LCD display configuration command allows customization of the LCD display to suit application requirements. The LCD display will alternate between the selected items with each item displaying for a three seconds interval.

- Sensor 1
- Sensor 2
- Analog output
- Primary variable
- Average temperature
- First good temperature
- Differential temperature
- Percent of range
- Terminal temperature
- Min and max 1
- Min and max 2
- Min and max 3
- Min and max 4

Reference Figure 2-18 to view the differences between the LCD display and LOI options available with the transmitter.

Figure 2-18: LOI and LCD Display



Configure the LCD display using Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 1, 4

Configure the LCD display using AMS Device Manager

Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup**.

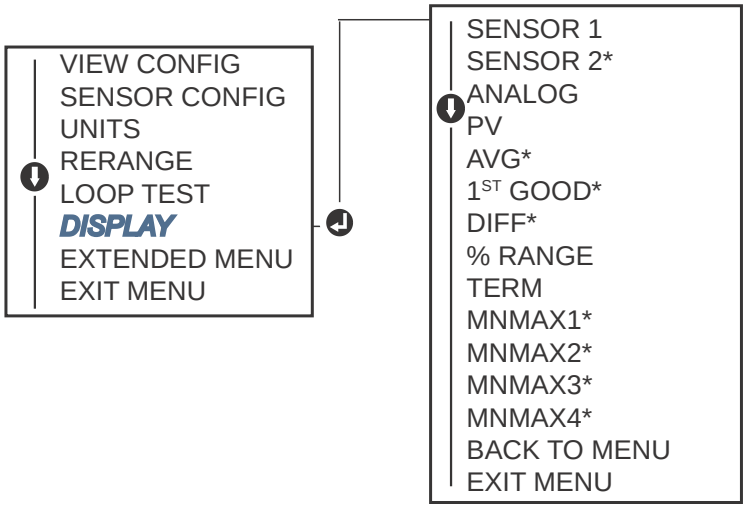
Note
On the **Display** tab there will be a group box with all available variables that can be displayed.

3. Check and uncheck the desired display variables, with a checked box indicating that the variable will be displayed.
4. Select **Apply** when complete.

Configure the LCD display using LOI

Reference Figure 2-19 to find the LCD display value configuration path on the LOI.

Figure 2-19: Configuring the LCD Display using LOI



*Available only if option code (S) or (D) is ordered.

2.9 Inputting device information

Access the transmitter information variables online using the Field Communicator or other suitable communications device. The following is a list of transmitter information variables, including device identifiers, factory-set configuration variables, and other information.

2.9.1 Tag, Date, Descriptor, and Message

The Tag, Date, Descriptor, and Message are parameters that provide transmitter identification in large installations.

The **Tag** variable is the easiest way to identify and distinguish between different transmitters in multi-transmitter environments. It is used to label transmitters electronically according to the requirements of the application. The defined Tag is automatically displayed when a HART®-based communicator establishes contact with the transmitter at power-up. The Tag is up to eight characters and the Long Tag (a parameter introduced with the HART 6 and 7 protocol) was extended to 32 characters long. Neither parameter has any impact on the primary variable readings of the transmitter, it is only for information.

The **Date** is a user-defined variable that provides a place to save the date of the last revision of configuration information. It has no impact on the operation of the transmitter or the HART-based communicator.

The **Descriptor** variable provides a longer user-defined electronic label to assist with more specific transmitter identification than is available with tag. The Descriptor may be up to 16 characters long and has no impact on the operation of the transmitter or the HART-based communicator.

The **Message** variable provides the most specific user-defined means for identifying individual transmitters in multi-transmitter environments. It allows for 32 characters of information and is stored with the other configuration data. The Message variable has no impact on the operation of the transmitter or the HART-based communicator.

Input device information using Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	1, 8

Input device information using AMS Device Manager

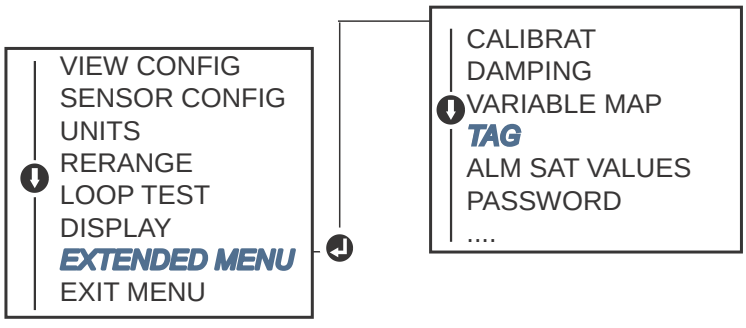
Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup**.
3. On the **Device** Tab there will be a group box called identification. Enter the desired characters in the **Tag**, **Date**, **Descriptor**, and **Message** fields
4. Select **Apply** when complete.

Input device information using LOI

Reference Figure 2-20 to find the tag configuration path in the LOI.

Figure 2-20: Configuring the Tag with LOI



2.10 Configure measurement filtering

2.10.1 50/60 Hz filter

The 50/60 Hz Filter (also known as Line Voltage Filter or AC Power Filter) function sets the transmitter electronic filter to reject the frequency of the AC power supply in the plant. The 60 or 50 Hz mode can be chosen. The factory default for this setting is 50 Hz.

Configure measurement filtering using Field Communicator

From the ***HOME*** screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 2, 7, 4, 1

Configure measurement filtering using AMS Device Manager

Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup**.
3. On the **Device** Tab there will be a group box called **Noise Rejection**. In the **AC Power Filter** box, select from the drop down menu.
4. Select **Apply** when complete.

2.10.2 Resetting the device

Processor Reset function resets the electronics without actually powering down the unit. It does not return the transmitter to the original factory configuration.

Reset the device using a Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	3, 4, 6, 1

Reset the device using AMS Device Manager

Procedure

1. Right click on the device and select **Service Tools**.
2. In the left navigation pane select **Maintenance**.
3. On the ***Reset/Restore*** tab select the **Processor Reset** button.
4. Select **Apply** when complete.

2.10.3 Intermittent sensor detection

The intermittent sensor detection feature (also known as the transient filter) is designed to guard against erratic process temperature readings caused by intermittent open sensor conditions. An intermittent sensor condition is an open sensor condition that lasts less than one update. By default, the transmitter is shipped with the intermittent sensor detection feature switched ON and the threshold value set at 0.2 percent of sensor limits. The intermittent sensor detect feature can be switched ON or OFF and the threshold value can be changed to any value between 0 and 100 percent of the sensor limits with a Field Communicator.

When the intermittent sensor detection feature is switched ON, the transmitter can eliminate the output pulse caused by intermittent open sensor conditions. Process temperature changes (T) within the threshold value will be tracked normally by the transmitter's output. A (T) greater than the threshold value will activate the intermittent sensor algorithm. True open sensor conditions will cause the transmitter to go into alarm.

The threshold value of the transmitter should be set at a level that allows the normal range of process temperature fluctuations; too high and the algorithm will not be able to filter out intermittent conditions; too low and the algorithm will be activated unnecessarily. The default threshold value is 0.2 percent of the sensor limits.

When the intermittent sensor detection feature is switched OFF, the transmitter tracks all process temperature changes, even from an intermittent sensor. (The transmitter behaves as though the threshold value had been set at 100 percent.) The output delay due to the intermittent sensor algorithm will be eliminated.

Configure intermittent sensor detect using a Field Communicator

The following steps indicate how to turn the intermittent sensor detect (or transient filter) feature ON or OFF. When the transmitter is connected to a Field Communicator, use the Fast Key sequence and choose ON (normal setting) or OFF.

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 2, 7, 4, 2

The threshold value can be changed from the default value of 0.2 percent. Turning the Intermittent Sensor Detect feature OFF or leaving it ON and increasing the threshold value above the default does not affect the time needed for the transmitter to output the correct alarm signal after detecting a true open sensor condition. However, the transmitter may briefly output a false temperature reading for up to one update in either direction up to the threshold value (100 percent of sensor limits if Intermittent Sensor Detect is OFF). Unless a rapid response rate is necessary, the suggested setting is ON with 0.2 percent threshold.

Configure intermittent sensor detect using AMS Device Manager

Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup**.

   Note
   On the **Device** Tab there will be a group box called Noise Rejection, in the box **Transient Filter Threshold**, enter the desired percent.

3. Select **Apply** when complete.

2.10.4 Open sensor hold off

The open sensor hold off option, at the normal setting, enables the Rosemount 644 Transmitter to be more robust under heavy EMI conditions. This is accomplished by the software having the transmitter perform additional verification of the open sensor status prior to activating the transmitter alarm. If the additional verification shows that the open sensor condition is not valid, the transmitter will not go into alarm.

For users of the Rosemount 644 Transmitter that desire a more vigorous open sensor detection, the open sensor hold off option can be changed to a fast setting where the transmitter will report an open sensor condition without additional verification of whether or not the open condition is valid.

Note
In high noise environments, normal mode is recommended.

Configure open sensor hold off using a Field Communicator

From the ***HOME*** screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 2, 7, 3

Configure open sensor hold off using AMS Device Manager

Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane select **Manual Setup**.
3. On the **Device** Tab there will be a group box called Open Sensor Hold Off. Change the Mode to either **Normal** or **Fast**.
4. Select **Apply** when complete.

2.11 Diagnostics and service

2.11.1 Perform a loop test

The analog loop test verifies the output of the transmitter, the integrity of the loop, and the operations of any recorders or similar devices installed in the loop. To initiate a loop test, follow the steps below.

The host system may provide a current measurement for the 4–20 mA HART® output. If not, connect a reference meter to the transmitter by either connecting the meter to the test terminals on the terminal block, or shunting transmitter power through the meter at some point in the loop.

Perform a loop test using a Field Communicator

From the ***HOME*** screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	3, 5, 1

Perform a loop test using AMS Device Manager

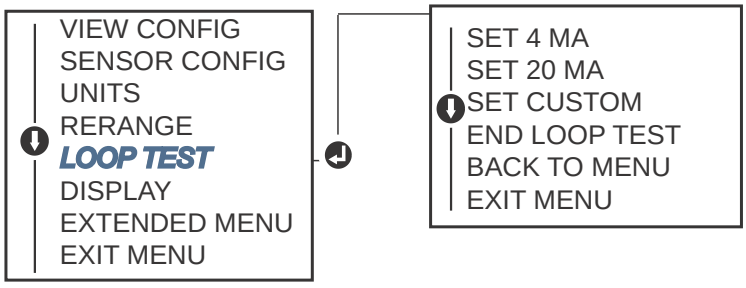
Procedure

1. Right click on the device and select **Service Tools**.
2. In the left navigation pane select **Simulate**.
3. On the **Simulate** Tab find the Perform Loop Test button in the **Analog Output Verification** group box.
4. Follow the guided instructions and select **Apply** when complete.

Perform a loop test using LOI

Reference the Figure 2-21 to find the path to the loop test in the LOI menu.

Figure 2-21: Performing a Loop Test with the LOI



2.11.2 Simulate digital signal (digital loop test)

The simulate digital signal function adds to the analog loop test by confirming the HART output values are outputting correctly. Digital loop test is only available in HART Revision 7 mode.

Simulate a digital signal using a Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	3, 5, 2

Simulate a digital signal using AMS Device Manager

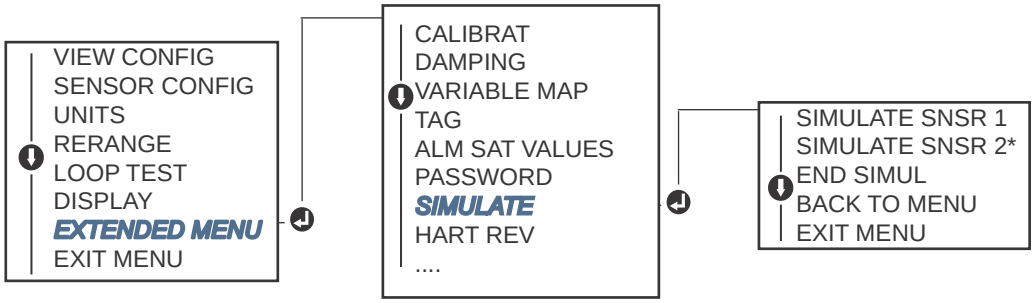
Procedure

1. Right click on the device and select **Service Tools**.
2. In the left navigation window select **Simulate**.
3. In the group box labeled **Device Variables** select the variable to simulate.
   a) Sensor 1 Temperature
   b) Sensor 2 Temperature (only available with option S or D)
4. Follow the screen prompts to simulate selected digital value.

Simulate a digital signal using LOI

Reference the Figure 2-22 to find the path to the simulate digital signal in the LOI menu.

Figure 2-22: Simulating the Digital Signal with LOI



*Available only if option code (S) or (D) is ordered.

2.11.3 Thermocouple degradation diagnostic

Thermocouple degradation diagnostic acts as a gauge of the general health of the thermocouple and is indicative of any major changes in the status of the thermocouple or the thermocouple loop. The transmitter monitors the resistance of the thermocouple loop to detect drift conditions or wiring condition changes. The transmitter uses a baseline and threshold Trigger value and reports the suspected status of the thermocouple based off the difference between these values. This feature is not intended to be a precise measurement of thermocouple status, but is a general indicator of thermocouple and thermocouple loop health.

Thermocouple diagnostic must be Enabled as well as connected and configured to read a thermocouple type sensor. Once the diagnostic has been activated, a baseline resistance value is calculated. Then a Trigger threshold must be selected,

which can be two, three, or four times the baseline resistance, or the default of 5000 ohms. If the thermocouple loop resistance reaches the Trigger Level, a maintenance alert is generated.

⚠ CAUTION

The thermocouple degradation diagnostic monitors the health of the entire thermocouple loop, including wiring, terminations, junctions, and the sensor itself. Therefore, it is imperative that the diagnostic baseline resistance be measured with the sensor fully installed and wired in the process, and not on the bench.

Note
The thermocouple resistance algorithm does not calculate resistance values while the active calibrator mode is enabled.

Perform thermocouple degradation diagnostic using a Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 2, 4, 3, 4

Perform thermocouple degradation diagnostic using AMS Device Manager

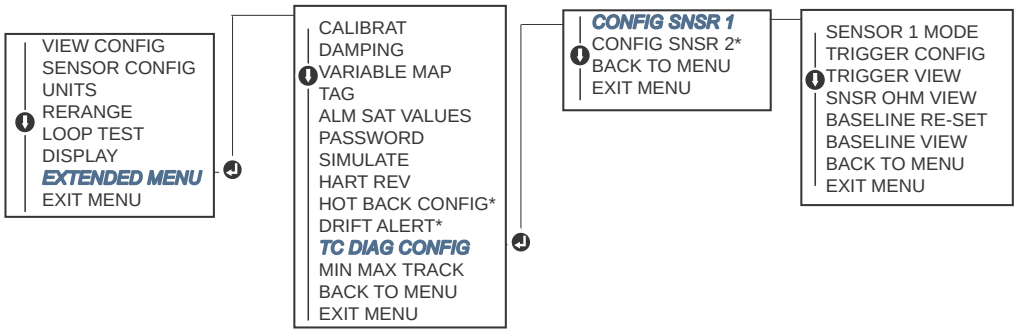
Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation window select **Manual Setup**.
3. On the Diagnostics tab, there is a group box labeled **Sensor and Process Diagnostics**; select the button for **Configure Thermocouple Diagnostic**.
4. Follow the screen prompts to Enable and set the values for the diagnostic. See AMS terms.

Perform thermocouple degradation diagnostic using LOI

Reference the Figure 2-23 to find the path to the thermocouple diagnostic in the LOI menu.

Figure 2-23: Configuring T/C Diagnostic with LOI



* Available only if option code (S) or (D) is ordered.

2.11.4 Minimum/maximum tracking diagnostic

Minimum and maximum temperature tracking (min/max tracking) when enabled records minimum and maximum temperatures with date and time stamps on Rosemount 644 HART Head Mount and Field Mount Temperature Transmitters. This feature records values for Sensor 1, Sensor 2, Differential, Average, First Good, and Terminal temperatures. Min/Max Tracking only records temperature maximum and minimum obtained since the last reset, and is not a logging function.

To track maximum and minimum temperatures, Min/Max Tracking must be enabled using a Field Communicator, AMS Device Manager, LOI, or other communicator. While enabled, this feature allows for a reset of information at any time, and all variables can be reset simultaneously. Additionally, each of the individual parameter's minimum and maximum values may be reset individually. Once a particular field has been reset, the previous values are overwritten.

Track minimum and maximum temperatures using a Field Communicator

From the ***HOME*** screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 2, 4, 3, 5

Track minimum and maximum temperatures using AMS Device Manager

Procedure

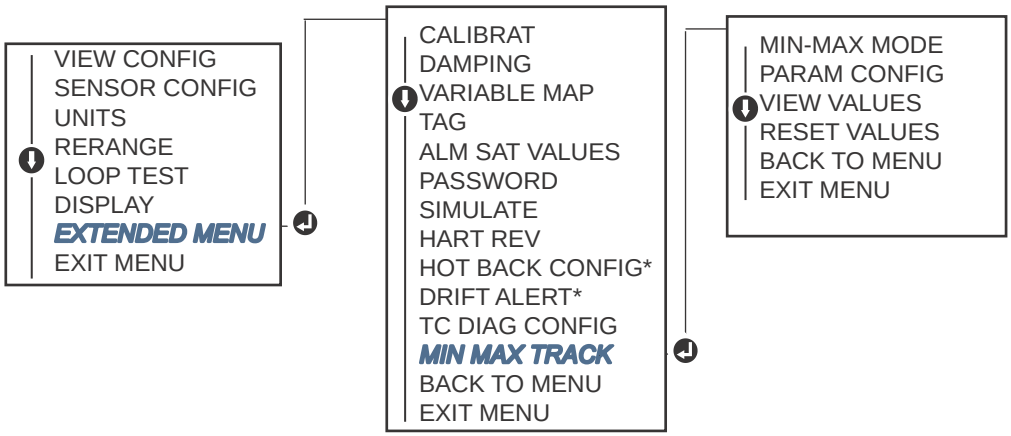
1. Right click on the device and select **Configure**.

2. In the left navigation window select **Manual Setup**.
3. On the Diagnostics tab, there is a group box labeled **Sensor and Process Diagnostics**; select the button for **Configure Min/Max Tracking**.
4. Follow the screen prompts to Enable and configure the settings for the diagnostic.

Track minimum and maximum temperatures using LOI

Reference the Figure 2-24 to find the path to configure min/max in the LOI menu

Figure 2-24: Configuring Min/Max Tracking with LOI



* Available only if option code (S) or (D) is ordered.

2.12 Establishing multi-drop communication

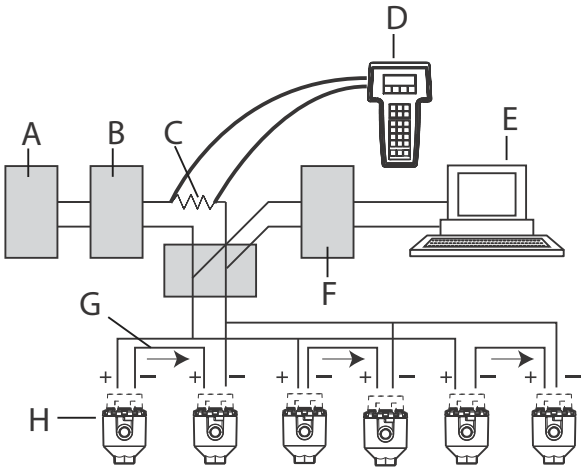
Multi-dropping refers to the connection of several transmitters to a single communications transmission line. Communication between the host and the transmitters takes place digitally with the analog output of the transmitters deactivated.

Many Rosemount transmitters can be multi-dropped. With the Field Communications protocol, up to 15 transmitters can be connected on a single twisted pair of wires or over leased phone lines.

A Field Communicator can test, configure, and format a multi-dropped Transmitter in the same way as in a standard point-to-point installation. The application of a multidrop installation requires consideration of the update rate necessary from each transmitter, the combination of transmitter models, and the length of the transmission line. Each transmitter is identified by a unique address (1–15) and responds to the commands defined in the HART protocol. A Field Communicator can test, configure, and format a multidropped transmitter the same as in a standard point-to-point installation.

Note
Multi-drop is not suitable for safety-certified applications and installations.

Figure 2-25: Typical Multi-dropped Network



A. Power supply
B. Power supply impedance
C. 250 Ω
D. Field Communicator
E. Computer or DCS
F. HART interface
G. 4–20 mA
H. Transmitter

Note
Rosemount 644 Transmitters are set to address 0 at the factory, allowing them to operate in the standard point-to-point manner with a 4–20 mA output signal. To activate multidrop communication, the transmitter address must be changed to a number between 1 and 15. This change deactivates the 4–20 mA analog output, sending it to 4 mA. The failure mode current also is disabled.

2.12.1 Changing a transmitter address

To activate multi-drop communication, the transmitter poll address must be assigned a number from 1–15 for HART Revision 5, and 1–63 for HART Revision 7. Each transmitter in a multi dropped loop must have a unique poll address.

Change transmitter address using a Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	1, 2, 1

Change transmitter address using AMS Device Manager

Procedure

1. Right click on the device and select **Configuration Properties** from the menu.
2. In HART Revision 5 mode:
   a) In the HART tab, enter poll address into the **Polling Address** box, select **Apply**.
3. In HART Revision 7 mode:
   a) In the HART tab, select the **Change Polling Address** button.

2.13 Using the transmitter with the HART Tri-Loop

To prepare the transmitter with dual-sensor option for use with a Rosemount 333 HART® Tri-Loop, the transmitter must be configured to Burst Mode and the process variable output order must be set. In Burst Mode, the transmitter provides digital information for the four process variables to the HART Tri-Loop. The HART Tri-Loop divides the signal into separate 4–20 mA loops for up to three of the following choices:

- Primary Variable (PV)
- Secondary Variable (SV)
- Tertiary Variable (TV)
- Quaternary Variable (QV)

When using the transmitter with dual-sensor option in conjunction with the HART Tri-Loop, consider the configuration of the differential, average, first good temperatures, Sensor Drift Alert, and Hot Backup features (if applicable).

Note
The procedures are to be used when the sensors and transmitters are connected, powered, and functioning properly. Also, Field Communicator must be connected and communicating to the transmitter control loop. For communicator usage instructions, see Verify configuration using the Field Communicator.

2.13.1 Set the transmitter to burst mode

To set the transmitter to burst mode, follow the steps below with the Fast Key sequence.

Set the transmitter to burst mode using a Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

	HART 5	HART 7
Device Dashboard Fast Keys	2, 2, 8, 4	2, 2, 8, 5

Set the transmitter to burst mode using AMS Device Manager

Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation window select **Manual Setup**.
3. On the **HART** tab find the Burst Mode Configuration group box and fill in the necessary content.
4. Select **Apply** when complete.

2.13.2 Set process variable output order

To set the process variable output order, follow the steps in one of the methods outlined in Mapping the HART variables.

Note
Take careful note of the process variable output order. The HART® Tri-Loop must be configured to read the variables in the same order.

Special considerations

To initiate operation between a transmitter with dual-sensor option and the HART® Tri-Loop, consider the configuration of both the differential, average and first good temperatures, sensor drift alert, and Hot Backup features (if applicable).

Differential temperature measurement

To enable the differential temperature measurement feature of a dual-sensor operating in conjunction with the HART® Tri-Loop, adjust the range end points of the corresponding channel on the HART Tri-Loop to include zero. For example, if the secondary variable is to report the differential temperature, configure the transmitter accordingly (see Mapping the HART variables) and adjust the corresponding channel of the HART Tri-Loop so one range end point is negative and the other is positive.

Hot Backup

To enable the Hot Backup feature of a transmitter with dual-sensor option operating in conjunction with the HART Tri-Loop, ensure that the output units of the sensors are the same as the units of the HART Tri-Loop. Use any combination of RTDs or thermocouples as long as the units of both match the units of the HART Tri-Loop.

Using the Tri-Loop to detect sensor drift alert

The dual-sensor transmitter sets a failure flag (through HART) whenever a sensor failure occurs. If an analog warning is required, the HART Tri-Loop can be configured to produce an analog signal that can be interpreted by the control system as a sensor failure.

Use these steps to set up the HART Tri-Loop to transmit sensor failure alerts.

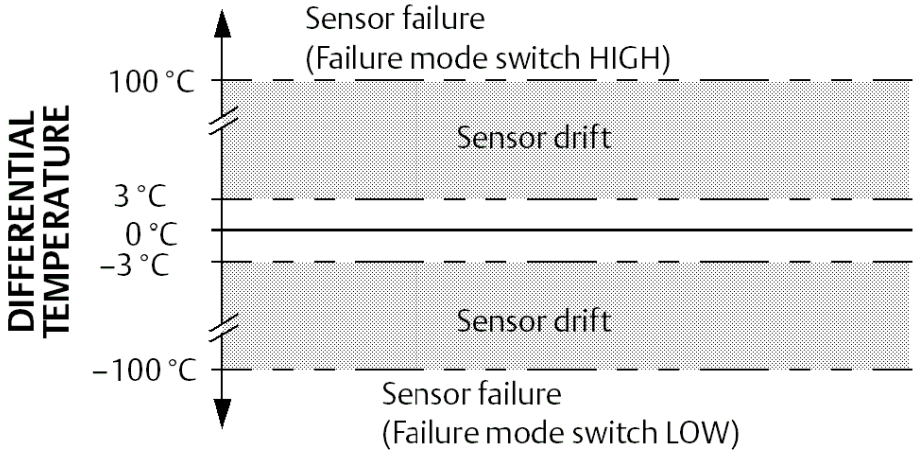
Procedure

1. Configure the dual-sensor transmitter variable map as shown:

Variable	Mapping
PV	Sensor 1 or sensor average
SV	Sensor 2
TV	Differential temperature
QV	As desired

2. Configure Channel 1 of the HART Tri-Loop as TV (differential temperature). If either sensor should fail, the differential temperature output will be +9999 or –9999 (high or low saturation), depending on the position of the Failure Mode Switch (see Setting the alarm switch).
3. Select temperature units for Channel 1 that match the differential temperature units of the transmitter.
4. Specify a range for the TV such as -148 to 212 °F (-100 to 100 °C). If the range is large, then a sensor drift of a few degrees will represent only a small percent of range. If Sensor 1 or Sensor 2 fails, the TV will be +9999 (high saturation) or –9999 (low saturation). In this example, zero is the midpoint of the TV range. If a ΔT of zero is set as the lower range limit (4 mA), then the output could saturate low if the reading from Sensor 2 exceeds the reading from Sensor 1. By placing a zero in the middle of the range, the output will normally stay near 12 mA, and the problem will be avoided.
5. Configure the DCS so that TV << –148 °F (–100 °C) or TV >> 212 °F (100 °C) indicates a sensor failure and, for example, TV ≤ 26.6 °F (–3 °C) or TV ≥ 37.4 °F (3 °C) indicates a drift alert. See Figure 2-26.

Figure 2-26: Tracking Sensor Drift and Sensor Failure with Differential Temperature



2.14 Transmitter security

2.14.1 Available security options

There are three security methods to utilize with the transmitter.

- Software security switch (write protect)
- HART lock
- LOI password

The write protect feature allows you to protect the transmitter data from accidental or unwarranted configuration changes. To enable the write protect feature, perform the following procedures.

Configure transmitter security using a Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Write Protect	2, 2, 9, 1
HART Lock	2, 2, 9, 2
LOI Password	2, 2, 9, 3

Configure transmitter security using AMS Device Manager

Procedure

1. Right click on the device and select the **Configure** menu.
2. In the left navigation pane select **Manual Setup** then select the **Security** tab.
   - All three parameters can be configured from this screen.
3. Select **Apply** when complete.

3 Hardware Installation

Note
Each transmitter is marked with a tag indicating the approvals. Install the transmitter according to all applicable installation codes, and approval and installation drawings (see Product Data Sheet). Verify the operating atmosphere of the transmitter is consistent with the hazardous location certifications. Once a device labeled with multiple approval types is installed, it should not be reinstalled using any of the other labeled approval types. To ensure this, the approval label should be permanently marked to distinguish the approval type(s) used.

3.1 Overview

The information in this section covers installation considerations for the Rosemount 644 Temperature Transmitter with HART® Protocol. A Quick Start Guide is shipped with every transmitter to describe recommended mounting and wiring procedures for initial installation. Dimensional drawings for transmitter mounting configurations are included in the Product Data Sheet.

3.2 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Follow instruction

Failure to follow these installation guidelines could result in death or serious injury.

Ensure only qualified personnel perform the installation.

Explosion

Explosions could result in death or serious injury.

Do not remove the connection head cover in explosive atmospheres when the circuit is live.

Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

All connection head covers must be fully engaged to meet explosion-proof requirements.

⚠ WARNING

Process leaks

Process leaks could result in death or serious injury.

Do not remove the thermowell while in operation.
Install and tighten thermowells and sensors before applying pressure.

Electric shock

Electrical shock could cause death or serious injury.

Use extreme caution when making contact with the leads and terminals.

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

3.3 Considerations

3.3.1 General

Electrical temperature sensors such as RTDs and thermocouples produce low-level signals proportional to their sensed temperature. The transmitter converts the low-level sensor signal to a standard 4–20 mA dc or digital HART® signal that is relatively insensitive to lead length and electrical noise. This signal is then transmitted to the control room via two wires.

3.3.2 Commissioning

The transmitter can be commissioned before or after installation. It may be useful to commission it on the bench, before installation, to ensure proper operation and to become familiar with its functionality. Ensure the instruments in the loop are installed in accordance with intrinsically safe, or non-incendive field wiring practices.

3.3.3 Installation

Measurement accuracy depends upon proper installation of the transmitter. Mount the transmitter close to the process and use minimum wiring to achieve best accuracy. Keep in mind the need for easy access, personnel safety, practical field calibration, and a suitable transmitter environment. Install the transmitter to minimize vibration, shock, and temperature fluctuation.

3.3.4 Mechanical

Location

When choosing an installation location and position, take into account the need for access to the transmitter.

Special mounting

Special mounting hardware is available for mounting a Rosemount 644 Head Mount Transmitter to a DIN rail or assembling a new Rosemount 644 Head Mount to an existing threaded sensor connection head (former option code L1).

3.3.5 Electrical

Proper electrical installation is necessary to prevent errors due to sensor lead resistance and electrical noise. For best results, shielded cable should be used in electrically noisy environments.

Make wiring connections through the cable entry in the side of the housing. Provide adequate clearance for cover removal.

3.3.6 Environmental

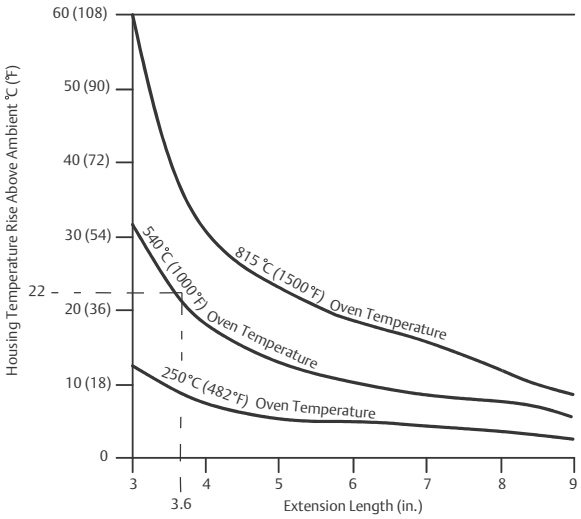
The transmitter electronics module is permanently sealed within a plastic enclosure, resisting moisture and corrosive damage. Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Temperature effects

The transmitter will operate within specifications for ambient temperatures between –40 and 185 °F (–40 °C and 85 °C). Heat from the process is transferred from the thermowell to the transmitter housing. If the expected process temperature is near or beyond specification limits, consider the use of additional thermowell lagging, an extension nipple, or a remote mounting configuration to isolate the transmitter from the process.

Figure 3-1 provides an example of the relationship between transmitter housing temperature rise and extension length.

Figure 3-1: Head Mount Transmitter Connection Head Temperature Rise vs. Extension Length



Example

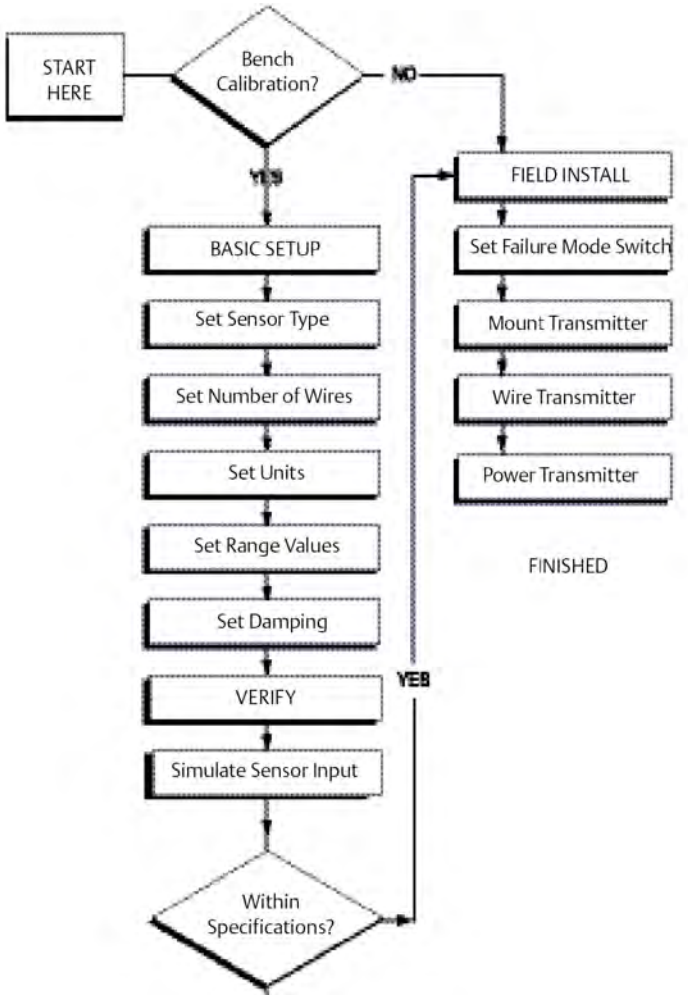
The maximum permissible housing temperature rise (T) can be calculated by subtracting the maximum ambient temperature (A) from the transmitter's ambient temperature specification limit (S). For instance, if A = 40 °C.

T = S - A T = 85 °C – 40 °C T = 45 °C

For a process temperature of 540 °C (1004 °F), an extension length of 3.6-in. (91.4 mm) yields a housing temperature rise (R) of 22 °C (72 °F), providing a safety margin of 23 °C (73 °F). A 6.0-in. (152.4 mm) extension length (R = 10 °C [50 °F]) offers a higher safety margin (35 °C [95 °F]) and reduces temperature-effect errors but would probably require extra transmitter support. Gauge the requirements for individual applications along this scale. If a thermowell with lagging is used, the extension length may be reduced by the length of the lagging.

3.4 Installation procedures

Figure 3-2: Installation Flowchart



3.4.1 Setting the alarm switch

Verify the alarm switch is set to the desired position before putting the device into operation to ensure correct function in the instance of a failure.

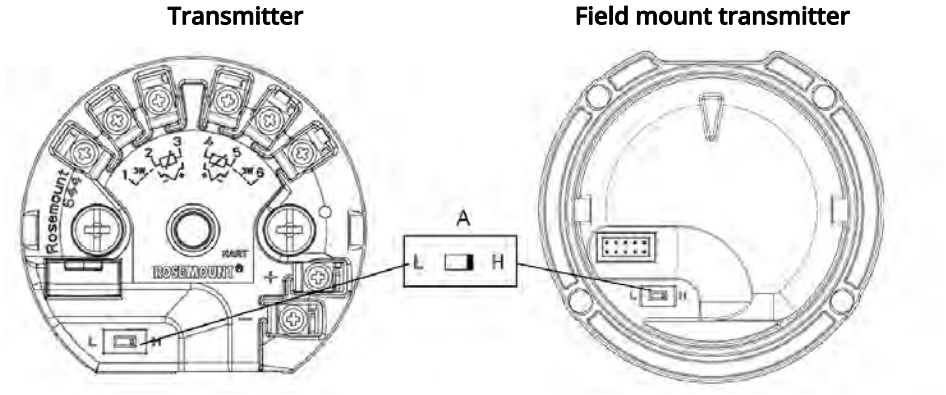
Setting the alarm switch without an LCD display

Procedure

1. Set the loop to manual (if applicable) and disconnect the power.
2. Remove the housing cover.
3. Set the physical hardware alarm switch to the desired position. H indicates High, L indicates Low. Then reattach the housing cover. See Figure 3-3 for alarm switch location.

4. Apply power and set the loop to automatic control.

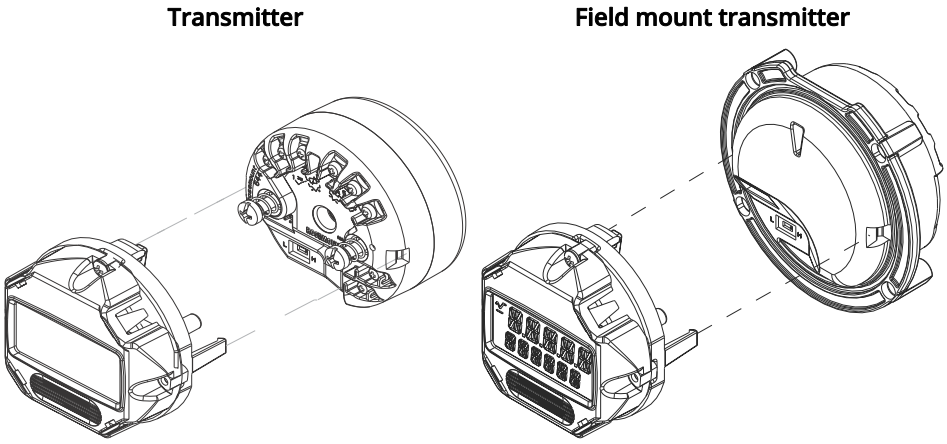
Figure 3-3: Failure Switch Location



A. Alarm switch

Note
If using an LCD Display or LOI, first remove the display by detaching it from the top of the device, set the switch to the desired position and reattach the display. See Figure 3-4 for proper display orientation.

Figure 3-4: Display Connection



3.4.2 Mount the transmitter

Mount the transmitter at a high point in the conduit run to prevent moisture from draining into the transmitter housing.

The Rosemount 644 Head Mount installs:

- In a connection head or universal head mounted directly on a sensor assembly.
- Apart from a sensor assembly using a universal head.
- To a DIN rail using an optional mounting clip.

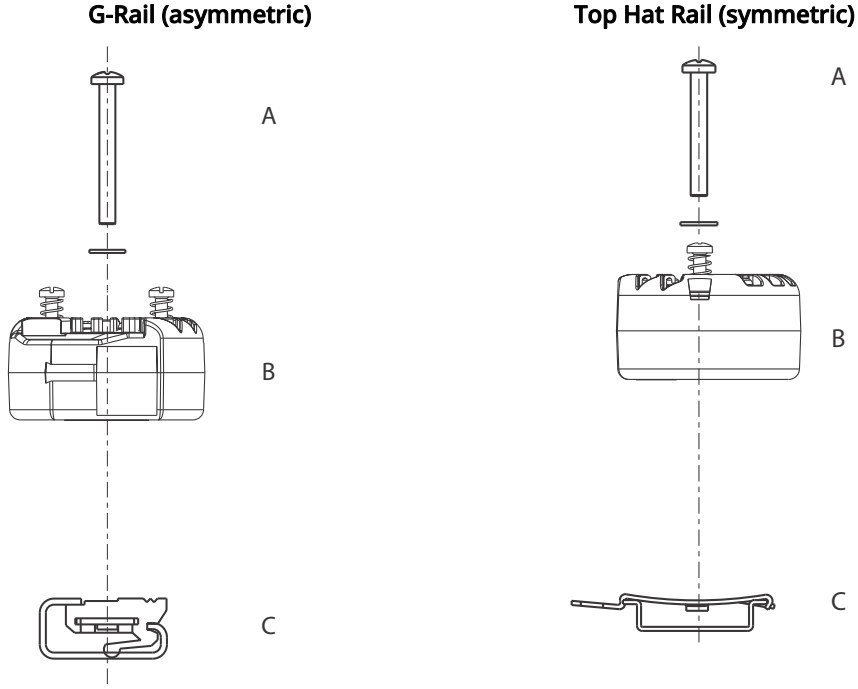
The Rosemount 644 Field Mount installs in a field mount housing, directly mounted on a sensor or apart from a sensor assembly using an optional bracket.

The Rosemount 644 Rail Mount attaches directly to a wall or to a DIN rail.

Mounting a Rosemount 644 Head Mount to a DIN rail

To attach a head mount transmitter to a DIN rail, assemble the appropriate rail mounting kit (part number 00644-5301-0010) to the transmitter as shown in Figure 3-5. Follow the procedure under Field mount transmitter with threaded sensor installation.

Figure 3-5: Assembling Rail Clip Hardware to a Rosemount 644 Transmitter

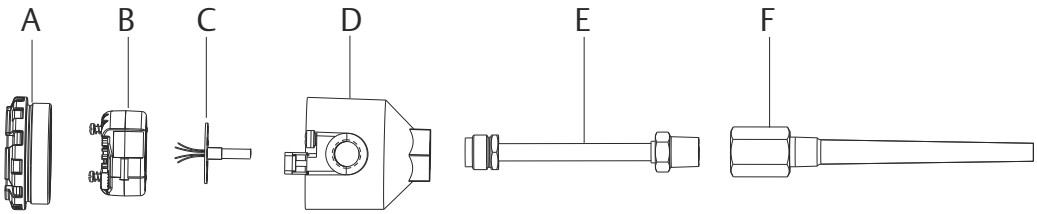


A. Mounting hardware
B. Transmitter
C. Rail clip

Note
Kit (part number 00644-5301-0010) includes mounting hardware and both types of rail kits.

3.4.3 Install the device

Head mount transmitter with DIN plate style sensor installation



A. Connection head cover

B. Transmitter mounting screws

C. Integral mount sensor with flying leads

D. Connection head

E. Extension

F. Thermowell

Procedure

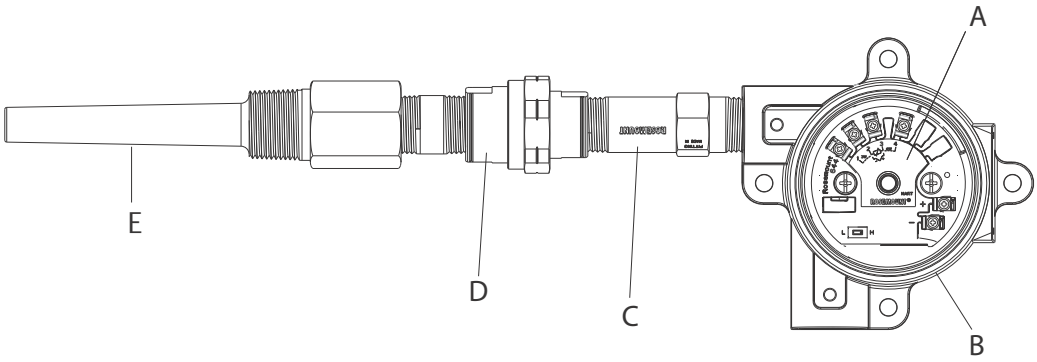
1. Attach the thermowell to the pipe or process container wall. Install and tighten the thermowell before applying process pressure.
2. Verify the transmitter failure mode switch position.
3. Assemble the transmitter to the sensor. Push the transmitter mounting screws through the sensor mounting plate.

   Note
   If using a threaded type sensor with a connection head, reference steps 1-6 below in Head mount transmitter with threaded sensor installation.

4. Wire the sensor to the transmitter (see Wiring and powering the transmitter).
5. Insert the transmitter-sensor assembly into the connection head. Thread the transmitter mounting screw into the connection head mounting holes. Assemble the extension to the connection head by tightening the threaded connections of the extension to the housing. Insert the assembly into the thermowell and tighten the threaded connections.
6. If using a cable gland for power wiring, properly attach the cable gland to a housing conduit entry.
7. Insert the shielded cable leads into the connection head through the conduit entry.

8. Connect the shielded power cable leads to the transmitter power terminals. Avoid contact with sensor leads and sensor connections. Connect and tighten the cable gland.
9. Install and tighten the connection head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.

Head mount transmitter with threaded sensor installation



A. Rosemount 644 Transmitter

B. Universal junction box

C. Threaded style sensor

D. Extension

E. Threaded thermowell

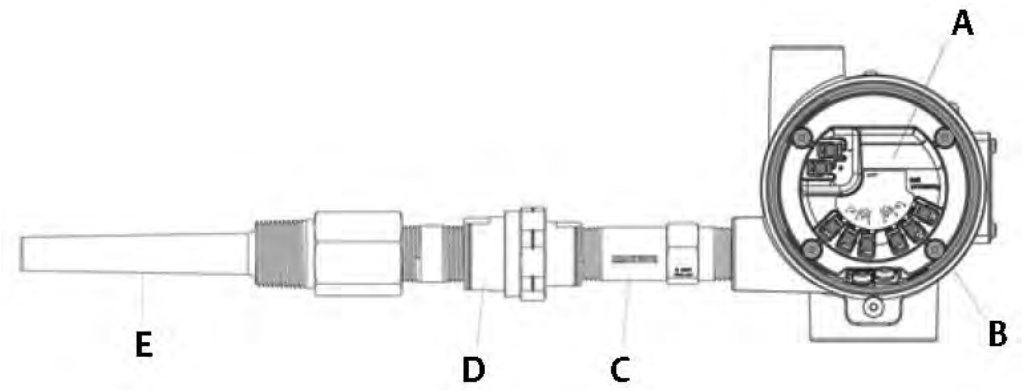
Procedure

1. Attach the thermowell to the pipe or process container wall. Install and tighten thermowells before applying process pressure.
2. Attach necessary extension nipples and adapters to the thermowell. Seal the nipple and adapter threads with silicone tape.
3. Screw the sensor into the thermowell. Install drain seals if required for severe environments or to satisfy code requirements.
4. Verify the transmitter failure mode switch is in the desired position.
5. To verify the correct installation of Integral Transient Protection (option code T1) on the device, confirm the following steps have been completed:
   a) Ensure the transient protector unit is firmly connected to the transmitter puck assembly.
   b) Ensure the transient protector power leads are adequately secured under the transmitter power terminal screws.
   c) Verify the transient protector's ground wire is secured to the internal ground screw found within the universal head.

Note
The transient protector requires the use of an enclosure of at least 3.5-in. (89 mm) in diameter.

6. Pull the sensor wiring leads through the universal head and transmitter. Mount the transmitter in the universal head by threading the transmitter mounting screws into the universal head mounting holes.
7. Seal adapter threads with thread sealant.
8. Pull the field wiring leads through the conduit into the universal head. Wire the sensor and power leads to the transmitter (see Wiring and powering the transmitter). Avoid contact with other terminals.
9. Install and tighten the universal head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.

Field mount transmitter with threaded sensor installation



A. Rosemount 644 Field Mount

B. Field mount housing

C. Threaded style sensor

D. Extension

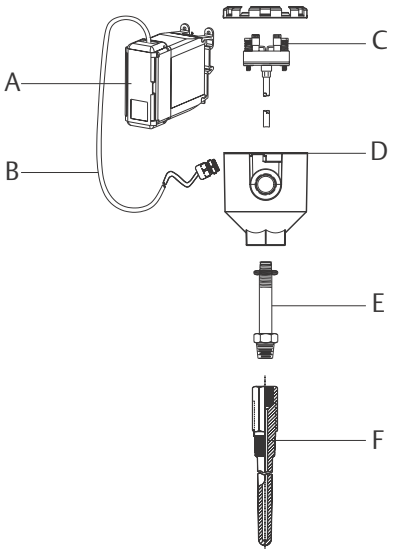
E. Threaded thermowell

Procedure

1. Attach the thermowell to the pipe or process container wall. Install and tighten thermowells before applying process pressure.
2. Attach necessary extension nipples and adapters to the thermowell.
3. Seal the nipple and adapter threads with silicone tape.
4. Screw the sensor into the thermowell. Install drain seals if required for severe environments or to satisfy code requirements.
5. Verify the transmitter failure mode switch is in the desired position.
6. Mount the transmitter-sensor assembly into the thermowell, or remote mount if desired.
7. Seal adapter threads with silicone tape.
8. Pull the field wiring leads through the conduit into the field mount housing. Wire the sensor and power leads to the transmitter. Avoid contact with other terminals.

9. Install and tighten the covers of two compartments. Enclosure covers must be fully engaged to meet explosion-proof requirements.

Rail mount transmitter and sensor



A. Rail mount transmitter

B. Sensor leads with cable glands

C. Integral mount sensor with terminal block

D. Connection head

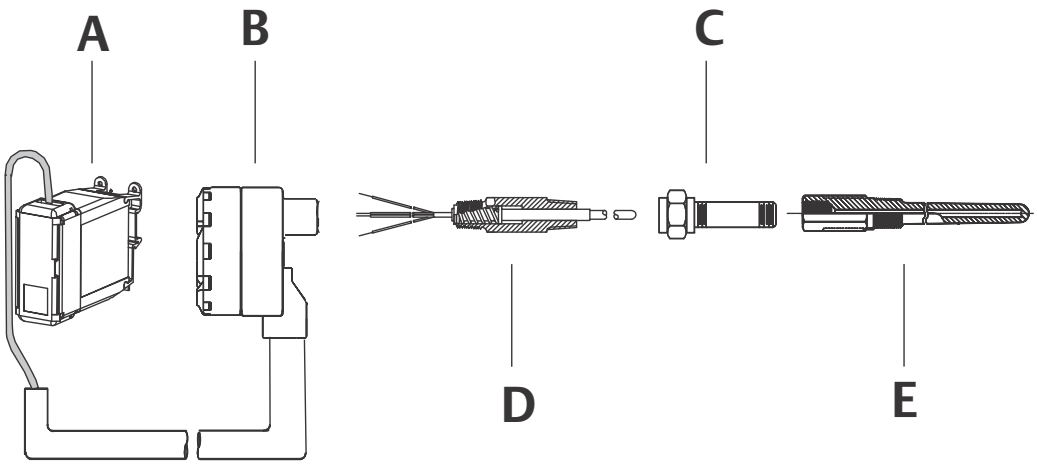
E. Standard extension

F. Threaded thermowell

Procedure

1. Attach the transmitter to a suitable rail or panel.
2. Attach the thermowell to the pipe or process container wall. Install and tighten the thermowell, according to plant standards, before applying pressure.
3. Attach the sensor to the connection head and mount the entire assembly to the thermowell.
4. Attach and connect sufficient lengths of sensor lead wire from the connection head to the sensor terminal block.
5. Tighten the connection head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.
6. Run sensor lead wires from the sensor assembly to the transmitter.
7. Verify the transmitter failure mode switch.
8. Attach the sensor wires to the transmitter.

Rail mount transmitter with threaded sensor



A. Rail mount transmitter

B. Threaded sensor connection head

C. Standard extension

D. Threaded style sensor

E. Threaded thermowell

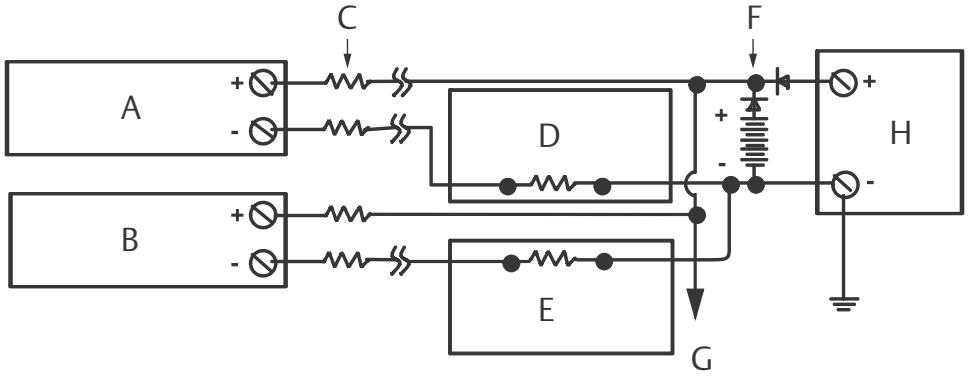
Procedure

1. Attach the transmitter to a suitable rail or panel.
2. Attach the thermowell to the pipe or process container wall. Install and tighten the thermowell before applying pressure.
3. Attach necessary extension nipples and adapters. Seal the nipple and adapter threads with thread sealant.
4. Screw the sensor into the thermowell. Install drain seals if required for severe environments or to satisfy code requirements.
5. Screw the connection head to the sensor.
6. Attach the sensor lead wires to the connection head terminals.
7. Attach additional sensor lead wires from the connection head to the transmitter.
8. Attach and tighten the connection head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.
9. Set the transmitter failure mode switch.
10. Attach the sensor wires to the transmitter.

3.4.4 Multichannel installations

In a HART® installation, several transmitters can be connected to a single master power supply, as shown in Figure 3-6. In this case, the system may be grounded only at the negative power supply terminal. In multichannel installations where several transmitters depend on one power supply and the loss of all transmitters would cause operational problems, consider an uninterrupted power supply or a back-up battery. The diodes shown in Figure 3-6 prevent unwanted charging or discharging of the back-up battery.

Figure 3-6: Multichannel Installations



Between 250 Ω and 1100 Ω if no load resistor.

A. *Transmitter no. 1*
B. *Transmitter no. 2*
C. R_{Lead}
D. *Readout or controller no. 1*
E. *Readout or controller no. 2*
F. *Backup battery*
G. *To additional transmitters*
H. *DC power supply*

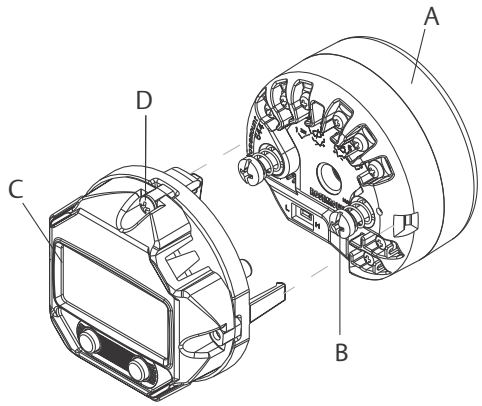
3.4.5 LCD display installation

The LCD display provides local indication of the transmitter output and abbreviated diagnostic messages governing transmitter operation. Transmitters ordered with the LCD display are shipped with the meter installed. After-market installation of the meter can be performed. After-market installation requires the meter kit, which includes:

- LCD display assembly (includes LCD display, meter spacer, and two screws)
- Meter cover with O-ring in place

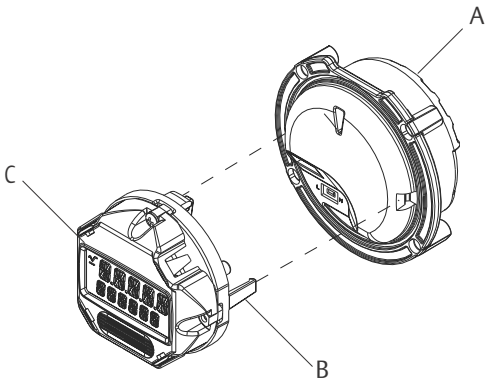
Figure 3-7: Display Connection

Transmitter



A. Rosemount 644 Transmitter
B. Mounting screw and springs
C. LCD display
D. LCD rotation screws

Field mount transmitter



A. Rosemount 644 Field Mount
B. LCD rotation screws
C. LCD display

Procedure

1. If the transmitter is installed in a loop, secure the loop and disconnect the power. If the transmitter is installed in an enclosure, remove the cover from the enclosure.
2. Decide meter orientation (the meter can be rotated in 90-degree increments). To change meter orientation, remove the screws located above and below the display screen. Lift the meter off the meter spacer. Rotate the display top and re-insert it in the location that will result in the desired viewing orientation.
3. Reattach the meter to the meter spacer using the screws. If the meter was rotated 90 degrees from its original position, it will be necessary to remove the screws from their original holes and re-insert them in the adjacent screws holes.
4. Line up the connector with the pin socket and push the meter into the transmitter until it snaps into place.

5. Attach the meter cover. The cover must be fully engaged to meet explosion-proof requirements.
6. Use a Field Communicator, AMS Device Manager software tool to configure the meter to the desired display.

Note

Observe the following LCD display temperature limits:

- Operating: –40 to 175 °F (–40 to 80 °C)
- Storage: –50 to 185 °F (–45 to 85 °C)

4 Electrical Installation

4.1 Overview

The information in this section covers installation considerations for the Rosemount 644 Temperature Transmitter. A Quick Start Guide is shipped with every transmitter to describe mounting, wiring, and basic hardware installation procedures for initial installation.

4.2 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Follow instruction

Failure to follow these installation guidelines could result in death or serious injury.

Ensure only qualified personnel perform the installation.

Explosion

Explosions could result in death or serious injury.

Do not remove the connection head cover in explosive atmospheres when the circuit is live.

Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

All connection head covers must be fully engaged to meet explosion-proof requirements.

Process leaks

Process leaks could result in death or serious injury.

Do not remove the thermowell while in operation.

Install and tighten thermowells and sensors before applying pressure.

Electric shock

Electrical shock could cause death or serious injury.

Use extreme caution when making contact with the leads and terminals.

⚠ WARNING

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

4.3 Wiring and powering the transmitter

All power to the transmitter is supplied over the signal wiring. Use ordinary copper wire of sufficient size to ensure the voltage across the transmitter power terminals does not drop below 12.0 Vdc.

If the sensor is installed in a high-voltage environment and a fault condition or installation error occurs, the sensor leads and transmitter terminals could carry lethal voltages. Use extreme caution when making contact with the leads and terminals.

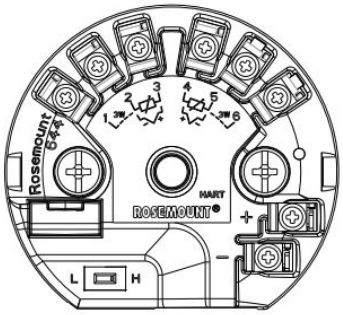
Note
Do not apply high voltage (e.g., ac line voltage) to the transmitter terminals. Abnormally high voltage can damage the unit. (Sensor and transmitter power terminals are rated to 42.4 Vdc. A constant 42.4 volts across the sensor terminals may damage the unit.)

For multichannel HART installations, the transmitters will accept inputs from a variety of RTD and thermocouple types. Refer to Figure 2-7 when making sensor connections.

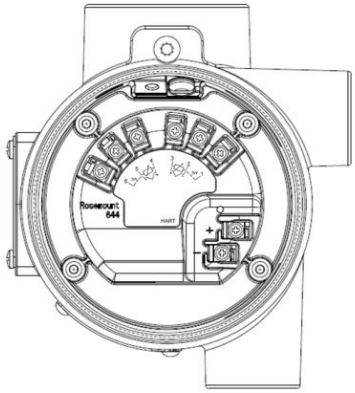
The sensor wiring diagram is located on the device's top label below the terminal screws. See Figure 4-1 and Sensor wiring for where to find and how to correctly wire all sensor types to the transmitter.

Figure 4-1: Wiring Diagram Location

Head mount transmitter



Field mount transmitter



4.3.1 Sensor connections

The transmitter is compatible with a number of RTD and thermocouple sensor types. Sensor wiring shows the correct input connections to the sensor terminals on the transmitter. To ensure a proper sensor connection, anchor the sensor lead wires into the appropriate captive terminals and tighten the screws.

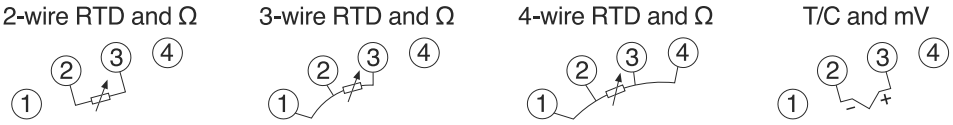
Sensor wiring

Emerson provides a 4-wire sensors for all single element RTDs.

You can use these RTDs in 3-wire configurations by leaving the unneeded leads disconnected and insulated with electrical tape.

Figure 4-2: HART Head Mount and Field Mount

Single input wiring



Dual input wiring

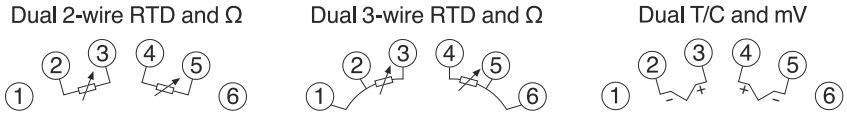
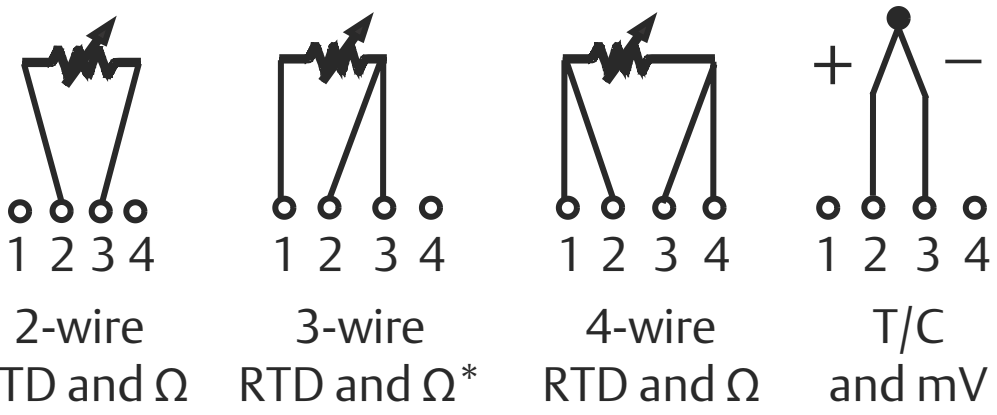


Figure 4-3: HART Rail Mount and FOUNDATION Fieldbus/PROFIBUS



Thermocouple or millivolt inputs

The thermocouple can be connected directly to the transmitter. Use appropriate thermocouple extension wire if mounting the transmitter remotely from the sensor. Make millivolt inputs connections with copper wire. Use shielding for long runs of wire.

RTD or Ohm inputs

The transmitters will accept a variety of RTD configurations, including 2-, 3- or 4-wire. If the transmitter is mounted remotely from a 3- or 4-wire RTD, it will operate within specifications, without recalibration, for lead wire resistances of up to 60 ohms per lead (equivalent to 6,000 feet of 20 AWG wire). In this case, the leads between the RTD and transmitter should be shielded. If using only two leads, both RTD leads are in series with the sensor element, so significant errors can occur if the lead lengths exceed three feet of 20 AWG wire (approximately 0.05 °C/ft). For longer runs, attach a third or fourth lead as described above.

Sensor lead wire resistance effect– RTD input

When using a 4-wire RTD, the effect of lead resistance is eliminated and has no impact on accuracy. However, a 3-wire sensor will not fully cancel lead resistance error because it cannot compensate for imbalances in resistance between the lead wires. Using the same type of wire on all three lead wires will make a 3-wire RTD installation as accurate as possible. A 2-wire sensor will produce the largest error because it directly adds the lead wire resistance to the sensor resistance. For 2- and 3-wire RTDs, an additional lead wire resistance error is induced with ambient temperature variations. The table and the examples shown below help quantify these errors.

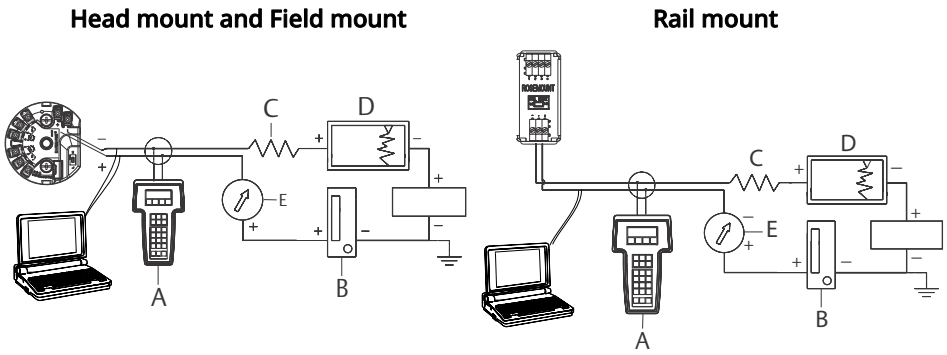
Note
For HART transmitters, the use of two grounded thermocouples with a dual option transmitter is not recommended. For applications in which the use of two thermocouples is desired, connect either two ungrounded thermocouples, one grounded and one ungrounded thermocouple, or one dual element thermocouple.

4.3.2 Power the transmitter

Procedure

1. An external power supply is required to operate the transmitter.
2. Remove the housing cover (if applicable).
3. Connect the positive power lead to the "+" terminal. Connect the negative power lead to the "–" terminal.
   - If a transient protector is being used, the power leads will now be connected to the top of the transient protector unit. See the transient label for indication of "+" and "-" terminal connections.
4. Tighten the terminal screws. When tightening the sensor and power wires, the maximum torque is 6.5 in-lb (0.73 N-m).
5. Reattach and tighten the cover (if applicable).
6. Apply power (12–42 Vdc).

Figure 4-4: Powering the Transmitter for Bench Configuration



A. Field communicator
B. Power supply
C. 248 Ω ≤ RL ≤ 1100 Ω
D. Recorder (optional)
E. Ammeter (optional)

Note

- Signal loop may be grounded at any point or left ungrounded.
- A Field Communicator may be connected at any termination point in the signal loop. The signal loop must have between 250 and 1100 ohms load for communications.
- Max torque is 6 in-lb (0/7 N-m).

Load limitation

The power required across the transmitter power terminals is 12 to 42.4 Vdc (the power terminals are rated to 42.4 Vdc). To prevent damaging the transmitter, do not allow terminal voltage to drop below 12.0 Vdc when changing the configuration parameters.

4.3.3 Ground the transmitter

Sensor shielding

The currents in the leads induced by electromagnetic interference can be reduced by shielding. Shielding carries the current to ground and away from the leads and electronics. If the ends of the shields are adequately grounded, only a small amount of current will actually enter the transmitter. If the ends of the shield are left ungrounded, voltage is created between the shield and the transmitter housing and also between the shield and earth at the element end. The transmitter may not be able to compensate for this voltage, causing it to lose communication and/or go into alarm. Instead of the shield carrying the currents away from the transmitter, the currents will now flow through the sensor leads into the transmitter circuitry where it will interfere with the circuit operation.

Shielding recommendations

The following are recommended practices from API Standard 552 (Transmission Standard) section 20.7, and from field and laboratory testing. If more than one recommendation is given for a sensor type, start with the first technique shown or the technique that is recommended for the facility by its installation drawings. If the technique does not eliminate the transmitter alarms, try another technique. If all of the techniques do not eliminate or prevent the transmitter alarms because of high EMI, contact an Emerson representative.

To ensure proper grounding, it is important that the instrument cable shield be:

- Trimmed close and insulated from touching the transmitter housing
- Connected to the next shield if cable is routed through a junction box
- Connected to a good earth ground at the power supply end

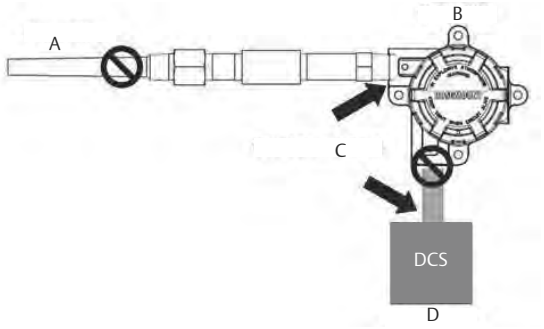
Ungrounded thermocouple, mV, and RTD/Ohm inputs

Each process installation has different requirements for grounding. Use the grounding options recommended by the facility for the specific sensor type, or begin with grounding option 1 (the most common).

Ground the transmitter: option 1

Procedure

1. Connect sensor wiring shield to the transmitter housing.
2. Ensure the sensor shield is electrically isolated from surrounding fixtures that may be grounded.
3. Ground signal wiring shield at the power supply end.



A. Sensor wires

B. Transmitter

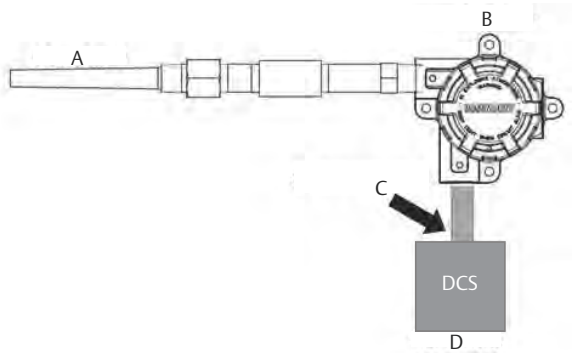
C. Shield ground point

D. 4-20 mA loop

Ground the transmitter: option 2

Procedure

1. Connect signal wiring shield to the sensor wiring shield.
2. Ensure the two shields are tied together and electrically isolated from the transmitter housing.
3. Ground shield at the power supply end only.
4. Ensure the sensor shield is electrically isolated from the surrounding grounded fixtures.



A. Sensor wires

B. Transmitter

C. Shield ground point

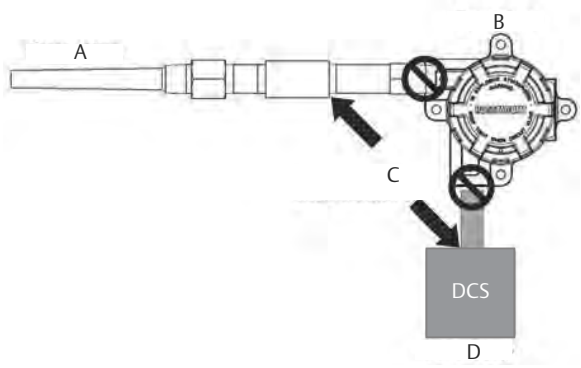
D. 4-20 mA loop

Note
Connect shields together, electrically isolated from the transmitter.

Ground the transmitter: option 3

Procedure

1. Ground sensor wiring shield at the sensor if possible.
2. Ensure the sensor wiring and signal wiring shields are electrically isolated from the transmitter housing.
3. Do not connect the signal wiring shield to the sensor wiring shield.
4. Ground the signal wiring shield at the power supply end.



A. Sensor wires

B. Transmitter

C. Shield ground point

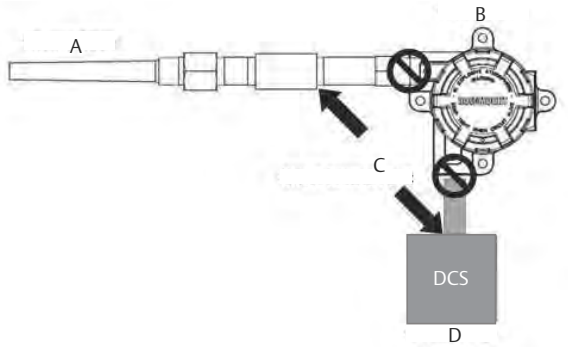
D. 4-20 mA loop

Grounded thermocouple inputs

Ground the transmitter: option 4

Procedure

1. Ground sensor wiring shield at the sensor.
2. Ensure the sensor wiring and signal wiring shields are electrically isolated from the transmitter housing.
3. Do not connect the signal wiring shield to the sensor wiring shield.
4. Ground signal wiring shield at the power supply end.



A. Sensor wires

B. Transmitter

C. Shield ground point

D. 4–20 mA loop

4.3.4 Wiring with a Rosemount 333 HART Tri-Loop (HART/4–20 mA only)

Use the dual-sensor option transmitter that is operating with two sensors in conjunction with a Rosemount 333 HART® Tri-Loop HART-to-Analog Signal Converter to acquire an independent 4–20 mA analog output signal for each sensor input. The transmitter can be configured to output four of the six following digital process variables:

- Sensor 1
- Sensor 2
- Differential temperature
- Average temperature
- First good temperature
- Transmitter terminal temperature

The HART Tri-Loop reads the digital signal and outputs any or all of these variables into as many as three separate 4–20 mA analog channels. Refer to Figure 2-7 for basic installation information. Refer to the Rosemount 333 HART Tri-Loop HART-to-Analog Signal Converter Reference Manual for complete installation information.

Power supply

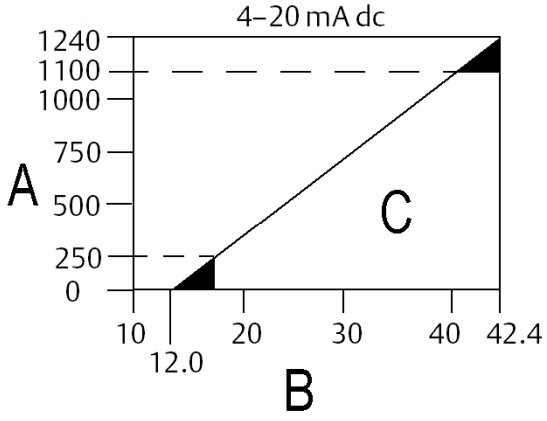
An external power supply is required to operate the transmitter and is not included. The input voltage range of the transmitter is 12–42.4 Vdc. This is the power required across the transmitter power terminals. The power terminals are rated to 42.4 Vdc. With 250 ohms of resistance in the loop, the transmitter requires a minimum of 18.1 Vdc for communication.

The power supplied to the transmitter is determined by the total loop resistance and should not drop below the lift-off voltage. The lift-off voltage is the minimum supply voltage required for any given total loop resistance. If the power drops below the lift-off voltage while the transmitter is being configured, the transmitter may output incorrect information.

The DC power supply should provide power with less than two percent ripple. The total resistance load is the sum of the resistance of the signal leads and the load resistance of any controller, indicator, or related piece of equipment in the loop. Note that the resistance of intrinsic safety barriers, if used, must be included.

Note
Permanent damage to the transmitter could result if the voltage drops below 12.0 Vdc at the power terminals, when changing transmitter configuration parameters.

Figure 4-5: Load Limits



Maximum Load = 40.8 × (Supply voltage - 12.0)

A. Load (ohms)
B. Supply voltage (V_{dc})
C. Operating region

5 Operation and Maintenance

5.1 Overview

This section contains information on calibrating Rosemount 644 Temperature Transmitter. Field Communicator, AMS Device Manager, and Local Operator Interface (LOI) instructions are given to perform all functions.

5.2 Safety messages

Read this manual before working with the product. For personal and system safety, and for optimum product performance, ensure you thoroughly understand the contents before installing, using, or maintaining this product.

⚠ WARNING

Follow instructions

Failure to follow these installation guidelines could result in death or serious injury.

Ensure only qualified personnel perform the installation.

Explosions

Explosions could result in death or serious injury.

Installation of the transmitters in a hazardous environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Product Certifications section for any restrictions associated with a safe installation.

Do not remove the connection head cover in explosive atmospheres when the circuit is live.

Before connecting a handheld communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.Verify the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

All connection head covers must be fully engaged to meet explosion-proof requirements.

Process leaks

Process leaks could result in death or serious injury.

Do not remove the thermowell while in operation.

Install and tighten thermowells and sensors before applying pressure.

⚠ WARNING

Electrical shock

Electrical shock could cause death or serious injury.

Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

The products described in this document are NOT designed for nuclear-qualified applications.

Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact your local Emerson Sales Representative.

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

⚠ CAUTION

Conduit/cable entries

The conduit/cable entries in the transmitter housing use a ½–14 NPT thread form.

When installing in a hazardous location, use only appropriately listed or Ex certified plugs, glands, or adapters in cable/conduit entries.

Unless otherwise marked, the conduit/cable entries in the housing enclosure use a ½–14 NPT form. Only use plugs, adapters, glands, or conduit with a compatible thread form when closing these entries.

Unless marked, the conduit/cable entries in the transmitter housing use a ½–14 NPT thread form. Entries marked "M20" are M20 × 1.5 thread form. On devices with multiple conduit entries, all entries will have the same thread form. Only use plugs, adapters, glands, or conduit with a compatible thread form when closing these entries.

Only use plugs, adapters, glands, or conduit with a compatible thread form when closing these entries.

5.3 Calibration overview

Calibrating the transmitter increases the measurement precision by allowing corrections to be made to the factory-stored characterization curve by digitally altering the transmitter's interpretation of the sensor input.

To understand calibration, it is necessary to understand that smart transmitters operate differently from analog transmitters. An important difference is that smart transmitters are factory-characterized, meaning that they are shipped with a standard sensor curve stored in the transmitter firmware. In operation, the transmitter uses this information to produce a process variable output, in engineering units, dependent on the sensor input.

Calibration of the transmitter may include the following procedures:

- Sensor Input Trim: digitally alter the transmitter's interpretation of the input signal.
- Transmitter-Sensor Matching: generates a special custom curve to match that specific sensor curve, as derived from the Callendar-Van Dusen constants.
- Output Trim: calibrates the transmitter to a 4–20 mA reference scale.
- Scaled Output Trim: calibrates the transmitter to a user-selectable reference scale.

5.3.1 Trimming

The trim functions should not be confused with the rerange functions. Although the re-range command matches a sensor input to a 4–20 mA output—as in conventional calibration—it does not affect the transmitter's interpretation of the input.

One or more of the trim functions may be used when calibrating. The trim functions are as follows:

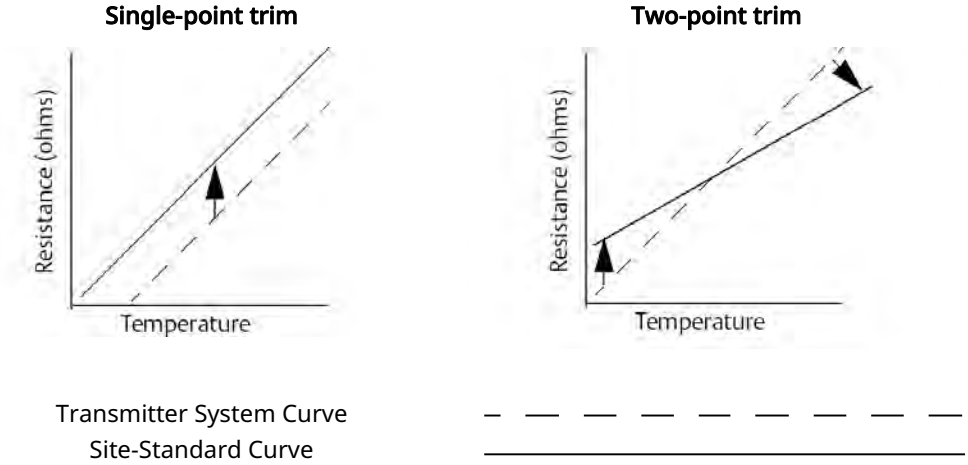
- Sensor input trim
- Transmitter-sensor matching
- Output trim
- Output scaled trim

5.4 Sensor input trim

The sensor trim command allows for alteration of the transmitter's interpretation of the input signal. The sensor trim command trims, in engineering (°F, °C, °R, K) or raw (ohms, mV) units, the combined sensor and transmitter system to a site standard using a known temperature source. Sensor trim is suitable for validation procedures or for applications that require profiling the sensor and transmitter together.

Perform a sensor trim if the transmitter's digital value for the primary variable does not match the plant's standard calibration equipment. The sensor trim function calibrates the sensor to the transmitter in temperature units or raw units. Unless the site-standard input source is NIST-traceable, the trim functions will not maintain the NIST-traceability of your system.

Figure 5-1: Trim



5.4.1 Application: Linear offset (single-point trim solution)

Procedure

1. Connect sensor to transmitter. Place sensor in bath between range points.
2. Enter known bath temperature using the Field Communicator.

5.4.2 Application: Linear offset and slope correction (two-point trim)

Procedure

1. Connect sensor to transmitter. Place sensor in bath at low range point.

2. Enter known bath temperature using the Field Communicator.
3. Repeat at high range point.

Perform a sensor trim using a Field Communicator

Procedure

1. Connect the calibration device or sensor to the transmitter. (If using an active calibrator, see Active calibrator and EMF compensation).
2. Connect the communicator to the transmitter loop.
3. From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	3, 4, 4, 1

   The communicator will display “Are you using an active calibrator?”
4. Select **No** if a sensor is connected to the transmitter
5. Select **Yes** if using a calibration device. By selecting Yes, the transmitter will switch into active calibration mode (see Active calibrator and EMF compensation). This is critical if the calibrator requires constant sensor current for calibration. If using a calibration device that can accept pulsed current, select **No**.

Perform a sensor trim using AMS Device Manager

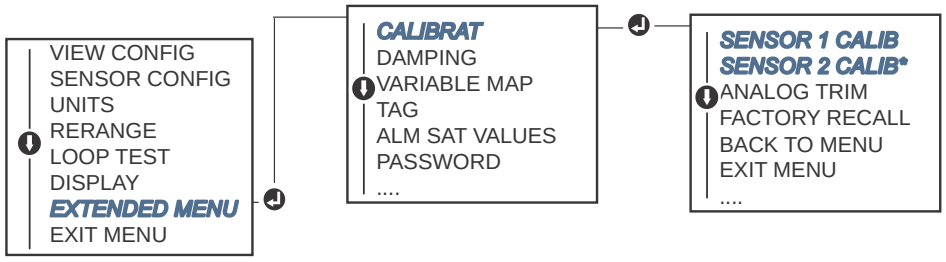
Procedure

1. Right click on the device and select **Overview**.
2. On the main Overview tab, select the **Calibrate Sensor(s)** button near the bottom of the window.
3. Follow the screen prompts through the Sensor Trimming process.

Perform a sensor trim using LOI

Reference the below image for guidance on where to find Sensor Calibration in the LOI menu.

Figure 5-2: Trimming the Sensor with the LOI



5.4.3 Recall factory trim—sensor trim

The recall factory trim—sensor trim feature allows the restoration of the as-shipped factory settings of the analog output trim. This command can be useful for recovering from an inadvertent trim, incorrect Plant Standard or faulty meter.

Recall factory trim using a Field Communicator

From the *HOME* screen, enter the Fast Key sequence and follow the steps within the Field Communicator to complete the sensor trim.

Device Dashboard Fast Keys	3, 4, 4, 2

Recall factory trim using AMS Device Manager

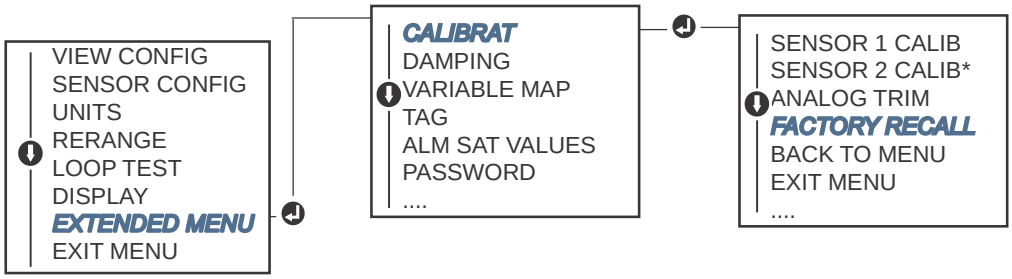
Procedure

1. Right click on the device and select **Service Tools**.
2. On the Sensor Calibration tab, select the **Restore Factory Calibration**.
3. Follow the screen prompts through the restoring of the calibration settings.

Recall factory trim using LOI

Reference Figure 5-3 for where to find recall sensor trim in the LOI menu.

Figure 5-3: Recalling the Sensor Trim with the LOI



5.4.4 Active calibrator and EMF compensation

The transmitter operates with a pulsating sensor current to allow EMF compensation and detection of open sensor conditions. Because some calibration equipment requires a steady sensor current to function properly, the “Active Calibrator Mode” feature should be used when an Active Calibrator is connected. Enabling this mode temporarily sets the transmitter to provide steady sensor current unless two sensor inputs are configured.

Disable this mode before putting the transmitter back into the process to set the transmitter back to pulsating current. “Active Calibrator Mode” is volatile and will automatically be disabled when a master reset is performed (through HART) or when the power is cycled.

EMF compensation allows the transmitter to provide sensor measurements that are unaffected by unwanted voltages, typically due to thermal EMFs in the equipment connected to the transmitter, or by some types of calibration equipment. If this equipment also requires steady sensor current, the transmitter must be set to “Active Calibrator Mode.” However, the steady current does not allow the transmitter to perform EMF compensation and as a result, a difference in readings between the Active Calibrator and actual sensor may exist.

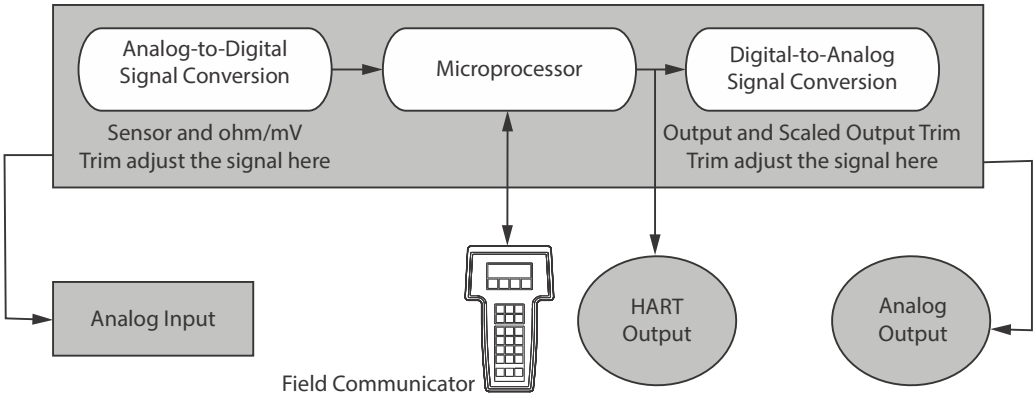
If a reading difference is experienced and is greater than the plant’s accuracy specification allows, perform a sensor trim with “Active Calibrator Mode” disabled. In this case, an active calibrator capable of tolerating pulsating sensor current must be used or the actual sensors must be connected to the transmitter. When the Field Communicator, AMS Device Manager, or the LOI asks if an Active Calibrator is being used when the sensor trim routine is entered, select No to leave the “Active Calibrator Mode” disabled.

5.5 Trim the analog output

5.5.1 Analog output trim or scaled analog output trim

Perform an output trim or a scaled output trim if the digital value for the primary variable matches the plant’s standards but the transmitter’s analog output does not match the reading on the output device. The output trim function calibrates the transmitter to a 4–20 mA reference scale; the scaled output trim function calibrates to a user-selectable reference scale. To determine the need for an output trim or a scaled output trim, perform a loop test (Perform a loop test).

Figure 5-4: Measurement Dynamics of Temperature Transmitter



5.5.2 Analog output trim

The analog output trim allows the transmitter’s conversion of the input signal to a 4–20 mA output to be altered (Figure 5-4). Adjust the analog output signal at regular intervals to maintain measurement precision.

Perform analog output trim using a Field Communicator

To perform a digital-to-analog trim, perform the following procedure with Traditional Fast Key sequence:

Procedure

1. Connect an accurate reference meter to the transmitter at the **CONNECT REFERENCE METER** prompt by shunting the power to the transmitter through the reference meter at some point in the loop.
2. From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	3, 4, 5, 1

Perform analog output trim using AMS Device Manager

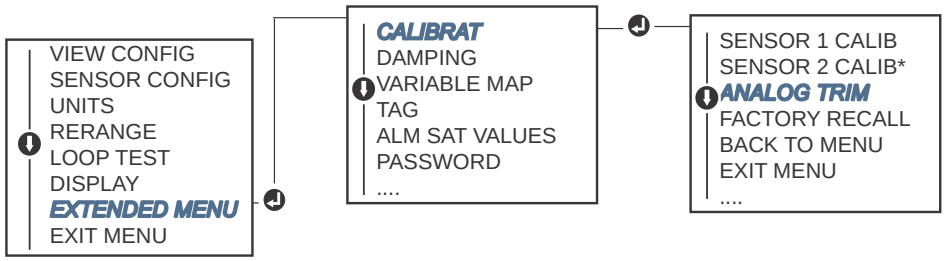
Procedure

1. Right click on the device and select **Service Tools**.
2. In the left navigation pane select **Maintenance**.
3. Find the **Analog Calibration** tab and click on the **Analog Trim** button.
4. Follow the screen prompts through the Analog Trimming process.

Perform analog output trim using LOI

Reference Figure 5-5 for guidance on where to find analog trim in the LOI menu.

Figure 5-5: Trimming the Analog Output with the LOI



5.5.3 Performing a scaled output trim

The scaled output trim matches the 4 and 20mA points to a user-selectable reference scale other than 4 and 20 mA (2–10 volts, for example). To perform a scaled D/A trim, connect an accurate reference meter to the transmitter and trim the output signal to scale as outlined in the Trim the analog output procedure.

Perform a scaled output trim using a Field Communicator

Procedure

1. Connect an accurate reference meter to the transmitter at the **CONNECT REFERENCE METER** prompt by shunting the power to the transmitter through the reference meter at some point in the loop.
2. From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	3, 4, 5, 2

Perform a scaled output trim using AMS Device Manager

Procedure

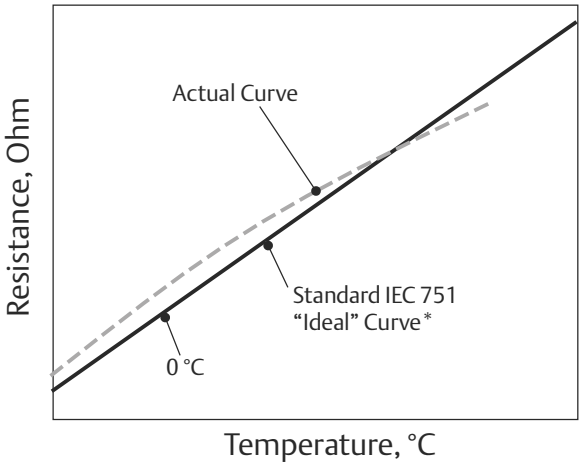
1. Right click on the device and select **Service Tools**.
2. In the left navigation pane select **Maintenance**.
3. Find the **Analog Calibration** tab and select the **Scaled Trim** button.
4. Follow the screen prompts through the Analog Trimming process.

5.6 Transmitter-sensor matching

Use Transmitter-Sensor Matching to enhance the temperature measurement accuracy of the system and if you have a sensor with Callendar-Van Dusen constants. When ordered from Emerson, sensors with Callendar-Van Dusen constants are NIST-traceable.

The transmitter accepts Callendar-Van Dusen constants from a calibrated RTD schedule and generates a special custom curve to match that specific sensor Resistance vs. Temperature performance. Figure 5-6.

Figure 5-6: Standard vs. Actual Sensor Curve



*The Actual Curve is identified from the Callendar-Van Dusen equation.

Matching the specific sensor curve with the transmitter significantly enhances the temperature measurement accuracy. See the comparison below in Table 5-1.

Table 5-1: Standard RTD vs. RTD with Matched CVD Constants with Standard Transmitter Accuracy

System accuracy comparison at 150 °C using a PT 100 (α=0.00385) RTD with a span of 0 to 200 °C			
Standard RTD		Matched RTD	
Rosemount 644	±0.15 °C	Rosemount 644	±0.15 °C
Standard RTD	±1.05 °C	Matched RTD	±0.18 °C
Total System(1)	±1.06 °C	Total System(1)	±0.23 °C

(1) Calculated using root-summed-squared (RSS) statistical method.

$$\text{TotalSystemAccuracy} = \sqrt{(\text{TransmitterAccuracy})^2 + (\text{SensorAccuracy})^2}$$

Table 5-2: Standard RTD vs. RTD with Matched CVD Constants with Enhanced Transmitter Accuracy Option P8

System Accuracy Comparison at 150 °C Using a PT 100 (α=0.00385) RTD with a Span of 0 to 200 °C			
Standard RTD		Matched RTD	
Rosemount 644	±0.10 °C	Rosemount 644	±0.10 °C
Standard RTD	±1.05 °C	Matched RTD	±0.18 °C
Total System(1)	±1.05 °C	Total System(1)	±0.21 °C

(1) Calculated using root-summed-squared (RSS) statistical method

$$\text{TotalSystemAccuracy} = \sqrt{(\text{TransmitterAccuracy})^2 + (\text{SensorAccuracy})^2}$$

Callendar-Van Dusen equation:

The following input variables, included with specially-ordered Rosemount temperature sensors, are required:

$R_t = R_o + R_o a [t – d(0.01t-1)(0.01t) – b(0.01t – 1)(0.01t)^3]$

- R_0 = Resistance at ice point
- Alpha = Sensor specific constant
- Beta = Sensor specific constant
- Delta = Sensor specific constant

To input Callendar-Van Dusen constants, perform one the following procedures:

5.6.1 Perform transmitter-sensor matching using a Field Communicator

From the *HOME* screen, enter the Fast Key sequence.

Device Dashboard Fast Keys	2, 2, 1, 9

5.6.2 Perform transmitter-sensor matching using AMS Device Manager

Procedure

1. Right click on the device and select **Configure**.
2. In the left navigation pane choose **Manual Setup** and choose the **Sensor 1** or **Sensor 2** tab depending on the need.
3. Find the **Transmitter Sensor Matching (CVD)** group box and enter in the required CVD constants. Or select “Set CVD Coefficients” button to be guided through steps. You may also select “Show CVD Coefficients” button to see the current coefficients loaded into the device.
4. Select **Apply** when complete.

Note
When the transmitter-senor matching is disabled, the transmitter reverts to either user or factory trim, whichever was used previously. Make certain the transmitter engineering units default correctly before placing the transmitter into service.

5.7 Switching HART Revision

Some systems are not capable of communicating with HART Revision 7 devices. The following procedures list how to change HART revisions between HART Revision 7 and HART Revision 5.

5.7.1 Switch HART revision using a generic menu

If the HART configuration tool is not capable of communicating with a HART Revision 7 device, it should load a Generic Menu with limited capability. The following procedures allow for switching between HART Revision 7 and HART Revision 5 from a generic menu in any HART compliant configuration tool.

Procedure

Locate “Message” field.

a) To change to HART Revision 5, Enter: **HART5** in the message field.

b) To change to HART Revision 7, Enter: **HART7** in the message field.

5.7.2 Switch HART revision using a Field Communicator

From the ***HOME*** screen, enter the Fast Key sequence and follow steps within the Field Communicator to complete the HART revision change.

Device Dashboard Fast Keys	2, 2, 8, 3

5.7.3 Switch HART revision using AMS Device Manager

Procedure

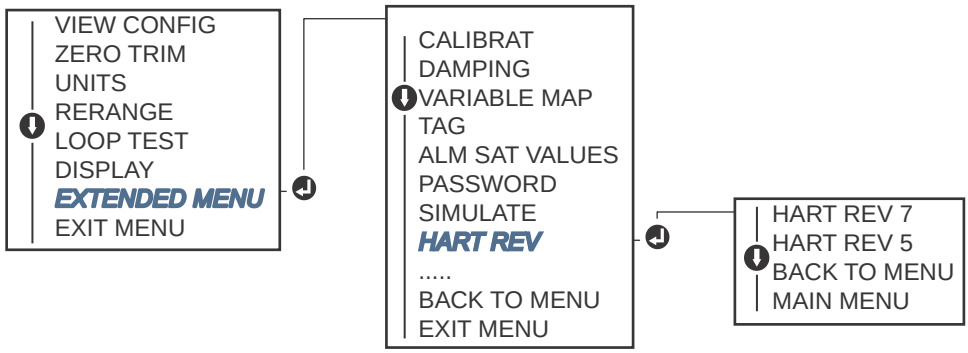
1. Right click on the device and select **Configure**.
2. In the left navigation pane choose **Manual Setup** and click on the **HART** tab.
3. Select the **Change HART Revision** button and follow the prompts.

Note
HART Revision 7 is only compatible with AMS Device Manager 10.5, and greater. AMS Device Manager version 10.5 requires a software patch to be compatible.

5.7.4 Switch HART revision using LOI

Reference Figure 5-7 for where to find HART Rev in the LOI menu.

Figure 5-7: Switching the HART Revision with the LOI



6 Troubleshooting

6.1 Overview

4–20 mA/HART output provides summarized maintenance and troubleshooting suggestions for the most common operating problems.

If you suspect malfunction despite the absence of any diagnostic messages on the Field Communicator display, follow the procedures described in 4–20 mA/HART output to verify that transmitter hardware and process connections are in good working order. Under each of four major symptoms, specific suggestions are offered for solving problems. Always deal with the most likely and easiest-to-check conditions first.

6.2 Safety messages

Read this manual before working with the product. For personal and system safety, and for optimum product performance, ensure you thoroughly understand the contents before installing, using, or maintaining this product.

⚠ WARNING

Follow instructions

Failure to follow these installation guidelines could result in death or serious injury.

Ensure only qualified personnel perform the installation.

Explosions

Explosions could result in death or serious injury.

Installation of the transmitters in a hazardous environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Please review the Product Certifications section for any restrictions associated with a safe installation.

Do not remove the connection head cover in explosive atmospheres when the circuit is live.

Before connecting a handheld communicator in an explosive atmosphere, ensure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.Verify the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

All connection head covers must be fully engaged to meet explosion-proof requirements.

⚠ WARNING

Process leaks

Process leaks could result in death or serious injury.

Do not remove the thermowell while in operation.
Install and tighten thermowells and sensors before applying pressure.

Electrical shock

Electrical shock could cause death or serious injury.

Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

The products described in this document are NOT designed for nuclear-qualified applications.

Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact your local Emerson Sales Representative.

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

⚠ CAUTION

Conduit/cable entries

The conduit/cable entries in the transmitter housing use a ½–14 NPT thread form.
When installing in a hazardous location, use only appropriately listed or Ex certified plugs, glands, or adapters in cable/conduit entries.
Unless otherwise marked, the conduit/cable entries in the housing enclosure use a ½–14 NPT form. Only use plugs, adapters, glands, or conduit with a compatible thread form when closing these entries.
Unless marked, the conduit/cable entries in the transmitter housing use a ½–14 NPT thread form. Entries marked "M20" are M20 × 1.5 thread form. On devices with multiple conduit entries, all entries will have the same thread form. Only use plugs, adapters, glands, or conduit with a compatible thread form when closing these entries.
Only use plugs, adapters, glands, or conduit with a compatible thread form when closing these entries.

6.3 4–20 mA/HART output

6.3.1 Transmitter communication

Transmitter does not communicate with Field Communicator

Potential cause

Loop wiring

Recommended actions

1. Check the revision level of the transmitter device descriptors (DDs) stored in your communicator. The communicator should report Dev v4, DD v1 (improved), or reference Field Communicator for previous versions. Contact Emerson Customer Central for assistance.
2. Check for a minimum of 250 ohms resistance between the power supply and Field Communicator connection.
3. Check for adequate voltage to the transmitter. If a Field Communicator is connected and 250 ohms resistance is properly in the loop, then the transmitter requires a minimum of 12.0 V at the terminals to operate (over entire 3.5–23.0 mA operating range), and 12.5 V minimum to communicate digitally.
4. Check for intermittent shorts, open circuits, and multiple grounds.

6.3.2 High output

Potential cause

Sensor input failure or connection

Recommended actions

1. Connect a Field Communicator and enter the transmitter test mode to check for a sensor failure.
2. Check for a sensor open or short circuit.
3. Check the process variable to see if it is out of range.

Potential cause

Loop wiring

Recommended actions

Check for dirty or defective terminals, interconnecting pins, or receptacles.

Potential cause

Power supply

Recommended actions

Check the output voltage of the power supply at the transmitter terminals. It should be 12.0–42.4 Vdc (over entire 3.75–23 mA operating range).

Potential cause

Electronics

Recommended actions

1. Connect a Field Communicator and enter the transmitter status mode to isolate module failure.
2. Connect a Field Communicator and check the sensor limits to ensure calibration adjustments are within the sensor range.

6.3.3 Erratic output

Potential cause

Loop wiring

Recommended actions

1. Check for adequate voltage to the transmitter. It should be 12.0–42.4 Vdc at the transmitter terminals (over entire 3.75–23 mA operating range).
2. Check for intermittent shorts, open circuits, and multiple grounds.
3. Connect a Field Communicator and enter the Loop test mode to generate signals of 4 mA, 20 mA, and user-selected values.

Potential cause

Electronics

Recommended actions

Connect a Field Communicator and enter the transmitter test mode to isolate module failure.

6.3.4 Low or no output

Potential cause

Sensor element

Recommended actions

1. Connect a Field Communicator and enter the transmitter test mode to isolate a sensor failure.
2. Check the process variable to see if it is out of range.

Potential cause

Loop wiring

Recommended actions

1. Check for adequate voltage to the transmitter. It should be 12.0–42.4 Vdc (over entire 3.75–23 mA operating range).
2. Check for shorts and multiple grounds.
3. Check for proper polarity at the signal terminal.
4. Check the loop impedance.
5. Connect a Field Communicator and enter the Loop test mode.
6. Check wire insulation to detect possible shorts to ground.

Potential cause

Electronics

Recommended actions

Connect a Field Communicator and check the sensor limits to ensure calibration adjustments are within the sensor range.

6.4 Diagnostic messages

Listed in the below sections are detailed tables of the possible messages that will appear on either the LCD/LOI Display, a Field Communicator, or an AMS Device Manager system. Use the tables below to diagnose particular status messages.

- Failed
- Maintenance
- Advisory

6.4.1 Failed status

Electronics failure

ALARM DEVICE ALARM FAIL

Potential cause

Essential electronics in the device have failed. The transmitter may have experienced an electronics failure while attempting to store information.

Recommended actions

1. Restart the transmitter.
2. If condition persists, replace the transmitter. Contact the nearest Emerson Field Service Center if necessary.

Sensor open

Sensor 1 is used here as an example. If Dual Sensors are ordered this alert can apply to either sensor.

ALARM SNSR 1 ALARM FAIL

Potential cause

The transmitter has detected an open sensor condition. The sensor may be disconnected, connected improperly, or malfunctioning.

Recommended actions

1. Verify the sensor connection and wiring. Refer to the wiring diagrams found on the transmitter label to ensure proper wiring.
2. Verify the integrity of the sensor and sensor lead wires. If the sensor is faulty, repair or replace the sensor.

Sensor short

Sensor 1 is used here as an example. If Dual Sensors are ordered this alert can apply to either sensor.

ALARM SNSR 1 ALARM FAIL

Potential cause

The transmitter has detected a shorted sensor condition. The sensor may be disconnected, connected improperly, or malfunctioning.

Recommended actions

1. Verify the process temperature is within the specified sensor's range. Use the Sensor Information button to compare with the process temperature.
2. Verify the sensor is properly wired and connected to the terminals.
3. Verify the integrity of the sensor and sensor lead wires. If the sensor is faulty, repair or replace the sensor.

Terminal temperature failure

ALARM TERM ALARM FAIL

Potential cause

The terminal temperature is outside the internal RTD’s specified operating range.

Recommended actions

Verify the ambient temperature is within the device specified operating range using the terminal temperature information button.

Invalid configuration

CONFG SNSR 1 WARN ERROR

Potential cause

The sensor configuration (type and/or connection) does not match the sensor output and is invalid.

Recommended actions

1. Verify sensor type and number of wires matched the sensor configuration of the device.
2. Reset the device.
3. If error persists, download the transmitter configuration.
4. If error still present, replace the transmitter.

Field device malfunction

ALARM DEVICE ALARM FAIL

Potential cause

The device has malfunctioned or needs immediate attention.

Recommended actions

1. Perform a processor reset.
2. View other alerts to see if the transmitter indicates a specific problem.
3. If the condition persists, replace the device.

6.4.2 Warning status

Hot Backup™ active

HOT BU SNSR 1 HOT BU FAIL

Potential cause

Sensor 1 has failed (open or shorted) and Sensor 2 is now the primary process variable output.

Recommended actions

1. Replace Sensor 1 at you earliest convenience.
2. Reset Hot Backup feature in the device software.

Sensor drift alert active

Sensor 1 is used here as an example. If Dual Sensors are ordered this alert can apply to either sensor.

WARN DRIFT WARN ALERT

Potential cause

The difference between Sensor 1 and 2 has gone beyond the user-configured Drift Alert Threshold.

Recommended actions

1. Verify sensor connections are valid on the transmitter.
2. If necessary, check calibration of each sensor.
3. Verify process conditions match sensor outputs.
4. If calibration fails, one of the sensors has failed. Replace it at your earliest convenience.

Sensor degraded

Sensor 1 is used here as an example. If Dual Sensors are ordered this alert can apply to either sensor.

WARN SNSR 1 DEGRA SNSR 1

Potential cause

The resistance of the thermocouple loop has exceeded the configured threshold. This could be caused by excess EMF.

Recommended actions

1. Check terminal connections on the terminal screws for corrosion.
2. Check the thermocouple loop for any signs of corrosion in terminal blocks, wire thinning, wire breaks, or faulty connections.
3. Verify the integrity of the sensor itself. Harsh process conditions may cause long-term sensor failures.

Calibration error

Potential cause

The value entered for the user trim point was not acceptable.

Recommended actions

Re-trim the device, ensure the user entered calibration points are close to the applied calibration temperature.

Sensor out of operating limits

Sensor 1 is used here as an example. If Dual Sensors are ordered this alert can apply to either sensor.

SAT SNSR 1 XX.XXX°C

Potential cause

Sensor readings are outside the sensor's specified range.

Recommended actions

1. Verify the process temperature is within the specified sensor's range. Use the Sensor Information button to compare with the process temperature.
2. Verify the sensor is properly wired and connected to the terminals.
3. Verify the integrity of the sensor and sensor lead wires. If the sensor is faulty, repair or replace the sensor.

Terminal temperature out of operating limits

SAT TERM DEGRA WARN

Potential cause

The terminal temperature is outside the on-board RTD specified operating range

Recommended actions

Verify the ambient temperature is within the device specified operating range using the Terminal Temperature Information Button.

6.4.3 Other LCD display messages

LCD is not displaying correctly or at all

Rosemount 644 HART 7 on screen

Potential cause

The display may not be functioning or it may be stuck on Home screen.

Recommended actions

If the meter does not appear to function, ensure the transmitter is configured for the meter option you desire. The meter will not function if the LCD Display option is set to Not Used.

Analog output fixed

WARN LOOP WARN FIXED

Potential cause

The analog output is set to a fixed value and is not currently tracking the HART Primary Variable.

Recommended actions

1. Verify that it was intended for the transmitter to be operating in “Fixed Current Mode.”
2. Disable “Fixed Current Mode” in Service Tools to have the analog output operate normally.

Simulation active

Potential cause

The device is in simulation mode and may not be reporting actual information.

Recommended actions

1. Verify simulation is no longer required.
2. Disable simulation mode in service tools.
3. Perform a device reset.

6.5 Return of materials

To expedite the return process in North America, call the Emerson National Response Center toll-free at 800-654-7768. This center, available 24 hours a day, will assist you with any needed information or materials.

The center will ask for the following information:

- Product model
- Serial numbers
- The last process material to which the product was exposed

The center will provide:

- A Return Material Authorization (RMA) number
- Instructions and procedures that are necessary to return goods that were exposed to hazardous substances.

For other locations, contact an Emerson sales representative.

Note
If a hazardous substance is identified, a Safety Data Sheet (SDS), required by law to be available to people exposed to specific hazardous substances, must be included with the returned materials.

7 Safety Instrumented Systems (SIS) Certification

7.1 SIS certification

The safety-critical output of the Rosemount 644P Temperature Transmitter is provided through a 2-wire, 4–20 mA signal representing temperature. The transmitter can be equipped with or without a display. The Rosemount 644P Safety Certified Safety Transmitter is certified to: Low demand; Type B.

- SIL 2 for random integrity at HFT=0
- SIL 3 for random integrity at HFT=1
- SIL 3 for systematic integrity

7.2 Safety certified identification

All Rosemount 644 HART Head Mount and Field Mount Transmitters must be identified as safety certified before installing into a SIS.

To identify a safety-certified transmitter, ensure the device satisfies the requirements below:

Procedure

1. Verify the transmitter was ordered with output option code “A” and option code “QT”. This signifies that it is a 4–20 mA/HART safety certified device.
   a) For example: MODEL 644HA.....QT.....
2. See a Yellow Tag affixed to the top of the transmitter face or a Yellow Tag affixed to the outside of the enclosure if pre-assembled.
3. Check the Namur Software Revision located on the adhesive transmitter tag. “SW _._._”.

   If the Device label software revision is 1.1.1 or higher, the device is safety certified.

7.3 Installation

Installations are to be performed by qualified personnel. No special installation is required in addition to the standard installation practices outlined in this document. Always ensure a proper seal by installing the electronics housing cover(s) so that metal contacts metal.

The loop should be designed so the terminal voltage does not drop below 12 Vdc when the transmitter output is 24.5 mA.

Environmental limits are available in the Rosemount 644 Temperature Transmitter product page.

7.4 Configuration

Use any HART-capable configuration tool or the optional Local Operator Interface (LOI) to communicate with and verify the initial configuration or any configuration changes made to the transmitter prior to operating in Safety Mode. All configuration methods outlined in Configuration are the same for the safety-certified transmitter with any differences noted.

Software lock must be used in order to prevent unwanted changes to the transmitter configuration.

Note
Transmitter output is not safety-rated during the following: Configuration changes, Multidrop operation, Simulation, Active calibrator mode, and loop tests. Alternative means should be used to ensure process safety during transmitter configuration and maintenance activities.

7.4.1 Damping

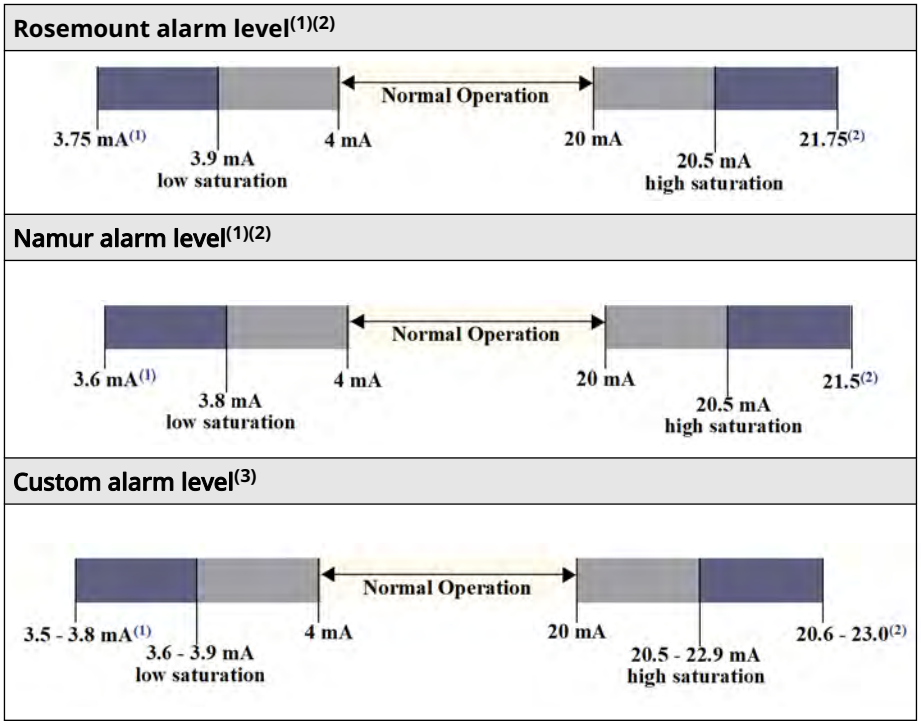
User-adjustable damping affects the transmitter's ability to respond to changes in the applied process. The damping value + response time should not exceed the loop requirements.

If using a thermowell assembly, ensure to also take into account the added response time due to thermowell material.

7.4.2 Alarm and saturation levels

DCS or safety logic solver should be configured to match transmitter configuration. Figure 7-1 identifies the three alarm levels available and their operations values.

Figure 7-1: Alarm Levels



(1) Transmitter Failure, hardware or software alarm in LO position.
(2) Transmitter Failure, hardware or software alarm in HI position.
(3) Low alarm must be at least 0.1 mA lower than the low saturation value.

7.5 Operation and maintenance

7.5.1 Proof test

The following proof tests are recommended. In the event that an error is found in the safety functionality, proof test results and corrective actions taken must be documented at Emerson.com/Rosemount/Safety.

All proof test procedures must be carried out by qualified personnel.

7.5.2 Partial proof test 1

The partial proof test 1 consists of a power cycle plus reasonability checks of the transmitter output. Reference the FMEDA Report for percent of possible DU failures in the device.

FMEDA report can be found at Rosemount 644 Temperature Transmitter product page.

Required tools: Field Communicator, mA meter

Procedure

1. Bypass the safety PLC or take other appropriate action to avoid a false trip.
2. Send a HART command to the transmitter to go to high alarm current output and verify that the analog current reaches that value. This tests for compliance voltage problems such as low loop power supply voltage or increased wiring resistance. This also tests for other possible failures.
3. Send a HART command to the transmitter to go to the low alarm current output and verify that the analog current reaches that value. This tests for possible quiescent current related failures.
4. Use the HART communicator to view detailed device status to ensure no alarms or warnings are present in the transmitter.
5. Perform reasonability check on the sensor value(s) versus an independent estimate (i.e. from direct monitoring of BPCS value) to show current reading is good.
6. Restore the loop to full operation.
7. Remove the bypass from the safety PLC or otherwise restore to normal operation.

7.5.3 Comprehensive proof test 2

The comprehensive proof test 2 consists of performing the same steps as the partial proof test but with a two-point calibration of the temperature sensor in place of the reasonability check. Reference the FMEDA report for percent of possible DU failures in the device.

Required tools: Field Communicator, temperature calibration equipment

Procedure

1. Bypass the safety PLC or take other appropriate action to avoid a false trip.
2. Perform partial proof test 1.
3. Verify the measurement for two temperature points for Sensor 1. Verify the measurement for two temperature points for Sensor 2, if second sensor is present.
4. Perform reasonability check of the housing temperature.
5. Restore the loop to full operation.
6. Remove the bypass from the safety PLC or otherwise restore to normal operation.

7.5.4 Comprehensive proof test 3

The comprehensive proof test 3 includes a comprehensive proof test along with a simple sensor proof test. Reference the FMEDA report for percent of possible DU failures in the device.

Procedure

1. Bypass the safety PLC or take other appropriate action to avoid a false trip.

2. Perform simple proof test 1.
3. Connect calibrated sensor simulator in place of sensor 1.
4. Verify safety accuracy of two temperature points inputs to transmitter.
5. If sensor 2 is used, repeat Step 3 and Step 4.
6. Restore sensor connections to transmitter.
7. Perform reasonability check of transmitter housing temperature.
8. Perform reasonability check on the sensor(s) values versus an independent estimate (i.e. from direct monitoring of BPCS value) to show current reading is acceptable.
9. Restore loop to full operation.
10. Remove the bypass from the safety PLC or otherwise restore to normal operation.

7.5.5 Inspection

Visual inspection	Not required.
Special tools	Not required.
Product repair	The Rosemount 644 is repairable by replacement only.

All failures detected by the transmitter diagnostics or by the proof-test must be reported. Feedback can be submitted electronically at Emerson.com/Rosemount/Contact-Us.

7.6 Specifications

The Rosemount 644 Transmitter must be operated in accordance to the functional and performance specifications provided in the Product Data Sheet.

7.6.1 Failure rate data

The report is available at the Rosemount 644 Temperature Transmitter product page.

7.6.2 Failure values

Safety Deviation (defines what is dangerous in a FMEDA):

- Span ≥ 100 °C ± 2% of process variable span
- Span << 100 °C ± 2 °C

Safety response time: five seconds

7.6.3 Product life

50 years - based on worst case component wear-out mechanisms — not based on wear-out of process sensors.

Report any safety related product information at Emerson.com/Rosemount/Contact-Us.

A Reference Data

A.1 Product certifications

To view current Rosemount 644 Temperature Transmitter product certification, follow these steps:

Procedure

1. Go to Emerson.com/Rosemount/Rosemount-644.
2. Scroll as needed to the green menu bar and click **Documents & Drawings**.
3. Click **Manuals & Guides**.
4. Select the appropriate Quick Start Guide.

A.2 Ordering information, specifications, and drawings

To view current Rosemount 644 Temperature Transmitter ordering information, specifications, and drawings, follow these steps:

Procedure

1. Go to Emerson.com/Rosemount/Rosemount-644.
2. Scroll as needed to the green menu bar and click **Documents & Drawings**.
3. For installation drawings, click **Drawings & Schematics**.
4. Select the appropriate Product Data Sheet.
5. For ordering information, specifications, and dimensional drawings, click **Data Sheets & Bulletins**.
6. Select the appropriate Product Data Sheet.

A.3 AMS terms

Resistance:	This is the existing resistance reading of the thermocouple loop.
Resistance threshold exceeded:	The check box indicates if the sensor resistance has passed the Trigger Level.
Trigger level:	Threshold resistance value for the thermocouple loop. The trigger level may be set for 2, 3, or 4 × Baseline or the default of 5000 ohms. If the resistance of the thermocouple loop surpasses the Trigger Level, a maintenance alert will be generated.
Baseline resistance:	The resistance of the thermocouple loop obtained after installation, or after resetting the baseline value. The trigger level may be calculated from the baseline value.
Reset baseline resistance:	Launches a method to recalculate the Baseline value (which may take several seconds).
TC diagnostic mode sensor 1or 2:	This field will read either enabled or disabled indicating when the thermocouple degradation diagnostic is on or off for that sensor.

B Field Communicator Menu Trees and Fast Keys

B.1 Field Communicator menu trees

Figure B-1: Overview

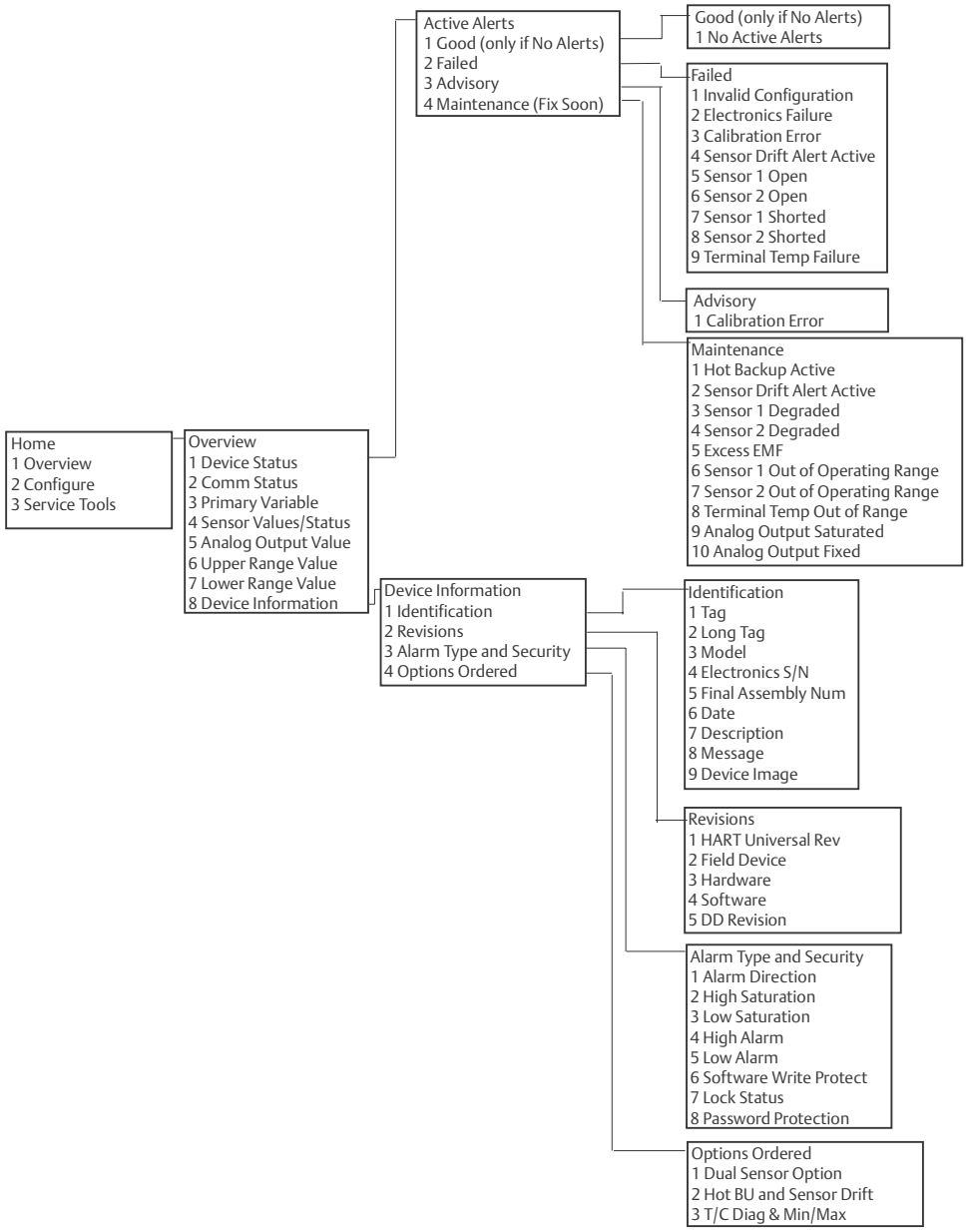


Figure B-2: Configure

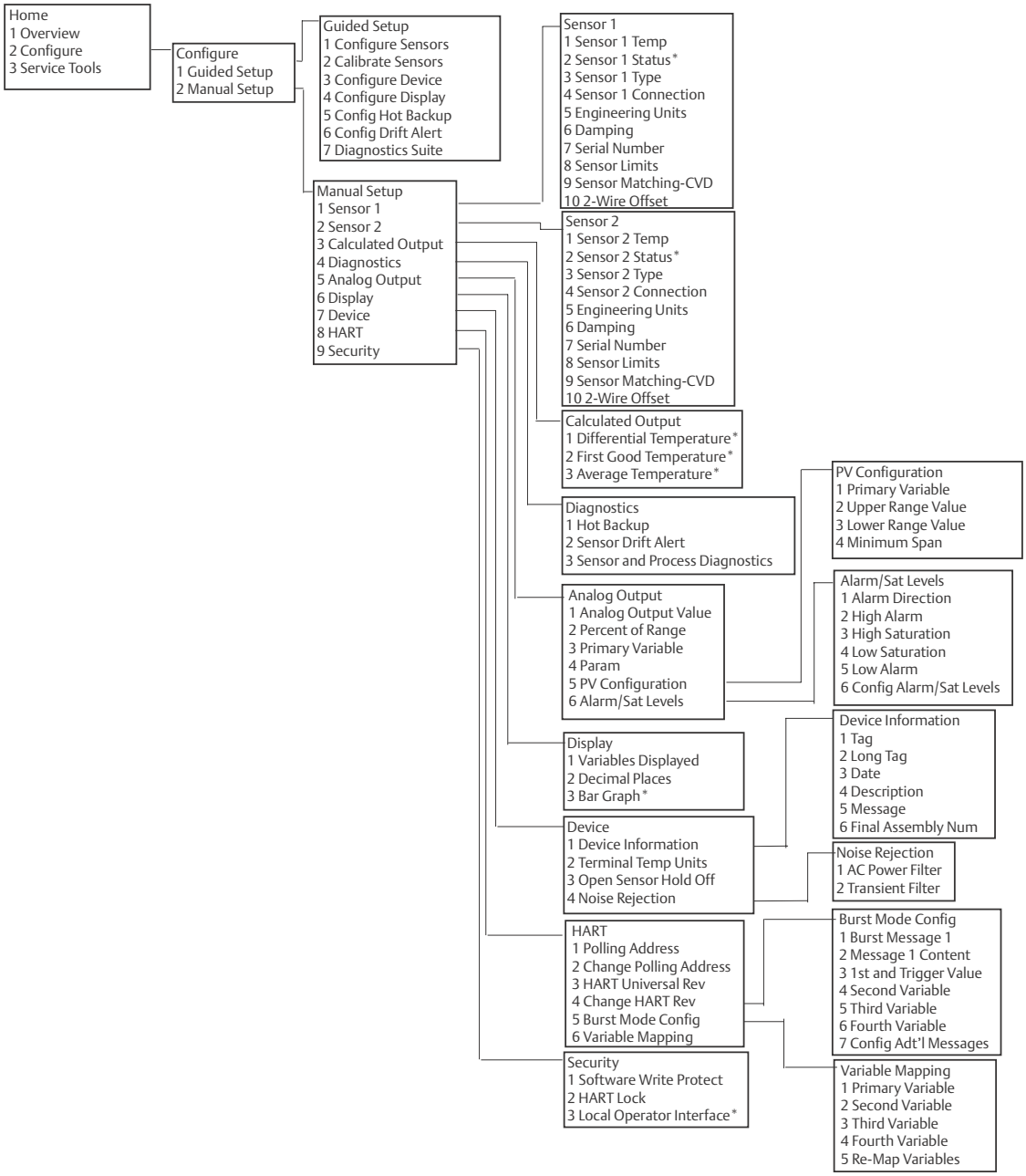


Figure B-3: Service Tools

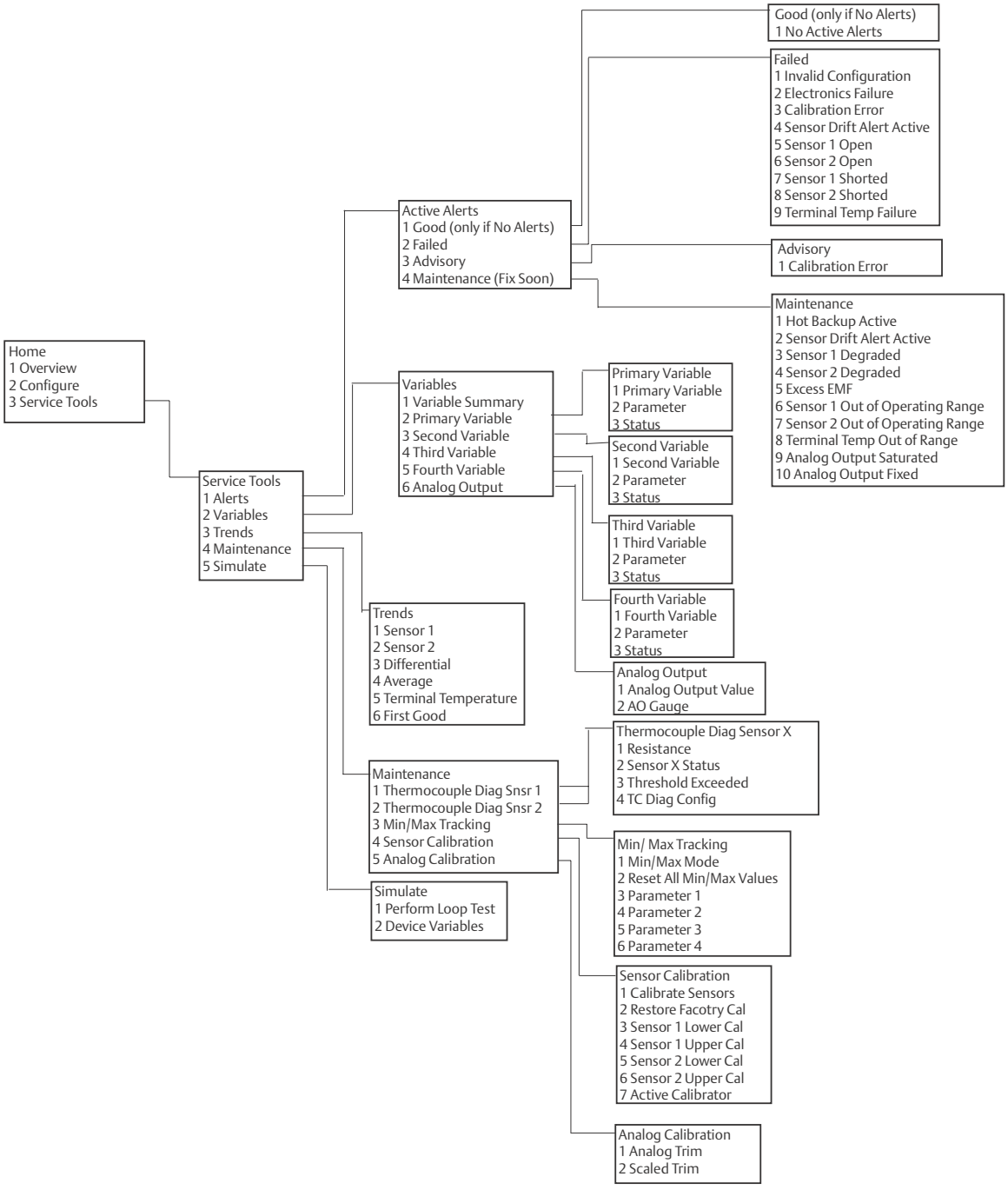


Figure B-4: HART Revision 7 Field Communicator Menu Tree – Overview

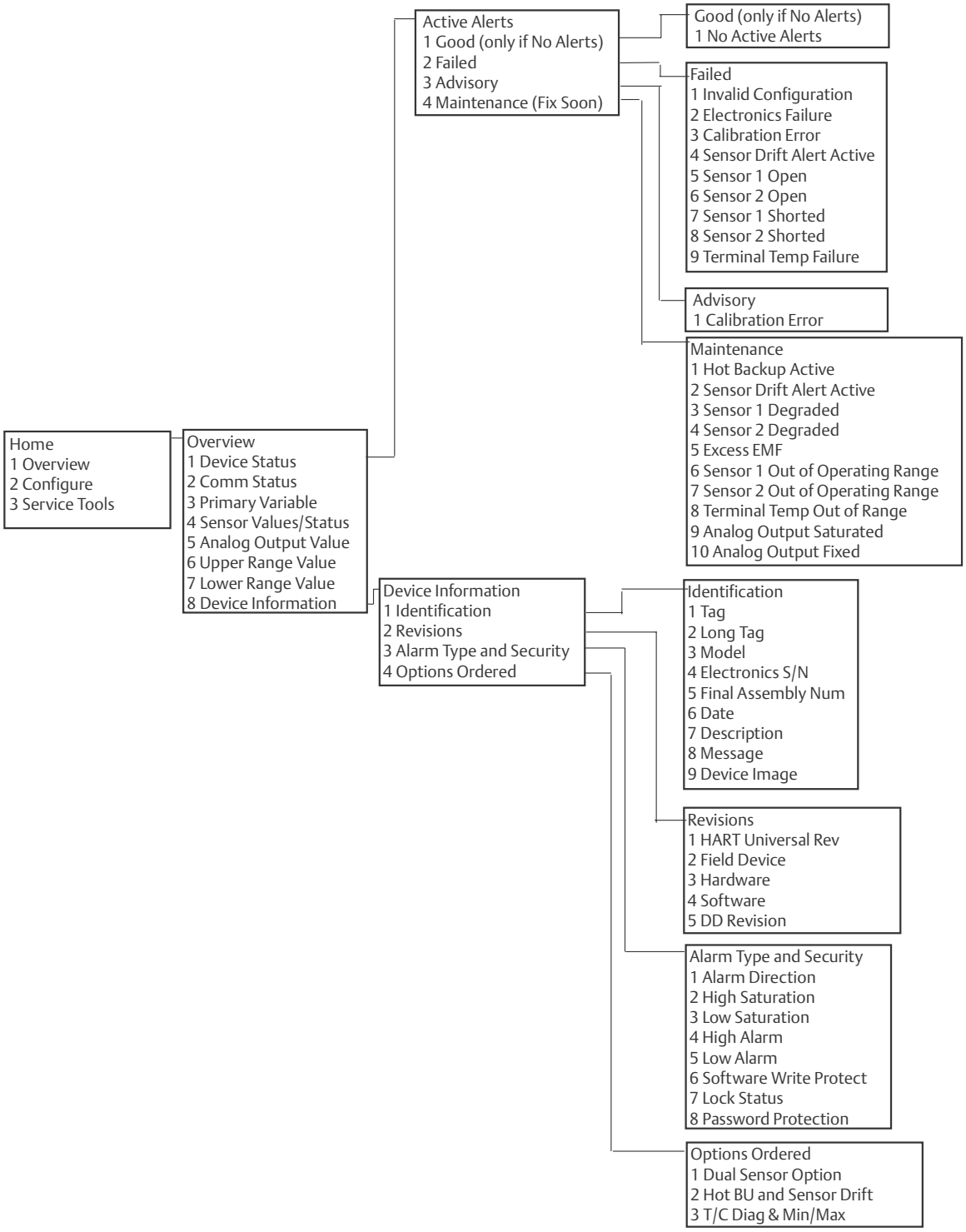


Figure B-5: HART Revision 7 Field Communicator Menu Tree - Configure

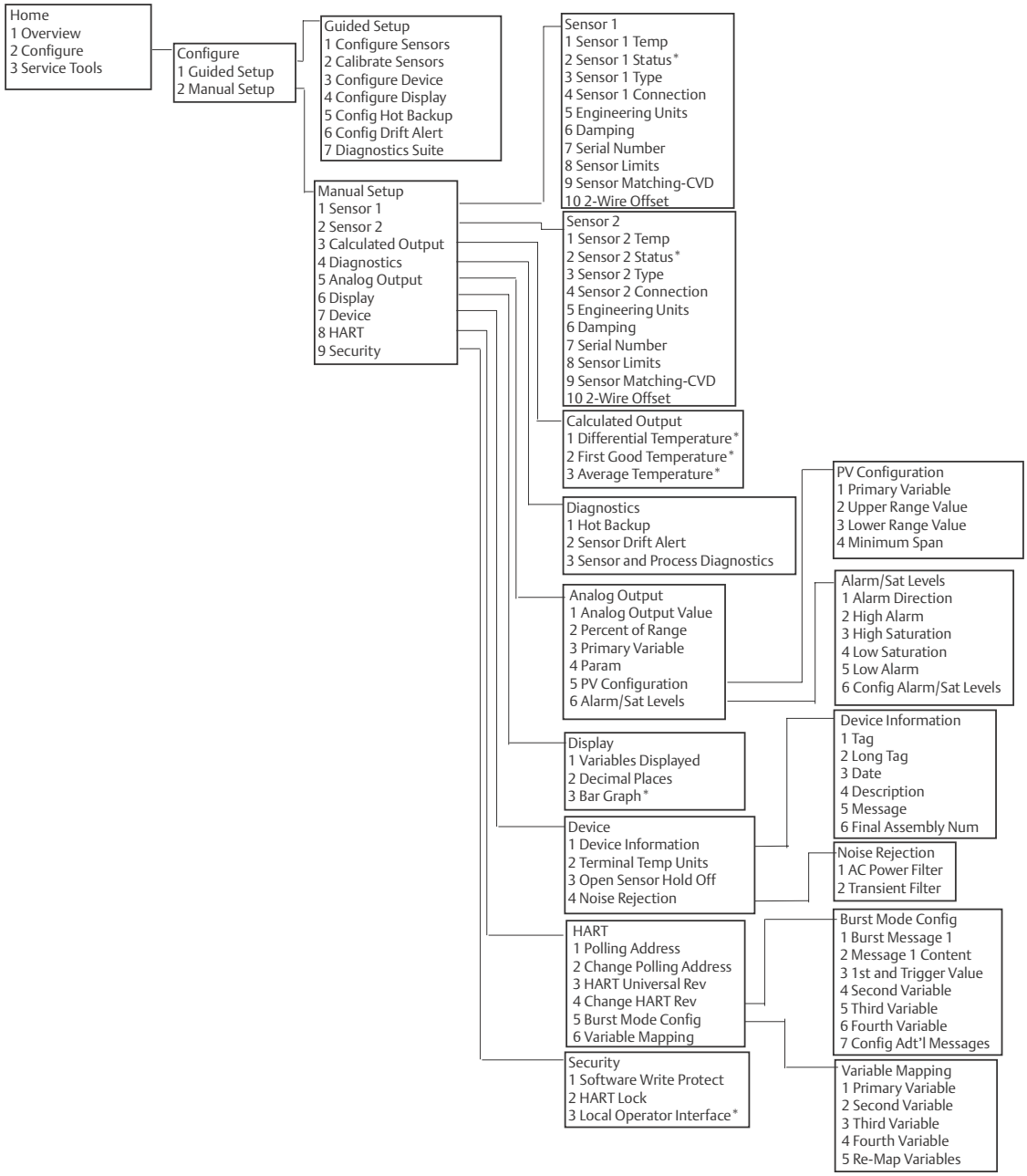
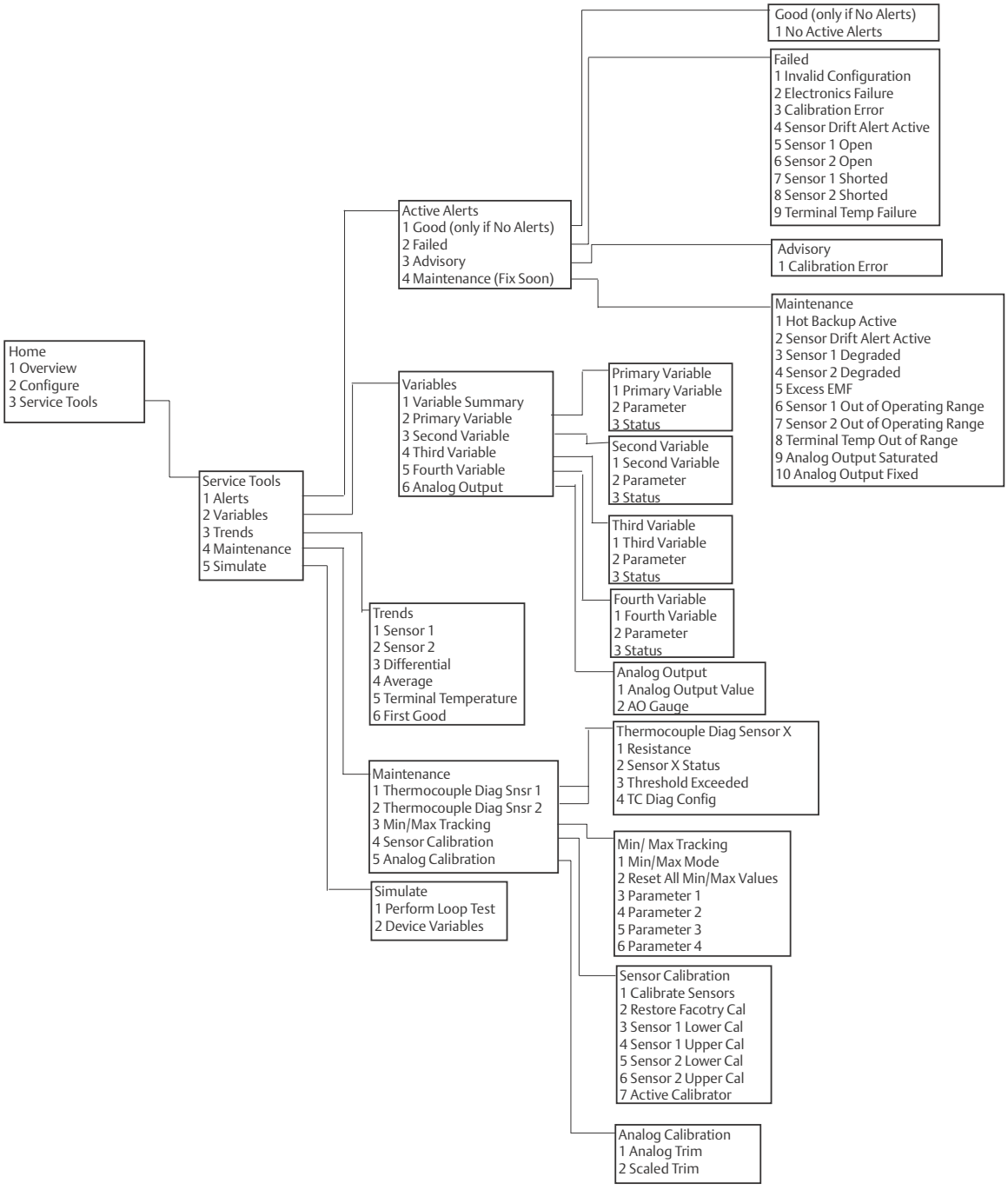


Figure B-6: Service Tools



B.2 Field Communicator Fast Keys

Table B-1: Device Revision 8 and 9 (HART 5 and 7) Field Communicator Device Dashboard Fast Key Sequences

Function	HART 5	HART 7
Alarm Values	2, 2, 5, 6	2, 2, 5, 6
Analog Calibration	3, 4, 5	3, 4, 5
Analog Output	2, 2, 5, 1	2, 2, 5, 1
Average Temperature Setup	2, 2, 3, 3	2, 2, 3, 3
Burst Mode	2, 2, 8, 4	2, 2, 8, 4
Comm Status	N/A	1, 2
Configure additional messages	N/A	2, 2, 8, 4, 7
Configure Hot Backup	2, 2, 4, 1, 3	2, 2, 4, 1, 3
D/A Trim	3, 4, 4, 1	3, 4, 4, 1
Damping Values	2, 2, 1, 5	2, 2, 1, 6
Date	2, 2, 7, 1, 2	2, 2, 7, 1, 3
Display Setup	2, 1, 4	2, 1, 4
Descriptor	2, 2, 7, 1, 4	2, 2, 7, 1, 5
Device Information	1, 8, 1	1, 8, 1
Differential Temperature Setup	2, 2, 3, 1	2, 2, 3, 1
Drift Alert	2, 2, 4, 2	2, 2, 4, 2
Filter 50/60 Hz	2, 2, 7, 4, 1	2, 2, 7, 4, 1
First Good Temperature Setup	2, 2, 3, 2	2, 2, 3, 2
Hardware Revision	1, 8, 2, 3	1, 8, 2, 3
HART Lock	N/A	2, 2, 9, 2
Intermittent Sensor Detect	2, 2,7, 4, 2	2, 2, 7, 4, 2
Loop Test	3, 5, 1	3, 5, 1
Locate Device	N/A	3, 4, 6, 2
Lock Status	N/A	1, 8, 3, 8
LRV (Lower Range Value)	2, 2, 5, 5, 3	2, 2, 5, 5, 3
LSL (Lower Sensor Limit)	2, 2, 1, 7, 2	2, 2, 1, 8, 2
Message	2, 2, 7, 1, 3	2, 2, 7, 1, 4
Open Sensor Hold off	2, 2, 7, 3	2, 2, 7, 3
Percent Range	2, 2, 5, 2	2, 2, 5, 2

Table B-1: Device Revision 8 and 9 (HART 5 and 7) Field Communicator Device Dashboard Fast Key Sequences *(continued)*

Function	HART 5	HART 7
Sensor 1 Configuration	2, 1, 1	2, 1, 1
Sensor 2 Configuration	2, 1, 1	2, 1, 1
Sensor 1 Serial Number	2, 2, 1, 6	2, 2, 1, 7
Sensor 2 Serial Number	2, 2, 2, 7	2, 2, 2, 8
Sensor 1 Type	2, 2, 1, 2	2, 2, 1, 3
Sensor 2 Type	2, 2, 2, 2	2, 2, 2, 3
Sensor 1 Unit	2, 2, 1, 4	2, 2, 1, 5
Sensor 2 Unit	2, 2, 2, 4	2, 2, 2, 5
Sensor 1 Status	N/A	2, 2, 1, 2
Sensor 2 Status	N/A	2, 2, 2, 2
Simulate Digital Signal	N/A	3, 5, 2
Software Revision	1, 8, 2, 4	1, 8, 2, 4
Tag	2, 2, 7, 1, 1	2, 2, 7, 1, 1
Long Tag	N/A	2, 2, 7, 1, 2
Terminal Temperature	2, 2, 7, 1	2, 2, 8, 1
URV (Upper Range Value)	2, 2, 5, 5, 2	2, 2, 5, 5, 2
USL (Upper Sensor Limit)	2, 2, 1, 7, 2	2, 2, 1, 8, 2
Variable Mapping	2, 2, 8, 5	2, 2, 8, 5
2-wire Offset Sensor 1	2, 2, 1, 9	2, 2, 1, 10
2-wire Offset Sensor 2	2, 2, 2, 9	2, 2, 2, 10

Table B-2: Device Revision 7 Field Communicator Traditional Fast Key Sequences

Function	Fast Keys
Active Calibrator	1, 2, 2, 1, 3
Alarm/Saturation	1, 3, 3, 2
AO Alarm Type	1, 3, 3, 2, 1
Burst Mode	1, 3, 3, 3, 3
Burst Option	1, 3, 3, 3, 4
Calibration	1, 2, 2
Callendar-Van Dusen	1, 3, 2, 1
Configuration	1, 3
D/A Trim	1, 2, 2, 2

Table B-2: Device Revision 7 Field Communicator Traditional Fast Key Sequences *(continued)*

Function	Fast Keys
Damping Values	1, 1, 10
Date	1, 3, 4, 2
Descriptor	1, 3, 4, 3
Device Info	1, 3, 4
Device Output Configuration	1, 3, 3
Diagnostics and Service	1, 2
Filter 50/60 Hz	1, 3, 5, 1
Hardware Rev	1, 4, 1
Hart Output	1, 3, 3, 3
Intermittent Detect	1, 3, 5, 4
LCD Display Options	1, 3, 3, 4
Loop Test	1, 2, 1, 1
LRV (Lower Range Value)	1, 1, 6
LSL (Lower Sensor Limit)	1, 1, 8
Measurement Filtering	1, 3, 5
Message	1, 3, 4, 4
Meter Configuring	1, 3, 3, 4, 1
Meter Decimal Point	1, 3, 3, 4, 2
Num Req Preams	1, 3, 3, 3, 2
Open Sensor Hold off	1, 3, 5, 3
Percent Range	1, 1, 5
Poll Address	1, 3, 3, 3, 1
Process Temperature	1, 1
Process Variables	1, 1
PV Damping	1, 3, 3, 1, 3
PV Unit	1, 3, 3, 1, 4
Range Values	1, 3, 3, 1
Review	1, 4
Scaled D/A Trim	1, 2, 2, 3
Sensor Connection	1, 3, 2, 1, 1
Sensor 1 Setup	1, 3, 2, 1, 2
Sensor Serial Number	1, 3, 2, 1, 4
Sensor 1 Trim	1, 2, 2, 1

Table B-2: Device Revision 7 Field Communicator Traditional Fast Key Sequences *(continued)*

Function	Fast Keys
Sensor 1 Trim- Factory	1, 2, 2, 1, 2
Sensor Type	1, 3, 2, 1, 1
Software Revision	1, 4, 1
Status	1, 2, 1, 4
Tag	1, 3, 4, 1
Terminal Temperature	1, 3, 2, 2
Test Device	1, 2, 1
URV (Upper Range Value)	1, 1, 7
USL (Upper Sensor Limit)	1, 1, 9
Variable Mapping	1, 3, 1
Variable Re-Map	1, 3, 1, 5
Write Protect	1, 2, 3
2-Wire Offset	1, 3, 2, 1, 2, 1

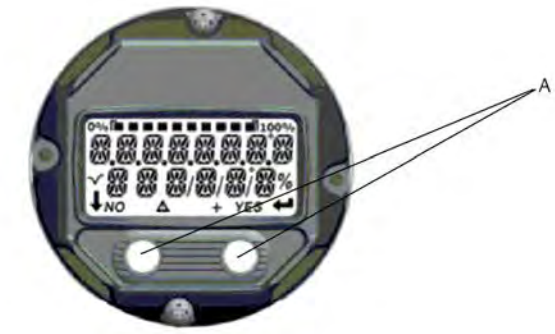
C Local Operator Interface (LOI)

- The LOI requires option code M4 to be ordered.
- To activate the LOI, push either configuration button. Configuration buttons are located on the LCD display (remove the housing cover to access the interface. See Table C-1 for configuration button functionality and Figure C-1 for configuration button location).

When using the LOI for configuration, several features require multiple screens for a successful configuration. Data entered will be saved on a screen-by-screen basis; the LOI will indicate this by flashing SAVED on the LCD display each time.

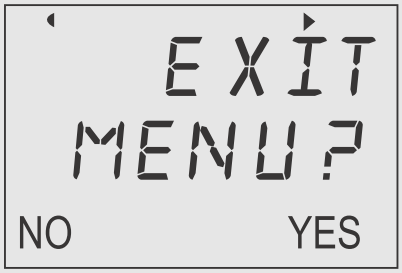
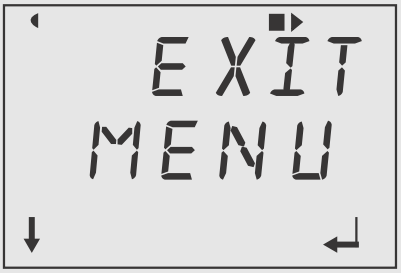
Note
Entering into the LOI menu effectively disables the ability to write to the device by any other host or configuration tool. Ensure this is communicated to necessary personnel before using the LOI for device configuration.

Figure C-1: LOI Configuration Buttons



A. Configuration buttons

Table C-1: LOI Button Operation

Button		
Left	No	SCROLL
Right	Yes	ENTER

LOI password

An LOI password can be entered and enabled to prevent review and modification of device configuration via the LOI. This does not prevent configuration from HART® or through the control system. The LOI password is a four-digit code that is to be set by the user. If the password is lost or forgotten the master password is “9307”. The LOI password can be configured and enabled/disabled by HART communication via a Field Communicator, AMS Device Manager, or the LOI.

C.1 Number entry

Floating-point numbers can be entered with the LOI. All eight number locations on the top line can be used for number entry. Refer to Table 2-2 for LOI button operation. Below is a floating-point number entry example for changing a value of “-0000022” to “000011.2”

Table C-2: LOI Number Entry

Step	Instruction	Current position (indicated by underline)
1	When the number entry begins, the left most position is the selected position. In this example, the negative symbol, “-“, will be flashing on the screen.	-0000022
2	Press the scroll button until the “0” is blinking on the screen in the selected position.	00000022
3	Press the enter button to select the “0” as an entry. The second digit from the left will be blinking.	00000022
4	Press the enter button to select “0” for second digit. The third digit from the left will be blinking.	00000022
5	Press the enter button to select “0” for the third digit. The fourth digit from the left will now be blinking.	00000022
6	Press the enter button to select “0” for the fourth digit. The fifth digit from the left will now be blinking.	00000022
7	Press scroll to navigate through the numbers until the “1” is on the screen.	00001022
8	Press the enter button to select the “1” for the fifth digit. The sixth digit from the left will now be blinking.	00001022
9	Press scroll to navigate through the numbers until the “1”, is on the screen.	00001122
10	Press the enter button to select the “1” for the sixth digit. The seventh digit from the left will now be blinking.	00001122

Table C-2: LOI Number Entry *(continued)*

Step	Instruction	Current position (indicated by underline)
11	Press scroll to navigate through the numbers until the decimal, ".", is on the screen.	000011.2
12	Press the enter button to select the decimal, ".", for the seventh digit. After pressing enter, all digits to the right of the decimal will now be zero. The eighth digit from the left will now be blinking.	000011.0
13	Press the scroll button to navigate through the numbers until the "2", is on the screen.	000011.2
14	Press the enter button to select the "2" for the eighth digit. The number entry will be complete and a "SAVE" screen will be shown.	000011.2

Usage notes:

- It is possible to move backwards in the number by scrolling to the left and pressing enter. The left arrow appears as such in the LOI: ;
- The negative symbol is only allowed in the left most position.
- The Over score character "‾ "is used in the LOI to enter a blank space for Tag entry.

C.2 Text entry

Text can be entered with the LOI. Depending on the edited item, up to eight locations on the top line can be used for text entry. Text entry follows the same rules as the number entry rules in Number entry, except the following characters are available in all locations: A-Z, 0-9, -, /, space.

C.2.1 Scrolling

When it is desired to move more quickly through the list of menu choices or alpha numeric characters without individual button presses, a faster scrolling technique is available. Scrolling functionality allows the user to walk through any menu in forward or reverse order, enter text or digits easily and quickly.

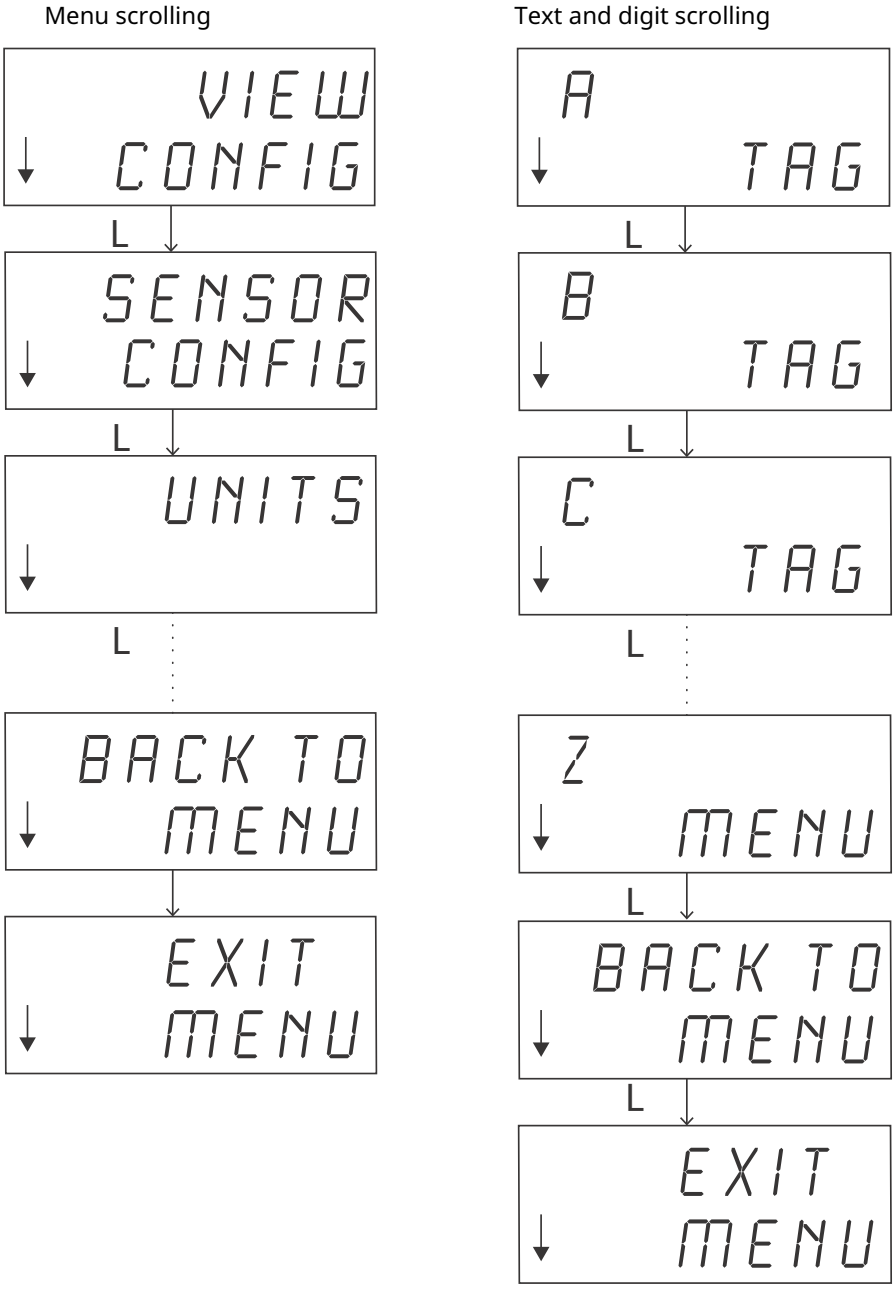
Menu scrolling

Simply hold down the left button after it brings you to the next menu item, each of the proceeding menus will be shown one after another while the button is pressed down.

Text or digit entry scrolling

Quickly navigate through number and text menu lists by holding down the left button the same as in Menu.

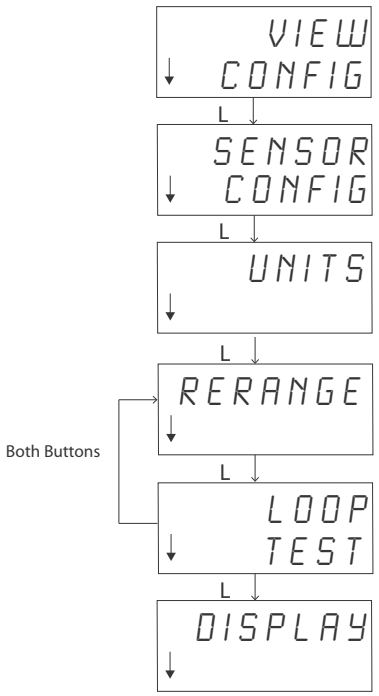
Figure C-2: Scrolling



Scrolling backwards

Moving backwards during digit or text entry was described above in Digit Entry "Usage Notes". During regular menu navigation it is possible to go back to the previous screen by pressing both buttons at the same time.

Figure C-3: Scrolling backwards



C.3 Timeout

The LOI in standard operation will Time Out and return to the home screen after 15 minutes of inactivity. To re-enter into the LOI menu, press either button.

C.4 Saving and canceling

The Save and Cancel functionality implemented at the end of a series of steps allows the user to save the change or exit the function without saving any of the changes. The way these functions are shown should always look as follows:

Saving

Whether you're choosing a setting from a list of choices or entering digits or text the first screen shall show "SAVE?" to ask the user if they want to save the information just entered. You can select the cancel function (choose NO) or the save function (choose YES). After the save function is selected, "SAVED" shall appear on the screen.

Figure C-4: Saving a Setting

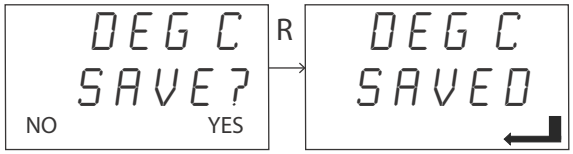
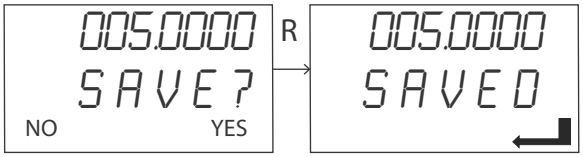


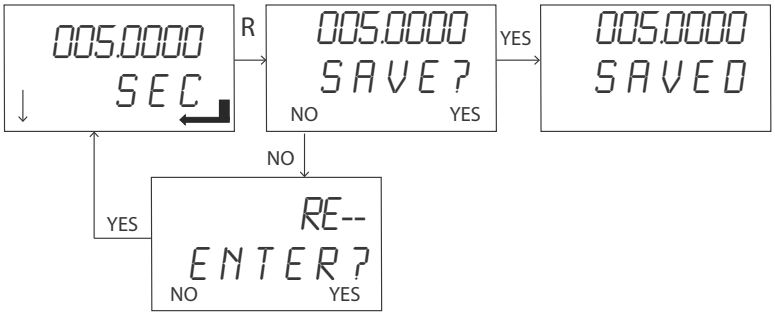
Figure C-5: Saving Text or Values



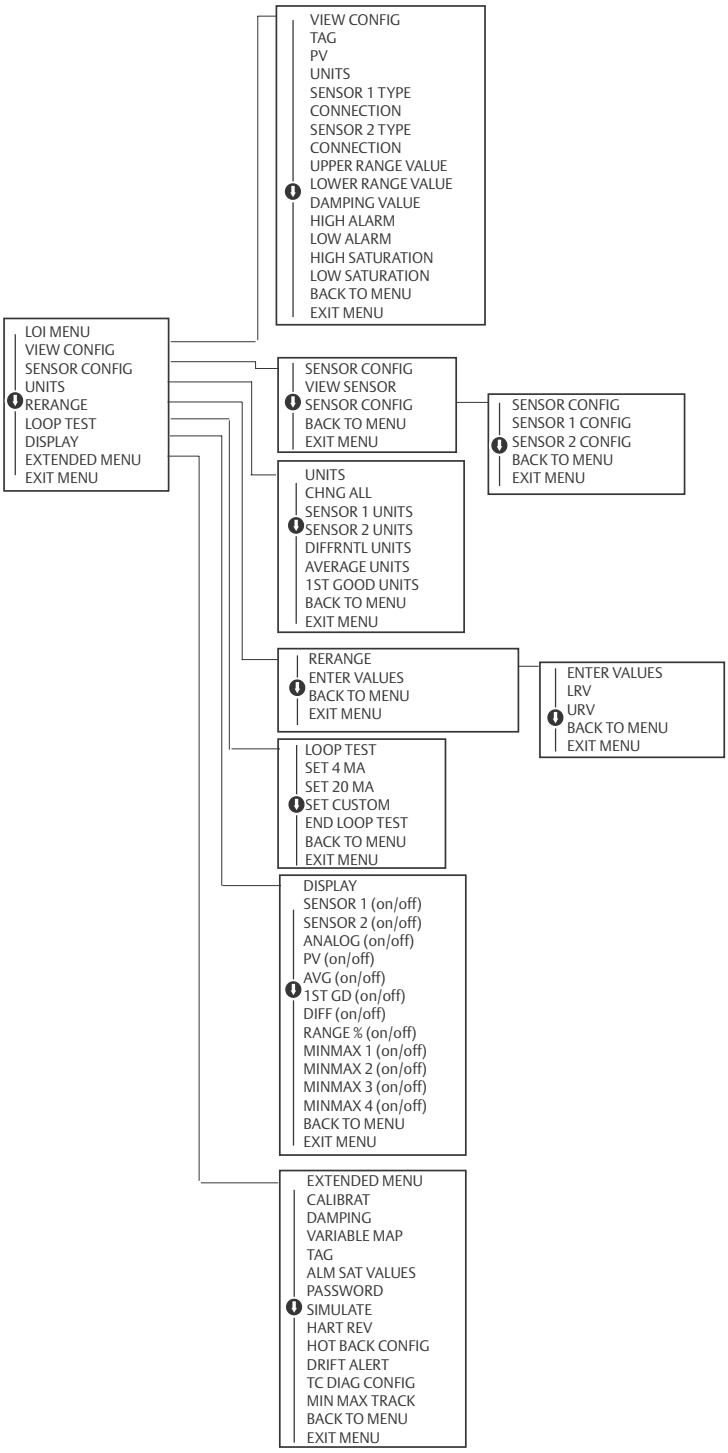
Canceling

When a value or text string is being entered into the transmitter via the LOI and the function is canceled, the LOI menu can offer the user a means to re-enter the value without losing the information entered. Examples of a value being entered are the Tag, Damping, and Calibration values. If you do not want to re-enter the value and desire to continue canceling, select the NO option when prompted.

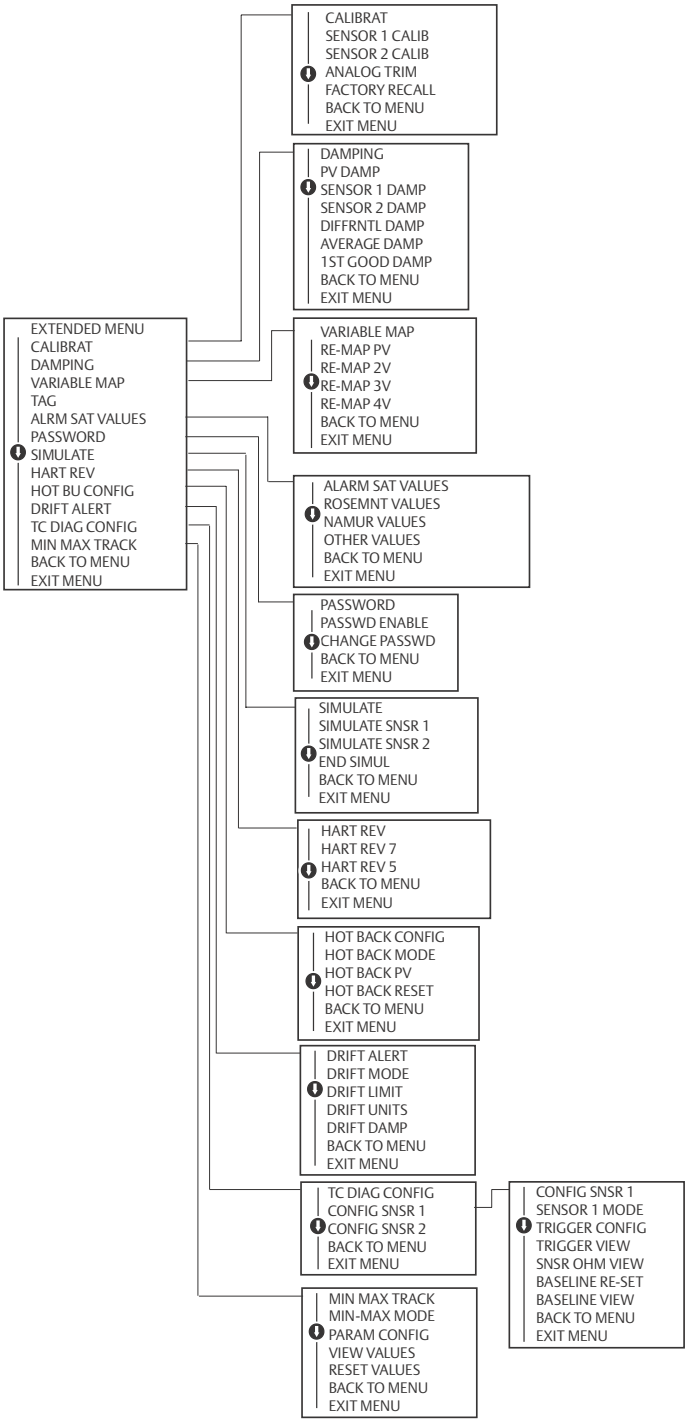
Figure C-6: Canceling



C.5 LOI menu tree



C.6 LOI menu tree – extended menu



00809-0200-4728
Rev. SF
2023

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7.6 IOM for Analyzers

INOV8
Customer Inspired Innovation

Inov8
Operating Manual

Contaminated Water Monitoring / Control Series

This manual is applicable to:
EXS-1/2
EXP-1/2
GPP-1/2
GPS-1/2

[IS-SOW-0100-3]

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EXS-1/2, EXP-1/2, GPP-1 and GPS-1 Operating Manual

The above equipment is designed and manufactured by Inov8 Systems Ltd which is located at Unit 6 Edgewater Road Office Park, Belfast, Northern Ireland, BT3 9JQ. Phone number +44 (0) 28 9069 8297

Caution / Warning Markings:





These labels are placed on the internal chassis. Do not look directly into the laser.

Declaration of conformity:

This product conforms to the following directives.

* 2014/34/EU ATEX Directive (EXP and EXS only)

* 06/108/EC EMC Directive

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Quick Start (Basic Operation)

Each unit may be supplied with several standard oil files/curves or a custom oil file if requested (and a sample provided).

- INOV8 100ppm Standard
- INOV8 500ppm Standard
- INOV8 1000ppm Standard

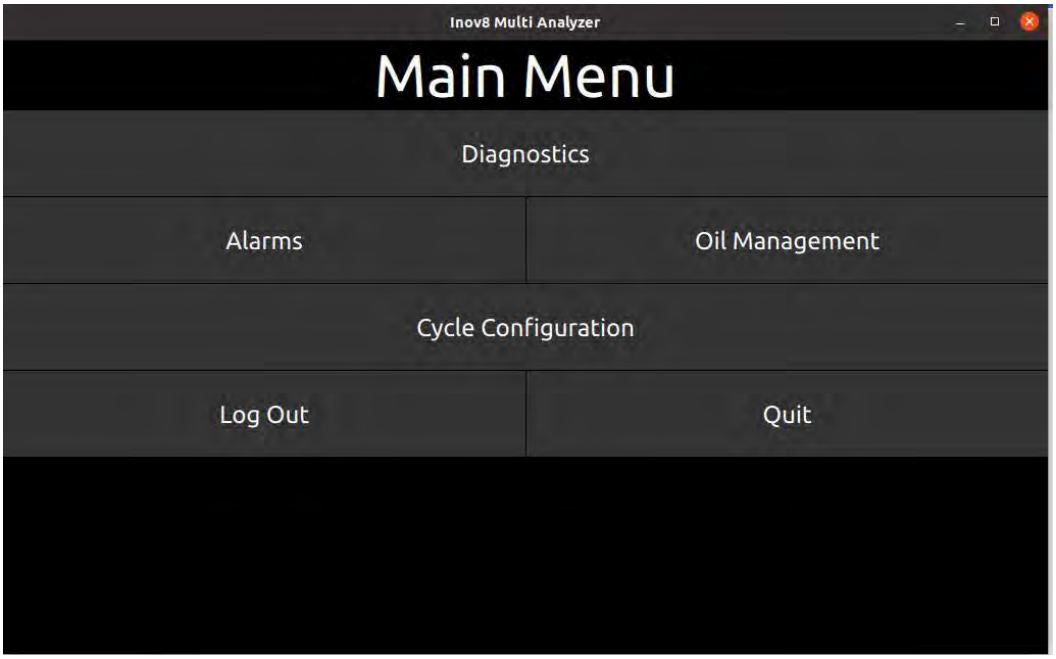
These files have been produced using a blend of crude oils to create generic curves, which are able to track the suspended concentrations of approximately 70% of known oil types with only minor changes for fine tuning required to match the results from lab sampling.

Where a standard oil file is not suitable for reasons of required accuracy or range, a bespoke file can be produced by or under the supervision of trained personnel.

Powering up

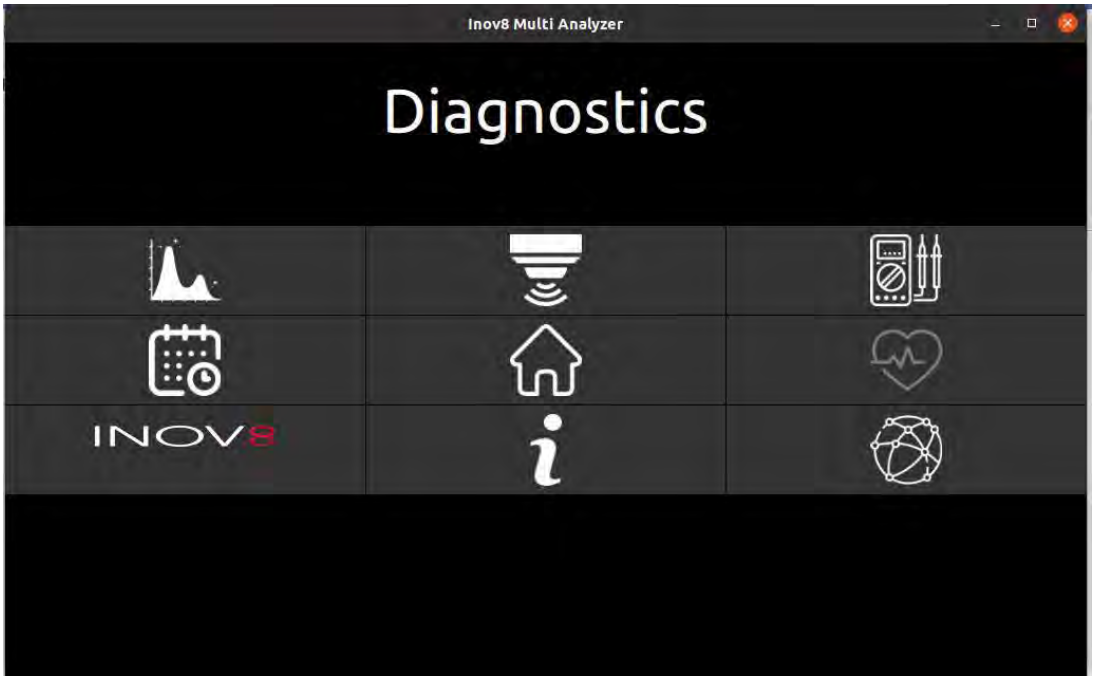
With 24V DC applied, the unit will automatically boot up and carry out diagnostic health checks. Once completed the Main Menu screen will appear. Once the Main Menu appears, please go to here to ensure the clock is set up. This should be done first.

Main Menu



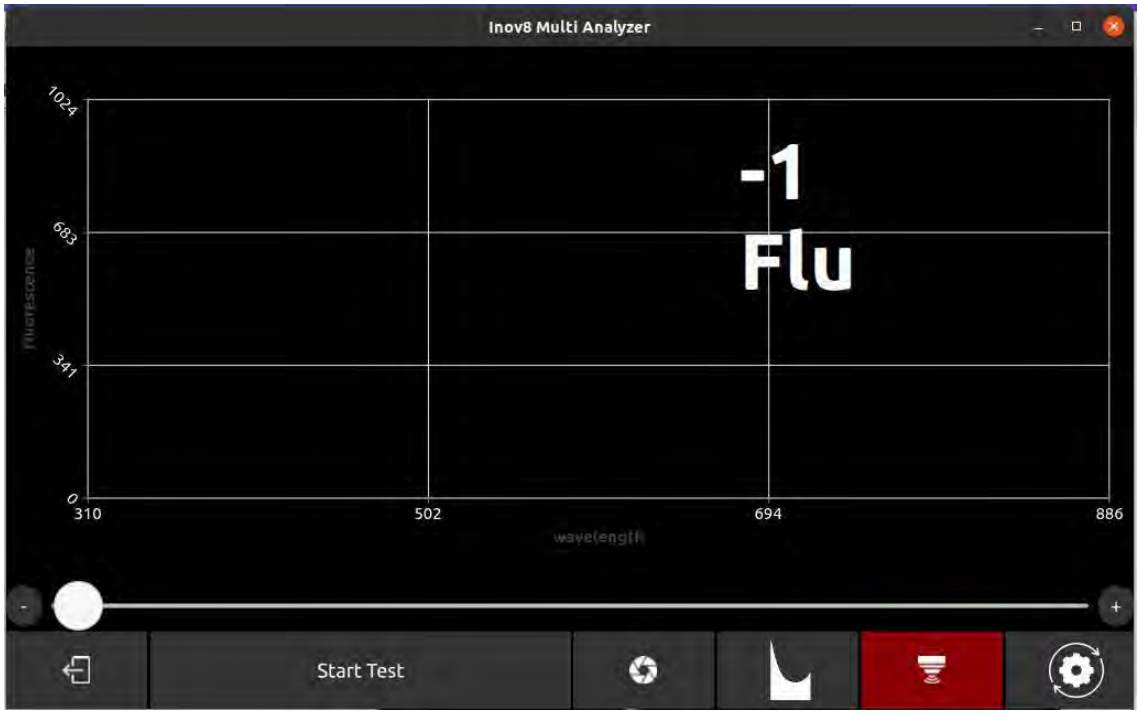
Ensure that an adequate volume of produced water is maintained across the sample chamber. When the analyser is powered up, a measurement cycle will automatically begin, if this has been set.

Diagnostics:

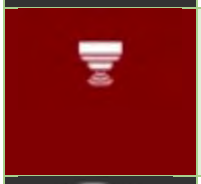
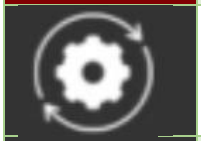
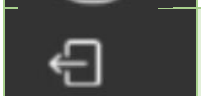


When hovering over each button, a tool tip shows the specific name for it. Please note that on some configurations some options will be disabled.

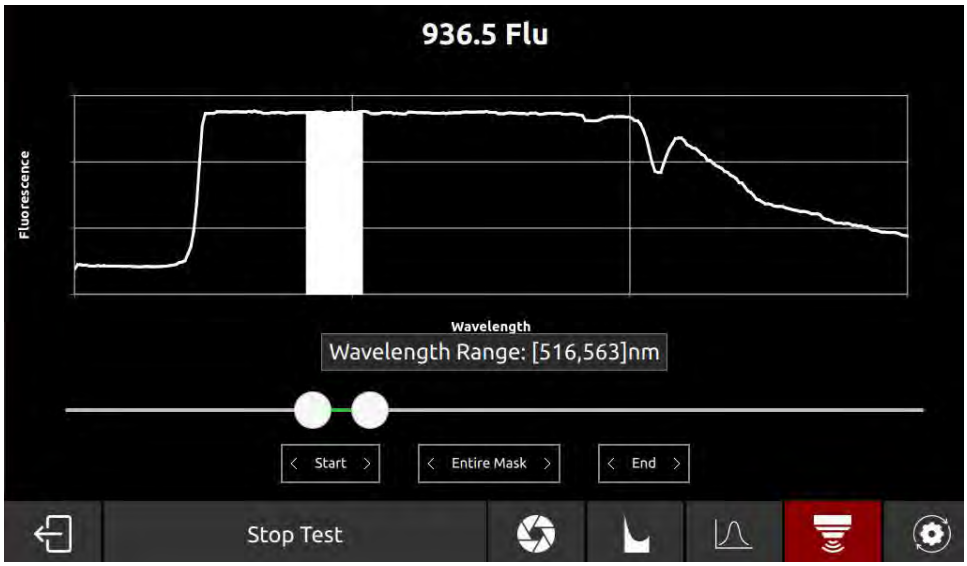
1 - Spectra



Select the ‘Start Test’ button to start and stop the measurement.

Button	Name	Function
	Integration Time Set Up	This button is the integration time. You can move the slider to achieve the integration time you need, or use the + and – buttons for more accurate setting.
	Spectra Wavelength Set Up	Here you can select the wavelength range so focus the resulting reading to part of the measurement.
	Ultrasonic cleaning	At any time, the ultrasonics button can be selected to action a quick burst of the ultrasonics, lasting 1 second. When active, this button will flash green before turning back to red.
	Find Best Settings	This button will find the best offset, wavelength and integration time for the user based on the current sample.
	Back to diagnostics	Use this back button to go back to the Diagnostics menu.
	Spectrometer Offset	Use this button to move the spectra up or down on the screen. This can be used to 'zero' the spectra which helps to overcome third party fluorescence in or around the sample.

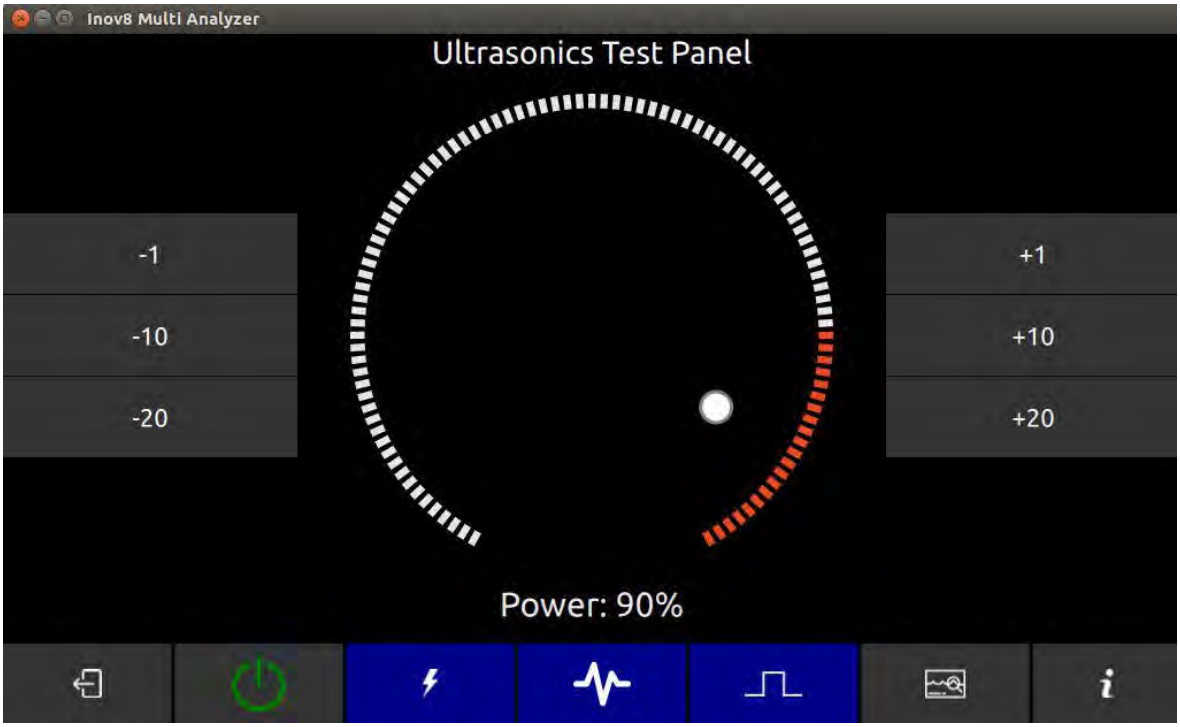
Once the settings have been chosen, either manually or through 'Find Best Settings', the measurement will be displayed as:



The tool tip is displayed as an information box in the top left corner of the measurement. Here, the Wavelength Range is displayed as both the lower and upper limit.

When creating a sample, 0-100ppm for example, the settings selected in the spectra diagnostics option, must remain unchanged until the sample has been created.

Wavelengths can now be shifted as a whole range or individually in applicable screens. The wavelength mask shown on the spectra now much more closely resembles where you select on the



slider.

2 - Ultrasonics

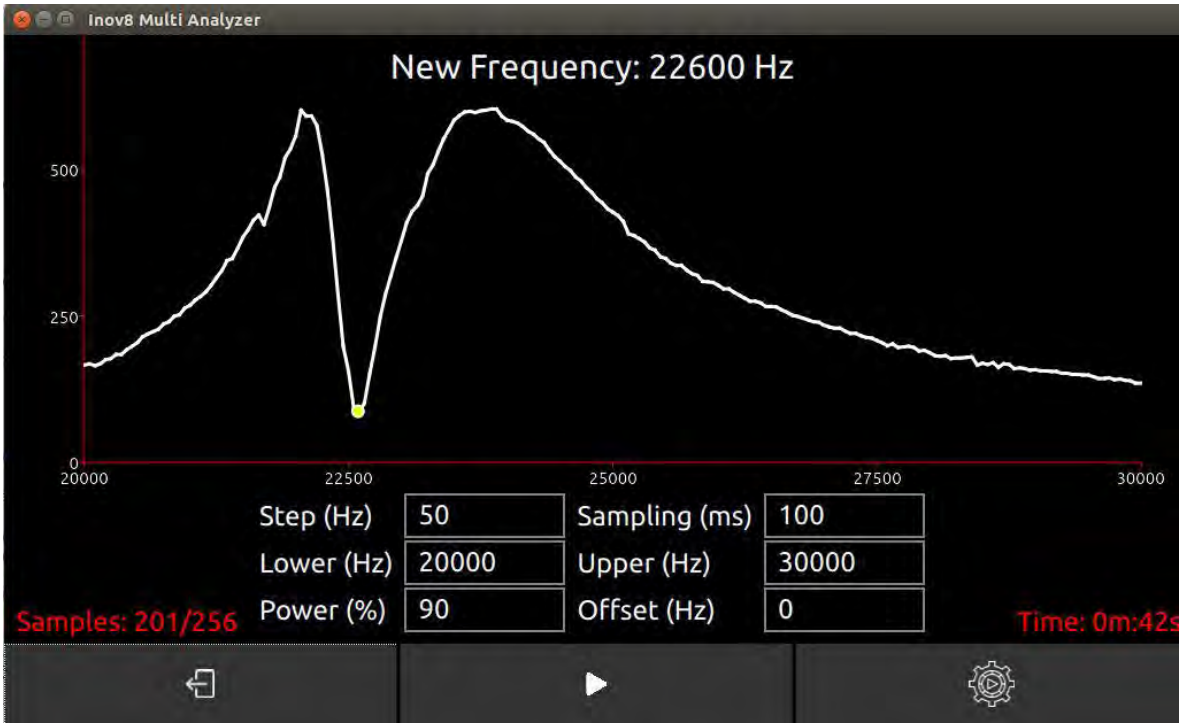
Ultrasonic Functions

Button	Name	Function
	Start Test	The start / stop button will alternate between green and red depending on whether the user has clicked the ultrasonics button on or off.
	Power	This button represents the power at which the ultrasonic cleaning will operate.
	Frequency	This button represents the frequency at which the ultrasonic cleaning will operate.
	Pulse on / off	Here, you can ‘pulse on’ and ‘pulse off’ the ultrasonics over a set period, measured in milliseconds.
	Auto Tune	If enabled, you can enter the ultrasonics auto tune menu here.

	Summary	This is a summary button that displays the power, frequency and pulse times.

On either side of the circular dials found on the Ultrasonic Test Panel, the column of buttons allows you to change the current setting by the shown amount. For example, on the power screen shown on the previous page, the power is set to 90%, if you click the -10 button it will change to 80%.

Auto Tune



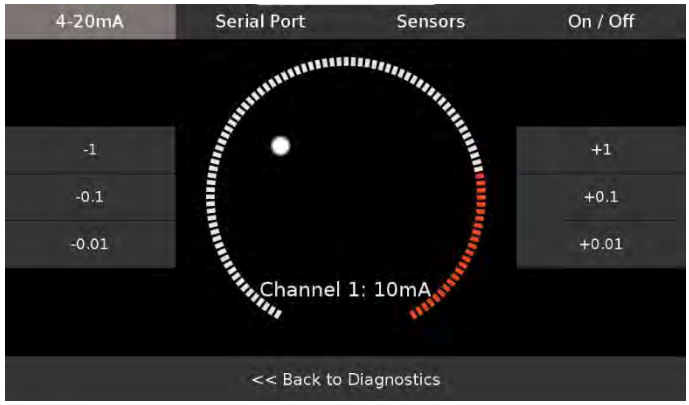
Here, you can perform an auto tune with the parameters which you set in the text boxes.

- The Lower and Upper (Hz) settings are simply the beginning and end frequencies of the auto tune, in Hertz.
- Step (Hz) refers to how large the gaps are between frequencies, for example with the above settings the auto tune starts at 20,000 Hz. then jumps to 20,050 Hz, then 20,100 Hz and so on.
- Sampling (ms) is how long the ultrasonics will be run for at every frequency step, this is in milliseconds. The ultrasonics will be off for the same amount of time. So above, on for 100ms and off for 100ms before moving to the next frequency.
- Offset (Hz) allows you to apply a positive of negative offset to fine-tune the ultrasonics further. For example, in certain scenarios the absolute peak cleaning performance may be slightly before or after where the auto tune will naturally pick, this offset allows you to achieve that performance.

3 - Functionality

This section allows you to perform some functionality test. The tabs at the top allow you to choose between a few different hardware options.









On / Off

This panel allows you to test the light source and relays, by simply turning them on or off and checking that they toggle as expected.

4-20 mA

If the unit is equipped with 4-20 mA module, the panel above can be used to test the output over the full range. Note - The analyser 4-20mA output is passive, therefore it requires a drive voltage of 24vDc to operate wired via 4-20mA channel B on the analyser terminal board.

Serial Port

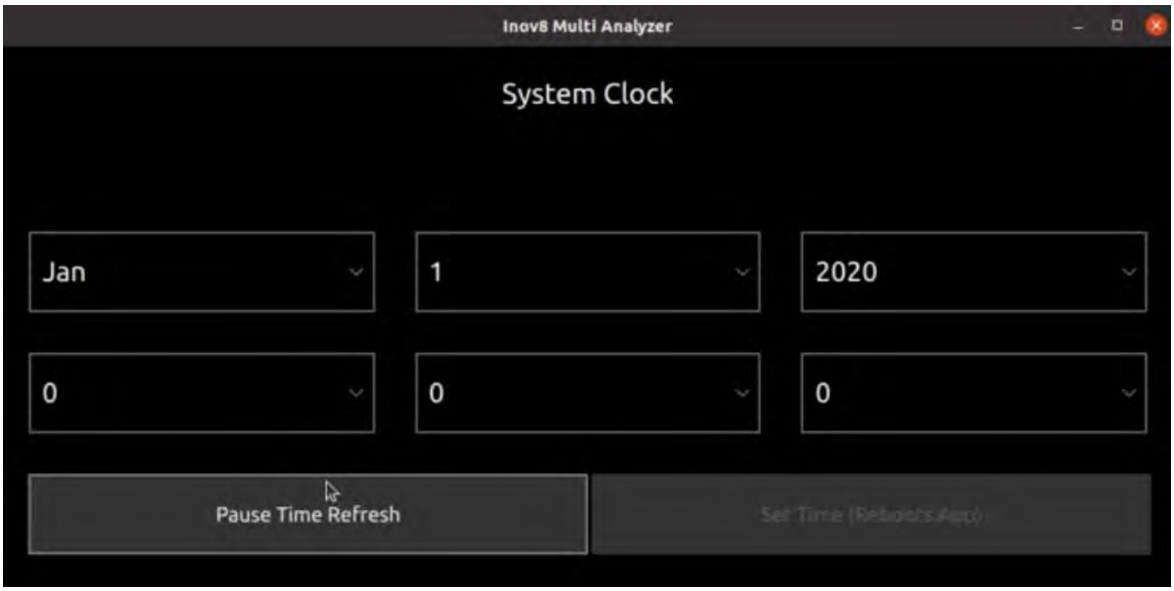
Serial port shows if the connection with the unit embedded module works correctly. You should see output like what is shown above, if you see ERR or a response time drastically higher than 15ms then please get in touch with the Inov8 Service department. This would indicate a communication issue with the microcontroller.

If possible, please completely power down the unit first for around a minute and then check this again.

Sensors (Pressure, Humidity and Temperature)

Some units might be equipped with a temperature, pressure and humidity sensor which is located on the main controller PCB. This can monitor the conditions inside the unit. Current values will be showed in the screen above. ERR indicates that the sensors are either not installed or there is a problem with PHT module.

4 - Clock



The clock is used to set the time for the equipment. Because many units will either never have an internet connection or at least not a constant connection, we have chosen to manually keep track of the time with a real time clock IC. Because of this the time needs to be set manually.

It's important to do this so the data stored in the logs reflects the real time and date. It is advisable to use whatever time it is in the United Kingdom or Coordinated Universal Time (UTC) and in some instances (remote connection) this may be required.

To set the time, first click on the button on the left which says, 'Pause Time Refresh'. Then use the drop-down boxes to set the date and time, which from top to bottom, left to right are:

- Month
- Day
- Year
- Hour
- Minute
- Second

Aim to set the time shortly ahead of where it really is (say 20 seconds) because it will take around that time for you to set all of the dropdowns. When all are set, wait for the real time to catch up to the time you have set and then click the right-hand button 'Set Time'. The app will close and automatically re-open after around a minute.

5 – Information

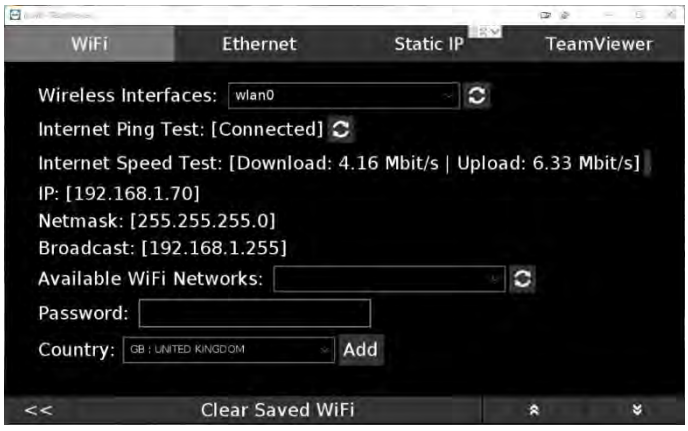


Here there is some useful pieces of information that can often help when a member of our team is trying to remotely diagnose issues or simply check if there is a newer version of software or firmware than what is currently installed.

6 – Networking

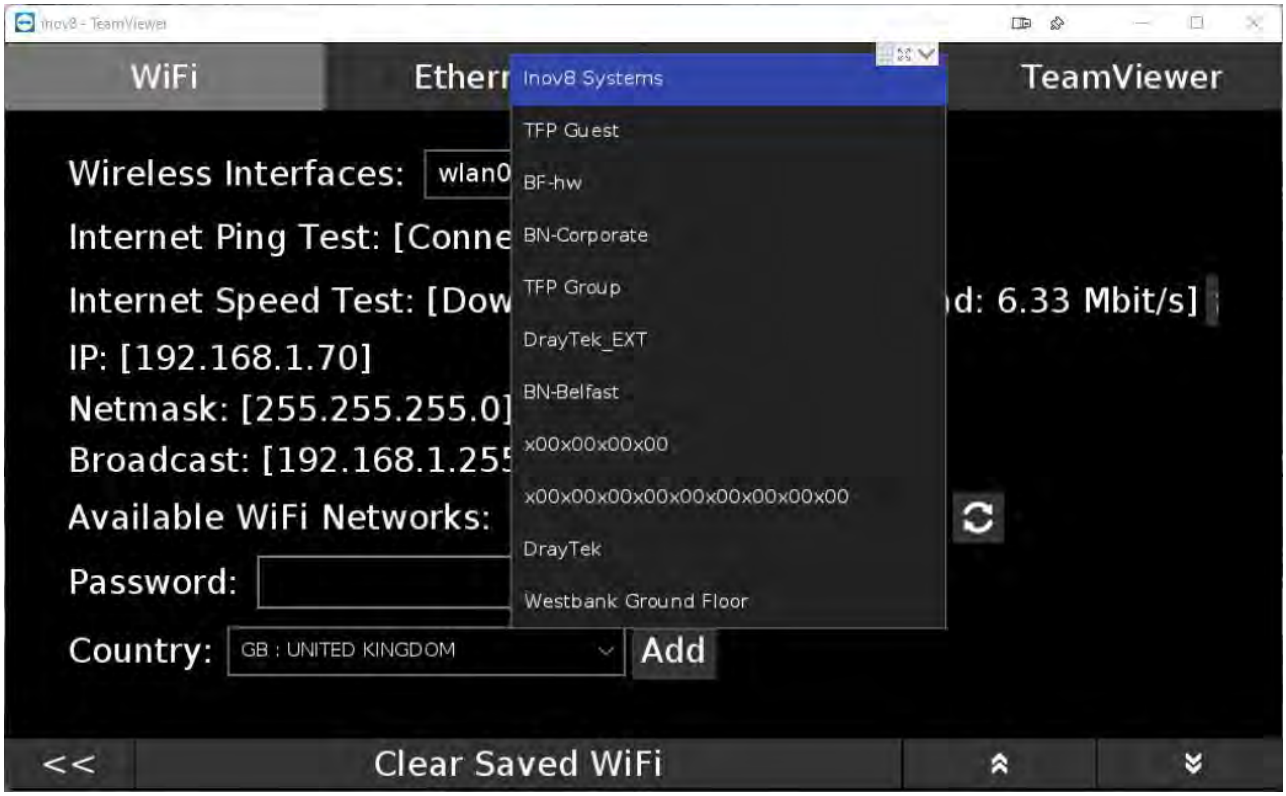
Wi-Fi





As shown above, the WiFi tab is initially greyed-out until the refresh button beside the wireless interfaces is pressed. Once an interface is selected, like wlan0 above, an internet ping test is run, if there is an internet connection then a speed test is automatically started.

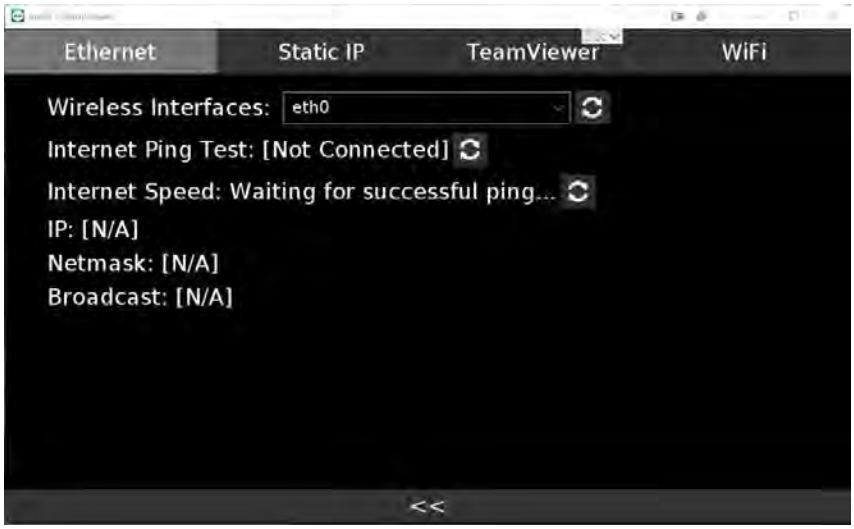
The IP Address, subnet mask and broadcast address are fetched and displayed.



Furthermore, you can search for WiFi networks, after a few seconds the list will be generated, and they can select their network from a drop-down list. After entering the password and selecting the country, you can click add and the analyzer will connect to that network.

This can be confirmed by waiting for a minute, then refreshing the ping test which should now be successful if it wasn't before. If it does not work you may have entered something wrong, click Clear Saved WiFi and try again.

Ethernet

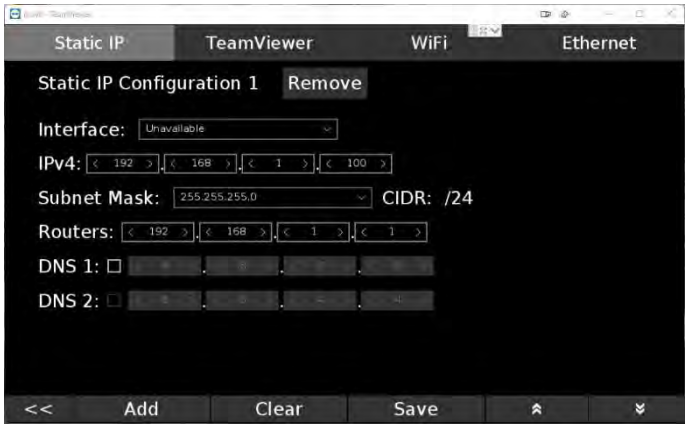


The ethernet tab is mostly the same as above. As you can see, I do not have an ethernet cable connected to the unit.

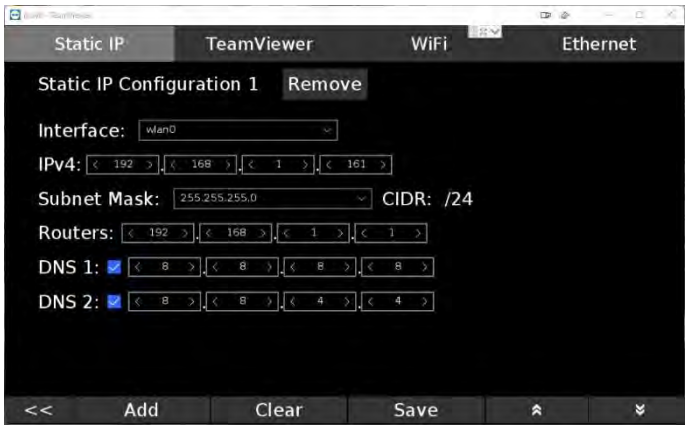
The other states would be an ethernet cable connected and providing internet access, in which case you would have an IP address and internet connection. Alternatively, you could have a direct connection between an analyzer and another computer, in which case you would have an IP address but no internet connection.

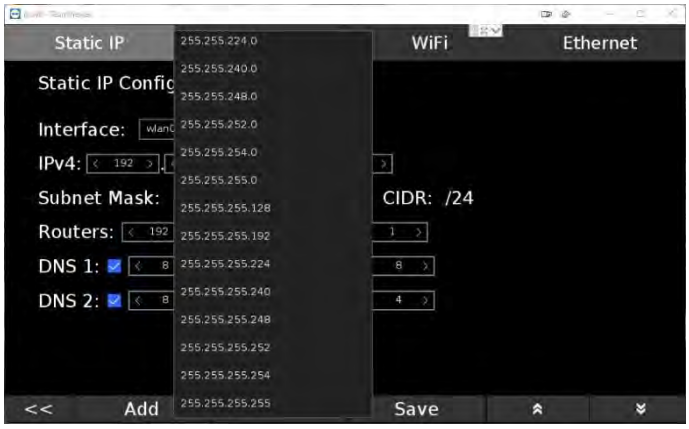
Static IP

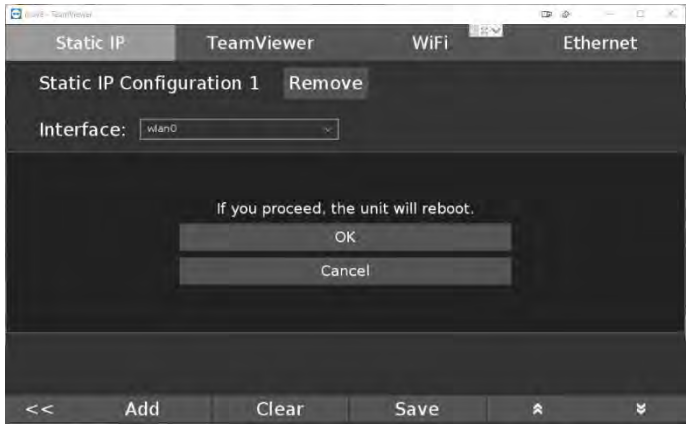

Static IP
TeamViewer
WiFi
Ethernet
<<
Add
Clear
Save

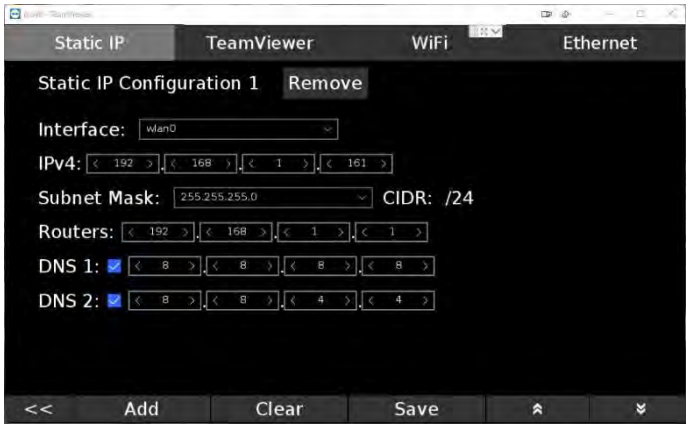

Static IP
TeamViewer
WiFi
Ethernet
Static IP Configuration 1
Remove
Interface:
Unavailable
IPv4:
192
168
1
100
Subnet Mask:
255.255.255.0
CIDR: /24
Routers:
192
168
1
1
DNS 1:
DNS 2:
<<
Add
Clear
Save


Static IP
TeamViewer
WiFi
Ethernet
Static IP Configuration 1
Remove
Interface:
Unavailable
eth0
wlan0
IPv4:
192
100
Subnet Mas
CIDR: /24
Routers:
192
168
1
1
DNS 1:
DNS 2:
<<
Add
Clear
Save


Static IP
TeamViewer
WiFi
Ethernet
Static IP Configuration 1
Remove
Interface:
wlan0
IPv4:
192
168
1
161
Subnet Mask:
255.255.255.0
CIDR: /24
Routers:
192
168
1
1
DNS 1:
8
8
8
8
DNS 2:
8
8
4
4
<<
Add
Clear
Save


Static IP
WiFi
Ethernet
Static IP Confi
Interface:
wlan0
IPv4:
192
Subnet Mask:
CIDR: /24
Routers:
192
1
DNS 1:
8
8
DNS 2:
8
4
255.255.224.0
255.255.240.0
255.255.248.0
255.255.252.0
255.255.254.0
255.255.255.0
255.255.255.128
255.255.255.192
255.255.255.224
255.255.255.240
255.255.255.248
255.255.255.252
255.255.255.254
255.255.255.255
<<
Add
Save


Static IP
TeamViewer
WiFi
Ethernet
Static IP Configuration 1
Remove
Interface:
wlan0
If you proceed, the unit will reboot.
OK
Cancel
<<
Add
Clear
Save


Static IP
TeamViewer
WiFi
Ethernet
Static IP Configuration 1
Remove
Interface:
wlan0
IPv4:
192
168
1
161
Subnet Mask:
255.255.255.0
CIDR: /24
Routers:
192
168
1
1
DNS 1:
8
8
8
8
DNS 2:
8
8
4
4
<<
Add
Clear
Save


WiFi
Ethernet
Static IP
TeamViewer
Wireless Interfaces:
wlan0
Internet Ping Test: Running...
Internet Speed: Waiting for successful ping...
IP: [192.168.1.161]
Netmask: [255.255.255.0]
Broadcast: [192.168.1.255]
Available WiFi Networks:
Password:
Country:
GB : UNITED KINGDOM
Add
<<
Clear Saved WiFi

The images on the previous page showcase the Static IP setup process. To begin with there will be no saved configs, so the screen will be blank. If you click the add button you will see the options that can be configured. Select an interface from the drop-down menu and set the IP address, subnet mask, routers and DNS servers as required.

You can add up to two configurations, usually one for WiFi and one for ethernet. When finished, click the save button. You will be warned the unit will reboot, click ok.

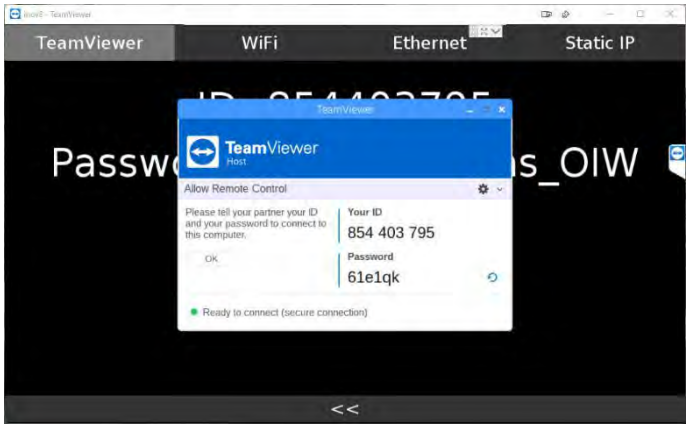
If you have configured the settings correctly, the unit should boot with the set IP address (you can check in the ethernet or WiFi tabs). If it has not been set, the IP address may already be in use by another device on the network. If the IP is correct, but the unit does not have internet connection then some of the settings may not be compatible with the ISP.

Please work with your on-site network engineer or equivalent as they are the only people who will know how this needs to be configured for your network.

TeamViewer

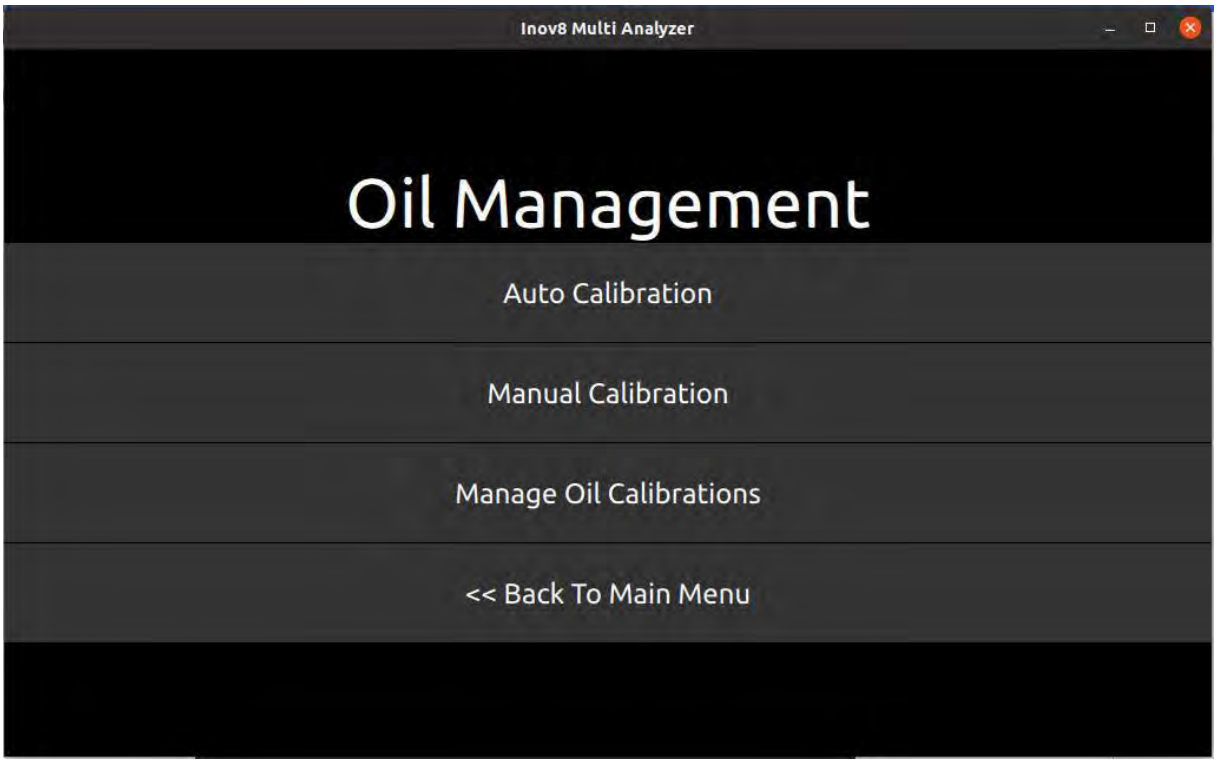
This tab will only be visible if TeamViewer is installed on the unit. It shows the ID and password which should let you connect every time, it does not change.



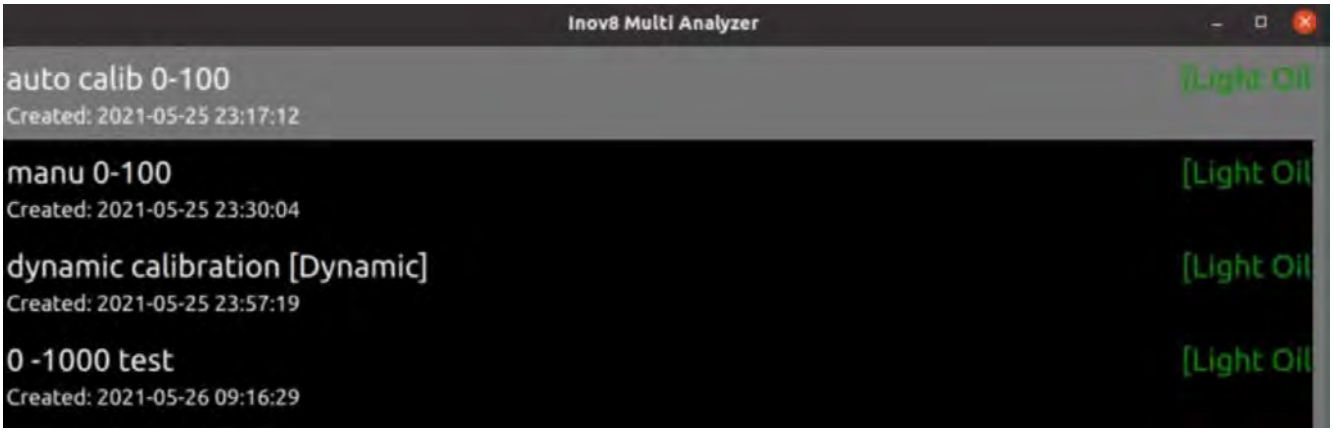


If you cannot connect over TeamViewer, you can click the ‘Open TeamViewer Status Page’ button which will show the connection status (bottom left), the ID (in-case the app is reading it wrong) and the 6-digit password which can be used instead of Inov8Systems_OIW.

Oil Management



When your first access this page you may not see or have access to the 'Manage Oil Calibrations' button. This will appear once oil files have been created. Below is how the window will appear with 4 created oil files:



PPM Setup: Sample Preparation

Before covering the PPM set up menus, the below instructions explain how to physically create an oil file for calibration.

Procedure:

1. Standards are prepared from an oil sample with the addition of surfactant (or active agent) to increase the oil dispersion in the water. Decon 90 or Loctite 7840 are acceptable.

2. This procedure is the standard for 100ppm and is prepared according to the table below. Additional standards are prepared by stepwise dilution with the initial standard being a water blank, or 0ppm.

	100ppm
Volume of Oil	20 µl
Volume of Surfactant	20 µl
Total Volume in Water	200 ml

3. The first standard is prepared by measuring 200ml of clean water in the graduated cylinder and add to the 500ml graduated glass bottle.

4. Using the pipette, with a fresh tip, add the required amount of surfactant (20 µl) to the water.

5. Next, using the pipette with the same tip, add the required amount of oil (20 µl) to the water and surfactant mixture.

6. Rinse the pipette in the water to clean the tip of any residue.

7. Cap the graduated glass bottle and shake it vigorously to mix for 2 minutes. Ensure that the oil and surfactant are well mixed.

8. Allow the sample to settle for 2 minutes.

9. Ensure the analyser beaker is thoroughly cleaned before adding the mixture. Cleaning can be done by rinsing with water and wiping with a lint free cloth.

10. Add the mixture to the calibration beaker and place inside the calibration chamber.

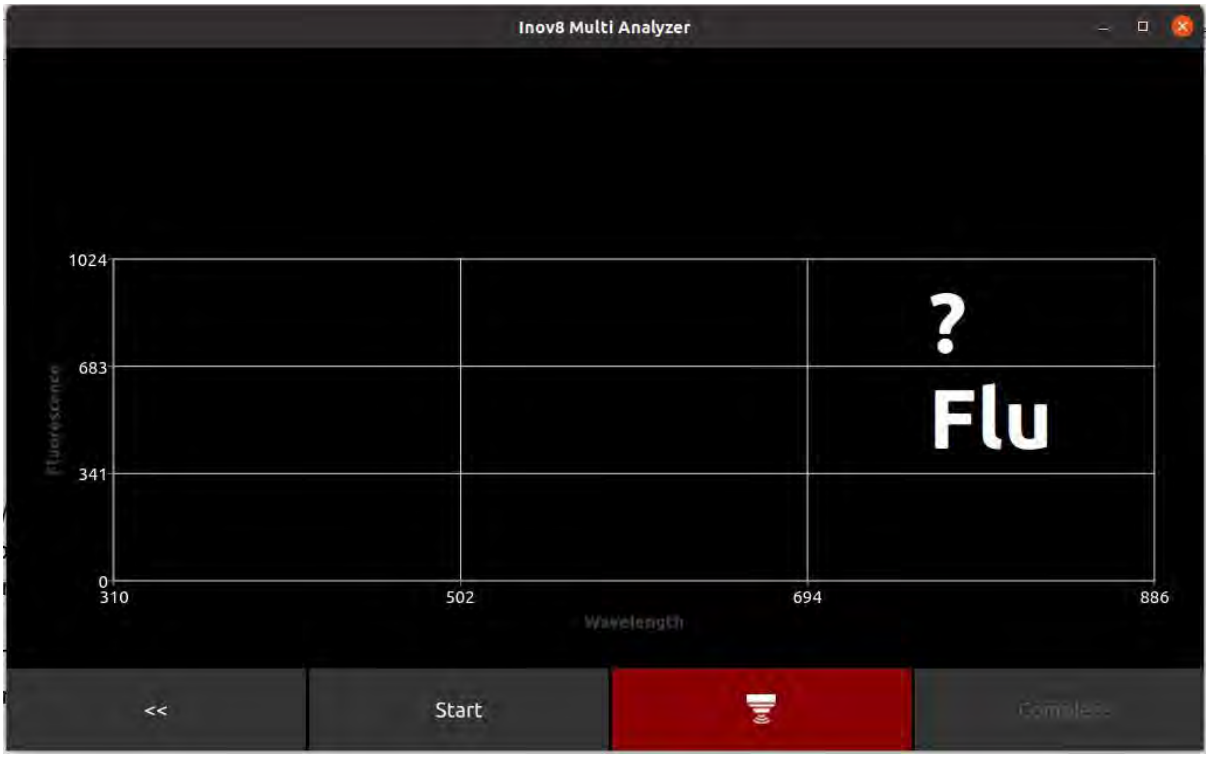
11. Onscreen, users will see the PPM reading.

12. Record your results.

13. Before commencing with the first cut of the sample, ensure the calibration beaker is cleaned. To ensure the best accuracy, thoroughly clean the calibration beaker before subsequent sample cuts.

14. To cut down the sample, the sample volume remains constant at 200ml throughout, and each half-cut dilution is achieved by removing 100ml of the sample and adding 100ml of water to dilute 50% and maintaining the 200ml overall volume.

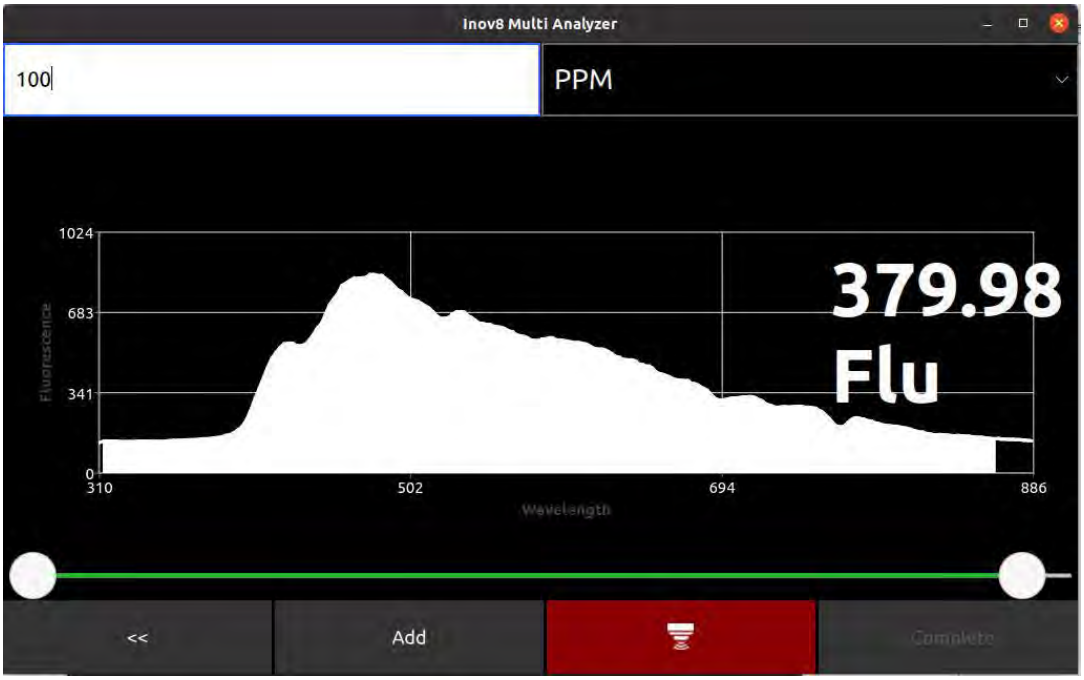
Auto Calibration



When 'Auto Calibration' is first selected, the user should prepare the sample with the maximum calibration value that will be used for measurement. E.g., for a 0-100 PPM curve, please make up a 100 PPM sample and use this to start, **not clean water for 0.**

The red cleaning button can be used to clean the measurement window, use this when measuring new samples / cut-downs.

When the sample is ready and placed in the calibration chamber, hit the 'Start button'. The unit will find best setting for calibration, which will be later applied during normal measurement cycle.

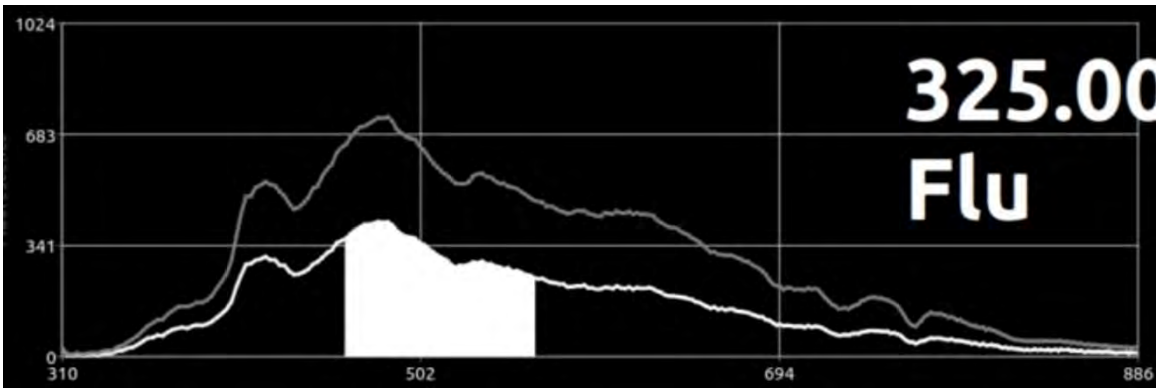


Enter a PPM reading into the correct window (top-left) as shown in the image above. The user can also toggle between PPM and PPB for the measurement units. When the sample measurement first appears on the screen, the wavelength range will be at its maximum. The user can adjust the scroll bar to narrow, widen or move the wavelength mask as required.

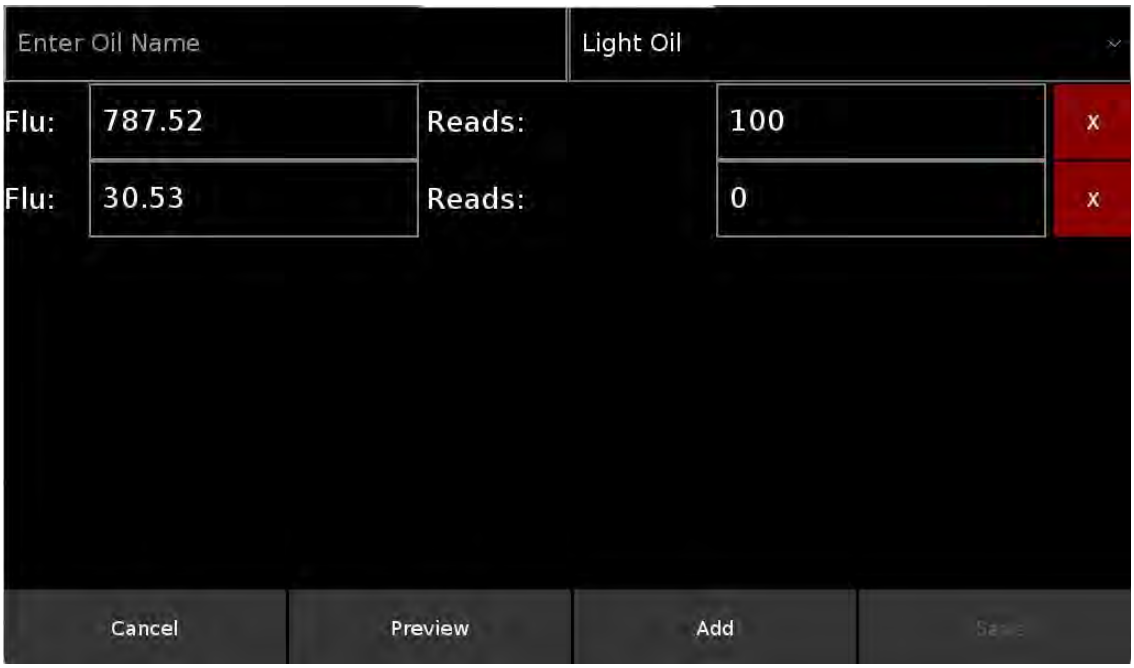
If you do change the wavelength mask, a prompt will appear saying that the integration time must be optimised for the new mask, if you meant to change the mask hit 'OK', if not hit 'Cancel'.

Once you are happy with the current measurement click the 'Add' button, there will be a confirmation prompt. Once added, the top-left value will change to half of the previous PPM to suggest a cut-down. You can manually change this value if needed. Proceed with as many cut-downs as required for your file and finish with a clean / de-ionised water sample for 0 ppm.

A measurement mask will appear for each new datapoint, the grey spectra shown above is the previous datapoint. For cut-downs the new spectra (white) should be lower than the previous spectra (grey). There will be a warning if you try to add a datapoint which is higher than the previous.



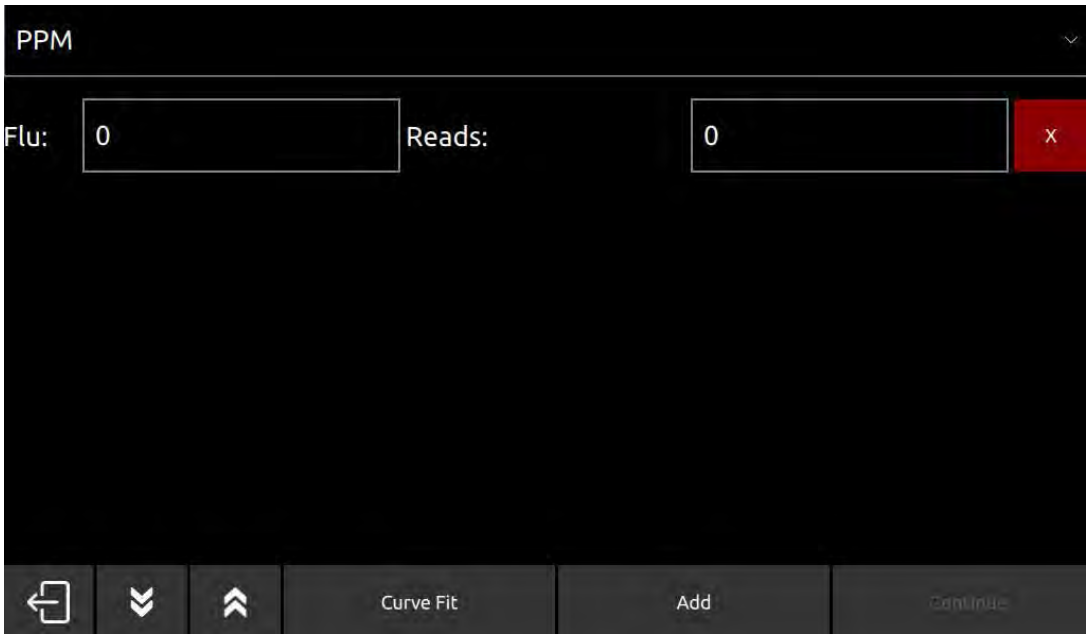
Once there are more than two datapoints the ‘Complete’ button will become enabled. After pressing this and confirming, you will be taken to the summary screen shown below.



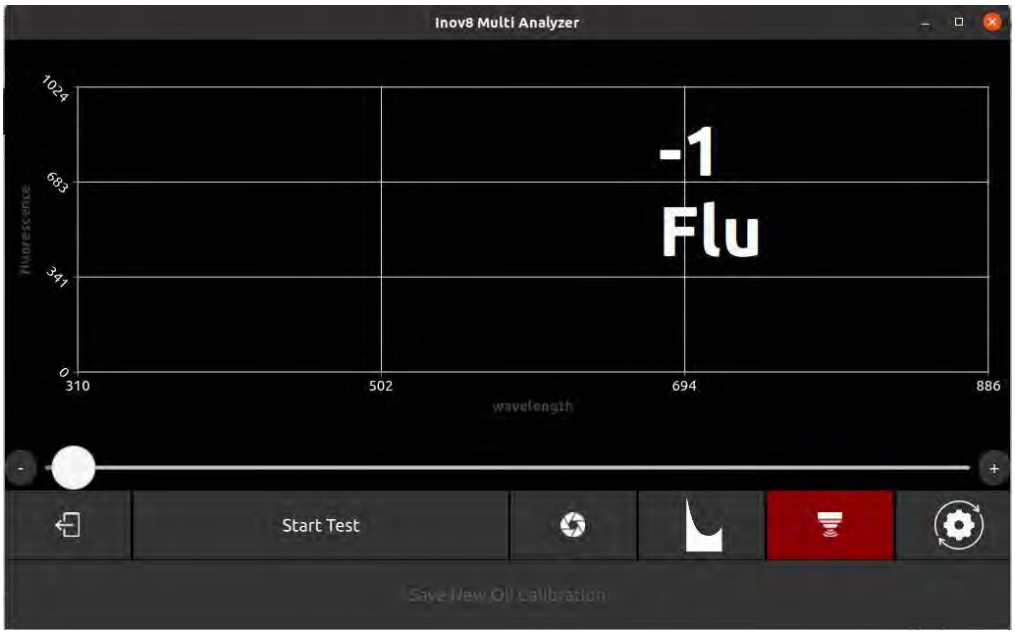
At this point if you change your mind or realise that something was wrong in your calibration setup and need to repeat the whole process, just press ‘Cancel’. You can edit the datapoints with you want, say if you made a typo in the previous screen etc or even add a datapoint, though this would usually be a niche case because it hasn’t been ‘measured’. When ready, enter a name for the oil file in the top-left corner and the ‘Save’ button will become enabled.

The preview button will show an example of the calibration curve Generated datapoints can be interpolated with 2 different methods: Straight Lines Fit and Best Polynomial Fit. Use Straight Lines Fit when collected datapoints are not matched properly with Polynomial Fit method.

Manual Calibration



Datapoints can be added manually when clicking the ‘Add’ button at the bottom of the screen. The ‘Curve Fit’ button operates the same as covered in the ‘Auto Calibration’ section. Once the datapoints are set, click the ‘continue’ button in the bottom-right to move to the spectra screen.



Put a reference sample in the measurement chamber and hit Start Test. The integration time, fluorescence offset, lower and upper wavelengths are to be set by the user manually. Click on each of the icons and set them as desired, see this section for more details.

Click the ‘Save New Oil Calibration’ button when ready and enter a name for the oil file in the popup that appears.

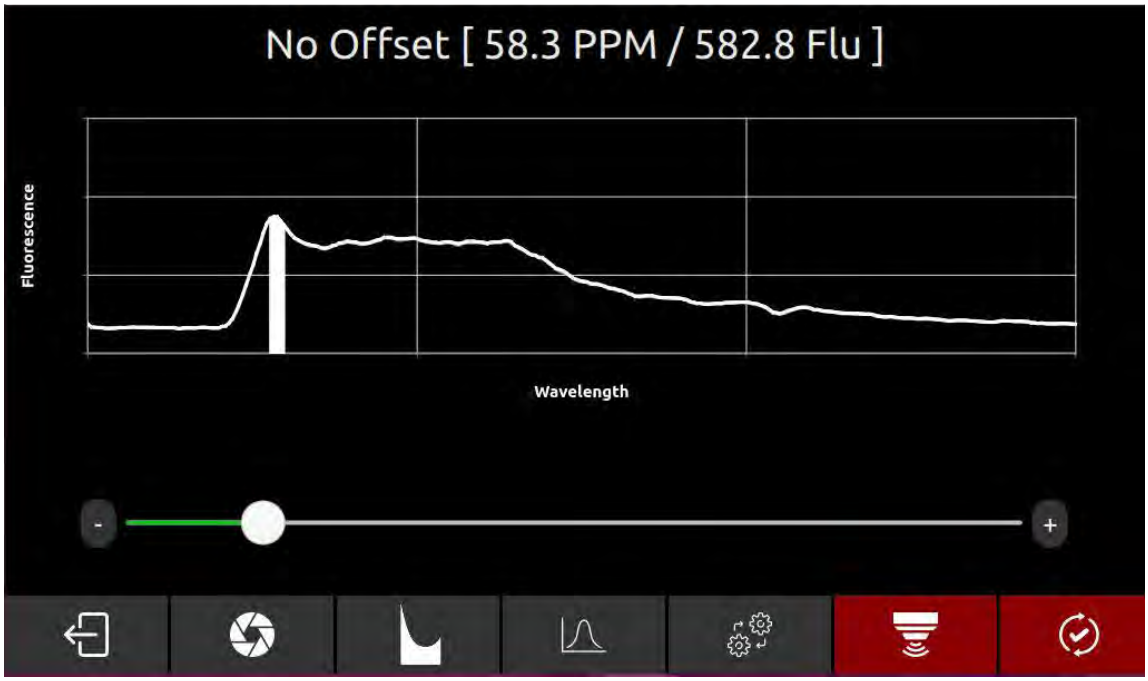
Spectra Offset

This feature can help to overcome any third-party fluorescence in or around the sample chamber, for example, a fluorescent tracer / dye or organics.

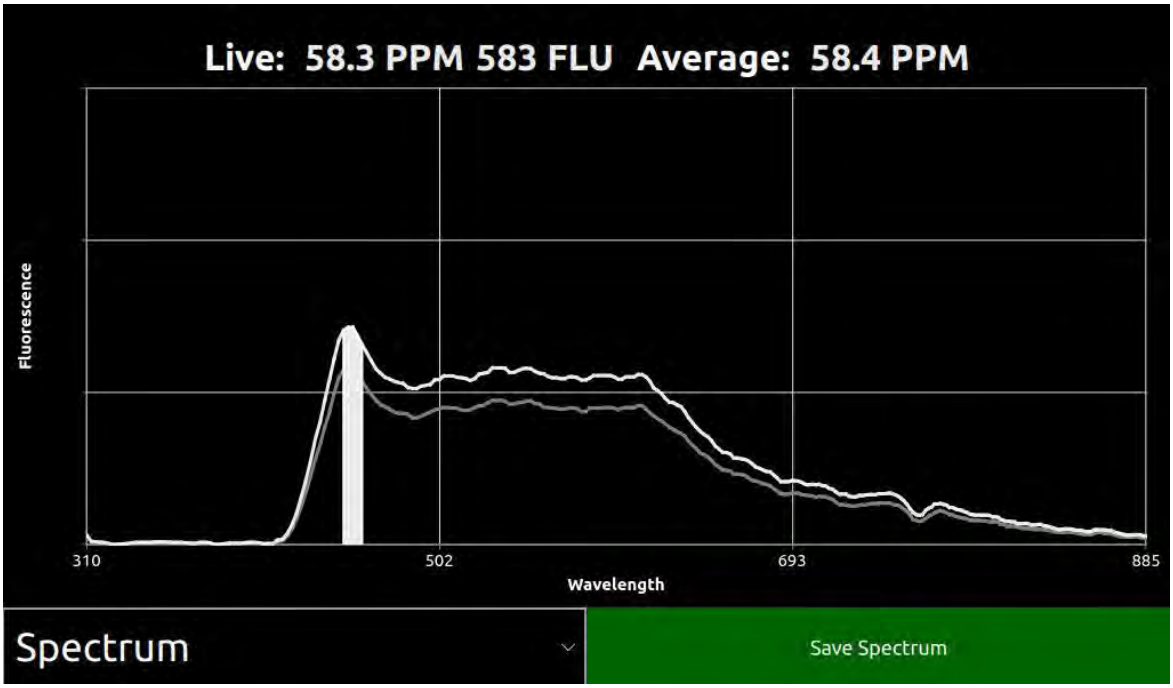
With this ‘vertical shift’ feature, the user can move the zero point of calibration as seen in the images below. There is a visual setting which brings the spectra to the bottom of the screen, while the cycle is running.



In the below screenshot, the image shows the spectra in edit oil for a file with 0 offset. Here the spectra is not at the bottom of the screen. The reading is 58.3ppm.



The image below shows the spectra during the cycle from the same file. You can see that it has been ‘floored’ to the bottom, but is still reading 58.3ppm as this is only a cosmetic operation.



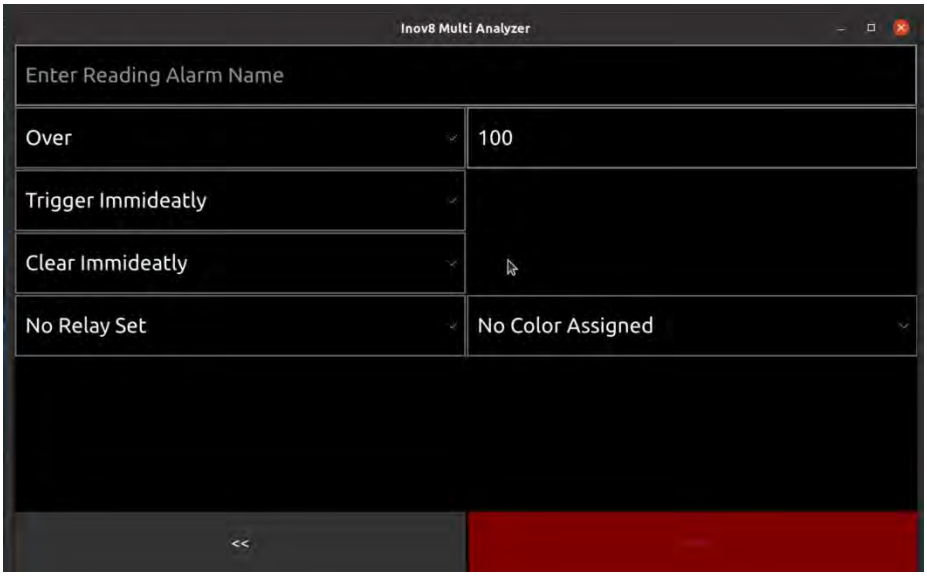
Alarms

Reading Alarms



Once the user clicks on the ‘Alarms’ button on the main menu, they are brought to the ‘Reading Alarms’ screen. The two options here are to create a reading alarm and to manage any alarms that are already created.

Create Reading Alarms



In the top-left in the above image, where it says 'Over', the user can change this to 'under'. To the right of the text, is the reading value in either PPM or PPM depending on what oil file is active with this alarm, which is configured in the measurement cycle.

If 'over' is selected with 100, then an alarm will trigger if the reading value is over 100 (PPM/PPB). You can configure the alarm to trigger immediately or to be delayed for several readings. If 'Delayed Trigger (readings)' is selected, there is an option to input a number. This means the alarm will only trigger if X consecutive readings are above 100 (or whatever is set).





You can configure the alarm clearing in the same way, either immediate or delayed.

Depending on how the system alarms (to be explained later) are configured you may have both relays (1 & 2) available to select for each alarm, one of the relays or none. You can also choose to set a colour on the alarm as a visual representation for anyone looking at the screen. It's possible set a visual alarm that is not tied to any relay.

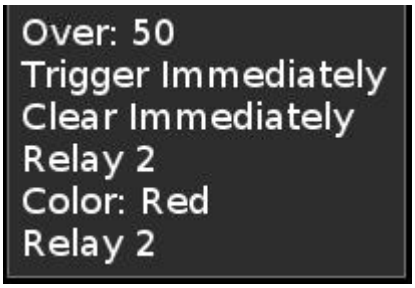


Once you are happy with all the settings, enter a name in the text field along the top of the screen and then click the red ‘Save’ button in the bottom-right.



Manage Reading Alarms

All created alarms are stored here. The date and time of their creation is saved underneath the alarm name. You can view the alarm information by selecting the alarm, which should become highlighted, then by clicking on the ‘i’ information button, as shown below:



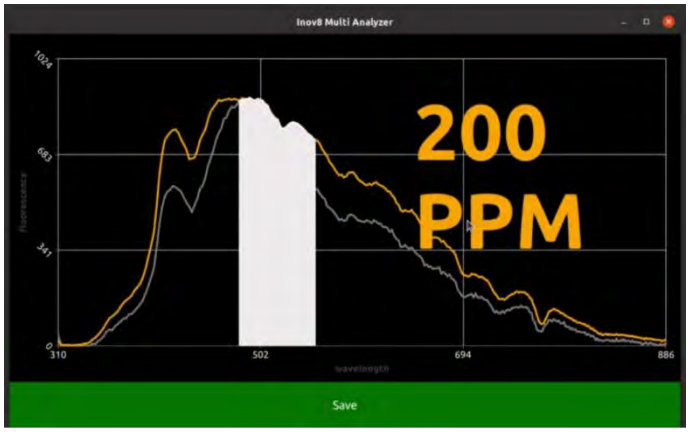


An alarm can be removed by clicking the red ‘Remove’ button, although it should be noted that an alarm cannot be removed if it is in use. A text box will appear to remind the user that the alarm is

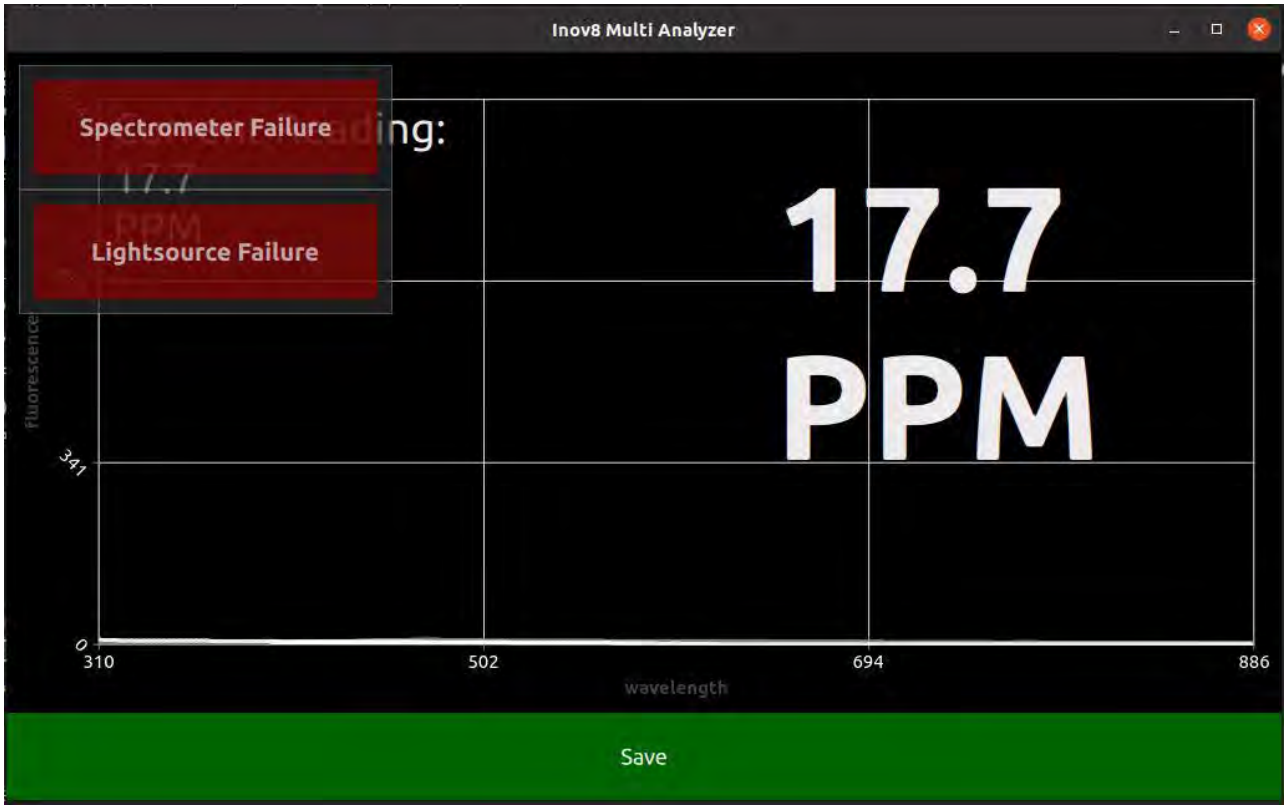
in use. Having the alarm selected by a measurement cycle would mark it as ‘in-use’, so if you remove that measurement cycle you will then be able to remove the alarm.

In a later section there is more info on how to link the alarms to a measurement cycle. The below images show how the alarms look on the cycle screens if you selected to tie it to a colour.





System Alarms



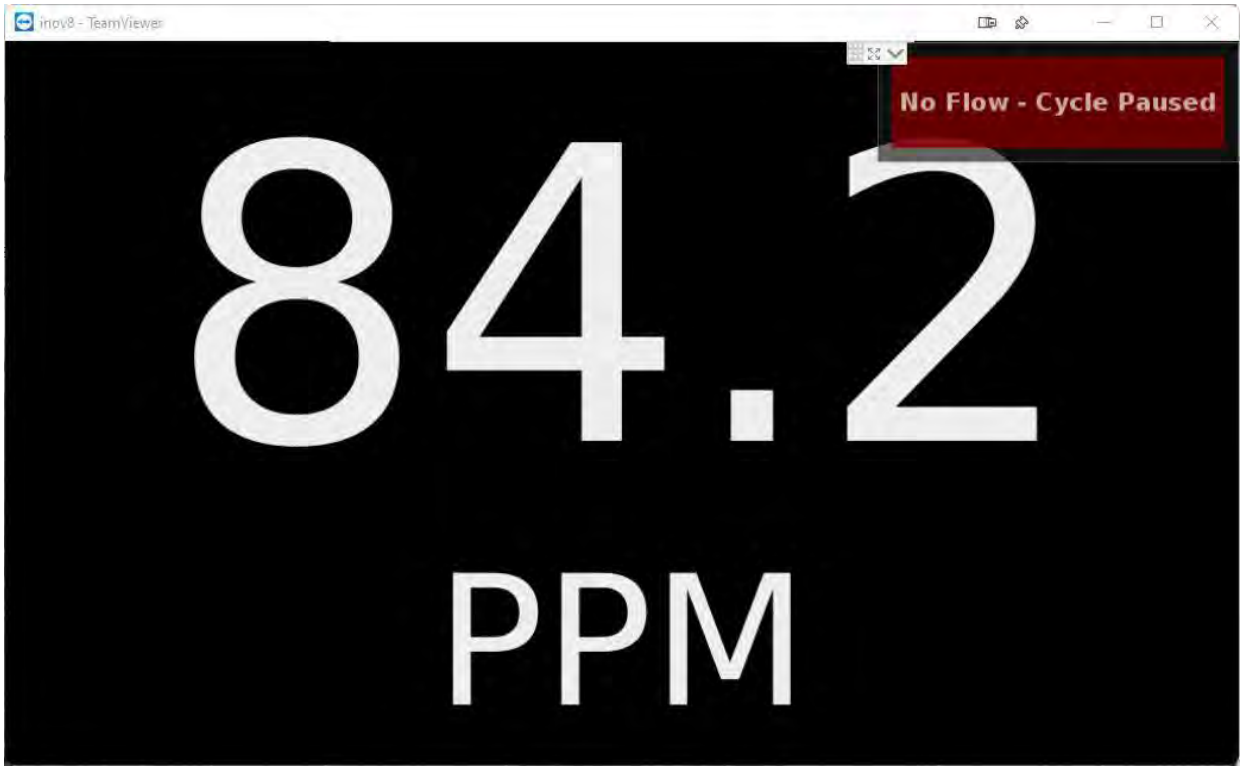
If enabled (let Inov8 know if you want this) the spectrometer and light source operational state is monitored whilst the system is measuring, either during a cycle or in spectra diagnostics. Should either of them be detected in a failure state, an alarm can be raised, both visually on the screen and it can be tied to a relay output.

Power Failure Relay

A power failure system alarm can be enabled, as well as a relay specified for it. This relay will be in an alarmed state (de-energized, same as when there is no power to the unit at all) by default, when the system starts it will remain that way until a cycle starts (should be set to auto-start) then it will be energized so the alarm clears.

If the cycle is stopped for any reason the relay will be alarmed again (de-energized).

Flow Switch



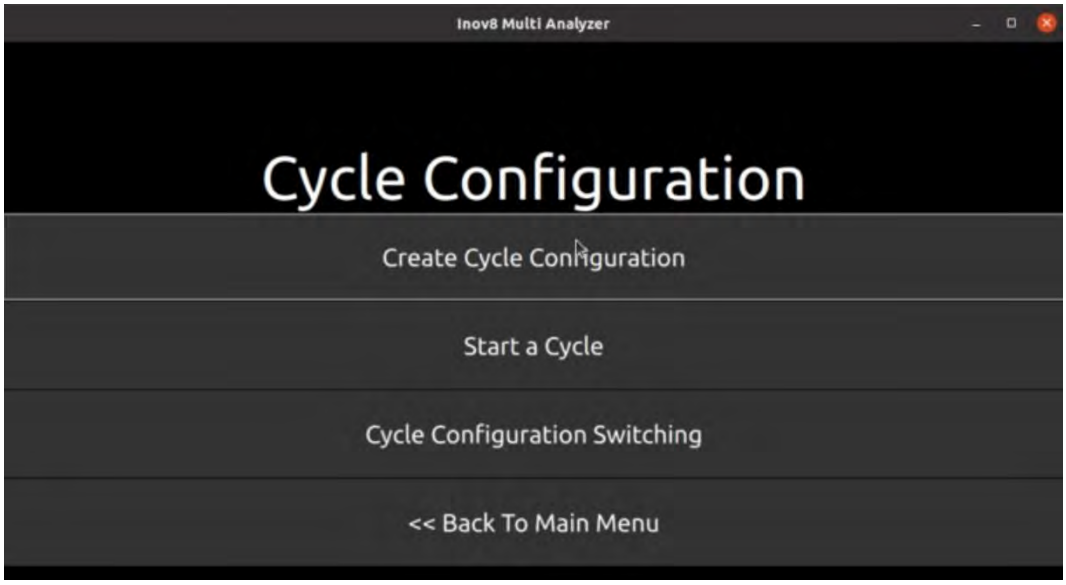
An external flow switch can be used in conjunction with our analyzers. The flow switch needs to have a 5V output which can be connected to the 'Flow' input on the terminal board. Please mention this when ordering your unit to ensure the PCBs and Software are set up to enable this.

When in a 'no flow' state, the cycle pauses, the screen displays a message and the 4-20mA goes to the alarm value set in the config, 23mA by default.

Cycle Configuration

Create Cycle Configuration

If the analyser has not previously had a cycle configuration, the user will only see the ‘Create Cycle Configuration’ and the ‘Back To Main Menu’ from the window below. The other options will be greyed out.

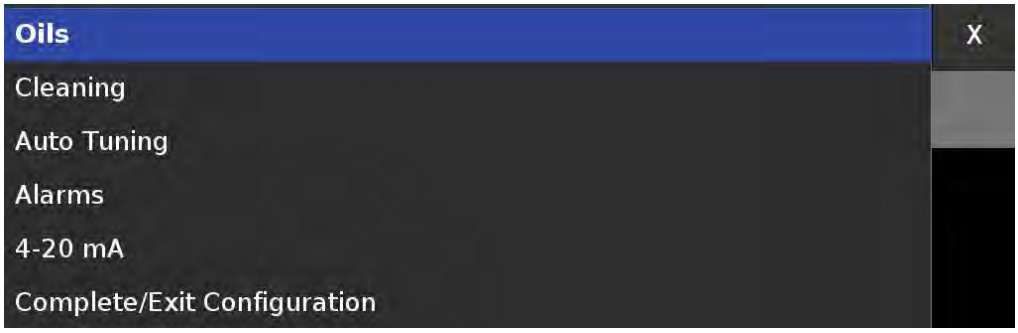


Oils

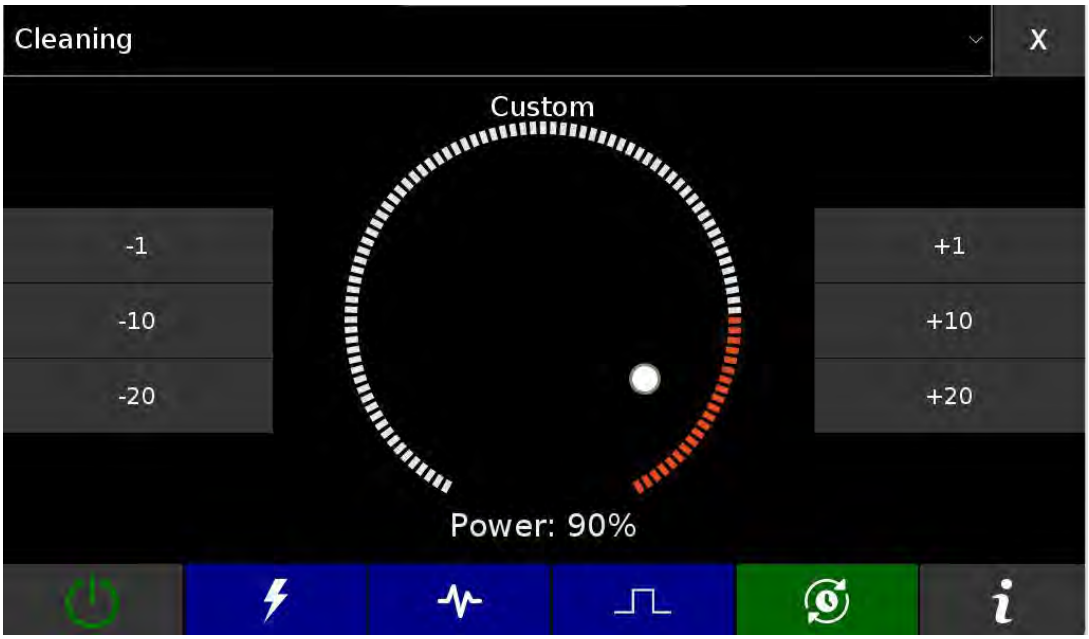


When you click ‘Create Cycle Configuration’ you will see the screen below. Any oil files that have been created, through either auto or manual calibration, will appear in the list. Simply click on the one you wish to measure with and it will be highlighted, as shown above (grey rectangle).

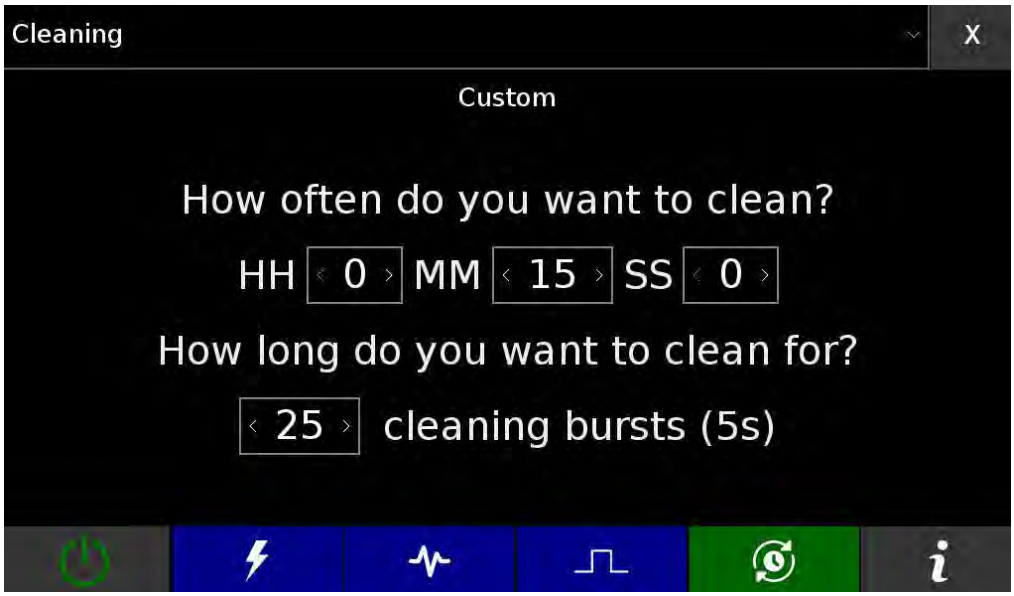
You may not notice it at first, but along the top of this screen, where it says ‘Oils’ (to the left of the ‘X’) is a drop-down menu. Click on it to reveal the other options.



Cleaning



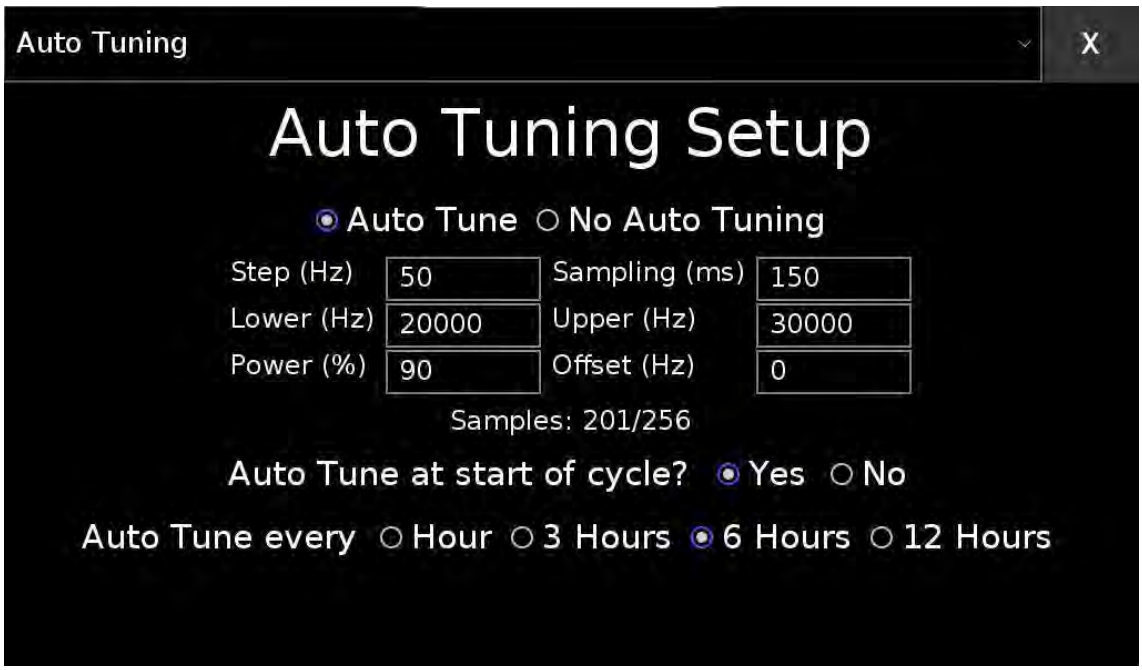
The buttons / icons along the bottom perform the same functions as they do in the diagnostics page, so please read this section for more information. The only new one in green on the right, is to set the cleaning routine.



Use the interactive boxes to set how often you want the ultrasonic cleaning to occur in hours (HH), minutes (MM) and seconds (SS). Then select how many cleaning bursts you want to be run, in effect how long you want to clean for. The cleaning time these bursts equate to is shown in brackets, in the image above, the 25 bursts would last for 5 seconds.

So, the routine above was to clean for 5 seconds every 15 minutes.

Auto Tuning



This page allows you to define the auto tune settings for the cycle. You can completely disable auto tuning for this cycle by selecting the 'No Auto Tuning' option for the top radio-button.

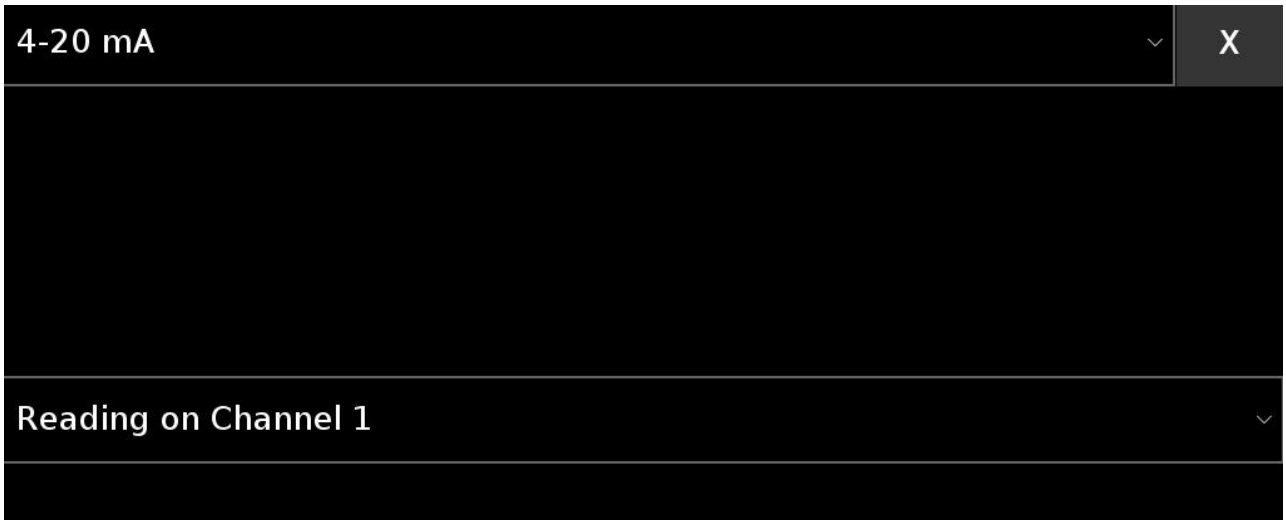
If enabled, you can customise the auto tune parameters in the six text boxes, see here for details. Finally, you can choose whether to auto tune at the very start of the cycle and then how long to wait after that before you perform another.

Alarms

If any reading alarms have been configured, you will see this option in the drop-down. You can select any one alarm from the list by clicking on the circle to the left of its name.



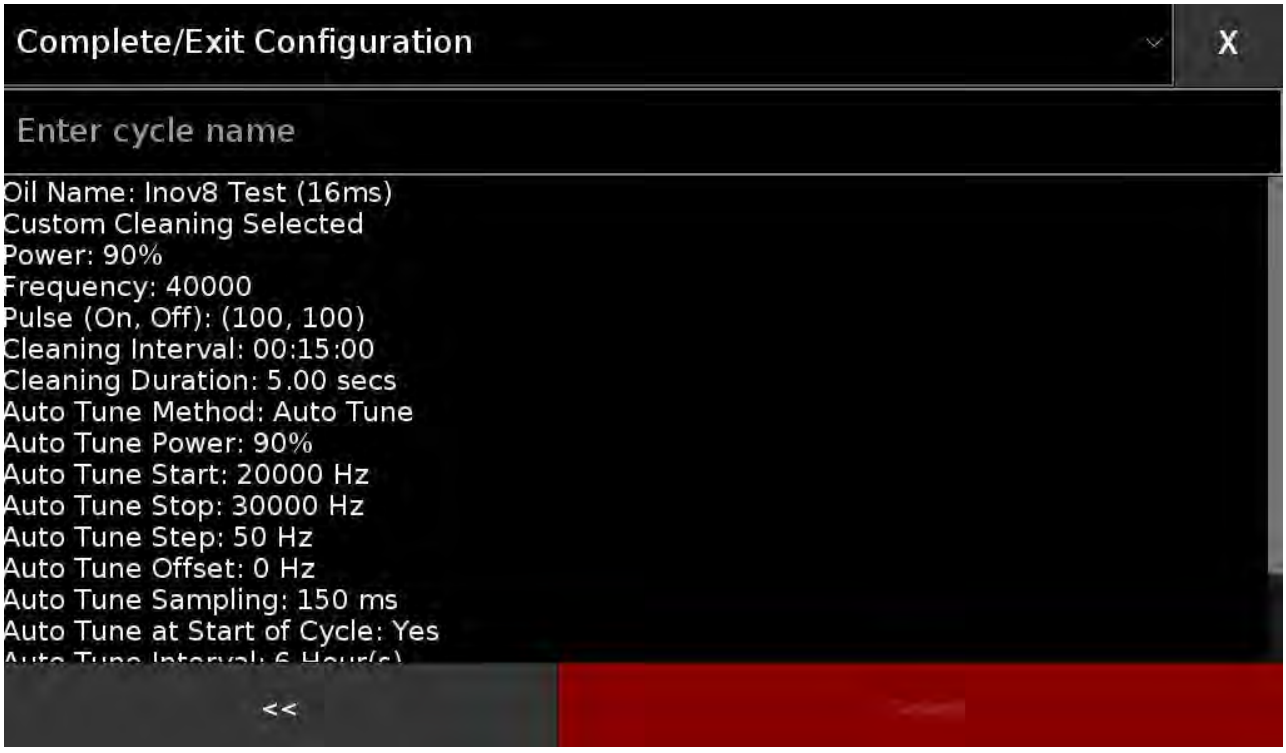
4-20mA



This screen allows you to choose whether to enable the 4-20mA output based on the measurement reading during the cycle (live update) or not.

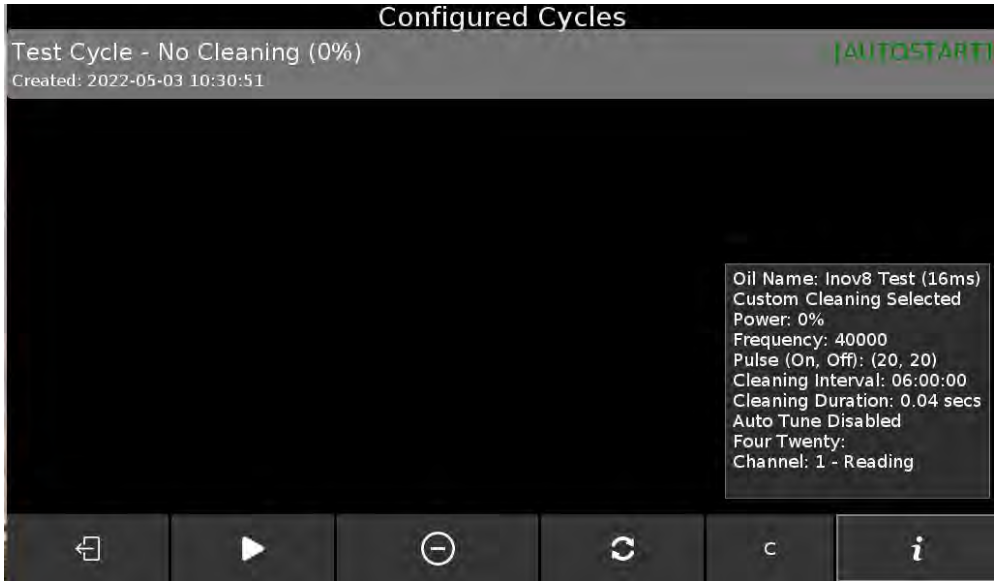
Summary

The summary screen lists all the options that you have selected so you can double-check them. Once ready to save, enter a name for the cycle configuration and click ‘Save’. If you wish to cancel either press the ‘X’ in the top right corner on any of the screens or the ‘<<’ in the bottom-left on the summary screen.



Starting a cycle

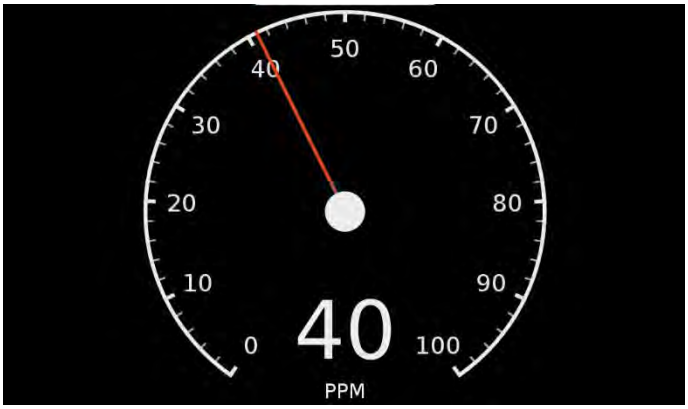
When you click the ‘Start a Cycle’ button it will bring you to a menu of all the configured cycles currently stored on the system. You can select any of them and start it with the play button.

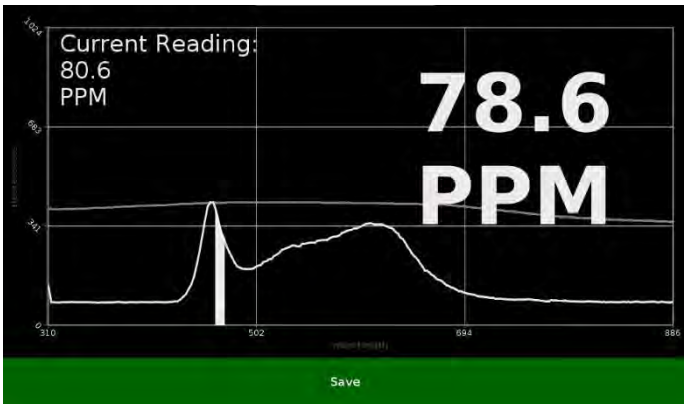


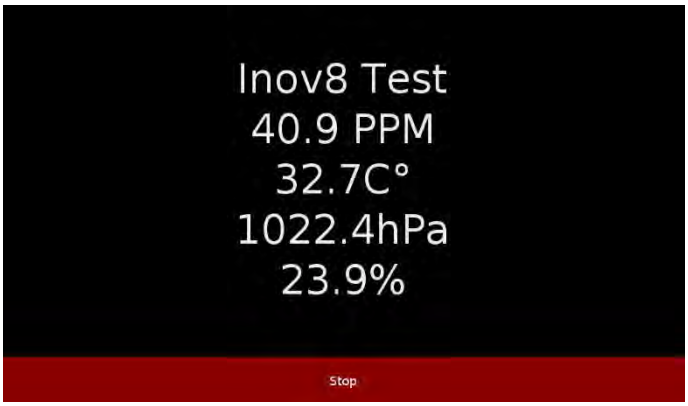
Button	Name	Function
	Back to the previous menu	This button takes you back to the cycle configuration screen.
	Start Measurement	This button will start the highlighted cycle
	Delete Measurement configuration	This button can be used to delete a highlighted cycle.
	Auto start cycle on system boot	Set the current cycle to auto-start as soon as the software boots. Green text [AUTOSTART} appears next to the selected cycle for clarity.
C	Clone ‘Test cycle’	This button allows the user to clone an already created cycle. Doing this allows the user to adjust the cycle but while saving it as a new cycle.
	Info	Provides a pop-up summary of the selected cycle.

When a cycle is started the PPM display screen will automatically appear giving a live value. If the user clicks on the screen it will move to the next one and so on. The available cycle screen are shown below: (PPM, PPM Gauge, Spectra, Info & Stop Cycle)









Cycle Configuration Switching

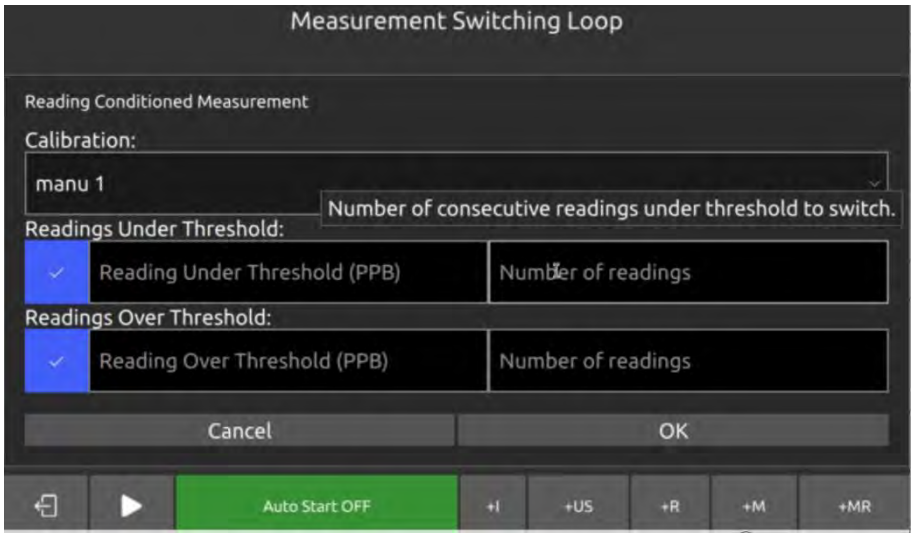


The user can choose to switch between created oil files in this window. For example, if a 0-100ppm file is being used, but the oil content jumps a little, this feature allows the user to switch to another file, maybe 0-500ppm.

This allows the unit to measure with accuracy at both ends of the oil content. The 0-100ppm file gives greater accuracy at the low end than possible with the 0-500ppm file.

NOTE: This feature is disabled by default, if you think you need it, please contact the service department.

Button	Name	Function
+I	Idle	Add idle state button.
+US	Ultrasonic Cleaning	Add ultrasonic cleaning button.
+R	Relay	Add relay action button.
+M	Measurement Cycle	Add measurement cycle button.
+MR	Cleaning frequency	This button is to add a reading-based measurement step. As shown below the table:



The user can select the calibration from a list of pre-made files. Then the user can untick, either the option for 'Readings Under Threshold' or 'Readings Over Threshold'. An example is to leave 'Readings Over Threshold' ticked and input the reading. If 100 is chosen, the user then selects the number of readings. If 3 is selected, then if the analyser reads over 100ppm over 3 samples, the switch to another cycle will take place.

If the user wants to have the file switching as a default when the analyser is turned on or rebooted, the user must select the 'Auto Start Off' as shown above, until it turns red and will then show 'Auto Start On'.

END

Inov8 Systems Ltd.

In-line Controller
Installation Guide

EXP-1 & EXP-2 Installation Guide

The above equipment is designed and manufactured by ***Inov8 Systems Ltd*** which is located at Unit 6, Edgewater Road Office Park, Belfast, BT3 9JQ. Phone number +44 (0) 28 9069 8297



In compliance with the WEEE Directive 2012/19/EU, this symbol indicates that this product must not be disposed of with your other waste.. Instead, it is your responsibility to dispose of your waste equipment by arranging to return it to a designated collection point for recycling your waste electrical and electronic equipment. Alternatively, you can send the electrical and electronic equipment back to Inov8 Systems, by contacting sales@inov8s.com. By separating and recycling your waste equipment at the time of disposal you will help to conserve natural resources and ensure that the equipment is recycled in a manner that protects human health and the environment. E waste can be disposed as per your country's legal requirements.

Caution / Warning Markings:



These labels are placed on the chassis of the EXP. Do not look directly into the light source.

Declaration of conformity :

This product conforms to the following directives;

- 2014/68/EU Pressure Equipment Directive, module A1
- 2014/34/EU ATEX Directive
- 06/108/EC EMC Directive
- 2012/19/EU Waste Electrical and Electronic Equipment

Standard :

FM3600
FM3615
CSA C22.2 number 30
EN60079-0
EN60079-1
EN60079-28
IEC-60079-0
IEC-60079-1
IEC-60079-28

WARRANTY AGREEMENT:

If you experience any defects in materials or find fault in manufacture of the goods that you have received within one year from the date of shipment, Inov8 Systems will repair, or at its option, replace the defective part free of charge. This is providing that the part is returned to the above address, with shipping charges prepaid. At Inov8 Systems discretion, a Technical Service Specialist may repair/replace the defective parts on location.

Instruments sent to Inov8 Systems must be appropriately packed and the following information must be provided prior to return.

- Inov8 Systems will assign a Return Authorization Number to you.
- The name and address of the company returning the items for repair.
- The department within the company returning the items for repair.
- The name, telephone number and extension of the individual in the company responsible for returning items for repair.
- A brief description of the fault.
- Does not apply to damage sustained in transit
- Shall cease to have effect if the goods have been used for purposes other than those for which they are intended or not in accordance with Inov8 Systems instructions.
- Does not cover misuse or mistreatment by the user.
- Does not cover previous repair or alteration by unauthorized repairmen and/ or repair facility.

Inov8 Systems does not assume responsibility for contingent liability through alleged failure or failures of any of its products or their accessories.

CHECK LIST OF MATERIALS:

- Inspect all shipping packages upon receipt and record any visible damage. Count the number of packages, making sure that the number is in agreement with the shipping paperwork. If there are any outward signs of damage, please retain all containers and packages for inspection by carrier. It is generally good practice to retain the packing material and boxes as they make an excellent way to protect the instrument if you move it our ever need to ship the instrument.
- Make sure that all items received match the packing list and that the quantities are correct.
- Verify that the number of packages received agrees with the package list and shipping papers.
- Notify both Inov8 Systems and the carrier within 48hrs of receipt, in the event of any physical damage to the packaging or goods supplied.

1.0 SAFETY REQUIREMENTS:

1.1 Only suitably competent formally trained personnel should install this equipment.

1.2 The enclosure must not be opened in hazardous environments when powered, without using a ‘hot working’ permit.

1.3 Modifications are not permitted to the equipment’s enclosure, as this will invalidate the hazardous area certifications.

1.4 The equipment must not be powered on if any physical damage is evident. In this event the manufacturer must be contacted for advice before proceeding

1.5 The primary earth connection shall be terminated using an earth wire that complies with regional regulations.

1.6 Only Class I Division 1 (or ATEX/IECEx) certified cable glands are to be used for the cable entry terminations.

1.7 The process connection coupling method must be suitably matched to the maximum expected process pressure.

1.8 Refrain from touching any internal part of the analyser for 12 minutes after turning off the power to the unit. The power reservoir takes time to dissipate.

2.0 Probe Mounting:

2.1 The flange will have been positioned on the probe in the factory at a default position or in line with the customer's specification. The taper bush flange design allows this position to be re-adjusted (Allen key required) during the installation, if required. The flange bolts used must match the flange pressure rating.

2.2 The probe should ideally be inserted to approximately ⅓ of the process pipe diameter.

2.3 **WARNING**: - Live insertion or retraction of the probe on process pressures that are >5.0bar should only be performed in conjunction with an appropriate extraction tool arrangement, unless otherwise agreed by Inov8 Systems

3.0 CERTIFICATIONS:

3.1 The system has the following hazardous area certification classifications: –
Class I Division 1 / ATEX / IECEx and must be installed in line with the requirements of these certifications.

4.0 POWER SOURCE:

The system is compatible with 24V dc and 110-230 VAC power input The requirements are as follows:

4.1 +24V dc (±10%) supply capable of delivering peak current up to 6.0 amps max (140W). The nominal power consumption is <20W.

4.2 110-230 VAC (±10%) supply capable of delivering peak current up to <15W nominal (84W peak).

NB: If the analyser is mains supplied, allowed for a minimum of 30 minutes after powering down the equipment, before opening the enclosure.

Cable entry M20 x 1.5mm [¾" NPT if specified at time of ordering] See Fig 1

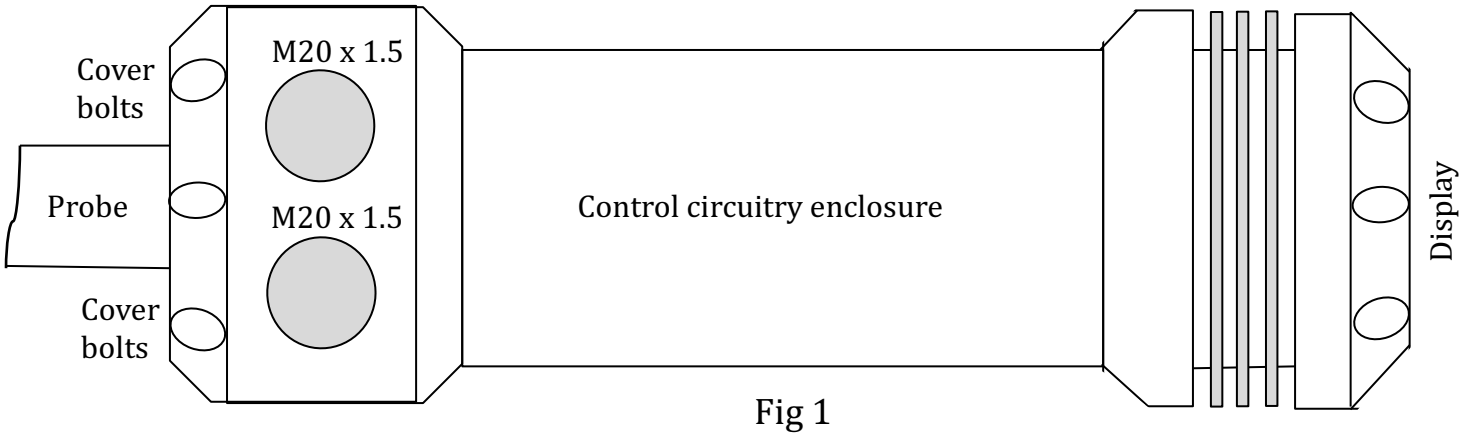


Fig 1

5.0 CONNECTIONS:

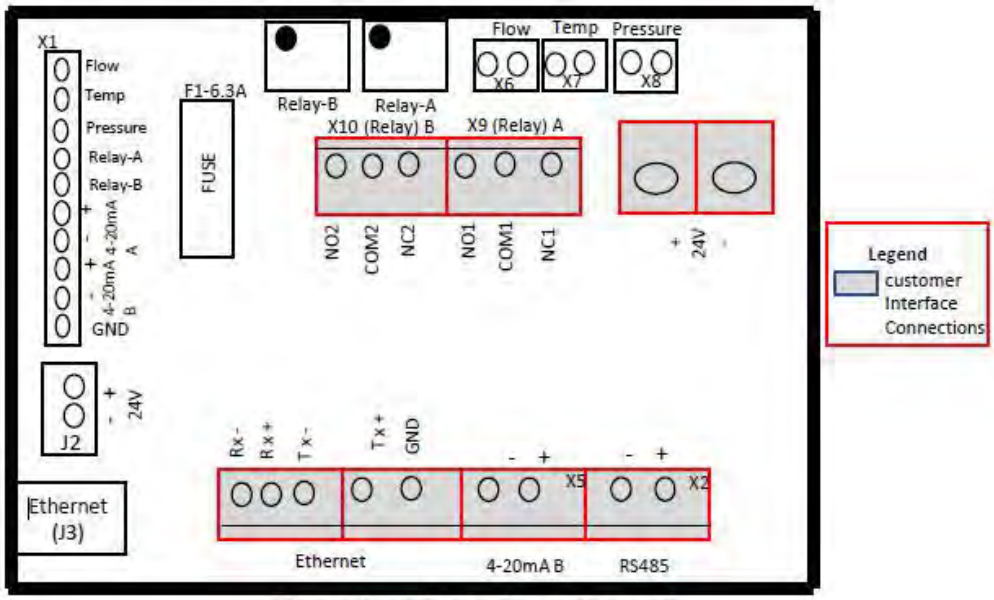
The power termination shall be made using a Class I Division 1/ATEX/IECEx rated cable gland. The 24V terminations are made on the Terminal Interface Board using the polarity shown in Fig 2 below. The 110-230 VAC terminations are made on the AC-DC converter board shown in Fig 3 below.

The Data Communications connections are via the second M20 cable entry port. The connections must be via Class I Division 1/ATEX/IECEx rated (see the Specific Conditions of Use) cable glands and are terminated in connectors X2, X4 or X5 as appropriate.

To gain access to the terminal interface board first make sure that power is disconnected. The operator must wait 12 minutes for the power in the capacitors to dissipate, before touching the internal parts of the analyser. Remove the eight cap screws from the ***pipe end*** of the housing and store them safely, carefully slide the enclosure cover off to expose the internal chassis. Store the cover carefully making sure that the flame path is not damaged. The Terminal Interface board is now accessible to make the relevant connections. Take extra care when sliding the enclosure back over the chassis to ensure wires or cabling do not become trapped.

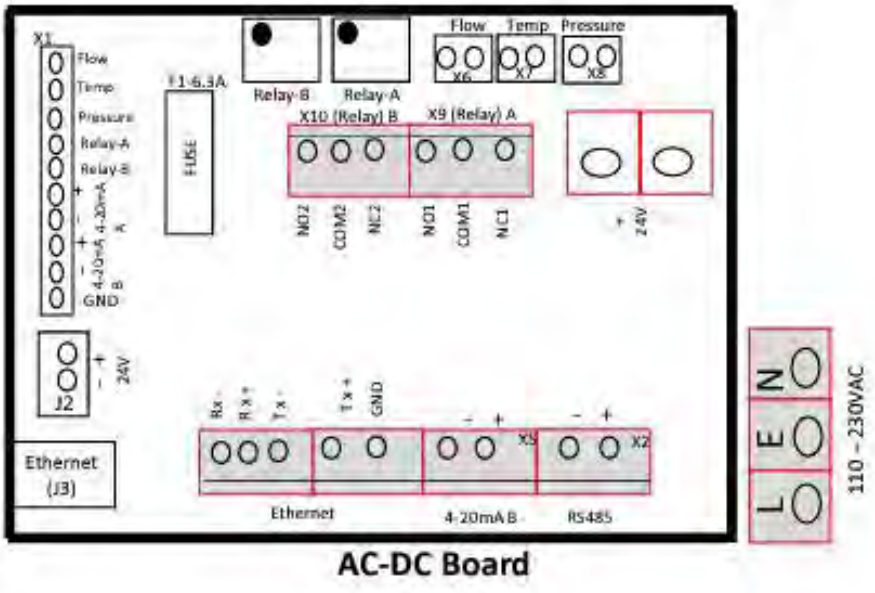
Once all of the connections are complete the cover must be replaced and the eight cap screws secured before applying power.

When powering the analyser using 24VDC, only hookup to the Terminal Interface Board is required.



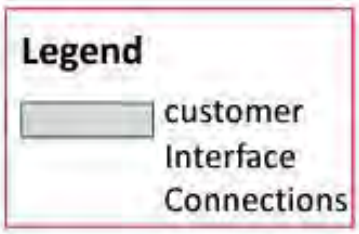
Terminal Interface Board

Terminal Interface Board.
Fig 2.



AC-DC Board

AC-DC Board.
Fig 3.



6.0 ENCLOSURE:

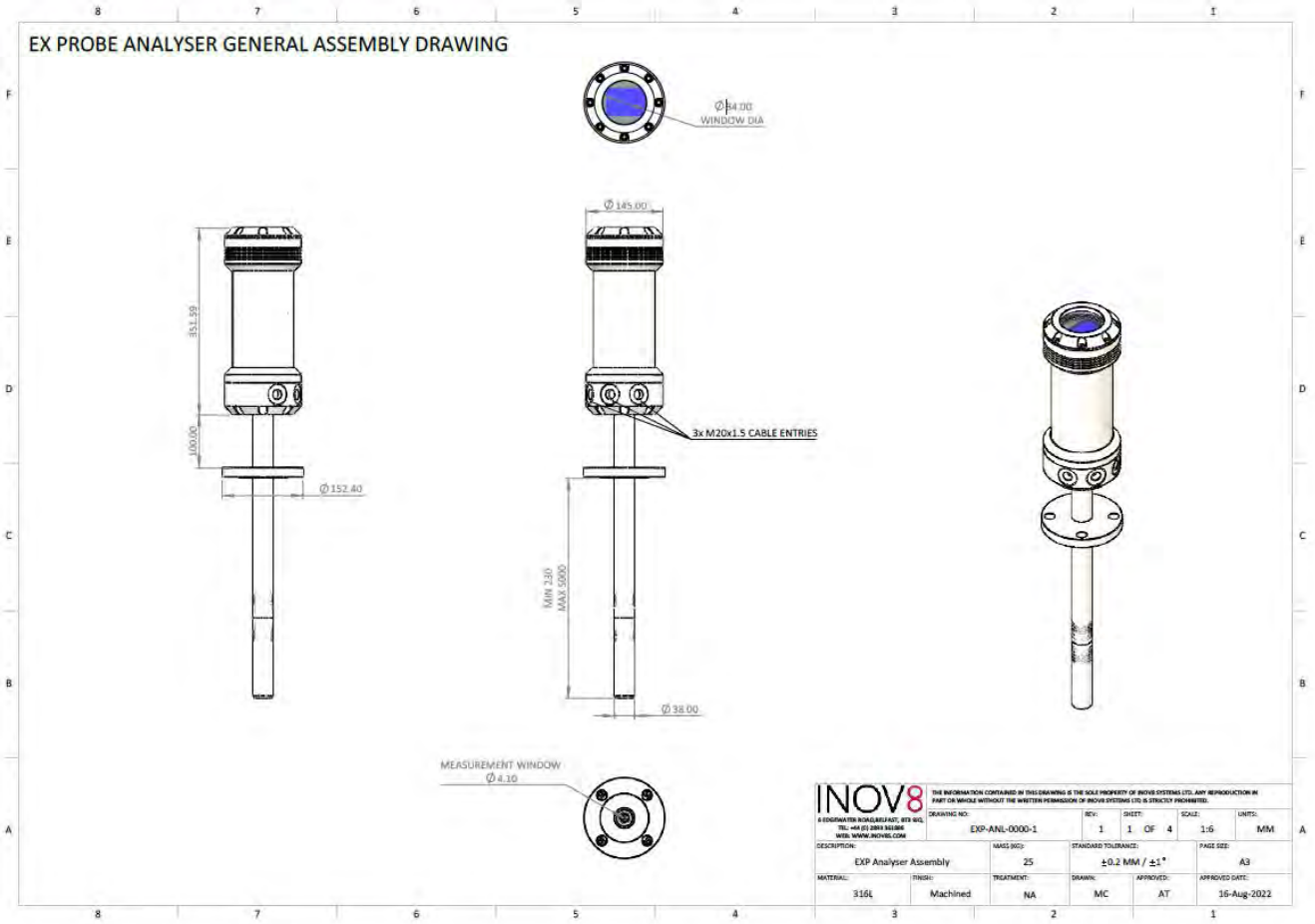
On completion of the installation and prior to power-on, all of the enclosure cover fixing bolts must be torqued to 30Nm.

WARNING: - Any unused ports must be fitted with a Class I Division 1/ATEX/IECEx rated (M20x1.5 OR ¾ NPT) stopping plug (see the Specific Conditions of Use)

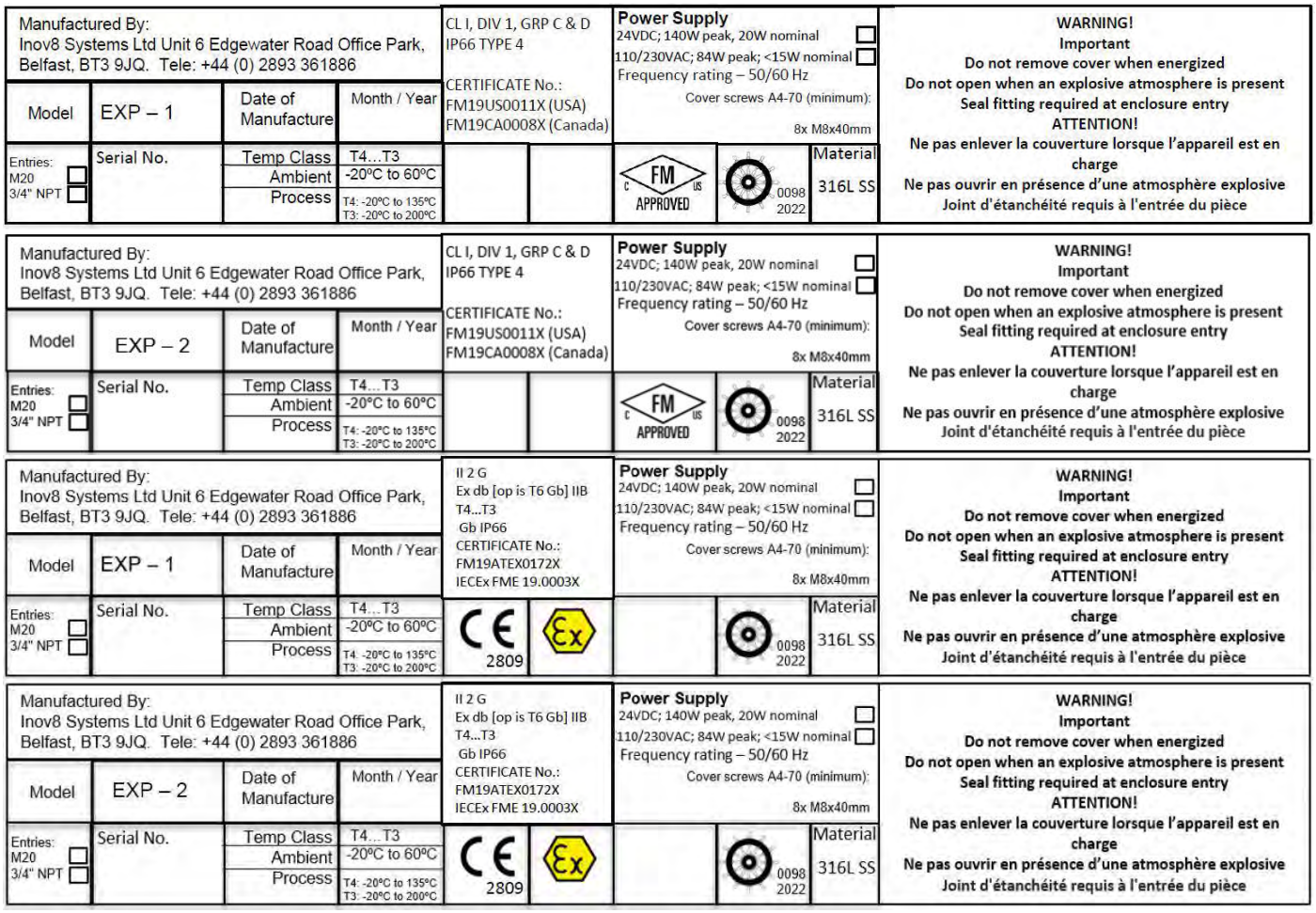
7.0 MAINTENANCE:

No routine maintenance is required on this equipment beyond a visual inspection for physical damage. An annual inspection is recommended to ensure that the equipment performance remains optimised.
The analyser requires servicing every 24 months on a preventative maintenance basis to ensure long term reliability of the equipment. This encompasses a light source and transducer replacement (where applicable) and a measurement verification.

8.0 GA Drawing



9.0 Certification Label:



10.0 Specific Conditions of Use

The equipment includes flame path joints. Should any repair of the flame paths be required, consultation with Inov8 is necessary.

The process temperature shall not exceed 200°C for T3 ratings and shall not exceed 135°C for T4 ratings.

For USA & Canada Division rated devices: The cable glands or cable sealing device or blanking plugs for the unused entries (as applicable) used for the installation shall be suitably certified with minimum certification rating of Class I, Division 1, Groups C & D Ta = -20°C to 60°C for temperature class T4 or T3 depending on the final area requirements.

For ATEX & IECEx rated devices: The cable glands or cable sealing device or blanking plugs for the unused entries (as applicable) used for the installation shall be suitably certified with minimum certification rating of Ex db IIB T4…T3 Gb Ta = -20°C to 60°C for temperature class T4 or T3 depending on the final area requirements.

END

INOV8
Customer Inspired Innovation

HART Operation Manual

Rev 1.0

Inov8 Systems Ltd
6 Edgewater Road, Belfast, BT3 9JQ
Tel: +44 (0) 2893 361886 Email: info@inov8s.com

Change Notes

Rev	Date	Change(s)
1.0	26/10/2020	First revision

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Operation ....**Error! Bookmark not defined.**
Modifiable Device Parameters....4
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Primary Variables....5
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Introduction

Our implementation of HART requires no custom drivers, e.g. DD files etc to run. It uses the standard backwards compatible configuration which will work with any handheld communicator or DCS straight away.

Wire your HART connection into 4-20mA B/2 on our terminal board. Our 4-20mA loop is passive, so either the DCS or handheld communicator you are using will need to supply the loop power (24V).

This manual assumes you are already familiar with our software.

Modifiable Device Parameters

Field	Valid Data
Polling Address	Number between 0-63.
Short Tag	Capital letters and numbers only. 8 characters long.
Long Tag	Any letter and number. 32 characters long.
Descriptor	Capital letters and numbers only. 16 characters long.
Device ID	Number between 0-16,777,215.

Click on **Apply Changes** when you have finished modifying any values. The HART connection will drop out and you will need to re-poll to find the device again after approximately 20 seconds.

Similarly, **Restart Modem** and **Restart Microcontroller** will drop the connection temporarily, these buttons should not need to be used but they are there in case of a lock-up.

You can also change the values in the table above from the HART master and send it a Message.

Supported Messages

Message	**Action**
START	Starts the cycle, if not already running.
STOP	Starts the cycle, if not already stopped.
CLEAN	Runs a burst of ultrasonic cleaning.

Primary Variables

Primary Variable	Measurement	Units	Meaning
PV1	Oil in Water Concentration	PPM	N/A
PV2	Ambient Temperature inside enclosure	Degrees Celsius	N/A
PV3	Cycle Status Indicator	Percentage	0% = Cycle Stopped 100% = Cycle Running

NOTE: The PV1 reading also changes to -1.00 PPM when the cycle is stopped and the PV mA reading changes to 3.2mA – therefore if you cannot make use of PV3 then you can determine if the cycle is running or not from PV1 itself.

Readings with a Communicator



Cycle Stopped



Cycle Running



PV2 and PV3



PV1 Lower and Upper Range Values



HART Revision, Device ID etc



Message, Short TAG, Descriptor

7.7 IOM for Pressure Gauges

ASHCROFT®

PRESSURE GAUGE INSTALLATION, OPERATION AND MAINTENANCE



I&M008-10098-5/02 (250-1353-L) Rev. 12/15

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1.0 SELECTION & APPLICATION

Users should become familiar with ASME B40.100 (Gauges – Pressure Indicating Dial Type – Elastic Element) before specifying pressure measuring gauges. That document – containing valuable information regarding gauge construction, accuracy, safety, selection and testing – may be ordered from:

ASME International
Three Park Avenue
New York, N.Y. 10016-5990
800-843-2763 (US/Canada)
001-800-843-2763 (Mexico)
973-882-1170 outside North America
email: infocentral@asme.org
www.asme.org

WARNING: To prevent misapplication, pressure gauges should be selected considering media and ambient operating conditions. Improper application can be detrimental to the gauge, causing failure and possible personal injury, property damage or death. The information contained in this manual is offered as a guide in making the proper selection of a pressure gauge. Additional information is available from Ashcroft Inc.

The following is a highlight of some of the more important considerations:

1.1 Range – The range of the instrument should be approximately twice the maximum operating pressure. Too low a range may result in (a) low fatigue life of the elastic element due to high operating stress and (b) susceptibility to overpressure set due to pressure transients that exceed the normal operating pressure. Too high a range may yield insufficient resolution for the application.

1.2 Temperature – Refer to Section 2 of this manual for important information concerning temperature related limitations of pressure gauges, both dry and liquid filled.

1.3 Media – The material of the process sensing element must be compatible with the process media. Use of a diaphragm seal with the gauge is recommended for process media that (a) is corrosive to the process sensing element; (b) contain heavy particulates (slurries) or (c) are very viscous including those that harden at room temperature.

1.4 Oxidizing media – Gauges for direct use on oxidizing media should be specially cleaned. Gauges for oxygen service should be ordered to variation X6B and will carry the ASME required dial marking "USE NO OIL" in red letters. Gauges for direct use on other oxidizing media may be ordered to variation X6W. They will be cleaned but carry no dial marking. *PLUS!*™ Performance gauges or Halocarbon filled gauge or diaphragm fill is required for use with oxidizing media; order variation XCF.

1.5 Pulsation/Vibration – Pressure pulsation can be dampened by several mechanisms; the patented *PLUS! Performance* gauge will handle the vast majority of applications. One exception to this is high frequency pulsation which is difficult to detect. The only indication may be an upscale zero shift due to movement wear. These applications should be addressed with a liquid filled gauge, or in extreme cases, a remotely mounted liquid filled gauge connected with a length of capillary line. The small diameter of the capillary provides excellent dampening, but can be plugged. The Ashcroft 1106 pulsation dampener and 1112 snubber are auxiliary devices which dampen pulsation with less tendency to plug.

1.6 Gauge fills. – Once it has been determined that a liquid filled gauge is in order, the next step is selecting the type of fill. **Glycerin** satisfies most applications. While being the least expensive fill, its usable temperature range is 20/180°F. **Silicone** filled gauges have a broader service range: –40/250°F. Oxidizing media require the use of **Halocarbon,** with a service range of –40/250°F. Pointer motion will be slowed at the low end of the low end of these temperature ranges.

1.7 Mounting – Users should predetermine how the gauge will be mounted in service: stem (pipe), wall (surface) or panel (flush). Ashcroft wall or panel mounting kits should be ordered with the gauge. See Section 3.

2.0 TEMPERATURE

2.1 Ambient Temperature – To ensure long life and accuracy, pressure gauges should preferably be used at an ambient temperature between –20 and +150°F (–30 to +65°C). At very low temperatures, standard gauges may exhibit slow pointer response. Above 150°F, the accuracy will be affected by approximately 1.5% per 100°F. Other than discoloration of the dial and hardening of the gasketing and degradation of accuracy, non-liquid filled Type 1279 (phenolic case) and 1379 (aluminum case) Duragauge® gauge, with standard glass windows, can withstand continuous operating temperatures up to 250°F. Unigauge models 2½″ and 3½″ 1009 and 1008S liquid filled gauges can withstand 200°F but glycerin fill and the acrylic window of Duragauge® gauges will tend to yellow. Silicone fill will have much less tendency to yellow. Low pressure, liquid filled Types 1008 and 1009 gauges may have some downscale errors caused by liquid fill expansion. This can be alleviated by venting the gauge at the top plug (pullout the blue plug insert). To do this the gauge must be installed in the vertical position.

Although the gauge may be destroyed and calibration lost, gauges can withstand short times at the following temperatures: gauges with all welded pressure boundary joints, 750°F (400°C); gauges with silver brazed joints, 450°F (232°C) and gauges with soft soldered joints, 250°F (121°C). For expected long term service below –20°F (–30°C) Duragauge® and 4½″ 1009 gauges should be hermetically sealed and specially lubricated; add "H" to the product code for hermetic sealing. Add variation XVY for special lubricant. Standard Duralife® gauges may be used to –50°F (–45°C) without modification.

2.2 Accuracy – Heat and cold affect accuracy of indication. A general rule of thumb for **dry gauges** is 0.5% of full scale change for every 40°F change from 75°F. Double that allowance for gauges with hermetically sealed or liquid filled cases, except for Duragauge® gauges where no extra allowance is required due to the elastomeric, compensating back. Above 250°F there may exist very significant errors in indication.

2.3 Steam service – In order to prevent live steam from entering the Bourdon tube, a siphon filled with water should be installed between the gauge and the process line. Siphons can be supplied with ratings up to 4,000 psi. If freezing of the condensate in the loop of the siphon is a possibility, a diaphragm seal should be used to isolate the gauge from the process steam. Siphons should also be used whenever condensing, hot vapors (not just steam) are present. Super heated steam should have enough piping or capillary line ahead of the siphon to maintain liquid water in the siphon loop.

2.4 Hot or very cold media – A five foot capillary line assembly will bring most hot or cold process media within the recommended gauge ambient temperature range. For media above

750°F (400°C) the customers should use their own small diameter piping to avoid possible corrosion of the stainless steel. The five foot capillary will protect the gauges used on the common cryogenic (less than –300°F (200°C) gases, liquid argon, nitrogen, and oxygen.) The capillary and gauge must be cleaned for oxygen service. The media must not be corrosive to stainless steel, and must not plug the small bore of the capillary.

2.5 Diaphragm seals – A diaphragm seal should be used to protect gauges from corrosive media, or media that will plug the instrument. Diaphragm seals are offered in a wide variety of designs and corrosion resistant materials to accommodate almost any application and most connections. Visit www.ashcroft.com for details.

2.6 Autoclaving – Sanitary gauges with clamp type connections are frequently steam sterilized in an autoclave. Gauges equipped with polysulfone windows will withstand more autoclave cycles than those equipped with polycarbonate windows. Gauges equipped with plain glass or laminated safety glass **should not be autoclaved.** Gauge cases should be vented to atmosphere (removing the rubber fill/safety plug if necessary) **before** autoclaving to prevent the plastic window from cracking or excessively distorting. If the gauge is liquid filled, the fill should be drained from the case and the front ring loosened before autoclaving.

3.0 INSTALLATION

3.1 Location – Whenever possible, gauges should be located to minimize the effects of vibration, extreme ambient temperatures and moisture. Dry locations away from very high thermal sources (ovens, boilers etc.) are preferred. If the mechanical vibration level is extreme, the gauge should be remotely located (usually on a wall) and connected to the pressure source via flexible tubing.

3.2 Gauge reuse – ASME B40.100 recommends that gauges not be moved indiscriminately from one application to another. The cumulative number of pressure cycles on an in-service or previously used gauge is generally unknown, so it is generally safer to install a new gauge whenever and wherever possible. This will also minimize the possibility of a reaction with previous media.

3.3 Tightening of gauge – Torque should never be applied to the gauge case. Instead, an open end or adjustable wrench should always be used on the wrench flats of the gauge socket to tighten the gauge into the fitting or pipe. NPT threads require the use of a suitable thread sealant, such as pipe dope or teflon tape, and must be tightened very securely to ensure a leak tight seal.

CAUTION: Torque applied to a diaphragm seal or its attached gauge, that tends to loosen one relative to the other, can cause loss of fill and subsequent inaccurate readings. Always apply torque **only** to the wrench flats on the lower seal housing when installing filled, diaphragm seal assemblies or removing same from process lines.

3.4 Process isolation – A shut-off valve should be installed between the gauge and the process in order to be able to isolate the gauge for inspection or replacement without shutting down the process.

3.5 Surface mounting – Also known as wall mounting. Gauges should be kept free of piping strains. The gauge case mounting feet, if applicable, will ensure clearance between the pressure relieving back and the mounting surface.

3.6 Flush mounting – Also known as panel mounting. The applicable panel mounting cutout dimensions can be found at www.ashcroft.com

4.0 OPERATION

4.1 Frequency of inspection – This is quite subjective and depends upon the severity of the service and how critical the accuracy of the indicated pressure is. For example, a monthly inspection frequency may be in order for critical, severe service applications. Annual inspections, or even less frequent schedules, are often employed in non-critical applications.

4.2 In-service inspection – If the accuracy of the gauge cannot be checked in place, the user can at least look for (a) erratic or random pointer motion; (b) readings that are suspect – especially indications of pressure when the user believes the true pressure is 0 psig. Any gauge which is obviously not working or indicating erroneously, should be immediately valved-off or removed from service to avoid a possible pressure boundary failure.

4.3 When to check accuracy – Any suspicious behavior of the gauge pointer warrants that a full accuracy check be performed. Even if the gauge is not showing any symptoms of abnormal performance, the user may want to establish a frequency of bench type inspection.

4.4 When to recalibrate – This depends on the criticality of the application. If the accuracy of a 3-2-3% commercial type gauge is only 0.5% beyond specification, the user must decide whether it's worth the time and expense to bring the gauge back into specification. Conversely if the accuracy of a 0.25% test gauge is found to be 0.1% out of specification then the gauge should be recalibrated.

4.5 Other considerations – These include (a) bent or unattached pointers due to extreme pressure pulsation; (b) broken windows which should be replaced to keep dirt out of the internals; (c) leakage of gauge fill; (d) case damage – dents and/or cracks; (e) any signs of service media leakage through the gauge including its connection; (f) discoloration of gauge fill that impedes readability.

4.6 Spare parts – As a general rule it is recommended that the user maintain in inventory one complete Ashcroft® instrument for every ten (or fraction thereof) of that instrument type in service.

5.0 GAUGE REPLACEMENT

It is recommended that the user stock one complete Ashcroft® instrument for every ten (or fraction thereof) of that instrument type in service. With regard to gauges having a service history, consideration should be given to discarding rather than repairing them. Gauges in this category include the following:

a. Gauges that exhibit a span shift greater than 10%. It is possible the Bourdon tube has suffered thinning of its walls by corrosion.

b. Gauges that exhibit a zero shift greater than 25%. It is likely the Bourdon tube has seen significant overpressure leaving residual stresses that may be detrimental to the application.

c. Gauges which have accumulated over 1,000,000 pressure cycles with significant pointer excursion.

d. Gauges showing any signs of corrosion and/or leakage of the pressure system.

e. Gauges which have been exposed to high temperature or exhibit signs of having been exposed to high temperature – specifically 250°F or greater for soft soldered systems; 450°F or greater for brazed systems; and 750°F or greater for welded systems.

f. Gauges showing significant friction error and/or wear of the movement and linkage.

g. Gauges having damaged sockets, especially damaged threads.

h. Liquid filled gauges showing loss of case fill.

NOTE: ASME B40.100 does not recommend moving gauges from one application to another. This policy is prudent in that it encourages the user to procure a new gauge, properly tailored by specification, to each application that arises.

6.0 ACCURACY: PROCEDURES/DEFINITIONS

Accuracy inspection – Readings at approximately five points equally spaced over the dial should be taken, both upscale and downscale, before and after lightly rapping the gauge to remove friction. **A pressure standard with accuracy at least four times greater than the accuracy of the gauge being tested is recommended.**

Equipment – A finely regulated pressure supply will be required. It is critical that the piping system associated with the test setup be leaktight. The gauge under test should be positioned as it will be in service to eliminate positional errors due to gravity.

Method – ASME B40.100 recommends that **known** pressure (based on the reading from the pressure standard used) be applied to the gauge under test. Readings including any error from the nominal input pressure, are then taken from the gauge under test. The practice of aligning the pointer of the gauge under test with a dial graduation and then reading the error from the master gauge ("reverse reading") can result in inconsistent and misleading data and should NOT be used.

Calibration chart – After recording all of the readings it is necessary to calculate the errors associated with each test point using the following formula: ERROR in percent = 100 times (TRUE VALUE minus READING) ÷ RANGE. Plotting the individual errors (Figure 1) makes it possible to visualize the total gauge characteristic. The plot should contain all four curves: upscale – before rap; upscale – after rap; downscale – before rap; downscale – after rap. "*Rap*" means lightly tapping the gauge **before** reading to remove friction as described in ASME B40.100.

Referring to Figure 1, several classes of error may be seen:

Zero – An error which is approximately equal over the entire scale. This error can be manifested when either the gauge is

FIG. 1

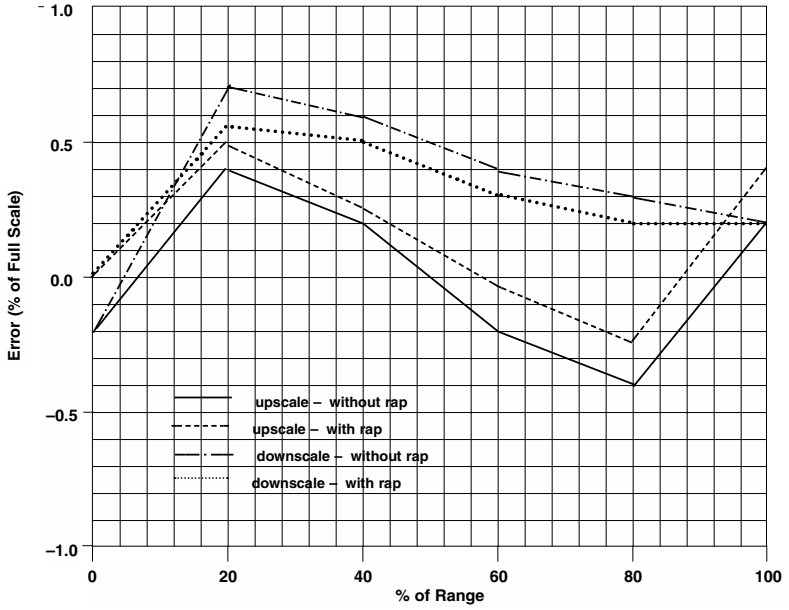
TYPICAL CALIBRATION CHART

INDICATED VALUE (PSI)

True Value – PSI	Increasing – Without RAP	Increasing – With RAP	Decreasing – Without RAP	Decreasing – With RAP
0	–.4	0	–.4	0
40	+.8	+1.0	+1.4	+1.1
80	+.4	+.5	+1.2	+1.0
120	–.4	–1.0	+.8	+.6
160	–.8	–.5	+.6	+.4
200	+.4	+.8	+.4	+.4

ERROR (% OF FULL SCALE)

True Value – % of Range	Increasing – Without RAP	Increasing – With RAP	Decreasing – Without RAP	Decreasing – With RAP
0	–.20	0	–.20	0
20	+.40	+.50	+.70	+.55
40	+.20	+.25	+.60	+.50
60	–.20	–.05	+.40	+.30
80	–.40	–.25	+.30	+.20
100	+.20	+.40	+.20	+.20



dropped or overpressured and the Bourdon tube takes a permanent set. This error may often be corrected by simply repositioning the pointer. Except for test gauges, it is recommended that the pointer be set at midscale pressure to "split" the errors.

Span – A span error exists when the error at full scale pressure is different from the error at zero pressure. This error is often proportional to the applied pressure. Most Ashcroft gauges are equipped with an internal, adjusting mechanism with which the user can correct any span errors which have developed in service.

Linearity – A gauge that has been properly spanned can still be out of specification at intermediate points if the response of the gauge as seen in Figure 1 (Typical Calibration Chart) is not linear. The Ashcroft Duragauge® pressure gauge is equipped with a rotary movement feature which permits the user to minimize this class of error. Other Ashcroft gauge designs (e.g., 1009 Duralife®) require that the dial be moved left or right prior to tightening the dial screws.

Hysteresis – Some Bourdon tubes have a material property known as hysteresis. This material characteristic results in differences between the upscale and downscale curves. This class of error can **not** be eliminated by adjusting the gauge movement or dial position.

Friction – This error is defined as the difference in readings before and after lightly tapping the gauge case at a check point. Possible causes of friction are burrs or foreign material in the movement gearing, "bound" linkages between the movement and the bourdon tube, or an improperly tensioned hairspring. If correcting these potential causes of friction does not eliminate excessive friction error, the movement should be replaced.

6.1 Calibration – Rotary Movement Gauges and Type 1259 Gauges – Inspect gauge for accuracy. Many times gauges are simply "off zero" and a simple pointer adjustment using the micrometer pointer is adequate. If inspection shows the gauge warrants recalibration to correct span and/or linearity errors, proceed as follows:

a. Remove ring, window and, if solid front case, the rear closure assembly.

b. Pressurize the gauge **once** to full scale and back to zero.

c. Refer to Figure 2 (Ashcroft System Assembly w/Rotary Gear Movement) for a view of a typical Ashcroft rotary system assembly with component parts identified. Refer to Figure 2A for link configuration of Type 1259 gauge.

FIG. 2 ASHCROFT SYSTEM ASSEMBLY W/ROTARY GEAR MOVEMENT

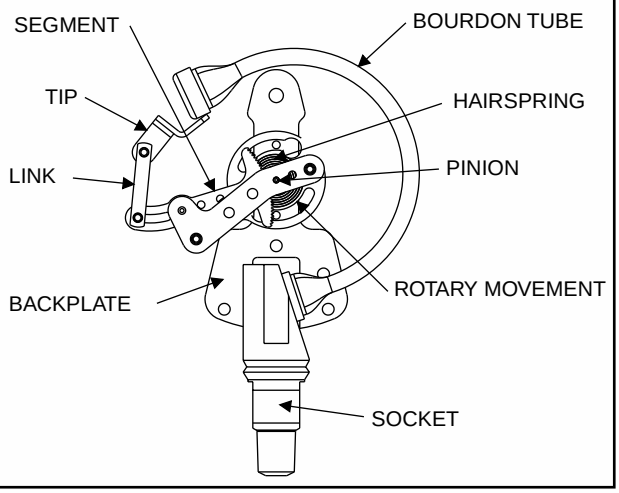
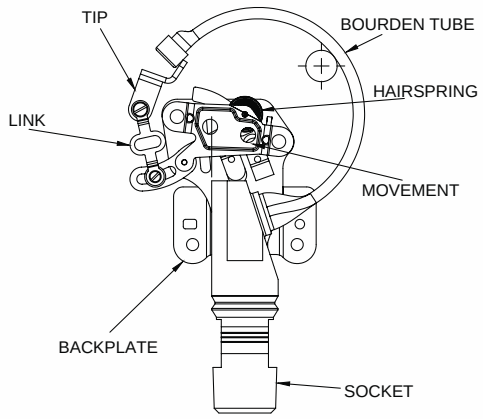


FIG. 2A ASHCROFT TYPE 1259 SYSTEM ASSEMBLY



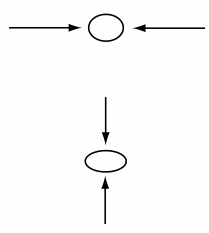
d. Adjust the micrometer pointer so that it rests at the true zero position. For open front gauges the pointer and dial must also be disassembled and the pointer should then be lightly pressed onto the pinion at the 9:00 o'clock position.

e. Apply full scale pressure and note the magnitude of the span error. With open front gauges, ideal span (270 degrees) will exist when at full scale pressure the pointer rests exactly at the 6:00 o'clock position.

f. If the span has shifted significantly (span error greater than 10%), the gauge should be replaced because there may be some partial corrosion inside the Bourdon tube which could lead to ultimate failure. If the span error exceeds 0.25%, loosen the lower link screw and move the lower end of the link toward the movement to increase span or away to decrease span. An adjustment of 0.004 inch will change the span by approximately 1%. This is a repetitive procedure which often requires more than one adjustment of the link position and the subsequent rechecking of the errors at zero and full scale pressure.

g. Apply midscale pressure and note error in reading. Even though the gauge is accurate at zero and full scale, it may be inaccurate at the midpoint. This is called linearity error. For corrections to linearity with the Type 1259 gauges refer to Figure 2B. For rotary movement gauges, note the following: if the error is positive, the movement should be rotated counter clockwise. Rotating the movement one degree will change this error by approximately 0.25%. Rotating the movement often affects span and it should be subsequently rechecked and readjusted if necessary according to step 6.1e and 6.1f.

FIG. 2B LINEARITY ADJUSTMENT & LINK CONFIGURATION FOR ASHCROFT TYPE 1259



h. While recalibrating the gauge, the friction error – difference in readings taken with and without rap – should be

noted. This error should not exceed the basic accuracy of the gauge. If the friction error is excessive, the movement should be replaced. One possible cause of excessive friction is improper adjustment of the hairspring. The hairspring torque,or tension, must be adequate without being excessive. The hairspring should also be level, unwind evenly (no turns rubbing) and it should never tangle.

NOTES:

1 For operation of test gauge external zero reset, refer to page 17.

2 For test gauge calibration procedure, refer to Figure 2 on page 18.

7.0 DIAPHRAGM SEALS

7.1 General – A diaphragm seal (isolator) is a device which is attached to the inlet connection of a pressure instrument to isolate its measuring element from the process media. The space between the diaphragm and the instrument's pressure sensing element is solidly filled with a suitable liquid. Displacement of the liquid fill in the pressure element, through movement of the diaphragm, transmits process pressure changes directly to a gauge, switch or any other pressure instrument. When diaphragm seals are used with pressure gauges, an additional 0.5% tolerance must be added to the gauge accuracy because of the diaphragm spring rate.

Used in a variety of process applications where corrosives, slurries or viscous fluids may be encountered, the diaphragm seal affords protection to the instrument where:

- The process fluid being measured would normally clog the pressure element.
- Pressure element materials capable of withstanding corrosive effects of certain fluids are not available.
- The process fluid might freeze due to changes in ambient temperature and damage the element.

7.2 Installation – Refer to bulletin OH-1 for information regarding (a) seal configurations; (b) filling fluids; (c) temperature range of filling fluids; (d) diaphragm material pressure and temperature limits; (e) bottom housing material pressure and temperature limits; (f) pressure rating of seal assembly; (g) accuracy/temperature errors of seal assembly; (h) diaphragm seal displacement. The volumetric displacement of the diaphragm must at least equal the volumetric displacement of the measuring element in the pressure instrument to which the seal is to be attached.

It is imperative that the pressure instrument/diaphragm seal assembly be **properly** filled prior to being placed in service. Ashcroft diaphragm seal assemblies should only be filled by a seal assembler certified by Ashcroft Inc. Refer to section 3.3 for a cautionary note about not applying torque on either the instrument or seal relative to the other.

7.3 Operation – All Ashcroft® diaphragm seals, with the exception of Type 310 mini-seals, are continuous duty. Should the pressure instrument fail, or be removed accidentally or deliberately, the diaphragm will seat against a matching surface preventing damage to the diaphragm or leakage of the process fluid.

7.4 Maintenance – Clamp type diaphragm seals – Types 100, 200 and 300 – allow for replacement of the diaphragm or diaphragm capsule, if that ever becomes necessary. The Type 200 top housing must also be replaced with the diaphragm. With all three types the clamping arrangement allows field disassembly to permit cleaning of the seal interior.

7.5 Failures – Diaphragm failures are generally caused by either corrosion, high temperatures or fill leakage. Process media build-up on the process side of the diaphragm can also require seal cleaning or replacement. Consult Customer Service, Stratford CT for advice on seal failures and/or replacement.

WARNING: All seal components should be selected considering process and ambient operating conditions to prevent misapplication. Improper application could result in failure, possible personal injury, property damage or death.

8.0 DAMPENING DEVICES

8.1 General – Some type of dampening device should be used whenever the pressure gauge may be exposed to repetitive pressure fluctuations that are fairly rapid, high in magnitude and especially when transitory pressure spikes exceeding the gauge range are present (as with starting and stopping action of valves and pumps). A restricted orifice of some kind is employed through which pressure fluctuations must pass before they reach the Bourdon tube. The dampener reduces the magnitude of the pressure pulse thus extending the life of the Bourdon tube and movement. This reduction of the pressure pulsation as "seen" by the pressure gauge is generally evidenced by a reduction in the pointer travel. If the orifice is very small the pointer may indicate the average service pressure, with little or no indication of the time varying component of the process pressure.

Commonly encountered media (e.g. – water and hydraulic oil) often carry impurities which can plug the orifice over time thus rendering the gauge inoperative until the dampener is cleaned or replaced.

Highly viscous media and media that tend to periodically harden (e.g., asphalt) require a diaphragm seal be fitted to the gauge. The seal contains an internal orifice which dampens the pressure fluctuation within the fill fluid.

8.2 Throttle Screws & Plugs – These accessories provide dampening for the least cost. They have the advantage of fitting completely within the gauge socket and come in three types: (a) a screwed-in type which permits easy removal for cleaning or replacement; (b) a pressed in, non-threaded design and (c) a pressed in, threaded design which provides a highly restrictive, helical flow path. Not all styles are available on all gauge types.

8.3 Ashcroft Pulsation Dampener – Type 1106 Ashcroft pulsation dampener is a moving pin type in which the restricted orifice is the clearance between the pin and any one of five preselected hole diameters. Unlike a simple throttle screw/plug, this device has a self-cleaning action in that the pin moves up and down under the influence of pressure fluctuations.

8.4 Ashcroft Pressure Snubber – The heart of the Type 1112 pressure snubber is a thick porous metal filter disc. The disc is available in four standard porosity grades.

8.5 Ashcroft Needle Valves – Type 7001 thru 7004 steel needle valves provide varying degrees of dampening. These devices, in the event of plugging, can easily be opened to allow the pressure fluid to clear away the obstruction.

8.6 Chemiquip® Pressure Limiting Valves – Model PLV-255, PLV-2550, PLV-5460, PLV-5500 and PLV-6430, available with and without built-in snubbers, automatically "shut off" at adjustable preset values of pressure to protect the gauge from damage to overpressure. They are especially useful on hydraulic systems wherein hydraulic transients

(spikes) are common.

9.0 TEST EQUIPMENT & TOOL KITS

See our website www.ashcroft.com for more details

9.1 Pressure Instrument Testing Equipment

Type 1305D Deadweight Tester

Type 1327D Pressure Gauge Comparator

Type 1327CM “Precision” Gauge Comparator

9.2 Tools & Tool Kits For Recalibration of 4½˝ and Larger Gauges

Type 2505 universal carrying case for 1082 test gauge

Type 266A132-01 span wrench for 1082 test gauge

Type 1281 socket O-Ring kit for 1279/1379 lower connect

Type 1285 4½˝ ring wrench for 1279/1379 lower & back connect

Type 1286 6˝ ring wrench for 1379 lower & back connect

Type 3220 pointer puller (all gauges except 1009 Duralife®)

Type 3530 pinion back-up tool for 1009 Duralife®

Type 3220 Handjack set

Type 1105 Tool Kit

9.3 Kits to Convert a Dry Gauge to a Liquid Filled or Weather Proof Case Gauge

Type 1280 conversion kit for 4½˝ lower connect 1279/1379

Type 1283 conversion kit for 4½˝ back connect 1279/1379

Type 1284 conversion kit for 6˝ lower & back connect



TYPE 1105
TOOL KIT

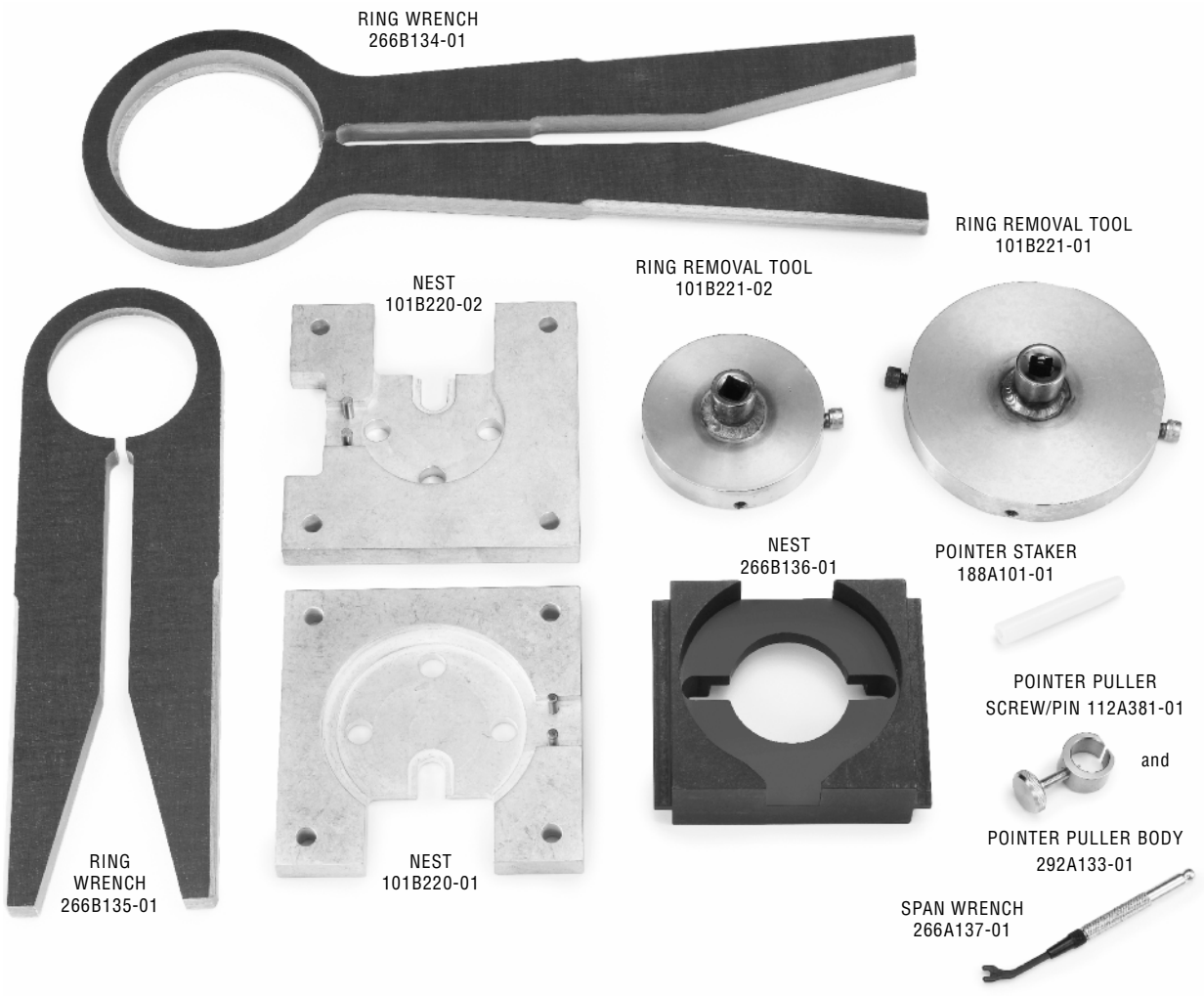


TYPE 3220
HAND JACK SET

9.4 2½ & 3½ 1009 Duralife® Gauge Tools

Description	Part No.
Pointer Puller Screw/Pin[2][3][4]	112A381-01
Pointer Puller Body[2][3][4]	292A133-01
Pointer Staker[2][4]	188A101-01
Span Wrench[2][5] (to adjust span)	266A137-01
Ring Wrench 3½″[1][5] (for ring removal) (35 1009)	266B134-01
Ring Wrench 2½″[1][5] (for ring removal) (25 1009)	266B135-01
Nest 2½″ & 3½″[1][5] (to hold gauge for ring removal) (25/35 1009)	266B136-01
Ring Removal Tool[6] (25 1009)	101B221-02
Ring Removal Tool[6] (35 1009)	101B221-01
Nest 2½″[6] (to hold gauge for ring removal) (25 1009)	101B220-02
Nest 3½″[6] (to hold gauge for ring removal) (35 1009)	101B220-01
Type 1230 throttle plug insertion (¼ NPT) for 1009 Duralife®)	1230
Type 1231 throttle plug insertion (½ NPT) for 1009 Duralife® (body only)	1231
Tool to open orifice on push-in throttle plug	101A206-01

(1) Formerly 1206T Tool Kit.
(2) Formerly some parts in 1205T Tool Kit.
(3) Both parts must be purchased together.
(4) Previous and current design.
(5) Previous design only.
(6) Current design only.



ASHCROFT® Type 1188 Bellows Gauge Calibration Procedure

CALIBRATION & TROUBLE CORRECTION DIAGRAM

RANGE SPAN ADJUSTMENT

RANGE TOO SHORT
Adjust slide "S" inward

RANGE TOO LONG
Adjust slide "S" outward

POINTER JUMPING

STICKY PARTS
Clean all bearings and gear teeth

LOOSE HAIRSPRING
Remove backlash by disengaging pinion & rotate to tighten

COUNTER BALANCE RUBBING
Bend if necessary to clear socket in travel

NOTE: After adjusting range span, set both movement stops. Set the underload stop so that the pointer will stop at zero. Set the overload stop so that the pointer will pass the maximum range approximately 5˝.

After adjusting span re-zero pointer by removing from pinion and re-assembling at the proper dial mark.

SLUGGISH MOVEMENT

TIGHT HAIRSPRING
Loosen by disengaging pinion & rotate

NON LINEAR

NON LINEAR FIRST 3RD.

ADJ. ANGLE OF PULL BY INCREASING ANGLE "A"

NON LINEAR LAST 3RD.

ADJ. ANGLE OF PULL BY DECREASING ANGLE "A"

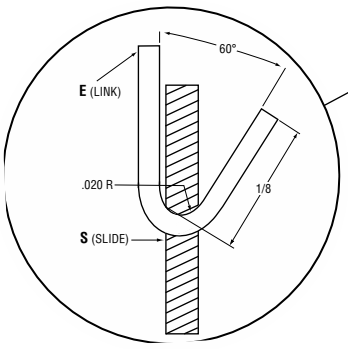
NOTE: To increase or decrease angle "A," bend tip inward or outward as required. Doing this may run the movement segment off the pinion. This can be corrected by cutting off one end off the link "E" decreasing its length, or makin a new length from .032 dia. phos. bronze wire.

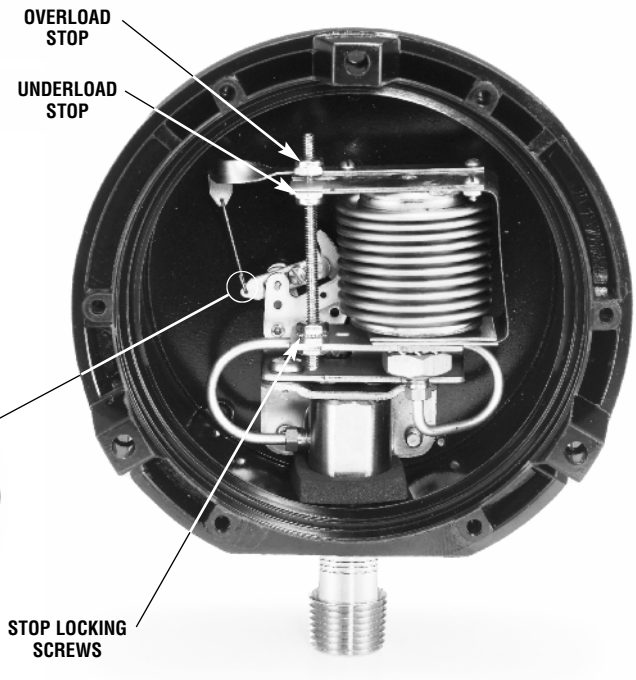
Caution: When reproducing link end, follow figure 44 very closely. this will prevent too much play, or, binding in operation.

REF: Replacing System Bellows

After assembling bellows to the gauge socket securely, subject system to 30 psi for five minutes, allowing bellows to travel approximately 1/8˝ against the overload stop. After this, heat treat system for 15 hours at 250°F, this procedure is necssary to prevent gauge drift.

SLIDE AND LINK (angle "A")
Enlarged view of slide and link





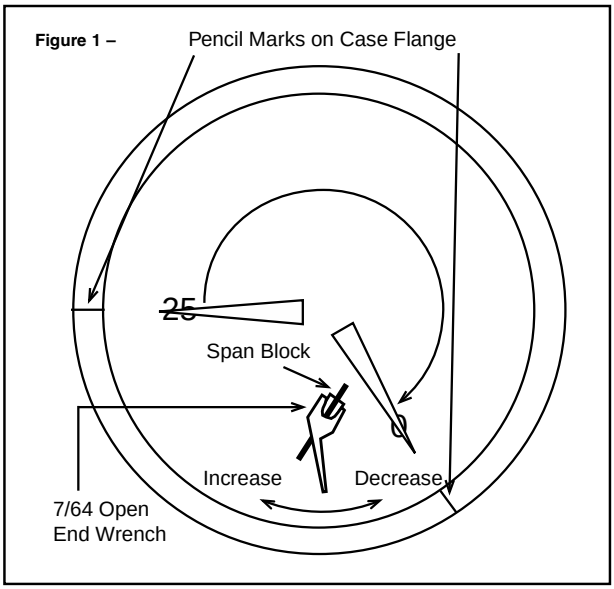
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ASHCROFT® Previous Type 1009 Duralife®
Calibration Procedure – Vacuum Range

ASHCROFT®

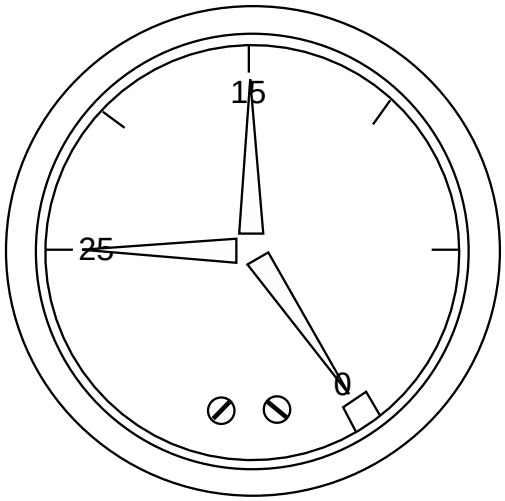
1. Remove ring, window and gasket pointer.
2. Using a pencil, refer to dial and mark the 0 and 25˝ Hg positions on the case flange.
3. Remove dial.
4. Apply 25˝ Hg vac.
5. Lightly press pointer onto pinion carefully aligning it with the 25˝ Hg vac. mark on the flange.
6. Release vacuum fully.
7. Note agreement of pointer to zero mark on flange.
8. If span is high or low, turn span block as shown in Figure 1.

Figure 1 –



9. Repeat steps 4 through 8 until span is correct.
10. Remove pointer.
11. With 25˝ Hg vac applied, reassemble dial, dial screws (finger tight) and point.
12. Apply 15˝ Hg vac. and note accuracy of indication. If required, slide dial left or right to reduce error to 1% maximum.
13. Firmly tighten dial screws.
14. Firmly tap pointer onto pinion.
15. recheck accuracy at 15 and 25˝ Hg vac. (Figure 2).
16. Reassemble window, gasket and ring.

Figure 2 –



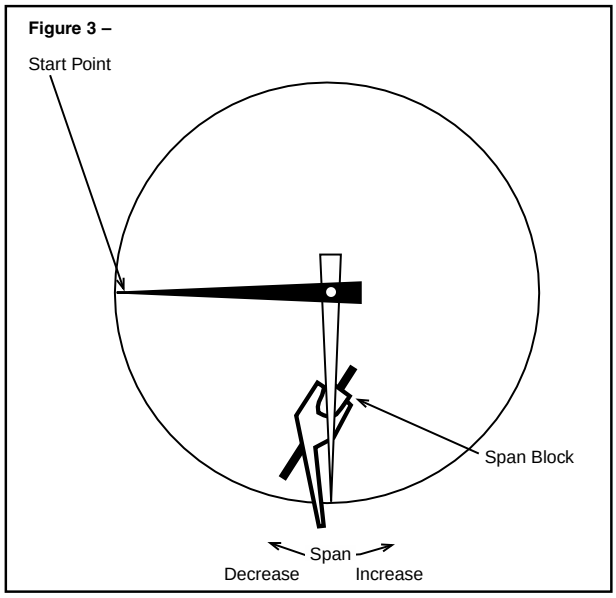
Notes: See page 10 for any tools required to calibrate.

For models produced prior to September 2008 for 2½˝ version and December 2008 for 3½˝ version.
Back of gauge will have a date code sticker.

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Step 1. With the dial off, install pointer at 9 o'clock "lightly," Figure 3.

Figure 3 –

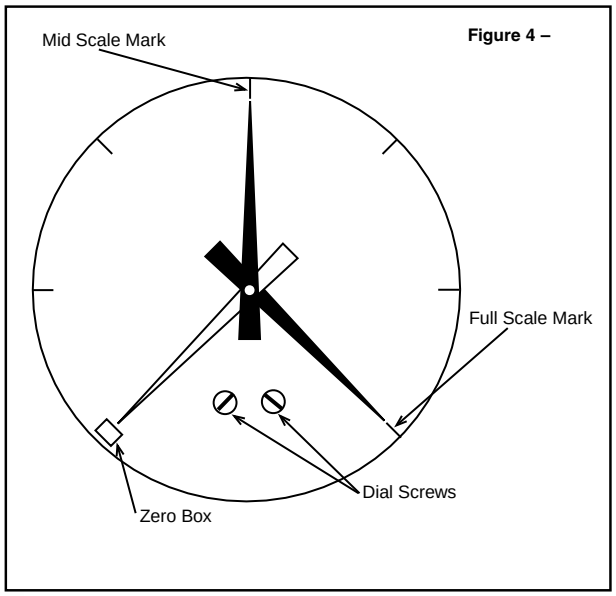


Step 2. Go to full scale pressure…rotate span block with tool until pointer rests at 6 o'clock.

Step 3. Go to zero pressure (9 o'clock)…if pointer has not moved away from start point, go to Step 4. If pointer has moved, repeat Step 1 until span is correct.

Step 4. Install dial with screws snug.

Figure 4 –



Step 5. Install pointer centered in zero box, Figure 4.

Step 6. Go to full scale pressure…check that pointer is within 1% of full scale mark. If not, remove pointer and dial and return to step 1, Figure 4.

Step 7. Go to mid-scale pressure…rotate dial until mid-scale mark is aligned with pointer, Figure 4.

Step 8. Tighten dials screws and stake on pointer.

Step 9. Check zero and full scale. Reassemble window, gasket and ring.

Notes: See page 10 for any tools required to calibrate.

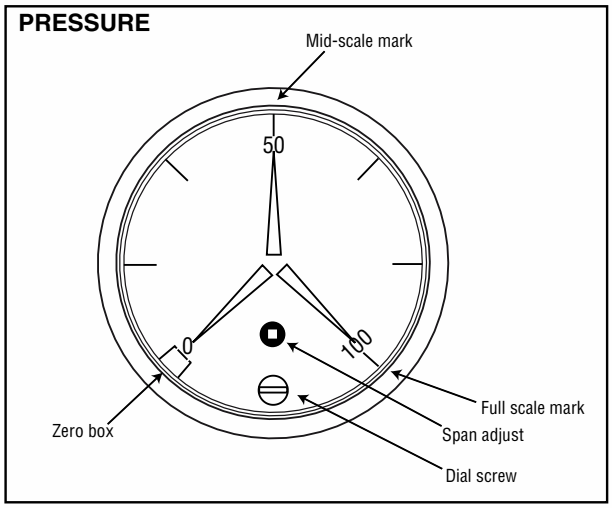
For models produced prior to September 2008 for 2½˝ version and December 2008 for 3½˝ version.
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ASHCROFT® Current Type 1009 Duralife® Calibration Procedure – Pressure and Vacuum Range

Calibration – 1009 Duralife® Gauge –
Inspect gauge for accuracy. At times gauges are simply "off zero" and opening the ventable plug at the top of the gauge will relieve internal gauge pressure and correct the offset. If this is not adequate and inspection shows that the gauge warrants recalibration to correct zero, span and/or linearity errors, proceed as follows:

Remove ring, window, and gasket using Ashcroft Ring Removal Tools P/N 101B220-02 and 101B221-02 for 2½" gauges and 101B220-01 and 101B221-01 for 3½" gauges.



Positive Pressure Ranges –

1. Adjust pointer with a slotted screwdriver until it is in the center of the zero box. This is often all that is required it correct calibration issues.

2. Apply full scale pressure. If error exceeds 1% rotate the black span adjustment device with a #0 square drive bit. Clockwise increases span, counterclockwise decrease span.

3. Fully exhaust pressure and check that pointer still is still in the zero box. If not, repeat step 1 and 2

4. Once 0 and full scale are within tolerance, pressurize gauge to mid-scale.

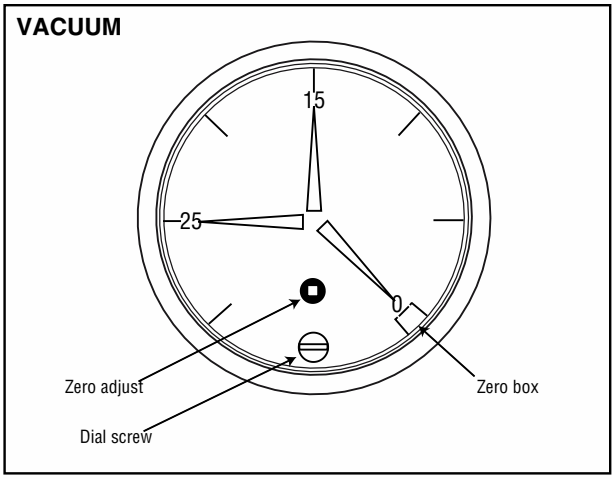
5. If gauge is within 1%, calibration is complete. If not loosen the dial screw and rotate dial left or right to adjust midpoint. Retighten dial screw.

6. If an adjustment was made in step 5, recheck the gauge at zero and full scale, adjust accordingly until zero, mid and full scale points are in tolerance.

Vacuum Range –

1. Adjust pointer with a slotted screwdriver until it is in the center of the zero box. This is often all that is required it correct calibration issues.

2. Apply 25 inches Hg vacuum. If the error exceeds 1% adjust pointer with a slotted screwdriver until gauge is within tolerance.



3. Vent to 0 pressure and check pointer position in the zero box. If error exceeds 1% rotate the black span adjustment device with a #0 square drive bit. Clockwise rotation moves pointer clockwise, counterclockwise rotation moves the pointer counterclockwise.

4. Repeat step 1 and 2 until 0 and 25 inches of Hg are within gauge tolerance.

5. Apply 15 inches Hg vacuum. If gauge is within 1%, calibration is complete. If not loosen the dial screw and rotate dial left or right to adjust midpoint. Retighten dial screw.

6. If an adjustment was made in step 4, recheck the gauge at zero and 25 inches of Hg vacuum, adjust accordingly until zero, 15 and 25 inches Hg are in tolerance.

7. Continue below.

Re-assemble window and ring to gauge:

a. If plastic window is used, push window back into front of gauge, ensure the o-ring does not roll out of window groove (lubricate if necessary). Align the tabs of the window with the tabs of the case front. Once window is in place, install ring and tighten with tools referenced above and shown on page 10.

b If safety glass is used, reinstall window, gasket, and ring. Ensure that the gasket is seated properly under all four tabs of the ring and does not wrinkle when ring is tightened.

Note: Tighten ring: Apply 120-200inlb of torque. Rotate ring clockwise to tighten. Warning: over tightening of safety glass may induce cracking.

Notes: See page 10 for any tools required to calibrate.

For models produced after September 2008 for 2½˝ version and December 2008 for 3½˝ version.
Back of gauge will have a date code sticker.

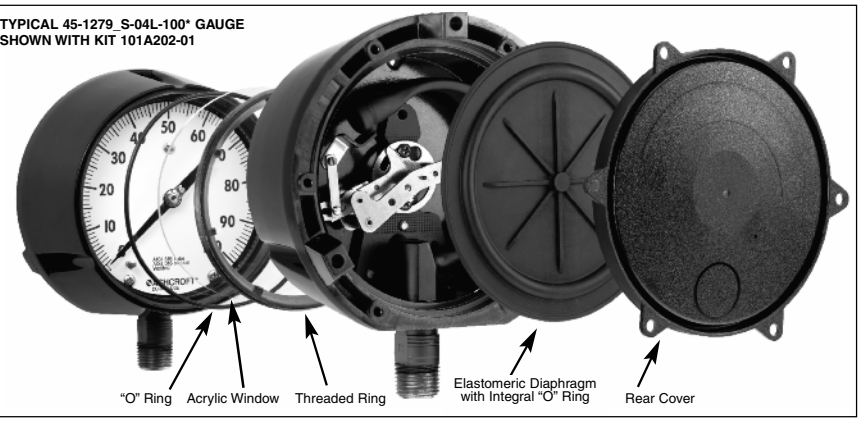
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TYPE 1279 & 1379 SOLID FRONT DURAGAUGE® PRESSURE GAUGE CONVERSION INSTRUCTIONS TO:

- **Convert A Standard Dry Gauge To A Liquid Filled Gauge**
- **Convert A Standard Dry Gauge To A Dry, Weatherproof IP66 Gauge**

ASHCROFT®

TYPICAL 45-1279_S-04L-100* GAUGE SHOWN WITH KIT 101A202-01



	1279		1379		
	4½˝ LOWER	4½˝ BACK	4½˝ LOWER	4½˝ BACK	6˝ LOWER & BACK
KIT PART NO.	101A202-01	101A203-01	1280	1283	1284
	QUANTITY INCLUDED				
ACRYLIC WINDOW	1	1	1	1	1
FRONT O-RING	1	1	1	1	1
DIAPHRAGM(1)	1	1	1	1	2(1-LC:1-BC)
REAR COVER	1	1	1	1	2(1-LC:1-BC)
COVER SCREWS	4	4	-	-	-
THROTTLE SCREWS	2	2	2	2	2
GARTER SPRING	–	1	1	1	1
FILL IDENTIFICATION	1	1	1	1	1
THREADED RING	–	–	1	1	1
TOP FILL PLUG	–	–	1	1	–

1. When Halocarbon fill is a requirement, rear case diaphragm bladder material is Viton instead of the standard Buna diaphragm bladder. Consult factory for part number.

TEMPERATURE LIMITS[1]				60 psi and Under Down Scale Zero Shift Required
	Ambient	Process	Storage	
Dry (IP66)	–20/200°F (–29/93°C)	–20/250°F(1) (–29/121°C)	–40/250°F (–40/121°C)	NONE
LF (glycerin)	20/150°F (7/66°C)	20/200°F (7/93°C)	0/150°F (–18/66°C)	NONE
(silicone)	–40/150°F (–40/66°C)	–40/200°F (–40/93°C)	–40/150°F (–40/66°C)	.12 psi
(halocarbon)	–40/150°F (–40/66°C)	–40/200°F (–40/93°C)	–40/150°F (–40/66°C)	.12 psi

Note: Other than discoloration of the dial and hardening of the gasketing that may occur as ambient or process temperatures exceeds 150°F, non-liquid-filled gauges with standard glass windows, can withstand continuous operating temperatures up to 250°F (121°C). Liquid-filled gauges can withstand 200°F (93°C) but glycerin fill and acrylic window will tend to yellow. Accuracy at temperatures above or below the reference ambient temperature of 68°F will be affected by approximately .4% per 25°F. Gauges with welded joints will withstand 750°F (450°F (232°C) with silver brazed joints) for short times without rupture, although other parts of the gauge will be destroyed and calibration will be lost. For continuous use and for process or ambient temperatures above 250°F (121°C), a diaphragm seal or capillary or siphon is recommended.
(1) Available for temperature below –20°F, see Production Information page ASH-PI-21B for details

1. Unscrew front threaded ring (turn CCW). Remove and discard glass window. For range spans 60 psi and under, shift pointer down scale by the amount shown in the table. With either the glass or plastic window, replace the O-ring with one furnished in the kit.
2. Remove protective paper from acrylic plastic window taking care not to scratch window. Assemble window in gauge.
3. Moisten face of threaded ring with silicone oil or silicone grease where ring bears up against window. Replace front threaded ring and tighten firmly hand tight. See instructions on reverse side for applying proper torque to ring to establish desired squeeze on O-ring seal. **(Fig. 4).**
It is important to hold gauge **rigidly,** otherwise ring lugs may be damaged during removal or assembly process.
4. From rear of gauge, remove and discard these parts: rear cover and cover gaskets from case.
Note: Disregard Step Nos. 5a and 5b if converting to hermetically sealed version.
When converting a 45-1379 with the top fill hole configuration, p/n 256A176-01 fill plug is required and must be ordered separately.
5. Filling Procedures:
a. Manual Filling Procedure: Place gauge face down on bench and **tip gauge** by blocking up front with a ⅜ inch block at the 12 o'clock dial position. Tipping of the gauge is necessary so fluid will flow into front cavity of the case. Pour in fill liquid to within about 1⁄16 inch of rear seal lip. When bubbles stop rising, front cavity is filled. Remove ⅜ inch block and pour in liquid until level is about 1⁄16 inch below rear sealing lip.
Note: An alternative method of filling is to fill the front dial cavity, adding the front window, etc., as in Step No. 3. Then fill the rear of the gauge. This method eliminates the need to tip the gauge.
b. Vacuum Pump Fill Procedure: (This procedure is recommended when filling a large number of gauges.) Place gauge face down and insert a ⅛ inch diameter tube, connected to a vacuum pump, through the 12 o'clock position hole in the rear, solid front portion of the case **(see Fig. 5).** Evacuate the air from the front dial cavity while pouring in the fill fluid through the case back. The vacuum will displace the air with fluid. When the dial cavity is solidly filled, remove the tubing and continue to pour the fill fluid to within 1⁄16 inch BELOW the O-ring channel lip.
Pre-measuring fill amount is not necessary with above methods. For reference, amount of fill is approximately 400 ml. or 14 fluid oz. (4½˝ GA.) and 455 ml. or 16 fluid oz. (6˝ GA.).
c. Note: The liquid fill level should be ⅜˝ (±⅛) as measured from the inside of the ring at the 12:00 o'clock position.
6. On lower connection gauges, assemble rear seal diaphragm to case.
For back connection gauges see instructions on reverse side. **(Fig. 2/4).**
7. For 1279:
Assemble rear cover and six self tapping screws in a criss-cross pattern and torque to 12 in lbs. (±2 in lbs.)
For 1379:
- Thread rear ring and torque to 200 in lbs
- Install stainless steel back cover using two screws. Torque screws to 14 in lbs. (±2 in lbs.)

8. Assemble throttle screw to threaded hole in socket.
Note: If system is monel (socket wrench flat stamped "PHS" or "PH") use monel throttle screw.
9. Check appropriate box on fill identification label, and peel off label back, and attach fill label to gauge case.
10. If gauge is to be repackaged:
a. Include enclosed instruction sheet inside carton.
b. Change type number on carton label to:
(1) Hermetically Sealed – 1279(*)SH.
(2) Liquid Filled – 1279(*)SL.
*Bourdon Tube System Code

Glycerin or silicone should not be used in applications involving Oxygen, Chlorine, Nitric Acid, Hydrogen Peroxide or other strong oxidizing agents, because of danger of spontaneous chemical reaction, ignition or explosion. Halocarbon should be specified. Products with this fill can be ordered from factory.

The use of fluids other than those listed in the table above (for example, Hydrocarbon-based oils) may result in leakage caused by a reaction between the fluid and the elastomeric seals. Consult the factory before filling with any other fluid.

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TYPE 1279 & 1379 SOLID FRONT DURAGAUGE®
PRESSURE GAUGE CONVERSION INSTRUCTIONS TO:

- **Convert A Standard Dry Gauge To A Liquid Filled Gauge**
- **Convert A Standard Dry Gauge To A Dry, Weatherproof IP66 Gauge**

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INSTRUCTIONS FOR USING CONE TOOL AND RING WRENCH

Garter Spring & Diaphragm Assembly (Back Connection Gauge Only)

A. Place cone tool over socket shank as shown.

B. Moisten lip of socket and outer O-ring surface with silicone oil or grease.

C. Place diaphragm with rib side facing upward over cone into case grove.
Diaphragm O-ring must be completely in socket-shank grove.

D. Place garter spring over cone as shown and slide onto diaphragm in socket grove

E. Assemble rear cover with screws per step 7.

Front Ring Assembly (All Gauges)

A. Assemble ring to case by hand to start.

B. Place ring on wrench as shown

C. Use ½˝ drive extension and torque ring to 200 in. lb

Alternate Method

A. Tighten ring snugly by hand

B. Mark case and ring.

C. Turn ring another 100 to 120 degrees (slightly less than ½ turn) using the ring wrench and ½˝ drive socket wrench or place the blunt end of a wooden or plastic dowel against a ring lug and tap with a hammer.

BACK CONNECTION ASSEMBLED GAUGE

Fig. 2

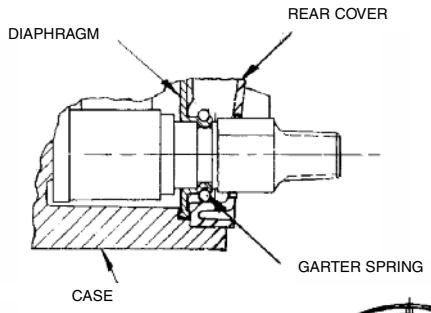


Fig. 3

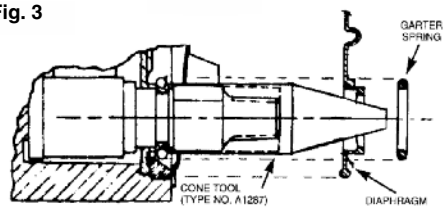
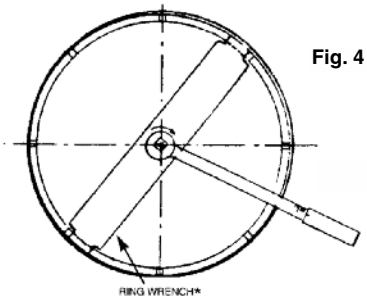


Fig. 4



INSTRUCTIONS FOR LIQUID FILLING ASHCROFT® TYPE 1279 AND 1379 SOLID FRONT DURAGAUGE® PRESSURE GAUGES USING A VACUUM PUMP

A. Insert a length of ⅛ ˝ diameter tubing through the 12 o'clock position hole in the rear, solid front portion of the case, as shown.

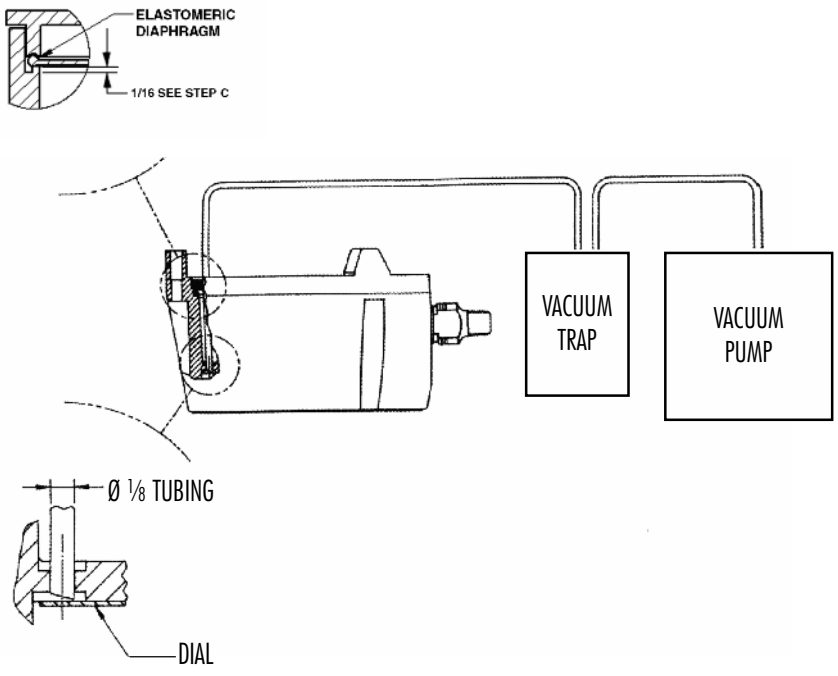
B. Evacuate the air from the front dial cavity while pouring in the fill fluid through the case back. The vacuum will displace the air with fluid.*

C. When the dial cavity is solidly filled, remove the tubing and continue to pour the fill fluid to within 1/16 ˝ below the o-ring channel lip, as shown.

D. When converting a 45-1379 with the top fill hole configuration, p/n 256A176-01 fill plug is required and must be ordered separately.

*To prevent breakage, reduce vacuum to 15 in. Hg for plain glass and safety glass.

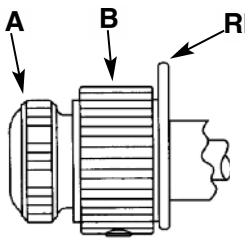
Fig. 5



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INSTRUCTIONS FOR USE OF EXTERNAL EASY ZERO™ ADJUST FEATURE*

Fig. 1



1. LOOSEN RING-LOCKING SCREW **A**.
2. OBTAIN REQUIRED ADJUSTMENT BY ROTATING KNOB **B** CLOCKWISE OR COUNTER-CLOCKWISE.
3. TIGHTEN SCREW **A** DOWN ON KNOB **B**.

*Applicable only for test gauge with hinged ring design.

ADDITIONAL CALIBRATION INSTRUCTIONS

1) "Standards shall have nominal errors no greater than ¼ of these permitted for the gauge being tested." *(Ref: ASME B40=100-1998)*
2) The instrument used as the calibration standard should have a maximum range no greater than 2x that of the gauge being tested. (i.e. Do not use a 400psi standard to test a 15psi gauge.)
3) "Known pressure shall be applied at each test point on increasing pressure (or vacuum) from one end to the other end of the scale. At each test point the gauge shall be . . .
lightly tapped, and then read . . ."
(*Ref: ASME B40.1 ¶ 6.2.4.1*)
4) To read gauge indication, move eye over red pointer tip at OD of printed dial until red reflection in mirror band is no longer visible, and then read the pointer position in reference to the dial.

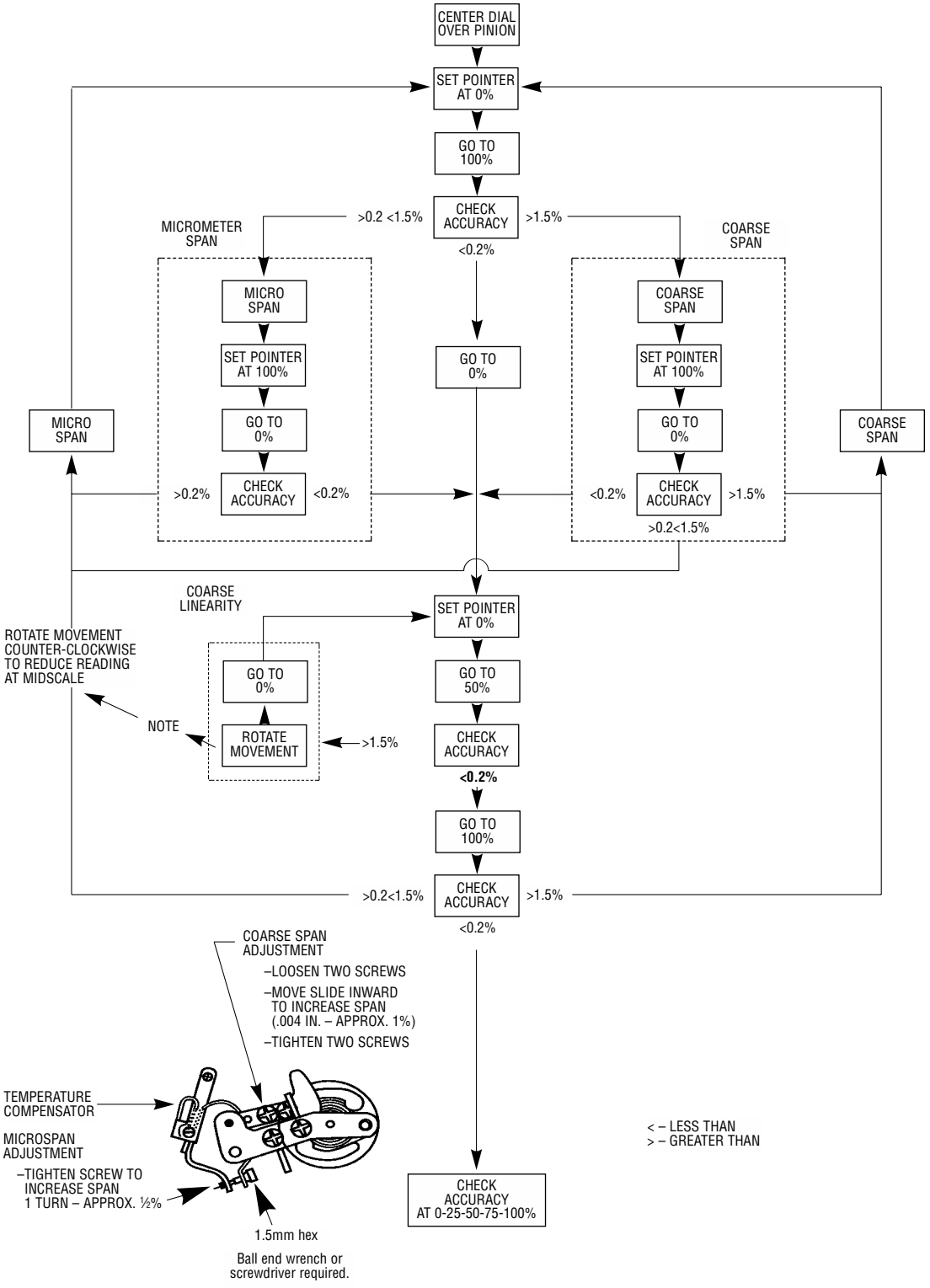
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Installation and Maintenance Instructions for ASHCROFT® Type 1082 Test Gauge
Calibration Procedure – Pressure Range

ASHCROFT®

Fig. 2

THIS TEST GAUGE IS PROVIDED WITH A MICROSPAN™ ADJUSTMENT TO SIMPLIFY CALIBRATION. THE FLOW CHART BELOW OUTLINES THE RECOMMENDED CALIBRATION PROCEDURE



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Diaphragm Seal Installation and Maintenence Manual

ASHCROFT®

1. Introduction



A diaphragm seal is a device that attaches to the process side of a pressure-measuring instrument to separate the instrument from the process fluid while transmitting pressure across a flexible membrane. The volume enclosed by the diaphragm, the top housing, and the measuring element is completely filled with a pressure transfer fluid. A change in pressure at the process connection causes a displacement of the filling fluid due to deflection of the diaphragm, transferring the change in pressure to the sensing element of the pressure instrument.

2. Safety Information

WARNING: Serious injury or equipment damage can result from failure to properly install, maintain, or operate these components. To assure safe operation and maintenance procedures, read carefully and follow the instructions in this manual.

- Follow all instructions in this document to avoid exposure to pressurized fluid
- Use proper tools and safety equipment in installing or maintaining components
- Assure that process pressure and temperatures are properly monitored and maintained, and the process fluid is appropriate and compatible with the wetted materials of the diaphragm seal
- Follow all of your company's safety procedures in the event of a leak or diaphragm seal failure

3. Diaphragm Seal Components

Though the exact components will vary between specific models, most diaphragm seals will share the same essential parts.



3.1 Top Housing

The top housing of the diaphragm seal is used to connect to the pressure measurement instrument. The fill port allows for assemblies to be vacuum filled, then sealed with a ball bearing in a conical seat and secured with a set screw.

3.2 Diaphragm

The diaphragm serves to separate the process fluid from the filling fluid, and as such is a component wetted to the process. Diaphragms can be welded or threaded into the top housing, which in turn can be welded or clamped to a lower housing. Changes in pressure cause the diaphragm to deflect, displacing fill fluid and transmitting pressure to the pressure-measuring instrument. It is important to ensure that a diaphragm has sufficient displacement to operate a pressure-measuring instrument across its entire span. For detailed diaphragm seal and instrument compatibility, see Ashcroft Product Information Page DS-PI-82, "Minimum and Maximum Pressures for Diaphragm Seals," found at Ashcroft.com

3.3 PTFE Gasket

All 100- and 200-series seals are supplied with a single-use PTFE skirted gasket. Refer to Section 4.2.3 for process considerations related to these gaskets.

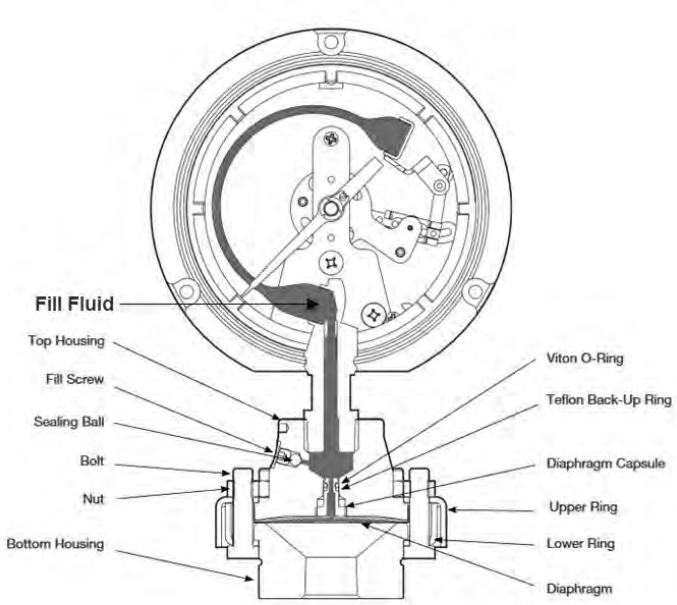
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3.4 Lower Housing

The lower housing connects a diaphragm seal to the user's process, and is therefore a wetted part. Lower housings are designed to mate with the process They are avaiable in a wide variety of thread sizes. Lower housings can optionally be provided with threaded flushing connections which can be used to clean the inside of the seal or to flush out process media.

3.5 Fill Fluid

A filling fluid (sometimes referred to as "system fill," "pressure sensing fluid," or, "hydraulic fluid") is required to transmit pressure from the diaphragm membrane to the pressure sensing device. Diaphragm seal assemblies are filled via a vacuum filling process that ensures the system contains no air gaps. Fill fluids are selected based on operating conditions; primarily temperature. Though normally not in contact with the process media, a diaphragm failure may bring process media in contact with the fill fluid, so compatibility with the process media should be a consideration.



4. Specifications

4.1 100/200/300-Series Seals

4.1.1 Threaded Seals: 100, 101, 200, 201, 300, 301

Connections	100, 200, 300: threaded process connection 101, 201, 301: threaded process connection with flushing port
Process Connection Sizes	¼ to 1½ NPT female ¼ to 1 NPT male
Instrument Connection Sizes	¼ or ½ NPT female
Pressure Ratings	2,500 psi (5,000 psi optional)
Added Instrument Tolerance	±0.5% typical
Wetted Components	Diaphragm, bottom housing, PTFE gasket
Non-Wetted Components	Top Housing, clamp rings, assembly hardware

4.2 Temperature Information

4.2.1 Thermal Dissipation

Seals will dissipate thermal energy, though ambient and process conditions will greatly affect the amount of heat that can be lost through the seal. Accessories designed for dissipating heat, such as siphons or capillaries, should be used whenever dealing with elevated process temperatures.

4.2.2 Elastomers and Polymeric materials

Seals made with elastomeric or polymeric wetted components will have lower pressure ratings than those made from metallic components. Refer to the applicable data sheet for temperature and pressure ratings for seals with non-metallic diaphragms or bottom housings.

4.2.3 PTFE Gasketing

The highest acceptable process temperature for PTFE gaskets is 500F. The lowest acceptable temperature is limited by the fill fluid, the lowest of which is Syltherm XLT, rated to -150ºF. For process temperatures below -150ºF or exceeding 500ºF, consider a temperature dissipating device, such as capillary or a a microTube™ or siphon. For processes that are not compatible with PTFE, consider an all-welded diaphragm seal.

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5. Fill Fluid Specifications

Fill Fluid	Temperature	Viscosity (cSt at RT)	Variation Code	Notes
Glycerin (food grade)	0°F to 400°F (-18°C to 204°C)	1,300	CG	Direct-mounting only. Not for use with vacuum service
50 cSt Silicone	-40°F to 500°F (-40°C to 260°C)	50	CK	
10 cSt Silicone	-40°F to 500°F (-40°C to 260°C)	10	DJ	
Halocarbon® 4.2	-70°F to 300°F (-57°C to 199°C)	4.2	CF	For use with oxygen/ oxidizing process media
Slytherm® 800	-40°F to 750°F (-40°C to 400°C)	10	HA	High temperature applications
Syltherm® XLT	-150°F to 500°F (-100°C to 260°C)	1.4	CC	Low temperature applications
Calflo® AF	-20°F to 600°F (-29°C to 316°C)	60	KF	High temperature, silicone-free
Mineral Oil	10°F to 400°F (-12°C to 204°C)	75	MY	
Neobee® M-20 (food grade)	5°F to 400°F (-15°C to 204°C)	9.5	NM	
Silicone (food grade)	-40°F to 500°F (-40°C to 260°C)	350	CZ	
Distilled Water	40°F to 185°F (4°C to 85°C)	0.9	FJ	
50/50 Glycerin/Water	15°F to 200°F (-9°C to 93°C)	30	GH	
Propylene Glycol	-50°F to 325°F (-46°C to 163°C)	54	CV	
Ethylene Glycol	20°F to 325°F (-7°C to 163°C)	14	FK	
50/50 Ethylene Glycol/Water	-25°F to 190°F (-32°C to 88°C)	2.9	CT	
80/20 Glycerin/Water	15°F to 225°F (-9°C to 107°C)	270	GR	
95/5 Water/ Propylene Glycol	40°F to 185°F (4°C to 85°C)	1.0	PY	

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Diaphragm Seal Installation and Maintenence Manual

ASHCROFT®

6. Installation

6.1 General Information

Instruments attached and filled to diaphragm seals should never be tightened or loosened at the top housing. Doing so will alter the dynamics of the fill fluid and diaphragm movement, causing errors in the reading. Assemblies should ONLY be installed and/or tightened at the diaphragm seal lower housing. Most diaphragm seals can be purchased with either a locking device (XLD) or with the instrument welded to the top housing of the seal to prevent tampering (XDU).

Diaphragm seals should be installed in accordance with any safety precautions or installation specifications applicable to the end user. That said, the general principles in the following sections still apply.

6.2 Flushing Ports

Use of flushing ports is application-specific and are often used when process media has the potential to clog inside the lower housing, whether due to process media solidification, suspended solids, polymerization, or other factors. Diaphragm seals with flushing ports must have the flushing ports plugged prior to startup. Flushing ports on most seals are ¼ NPT, though some configurations may have ⅛ or ½ NPT flushing ports. Diaphragm seals can be ordered with the flushing ports pre-plugged with the "XPU" variation. Note that to prevent thread galling or stripping, factory-installed flush plugs may not be fully tightened and should be checked for tightness prior to pressurization.

6.3 Threaded Seals

Note: Torque should never be applied to the pressure instrument when installing the diaphragm seal. Most seals are supplied with either wrench flats or spanner holes to be used when installing the seal into process piping.

Threaded seals are most commonly supplied with NPT threads per ASME B1.20.1. NPT threads require the use of a suitable thread sealant, such as pipe dope or PTFE tape, and must be tightened securely to prevent galled threads and to ensure a leak-tight seal. Torque values will vary by connection size, though 2-3 full turns past finger-tight is often used as a guideline. Refer to ASME B1.20.1 for detailed information regarding NPT threads. For alternate thread types (metric, BSP, etc.), refer to the applicable specification.

7. Maintenence

7.1 Storage

Diaphragm seal assemblies should be stored in accordance with the storage requirements for all instruments attached, as well as any temperature limits listed above. Common instrumentation is shown in the table below. Refer to the respective data sheets or maintenance guides for detailed storage requirements for Ashcroft pressure instruments. Note that certain fill fluids (e.g., distilled water) may have storage and process temperature limitations narrower than the below data.

Pressure Instrument	Minimum Storage Temperature °F (°C)	Maximum Storage Temperature °F (°C)
Pressure Gauge (Dry)	-40 (-40)	250 (121)
Pressure Gauge (Glycerin-filled)	0 (-18)	150 (66)
B-series switches	-20 (-28)	150 (65)
A- Series Switches	-40 (-40)	257 (125)

7.2 Frequency of Inspection

Inspection frequency is application-specific and depends on the severity of the service and how critical the accuracy of the pressure instrument is. For example, a monthly inspection may be necessary for severe service applications, such as corrosive process media or heavy pulsation and vibration. Annual inspections, or even less frequent schedules, are often employed in non-critical applications.

7.3 Removal from Service

Diaphragm seals should be properly isolated and vented from the process prior to disassembly. Most diaphragms can be inspected by removing the diaphragm seal from the process (either by unthreading or by removing it from the mating flange) and viewing the diaphragm through the lower housing. If additional inspection is needed, 100- and 200-series diaphragm seals can be disassembled by removing the clamping screws and separating the top housing and diaphragm from the lower housing. Note that the PTFE wetted gaskets on certain seals are single use, and must be replaced anytime the compression is lost. Replacement gaskets can be ordered from Ashcroft (part number 124A287-01). 300-series seal should not be disassembled, as the diaphragm is merely clamped between the top and bottom housing; disassembling will result in loss of fill fluid.

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7.4 Diaphragm Seal Failures and Troubleshooting

100, 200, and 300-series diaphragm seal are continuous duty as defined by ASME B40.2. Should the pressure instrument fail or be removed accidentally, the diaphragm will seat against a matching surface in the top housing preventing damage to the diaphragm or leakage of the process fluid.

In the event that a diaphragm failure is suspected, the assembly should be immediately isolated from the process and the cause for failure determined. Most diaphragm failures are caused by corrosion, high temperatures, or fill leakage. Process media build-up in the lower housing can also require cleaning or replacement. In the event of a diaphragm failure due to corrosion, it is critical that the wetted materials of the assembly be evaluated for compatibility before it is replaced.

7.4.1 Troubleshooting Guide

Symptom	Possible Cause	Solution
Instrument not responding to pressure	Poor filling process, loss of fill fluid	Refill diaphragm seal and instrument assembly
	Process media clog or accumulation in lower housing	Clean out lower housing; alternately, use a seal with a flushing port
Process media leaking from process connection	Threaded seals: Inadequate thread sealing	Check that the seal has been properly torqued and that the threads have been sealed with pipe dope or PTFE tape
Rusted bolts/top housing/flange	Corrosive atmosphere	In most cases rust will not affect the performance of the seal. Consider more corrosion-resistant non-wetted materials.
Upscale shift on pressure reading	Temperature error – High Temp	Consider a heat dissipation accessory, such as a capillary or MicroTube™ Siphon
	Overfilling	Refill diaphragm seal and instrument assembly
	Diaphragm permeation	Certain process media can permeate the very thin diaphragm material and react with fill fluid. Review wetted material compatibility

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7.8 IOM for Automatic and Manual Valves

FORGED STEEL GATE, GLOBE AND CHECK VALVES

B.F.E. S.r.l.
BONNEY FORGE

USE THIS MANUAL FOR:

BFE STANDARD PRODUCT			SPECIAL CONFIGURATION		
					

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1. INTRODUCTION

This manual has been prepared to provide the end user with general guidelines in the installation, operation and routine maintenance of BFE valves. If, after reviewing the contents of this manual, you require any special instructions, assistance, repair services or have any additional questions, please contact either our factory or our nearest representative for assistance.

2. GENERAL DESCRIPTION

A. CATALOGUE : A copy of our catalogue is available upon request.

B. TECHNICAL DATA : Nameplate & Valve Information.

The nameplate permanently attached to the valve, provides you with the rated working pressure, temperature range and material used. When ordering replacement parts, reference to the information provided on the nameplate will aid in ensuring that you receive correct component parts for your valves. For further information refer to this manual or contact BFE Customer Service.

WARNING!!! Never attempt to modify BFE valves in any way without authorization and assistance of BFE, otherwise the mechanical guarantee will not apply and severe damage to the equipment could result.

3. VALVE STORAGE

A. Preparation and Preservation for Shipment

Preservation and other protective measures for shipment must be sufficient to protect against deterioration and physical damage during shipment. The type of packing must be defined in the Customer's Order and shall be appropriate to ensure safe transportation and conservation before installation.

BFE valves are normally shipped from the factory in boxes, crates or on skids. Protruding parts, such as the handwheels, indicator rods, and stem protectors are sometimes removed from the valves and either attached to the box or crate or packaged separately.

B. Inspection Procedure

All valves and associated parts should be inspected carefully for any visible sign of damage and if necessary, claims promptly submitted to the carrier. Any parts shipped loose or separately should be properly packed to prevent losts or damage. Care should be taken in handling valves to prevent damage, particularly to equipment extending above the valve bonnet and any fittings protruding from the valve body. Upon receipt, the valves should be inspected for shipping damage. If the end protectors are removed for inspection purpose, be sure to re-install them to maintain internal cleanliness. If caps are missing, an inspection of the valve cavity is required. All foreign matter must be removed.

C. Handling

- Most handling can be accomplished by placing "hook" diagonally into holes on each side of the end flanges, or by the usage of straps slung around the arms of the valve body.
- Never lift or move the valve assembly using the bore, shafts, nut as a pressure point.
- Never lift or move the valve assembly by using the actuator, positioner, extensions, handwheel, gland bolting or other valve options.
- Transport, unpack and store being careful not to scratch the surfaces of flanges or gaskets. Also, take steps that will prevent any foreign matter from getting into the valves. Wooden plate or plastic caps should not be removed until the valves are installed.
- The transportation of all packed material must be carried out safely and following the local safety regulations.

D. Storage Procedure

- If the valves are to be stored for any extended period of time, the flange or end protector should be examined to ensure they are fastened securely, and any other open areas should be sealed to prevent any moisture damage.
- All valves should be securely held in place by banding or other means of support to prevent accidental damage due to movement of the valves.
- Valves should be kept in a clean, heated, weather tight (dry), well-ventilated, fire-resistant storage facility with flooring that seals against dust and dirt and will not be subject to flooding.
- Valves should be stored off of the floor on suitable skids, pallets or racks and protected from dirt, debris and exposure to direct sunlight, particularly to soft sealing surfaces.
- Valve assemblies with electrical components, pneumatic tubing, positioners, actuators, and other accessories should be protected from impact.
- The end faces must be protected from rust and dust with plastic or wooden discs fixed with straps.
- Periodical checks at least every 6 months have to be carried out in the storage area to verify that the above mentioned conditions are maintained.

4. VALVE INSTALLATION

A. General

- Remove valve assembly from box or crate with caution.
- Prior to installation, confirm that there are no scratches on the surfaces of flanges and stem. Also, make sure that the inside of the valve port area and seat surfaces are cleaned with a dry cloth. The seat surfaces are most important in achieving optimal valve performance and special attention should be taken to ensure that there are no “scratches” or defects to these surfaces.
- All BFE Valves are shipped from the factory in the closed position and normally will have a coating of rust protective oil. Before installing the valves, all oil or grease (used to protect the valve) should be removed taking care not to damage the seat contact surfaces.
- Following installation of the valve, operate the gate disc fully open and closed at least once prior to hydrostatic testing of the line to ensure freedom of operation.
- Ensure that the construction materials listed on the valve nameplates are appropriate for the service intended and are as specified.
- For threaded ends use conventional sealant, for flanged ends or other ends (clamp etc) use the standard method described in the international standards.
- After the valve installation and before the line testing, it is recommended to perform an accurate cleaning of the lines to eliminate dirt and any foreign matter that could seriously jeopardize the tightness between seat/disc and the correct operation of the valve.
- If the valve has been stored for a long time, check the bolt torque for all bolting.
- Packing compression should be carefully inspected and if necessary packing gland bolts torque should be adjusted.
- If piping system is pressurized with water for testing, and in case the piping system has been shut down after testing for a long time, it is recommended to use corrosion inhibitor with water to pressurize the piping system and after testing, the piping system should be depressurized and the test water completely drained.
- The pipeline must have a pulsation dampener if there are pulsation sources in the line. Lines subjected to pipe vibration and pulsation affect the lifetime of the valve seal parts.
- After completion of hydrostatic testing, the valve should be drained to eliminate any water or test fluid which may have been trapped in the valve.

B. INSTALLATION TABLE BASED ON VALVE CONNECTION TYPE

Simply choose your procedure depending on the Valve End Finish:

FLANGED END

Make sure that two like flanges are being fitted together. Usually the proper set-up is either plain face to plain face or raised face to raised face flange. Tighten the flange bolts in a crossover pattern as follows:

A - Slightly torque all bolts using a crossover bolt sequence. Bolts should be tightened evenly to prevent cocking of the flange and uneven gasket loading.
B - Repeat step 'A' using additional torque until all bolts are tightened properly.
This may require several re-torques because as one bolt is torqued, it will relieve stress on the adjacent bolts.
C - On high pressure, high temperature applications, it is recommended that the bolts be retightened after 24 hours of operation to compensate for any relaxation or creep that may have occurred.

BUTT WELDING END

WARNING!!! Gate and Globe valves should be lightly open to prevent damage to the seating surfaces and stem caused by thermal expansion during the butt welding process.

NOTES:
- Proper welding is required to ensure a pressure tight seat and to retain its ability to withstand stress. Remember that the valve, pipe and weld root must be of compatible materials and the welding be performed by a properly trained welder and approved weld procedures and qualifications.
- Be sure to leave a proper gap between the end of the pipe and the end of the valve. This will allow for expansion of the materials as it is welded, any extended welding time could cause excessive heat build up on the valve seat area which could cause damage such as loosening of the seat rings, surface distortion etc.
- The specified PWHT can then be performed in line without affecting the valve. Shortly after welding, open and close the valve to check for proper operation to make sure no binding has occurred due to welding heat.
- Also welding slags and spatters are to be completely removed and cleaned to avoid damage on seating areas.
- Where possible, attach the electrical ground to the adjoining pipe on the same side of the valve as the weld being made. Do not attach the earth to the handwheel or upper structure of the valve or arcing across the valve seating surfaces could occur.
- Where possible, welding should be done in the flat or horizontal position. Where vertical welding is necessary, progression should be upward (vertical down welding is prone to lack-of-fusion).
- During the PWHT only the valve body must be insulated in order to not overheat the packing-stem region.

SOCKED WELD END

WARNING!!! Gate and Globe valves should be lightly open to prevent damage to the seating surfaces and stem caused by thermal expansion during the socket welding process.

Weld the connection as follows:
A - Remove all grease, oil or paint from the pipe that is to be welded into the valve and from the valve end connections.
B - Insert the pipe into the valve end connection until it bottoms out in the socket weld bore.
C - Withdraw the pipe 1/16" so that a gap remains between the pipe and the bottom of the socket weld bore to prevent cracks (ASME B16.11). Tack the pipe into the valve and complete the fillet weld.
NOTES:
A minimum of two layers should be used for all socket welds. This will decrease the chance of leaking even if one pass contains a weld defect.
- The specified PWHT can then be performed in line without affecting the valve. Shortly after welding, open and close the valve to check for proper operation to make sure no binding has occurred due to welding heat.
- Where possible, welding should be done in the flat or horizontal position. Where vertical welding is necessary, progression should be upward (vertical down welding is prone to lack-of-fusion).
- During the PWHT only the valve body must be insulated in order to not overheat the packing-stem region.

CLAMP END

Clamp installation and maintenance instruction (clamp, clamp gasket and clamp boltings and nut) and are not scope of the valve manual. See the clamp manufuacturer IOM for details.

THREADED END

See Annex A of this manual.

C. VALVE POSITIONING

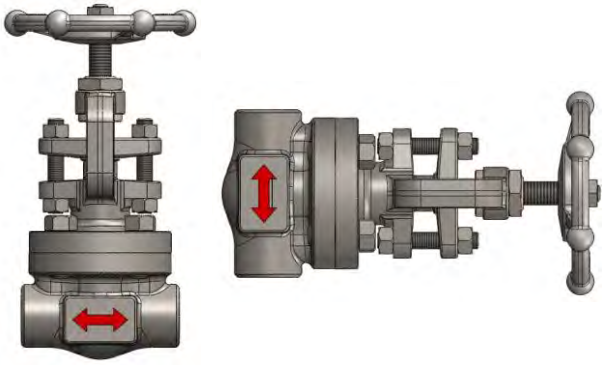
Positioning the valve in the pipe run is very important. Prior to actual installation, check for clearance around the valve to ensure adequate space for proper operation. Also, keep in mind the need for

clearance for future maintenance and repair. Once proper positioning and clearance have been assured the system should be cleaned of all foreign matter. Whenever possible, blow out the pipeline with water to remove grit and dirt. Also be sure to remove the valve end protectors and check the valve again for cleanliness.

ACTUATED VALVES: valves are designed to withstand the actuator only with stem in vertical position. If the installation requires a different stem position, user must fasten the actuator to avoid damage or incorrect working of valve-actuator system.

VALVE POSITIONING for GATE & GLOBE VALVES

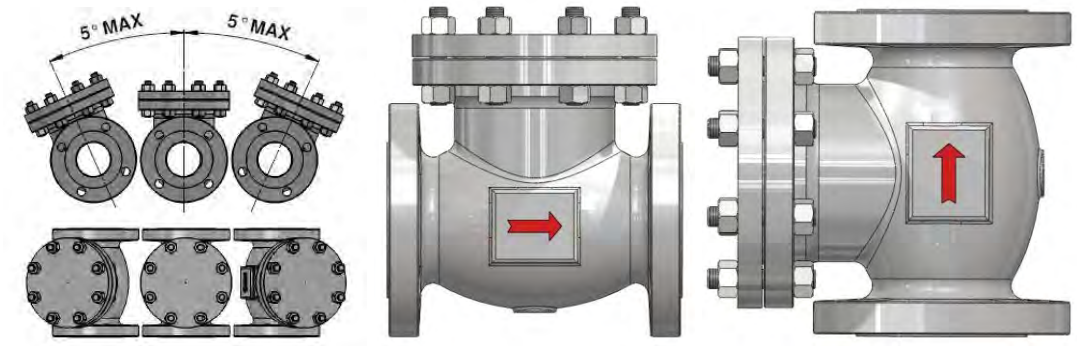
Gate and globe valves should be installed with the stem in an upward position on horizontal lines. However, an alternative stem position is at an angle between the vertical and horizontal axis that will allow for complete drainage. If installed with the stem below the horizontal axis, complete drainage is not possible and solids may accumulate in the valve bonnet that will greatly affect the valve operation and service life. A gate valve can be installed in line with disregard to flow direction. However, install the valve carefully according to the flow direction arrow, when the disc is provided with pressure balance holes to prevent abnormal pressure increase.



VALVE POSITIONING for CHECK VALVES

Check valves must be fitted in horizontal pipe runs with the cover facing vertically upward. Variance to either side of the vertical axis must not exceed 5 degrees. Swing check valves and spring loaded check valve design allow for additional position, such as vertical upwards flow. Valves must not be installed in vertical downward flow pipe runs or in horizontal pipe runs with the cover not in vertical up position. Always install valves in the direction indicated by the flow arrow stamped on the body. Piston and stop check valves should be fitted similarly to check valves.

NOTE. Spring loaded check valves can be installed with fluid direction from downward, but it's not advisable, the gravity effect cannot ensure a proper sealing in the event of a back-flow from downward.



D. PURGING AND TESTING OF LINE

Once the valve is in line, open the valve and flush or blow out the line again to remove any dirt or foreign objects that may have collected during installation. Check for tightness of body/bonnet bolts and for proper packing gland adjustment. Operate the valve to ensure correct operation. Pressure test the valve to ensure the integrity of all joints.

5. VALVE OPERATION

- The gate/globe valve is closed by rotating the handwheel in a clockwise direction; and is opened by rotating the handwheel in a counter clockwise direction.
- Do not apply excessive torque to the gate of the valve after it has reached the fully open or fully closed position as this could result in damage to the gate, stem or operating nut.
- Gate valve should be used in fully opened or fully closed position. If it is used in a slight or half opened position, the disc may vibrate at a high speed that may cause pulsation of the flow. Therefore, do not use a gate valve for flow control or throttling service.
- Globe valves can also operate in either direction or flow, but it is recommended that pressure is always against/under the disc.
- **WARNING!!! If the valve is SLAB or PARALLEL SLIDE TYPE: When the position indicator is in the closed position the valve is fully isolated. DO NOT APPLY ANY ADDITIONAL FORCE.**

6. MAINTENANCE

A. GENERAL

WARNING!!! Do not remove or disassemble the valve while it is under pressure. Depressurize the line and the valve as following:

- ✓ Place the valve in the open position and drain the line.
- ✓ Cycle the valve to relieve the pressure trapped in the body cavity.
- ✓ After removal and before disassembly, cycle the valve several times.

WARNING!!! Line Fluid can be toxic, corrosive or dangerous the health and safety. Protect yourself and others by observing all applicable standard procedures. Make the right choice, ***SAFETY FIRST***!

B. RECOMMENDED PREVENTIVE MAINTENANCE

Maintenance programs vary greatly from application to application, depending on factors such as operational frequency, fluid make-up, external environment, etc. The end user should establish a routine maintenance program to extend the life of the valves and minimize downtime for repair.

SUGGESTED MONTHLY MAINTENANCE	SUGGESTED 6 MONTHS MAINTENANCE
1.Visually inspect the valve for signs of leakage or corrosion.	1.Cycle the valve fully open and closed at least once to check for freedom of operation.
2.Visually inspect the stem packing to avoid any leakage from the stuffing box.	2.Remove the stem protection (if any) and lubricate the valve stem.
3.Lubricate the valve, if necessary (stem and stem nut).	3.Repeat steps 1, 2 and 3 from the monthly maintenance recommendations.

C. MAINTENANCE INSTRUCTION

The maintenance and repair of BFE valves is usually limited to the adjustment of the packing gland and the lubrication of yoke sleeve as previously stated.
For standard maintenance of valves the only components suitable to be substitute are: Stuffing box packing & Body/bonnet gasket.
For special ordinary maintenance the seat replacement and the seal surface retrofit can be performed.
Should you need to perform the mentioned above repairs the following information should be used as a guide in your repairs always in conjunction with the applicable GAD (ask BFE if you don't have it). For special requirements ask BFE for special custom instruction & VGI.

C1. STEM PACKING

If the gland has run out of travel or excessive tightening does not stop the leakage, isolate and de-pressurise the valve for repacking. The valve need not be taken out of line for simple repacking, however, repacking is not recommended while the valve is in service.

If the stem does not backseat correctly and seal completely against the backseat bushing, the stem packing can not be replaced while the valve is under service conditions.

To extract packing remove the gland nuts and studs, lift the gland flange and gland out of the stuffing box. Next, remove old packing, by using an extractor tool of the correct size. Any remnants of old packing must be removed from the stuffing box and the stem. Clean the stem and stuffing box and examine it for damage. Install new packing rings, one at a time.



Each ring should be firmly compressed into position before the next ring is added. Rings should fit snugly into the stuffing box. Install the gland and the gland flange and secure with the gland nuts. Tighten the nuts uniformly, but only to the extent needed to prevent leakage. When graphite packing is to be installed, their replacement may be made by cutting the preformed rings in two halves/by a single cut and carefully opening the ring to allow its insertion into the stuffing box. Procedure to insert is then the same as stated for normal packing.

SUGGESTED GLAND BOLTS TORQUE [Nm]

VALVE NPS	ASME CLASS					
	UP TO ASME 800		FROM 900 UP TO 2680		ABOVE 2680	
	FULL	REDUCED	FULL	REDUCED	FULL	REDUCED
3/8"	5	N.A.	12	N.A.	24	N.A.
1/2"	7	5	14	12	30	24
3/4"	8	7	18	14	35	30
1"	10	8	20	18	40	35
1"-1/4	12	10	22	20	46	40
1"-1/2	14	12	24	22	50	46
2"	16	14	26	24	65	50

C2. GASKET REPLACEMENT (BOLTED BONNET VALVES ONLY)

Complete disassembly procedures are listed below. However, it is recommended that disassembly be limited only to the extent required to carry out repairs.

1 - Isolate and de-pressurize the system and operate the valve to its full open position.
2 - Match mark the body and bonnet, the wedge and body to maintain their relation upon reassembly.
3 - Remove the body bolts and lift up the entire bonnet assembly, taking care not to damage the wedge.
4 - Examine the gasket-seating surface of the body and the bonnet for evidence of wear damage or deterioration.
5 - Discard the old gasket. Replace or repair all damaged parts, then clean the seating surfaces to remove all rust, gasket residue and other debris.
6 - Polish the gasket-seating surfaces using a fine emery cloth. Remove any radial scratches or other defects, taking care that the emery cloth does not remain in the valve.
7 - A radial scratch across the seating surface may allow for a leak path. To affect a good seat, the gasket-seating surface must be flat and should have a finish between Ra=1.6 and Ra=3.2.
8 - Again, clean the surface to remove all polishing residue. Install a new gasket and reassemble the valve. No gasket-sealing compound should be used when installing the gasket. Care should be taken to ensure that the wedge does not contact the seats during reassembly and bolt tightening. Re-tighten the bolts acc.to Annex “B” of this manual.

C3. VALVE SEATING

GENERAL FOR GATE AND SWING CHECK VALVES

The valve and seat ring design and the method of seat ring installation are such that the valve must be removed from the line when seat ring replacement is necessary. Therefore, we recommend that the valve be replaced or returned to the maintenance work shop for seat replacement.

Seat rings for gate valves, sizes 1" and larger, if not too badly damaged (defect not deeper than 0.8 mm), may be repaired in the body by lapping. Smaller size valves can be repaired, but with great difficulty; therefore BFE recommends the installation of new seats.

The seats can be lapped in the body, using a flat lapping plate larger than that of the seat. The plate must have a square hole in the center for attachment to a square end tool. Make a square tool of suitable size and length with one end to fit a brace and the other end attached to the plate. Valve seats can then be hand lapped by using a fine grain compound. Wedges can be lapped on any surface plate, but care should be taken to maintain the correct wedge angle. As noted previously, we recommend that the valves be replaced or returned to the factory for seat ring replacement. However, it's suggested the following instructions are issued to aid in any attempts of seat replacement in the field maintenance work shop.

SEAT REMOVAL & REPLACEMENT FOR GATE AND SWING CHECK VALVES

The valve and seat ring design and method of seat ring installation are such that the valve must be removed from the line when seat ring replacement is necessary. Therefore, BFE recommends that the valve be replaced or returned to the factory for seating ring replacement.

GENERAL FOR GLOBE AND PISTON CHECK VALVES

Prior to lapping the disc of the globe valves, the disc may require machine refinishing. When defects are found on the stem/disc assembly-seating surface, it is recommended to place the stem/disc assembly into a lathe spindle and check the disc diameter, without taking the assembly apart. Hold the disc using a 3-jaw chuck so that large OD and seating surface run true. Grind the seating surface using a tool grinder. Machine only deep enough to clean the surface, then polish the seating surface with a fine emery cloth, retaining the original shape of the disc.

When surface damage is minor, the seats may be repaired by a lapping operation use a small quantity of lapping compound between the seat and the disc surfaces.

It is important that not too much pressure be applied to the disc and seat. With the lapping compound in place, between the mating surface, the disc should be reciprocally rotated, the strokes should be light and the disc should be lifted frequently and turned to a new position (circularly around the valve body) so the lapping will take place over a new area. Continue lapping until all defects are removed, and then apply a final finish with a fine compound. It is recommended that the face of the disc be "blued" to check for contact of seating surface after final lapping. The globe valve stem/disc assembly may be used in the lapping operation, however, due to its loose disc design, it is necessary to prevent the disc from rotating on the stem.

This can be accomplished by preparing a fixture (the valve handwheel can then be re-attached to the stem and used as a convenient handle when re-lapping the seats).

Valves having renewable (threaded-in) seats may have the seat ring replaced only in the factory by means of special tools.

The seat ring may then be removed by un-threading in a counter-clockwise direction. The seat threads in the valve body should be carefully inspected to make sure they are in a usable condition. When installing new seats, the seats should be screwed tightly into the valve body, then unscrewed to make sure they are making continuous contact for a tight seal.

SUGGESTED TOOLS & CONSUMABLES FOR LAPPING

- Lapping compound (Carborundum).
- Grain size: 400 - 600 mesk – for rough finishing.
- Grain size: 800 – 1200 mesk – for fine finishing.
- The surface plate should be homogenous cast iron having approximate HB 250 Hardness.

Machine oil, fillet scraper, bluing compound and waste cloth.

D. LUBRICATION

BFE valves are made from selected materials to give long and trouble free service, when properly installed for the correct applications. Proper care and maintenance in the field can contribute to extended performance of the valve. The general maintenance operation on a valve usually consists of periodical lubrication. See the lubrification chart below for details:

LUBRIFICATION CHART

STEM THREADS LUBRICATION	GEAR HOUSING LUBRIFICATION	SLEEVE LUBRICATION
Exposed stem threads should be kept clean and should be lubricated. Because a tacky lubricant on exposed stem threads can attract abrasive particles from the atmosphere the use of dry lubricants is recommended. Graphite powder can be applied by spraying or by the use of a normal brush. When valves will be supplied according to Statoil specifications, BFE will use Molykote BR2 plus grease approved by STATOIL.	On valves equipped with bevel gear operators, the operators are basically sealed units which are considered to be permanently lubricated. BFE recommends that the operators be at least partially disassembled every three years to inspect the condition of the lubrication and component parts. Should dirt, water or other foreign matter be found during the inspection, the units should be flushed using a commercial cleaner/degreaser which is not corrosive or incompatible with bearings and gears. Other close fitting parts should be liberally coated by hand with grease prior to reassembly.	The valve yoke-sleeve shall be lubricated periodically based on cycle and service conditions, but not less than once a year or 100 cycles maximum. Any good grade of grease may be used on these parts. Only a small amount of grease is required over lubricating the stem bearings will result in the leakage of grease around the bearing housing.
MANCON MACONSYNTH HT (BFE SUGGESTION) or MOLYKOTE BR2 PLUS or TOTAL MULTIS MS2	AGIP GR MU EP 2 (BFE SUGGESTION) or STATOIL UNIWAY LI-62 or ESSO BEACON EP1	MANCON MACONSYNTH HT (BFE SUGGESTION) or MOLYKOTE BR2 PLUS or TOTAL MULTIS MS2

IMPORTANT NOTE!!! For oxygen service use only packing and lubricant BAM or WHA approved. Lubricate only if necessary.

E. LIST OF ORDINARY MAINTENANCE TOOLS

1. Seat removing tools (for removal of the threading seat rings, these tools can be supplied on request).
2. Packing extraction tool (can be supplied upon request)
3. Injector gun (can be supplied upon request).

7. PRECAUTIONS

WORKING PRESSURE AND TEMPERATURE	When using the valve, be sure to work with proper pressure temperature combinations within the maximum allowed as per the ratings marked on valve nameplate. The rating tables are those of ASME B16.34, EN 12516-1 and BFE table T600 as applicable. For special materials and conditions not "Rated", check that the design condition specified in the customer order, are correctly specified and applied (also check the valve nameplate).
VALVE MATERIAL CHOICE	It is the client's responsibility to select the correct material, based upon the media and operational condition. The correct choice will aid in increasing valve life expectancy andvice versa, corrosion, erosion or other factors which can lead to a reduced valve life.
CORROSION ALLOWANCE	Standard valves are designed to be safe taking into account a maximum corrosion allowance of 3mm. Never use the valve with a higher corrosion allowance unless specified in the customer order.
PIPELINE LOAD	Standard valves have not been designed for support purposes, hence the client must avoid any significant pipeline load concentrations at valve interface. If requested, BFE can supply the necessary information to allow the customer to perform the relevant verification or be required to perform the verification based on client data.
CYCLIC LOAD	In case of a significant number of cycles and load variations, further stress analysis shall be performed to verify the valve strength. This being the case, BFE can supply the necessary information to allow the customer to perform the relevant verification, or can be asked to perform the verification based on client data.
START-UP	Once the valve has been installed in accordance with all the procedures and precautions as described in the previous chapters, the valve can be started-up. For gate valves only, be careful not to heat-up the valve in a closed position with fluids inside, this could result in over pressurizing the valve.
NORMAL OPERATION	When in operation, the gate and globe valve can be hand-operated from open to close or vice versa by the handwheel. Prior to operating the valve, make sure that the temperature of the handwheel is not too hot or cold which could result in injury to the operator's hands.
SHUT-DOWN	No special procedures are required for shut-down.
FLUID GROUP P.E.D. / P.E.R.	According to P.E.D. 2014/68/UE & P.E.R. - PRESSURE EQUIPMENT (SAFETY) REGULATIONS, SI 2016 No. 1105 the valves / strainers are classified in category III (highest possible category) and then can be used with fluid group 1 or 2 including unstable gas.
VALVE MODIFICATION	In no case is the user allowed to modify the geometry or the material of valve components. This action determines the immediate expiring of factory warranty.

8. RESIDUAL RISK LIST RELATED TO MACHINERY DIRECTIVE 2006/42/EC

Important note! All BFE Valves and actuator assembly are defined as "Partly Completed Machinery" acc.to Machinery Directive 2006/42/EC.

RESIDUAL RISK	NOTE
NOISE	Valve and operator equipment (e.g. actuator) are designed in order to not generate any noise above 70dB(A). However the user must evaluate the process data in order to consider if the noise generated by the flow can produce with the applicable environmental legislation governing noise nuisance. If required protective equipment such as earplugs or other noise reduction equipments must be used.
EQUIPMENT MAINTENANCE	Any action related to the installation and maintenance of equipments not part of the valve product (e.g. Actuator or Limit-Switch) must be performed according to the IOM issued by the equipment manufacturer.
EQUIPMENT OPERATION	Any action related to the operation of equipments not part of the valve product (e.g. Actuator or Limit-Switch) must be performed according to the IOM issued by the equipment manufacturer.
ELECTRICAL AND ATEX / UKSI	System grounding is the responsibility of the user or system designer during the first installation and at every maintenance operation the grounding must be verified. During maintenance operation must be verified that all electrical and pneumatic energy sources are proper disconnected. All electrical connection where applicable must be performed acc.to local regulations (e.g. EN60079-14)

9. EXPLOSIVE ATMOSPHERES (ATEX / UKSI)

Valves may be used in potentially explosive atmospheres. Where the customer require valves in conformity to ATEX 2014/34/UE or UKSI 2016:1107 B.F.E. can supply valves in conformity to Zone II category 2. In accordance with the above Directives. in this manual B.F.E gives some indications to the valve users on how to operate in safe conditions.

LEAKAGE FROM PACKING	Check frequently the condition of packing and monitor the amount of emission by the use of suitable means (i.e. sniffers); in the case of significant leakage level change or adjust the packing.
LEAKAGE FROM BODY/BONNET CONNECTION	In the case of valve leakage through body-bonnet joint, it is necessary to substitute the gasket.
INADEQUATE LUBRICATION	In the case of long and frequent operations, the friction between stem, yoke sleeve and bonnet, can cause a local increase of the temperature. Therefore BFE recommends lubricating all the parts involved.
INADEQUATE ELECTRIC CONTINUITY	BFE valves are made with permanently contactable steel components hence a full electric continuity is guaranteed. If the connection to the pipeline does not guaranty the metal continuity (i.e. flanged connection with fully or partially non metallic gasket) BFE suggests adopting equipotential devices.
INADEQUATE THERMAL INSULATION	Valves can be used at any temperature allowed by the relevant rating table; the high temperature of external surfaces can be a potential cause of explosion. In this case it is good practice to insulate the valves when used in hot conditions with similar devices as adopted for the rest of the pipeline. However, the temperature of the fluid conveyed in the inner part has to be compared with the minimum temperature for priming of explosive atmosphere in order to check the compatibility.
ELECTRIC COMPONENTS	If the valves need any electrical equipment mounted, check if the Ex certificates of the electric components are for the protection level necessary for the site conditions.
PRESENCE OF POWDERS THAT MAY TRIGGER EXPLOSION	BFE valves are constructed in such a way that any powders in the surrounding environment cannot enter the valve itself. Nevertheless it is recommended to check at regular intervals the fastening of the stuffing box in order to prevent the infiltration of these powders, which, after contact with the inner fluid/gas, might trigger explosions. During the cleaning of the external valve surfaces, it is recommended to use wet cloths to prevent electrostatic effects, which may trigger explosions, if in contact with the powders themselves.

10. ENVIRONMENTAL PRECAUTIONS

The following are the indications of good practice which should be adopted during the life cycle of the product for correct use and in order to protect the environment and prevent pollution.

ASSEMBLY	When installing the valve, the materials for packing and protection have to be removed and disposed of according to the following procedures: DO NOT BURN IN UNCONTROLLED WAY DISPOSE ACCORDING TO THE NATIONAL RULES IN FORCE PREFERABLY RECYCLE – ALL THE PACKING MATERIALS USED ARE RECYCLABLE
OPERATION AND MAINTENANCE	Observe the indications contained in this manual to prevent leakage of products that are harmful for the environment. The material used for the packings is free from asbestos fibres, use products with the same features when replacing. Maintenance should be in accordance with the indications of this manual.
DISPOSAL	When the valve life has come to the end it becomes waste and it should be disposed of according to the following indications DISPOSE ACCORDING TO THE NATIONAL RULES IN FORCE TEMPER WHEN THE VALVE WAS IN CONTACT WITH HARMFUL PRODUCTS PREFERABLY RECYCLE – ALL THE MATERIALS USED ARE RECYCLABLE

ANNEX "A" - NPT ASSEMBLY INSTRUCTIONS

The following steps are applicable to all the NPT connections of the valve (Plugs, End Connections, etc).

STEP-1 : Inspect port and fitting to ensure that both are free of contaminants and excessive burrs.

STEP-2: Apply a strip of an anaerobic liquid pipe sealant around the male threads leaving the first two threads uncovered. If no liquid sealant is available, wrap Teflon tape 1-1/2 turns in a clockwise direction, viewed from the pipe end, leaving the first two threads uncovered.
CAUTION: Teflon tape and some pipe sealants are damaging to hydraulic components. Always use extreme caution and follow manufacturer's recommendations for proper application of any sealant in order to prevent contamination.

STEP 3: Screw finger tight into the port.

STEP 4: Wrench tighten the fitting to the correct turns Past Finger Tight position (See following table).
A properly assembled fittings total thread engagement should be 3 to 6 turns.
CAUTION: Never back off an installed pipe fitting to achieve proper alignment. Loosening installed pipe fittings will corrupt the seal and contribute to leakage and failure.

Torque installation of pipe fittings is not a recommended practice. Thread taper and quality, different port and fitting materials, plating thickness and types, varying thread sealants, orientation, and other factors reduce the reliability of a torqued connection. If torque installation is required, refer to the following table for suggested torque values.

NPT TABLE

ITEM	SCREW SIZE	TURN PAST FINGER TIGHT	TORQUE [Nm]
1	1/8"	1.5 - 3.0	17
2	1/4"	1.5 - 3.0	35
3	3/8"	1.5 - 3.0	55
4	1/2"	1.5 - 3.0	75
5	3/4"	1.5 - 3.0	105
6	1"	1 - 2.5	150
7	1"-1/4	1 - 2.5	210
8	1"-1/2	1 - 2.5	290
9	2"	1 - 2.5	410

ANNEX "B" – BODY-BONNET BOLT OR SCREW TIGHTENING SPECIFICATION

To avoid having bolts over stressed during the valve re-assembly, follow the recommended bolting torques provided here:

BOLTING TORQUE TABLE [Nm]

IMPERIAL BOLT SIZE	METRIC BOLT SIZE	ALL MATERIALS WITH MIN YIELD STRESS @ ROOM TEMPERATURE OF 400MPa AND BELOW. (EG. ASTM A320 B8M CL.1)	ALL MATERIALS WITH MIN YIELD STRESS @ ROOM TEMPERATURE ABOVE 400MPa. (EG. ASTM A320 L7M)	ONLY FOR X5CrNi18.10 (A2-70) 24CrMo5 (G) 21CrMoV57 (GA)
3/8 UNC	M10	**16**	**30**	45
1/2 UNC	M12	**37**	**70**	75
9/16 UNC	M14	**50**	**95**	120
5/8 UNC	M16	**70**	**140**	185
3/4 UNC	M20	**125**	**230**	260
7/8 UNC	M22	**200**	**370**	450
1-UNC	M24	**300**	**550**	670

NOTE:

- Torque tolerance ±10%.
- For temperatures above 400°C use 75% of the torque values.
- Torque values are with the bolts lubricated.
- When applying the torque to the bolts, each bolt should be torqued in steps of approximately 20% of the final torque.
- Do not use impacting devices to tighten up the bolting on the body/bonnet. Use suitable mechanical devices for tightening.
- In case of metric bolting use the nearest imperial nominal size available.
- Before installing flange bolts, it is recommend to apply a light coating anti-seize (non-galling, high temperature grease) to the threads of the bolts.

FLANGE BOLT TIGHTENING SEQUENCE

To ensure even distribution of stresses in the fully-installed flange, tighten the bolts in a star pattern then repeat the star pattern while tightening to the next torque value, and so on up to the maximum torque value.

EXAMPLE OF CRISS-CROSS SEQUENCE



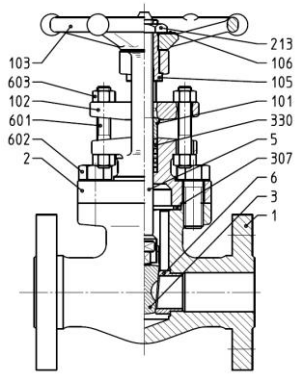
ANNEX "C" - TROUBLESHOOTING GUIDE

FAILURE	CAUSE	TROUBLESHOOTING
Leakage of packing	1-Gland flange nuts loose 2-Rings of packing insufficient 3-Packing aged or failing 4-Stem sealing damage	1-Equally tighten gland flange nuts 2-Add packing 3-Replace packing 4-Stem should be maintained in accordance with the correct procedures or replaced according to with the maintenance of pipeline facilities
Leakage between sealing surface	1-Dirt between sealing surfaces 2-Sealing surface damaged	1-Clean sealing surface 2-Repair the sealing surfaces
Operation failure	1-Packing too tight 2-Stem nut over worn 3-Stem bent 4-Foreign matter between the stem and stem nut or gland or gland flange	1-Properly loosen gland flange nuts 2-Replace stem nut 3-Rectify or replace stem 4-Clean foreign matter
Leakage between body/bonnet flanges	1-Bonnet bolts loose 2-Bonnet gasket failure	1-Properly tighten bonnet nuts 2-Replace bonnet gasket
Body and bonnet broken and leaking	1-Static head 2-Fatigue 3-Cracking or breaking from freezing temperatures	1-Careful operation to prevent sudden stopping, pumping and rapid shutting 2-Replace valve that exceeds guarantee period or is found with early fatigue defection 3-Drain away water in winter when valve is not used
Disc fails to open	1- Disc blocked in the body 2- Stem is overheated and blocks the disc	1-Use proper torque 2-When the valve is closed and the pipeline is heated, rotate the handwheel slightly counter clockwise at varying intervals

IF THE PROBLEM PERSISTS, YOU HAVE ANY QUESTIONS OR NEED ADDITIONAL INFORMATION, PLEASE DO NOT HESITATE TO CONTACT BFE'S CUSTOMER SERVICE DEPARTMENT FOR FURTHER ASSISTANCE AND INSTRUCTIONS.

ANNEX "D" – TYPICAL VALVE SKETCHES

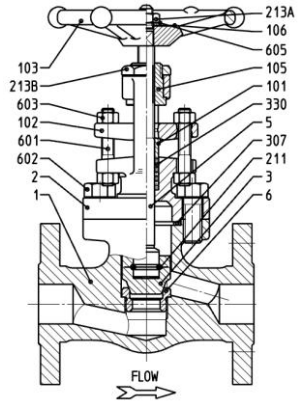
GATE



ITEM	DESCRIPTION
1	BODY
2	BONNET
3	GATE
5	STEM
6	SEAT
101	GLAND
102	GLANDE FLANGE
103	HANDWHEEL

ITEM	DESCRIPTION
105	SLEEVE
106	NAMEPLATE
213	NUT
307	GASKET
330	PACKING
601	BOLT
602	SCREW
603	NUT

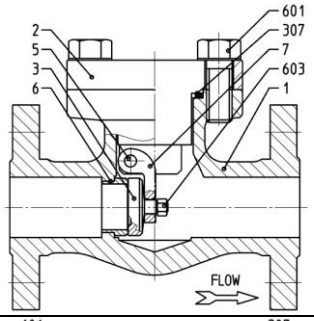
GLOBE



ITEM	DESCRIPTION
1	BODY
2	BONNET
3	DISC
5	STEM
6	SEAT
101	GLAND
102	GLAND FLANGE
103	HANDWHELL
105	SLEEVE
106	NAMEPLATE

ITEM	DESCRIPTION
211	WIRE
213A	NUT
213B	NUT
307	GASKET
330	PACKING
601	BOLT
602	SCREW
603	NUT
605	WASHER

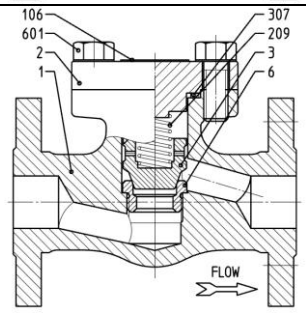
SWING CHECK



ITEM	DESCRIPTION
1	BODY
2	BONNET
3	GATE
5	STEM
6	SEAT

ITEM	DESCRIPTION
7	HINGE
307	GASKET
601	BOLT
603	NUT

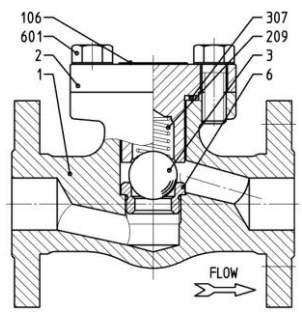
PISTON CHECK



ITEM	DESCRIPTION
1	BODY
2	BONNET
3	DISC
6	SEAT

ITEM	DESCRIPTION
106	NAMEPLATE
209	SPRING
307	GASKET
601	BOLT

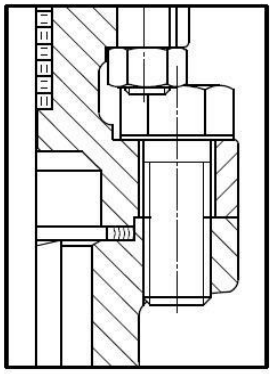
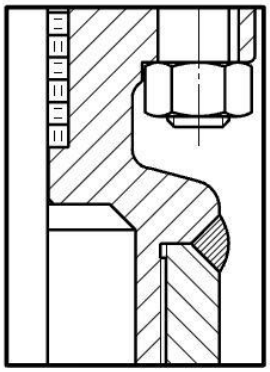
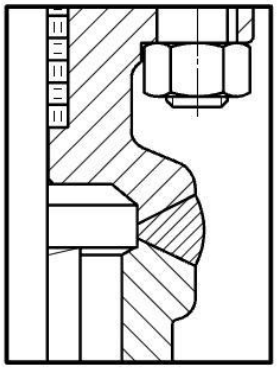
BALL CHECK



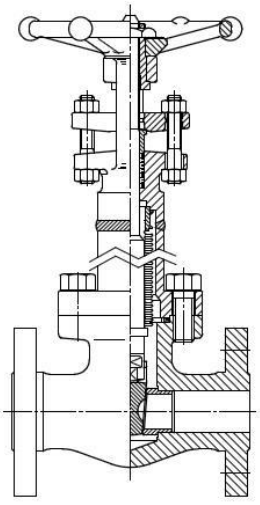
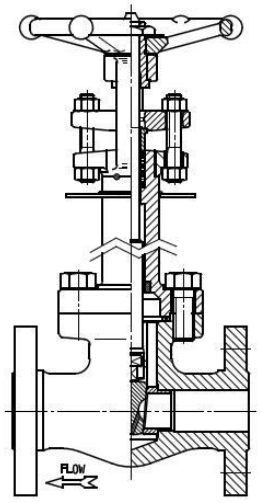
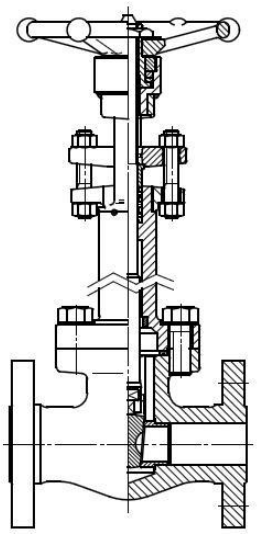
ITEM	DESCRIPTION
1	BODY
2	BONNET
3	BALL
6	SEAT

ITEM	DESCRIPTION
106	NAMEPLATE
209	SPRING
307	GASKET
601	BOLT

BODY-BONNET CONNECTIONS

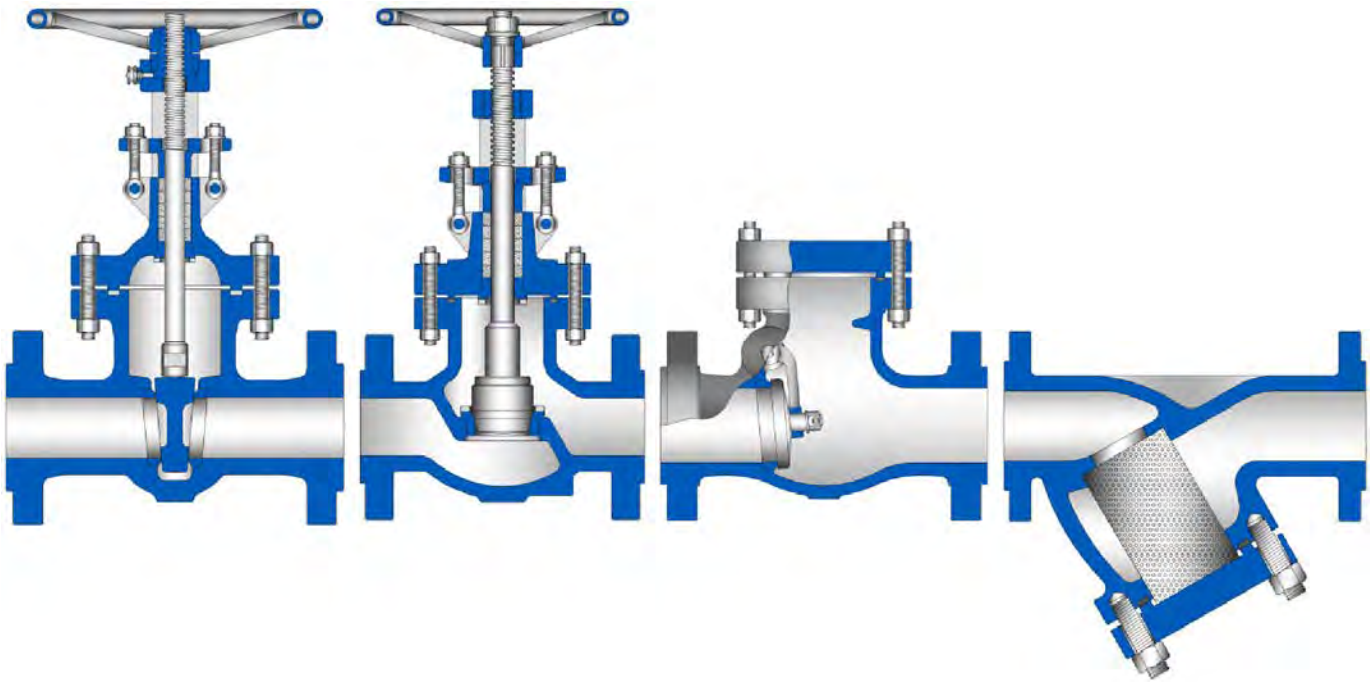
BOLTED	WELDED	FULL PENETERATION WELDED
The bolted connection consist of a body bonnet gasket located in its housing between two flanges and compressed by bts.	Welded bonnet valves are supplied in the standard type threaded in and fillet welded bonnet	The bolted connection consist of a full penetration weld.
		

VALVE CONFIGURATIONS (OTHER THEN BASIC)

BELLOW SEAL	CRYOGENIC	HIGH TEMPERATURE
Bellow seal valves feature a formed multi-ply bellows welded to the stem and to the bottom of the bonnet, creating a hermetic seal or impermeable barrier.	Cryogenic valves have an extended bonnet, the extension prevents cryogenic liquids from reaching the stem packing by enabling the liquids to boil and convert to gas.	The heat dissipation extended bonnet construction is made to dissipate heat and to lower the heat at the stem packing and to avoid subsequent failure of the packing and operation of the valve.
		

VALVOSIDER
MANUFACTURER OF VALVES

MAINTENANCE AND INSTRUCTIONS MANUAL



MANUALE DI ISTRUZIONI E MANUTENZIONE

7	26/10/2017	Updating Aggiornamento			
Nr.	**Date** **Data**	Description Descrizione	Product Specialist Specialista di Prodotto	Quality Department Ufficio Qualità	Technical Manager Direttore Tecnico
Revisions **Revisioni**			**Issued** **Emesso**	**Verified** **Verificato**	**Approved** **Approvato**

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VALVOSIDER
MANUFACTURER OF VALVES

MAINTENANCE AND INSTRUCTIONS MANUAL
MANUALE DI ISTRUZIONI E MANUTENZIONE



GENERAL OPERATING INSTRUCTIONS
ISTRUZIONI OPERATIVE GENERALI

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1.1 INSTALLATION AND ASSEMBLY

Make sure that:

- ✓ The **rating** and any other characteristics indicated on the **tag plate** comply with the operating conditions.
- ✓ The **pressure** and **temperature** values that the valves are exposed to are included within the limits defined in the **international standards** according to the **class** and **material** of construction of the valves.
- ✓ If no indication of temperature limits is made on **tag plate**, please consider as **max temperature limits** the following:

Material - Materiale	Max Temp.	Material - Materiale	Max Temp.
ASTM A216 WCB / GSC25N	450°C	GX5CrNiNb19-11 (1.4552)	300°C
ASTM A217 WC6, ASTM A217 C5 / 1.7363	600°C	ASTM A351 CF8M, ASTM A351 CF8C	440°C

- ✓ For low temperature are utilized valves made for cryogenic service.
- ✓ The valves exposed to corrosive or abrasive fluids are made with specific material for the requested usage.
- ✓ The valves that are used for flammable or explosive fluids are protected with a fire-prevention system connected to the facility in which are installed, or alternatively with a fire extinguisher placed near by the equipment.
- ✓ While in storage valves should be kept closed with the ends plugged.
- ✓ Prior to installation clean the inside to remove any foreign objects.
- ✓ Prior installation verify the integrity of its original packaging

During installation and assembling of the valve pay attention not to contaminate the valves assigned for oxygen use with materials from the facility or site

- ✓ Consider a spacious area for the installation that can provide access for proper operation and maintenance.
- ✓ Swing check valves can be installed inclined or vertical provided the flow direction is upwards.
- ✓ Always keep the flow direction indicated on the valves.
- ✓ Avoid excessive strain and tighten force on the valve that could compromise the structure or deformation therefore will jeopardize the functionality of the valve.
- ✓ Install gate valves on horizontal pipes with the stem in a vertical position that will guarantee good operation and lasting service. (See Figure 3)
- ✓ Cryogenic valves specified to be in gas service shall be capable of operation with the extended bonnet in any position.
- ✓ Valves specified to be in liquid service, other than cold box applications, shall be capable of operation with extended bonnet at or above 45° above the horizontal position. (see Figure 1)
- ✓ Valves specified to be in cold box applications, equipped with extended bonnet, for applications with liquids, shall be capable of operate with the stem oriented 15° to 90° above the horizontal plane (see figure 2).

INSTALLAZIONE E ASSEMBLAGGIO

Assicurarsi che:

Il **rating** e le altre caratteristiche riportate sulla **targhetta** siano in accordo con le condizioni di esercizio.

I valori di **pressione** e **temperatura** ai quali le valvole sono sottoposte sianno inclusi entro I limiti definiti dagli **standard internazionali** in accordo alla **classe** e al **materiale** costruttivo.

Se sulla **targhetta** non è riportata alcuna indicazione dei limiti di temperatura, siano considerati come limiti di **temperatura massima** i seguenti:

Per basse temperature vengano utilizzate valvole realizzate per il servizio criogenico.

Le valvole esposte a fluidi corrosivi o abrasivi siano realizzate con materiale specifico per l'utilizzo richiesto.

Le valvole utilizzate per fluidi infiammabili o esplosivi siano protette con un sistema antincendio collegato all'impianto in cui sono installate, o in alternativa con un estintore posto vicino all'apparecchiatura.

Durante l'immagazzinamento le valvole siano mantenute chiuse con le estremità tappate.

Prima dell'installazione venga pulito l'interno valvole per rimuovere eventuali corpi estranei.

Prima dell'installazione sia verificata l'integrità dell'imballaggio originale

Durante l'installazione e l'assemblaggio della valvola sia fatta attenzione a che le valvole destinate al servizio ossigeno non vengano contaminate con materiali provenienti dall'impianto o dal sito.

Sia considerata un'area spaziosa per l'installazione, che possa consentire l'accesso per il corretto funzionamento e la manutenzione.

Che per le valvole di ritegno a battente, pur installate inclinate o verticali, la direzione del flusso sia verso l'alto.

Sia sempre mantenuta la direzione del flusso indicata sulle valvole.

Siano evitati sforzi eccessivi e forze di serraggio sulla valvola che potrebbero comprometterne la struttura o provocare deformazioni che ne pregiudichino la funzionalità.

Le valvole a saracinesca vengano installare su tubazioni orizzontali con lo stelo in posizione verticale, che ne garantisca un buon funzionamento e un servizio duraturo. (Vedi Figura 3)

Le valvole criogeniche specificate per servizio gas siano in grado di funzionare con il cappello allungato in qualsiasi posizione.

Le valvole specificate per il servizio con liquidi, a eccezione delle applicazioni cold box, possano funzionare con il cappello allungato a 45° o più rispetto la posizione orizzontale. (Vedi figura 1)

Le valvole specificate per le applicazioni cold box, dotate di capello allungato, per applicazioni con liquidi, siano in grado di operare con lo stelo orientato da 15° a 90° sopra il piano orizzontale (vedi figura 2).

✓ Check that the closing torque of the boltings and gland packing is correct; after a few hours of operation you should control and regulate the compression of the packing.	La coppia di chiusura dei tiranti e del premistoppa sia corretta; dopo alcune ore di funzionamento si dovrebbe controllare e regolare la compressione del pacco baderna.
✓ Avoid any stagnation due to condensation in the body of the globe valves.	Sia evitato qualsiasi ristagno dovuto alla condensa nel corpo delle valvole a globo.
✓ Install Check and Globe valve as indicated by arrow marked on valve body	La valvola a globo e la valvola di ritegno siano installate come indicato dalla freccia presente sul corpo della valvola

1.2 USAGE PRECAUTIONS — PRECAUZIONI D'USO

✓ For the valves subject to the PED (European Directive 97/23/EC and 2014/68/EU), attention must be placed in case the material of the body, bonnet or cover is in alloy steel in accordance to ASTM A217 grades WC1, WC5, WC6, WC9, C5 and C12. These materials are suitable for High Temperature Services. In case the temperature of these materials goes under -10°C Valvosider recommends not to pressurize the valve and avoid any hit that could damage theirs mechanical properties. In such conditions it is necessary to proceed with a Thermal Transient phase with a pressure not higher than 0,5 bars that allows the temperature of the valve to gradually return to values higher than -10°C before being pressurized to the applicable rating values. Moreover it will be necessary to prevent the dangerous effects of any abrupt change of pressure, water hammers, impacts from inside due to solid suspension or solid objects passing in the piping, and impacts from outside.	Per le valvole soggette alla PED (Direttiva Europea 97/23/CE e 2014/68/UE), occorre prestare attenzione nel caso in cui il materiale del corpo, del cappello o del coperchio sia in acciaio legato secondo la norma ASTM A217 gradi WC1, WC5, WC6, WC9, C5 e C12. Questi materiali sono adatti per Servizi ad Alta Temperatura. Nel caso in cui la temperatura di questi materiali scenda al di sotto di -10°C Valvosider raccomanda di non pressurizzare la valvola e di evitare qualsiasi colpo che potrebbe danneggiare le loro proprietà meccaniche. In tali condizioni è necessario procedere con una fase Termica Transitoria con una pressione non superiore a 0,5 bar che permetta alla temperatura della valvola di ritornare gradualmente a valori superiori a -10°C prima di essere pressurizzata ai valori nominali applicabili. Inoltre sarà necessario prevenire gli effetti pericolosi di qualsiasi brusco cambiamento di pressione, colpi d'ariete, impatti dall'interno dovuti a sospensioni solide o a oggetti solidi che passano nelle tubazioni, e impatti dall'esterno.
✓ Handle the valves only through the handwheel, lever or the proper controls. Do not use tools or handwheel keys in order not to provoke serious damages to the seats	Maneggiare le valvole solo attraverso il volantino, la leva o i comandi appropriati. Non utilizzare attrezzi o chiavi a mano per non provocare gravi danni alle sedi
✓ Avoid water hammers and sudden temperature and pressure changes	Evitare colpi d'ariete e sbalzi improvvisi di temperatura e pressione
✓ Use correct means of protection and be careful if there are explosive, inflammable, toxic or corrosive fluids or when there are high or low service temperatures	Utilizzare mezzi di protezione corretti e fare attenzione alla presenza eventuale di fluidi esplosivi, infiammabili, tossici o corrosivi o quando ci siano alte o basse temperature di servizio
✓ Particular precautions are necessary to assure seal and the regular operation of the valves when there are fluids with solids in suspension or with high levels of condense	Particolari precauzioni sono necessarie per assicurare la tenuta e il regolare funzionamento delle valvole quando ci sono fluidi con solidi in sospensione o con elevati livelli di condensa
✓ Maintenance and lubrication of the valves must always be done as specified in the maintenance manual provided.	La manutenzione e la lubrificazione delle valvole devono essere sempre effettuate come specificato nel manuale di manutenzione fornito.

1.3 MAINTENANCE AND INSPECTIONS — MANUTENZIONI E ISPEZIONI

✓ Check periodically tightness of bolts and gasket seals based on the thermal cycles and usage; replace gasket seals as soon as possible if any leakages are present.	Controllare periodicamente il serraggio dei tiranti e la tenuta delle guarnizioni in base ai cicli termici e all'utilizzo; sostituire le guarnizioni il più presto possibile in caso di perdite.
✓ Do not tight the packing seal rings with too much strength. If it is necessary to compress the packing seals with higher torque than expected in order to obtain a seal on the stem, replace the packing seal rings.	Non serrare la baderna con troppa forza. Se è necessario comprimere le guarnizioni di tenuta a baderna con una coppia maggiore del previsto per ottenere una tenuta sullo stelo, provvedere alla sostituzione.
✓ For the maintenance and replacement of seals and other components of the valves, use only material that are suitable to the valve's class and temperature as well as to the fluids it makes contact with.	Per la manutenzione e la sostituzione delle guarnizioni e degli altri componenti delle valvole, utilizzare solo materiale adatto alla classe e alla temperatura della valvola, nonché ai fluidi con cui viene a contatto.
✓ Check periodically wall thickness of valves and strainers. If values reach the minimum required standards (ASME B16.34, EN 12516-1, BS 1873, BS 1868, API 600, API 6D), it is necessary to replace the valve immediately.	Controllare periodicamente lo spessore delle pareti delle valvole e dei filtri. Se i valori sono ridotti agli standard minimi richiesti (ASME B16.34, EN 12516-1, BS 1873, BS 1868, API 600, API 6D), è necessario sostituire immediatamente la valvola.

✓ Lubricate regularly the handwheel and the lantern if present; lubricants must be suitable with the valve's fluids. Pay particular attention to the oxygen valves in service.	Lubrificare regolarmente il volantino e la lanterna, se presente; i lubrificanti devono essere adatti ai fluidi di utilizzo della valvola. Prestare particolare attenzione alle valvole per servizio ossigeno.
Empty and vent completely the valve before its removal for maintenance.	Svuotare e sfiatare completamente la valvola prima della sua rimozione per la manutenzione.

1.4 DISPOSAL / SMALTIMENTO

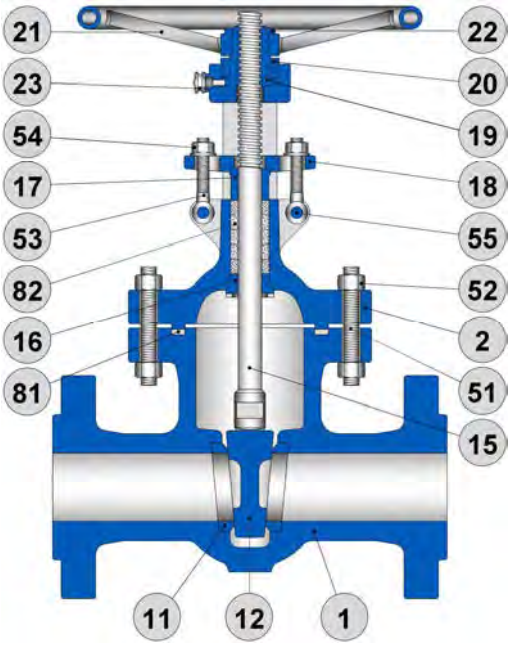
✓ Do not discard any equipment no longer in use in the environment.	Non smaltire nell'ambiente le apparecchiature non più utilizzate
✓ Verify the equipment is empty when is no longer in use.	Verificare che le apparecchiatura non più utilizzate siano vuote.
✓ Remove all harmful residues to health and environment.	Rimuovere tutti i residui nocivi per la salute e l'ambiente.
✓ Discard all unused equipment according to law.	Smaltire tutte le apparecchiature non più utilizzate in accordo alla legge.

1.5 WARNING / AVVERTENZE

✓ The pressure equipment, due to their characteristics and the fluids which they are in contact with, may represent a hazard to humankind, animals and the environment.	Le attrezzature a pressione, a causa delle loro caratteristiche e dei fluidi con cui sono a contatto, possono rappresentare un pericolo per l'uomo, gli animali e l'ambiente.
✓ To prevent and limit the risk deriving from the pressure equipment operation are strictly recommended the above instructions, which are comply with the international codes provisions, to the the technical knowledge and experience of our customers-users, as far as available at the moment when the present document was written and given to the user.	Per prevenire e limitare i rischi derivanti dal funzionamento delle attrezzature a pressione, sono strettamente raccomandate le istruzioni di cui sopra, che sono conformi alle disposizioni dei codici internazionali, alla conoscenza tecnica e all'esperienza dei nostri clienti-utenti, per quanto disponibili al momento in cui il presente documento è stato scritto e consegnato all'utente.
✓ The risk analysis available with the maintenance instructions is useful, but not sufficient to prevent the risks deriving from the pressure equipment installed according to the design project: the installer will find indications to minimise the effects of intrinsic risks which cannot be eliminated.	L'analisi dei rischi disponibile con le istruzioni di manutenzione è utile, ma non sufficiente a prevenire i rischi derivanti dalle attrezzature a pressione installate secondo le specifiche di progetto: l'installatore vi troverà indicazioni per minimizzare le conseguenze dei rischi intrinsechi che non possono essere eliminati.

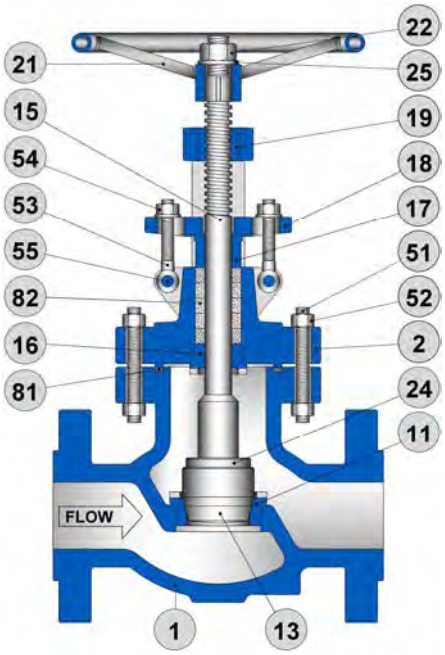
1.6 VALVES FIGURES — FIGURE VALVOLE

GATE VALVE — VALVOLA A SARACINESCA



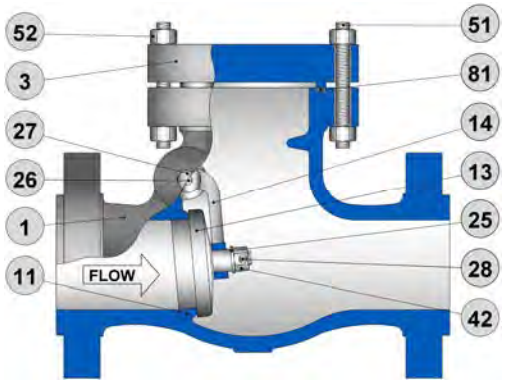
Part	Componente
1	Body Corpo
2	Bonnet Cappello
11	Seat ring Anello Sede
12	Wedge Cuneo
15	Stem Stelo
16	Backseat Controtenuta
17	Gland Premistoppa
18	Gland flange Flangia premistoppa
19	Yoke sleeve Madrevite
20	Yoke nut Ghiera madrevite
21	Handwheel Volantino
22	Handwheel nut Ghiera volantino
23	Grease nipple Ingrassatore
51	Bolts Tiranti
52	Nuts Dadi
53	Eye bolts Occhioli
54	Eye bolts nuts Dadi occhioli
55	Eye bolts pin Perni occhioli
81	Gasket Guarnizione
82	Packing Pacco baderna

GLOBE VALVE — VALVOLA A GLOBO



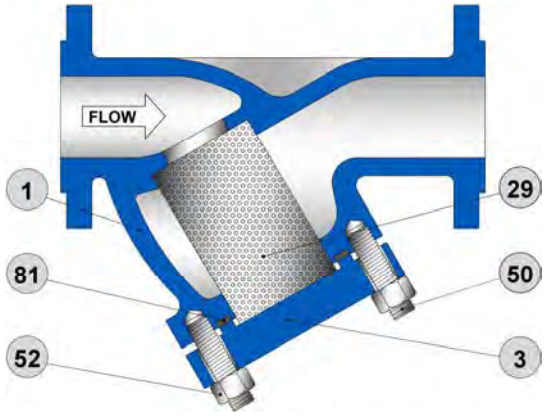
Part	Componente
1	Body Corpo
2	Bonnet Cappello
11	Seat ring Anello Sede
13	Disk Otturatore
15	Stem Stelo
16	Back seat Contro tenuta
17	Gland Premistoppa
18	Gland flange Flangia premistoppa
19	Yoke sleeve Madrevite
21	Handwheel Volantino
22	Handwheel nut Ghiera volantino
24	Disc nut Ghiera otturatore
25	Rondella Washer
51	Bolts Tiranti
52	Nuts Dadi
53	Eye bolts Occhioli
54	Eye bolts nuts Dadi occhioli
55	Eye bolts pin Perni occhioli
81	Gasket Guarnizione
82	Packing Pacco baderna

SWING CHECK VALVE — VALVOLA DI RITEGNO A BATTENTE



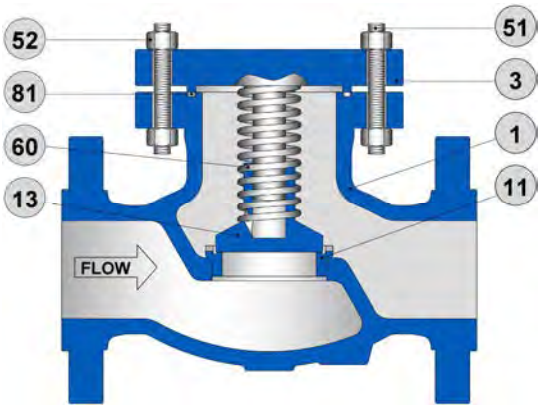
Part	Componente
1	Body Corpo
3	Cover Coperchio
11	Seat ring Anello Sede
13	Disk Otturatore
14	Hinge Leva
25	Washer Rosetta
26	Hinge pin Spinotto leva
27	Plug Tappo
28	Disk pin Spina otturatore
42	Disk nut Dado otturatore
51	Bolts Tiranti
52	Nuts Dadi
81	Gasket Guarnizione

STRAINER — FILTRO



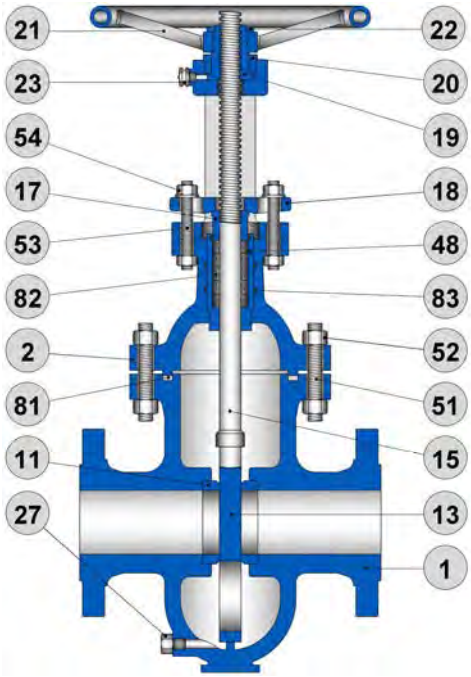
Part	Componente
1	Body Corpo
3	Cover Coperchio
29	Screen Filtro
50	Studs Prigionieri
52	Nuts Dadi
81	Gasket Guarnizione

PISTON CHECK VALVE
VALVOLA DI RITEGNO A PISTONE



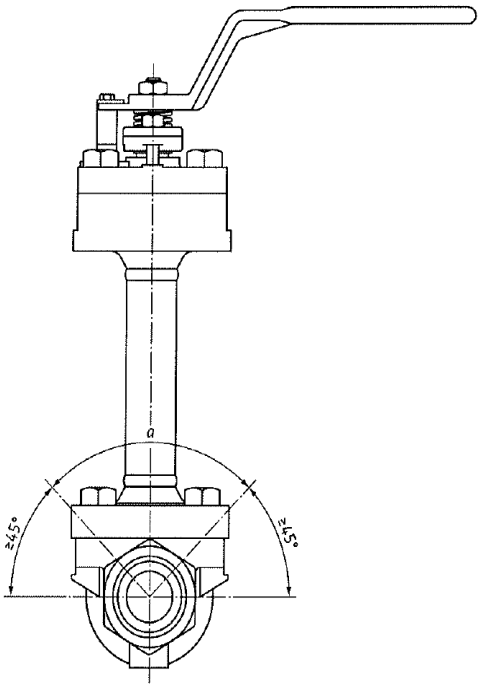
Part	Componente
1	Body Corpo
3	Cover Coperchio
11	Seat ring Anello Sede
13	Disk Otturatore
51	Bolts Tiranti
52	Nuts Dadi
60	Spring Molla
81	Gasket Guarnizione

SLAB GATE VALVE
VALVOLA A SARACINESCA SLAB

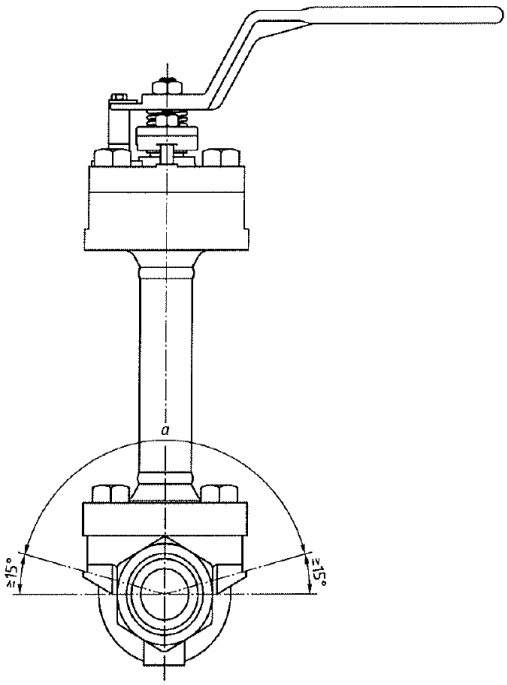


Part	Componente
1	Body Corpo
2	Bonnet Coperchio
11	Seat ring Anello Sede
13	Wedge Cuneo
15	Stem Stelo
17	Gland Premistoppa
18	Gland flange Flangia premistoppa
19	Yoke sleeve Madrevite
20	Yoke nut Ghiera madrevite
21	Handwheel Volantino
22	Handwheel nut Ghiera volantino
23	Grease nipple Ingrassatore
27	Plug Tappo
48	Stuffing box Camera stoppa
51	Bolts Tiranti
52	Nuts Dadi
53	Gland bolts Tiranti premistoppa
54	Gland nuts Dadi premistoppa
81	Gasket Guarnizione
82	Packing Pacco baderna
83	O-Ring

VALVES SPECIFIED TO BE IN LIQUID SERVICE
VALVOLE SPECIFICATE IN SERVIZIO LIQUIDO
Fig. 1

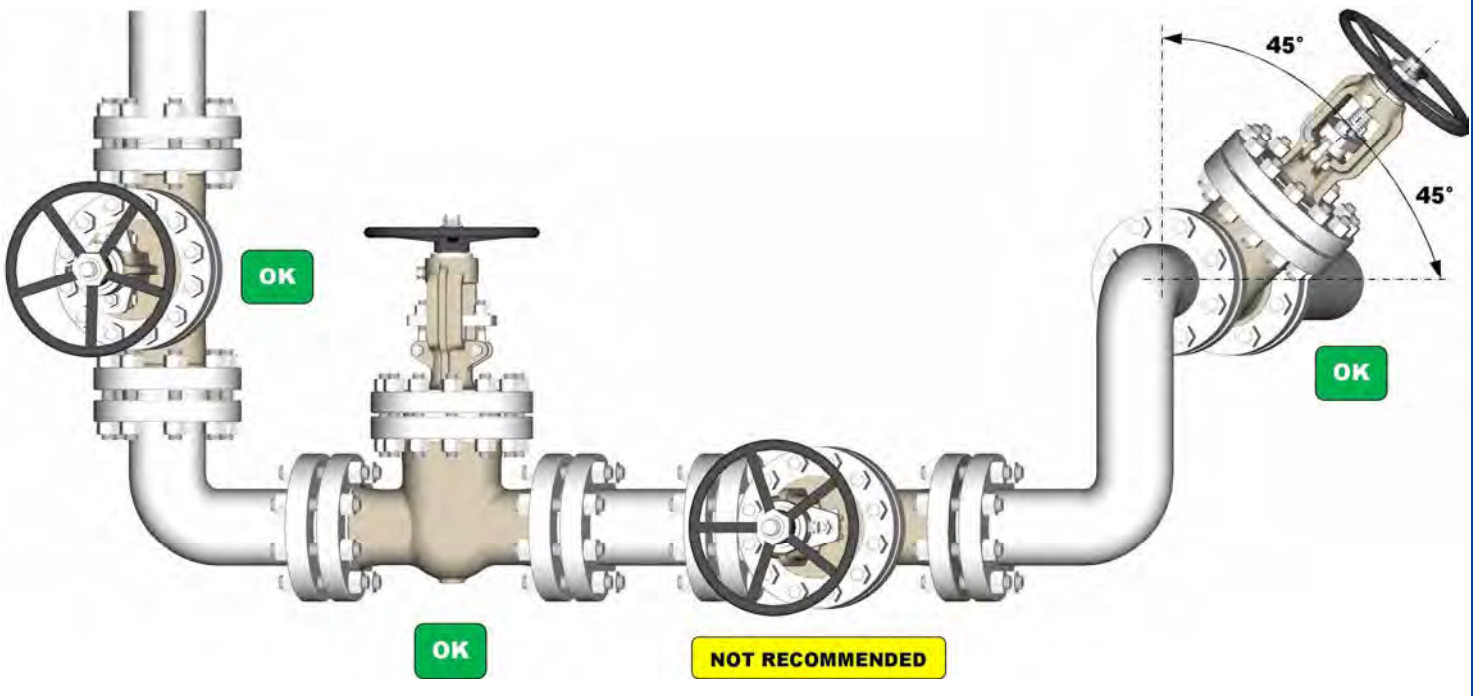


VALVES SPECIFIED TO BE IN COLD BOX APPLICATIONS
VALVES SPECIFICATE IN APPLICAZIONI COLD BOX
Fig. 2



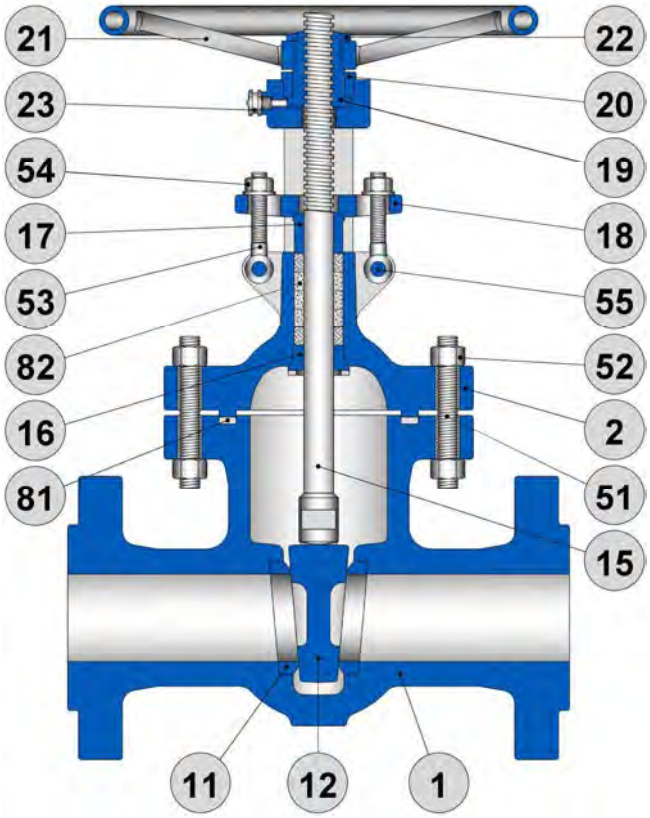
1.7 VALVES INSTALLATION — INSTALLAZIONE VALVOLE

GENERAL RULES AND PRACTICES FOR GATE VALVE INSTALLATION
REGOLE E PRATICHE GENERALI PER L'INSTALLAZIONE DELLE VALVOLE A SARACINESCA
Fig. 3



VALVOSIDER
MANUFACTURER OF VALVES

MAINTENANCE AND INSTRUCTIONS MANUAL
MANUALE DI ISTRUZIONI E MANUTENZIONE



GATE VALVE
VALVOLA A SARACINESCA

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2.2	Maintenance and replacement of damaged parts Manutenzione e sostituzioni di componenti danneggiati	pag. 11
2.3	Wedges and sealing seats Tenute dei cunei e seggi	pag. 12
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2.5	Notes Note	pag. 13
2.6	Sectional drawing with part list Disegno in sezione con lista componenti	pag. 14

2 GATE VALVES WITH OUTSIDE SCREW, YOKE AND RISING STEM / VALVOLA A SARACINESCA CON VITE ESTERNA E STELO SALIENTE

2.1 PERIODIC CHECKS / VERIFICHE PERIODICHE

2.1.1 Check the stem packing monthly (part n. 82) / Controllare mensilmente il pacco baderna (componente n. 82)

In case of leaks from the gland, tighten the eye bolts (part n. 53) it will tighten the packing ring seals (part n. 82).

In caso di perdite dal premistoppa, serrare i tiranti a occhiolo (componente n. 53) in modo tale da comprimere ulterirmente il pacco baderna (componente n. 82).

Compression/tighten must not exceed the correct limit in order to avoid difficulties during opening-closing operations or during the adjustment.

La compressione non dovrà superare il limite necessario, al fine di evitare difficoltà durante le manovre di apertura/chiusura o di regolazione.

If it is not possible to compress/tighten the seals, stem packing replacement is necessary, asking the manufacturer for the supply of spare packing seals.

Nel caso non fosse possibile comprimere ulteriormente le guarnizioni, si rende necessaria la sostituzione del pacco baderna, chiedendo la fornitura dei ricambi.

Avoid adding packing rings, unless the maintenance is temporary.

L'aggiunta di alcuni anelli di treccia è da evitare e da riservarsi solo per una manutenzione temporanea.

The regular sealing of the packing ring is guaranteed only by the design-specific seals.

La regolare tenuta del pacco baderna è garantita solo dalle guarnizioni specifiche di progetto.

2.1.2 Check monthly the yoke sleeve lubrication (part n. 19) / Controllare mensilmente la lubrificazione della madrevite (componente n. 19)

Lubrication of valves with grease nipple (part n. 23) must be carried out with a suitable high pressure lubricant device.

La lubrificazione delle valvole con ingrassatore a sfera (componente n. 23), deve essere eseguita con un'apposita pistola lubrificante ad alta pressione.

2.1.3 Bolts tension (part n. 51) / Serraggio tiranti (componente n. 51)

It is recommended to check periodically the bolts tension of valves in service at high temperature and subjected to frequent thermal cycles.

Si raccomanda di controllare periodicamente il serraggio dei tiranti delle valvole in servizio ad alta temperatura e sottoposte a frequenti cicli termici.

Even if the seal leakage are rare, the corrosion could be cause of the losses. In this case it is necessary to replace the seal checking at the same time also the contact surface of the gasket (part n. 81).

Seppure le perdite dalla guarnizione siano rare, la corrosione potrebbe causarle. In tal caso è necessaria la sostituzione della guarnizione (componente n. 81) controllando contemporaneamente anche la superficie a contatto con la stessa.

2.2 MAINTENANCE AND REPLACEMENT OF DAMAGED PARTS / MANUTENZIONE E SOSTITUZIONE DELLE PARTI DANNEGGIATE

2.2.1 Stem (part n. 15) / Stelo (componente n. 15)

Difficulty during operation or stem locking can be caused by the packing ring seals or lantern ring drying up or by the yoke sleeve locking.

Difficoltà di manovra o bloccaggio dello stelo possono essere causati da essiccamento del pacco baderna o della lanterna oppure da bloccaggio della madrevite.

In order to restore normal operation conditions we recommend the following:

Per ristabilire le normali condizioni di funzionamento si consiglia di:

- ✓ Check the packing and lantern ring service capacity, restore packing lubrication and pressure. If the parts are damaged, their replacement is necessary.
- ✓ Controllare la capacità di servizio del pacco baderna e della lanterna, ripristinando lubrificazione e compressione delle guarnizioni. Se i componenti sono danneggiati è necessaria la loro sostituzione.
- ✓ In case of locking due to the lantern ring wear and tear, disassemble the stem and replace the lantern ring.
- ✓ In caso di bloccaggio dovuto ad usura della lanterna, si raccomanda di smontare lo stelo e sostituire la lanterna.
- ✓ Clean the yoke sleeve and replenish with correct lubrication, verify that there is no damage. Damaged or worn yoke sleeve must be replaced with a new one.
- ✓ Pulire la madrevite e ristabilire la corretta lubrificazione, verificando che non sia danneggiata. La madrevite danneggiata o usurata deve essere sostituita con una nuova.

2.2.2 Packing ring seal maintenance with the valve in service

Repacking of the valve while it is under pressure is extremely dangerous, so is not recommended and in any case is at the owner's risk.

The successful completion of a backseat test should not be construed as a recommendation by the manufacturer that a valve may be repacked while it is under pressure.

Preferably the backseat (part n.16) may be used as a means of stopping or reducing packing leakage until the packing can be replaced under no pressure.

In the following paragraph 2.2.3 is explained how repacking the valve, in safety manner, in depressurized conditions.

Manutenzione del pacco baderna con valvola in servizio

La sostituzione del pacco baderna con valvola in pressione è estremamente pericoloso, quindi non è raccomandato ed è comunque a proprio rischio.

L'esito positivo del test di controtenuta non deve essere interpretato come una raccomandazione da parte del produttore a eseguire tale operazione.

Preferibilmente la controtenuta (parte n.16) può essere usata come mezzo per fermare o ridurre le perdite dalla baderna fino a quando non si può procedere alla sua sostituzione in assenza di pressione.

Nel seguente paragrafo 2.2.3 viene spiegato come sostituire il pacco baderna in modo sicuro, in condizioni di depressurizzazione.

2.2.3 Maintenance carried out with the valve out of service

Step 1

- ✓ Empty and drain the valve and the connected pipes;
- ✓ Put valve in half opening position;
- ✓ Loosen the packing eye-bolts;
- ✓ Loosen body-bonnet bolts, then remove them;
- ✓ Pull out the wedge from the stem;
- ✓ Unscrew the stem from the yoke sleeve and slip out of bonnet;
- ✓ Remove gland, gasket, packing and lantern ring if present;
- ✓ Check the parts, replace the worn down or damaged ones and all gaskets.

Step 2

Reassemble the valve, lubricating the parts according to the nature of the fluids the valve is connected to, following the subsequent order:

- ✓ Insert the packing, the lantern ring if present, the gland in their own housing;
- ✓ Screw the stem to the yoke sleeve through the packing, being careful not to damage the gaskets;
- ✓ Replace the wedge on the stem;
- ✓ Fix the bonnet on the body with the bolts, checking the correct position of gasket;
- ✓ Register gland compression and verify the operation and service of the valve;
- ✓ Check bolts, gasket and packing seal a few hours after it has been in service.

The suitability of the valves used for explosive, inflammable, toxic, corrosive fluids or is in service in a special security conditions should be checked through hydraulic test after its maintenance.

Manutenzione effettuata con valvola fuori servizio

Fase 1

- ✓ Svuotare e sfiatare la valvola e le tubazioni collegate;
- ✓ Mettere la valvola in posizione di mezza apertura;
- ✓ Allentare i tiranti del premistoppa;
- ✓ Allentare tutti i tiranti corpo/cappello, poi rimuoverli;
- ✓ Sfilare il cuneo dallo stelo;
- ✓ Svitare lo stelo dalla madrevite e sfilarla dal cappello;
- ✓ Rimuovere premistoppa, guarnizioni, pacco baderna e lanterna se presente;
- ✓ Controllare i componenti, sostituire quelli usurati o danneggiati e tutte le guarnizioni;

Fase 2

Rimontare la valvola, lubrificando i componenti secondo la natura dei fluidi con cui è a contatto, agendo nel seguente ordine:

- ✓ Inserire il pacco baderna, la lanterna se presente, il premistoppa nel proprio alloggiamento:
- ✓ Avvitare lo stelo alla madrevite attraverso il pacco baderna prestando attenzione a non danneggiare le guarnizioni;
- ✓ Reinserire il cuneo sull'attacco dello stelo;
- ✓ Fissare il cappello al corpo con i tiranti, controllando l'esatta posizione della guarnizione,
- ✓ Registrare la compressione del premistoppa e verificare funzionamento e la manovrabilità della valvola;
- ✓ Controllare la tenuta dei tiranti e delle guarnizioni dopo qualche ora di servizio.

L'idoneità delle valvole in servizio con fluidi esplosivi, infiammabili, tossici, corrosivi o che devono operare in condizioni di sicurezza particolari dovrebbe essere controllata per mezzo di prova idraulica dopo operazioni di manutenzione straordinaria.

2.3 WEDGES AND SEALING SEATS

Seats and wedges leakage is not always easy to notice when the valve is in service; if this leak is confirmed, it is necessary to intervene immediately. Seats and wedge surfaces or even both can be seriously damaged without an immediate intervention. In order to repair or replace the parts it is necessary to put the valve out of service and remove the various elements as previously described (2.2.3–1).

Seats maintenance

If seats surfaces are locking, or have cavities or furrows not deeper than 1.5 mm (1/16"), it is possible to repair the

CUNEO E SEDI DI TENUTA

Le perdite delle sedi e dai cunei non sono sempre facili da notare quando le valvole sono in servizio; qualora tali perdite siano confermate è utile agire subito. Le superfici delle sedi o dei cunei, o addirittura entrambi, possono subire danni gravi se non si interviene prontamente. Per effettuare le riparazioni o sostituzioni è necessario mettere la valvola fuori servizio e rimuovere i vari componenti come descritto precedentemente punto (2.2.3–1).

Manutenzione sedi di tenuta

Se le superfici delle sedi mostrano bloccaggio, cavità o solchi profondi non oltre 1,5 mm (1/16") è possibile riparare le

surfaces, restore it to its original condition grinding them with granular abrasive paste.

If is necessary to use paste (normally blue in color) check seats surfaces after final grinding.

Surfaces with defects deeper than 1.5 mm (1/16") cannot be repaired through grinding; in this case the use of spare parts is recommended.

To assemble the valve please follow instruction on paragraph 2.2.3–2

superfici, riportandole alle condizioni originali di perfetta tenuta, lappandole con pasta abrasiva granulare.

Per controllare le superfici delle sedi dopo la lappatura finale è necessario utilizzare pasta di riscontro (normalmente di colore blu).

Le superfici che presentano difetti con profondità superiore a 1,5 mm (1/16") non possono essere riparate mediante lappatura; in questo caso si consiglia l'utilizzo di parti di ricambio.

Per il ri-assemblaggio delle valvole seguire le istruzioni come da paragrafo 2.2.3–2

2.4 ACTUATORS

Actuators maintenance on valves must be carried out according to the actuators manufacturer's instruction manual.

ATTUATORI

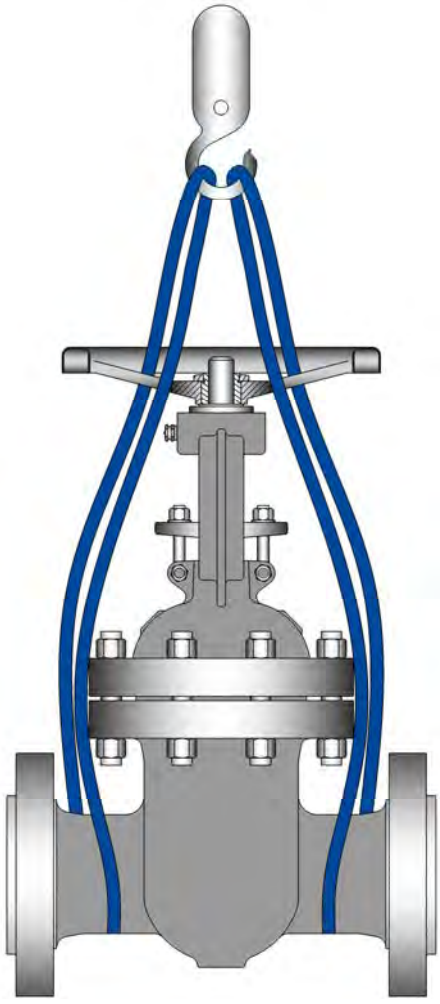
La manutenzione degli attuatori montati sulle valvole deve essere effettuata in accordo alle istruzioni del produttore.

2.5 NOTES

- ✓ Yoke nut of the yoke sleeve is tack welded to the bonnet.
- ✓ See the following figure for valve handling

NOTE

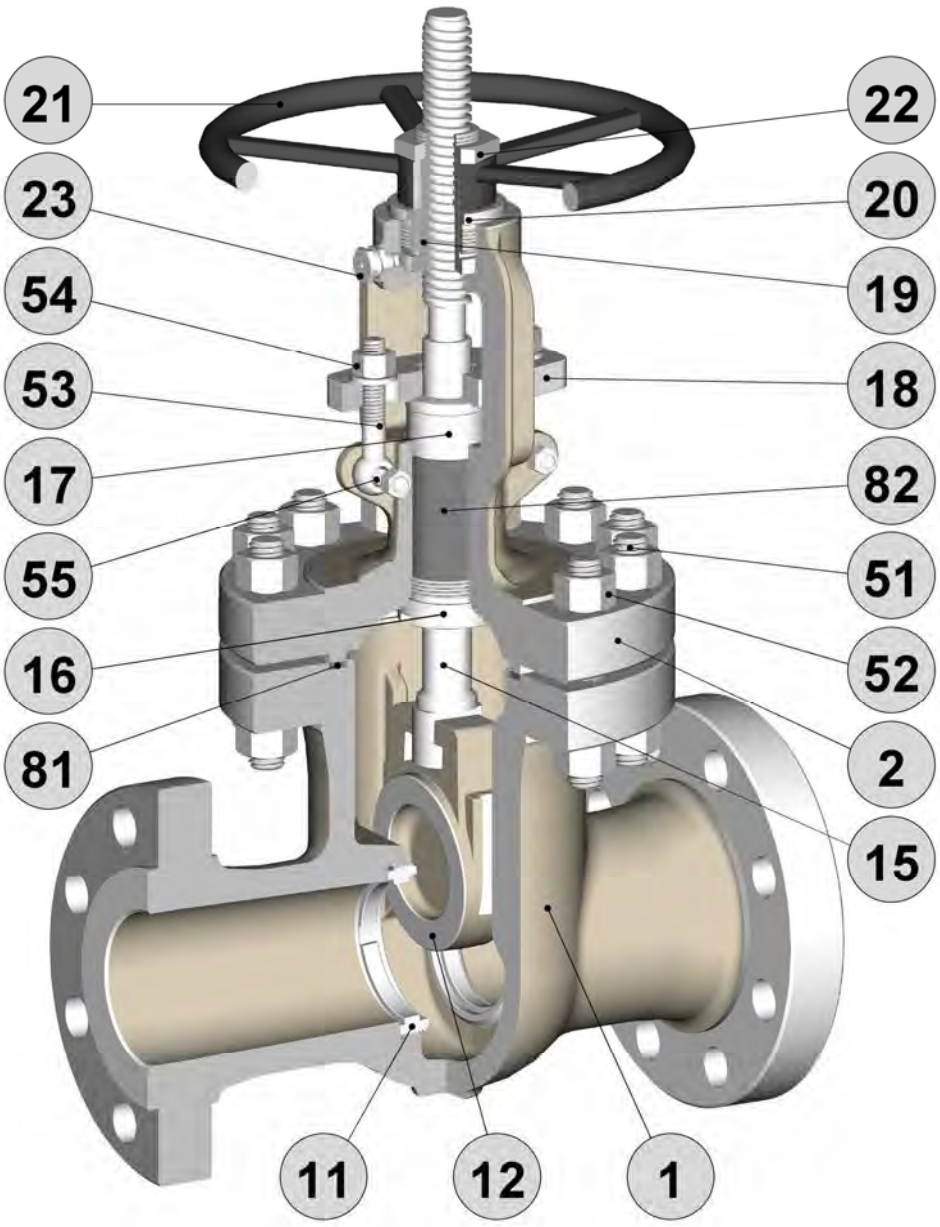
- ✓ La ghiera di fissaggio della madrevite è assicurata al cappello con un punto di saldatura.
- ✓ Per la movimentazione delle valvole attenersi alla figura successiva.



VALVE HANDLING
MOVIMENTAZIONE DELLE VALVOLE

2.6 SECTIONAL DRAWING WITH PART LIST — DISEGNO IN SEZIONE CON LISTA COMPONENTI

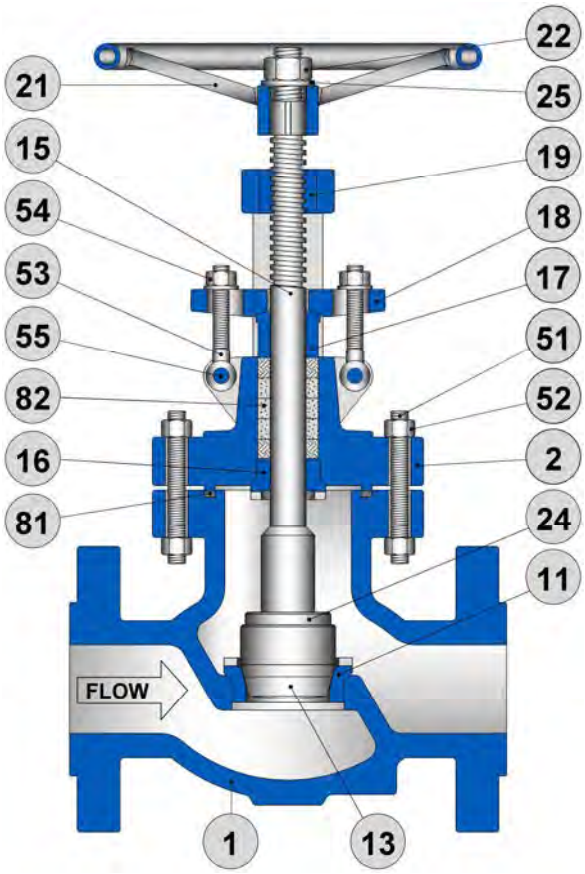
GATE VALVE
VALVOLA A SARACINESCA



Pos.	Part Name	Componente
1	Body	Corpo
2	Bonnet	Cappello
11	Seat Ring	Anello Sede
12	Wedge	Cuneo
15	Stem	Stelo
16	Back Seat	Contro Tenuta
17	Gland	Premistoppa
18	Gland Flange	Flangia Premistoppa
19	Yoke Sleeve	Madrevite
20	Yoke Nut	Ghiera Madrevite
21	Handwheel	Volantino
22	Handwheel Nut	Ghiera Volantino
23	Grease Nipple	Ingrassatore
51	Body/Bonnet Bolt	Tirante Corpo/Cappello
52	Body/Bonnet Nut	Dado Corpo/Cappello
53	Eye Bolt	Tirante a Occhiolo
54	Eye Bolt Nut	Dado Occhiolo
55	Eye bolt Pin	Perno Occhiolo
81	Gasket	Guarnizione
82	Packing	Pacco Baderna

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GLOBE VALVE
VALVOLA A GLOBO

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3 GLOBE VALVES WITH OUTSIDE SCREW, YOKE AND RISING STEM / VALVOLA A GLOBO CON VITE ESTERNA E STELO SALIENTE

3.1 PERIODIC CHECKS / VERIFICHE PERIODICHE

3.1.1 Check the stem packing monthly (part n. 82) / Controllare mensilmente il pacco baderna (componente n. 82)

In case of leaks from the gland, tighten the eye bolts (part n. 53) it will tighten the packing ring seals (part n. 82).

In caso di perdite dal premistoppa, serrare i tiranti a occhiolo (componente n. 53) in modo tale da comprimere ulterirmente il pacco baderna (componente n. 82).

Compression/tighten must not exceed the correct limit in order to avoid difficulties during opening-closing operations or during the adjustment.

La compressione non dovrà superare il limite necessario, al fine di evitare difficoltà durante le manovre di apertura/chiusura o di regolazione.

If it is not possible to compress/tighten the seals, stem packing replacement is necessary, asking the manufacturer for the supply of spare packing seals.

Nel caso non fosse possibile comprimere ulteriormente le guarnizioni, si rende necessaria la sostituzione del pacco baderna, chiedendo la fornitura dei ricambi.

Avoid adding packing rings, unless the maintenance is temporary.

L'aggiunta di alcuni anelli di treccia è da evitare e da riservarsi solo per una manutenzione temporanea.

The regular sealing of the packing ring is guaranteed only by the design-specific seals.

La regolare tenuta del pacco baderna è garantita solo dalle guarnizioni specifiche di progetto.

3.1.2 Check monthly the yoke sleeve lubrication (part n. 19) / Controllare mensilmente la lubrificazione della madrevite (componente n. 19)

3.1.3 Bolts tension (part n. 51) / Serraggio tiranti (componente n. 51)

It is recommended to check periodically the bolts tension of valves in service at high temperature and subjected to frequent thermal cycles.

Si raccomanda di controllare periodicamente il serraggio dei tiranti delle valvole in servizio ad alta temperatura e sottoposte a frequenti cicli termici.

Even if the seal leakage are rare, the corrosion could be cause of the losses. In this case it is necessary to replace the seal checking at the same time also the contact surface of the gasket (part n. 81).

Seppure le perdite dalla guarnizione siano rare, la corrosione potrebbe essere causarle. In tal caso è necessaria la sostituzione della guarnizione (componente n.81) controllando contemporaneamente anche la superficie a contatto con la stessa.

3.2 MAINTENANCE AND REPLACEMENT OF DAMAGED PARTS / MANUTENZIONE E SOSTITUZIONE DELLE PARTI DANNEGGIATE

3.2.1 Stem (part n. 15) / Stelo (componente n. 15)

Difficulty during operation or stem locking can be caused by the packing ring seals or lantern ring drying up or by the yoke sleeve locking.

Difficoltà di manovra o bloccaggio dello stelo possono essere causati da essiccamento del pacco baderna o della lanterna oppure da bloccaggio della madrevite.

In order to restore normal operation conditions we recommend the following:

Per ristabilire le normali condizioni di funzionamento si consiglia di:

- ✓ Check the packing and lantern ring service capacity, restore packing lubrication and pressure. If the parts are damaged, their replacement is necessary.
- ✓ Controllare la capacità di servizio del pacco baderna e della lanterna, ripristinando lubrificazione e compressione delle guarnizioni. Se i componenti sono danneggiati è necessaria la loro sostituzione.
- ✓ In case of locking due to the lantern ring wear and tear, disassemble the stem and replace the lantern ring.
- ✓ In caso di bloccaggio dovuto ad usura della lanterna, si raccomanda di smontare lo stelo e sostituire la lanterna.
- ✓ Clean the yoke sleeve and replenish with correct lubrication, verify that there is no damage. Damaged or worn yoke sleeve must be replaced with a new one.
- ✓ Pulire la madrevite e ristabilire la corretta lubrificazione, verificando che non sia danneggiata. La madrevite danneggiata o usurata deve essere sostituita con una nuova.

3.2.2 Packing ring seal maintenance with the valve in service / Manutenzione del pacco baderna con valvola in servizio

Repacking of the valve while it is under pressure is extremely dangerous, so is not recommended and in any case is at the owner's risk.

La sostituzione del pacco baderna con valvola in pressione è estremamente pericoloso, quindi non è raccomandato ed è comunque a proprio rischio.

The successful completion of a backseat test should not be construed as a recommendation by the manufacturer that a

L'esito positivo del test di controtenuta non deve essere interpretato come una raccomandazione da parte del

valve may be repacked while it is under pressure.

Preferably the backseat (part n.16) may be used as a means of stopping or reducing packing leakage until the packing can be replaced under no pressure.

In the following paragraph 3.2.3 is explained how repacking the valve, in safety manner, in depressurized conditions.

produttore a eseguire tale operazione.

Preferibilmente la controtenuta (parte n.16) può essere usata come mezzo per fermare o ridurre le perdite dalla baderna fino a quando non si può procedere alla sua sostituzione in assenza di pressione.

Nel seguente paragrafo 3.2.3 viene spiegato come sostituire il pacco baderna in modo sicuro, in condizioni di depressurizzazione.

3.2.3 Maintenance carried out with the valve out of service

Step 1

- ✓ Empty and drain the valve and the connected pipes;
- ✓ Put valve in half opening position;
- ✓ Loosen the packing eye-bolts;
- ✓ Loosen body-bonnet bolts, then remove them;
- ✓ Unscrew the stem from the yoke sleeve and slip out of bonnet;
- ✓ Remove gland, gasket, packing and lantern ring if present;
- ✓ Check the parts, replace the worn down or damaged ones and all gaskets.

Step 2

Reassemble the valve, lubricating the parts according to the nature of the fluids the valve is connected to, following the subsequent order:

- ✓ Insert the packing, the lantern ring if present, the gland in their own housing;
- ✓ Screw the stem to the yoke sleeve through the packing, being careful not to damage the gaskets;
- ✓ Replace the disc on the stem;
- ✓ Fix the bonnet on the body with the bolts, checking the correct position of gasket;
- ✓ Register gland compression and verify the operation and service of the valve;
- ✓ Check bolts, gasket and packing seal a few hours after it has been in service.

The suitability of the valves used for explosive, inflammable, toxic, corrosive fluids or is in service in a special security conditions should be checked through hydraulic test after its maintenance.

Manutenzione effettuata con valvola fuori servizio

Fase 1

- ✓ Svuotare e sfiatare la valvola e le tubazioni collegate;
- ✓ Mettere la valvola in posizione di mezza apertura;
- ✓ Allentare i tiranti del premistoppa;
- ✓ Allentare tutti i tiranti corpo-cappello, poi rimuoverli;
- ✓ Svitare lo stelo dalla madrevite e sfilarla dal cappello;
- ✓ Rimuovere premistoppa, guarnizioni, pacco baderna e lanterna se presente;
- ✓ Controllare i componenti, sostituire quelli usurati o danneggiati e tutte le guarnizioni;

Fase 2

Rimontare la valvola, lubrificando i componenti secondo la natura dei fluidi con cui è a contatto, agendo nel seguente ordine:

- ✓ Inserire il pacco baderna, la lanterna se presente, il premistoppa nel proprio alloggiamento:
- ✓ Avvitare lo stelo alla madrevite attraverso il pacco baderna prestando attenzione a non danneggiare le guarnizioni;
- ✓ Reinserire l'otturatore sull'attacco dello stelo;
- ✓ Fissare il cappello al corpo con i tiranti, controllando l'esatta posizione della guarnizione,
- ✓ Registrare la compressione del premistoppa e verificare funzionamento e la manovrabilità della valvola;
- ✓ Controllare la tenuta dei tiranti e delle guarnizioni dopo qualche ora di servizio.

L'idoneità delle valvole in servizio con fluidi esplosivi, infiammabili, tossici, corrosivi o che devono operare in condizioni di sicurezza particolari dovrebbe essere controllata per mezzo di prova idraulica dopo operazioni di manutenzione straordinaria.

3.3 DISCS AND SEALING SEATS

Seats and disc leakage is not always easy to notice when the valve is in service: if this leak is confirmed, it is necessary to intervene immediately.

Seats and disc surfaces or even both can be seriously damaged without an immediate intervention.

In order to repair or replace the parts it is necessary to put the valve out of service and remove the various elements as previously described (3.2.3–Step 1).

Seat maintenance

If seats surfaces are locking, or have cavities or furrows not deeper than 1.5 mm (1/16"), it is possible to repair the surfaces, restore it to its original condition grinding them with granular abrasive paste.

If is necessary to use paste (normally blue in color) check seats surfaces after final grinding.

OTTURATORI E SEDI DI TENUTA

La perdita dalla sede e dall'otturatore non sono sempre facili da notare quando la valvola è in servizio: qualora tali perdite siano confermate è utile agire subito.

Le superfici della sede o dell'otturatore, o addirittura entrambi, possono subire danni gravi se non si interviene prontamente.

Per effettuare le riparazioni o sostituzioni è necessario mettere la valvola fuori servizio e rimuovere i vari componenti come descritto precedentemente punto (3.2.3– Fase 1).

Manutenzione sede di tenuta

Se le superfici delle sedi mostrano bloccaggio, cavità o solchi profondi non oltre 1,5 mm (1/16") è possibile riparare le superfici, riportandole alle condizioni originali di perfetta tenuta, lappandole con pasta abrasiva granulare.

Per controllare le superfici delle sedi dopo la lappatura finale è necessario utilizzare pasta di riscontro (normalmente di colore blu).

Surfaces with defects deeper than 1.5 mm (1/16") cannot be repaired through grinding; in this case the use of spare parts is recommended.

To assemble the valve please follow instruction on paragraph 3.2.3–Step 2

Le superfici che presentano difetti con profondità superiore a 1,5 mm (1/16") non possono essere riparate mediante lappatura; in questo caso si consiglia l'utilizzo di parti di ricambio.

Per il ri-assemblaggio delle valvole seguire le istruzioni come da paragrafo 3.2.3 – Fase 2

3.4 ACTUATORS

Actuators maintenance on valves must be carried out according to the actuators manufacturer's instruction manual.

ATTUATORI

La manutenzione degli attuatori montati sulle valvole deve essere effettuata in accordo alle istruzioni del produttore.

3.5 NOTES

- ✓ The use of the globe valve is limited to the differential pressure (ΔP) below the disc (look at the table below)

NOTE

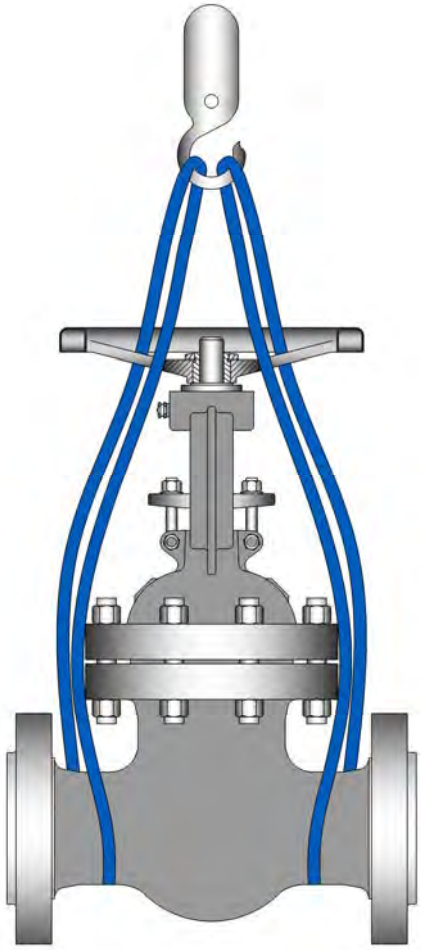
L'impiego delle Valvole a Globo è limitato dalla pressione differenziale (ΔP) sotto l'otturatore (vedi tabella).

DN	5"	6"	8"	10"	12"	14"	16"
Δ P (Bar)	33	21	14	9	6	4,5	3,5

- ✓ If the differential pressure under the disc is higher than the values shown in the table, it is necessary to install the valve with opposite flux and with external by-pass or, if requested, with internal by by-pass.
- ✓ See the following figure for valve handling.

Nel caso in cui la pressione differenziale sotto l'otturatore superi i valori indicati in tabella, occorre prevedere il montaggio della valvola con flusso inverso e con by-pass esterno o, su richiesta, con by-pass interno.

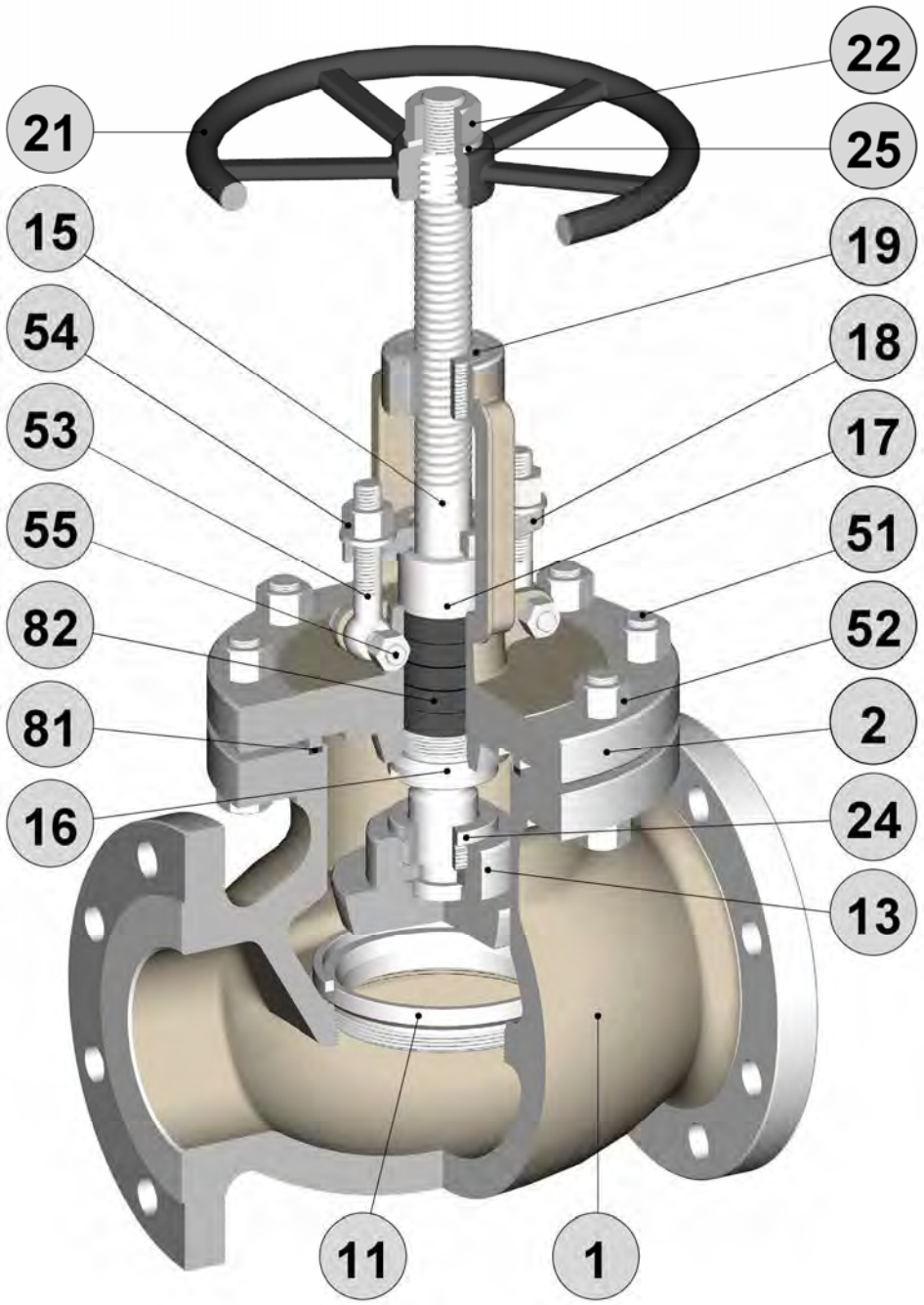
Per la movimentazione delle valvole attenersi alla figura successiva.



VALVE HANDLING
MOVIMENTAZIONE DELLE VALVOLE

3.6 SECTIONAL DRAWING WITH PART LIST — DISEGNO IN SEZIONE CON LISTA COMPONENTI

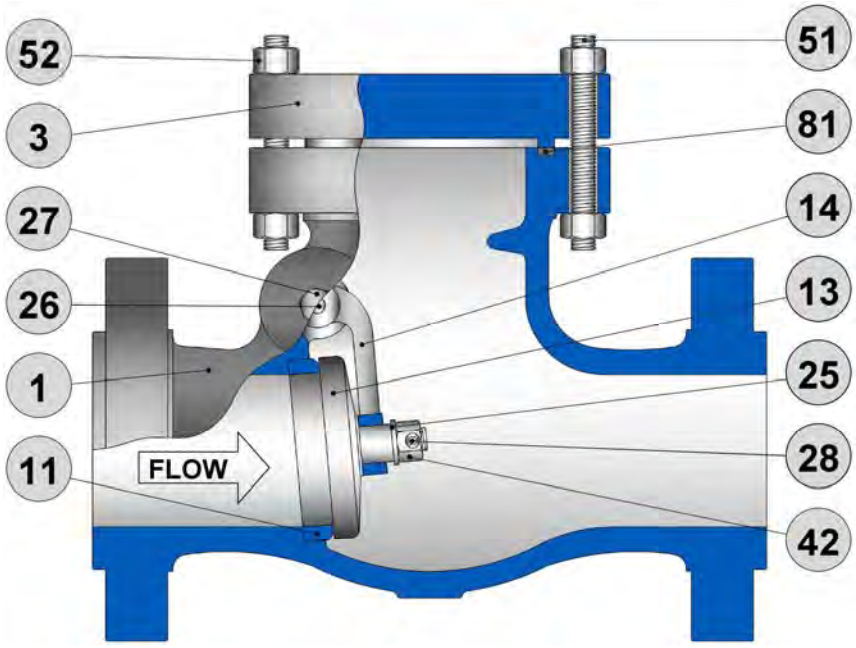
GLOBE VALVE
VALVOLA A GLOBO



Pos.	Part name	Componente
1	Body	Corpo
2	Bonnet	Cappello
11	Seat ring	Anello sede
13	Disc	Otturatore
15	Stem	Stelo
16	Backseat	Controtenuta
17	Gland	Premistoppa
18	Gland Flange	Flangia Premistoppa
19	Yoke sleeve	Madrevite
21	Handwheel	Volantino
22	Handwheel Nut	Ghiera Volantino
24	Disc Nut	Ghiera Volantino
25	Washer	Rondella
51	Body/Bonnet Bolt	Tirante Corpo/Cappello
52	Body/Bonnet Nut	Dado Corpo/Cappello
53	Eye Bolt	Tirante a Occhiolo
54	Eye Bolt Nut	Dado Occhiolo
55	Eye bolt Pin	Perno Occhiolo
81	Gasket	Guarnizione
82	Packing	Pacco Baderna

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SWING CHECK VALVE
VALVOLA DI RITEGNO A BATTENTE

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4.2	Maintenance and replacement of damaged parts Manutenzione e sostituzioni di componenti danneggiati	pag. 21
4.3	Notes Note	pag. 22
4.4	Sectional drawing with part list Disegno in sezione con lista componenti	pag. 23



4 SWING CHECK VALVE / VALVOLA DI RITEGNO A BATTENTE

4.1 PERIODIC CHECKS / VERIFICHE PERIODICHE

We recommend to check periodically the eye bolts tension and gasket seals of the valve according to the usage and high temperature or if the valve is exposed to frequent thermal cycle with a significant change in temperature.

Perform preventive maintenance according to previous experience of plant or equipment.

Si raccomanda di controllare periodicamente e in base all'utilizzo il serraggio dei tiranti e la tenuta della guarnizione delle valvole in servizio ad alta temperatura o sottoposte a frequenti cicli termici con significativo differenziale di temperatura

Effettuare manutenzioni preventive secondo quanto indicato da precedenti esperienze di impianto o di apparecchiatura.

4.2 MAINTENANCE AND REPLACEMENT OF DAMAGED PARTS / MANUTENZIONE E SOSTITUZIONE DELLE PARTI DANNEGGIATE

4.2.1 Gasket leaks / Perdite dalla guarnizione

- ✓ Place the valve out of service;
- ✓ Empty and completely drain the valve and the pipes connected to it;
- ✓ Loosen all bolts and nuts, then remove them;
- ✓ Remove the cover (part n. 3);
- ✓ Check plate (washer n. 25), nut (part n. 42), pin (part n. 28) are in good conditions and correctly connected: if there are damaged parts it must be changed;
- ✓ Remove the disc operating on the hinge (part n. 14);
- ✓ Verify that this step is not hindered by the hinge pin seizing (part n. 26). If the swing check track is not smooth, remove the hinge pin loosing it and taking away the plugs and the undrilled flanges.
- ✓ Check the hinge pin surface: If the seizing signs are dept less than 1.5 mm (1/16") and they are only on the surface connected with the hinge, turn / flip the hinge pin and reassemble.
- ✓ If the depth is greater than 1.5 mm (1/16"),replace the hinge pin.
- ✓ Before replacing the hinge pin check the disc and the seal.

- ✓ Mettere fuori servizio la valvola;
- ✓ Svuotare e sfiatare completamente la valvola e le tubazioni ad essa collegate;
- ✓ Allentare tutti i tiranti e i relativi dadi, poi rimuoverli;
- ✓ Sollevare il coperchio (parte n. 3);
- ✓ Controllare che le parti n. 25 (rosetta), 42 (dado), 28 (spina) siano in buone condizioni e ben collegate: nel caso si riscontrassero parti danneggiate, sarà necessaria la loro sostituzione
- ✓ Sollevare l'otturatore agendo sulla cerniera (parte n. 14);
- ✓ Accertarsi che tale movimento non venga ostacolato da eventuali bloccaggi dello spinotto (parte n. 26). Se la corsa del battente non fosse scorrevole, rimuovere lo spinotto allentando prima e poi togliendo i tappi e le flange cieche.
- ✓ Controllare la superficie dello spinotto: se i segni di bloccaggio sono meno profondi di 1,5 mm (1/16") e limitati alla superficie di contatto con la cerniera, girare lo spinotto e rimontarlo.
- ✓ Se la profondità è superiore a 1,5 mm (1/16"), sostituire lo spinotto.
- ✓ Prima di rimontare lo spinotto, controllare il battente e la sede di tenuta.

4.2.2 Leaks provoked by seal surface damage because of corrosion or do to wear and tear / Perdite dovute al deterioramento della superficie di tenuta a causa usura o corrosione

Disc surfaces wear

- ✓ Disassemble the disc removing the pin, nut and plate;
- ✓ Smooth and grind the seal surface with abrasive paste of fine grained.

Seat surfaces wear

- ✓ If seats surfaces are locking, or have cavities or furrows not deeper than 1.5 mm (1/16"), it is possible to repair the surfaces, restore it to its original condition grinding them with granular abrasive paste: if it's necessary to use paste (normally blue in color) check seats surfaces after final grinding.
- ✓ Surfaces with defects deeper than 1.5 mm (1/16") cannot be repaired through grinding: in this case the use of spare parts is recommended.

Deterioramento delle superficie dell'otturatore

- ✓ Smontare il battente rimuovendo la spina, il dado e la rosetta;
- ✓ Levigare e lappare lasuperficie di tenuta con una pasta abrasiva a grana fine.

Deterioramento delle superfici della sede

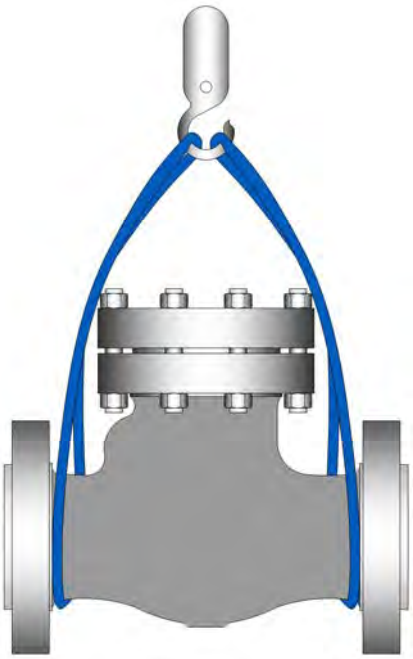
- ✓ Se le superfici delle sedi mostrano bloccaggi, cavità o solchi profondi non oltre 1,5 mm (1/16") è possibile riparare le superfici, riportandole alle condizioni originali di perfetta tenuta, lappandole con pasta abrasiva granulare: è necessario utilizzare pasta di riscontro (normalmente di colore blu) per controllare le superfici delle sedi dopo la lappatura finale.
- ✓ Le superfici che presentano difetti con profondità superiore a 1,5 mm (1/16") non possono essere riparate mediante lappatura: per ripristinare la funzionalità della valvola è raccomandato usare usare parti di ricambio.

4.3 NOTES

See the following figure for valve handling.

NOTE

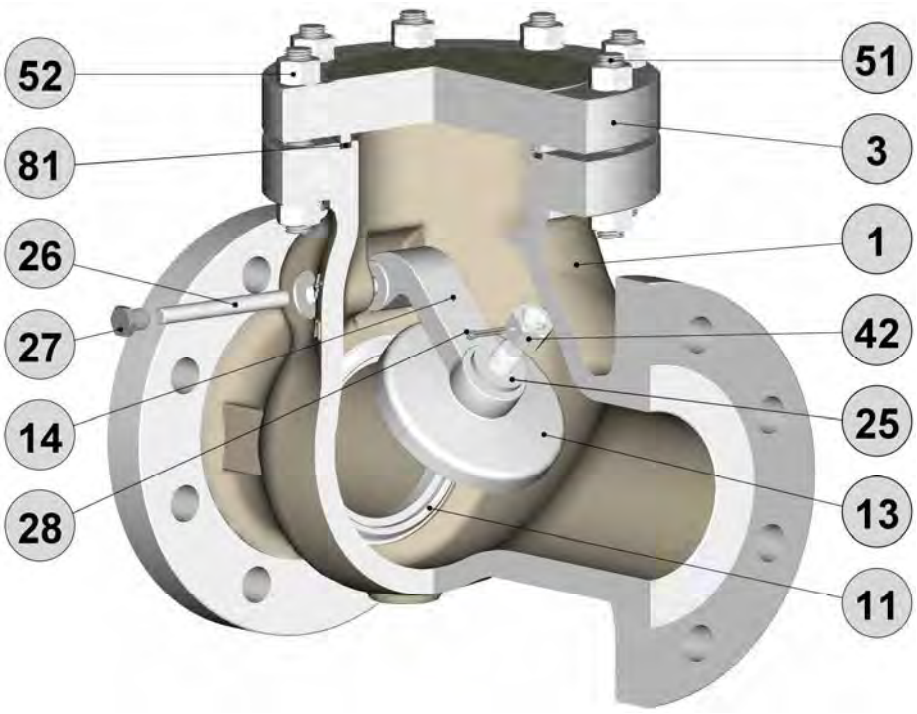
Per la movimentazione delle valvole attenersi alla figura successiva.



VALVE HANDLING
MOVIMENTAZIONE DELLE VALVOLE

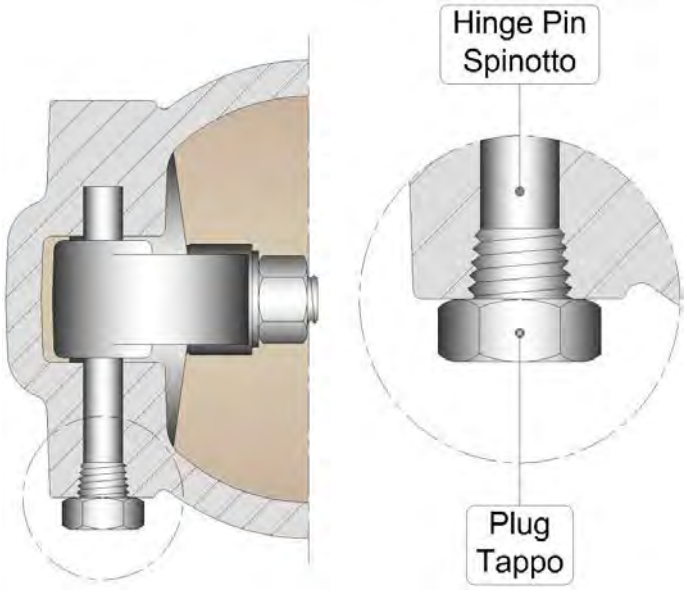
4.4 SECTIONAL DRAWING WITH PART LIST — DISEGNO IN SEZIONE CON LISTA COMPONENTI

SWING CHECK VALVE
VALVOLA DI RITEGNO A BATTENTE

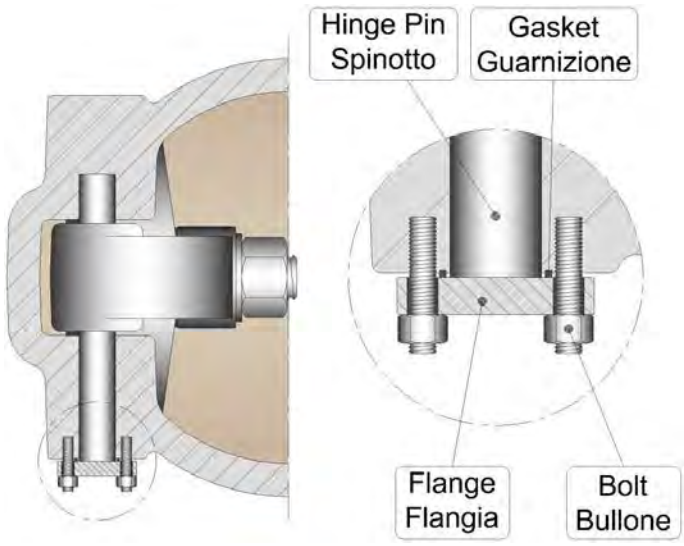


Pos.	Part name	Componente
1	Body	Corpo
3	Cover	Coperchio
11	Seat Ring	Anello Sede
13	Disk	Otturatore
14	Hinge	Cerniera
25	Washer	Rosetta
26	Hinge Pin	Spinotto Leva
27	Plug	Tappo
28	Disk Pin	Spina Otturatore
42	Disk Nut	Dado Otturatore
51	Body/Cover Bolt	Tirante Corpo/Coperchio
52	Body/Cover Nut	Dado Corpo/Coperchio
81	Gasket	Guarnizione

Option - Opzione A

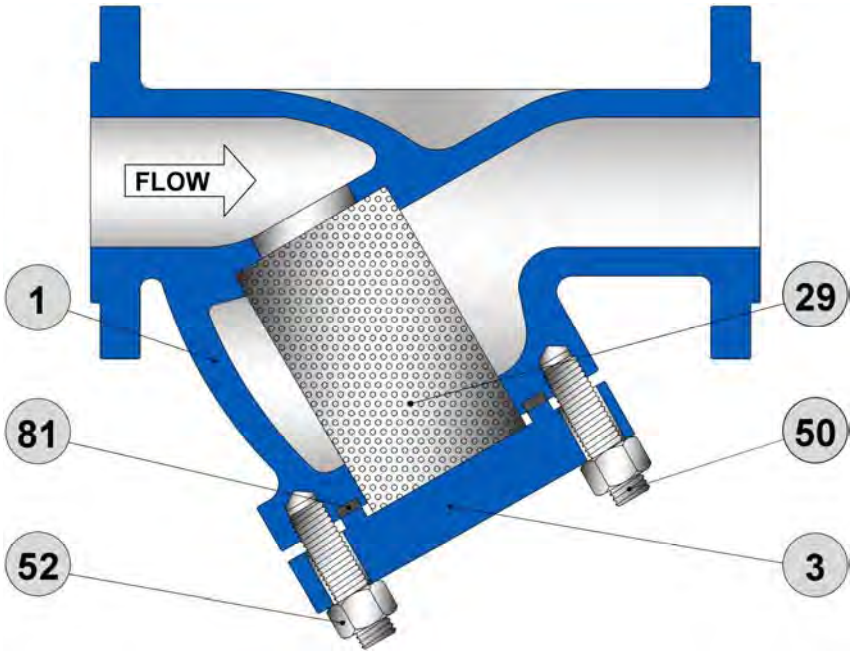


Option - Opzione B



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STRAINER
FILTRO

5.1	Periodic checks Controlli periodici	pag. 25
5.2	Maintenance and replacement of damaged parts Manutenzione e sostituzioni di componenti danneggiati	pag. 25
5.3	Notes Note	pag. 25
5.4	Sectional drawing with part list Disegno in sezione con lista componenti	pag. 26



5 STRAINER — FILTRO

5.1 PERIODIC CHECKS — VERIFICHE PERIODICHE

We recommend to check periodically the bolts tension and gasket seals of the valve according to the usage and high temperature or if the valve is exposed to frequent thermal cycle with a significant change in temperature.

Cleaning and preventive maintenance is recommended according to the fluids the valves is in service for; strainers operating in a new system must be cleaned and check after a few hours after it has been in service.

Si raccomanda di controllare, periodicamente e in base all'utilizzo, la tensione dei tiranti e la tenuta della guarnizione dei filtri in servizio ad alta temperatura o sottoposti a frequenti cicli termici con significativo differenziale di temperatura

Effettuare operazioni di pulizia e di manutenzione preventiva in base ai fluidi trattati ed alle condizioni di esercizio; i filtri inseriti in nuovi impianti devono essere puliti e controllati dopo qualche ora dalla messa in servizio.

5.2 MAINTENANCE AND REPLACEMENT OF DAMAGED PARTS — MANUTENZIONE E SOSTITUZIONE DELLE PARTI DANNEGGIATE

If the screen must be cleaned (part n. 29), or in case of seal gaskets has a leakage we recommend the following:

- ✓ Place strainer out of service;
- ✓ Empty and completely drain the strainer and pipes connected to it;
- ✓ Loose all nuts and remove them (part n.52);
- ✓ Remove the cover (part n.3);
- ✓ Remove the screen (part n.29) and clean carefully;
- ✓ Put it back the screen in the original position;
- ✓ We recommend to change the gasket (part n.81) after the strainer is removed.
- ✓ Place the cover and tight the nuts.

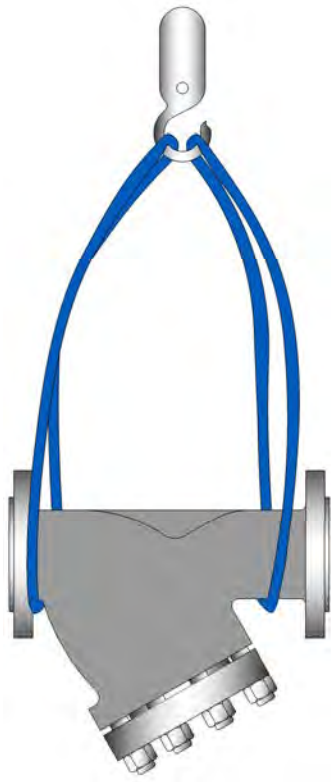
Se è necessario pulire la rete (parte n. 3), o in caso in caso di perdita dalla guarnizione, procedere come segue:

- ✓ Mettere fuori servizio il filtro;
- ✓ Svuotare e sfiatare completamente il filtro e le tubazioni ad esso collegate;
- ✓ Allentare tutti i dadi, poi rimuoverli (componente n.52);
- ✓ Sollevare il coperchio (componente n. 3);
- ✓ Rimuovere la rete (parte n. 29) e pulirla accuratamente.
- ✓ In seguito rimontare la rete nella posizione originale;
- ✓ E' raccomandabile sostituire la guarnizione (componente n. 81) quando il filtro viene smontato.
- ✓ Montare il coperchio e stringere i dadi.

5.3 NOTES — NOTE

See the following figure for strainers handling

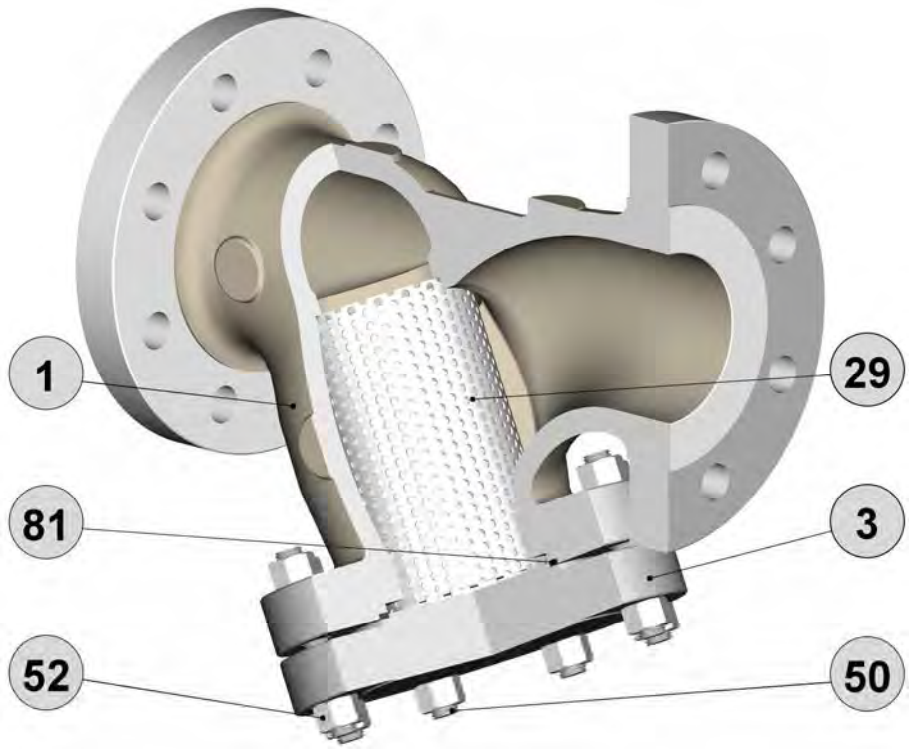
Per la movimentazione dei filtri attenersi alla figura successiva.



STRAINERS HANDLING
MOVIMENTAZIONE DEI FILTRI

5.4 SECTIONAL DRAWING WITH PART LIST — DISEGNO IN SEZIONE CON LISTA COMPONENTI

STRAINER
FILTRO



Pos.	Part name	Componente
1	Body	Corpo
3	Cover	Coperchio
29	Screen	Rete
50	Stud	Prigioniero
52	Nut	Dado
81	Guarnizione	Gasket

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SPARE PARTS
PARTI DI RICAMBIO

6.1	Request of spare parts Richiesta di parti di ricambio	pag. 28

6 SPARE PARTS / PARTI DI RICAMBIO

6.1 REQUEST OF SPARE PARTS / RICHIESTA PARTI DI RICAMBIO

When requesting spare parts the following information is needed:

- ✓ Type, class and size of valve;
- ✓ Number of drawing or picture on catalog;
- ✓ Order number;
- ✓ Requested detail with part number;
- ✓ Type of material and required amount of pieces;
- ✓ Serial number.

La richiesta dei parti di ricambio deve essere accompagnata delle seguenti informazioni:

- ✓ Tipo, classe e misura della valvola;
- ✓ Numero disegno di riferimento o figura del catalogo;
- ✓ Numero ordine di acquisto della valvola;
- ✓ Parte richiesta e relativo numero in distinta componenti;
- ✓ Tipo di materiale e numero di pezzi richiesti;
- ✓ Numero di serie.

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ATEX DIRECTIVE 2014/34/EU AND EN 1127-1
INSTRUCTIONS FOR EXPLOSION PREVENTION AND PROTECTION
DIRETTIVA ATEX 2014/34/EU E EN 1127-1
ISTRUZIONI PER LA PREVENZIONE E LA PROTEZIONE DALLE ESPLOSIONI

7.1	Installation Installazione	pag. 30
7.2	Operation and maintenance Funzionamento e manutenzione	pag. 30
7.3	Tools Attrezzature	pag. 31

7 ATEX DIRECTIVE 2014/34/EU AND EN 1127-1
Instructions for explosion prevention and protection

DIRETTIVA ATEX2014/34/EU E EN 1127-1
Istruzioni per la prevenzione e la protezione dalle esplosioni

7.1 INSTALLATION

For the phase installation the user is responsible for the following steps to be done prior installation:

- ✓ For flanged valves, the flange surfaces and the gaskets must be cleaned and intact before installation.
- ✓ For butt weld valves, the weld area must be cleaned and in appropriate conditions for the welding. All valves must be partially open prior to welding.
- ✓ The valves must be carefully cleaned before installation, both internal and external surfaces. The same cleaning operations must be applied to the entire system in order to avoid the presence of any possible abrasive particles within the piping system.
- ✓ The valve must be electrically ground immediately after installation.
- ✓ Before installation the user must carry out a thorough risk assessment of the facility regarding possible risks of explosion and fire.
- ✓ Adjacent installations must be done in a way that will not create any threats.
- ✓ The valves must be installed in an area where there is a system of drainage and ventilation to control minor losses and effects of the release of combustible gases and vapors.

INSTALLAZIONE

Per la fase di installazione l'utilizzatore è responsabile delle seguenti fasi da espletare prima dell'installazione:

- ✓ Per le valvole flangiate, le superfici delle flange e le guarnizioni devono essere intatte e pulite prima dell'installazione.
- ✓ Per le valvole con saldatura di testa, la zona da saldare deve essere pulita e in condizioni appropriate per la saldatura. Tutte le valvole devono essere parzialmente aperte prima della saldatura.
- ✓ Le valvole devono essere accuratamente pulite prima dell'installazione, sia per le superfici interne che quelle esterne. Le stesse operazioni di pulizia devono essere applicate a tutto l'insieme per evitare la presenza di eventuali particelle abrasive all'interno del sistema di tubazioni.
- ✓ La valvola deve essere messa elettricamente a terra subito dopo l'installazione.
- ✓ Prima dell'installazione l'utilizzatore deve effettuare un'accurata valutazione dei rischi dell'impianto per quanto riguarda i possibili rischi di esplosione e incendio.
- ✓ Le installazioni adiacenti devono essere fatte in modo da non creare alcun pericolo.
- ✓ Le valvole devono essere installate in un'area dove esiste un sistema di drenaggio e ventilazione per controllare le perdite minori e gli effetti del rilascio di gas e vapori combustibili.

7.2 OPERATION AND MAINTENANCE

- ✓ For the operation and maintenance phase the user is responsible to the following:
- ✓ Avoid the presence of any foreign object/material inside the pipe system that can create sparks if in contact with the surfaces of the valve.
- ✓ Avoid the occurrence of any possible exothermic chemical reaction within the plant e.g. possibly in the absence of air and oxygen.
- ✓ Prevent the creation of current flow, e.g. as a result of magnetic induction, current return, lightning.
- ✓ Schedule periodic cleaning of the valve and the entire plant/facility in order to prevent and/or limit dust or any particles that may be a source of ignition of fire or explosions.
- ✓ Gas/air and steam/air atmospheres surrounding the plant must undershoot the temperature of all surfaces, even in case of rare malfunctions.
- ✓ The temperature of the atmosphere should not exceed a maximum value of 80% of the minimum ignition temperature.
- ✓ The temperatures of all surfaces must be at a maximum

FUNZIONAMENTO E MANUTENZIONE

- ✓ Per la fase di funzionamento e manutenzione l'utilizzatore è responsabile di quanto segue:
- ✓ Evitare la presenza di qualsiasi oggetto/materiale estraneo all'interno dell'impianto che possa creare scintille se a contatto con le superfici della valvola.
- ✓ Evitare il verificarsi di qualsiasi possibile reazione chimica esotermica all'interno dell'impianto, a esempio in assenza di aria e ossigeno.
- ✓ Prevenire la creazione di flusso di corrente, a esempio a seguito di induzione magnetica, ritorno di corrente, fulmini.
- ✓ Programmare la pulizia periodica della valvola e dell'intero impianto/struttura al fine di prevenire e/o limitare la polvere o qualsiasi particella che possa essere fonte di innesco di incendi o esplosioni.
- ✓ Le atmosfere gas/aria e vapore/aria che circondano l'impianto devono essere di temperatura inferiore a tutte le superfici, anche in caso di rari malfunzionamenti.
- ✓ La temperatura dell'atmosfera non deve superare un valore massimo dell'80% della temperatura minima di accensione.
- ✓ Le temperature di tutte le superfici devono essere a un

value of 2/3 of the minimum ignition temperature.

✓ The temperature of the atmosphere and the plant should be carefully checked with the usage of appropriate tools.

✓ The plant must be protected by a system capable of: detect and extinguish sparks, eliminate and suppress possible explosions, isolate processes, identify and combat fires, and shut down the system in case of emergency.

valore massimo di 2/3 della temperatura minima di accensione.

✓ La temperatura dell'atmosfera e dell'impianto deve essere controllata attentamente con l'uso di strumenti appropriati.

✓ L'impianto deve essere protetto da un sistema in grado di: rilevare ed estinguere scintille, eliminare e sopprimere possibili esplosioni, isolare i processi, identificare e affrontare gli incendi, arrestare l'impianto in caso di emergenza.

7.3 TOOLS — ATTREZZATURE

✓ Tools must be divided into two categories:

a) Tools that can cause sparks when they are used (e.g. drills, wrenches, screwdrivers, and monkey wrenches).

b) Tools that generate a shower of sparks when used to cut or break off something such as sawing or grinding.

✓ In zones 0 and 20 are not allowed tools which can cause sparks.

✓ In zones 1 and 2 can be used only tools belonging to the category “a”. Tools belonging to category “b” are only allowed if there are no traces of hazardous substance or explosive in the atmosphere.

✓ In any case, the use of any steel tools is absolutely prohibited in zone 1 when there exists the possibility of explosion due to the presence of substances which belong to the group II C (in standard EN 50014) acetylene, carbon disulphide, hydrogen, hydrogen sulphide, ethylene oxide, carbon monoxide, unless it is established that no potentially hazardous atmosphere is present in the workplace during the use of the above mentioned tools.

✓ Steel tools belonging to category “a” are permitted in zones 21 and 22. Steel tools belonging to category “b” are permitted only if the workplace has been isolated from the remaining areas of zones 21 and 22 and the following precautions have been taken:

- Any dust deposits were removed from the workplace, or
- The workplace is kept so wet to prevent dispersion of dust in the air as well as possible development of combustion residual products.

✓ When performing grinding or sawing work in zones 21 and 22 or in the vicinity, you have to be aware that sparks may be dispersed over great distances, and that this could lead to the formation of combustible particles. For this reason also the areas adjacent to the workplace must be protected using the protective measures just mentioned.

✓ The use of tools in zone 1, 2, 21 and 22 must be subject to a “work permit” only.

✓ Le attrezzature devono essere divisi in due categorie:

a) Attrezzi che possono provocare scintille quando vengono usati (per esempio, trapani, chiavi, cacciaviti e chiavi inglesi).

b) Attrezzi che generano una pioggia di scintille quando vengono usati per tagliare o rompere qualcosa, come tagliare o molare.

✓ Nelle zone 0 e 20 non sono ammessi utensili che possono causare scintille.

✓ Nelle zone 1 e 2 possono essere usati solo utensili appartenenti alla categoria "a". Gli utensili appartenenti alla categoria "b" sono ammessi solo se non ci sono tracce di sostanze pericolose o esplosive nell'atmosfera.

✓ In ogni caso, l'uso di qualsiasi utensile in acciaio è assolutamente vietato nella zona 1 quando esiste la possibilità di esplosione a causa della presenza di sostanze che appartengono al gruppo II C (nella norma EN 50014) acetilene, disolfuro di carbonio, idrogeno, solfuro di idrogeno, ossido di etilene, monossido di carbonio, a meno che non sia stabilito che non sia presente un'atmosfera potenzialmente pericolosa nel luogo di lavoro durante l'uso dei suddetti utensili.

✓ Gli utensili in acciaio appartenenti alla categoria "a" sono ammessi nelle zone 21 e 22. Gli utensili d'acciaio appartenenti alla categoria "b" sono permessi solo se il luogo di lavoro è stato isolato dalle restanti aree delle zone 21 e 22 e sono state prese le seguenti precauzioni:

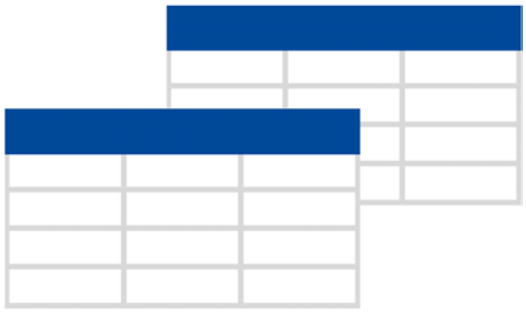
- Qualsiasi deposito di polvere è stato rimosso dal luogo di lavoro, o
- Il posto di lavoro è mantenuto così umido da impedire la dispersione della polvere nell'aria così come il possibile sviluppo di prodotti residui della combustione.

✓ Quando si eseguono lavori di molatura o segatura nelle zone 21 e 22 o nelle vicinanze, bisogna essere consapevoli che le scintille possono essere disperse a grandi distanze, e che questo potrebbe portare alla formazione di particelle combustibili. Per questo motivo anche le aree adiacenti al luogo di lavoro devono essere protette utilizzando le misure di protezione appena menzionate.

✓ L'uso di utensili nelle zone 1, 2, 21 e 22 deve essere soggetto solo ad un "permesso di lavoro".

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TABLES
TABELLE

8.1	Pressure - Temperature Ratings to ASME B16.34 Ratings Pressione - Temperatura in accordo ASME B16.34	pag. 33
8.2	Pressure - Temperature Ratings to EN 1092-1 Ratings Pressione - Temperatura in accordo EN 1092-1	pag. 35
8.3	Recommended Tightening Torques Coppie di serraggio raccomandate	pag. 36

8.1 Pressure - Temperature Ratings to ASME B16.34 — Ratings Pressione - Temperatura ASME B16.34

MATERIALS		WCB(a)	WCC(a) LCC(b) LC2(b) LC3(b)	LCB(b) WC1(h) LC1(b)	WC4(j) WC5	WC6(m)	WC9(m)	C5	C12	CF3(e) CF8(g)	CF8M(g) CF3M(f)	CF8C(g)	CK3M-CuN Gr.6A
CLASS	TEMPERATURE °C	Working pressure (bars)											
	- 29 to 38	19,6	19,8	18,4	19,8	19,8	19,8	20,0	20,0	19,0	19,0	19,0	20,0
	50	19,2	19,5	18,2	19,5	19,5	19,5	19,5	19,5	18,3	18,4	18,7	19,5
	100	17,7	17,7	17,4	17,7	17,7	17,7	17,7	17,7	15,7	16,2	17,4	17,7
	150	15,8	15,8	15,8	15,8	15,8	15,8	15,8	15,8	14,2	14,8	15,8	15,8
	200	13,8	13,8	13,8	13,8	13,8	13,8	13,8	13,8	13,2	13,7	13,8	13,8
	250	12,1	12,1	12,1	12,1	12,1	12,1	12,1	12,1	12,1	12,1	12,1	12,1
	300	10,2	10,2	10,2	10,2	10,2	10,2	10,2	10,2	10,2	10,2	10,2	10,2
	350	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4	8,4	9,3
	400	6,5	6,5	6,5	6,5	6,5	6,5	6,5	6,5	6,5	6,5	6,5	8,4
150	425	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	7,4
	450	4,6	4,6	4,6	4,6	4,6	4,6	4,6	4,6	4,6	4,6	4,6	6,5
(PN 20)	500	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	
	538	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	
	550				1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	
	600					1,4	1,4	1,4	1,4	1,4	1,4	1,4	
	650					1,1	1,1	0,9	1,4	1,4	1,4	1,4	
	700									1,4	1,4	1,4	
	750									1,4	1,4	1,2	
	800									1,2	1,2	0,8	
	SHELL TEST	30	30	28	30	30	30	30	30	29	29	29	30
	SEAT TEST	22	22	21	22	22	22	22	22	21	21	21	22
	- 29 to 38	51,1	51,7	48,0	51,7	51,7	51,7	51,7	51,7	49,6	49,6	49,6	51,7
	50	50,1	51,7	47,5	51,7	51,7	51,7	51,7	51,7	47,8	48,1	48,8	51,7
	100	46,6	51,5	45,3	51,5	51,5	51,5	51,5	51,5	40,9	42,2	45,3	50,7
	150	45,1	50,2	43,9	50,3	49,7	50,3	50,3	50,3	37,0	38,5	42,5	45,9
	200	43,8	48,6	42,5	48,6	48,0	48,6	48,6	48,6	34,5	35,7	39,9	42,7
	250	41,9	46,3	40,8	46,3	46,3	46,3	46,3	46,3	32,5	33,4	37,8	40,5
	300	39,8	42,9	38,7	42,9	42,9	42,9	42,9	42,9	30,9	31,6	36,1	38,9
	350	37,6	40,0	36,4	40,3	40,3	40,3	40,3	40,3	29,6	30,3	34,8	38,2
	400	34,7	34,7	32,6	36,5	36,5	36,5	36,5	36,5	28,4	29,4	33,9	37,6
300	425	28,8	28,8	27,3	35,2	35,2	35,2	35,2	35,2	28,0	29,1	33,6	37,4
	450	23,0	23,0	21,6	33,7	33,7	33,7	33,7	33,7	27,4	28,8	33,5	36,5
(PN 50)	500	11,8	11,6	11,1	26,7	25,7	28,2	21,4	28,2	26,5	28,2	28,2	
	538	5,9	5,9	5,9	13,9	14,9	18,4	13,7	17,5	24,4	25,2	25,2	
	550				12,6	12,7	15,6	12,0	15,0	23,6	25,0	25,0	
	600					6,1	6,9	6,2	7,2	16,9	19,9	19,8	
	650					2,8	2,8	2,4	3,5	11,3	12,7	10,3	
	700									8,0	8,4	5,6	
	750									5,8	5,9	3,1	
	800									3,5	3,5	2,0	
	SHELL TEST	77	78	72	78	78	78	78	78	75	75	75	78
	SEAT TEST	57	57	53	57	57	57	57	57	55	55	55	57
	- 29 to 38	102,1	103,4	96,0	103,4	103,4	103,4	103,4	103,4	99,3	99,3	99,3	103,4
	50	100,2	103,4	94,9	103,4	103,4	103,4	103,4	103,4	95,6	96,2	97,5	103,4
	100	93,2	103,0	90,7	103,0	103,0	103,0	103,0	103,0	81,7	84,4	90,6	101,3
	150	90,2	100,3	87,9	100,3	99,5	100,3	100,3	100,3	74,0	77,0	84,9	91,9
	200	87,6	97,2	85,1	97,2	95,9	97,2	97,2	97,2	69,0	71,3	79,9	85,3
	250	83,9	92,7	81,6	92,7	92,7	92,7	92,7	92,7	65,0	66,8	75,6	80,9
	300	79,6	85,7	77,4	85,7	85,7	85,7	85,7	85,7	61,8	63,2	72,2	77,7
	350	75,1	80,0	72,8	80,4	80,4	80,4	80,4	80,4	59,3	60,7	69,5	76,3
	400	69,4	69,4	65,2	73,3	73,3	73,3	73,3	73,3	56,9	58,9	67,8	75,3
600	425	57,5	57,5	54,6	70,0	70,0	70,0	70,0	70,0	56,0	58,3	67,2	74,7
	450	46,0	46,0	43,2	67,7	67,7	67,7	67,7	67,7	54,8	57,7	66,9	73,3
(PN 100)	500	23,5	23,2	22,1	53,4	51,5	56,5	42,8	56,5	53,0	56,5	56,5	
	538	11,8	11,8	11,8	27,9	29,8	36,9	27,4	35,0	48,9	50,0	50,0	
	550				25,2	25,4	31,3	24,1	30,0	47,1	49,8	49,8	
	600					12,2	13,8	12,5	14,4	33,8	39,8	39,6	
	650					5,7	5,7	4,7	7,1	22,5	25,3	20,6	
	700									16,1	16,8	11,2	
	750									11,6	11,7	6,2	
	800									7,0	7,0	4,0	
	SHELL TEST	154	156	144	156	156	156	156	156	149	149	149	156
	SEAT TEST	113	114	106	114	114	114	114	114	110	110	110	114

NOTES
(a) Permissible, but not recommended for prolonged usage above 425 °C (800 °F)
(b) Not to be used over 345 °C (650 °F)
(c) Permissible, but not recommended for prolonged usage above 454 °C (850 °F)
(d) Permissible, but not recommended for prolonged usage above 593 °C (1100 °F)
(e) Not to be used over 427 °C (800 °F)
(f) Not to be used over 454 °C (850 °F)
(g) At temperature over 538 °C (1000 °F), use only when carbon content is 0,04 or higher
(h) Permissible, but not recommended for prolonged usage above 468 °C (875 °F)
(j) Not be used over 538 °C (1000 °F)
(m) Not be used over 595 °C (1100 °F)

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MATERIALS		WCB(a)	WCC(a) LCC(b) LC2(b) LC3(b)	LCB(b) WC1(h) LC1(b)	WC4(j) WC5	WC6(m)	WC9(m)	C5	C12	CF3(e) CF8(g)	CF8M(g) CF3M(f)	CF8C(g)	CK3M-CuN Gr.6A
CLASS	TEMPERATURE °C	Working pressure (bars)											
	- 29 to 38	153,2	155,1	144,1	155,1	155,1	155,1	155,1	155,1	148,9	148,9	148,9	155,1
	50	150,4	155,1	142,4	155,1	155,1	155,1	155,1	155,1	143,5	144,3	146,3	155,1
	100	139,8	154,6	136,0	154,6	154,4	154,6	154,6	154,6	122,6	126,6	135,9	152,0
	150	135,2	150,5	131,8	150,6	149,2	150,6	150,6	150,6	111,0	115,5	127,4	137,8
	200	131,4	145,8	127,6	145,8	143,9	145,8	145,8	145,8	103,4	107,0	119,8	128,0
	250	125,8	139,0	122,3	139,0	139,0	139,0	139,0	139,0	97,5	100,1	113,4	121,4
	300	119,5	128,6	116,1	128,6	128,6	128,6	128,6	128,6	92,7	94,9	108,3	116,6
	350	112,7	120,1	109,2	120,7	120,7	120,7	120,7	120,7	88,9	91,0	104,3	114,5
	400	104,2	104,2	97,9	109,8	109,8	109,8	109,8	109,8	85,3	88,3	101,7	112,9
900	425	86,3	86,3	81,9	105,1	105,1	105,1	105,1	105,1	84,0	87,4	100,8	112,1
	450	69,0	69,0	64,8	101,4	101,4	101,4	101,4	101,4	82,2	86,5	100,4	109,8
(PN 150)	500	35,3	34,7	33,2	80,1	77,2	84,7	64,1	84,7	79,5	84,7	84,7	
	538	17,7	17,7	17,7	41,8	44,7	55,3	41,1	52,5	73,3	75,2	75,2	
	550				37,8	38,1	46,9	36,1	45,0	70,7	74,8	74,8	
	600					18,3	20,7	18,7	21,5	50,6	59,7	59,4	
	650					8,5	8,5	7,1	10,6	33,8	38,0	30,9	
	700									24,1	25,1	16,8	
	750									17,3	17,6	9,3	
	800									10,5	10,5	6,1	
	SHELL TEST	230	233	217	233	233	233	233	233	224	224	224	233,0
	SEAT TEST	169	171	159	171	171	171	171	171	164	164	164	171,0
	- 29 to 38	255,3	258,6	240,1	258,6	258,6	258,6	258,6	258,6	248,2	248,2	248,2	258,6
	50	250,6	258,6	237,3	258,6	258,6	258,6	258,6	258,6	239,1	240,6	243,8	258,6
	100	233,0	257,6	226,7	257,6	257,4	257,6	257,6	257,6	204,3	211,0	226,5	253,3
	150	225,4	250,8	219,7	250,8	248,7	250,8	250,8	250,8	185,0	192,5	212,4	229,6
	200	219,0	243,2	212,7	243,4	239,8	243,4	243,4	243,4	172,4	178,3	199,7	213,3
	250	209,7	231,8	203,9	231,8	231,8	231,8	231,8	231,8	162,4	166,9	189,1	202,3
	300	199,1	214,4	193,4	214,4	214,4	214,4	214,4	214,4	154,6	158,1	180,4	194,3
	350	187,8	200,1	182,0	201,1	201,1	201,1	201,1	201,1	148,1	151,6	173,8	190,8
	400	173,6	173,6	163,1	183,1	183,1	183,1	183,1	183,1	142,2	147,2	169,5	188,2
1500	425	143,8	143,8	136,5	175,1	175,1	175,1	175,1	175,1	140,0	145,7	168,1	186,8
	450	115,0	115,0	107,9	169,0	169,0	169,0	169,0	169,0	137,0	144,2	167,3	183,1
(PN 250)	500	58,8	57,9	55,4	133,4	128,6	140,9	106,9	140,9	132,4	140,9	140,9	
	538	29,5	29,5	29,5	69,7	74,5	92,2	68,6	87,5	122,1	125,5	125,5	
	550				63,0	63,5	78,2	60,2	75,0	117,8	124,9	124,9	
	600					30,5	34,4	31,2	35,9	84,4	99,5	99,0	
	650					14,2	14,2	11,8	17,7	56,3	63,3	51,5	
	700									40,1	41,9	28,1	
	750									28,9	29,3	15,5	
	800									17,4	17,4	10,1	
	SHELL TEST	383	388	361	388	388	388	388	388	373	373	373	388,0
	SEAT TEST	281	285	265	285	285	285	285	285	274	274	274	285,0
	- 29 to 38	425,5	430,9	400,1	430,9	430,9	430,9	430,9	430,9	413,7	413,7	413,7	430,9
	50	417,7	430,9	395,6	430,9	430,9	430,9	430,9	430,9	398,5	400,9	406,4	430,9
	100	388,3	429,4	377,8	429,4	429,0	429,4	429,4	429,4	340,4	351,6	377,4	422,2
	150	375,6	418,1	366,1	418,2	414,5	418,2	418,2	418,2	308,4	320,8	353,9	382,7
	200	365,0	405,4	354,4	405,4	399,6	405,4	405,4	405,4	287,3	297,2	332,8	355,4
	250	349,5	386,2	339,8	386,2	386,2	386,2	386,2	386,2	270,7	278,1	315,1	337,2
	300	331,8	357,1	322,4	357,1	357,1	357,1	357,1	357,1	257,6	263,5	300,7	323,8
	350	313,0	333,5	303,3	335,3	335,3	335,3	335,3	335,3	246,9	252,7	289,6	318,0
	400	289,3	289,3	271,9	304,9	304,9	304,9	304,9	304,9	237,0	245,3	282,6	313,7
2500	425	239,7	239,7	227,5	291,6	291,6	291,6	291,6	291,6	233,3	242,9	280,1	311,3
	450	191,7	191,7	179,9	281,8	281,8	281,8	281,8	281,8	228,4	240,4	278,8	304,9
(PN 420)	500	97,9	96,5	92,3	222,4	214,4	235,0	178,2	235,0	220,7	235,0	235,0	
	538	49,2	49,2	49,2	116,2	124,1	153,7	114,3	145,8	203,6	208,9	208,9	
	550				105,0	105,9	130,3	100,4	125,0	196,3	208,0	208,0	
	600					50,9	57,4	51,9	59,8	140,7	165,9	165,1	
	650					23,6	23,6	19,7	29,5	93,8	105,5	85,8	
	700									66,9	69,8	46,8	
	750									48,1	48,9	25,8	
	800									29,2	29,2	16,9	
	SHELL TEST	639	647	601	647	647	647	647	647	621	621	621	647,0
	SEAT TEST	469	474	441	474	474	474	474	474	456	456	456	474,0

NOTES
(a) Permissible, but not recommended for prolonged usage above 425 °C (800 °F)
(b) Not to be used over 345 °C (650 °F)
(c) Permissible, but not recommended for prolonged usage above 454 °C (850 °F)
(d) Permissible, but not recommended for prolonged usage above 593 °C (1100 °F)
(e) Not to be used over 427 °C (800 °F)
(f) Not to be used over 454 °C (850 °F)
(g) At temperature over 538 °C (1000 °F), use only when carbon content is 0,04 or higher
(h) Permissible, but not recommended for prolonged usage above 468 °C (875 °F)
(j) Not be used over 538 °C (1000 °F)
(m)Not be used over 595 °C (1100 °F)

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8.2 Pressure - Temperature Ratings to EN 1092-1 — Ratings Pressione - Temperatura EN 1092-1

RATING FOR GROUP 3E0 MATERIALS - GP240GH - 1.0619

TEMP.	GAUGE WORKING PRESSURE IN BAR				
°C	PN 16	PN 25	PN 40	PN 63	PN 100
RT	16,0	25,0	40,0	63,0	100,0
100	14,8	23,2	37,1	58,5	92,8
150	14,0	22,0	35,2	55,5	88,0
200	13,3	20,8	33,3	52,5	83,3
250	12,1	19,0	30,4	48,0	76,1
300	11,0	17,2	27,6	43,5	69,0
350	10,2	16,0	25,7	40,5	64,2
400	9,5	14,8	23,8	37,5	59,5
450					
460					
470					
480					
490					
500					

RATING FOR GROUP 4E0 MATERIALS - G20Mo5 - 1.5419

TEMP.	GAUGE WORKING PRESSURE IN BAR				
°C	PN 16	PN 25	PN 40	PN 63	PN 100
RT	16,0	25,0	40,0	63,0	100,0
100	16,0	25,0	40,0	63,0	100,0
150	16,0	25,0	40,0	63,0	100,0
200	16,0	25,0	40,0	63,0	100,0
250	15,6	24,4	39,0	61,5	97,6
300	13,7	21,4	34,2	54,0	85,7
350	12,9	20,2	32,3	51,0	80,9
400	11,9	18,6	29,9	47,1	74,7
450	11,0	17,2	27,6	43,5	69,0
460	10,2	16,0	25,6	40,3	64,0
470	9,4	14,7	23,6	37,2	59,1
480	8,6	13,5	21,6	34,1	54,2
490	7,8	12,3	19,7	31,0	49,2
500					

RATING FOR GROUP 5E0 MATERIALS - G17CrMo5-5 - 1.7357

TEMP.	GAUGE WORKING PRESSURE IN BAR				
°C	PN 16	PN 25	PN 40	PN 63	PN 100
RT	16,0	25,0	40,0	63,0	100,0
100	16,0	25,0	40,0	63,0	100,0
150	16,0	25,0	40,0	63,0	100,0
200	16,0	25,0	40,0	63,0	100,0
250	16,0	25,0	40,0	63,0	100,0
300	16,0	25,0	40,0	63,0	100,0
350	15,2	23,8	38,0	60,0	95,2
400	14,4	22,5	36,0	56,7	90,0
450	13,4	21,0	33,7	53,1	84,2
460	12,8	20,0	32,0	50,5	80,2
470	12,1	19,0	30,4	47,9	76,1
480	11,5	18,0	28,8	45,4	72,0
490	10,8	17,0	27,2	42,8	68,0
500					

RATING FOR GROUP 6E1 MATERIALS - GX15CrMo5 - 1.7365

TEMP.	GAUGE WORKING PRESSURE IN BAR				
°C	PN 16	PN 25	PN 40	PN 63	PN 100
RT	16,0	25,0	40,0	63,0	100,0
100	16,0	25,0	40,0	63,0	100,0
150	16,0	25,0	40,0	63,0	100,0
200	16,0	25,0	40,0	63,0	100,0
250	16,0	25,0	40,0	63,0	100,0
300	16,0	25,0	40,0	63,0	100,0
350	16,0	25,0	40,0	63,0	100,0
400	16,0	25,0	40,0	63,0	100,0
450	16,0	25,0	40,0	63,0	100,0
460					
470					
480					
490					
500					

RATING FOR GROUP 12E0 MATERIALS - GX5CrNiNb 19-11 - 1.4552

TEMP.	GAUGE WORKING PRESSURE IN BAR				
°C	PN 16	PN 25	PN 40	PN 63	PN 100
RT	16,0	25,0	40,0	63,0	100,0
100	15,8	24,7	39,6	62,4	99,0
150	14,9	23,3	37,3	58,8	93,3
200	14,1	22,1	35,4	55,8	88,5
250	13,4	21,0	33,7	53,1	84,2
300	12,7	19,8	31,8	50,1	79,5
350	12,2	19,1	30,6	48,3	76,6
400	11,8	18,5	29,7	46,8	74,2
450	11,6	18,1	29,0	45,7	72,6
500	11,3	17,7	28,3	44,7	70,9
550					
560					

RATING FOR GROUP 15E0 MATERIALS - GX5CrNiMoNb 19-11-2 - 1.4581

TEMP.	GAUGE WORKING PRESSURE IN BAR				
°C	PN 16	PN 25	PN 40	PN 63	PN 100
RT	16,0	25,0	40,0	63,0	100,0
100	16,0	25,0	40,0	63,0	100,0
150	15,6	24,5	39,2	61,8	98,0
200	14,9	23,3	37,3	58,8	93,3
250	14,1	22,1	35,4	55,8	88,5
300	13,3	20,8	33,3	52,5	83,3
350	12,8	20,1	32,1	50,7	80,4
400	12,4	19,5	31,2	49,2	78,0
450	12,2	19,1	30,6	48,3	76,6
500	12,0	18,8	30,0	47,4	75,2
550	11,9	18,6	29,9	47,1	74,7
560	11,8	18,5	29,6	46,6	74,0

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8.3 RECOMMENDED TIGHTENING TORQUES — COPPIE DI SERRAGGIO RACCOMANDATE

Nominal diameter		Pitch/ Thread number per inch	A193 B7 A320 L7 A193 B16	A193 B7M A320 L7M	A307 Gr. B	8.8	C35 CK35	24 CrMo 5	21 CrMoV 5 7	A193 B8 A193 B8M CL 1	A193 B8 CL 2	A 193 B8M CL 2	A.2 - A.4 CL 70	A.2 - A.4 CL 80	A453 Gr. 660
INCHES	METRIC		Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm
	M6	1				9,7	4,2	6,4	8,3	2,6	8,6	8,3	5,6	7,5	7,3
1/4"		20UNC	13,3	10,2	5,6					3,1	10,5	10,1	6,9	9,2	9
5/16"		18UNC	26,7	20,4	11,1					6,3	21,1	20,3	13,8	18,4	18
	M8	1,25				24,5	10,7	16,1	21,1	6,5	21,7	20,9	14,2	18,9	18,4
3/8"		16UNC	48,1	36,7	20,1					11,3	38	36,6	24,8	33	32
	M10	1,5				48,4	21,2	31,8	41,6	12,8	43	41,5	28	37,4	36,5
7/16"		14UNC	78	59,6	32,6					18,3	62	59	40,3	54	53
	M12	1,75				84	36,8	55,1	72,2	22,1	74	72	48	65	63
1/2"		13UNC	118	90	49,1					27,6	93	89	60	81	79
	M14	2				133	58,2	87,3	114	35,2	118	114	77	103	100
9/16"		12UNC	167	128	69					39,1	132	127	86	114	113
5/8"		11UNC	231	176	96					54	182	176	119	158	156
	M16	2				209	91,4	137	180	55	185	179	121	161	157
	M18	2,5				286	125	188	246	75	254	245	166	221	215
3/4"		10UNC	406	310	169					95	321	309	209	279	274
	M20	2,5				406	178	266	349	107	360	347	235	313	306
	M22	2,5				588	257	386	505	147	395	395	323		420
7/8"		9UNC	651	497	271					153	410	410	335		439
	M24	3				699	306	459	601	184	495	495	405		526
1"		8UNC	970	741	404					227	610	610	499		655
	M27	3				1038	454	681	892	274	601	601			781
1 1/8"		8UN	1421	1085	592					333	732	732			959
	M30	3,5				1408	616	924	1210	371	816	816			1060
1 1/4"		8UN	1994	1523	831					468	1026	1026			1346
	M33	3,5				1914	837	1256	1645	505	850	850			1441
1 3/8"		8UN	2701	2063	1125					633	1066	1066			1822
	M36	4				2456	1075	1612	2111	648	1090	1090			1849
1 1/2"		8UN	3556	2716	1481					834	1403	1403			2399
	M39	4				3191	1396	2094	2742	842	1416	1416			2402
1 5/8"		8UN	4589	3505	1912					1076					3096
	M42	4,5				3931	1720	2580	3378	1037					2959
1 3/4"		8UN	5781	4416	2409					1355					3901
	M45	4,5				4925	2155	3232	4232	1299					3708
1 7/8"		8UN	7160	5469	2983					1679					4832
	M48	5				5948	2602	3903	5112	1569					4477
2"		8UN	8758	6690	3649					2054					5910
	M52	5				7661	3352	5028	6584	2021					5766
	M56	5,5				9543	4175	6263	8201	2517					7183
2 1/4"		8UN	12629	9647	5262					2961					8523
	M60	5,5				11847	5183	7775	10181	3125					9818
2 1/2"		8UN	17486	13357	7286					4100					11800
	M64	6				14259	6238	9357	12254	3761					10734
	M68	6				17253	7548	11322	14827	4551					12988
2 3/4"		8UN	21452	16387	9792					5510					15859
	M72	6				20647	9033	13550	17744	5446					15543
	M76	6				24446	10695	16043	21008	6448					18402
3"		8UN	28120	21481	12782					7193					20702

FLOATING BALL VALVES USE AND MAINTENANCE MANUAL

GENERAL INSTRUCTIONS FOR THE INSTALLATION USE AND MAINTENANCE OF FLOATING BALL VALVES

1.0 INSTALLATION

1.1 Remove the bonnet of the flange or the final protection and clean the surfaces of contact which should be protected with anti-rust

1.2 Ensure that the valve is in open position before the installation

1.3 Install the valve on the conduct and taking care not to put the valve in operation before the conduct is completely clean

2.0 USE

2.1 Floating ball valves are designed for services for ON/OFF services and have to be utilised only in fully open or fully closed position. Improper use of flow control could invalidate de warranty

2.2 The operations of opening and closure are to be carried with the operator which has been furnished and designed for the valve. The manufacturer declines from any responsibility for operations that have been carried out with other tools.

3.0 REMOVAL OF SET FOR MANOUVER

3.1 REMOVAL OF WRENCH

3.1.1 Manually remove the retaining bolt, remove the lever.

4.0 DISASSEMBLING FOR MAINTENANCE

4.1 Check that no pressure is trapped inside the valve body cavity.

4.2 Mark body and body connector for the correct reassembling and alignment of the valve after reassembling.

4.3 Unscrew the body screw/nuts between body and body connector (pos. 03).

4.4 Divide the body (pos. 02) from the body connector (pos. 03).

4.5 Put the ball in closed position (pos. 04).

4.6 Remove the ball without damaging the sealing surface (pos. 04).

4.7 Remove the seats from their slots (pos. 05).

4.8 Unscrew the lever and stem nuts (pos. 06).

4.9 Remove the lever and the stop pad (pos.07) and (pos. 06A).

4.10 Push the stem towards the internal of the body and remove it from inside the valve (pos. 08)

5.0 MAINTAINANCE

5.1 Check the internal surface of the body. There must not be evident signs of abrasion and/or corrosion, otherwise please contact the supplier.

5.2 Check that the ball sealing surface be not damaged.

5.3 Check that the stem is not damaged.

5.4 Control that all seals and gaskets do not show anomalous damages (it is anyway advisable their full substitution)

6.0 ASSEMBLY

Before starting the reconstruction of the valve check that every part is cleaned and free from every external material. Ensure that the assembly takes place in a clean area and that all parts packed are kept as clean as possible, the instruction are opposite to the instruction of disassembly.

6.1 Assemble all gaskets on the stem as per picture (pos. 09).

6.2 Put the stem in the valve body (from inside).

6.3 Put all external seals, the stem spacer and fix the stem with the stem nut (pos. 11-12-06A).

6.4 Put the seats in their slots.

6.5 Smoothly put the ball in the valve body fixing it to the stem in closed position and check the rotations.

7.6 Put the body gasket between the body (pos. 10).

7.7 Approach the body to the body connector by using the mark made on the parts before opening the valve. Take care not to damage the relevant gasket.

7.8 Put screw/bolts between bodies and screw with crossed sequence (pos. 01).

7.9 Fix the stem with the stem nut (pos. 06A).

7.10 Put the handle on the stem (pos. 07).

7.11 Fix the stem stop lever nut (pos. 06).

8.0 FINAL ADVICE

8.1 Carry out after assembly of the valve at least a couple of manoeuvres rotating the stem, in order to permit the components to assess themselves.

8.2 Ensure that in completely open position the reed is parallel with respect to the flow line, and in close position it is perpendicular

9.0 SPARE PARTS RECOMENDED FOR MAINTAINANCE

O-RING SET	Stem
	Closure
INSERT	Seat
SEALS	Stem graphite
	Body graphite

10.0 STORAGE

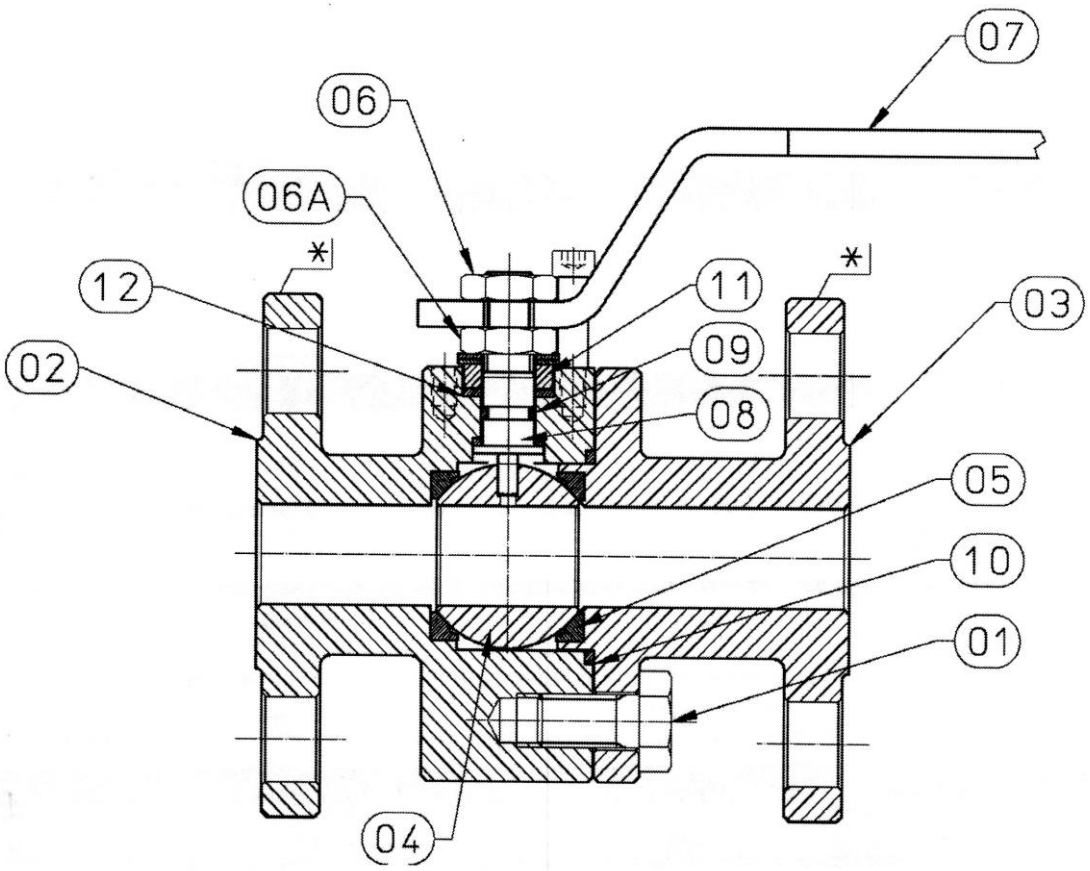
10.1 The valves are supplied complete with wood or plastic final protectors to be removed prior to installation.

10.2 The ball has to lay in open position during storage

10.3 The valves can be stored in their original packing for up to 18 moths in a clean dry and covered area or in a warehouse having a controlled environment, on shelves or pallets

10.4 If storage is to be in an outside yard for periods longer than 12 months, this has to be told prior to ordering

10.5 The valves stored for over 18 months should be cycled once to ensure freedom of operation


07
06
06A
12
11
03
02
09
08
05
10
01
04

Installation, Operation & Maintenance Manual

E-Type and C-Type Variants
Quarter-Turn Rack & Pinion Actuator



Trutorq® Actuators

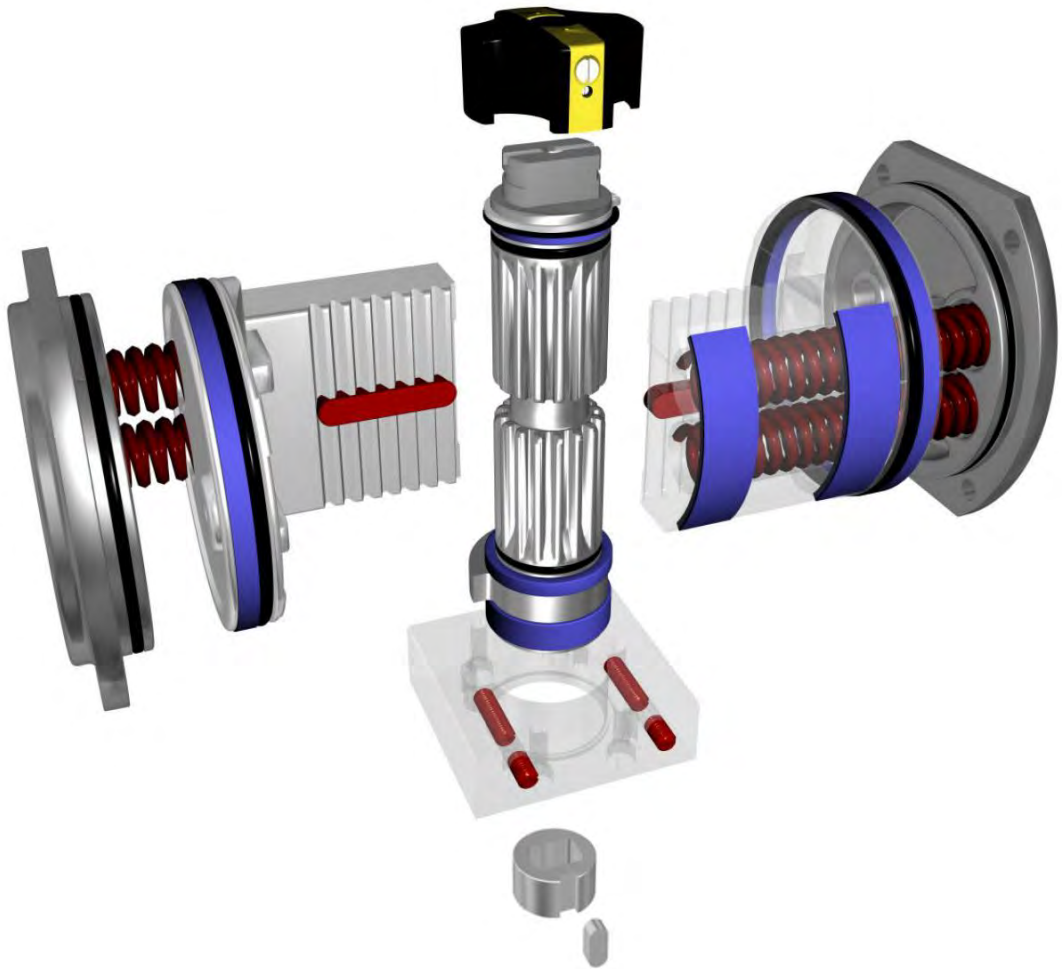
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Introduction

Product Description



TruTorq actuators are pneumatic quarter turn actuators which are based on a double rack and pinion design. The unique features of the actuator are:

- The “patented” spring encapsulation (no special tools required to change DA to SR, same overall dimensions remain the same for both types).
- The dual encapsulated “POM Delrin” wear pads on the piston prevent metal to metal contact between piston and cylinder wall,
- The piston racks each have an encapsulated support “GUIDE BAR” which rolls against the drive shaft and thus relieves any side loading which reduces pinion & rack wear.
- Triple shaft bearing system to prevent any adverse loading on the driveshaft
- Piston back-up bearings, which are situated behind the pistons ‘o’ ring to ensure linear movement and prevent wear on the cylinder surface
- Integral body adaptor kit, which is interchangeable with a wide range of valves for direct mounting by using an interchangeable insert sleeve, which is retained by a circlip.
- Dual end stop adjustments which are integral to the body adaptor and operate in conjunction with the machined cam on the single piece driveshaft, while remaining outside of the pressurized cylinder.

Introduction

Standards

Trutorq Pneumatic Actuators are designed to and in compliance with the following standards:

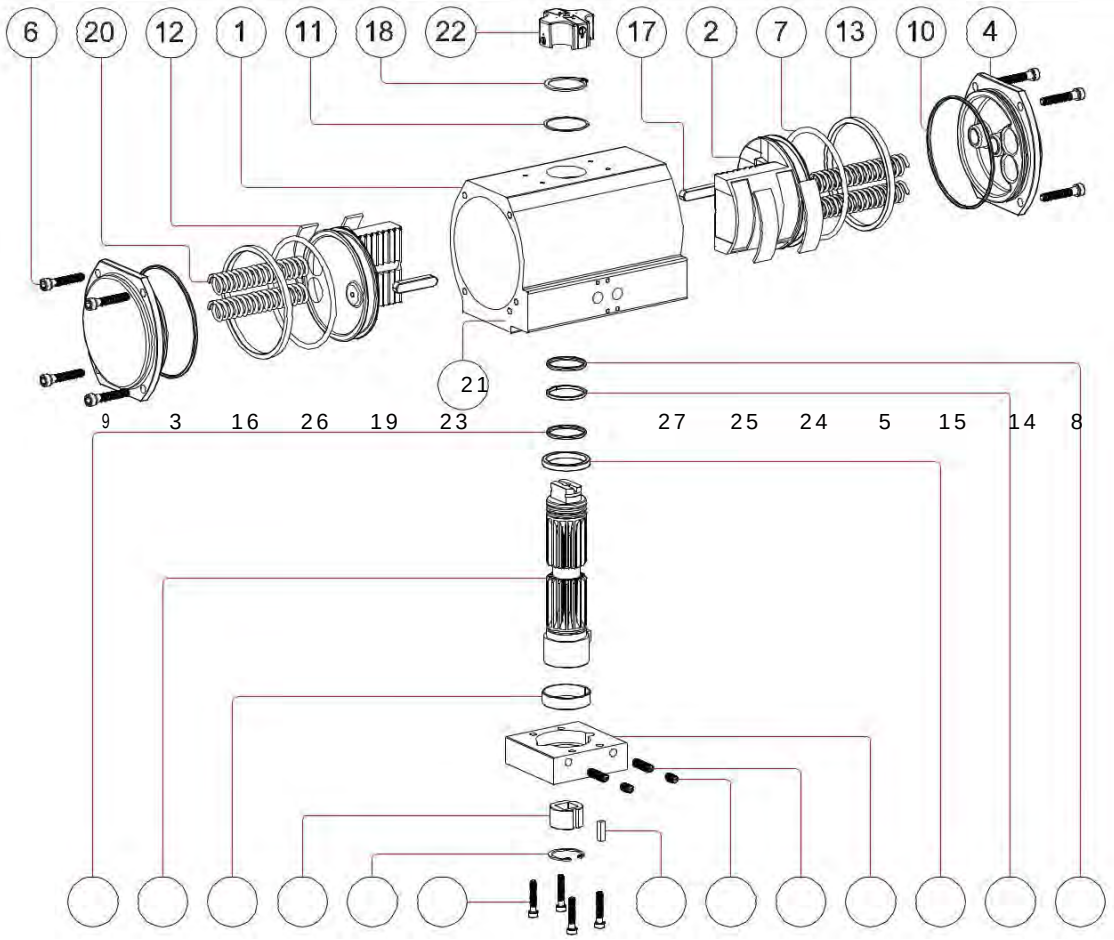
DIN3337: Orientation of insert sleeve is 45 degrees offset, not in-line.
ISO5211: Orientation of actuator to valve mounting flange (i.e. F05, F07…)
VDI/VDE 3845: Namur mounting for accessories such as switchboxes, solenoid valves and positioners.
ATEX: Compliance to the ATEX directive (2014/34/EU), certificate available upon request
PED: Compliance to the Pressure Equipment Directive (2014/68/EU), certificate available upon request

Partnumber Breakdown (All Products)

Version	Type	Size	Finish	Action	Shaft (E-Type only)	Threading	Special Codes
T = Trutorq	Blank = E-Type	E-Type 008	A = Anodized	0 = DA	TT8 X = F05	M = Metric	O = Oxygen
	C = C-Type	012	C = CNI®	1 = SR 4/4	Z = F07	U = Imperial	V = Viton seals
		020	E = Epoxy	2 = SR 4/3	TT12 X = F05		HT = High temp/High Cycle
		035		3 = SR 4/2	Blank = F07		FA = Fast Acting (< 1 sec.)
		055		4 = SR 4/1	TT35 X = F07		FO = Fail Open
		070		5 = SR 4/0	Z = F10		CM = Crossmount to pipe
		100			TT55 X = F10		TVP = TruVision Target Puck
		150		250 & 400 are	Z = F12		
				on application.	TT70 X = F10		
		C-Type 002			Z = F12		
		004					
		008					
		012					
		020					
		035					
		055					
		250					
		400					

Please refer to S-TYPE IOM Manual for further details on the S-TYPE range of actuators.

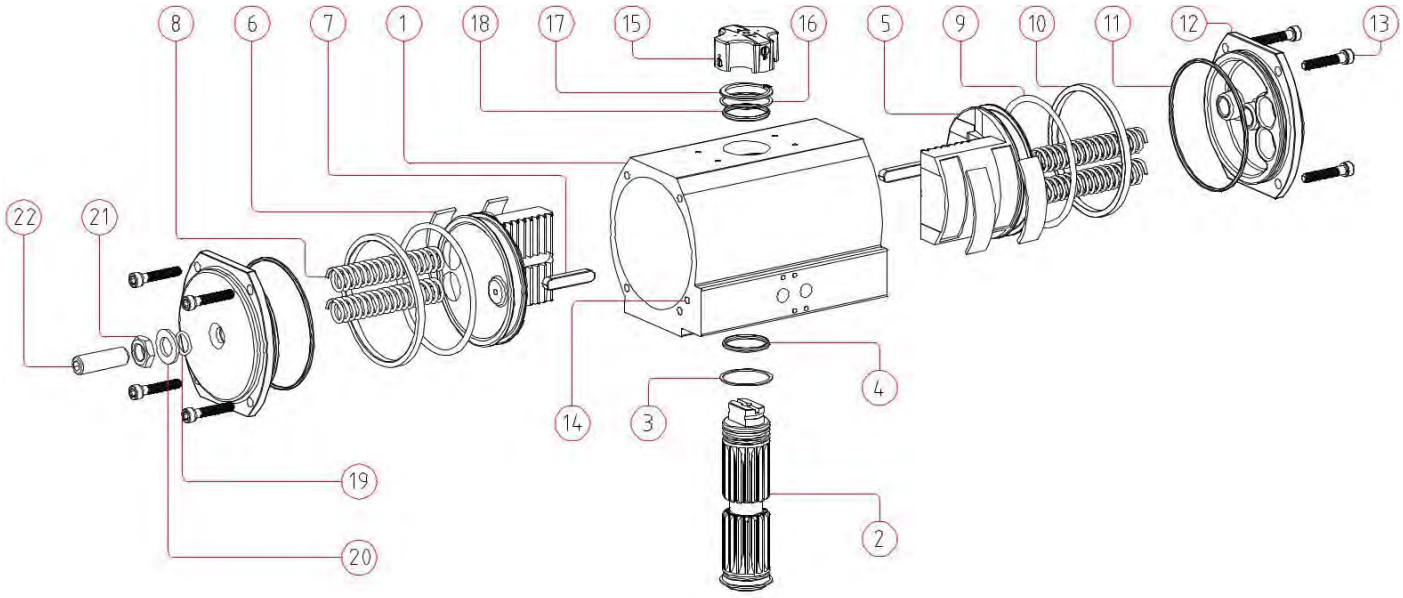
E-TYPE Parts List



Ref No	Description	Qty	Material Std Unit	Material CNI® unit	Comments
1	Cylinder	1	Alum. Anodized	Alum/CNI 530T	
2	Piston	2	Alum. Anodized	Alum/CNI 425	
3	Driveshaft	1	Steel	Stainless Steel	Option CNI 530T Shaft
4	Endcap	2	Alum. Anodized	Alum/CNI 530T	
5	Body Adaptor	1	Alum. Anodized	Alum/CNI 530T	
6	Endcap Bolt	8	Stainless Steel	Stainless Steel	
7*	Piston 'O' ring	2	Buna Nitrile	Buna Nitrile	Option Viton or Silicone
8*	Driveshaft upper 'O' ring	1	Buna Nitrile	Buna Nitrile	Option Viton or Silicone
9*	Driveshaft lower 'O' ring	1	Buna Nitrile	Buna Nitrile	Option Viton or Silicone
10*	Endcap 'O' ring	2	Buna Nitrile	Buna Nitrile	Option Viton or Silicone
11*	Washer	1	Polyethylene	Polyethylene	
12*	Wear Pads	4	POM Delrin	POM Delrin	
13*	Backup Bearing	2	POM Delrin	POM Delrin	
14*	Driveshaft Upper Bearing	1	POM Delrin	POM Delrin	
15*	Driveshaft Lower Bearing	1	POM Delrin	POM Delrin	
16*	Body Adaptor Bearing	1	POM Delrin	POM Delrin	
17*	Guide Bar	2	Steel	Stainless Steel	
18*	Circlip Upper	1	Steel	Stainless Steel	
19	Circlip Lower	1	Steel	Stainless Steel	
20	Spring	4	SiCr	SiCr	
21*	Ball Bearing	2	Composite	Composite	
22	TruVision Indicator	1	POM Delrin	POM Delrin	TruVision optional on Std unit
23	Body Adaptor Bolts	4	Stainless Steel	Stainless Steel	
24	Stop Adjustment Screws	2	High Tensile Steel	High Tensile Steel	Dacrolit Coated
25	Lock Screws	2	Steel	Steel	Dacrolit Coated
26	Insert Sleeve	1	Stainless Steel	Stainless Steel	
27	Insert Sleeve Key	1	Keysteel	Keysteel	

REPAIR KIT INCLUDES ITEMS MARKED WITH AN ASTERISKS

C-TYPE Parts List



Ref No	Description	Qty	Material Std Unit	Material CNI® unit	Comments
1	Body	1	Alum. Anodized	Alum/CNI 530T	
2	Driveshaft	1	Steel	Stainless Steel	Option CNI 530T
3*	Washer	1	Polyethylene	Polyethylene	
4*	'O' ring	1	Buna Nitrile	Buna Nitrile	Option Viton or Silicone
5	Piston	2	Alum. Anodized	Alum/CNI 425	
6*	Wear Pads	4	POM Delrin	POM Delrin	
7*	Guide Bar	2	Steel	Stainless Steel	
8	Spring	4	SiCr	SiCr	
9*	'O' ring	2	Buna Nitrile	Buna Nitrile	Option Viton or Silicone
10*	Back-up Bearing	2	POM Delrin	POM Delrin	
11*	'O' ring	2	Buna Nitrile	Buna Nitrile	Option Viton or Silicone
12	Endcap	2	Alum. Anodized	Alum/CNI 530T	
13	Endcap Bolt	8	Stainless Steel	Stainless Steel	
14*	Ball Seal	2	Composite	Composite	
15	Position Indicator	1	Polyethylene	POM Delrin	
16*	Washer	1	Polyethylene	Polyethylene	
17*	Circlip	2	Steel	Stainless Steel	
18*	'O' ring	1	Polyethylene	Polyethylene	
19	Stop Adjustment 'O' ring	2 (1)	Buna Nitrile	Buna Nitrile	Option Viton or Silicone
20	Stop Adjustment Washer	2 (1)	Polyethylene	Polyethylene	
21	Stop Adjustment Nut	2 (1)	High Tensile Steel	High Tensile Steel	Dacrolit Coated
22	Stop Adjustment Screw	2 (1)	High Tensile Steel	High Tensile Steel	Dacrolit Coated

REPAIR KIT INCLUDES ITEMS MARKED WITH AN ASTERISKS

QUANTITIES IN BRACKETS ARE FOR SIZES 2 & 4 ONLY

Actuator Operation

Technical Data:

TDA	=	Double Acting	**TSR**	=	Spring Return
Port 'A'	=	Air To Open (Anti-Clockwise)	**Port 'A'**	=	Air To Open (Anti-Clockwise compressing springs)
Port 'B'	=	Air To Close (Clockwise)	**Port 'B'**	=	Spring To Close (Clockwise)

Fail Safe Open	=	Rotate Pistons 180° About Own Axis			
Drive Medium	=	Air (Dry or Lubricated); Non Corrosive Gas; Light Hydraulic Oil			
Temperature	=	Buna Nitrile 'O' Seals	-40 to +100°C	or	-40 to +212°F
		Viton 'O' Seals	-25 to +250°C	or	-13 to +482°F

Maximum Operating Time Per Second (5.5 barg / 80 psig)

Actuator Size	2	4	8	12	20	35	55	70	100	150
DA open	<1	<1	<1	1.5	2	2.5	3.5	4	4.5	5
DA close	<1	<1	<1	1.5	2	2.5	3.5	4	4.5	5
SR open	<1	<1	<1	1.5	2	2.5	3.5	4	5.5	7
SR close	<1	<1	<1	1	1.5	2	3	3	3	4

Air Consumption per Stroke

Actuator Size	2	4	8	12	20	35	55	70	100	150
Port 'A' to open (liters)	0.09	0.18	0.34	0.49	0.90	1.69	2.80	3.05	5.52	7.60
Port 'B' to close (liters)	0.12	0.24	0.41	0.64	1.00	1.90	3.40	3.70	5.90	9.60
Port 'A' to open (cubic inch)	5.49	10.98	20.75	29.90	54.92	103.13	170.87	186.12	336.85	463.78
Port 'B' to close (cubic inch)	7.32	14.65	25.02	39.06	61.02	115.95	207.48	225.79	360.04	585.83

Overall Actuator Weight

Actuator Size	2	4	8	12	20	35	55	70	100	150
DA Kilograms	1.0	1.8	3.1	4.5	6.9	11.5	20.0	22.4	31.2	44.4
SR Kilograms	1.1	1.9	3.4	5.2	7.7	13.2	22.7	26.5	35.8	52.8
DA pounds	2.2	4.0	6.8	9.9	15.2	25.3	44.0	49.3	68.6	97.7
SR pounds	2.4	4.2	7.5	11.4	16.9	29.0	49.9	58.3	78.8	116.2

Minimum Recommended Solenoid Valve Cv

Actuator Size	2	4	8	12	20	35	55	70	100	150
Solenoid Cv	0.2	0.2	0.5	0.5	0.5	0.5	0.8	0.8	1.1	1.1

- Weights for size 8-150 are for E-Type actuators.
- C-Type weights are approximately 10% lower than indicated for sizes 8-55
- Refer to S-Type manual for S-Type technical information
- Please contact Trutorq or a Trutorq representative for 250 & 400 information.

Actuator Operation

Double Acting



Opening Stroke:

- Looking at the front of the Actuator, PORT ‘A’ is on the left and PORT ‘B’ is on the right.
- To open the Actuator, connect the air supply to PORT ‘A’ to fill the central chamber of the Actuator.
- The two opposing Pistons will open and rotate the driveshaft in a counter-clockwise direction.
- When the pistons reach the end of their travel, the actuator driveshaft will be in the open position.



Closing Stroke:

- Looking at the front of the Actuator, PORT ‘A’ is on the left and PORT ‘B’ is on the right.
- To close the Actuator, connect the air supply to PORT ‘B’ to fill the outer chambers of the Actuator.
- The two opposing Pistons will close and rotate the actuator driveshaft in a clockwise direction.
- When the pistons reach the end of their travel, the actuator driveshaft will be in the closed position.

Actuator Operation

Spring Return



Opening Stroke:

- Looking at the front of the Actuator, PORT ‘A’ is on the left and PORT ‘B’ is on the right.
- To open the Actuator, connect the air supply to PORT ‘A’ to fill the central chamber of the Actuator.
- The two opposing Pistons will open, compressing the springs in the outer chambers and rotate the driveshaft in a counter-clockwise direction.
- When the pistons reach the end of their travel, the springs will be fully compressed and the actuator driveshaft will be in the open position



Closing Stroke:

- Looking at the front of the Actuator, PORT ‘A’ is on the left and PORT ‘B’ is on the right.
- To close the Actuator, disconnect the air supply from PORT ‘A’. This will allow the compressed springs to push the pistons back to their starting position.
- As the springs decompress the two opposing Pistons will close and rotate the actuator driveshaft in a clockwise direction.
- When the pistons reach the end of their travel, the actuator driveshaft will be in the closed position.

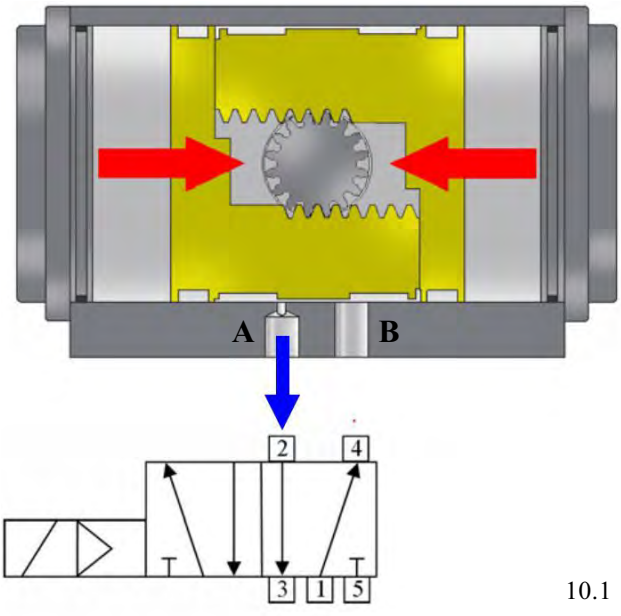
Actuator Operation

Solenoid Valve Mounting: Namur Type

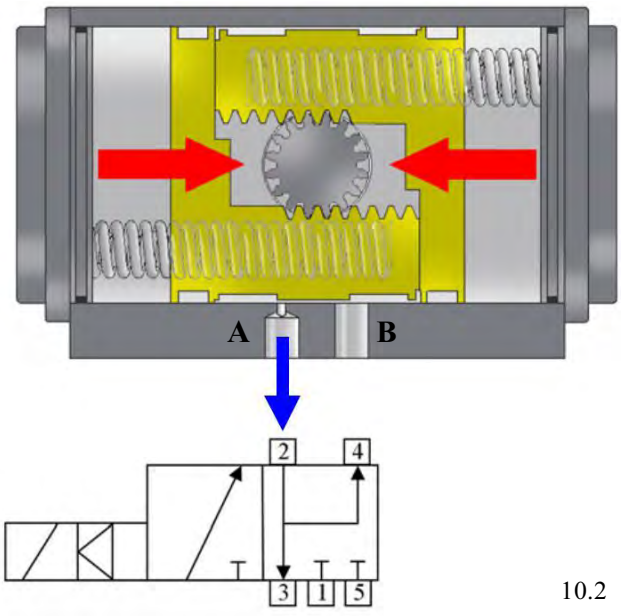
Please ensure you read the IOM manual that is supplied with the solenoid valve in order to ensure correct function. This section is a guide to the function of a solenoid valve in conjunction with a pneumatic quarter turn actuator. The solenoid valves mentioned here are **"namur mounted"** with a modular **"5/2 way / 3/2 way"** (meaning either mode is possible with the same valve).

Certain facts need to be taken into consideration when mounting a namur solenoid valve to a quarter turn pneumatic actuator:

- Port '2' and '4' are always on the namur interface of the solenoid valve
- Port '2' and '4' are always connected to the namur interface of the quarter turn pneumatic actuator
- Port '1' is where instrument air is always connected to the solenoid valve
- Port '1' is always referred to as the air inlet or pressure port on a solenoid valve



10.1



10.2

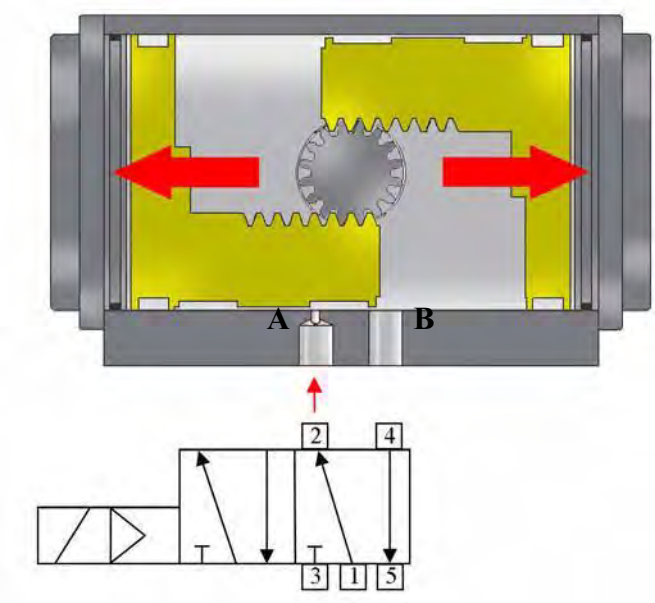
The above diagrams show a double acting actuator with 5/2 way solenoid valve (10.1) and a spring return actuator with a 5/2 way valve set up to function as a 3/2 way valve (10.2). Both valves are shown in the de-energised state (coil inactive, no electrical current). In both cases the solenoid valves port '2' is connected to the actuators port 'A' through which air will vent out of port '3'.

When connecting a namur solenoid valve, the pneumatic diagram will determine how to connect the ports. Only solenoid valve ports '2' and '4' can be connected to the actuator. Whichever of the two ports shows a vertical arrow pointing away from it, is the port that needs to be connected to the actuators central chamber, in this case port 'A'.

Actuator Operation

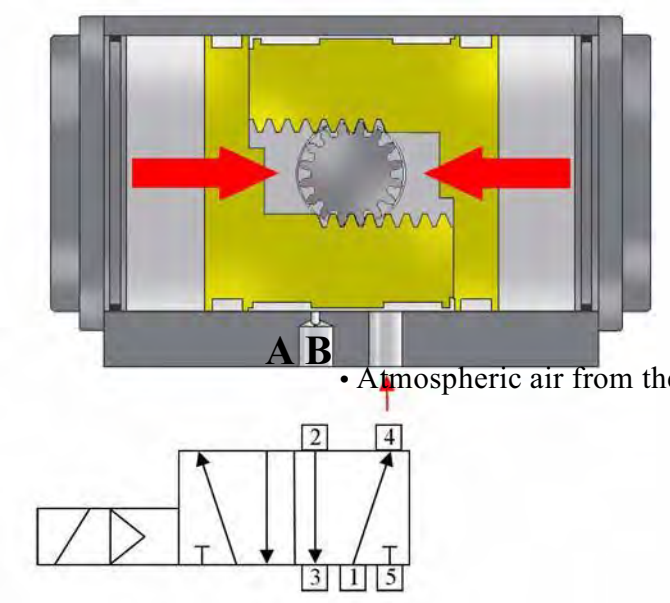
Operation with Solenoid Valves: Double Acting

Please ensure you read the IOM manual that is supplied with the solenoid valve in order to ensure correct function. This section is a guide to the function of a solenoid valve in conjunction with a pneumatic quarter turn actuator. The solenoid valves mentioned here are **"namur mounted"** with a modular **"5/2 way / 3/2 way"** (meaning either mode is possible with the same valve).



Solenoid Coil Energised:

- This allows air to flow from **solenoid inlet port '1'** to **solenoid port '2'** which is connected to **actuator port 'A'**
- As the air enters the center chamber of the actuator, the pistons start to move towards the open position (as indicated by the large red arrows).
- Atmospheric air from the outer chambers will vent out of **actuator port 'B'**, which is connected to **solenoid port '4'** and then exhausts via **solenoid port '5'.**
- **Solenoid port '3'** is not used.



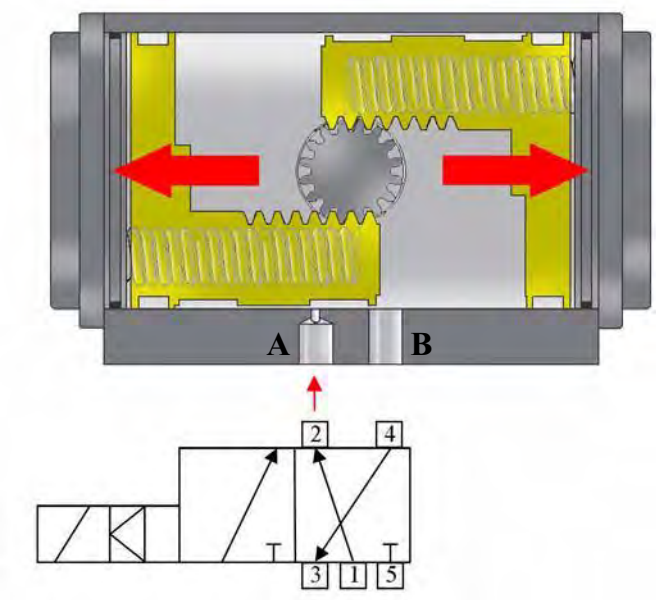
Solenoid Coil De-Energised:

- This allows air to flow from **solenoid inlet port '1'** to **solenoid port '4'** which is connected to **actuator port 'B'**
- As the air enters the outer chambers of the actuator, the pistons start to move towards the closed position (as indicated by the large red arrows).
- Atmospheric air from the inner chamber will vent out of **actuator port 'A'**, which is connected to **solenoid port '2'** and then exhausts via **solenoid port '3'.**
- **Solenoid port '5'** is not used

Actuator Operation

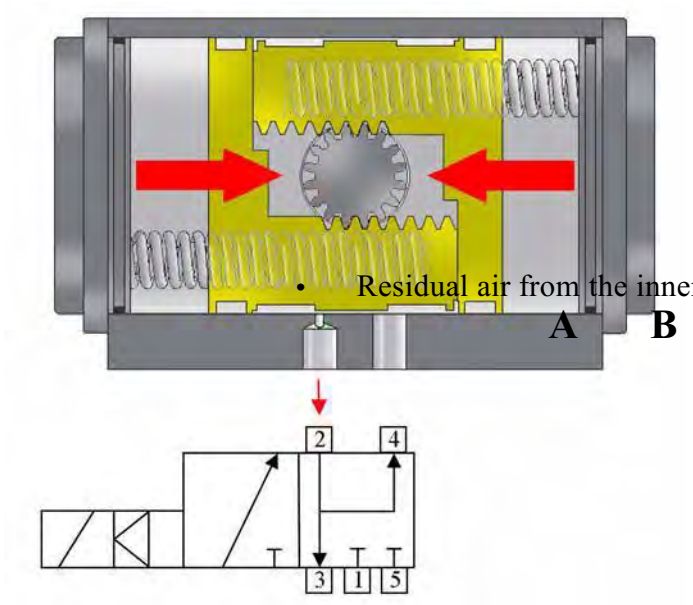
Operation with Solenoid Valves: Spring Return

Please ensure you read the IOM manual that is supplied with the solenoid valve in order to ensure correct function. This section is a guide to the function of a solenoid valve in conjunction with a pneumatic quarter turn actuator. The solenoid valves mentioned here are **"namur mounted"** with a modular **"5/2 way / 3/2 way"** (meaning either mode is possible with the same valve).



Solenoid Coil Energised:

- This allows air to flow from **solenoid inlet port '1'** to **solenoid port '2'** which is connected to **actuator port 'A'**
- As the air enters the center chamber of the actuator, the pistons start to move towards the open position and compressing the springs in the outer chambers (as indicated by the large red arrows).
- Atmospheric air from the outer chambers will vent out of **actuator port 'B'**, which is connected to **solenoid port '4'** and then exhausts via **solenoid port '3'.**
- **Solenoid port '5'** is not used.



Solenoid Coil De-Energised:

- This closes **solenoid port '1'** and stops inlet air from flowing.
- The springs in the outer chambers will move the pistons back to the closed position (as indicated by the large red arrows).
- Residual air from the inner chamber will vent out of **actuator port 'A'**, which is connected to **solenoid port '2'** and then exhausts via **solenoid port '3'.**
- **Solenoid port '5'** is not used.
- **Solenoid port '2'** and **port '4'** are also connected in a loop so no dirty air may enter the actuator (this is available only on some solenoid valves).

Mounting Variations

Below are the two common variations to mounting a 90 degree or 180 degree actuator to a valve.

13.1 mounted **in-line** or **parallel** to the pipe, the actuator and valve are in the standard closed position
13.2 mounted **in-line** or **parallel** to the pipe, the actuator and valve are in the standard open position

13.3 mounted **crossmount** or **offset** to the pipe, the actuator and valve are in the standard closed position
13.4 mounted **crossmount** or **offset** to the pipe, the actuator and valve are in the standard open position

Mounting actuators in these varying positions is due to space constraints in the global assembly or simply due to consistency with prior assemblies already in existence. Please note how the indicator puck always correctly shows the position of the valve disc and hence showing the flowpath of the medium running through the pipe.

13.1 in-line, closed position



13.2 in-line, open position



13.3 crossmount, closed position

13.4 crossmount, open position

Contents

WARNING:

NEVER DISASSEMBLE A UNIT THAT IS PRESSURISED!

Always isolate the actuator pneumatically or hydraulically and electrically.

Always remove all accessories and mounting hardware prior to maintenance.

Other Information

Actuator Lubricant: BERULUB FR16
Spring Lubrication: VALVOLINE L-EP2

Trutorq supplied Repair Kits include all soft components and bearings. Please review the items marked with a star in the parts listing on page 5 for the E-TYPE actuator and page 6 for the C-TYPE actuator.

Always insure you wear the correct safety equipment as stipulated by your local organisations and applicable laws.

Always take care to follow this manual in order to correctly maintain Trutorq actuators.

Before removing the actuator insure that you follow the correct procedure to properly isolate the valve in the piping system.

PLEASE NOTE:

IF YOU EVER HAVE ANY QUESTIONS REGARDING THE MAINTENANCE OF OUR PRODUCTS, PLEASE CONTACT YOUR LOCAL TRUTORQ REPRESENTATIVE.

BE SAFE, DO NOT GUESS YOU ARE DOING IT RIGHT. KNOW YOU ARE DOING IT RIGHT.

ALWAYS FOLLOW COMPANY PROCEDURES AND LOCAL AND NATIONAL HEALTH AND SAFETY GUIDELINES.

EN **INSTALLATION & MAINTENANCE INSTRUCTIONS**

N.J. USA 07652
www.VERSA-VALVES.com

Register your product at http://www.versa-valves.com/registration.htm

INS-XDD-1

REV - D (09-18)

Suffix Option (Conduit Entry)	**CSA 16.70054415** C US C22.2 # 139 UL 429 *See Chart on back page for rating/temp	**Sira 16ATEX1157X - IECEx CSA 16.0029X** 0344
-XDDS (M20 x 1,5)	Class I, Zone 1 AEx/Ex db IIC TYPE 4X, 6P, IP66 Zone 21 AEx/Ex tb IIIC Db T*	Ex II 2 G D Ex db IIC T* Gb Ex tb IIIC T* °C Db IP 66/67/68
-XDDT (1/2" NPT)	Class I, Groups B, C, D, Class II, Groups E, F, G, Class III Class I, Div 2, Groups A, B, C, D Class I, Zone 1 AEx/Ex db IIC TYPE 4X, 6P, IP66 Zone 21 AEx/Ex tb IIIC Db T*	

WARNING	WARNHINWEIS	ADVERTENCIA
1. DO NOT OPEN WHILE ENERGIZED 2. Check nameplate for correct voltage and classification.	1. NICHT UNTER SPANNUNG ÖFFNEN 2. Siehe Etikett für korrekte Spannung und Klassifizierung.	1. NO LA ABRA MIENTRAS ESTÉ CONECTADA A LA ELECTRICIDAD. 2. Verifique la placa para determinar la clasificación y voltaje correcto.

AVERTISSEMENT	AVVERTENZA
1. NE PAS OUVRIR SOUS TENSION 2. Regardez la plaque pour connaître le bon voltage et la classification.	1. NON APRIRE SOTTO TENSIONE. 2. Controllare la targhetta per voltaggio corretto e classificazione.

INSTALLATION

The solenoid operated safety valves shall only be used within a working temperature range of -52°C to +90°C.

1. Check nameplate for correct voltage and classification.
2. For optimum performance mount the operator upright.
3. The Housing may be rotated 360°.
   The cable entry device shall be certified in type of explosion protection flameproof enclosure "d", suitable for the conditions of use and correctly installed. For ambient temperature up to 60 °C, cables and cable glands suitable for at least 85 °C shall be used. For ambient temperature up to 90 °C, cables and cable glands suitable for at least 115 °C shall be used.
4. For ground terminal termination locted inside on mounting plate, crimping tool CT-1551 from Panduit ® must be used.
5. Thread lubricant Never-Seez Marine Grade from Bostick Inc. or LUBG-6 from Killark ® must be used to seal conduit entry.

SEQUENCE OF INSTALLATION

1. Loosen the set screw in the housing by 2 turns (use 1.5mm hexagonal wrench) and remove cover by unscrewing counter-clockwise.
2. Connect the incoming supply cable to the terminal block.
   - Leads connected to the terminals shall be insulated for the appropriate voltage and this insulation shall extend to within 1 mm of the terminal throat.

   Note:
   The terminal block can be removed for ease of wiring but must be re-assembled once connections have been made.

   - All terminal screws, used and unused, shall be tightened down to between 0.4 Nm and 0.45 Nm.
3. Replace the cover by screwing it over the housing and tighten until the two mating faces are in contact. Lock the cover in this position by tightening the set screw.

MAINTENANCE

The solenoid operator itself does not require periodic maintenance.

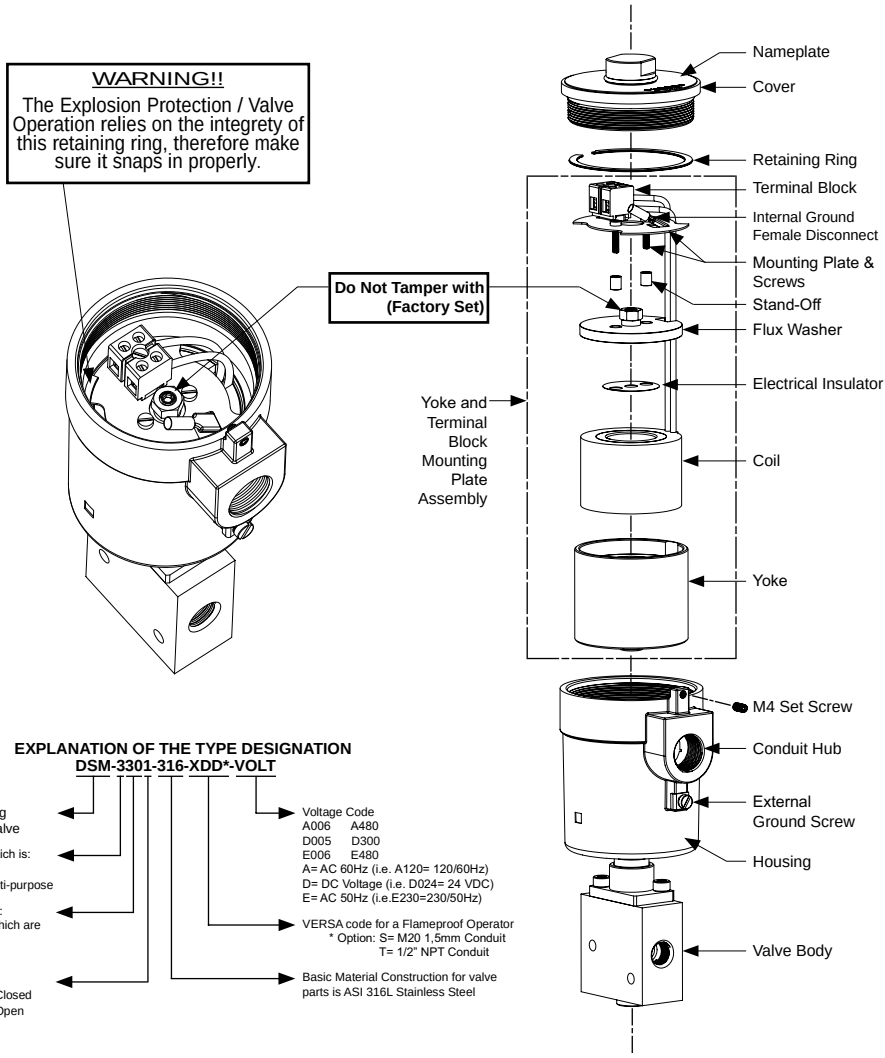
COIL REPLACEMENT

1. Shut off electrical current.
2. Loosen the set screw in the housing by 2 turns and remove cover by unscrewing counterclockwise.
3. Remove terminal block from mounting plate.
4. Remove retaining ring.
5. Pull out the yoke and terminal block mounting plate assembly.
6. Unscrew the two flux washer mounting screws from the yoke (Care not to lose the electrical insulator and the two stand offs)
7. Disconnect the coil leads from the terminal block, replace the coil with a new one, and connect the new leads to the terminal block.
8. Re-install coil in the yoke, the electrical insulator, the two stand offs, the flux washer and terminal block mounting plate assembly (in that order) and install the two flux washer mounting screws.
9. Place the entire assembly back into the housing and secure by reassembling the retaining ring. **Making sure it snaps in properly and fully retained inside housing groove.**
10. Secure terminal block to mounting plate.
11. Re-place the cover by screwing it over the housing and tightening until the two mating faces are in contact. Lock the cover in this position by tightening the set screw in the housing.

TEMPERATURE CLASS (T-rating)

Ambient temperature range and temperature codes depend on power rating and seal material.

Configuration		Temperature Code			
Power	O-Ring Material	T6	T5	T4	T3
2.6 W (DC)	FVMQ	-52°C to +42°C	-52°C to +57°C	-52°C to +90°C	-52°C to +90°C
	LT BUNA	-40°C to +42°C	-40°C to +57°C	-40°C to +90°C	-40°C to +90°C
	FKM	-20°C to +42°C	-20°C to +57°C	-20°C to +90°C	-20°C to +90°C
3.1 W (AC)	FVMQ	-52°C to +42°C	-52°C to +57°C	-52°C to +90°C	-52°C to +90°C
	LT BUNA	-40°C to +42°C	-40°C to +57°C	-40°C to +90°C	-40°C to +90°C
	FKM	-20°C to +42°C	-20°C to +57°C	-20°C to +90°C	-20°C to +90°C



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7.9 IOM for PSV

Consolidated

a Baker Hughes business

1900/1900 DM Series

Safety Relief Valves

The Eductor Tube Advantage™

Instruction Manual (Rev. L)



Baker Hughes Data Classification : Public

THESE INSTRUCTIONS PROVIDE THE CUSTOMER/OPERATOR WITH IMPORTANT PROJECT-SPECIFIC REFERENCE INFORMATION IN ADDITION TO THE CUSTOMER/OPERATOR'S NORMAL OPERATION AND MAINTENANCE PROCEDURES. SINCE OPERATION AND MAINTENANCE PHILOSOPHIES VARY, BAKER HUGHES (AND ITS SUBSIDIARIES AND AFFILIATES) DOES NOT ATTEMPT TO DICTATE SPECIFIC PROCEDURES, BUT TO PROVIDE BASIC LIMITATIONS AND REQUIREMENTS CREATED BY THE TYPE OF EQUIPMENT PROVIDED.

THESE INSTRUCTIONS ASSUME THAT OPERATORS ALREADY HAVE A GENERAL UNDERSTANDING OF THE REQUIREMENTS FOR SAFE OPERATION OF MECHANICAL AND ELECTRICAL EQUIPMENT IN POTENTIALLY HAZARDOUS ENVIRONMENTS. THEREFORE, THESE INSTRUCTIONS SHOULD BE INTERPRETED AND APPLIED IN CONJUNCTION WITH THE SAFETY RULES AND REGULATIONS APPLICABLE AT THE SITE AND THE PARTICULAR REQUIREMENTS FOR OPERATION OF OTHER EQUIPMENT AT THE SITE.

THESE INSTRUCTIONS DO NOT PURPORT TO COVER ALL DETAILS OR VARIATIONS IN EQUIPMENT NOR TO PROVIDE FOR EVERY POSSIBLE CONTINGENCY TO BE MET IN CONNECTION WITH INSTALLATION, OPERATION OR MAINTENANCE. SHOULD FURTHER INFORMATION BE DESIRED OR SHOULD PARTICULAR PROBLEMS ARISE WHICH ARE NOT COVERED SUFFICIENTLY FOR THE CUSTOMER/OPERATOR'S PURPOSES THE MATTER SHOULD BE REFERRED TO BAKER HUGHES.

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Conversion Table

All the United States Customary System (USCS) values are converted to metric values using the following conversion factors:		
USCS Unit	Conversion Factor	Metric Unit
in.	25.4	mm
lb.	0.4535924	kg
in^2	6.4516	cm^2
ft^3/min	0.02831685	m^3/min
gal/min	3.785412	L/min
lb/hr	0.4535924	kg/hr
psig	0.06894757	barg
ft lb	1.3558181	Nm
°F	5/9 (°F-32)	°C

Note: Multiply USCS value with conversion factor to get metric value.

NOTICE
For valve configurations not listed in this manual, please contact your local **Green Tag™ Center (GTC)** for assistance.

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I. Product Safety Sign and Label System

If and when required, appropriate safety labels have been included in the rectangular margin blocks throughout this manual. Safety labels are vertically oriented rectangles as shown in the ***representative*** examples (below), consisting of three panels encircled by a narrow border. The panels can contain four messages which communicate:

- The level of hazard seriousness
- The nature of the hazard
- The consequence of human, or product, interaction with the hazard.
- The instructions, if necessary, on how to avoid the hazard.

The top panel of the format contains a signal word (DANGER, WARNING, CAUTION or ATTENTION) which communicates the level of hazard seriousness.

The center panel contains a pictorial which communicates the nature of the hazard, and the possible consequence of human or product interaction with the hazard. In some instances of human hazards the pictorial may, instead, depict what preventive measures to take, such as wearing protective equipment.

The bottom panel may contain an instruction message on how to avoid the hazard. In the case of human hazard, this message may also contain a more precise definition of the hazard, and the consequences of human interaction with the hazard, than can be communicated solely by the pictorial.

① DANGER — Immediate hazards which WILL result in severe personal injury or death.

② WARNING — Hazards or unsafe practices which COULD result in severe personal injury or death.

③ CAUTION — Hazards or unsafe practices which COULD result in minor personal injury.

④ ATTENTION — Hazards or unsafe practices which COULD result in product or property damage.



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II. Safety Alerts

Read - Understand - Practice

Danger Alerts

A DANGER alert describes actions that may cause severe personal injury or death. In addition, it may provide preventive measures to avoid severe personal injury or death.

DANGER alerts are not all-inclusive. Baker Hughes cannot know all conceivable service methods nor evaluate all potential hazards. Dangers include:

- High temperature/pressure can cause injury. Ensure all system pressure is absent before repairing or removing valves.
- Do not stand in front of a valve outlet when discharging. STAND CLEAR OF VALVE to avoid exposure to trapped, corrosive media.
- Exercise extreme caution when inspecting a pressure relief valve for leakage.
- Allow the system to cool to room temperature before cleaning, servicing, or repairing. Hot components or fluids can cause severe personal injury or death.
- Always read and comply with safety labels on all containers. Do not remove or deface container labels. Improper handling or misuse could result in severe personal injury or death.
- Never use pressurized fluids/gas/air to clean clothing or body parts. Never use body parts to check for leaks, flow rates, or areas. Pressurized fluids/gas/air injected into or near the body can cause severe personal injury or death.
- It is the owner's responsibility to specify and provide protective wear to protect persons from pressurized or heated parts. Contact with pressurized or heated parts can result in severe personal injury or death.
- Do not work or allow anyone under the influence of intoxicants or narcotics to work on or around pressurized systems. Workers under the influence of intoxicants or narcotics are a hazard to themselves and other employees. Actions taken by an intoxicated employee can result in severe personal injury or death to themselves or others.
- Always perform correct service and repair. Incorrect service and repair can result in product or property damage or severe personal injury or death.
- Always use the correct tool for a job. The misuse of a tool or the use of an improper tool can result in personal injury, damage to product or property.
- Ensure the proper "health physics" procedures are followed, if applicable, before starting operation in a radioactive environment.

Caution Alerts

A CAUTION alert describes actions that may result in a personal injury. In addition, they may describe preventive measures that must be taken to avoid personal injury. Cautions include:

- Heed all service manual warnings. Read installation instructions before installing valve(s).
- Wear hearing protection when testing or operating valves.
- Wear appropriate eye and clothing protection.
- Wear protective breathing apparatus to protect against toxic media.

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III. Safety Notice



Proper installation and start-up is essential to the safe and reliable operation of all valve products. The relevant procedures recommended by Baker Hughes, and described in these instructions, are effective methods of performing the required tasks.

It is important to note that these instructions contain various “safety messages” which should be carefully read in order to minimize the risk of personal injury, or the possibility that improper procedures will be followed which may damage the involved Baker Hughes product, or render it unsafe. It is also important to understand that these “safety messages” are not exhaustive. Baker Hughes can not possibly know, evaluate, and advise any customer of all of the conceivable ways in which tasks might be performed, or of the possible hazardous consequences of each way. Consequently, Baker Hughes has not undertaken any such broad evaluation and, thus, anyone who uses a procedure and/or tool, which is not recommended by Baker Hughes, or deviates from Baker Hughes recommendations, must be thoroughly satisfied that neither personal safety, nor valve safety, will be jeopardized by the method and/or tools selected. If not so satisfied, please contact your local *Green Tag* Center if there are any questions relative to procedures and/or tools.

The installation and start-up of valves and/or valve products may involve proximity to fluids at extremely high pressure and/or temperature. Consequently, every precaution should be taken to prevent injury to personnel during the performance of any procedure. These precautions should consist of, but are not limited to, ear drum protection, eye protection, and the use of protective clothing, (i.e., gloves, etc.) when personnel are in, or around, a valve work area. Due to the various circumstances and conditions in which these operations may be performed on Baker Hughes products, and the possible hazardous consequences of each way, Baker Hughes can not possibly evaluate all conditions that might injure personnel or equipment. Nevertheless, Baker Hughes does offer certain Safety Alerts, listed in Section II, for customer information only.

It is the responsibility of the purchaser or user of Baker Hughes valves/equipment to adequately train all personnel who will be working with the involved valves/equipment. Further, prior to working with the involved valves/equipment, personnel who are to perform such work should become thoroughly familiar with the contents of these instructions.

IV. Warranty Information

Warranty Statement:[1] Baker Hughes warrants that its products and work will meet all applicable specifications and other specific product and work requirements (including those of performance), if any, and will be free from defects in material and workmanship.

CAUTION
Defective and nonconforming items must be held for Baker Hughes’ inspection and returned to the original F.O.B point upon request.

Incorrect Selection or Misapplication of Products: Baker Hughes cannot be responsible for customer’s incorrect selection or misapplication of our products.

Unauthorized Repair work: Baker Hughes has not authorized any non-Baker Hughes affiliated repair companies, contractors or individuals to perform warranty repair service on new products or field repaired products of its manufacture. Therefore customers contracting such repair services from unauthorized sources must do at their own risk.

Unauthorized Removal of Seals: All new valves and valves repaired in the field by Baker Hughes Field Service are sealed to assure the customer of our guarantee against defective workmanship. Unauthorized removal and/or breakage of this seal will negate our warranty.

[1] Refer to Baker Hughes’s Standard Terms of Sale for complete details on warranty and limitation of remedy and liability.

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IV. Warranty Information (Cont.)



V. Terminology for Safety Relief Valves

Accumulation - the pressure increase over the maximum allowable working pressure of the vessel during discharge through the SRV, expressed as a percentage of that pressure or in actual pressure units.

- Backpressure - the pressure on the discharge side of the SRV:
  - Built-up backpressure - the pressure that develops at the valve outlet, after the SRV has been opened, as a result of flow.
  - Superimposed backpressure - the pressure in the discharge header before the SRV is opened.
  - Constant backpressure - the superimposed backpressure that is constant with time.
  - Variable backpressure - the superimposed backpressure that varies with time.
- Blowdown - the difference between set pressure and re-seating pressure of the SRV, expressed as a percentage of the set pressure or in actual pressure units.
- Cold Differential Set Pressure - the pressure at which the valve is adjusted to open on the test stand. This pressure includes the corrections for backpressure and/or temperature service conditions.
- Differential Between Operating and Set Pressures - Valves in installed process services will generally give best results if the operating pressure does not exceed 90% of the set pressure. However, on pump and compressor discharge lines, the differential required between the operating and set pressures may be greater because of pressure pulsations coming from a reciprocating piston. The valve should be set as far above the operating pressure as possible.
- Lift - the actual travel of the disc away from the closed position when a valve is relieving.
- Maximum Allowable Working Pressure - the aximum gauge pressure permissible in a vessel at a designated temperature. A vessel may not be operated above this pressure, or its equivalent, at any metal temperature other than that used in its design. Consequently, for that metal temperature, it is the highest pressure at which the primary pressure SRV is set to open.
- Operating Pressure - the gauge pressure to which the vessel is normally subjected in service. A suitable margin is provided between operating pressure and maximum allowable working pressure. For assured safe operation, the operating pressure should be at least 10% under the maximum allowable working pressure or 5 psi (.34 bar), whichever is greater.
- Overpressure - a pressure increase over the set pressure of the primary relieving device. Overpressure is similar to accumulation when the relieving device is set at the maximum allowable working pressure of the vessel. Normally, overpressure is expressed as a percentage of set pressure.

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V. Terminology for Safety Relief Valves (Cont.)

- Rated Capacity - the percentage of measured flow at an authorized percent overpressure permitted by the applicable code. Rated capacity is generally expressed in pounds per hour (lb/hr) for vapors, standard cubic feet per minute (SCFM) or m3/min for gases, and in gallons per minute (GPM) for liquids.
- Relief Valve - an automatic pressure-relieving device, actuated by static pressure upstream from the valve. A relief valve is used primarily for liquid service.
- Safety Relief Valve (SRV) - an automatic pressure-relieving device used as either a safety or relief valve, depending upon application. The SRV is used to protect personnel and equipment by preventing excessive overpressure.
- Safety Valve - an automatic pressure-relieving device actuated by the static pressure upstream of the valve, and characterized by a rapid opening or “pop” action. It is used for steam, gas, or vapor service.
- Set Pressure - the gauge pressure at the valve inlet for which the relief valve has been adjusted to open under service conditions. In liquid service, the inlet pressure at which the valve starts to discharge determines set pressure. In gas or vapor service, the inlet pressure at which the valve pops determines the set pressure.
- Simmer - the audible passage of a gas or vapor across the seating surfaces just before “pop.” The difference between this start-to-open pressure and the set pressure is called “simmer.” Simmer is generally expressed as a percentage of set pressure.

VI. Handling and Storage

Handling

Always keep the inlet flange down on a crated or uncrated flange valve to prevent misalignment and damage to valve internals.

ATTENTION!

Never lift the full weight of the valve by the lifting lever.

ATTENTION!

Do not rotate the valve horizontally or lift/carry using the lifting lever.

VI. Handling and Storage (Cont.)

Wrap a chain or sling around the discharge neck and around the upper bonnet structure to move or hoist an uncrated valve. Ensure the valve is in a vertical position during the lift.

ATTENTION!

Handle carefully. Do not drop or strike the valve.

Do not subject SRVs, either crated or uncrated, to sharp impact. Ensure that the valve is not bumped or dropped during loading or unloading from a truck. While hoisting the valve, take care to prevent bumping the valve against steel structures and other objects.

ATTENTION!

Prevent dust and debris from entering inlet or outlet of the valve

Storage

Store SRVs in a dry environment and protect them from the weather. Do not remove the valve from the skids or crates until immediately before installation.

Do not remove flange protectors and seating plugs until the valve is ready to be bolted into place during the installation.

VII. Pre-Installation and Installation Instructions

When SRVs are uncrated and the flange protectors or sealing plugs are removed, exercise meticulous care to prevent dirt and other foreign materials from entering the inlet and outlet ports while bolting the valve in place.

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VIII. Design Features and Nomenclature

Cap and Lever Interchangeability

In the field, it is often necessary to change the type of cap or lever after a valve has been installed. All flanged **Consolidated™ SRVs** are designed to be converted to any type of lever or cap desired. It is not necessary to remove the SRV from the installation, nor will the set pressure be affected when making such a change.

Design Simplicity

Consolidated SRVs have few component parts, resulting in savings by minimizing spare parts inventory and simplifying valve maintenance.

Nomenclature Related to Design Features

The nomenclature of the components of 1900 Series valves, including those with design options for Dual Media, Dual Media soft-seat bellows, O-ring seat, liquid trim, and Thermodisc, is identified in Figures 1 through 10.

Simple Blowdown Adjustment

The Consolidated single blowdown ring design makes it possible to set and test a valve at the customer's shop when it is impractical to set and media may be very low, the ring can be positioned so that the set point can be observed without damaging the valve. Blowdown can be attained by positioning the ring in accordance with the adjusting ring position (see Tables 12 through 14).

Valve Interchangeability

A standard Consolidated SRV may be converted to the Dual Media, Dual Media soft-seat bellows type, the o-ring seat seal type, etc., and vice versa. Should conversion be required, this interchangeability lowers costs and requires fewer new parts than replacing entire valve types.

Note: The 1900 Dual Media (DM) was previously called Universal Media (UM). Unless otherwise noted, the 1900 Universal Media shall be inspected, disassembled, reassembled, tested, installed, operated and maintained per the instructions of the 1900 Dual Media.

IX. Introduction

The safety relief valve (SRV) is an automatic, pressure-actuated relieving device suitable for use either as a safety valve or relief valve, depending on application.

SRVs are used on hundreds of different applications, including liquids and hydrocarbons; therefore, the valve is designed to meet many requirements.

The 1900 Series valves included in this manual may be used to meet the requirements for ASME Section III and Section XIII (UV Designator). They cannot be used on ASME Code Section I steam boilers or superheaters, but may be used on process steam.

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X. Consolidated 1900 Series Safety Relief Valve

A. Metal Seat Valve

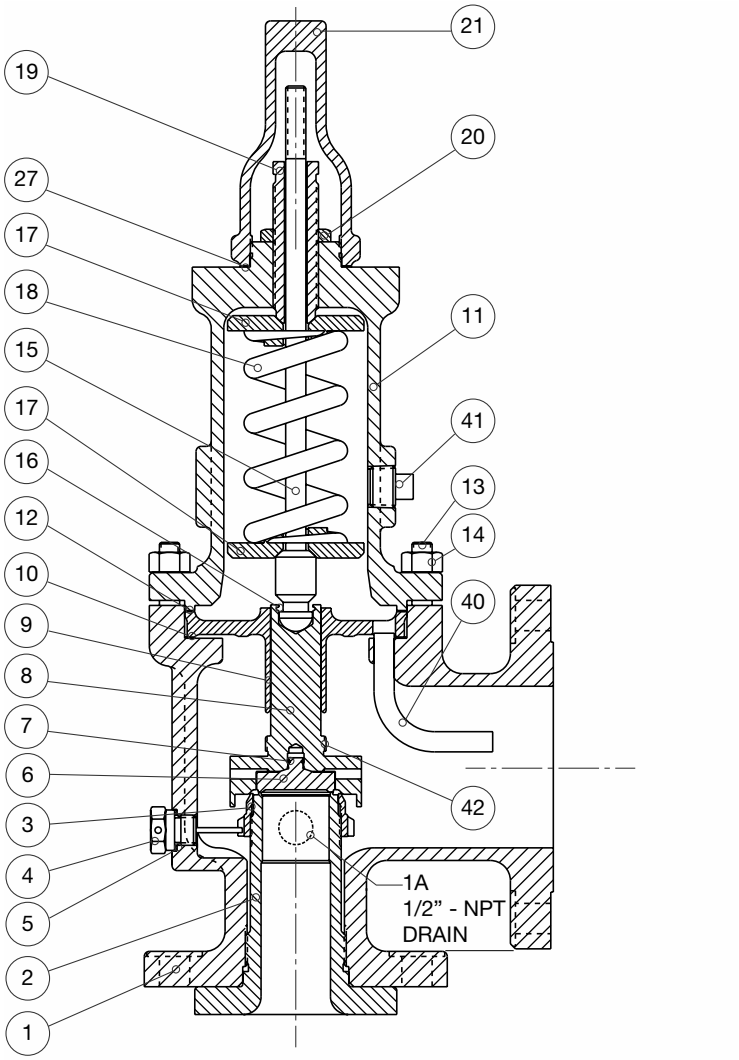


Figure 1: Conventional Metal Seat Valve

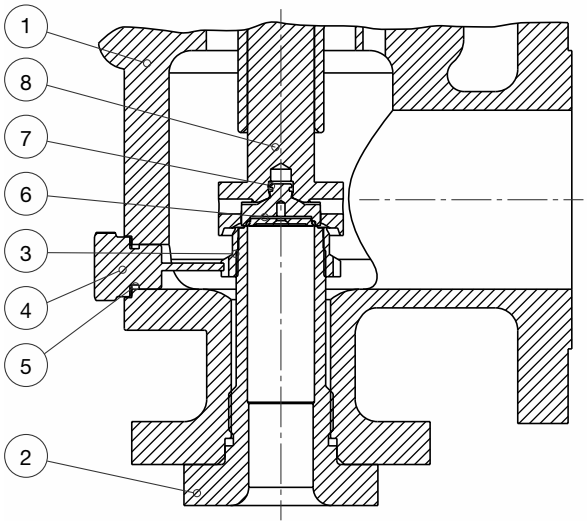


Figure 2: DM Metal Seat Valve

Part No.	Nomenclature
1	Base
2	Nozzle
3	Adjusting Ring
4	Adjusting Ring Pin
5	Adjusting Ring Pin Gasket
6	Disc
7	Disc Retainer
8	Disc Holder
9	Guide
10	Guide Gasket
11	Bonnet
12	Bonnet Gasket
13	Base Stud
14	Stud Nut
15	Spindle
16	Spindle Retainer
17	Spring Washer
18	Spring
19	Adjusting Screw
20	Adjusting Screw Locknut
21	Screwed Cap
27	Cap Gasket
40	Eductor Tube
41	Bonnet Plug
42	Limit Washer[1]

[1]Refer to page 33 and Figure 30 for more details.

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X. Consolidated 1900 Series Safety Relief Valve (Cont.)

B. Standard Cap Types

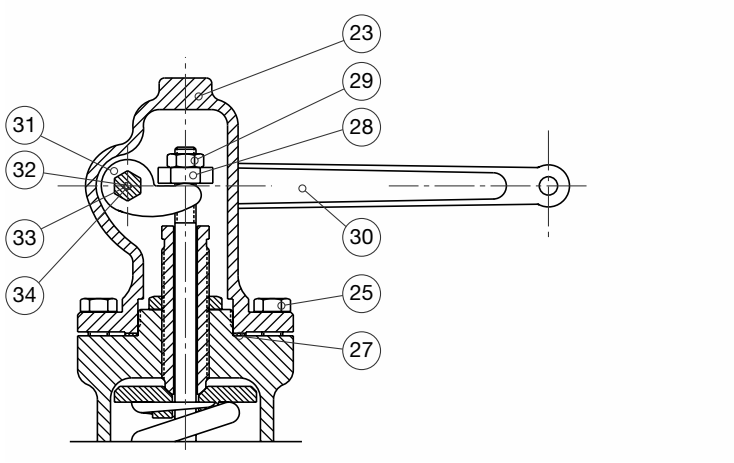


Figure 3: Packed Cap

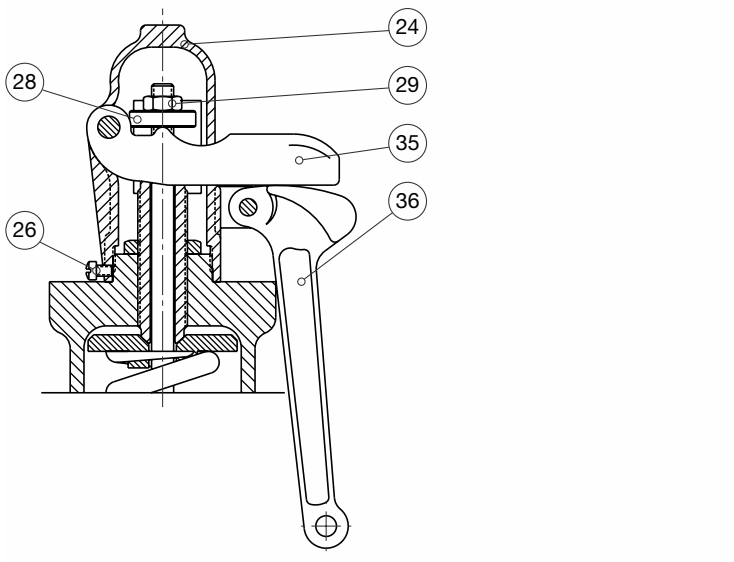


Figure 4: Plain Cap

Part No.	Nomenclature
22	Bolted Cap
23	Packed Cap
24	Plain Cap
25	Cap Bolt
26	Cap Set Screw
27	Cap Gasket
28	Release Nut
29	Release Locknut
30	Lever
31	Lifting Fork
32	Lever Shaft
33	Packing
34	Packing Nut
35	Top Lever
36	Drop Lever
37	Gag
38	Sealing Plug
39	Sealing Plug Gasket

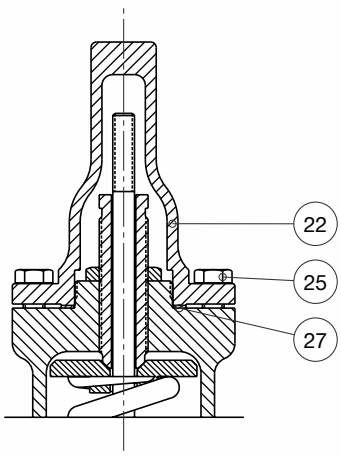


Figure 5: Bolted Cap

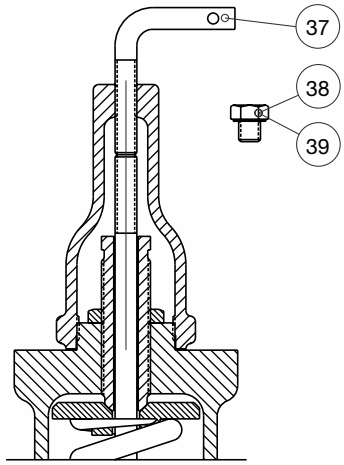


Figure 6: Cap with Gag

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X. Consolidated 1900 Series Safety Relief Valve (Cont.)

C. Bellows Metal Seat Valve

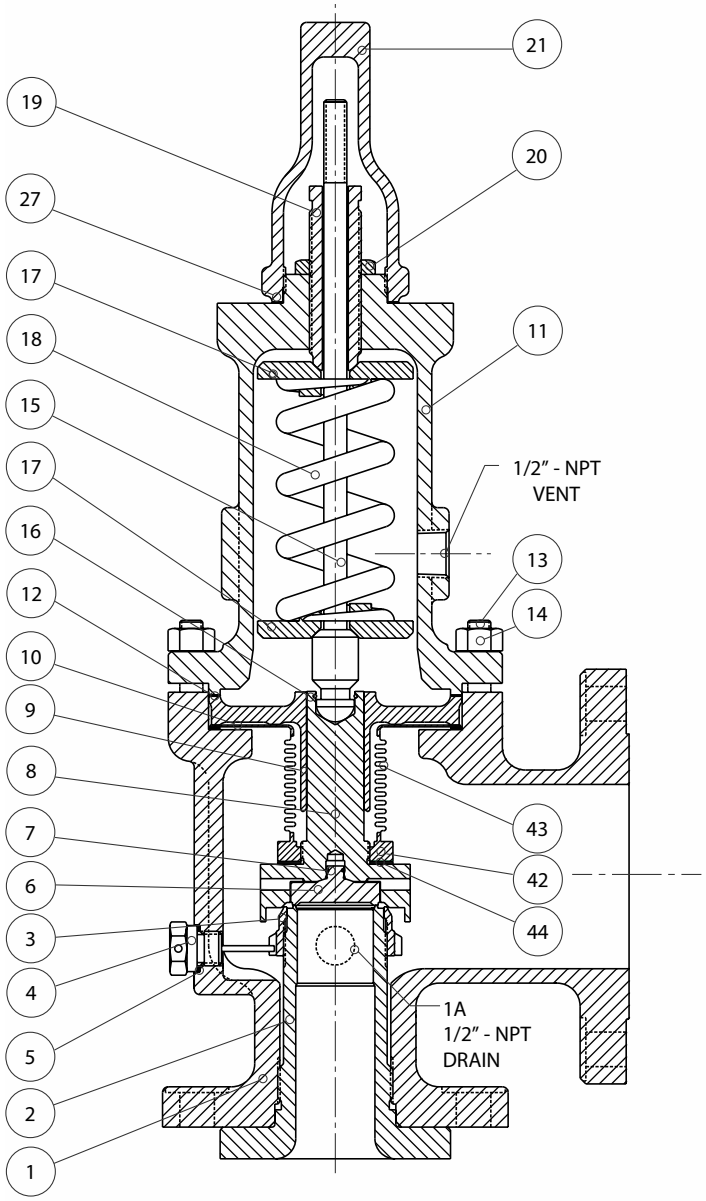


Figure 7: Bellows Metal Seat Valve Construction

Part No.	Nomenclature
1	Base
1A	Base Plug
2	Nozzle
3	Adjusting Ring
4	Adjusting Ring Pin
5	Adjusting Ring Pin Gasket
6	Disc
7	Disc Retainer
8	Disc Holder
9	Guide
10	Guide Gasket
11	Bonnet
12	Bonnet Gasket
13	Base Stud
14	Stud Nut
15	Spindle
16	Spindle Retainer
17	Spring Washer
18	Spring
19	Adjusting Screw
20	Adjusting Screw Locknut
21	Screwed Cap
27	Cap Gasket
42	Limit Washer[1]
43	Bellows
44	Bellows gasket

[1]Refer to page 33 and Figure 30 for more details.

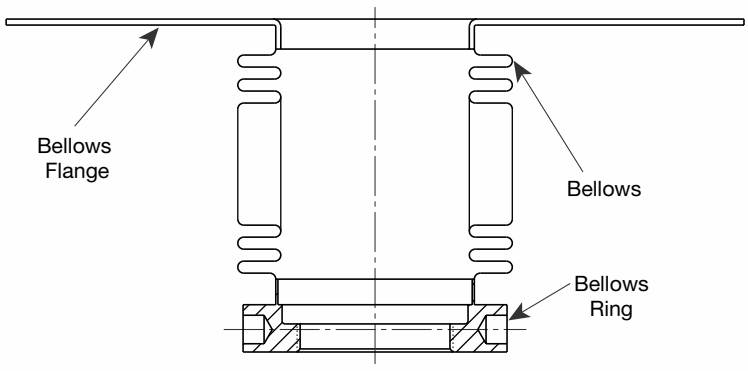


Figure 8: Bellows Assembly

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X. Consolidated 1900 Series Safety Relief Valve (Cont.)

D. V-W Bellows Metal Seat Valve

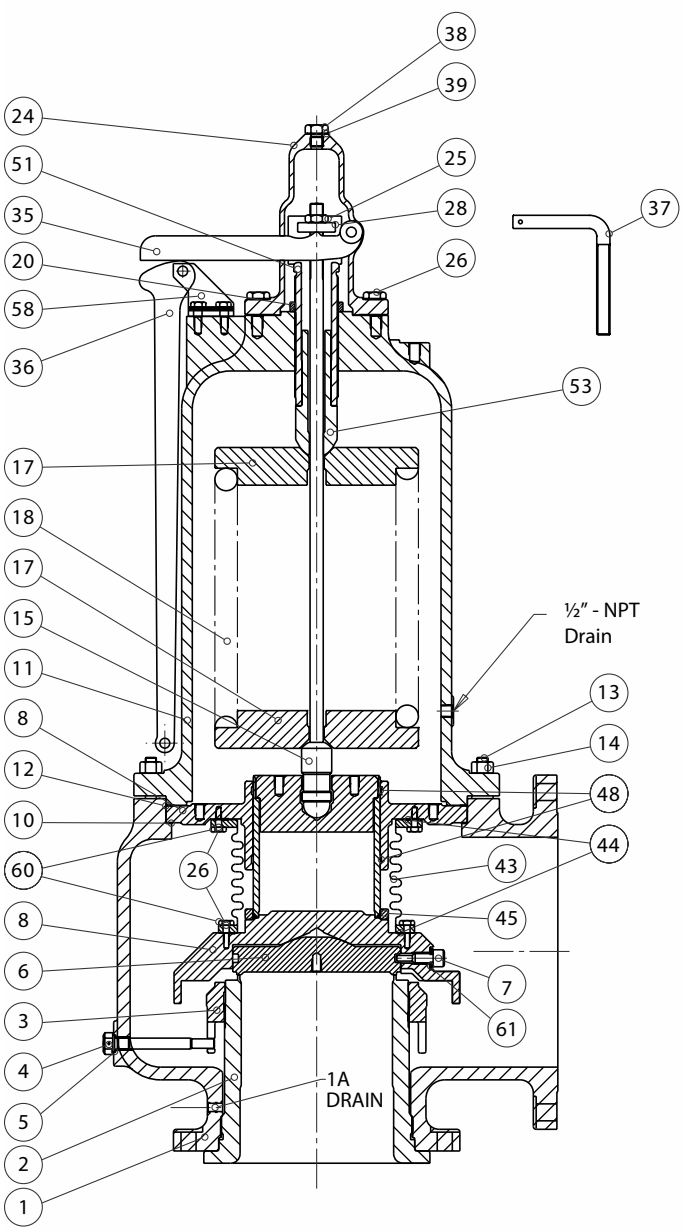


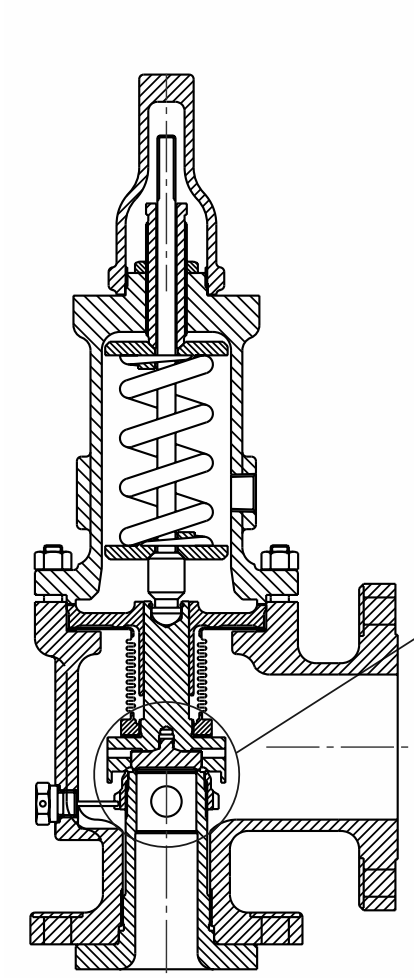
Figure 9: V & W Orifice Valve Construction

Part No.	Nomenclature
1	Base
2	Nozzle
3	Adjusting Ring
4	Adjusting Ring Pin
5	Adjusting Ring Pin Gasket
6	Disc
7	Disc Retainer
8	Disc Holder
9	Guide
10	Guide Gasket
11	Bonnet
12	Bonnet Gasket
13	Base Stud
14	Stud Nut
15	Spindle
16	Spindle Retainer
17	Spring Washer
18	Spring
19	Adjusting Screw
20	Compression Screw Locknut
24	Plain Cap
25	Release Locknut
26	Cap Set Screw
28	Release Nut
35	Top Lever
36	Drop Lever
37	Gag
38	Sealing Plug
39	Sealing Plug Gasket
43	Bellows
44	Bellows gasket
45	Overlift Restrictor
48	Guide RIngs
51	Compression Screw
53	Spring Plunger
58	Clevis
60	Lockscrew Washer (Bellows)
61	Retainer Screw Lockwasher

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X. Consolidated 1900 Series Safety Relief Valve (Cont.)

E. Soft Seat Valve



Conventional O-Ring Soft Seat Valve

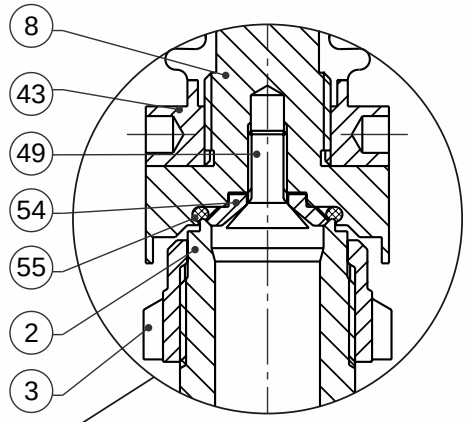


Figure 10a: D - J Orifice

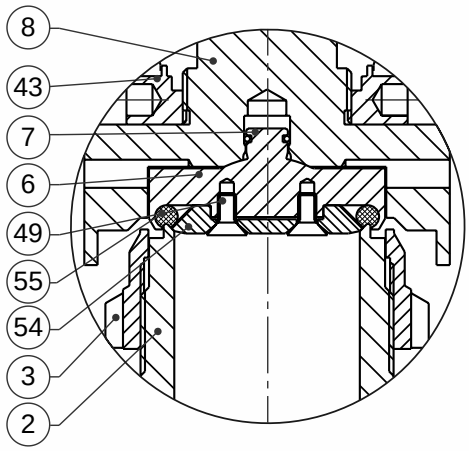


Figure 10b: 1900 DM, D-U Orifice

Part No.	Nomenclature
2	Nozzle
3	Adjusting Ring
6	Disc
7	Disc Retainer
8	Disc Holder
43	Bellows
49	O-Ring Retainer Lockscrew
54	O-Ring Retainer
55	O-Ring Seat Seal

Figure 10: Soft Seat Valve Construction

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X. Consolidated 1900 Series Safety Relief Valve (Cont.)

F. Thermodisc

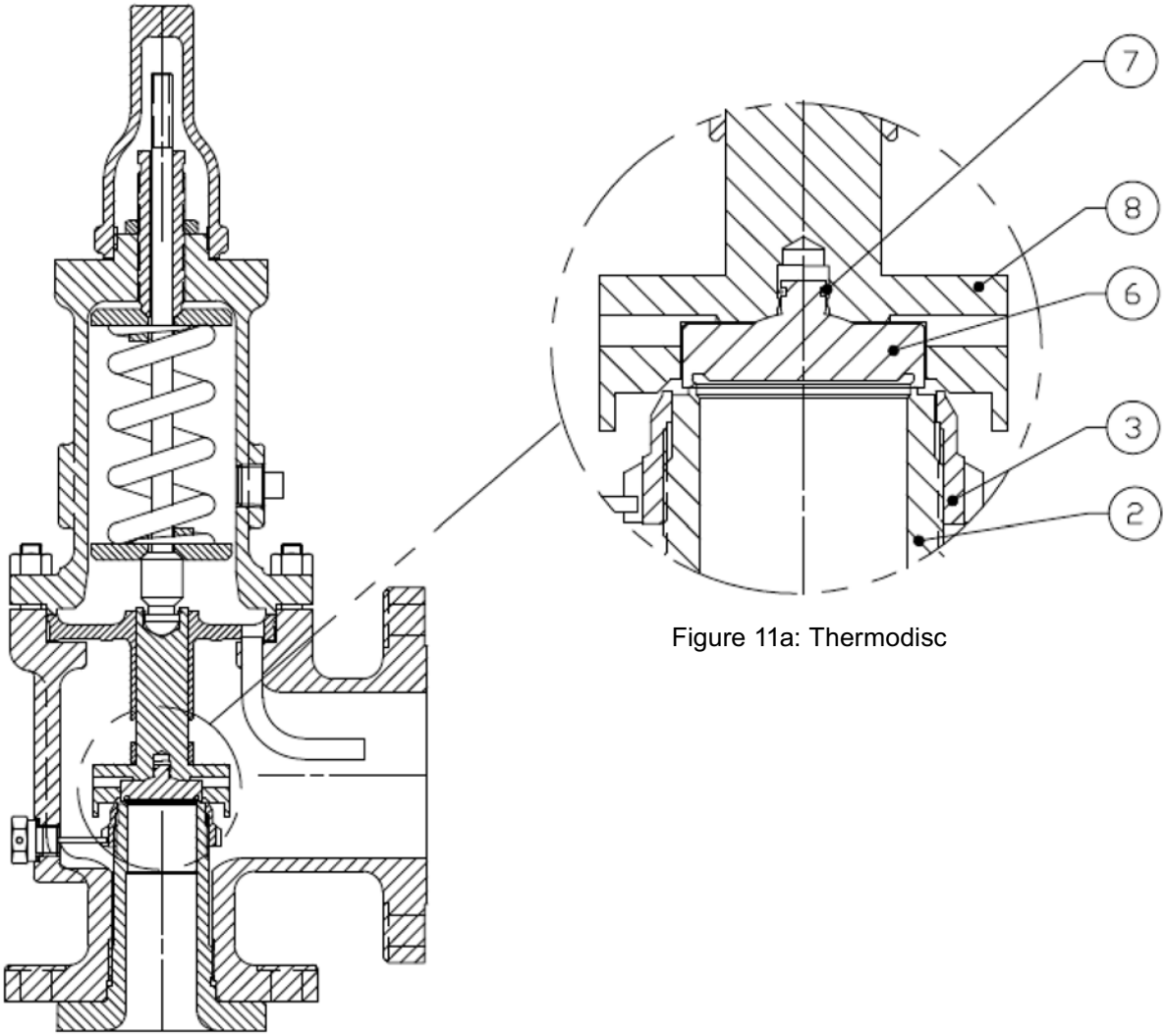


Figure 11a: Thermodisc

Figure 11: Thermodisc Valve Construction

Part No.	Nomenclature
2	Nozzle
3	Adjusting Ring
6	Disc
7	Disc Retainer
8	Disc Holder

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X. Consolidated 1900 Series Safety Relief Valve (Cont.)

G. Cryodisc

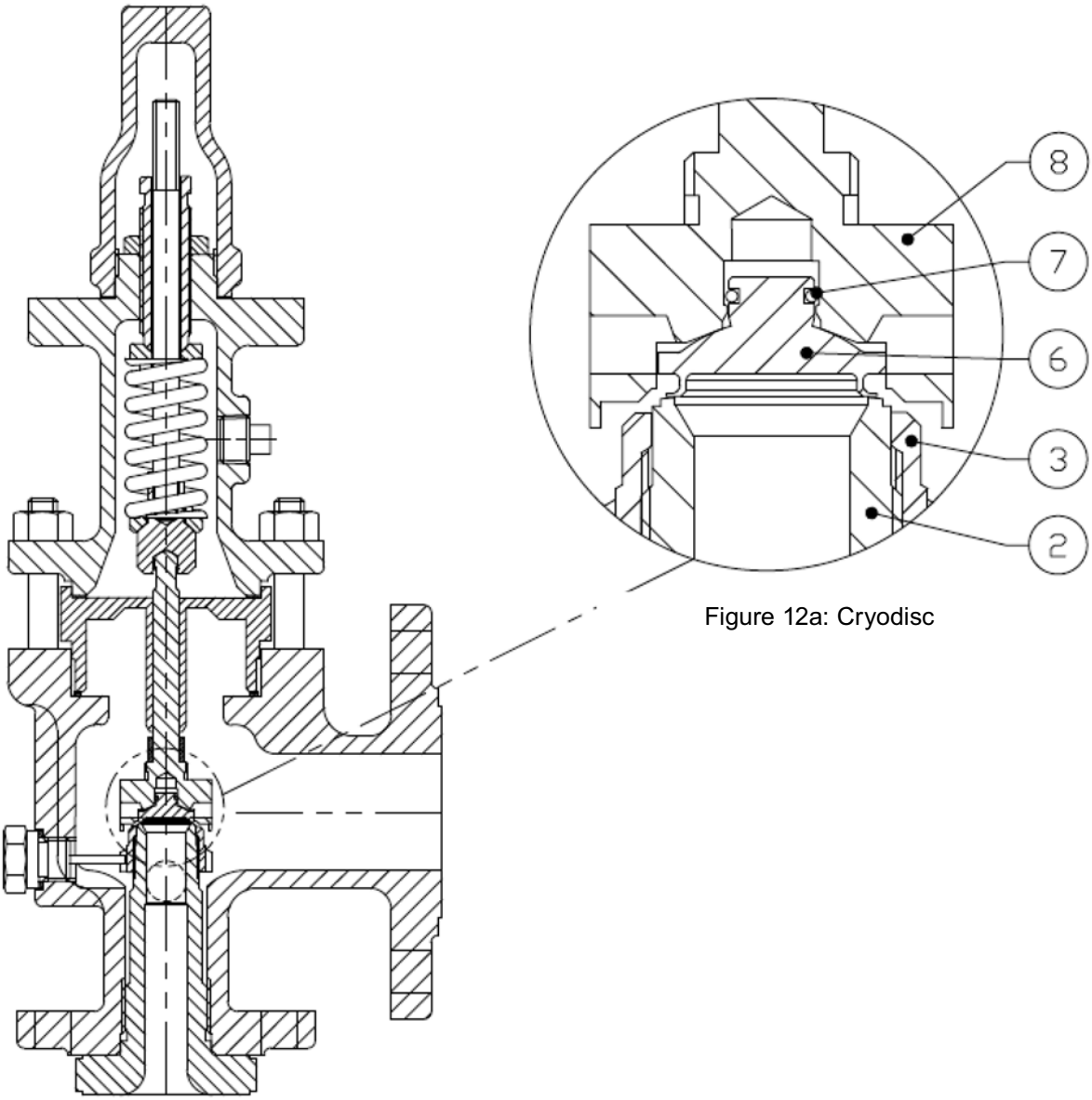


Figure 12a: Cryodisc

Figure 12: Cryodisc Valve Construction

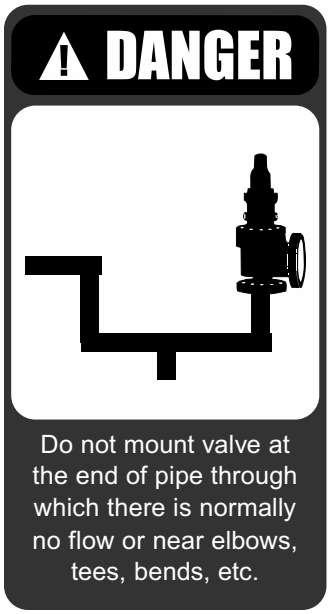
Part No.	Nomenclature
2	Nozzle
3	Adjusting Ring
6	Cryodisc
7	Disc Retainer
8	Disc Holder

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XI. Recommended Installation Practices



Mount safety relief valves in a vertical, upright position only.



Do not mount valve at the end of pipe through which there is normally no flow or near elbows, tees, bends, etc.



Heed all service manual warnings. Read installation instructions before installing valve(s).

A. Mounting Position

Mount SRVs in a vertical (upright) position (in accordance with API RP 520). Installing a safety relief valve in any position other than vertical (±1 degree) will adversely affect its operation as a result of the induced misalignment of moving parts.

A stop valve may be placed between the pressure vessel and its relief valve only as permitted by code regulations. If a stop valve is located between the pressure vessel and SRV, the stop valve port area should equal or exceed the nominal internal area associated with the pipe size of the SRV inlet. The pressure drop from the vessel to the SRV shall not exceed 3% of the valve's set pressure, when flowing at full capacity.

Ensure the flange and sealing faces of the valve and connective piping are free from dirt, sediment, and scale.

Ensure all flange bolts are drawn evenly to prevent distortion of the valve body and the inlet nozzle.

Position SRVs for easy access and/or removal so that servicing can be properly performed. Ensure sufficient working space is provided around and above the valve.

B. Inlet Piping

The inlet piping (see Figure 13) to the valve should be short and directly from the vessel or equipment being protected. The radius of the connection to the vessel should permit smooth flow to the valve. Avoid sharp corners. If this is not practical, then the inlet should be at least one additional pipe diameter larger.

The pressure drop from the vessel to the valve shall not exceed 3% of valve set pressure when the valve is allowing full capacity flow. The inlet piping should never be smaller in diameter than the inlet connection of the valve. Excessive pressure drop in gas, vapor, or flashing-liquid service at the inlet of the SRV will cause the extremely rapid opening and closing of the valve, which is known as "chattering." Chattering will result in lowered capacity and damage to the seating surfaces. The most desirable installation is that in which the nominal size of the inlet piping is the same as, or greater than, the nominal size of the valve inlet flange and in which the length does not exceed the face-to-face dimensions of a standard tee of the required pressure class.

Do not locate SRV inlets where excessive turbulence is present, such as near elbows, tees, bends, orifice plates or throttling valves.

Section VIII of the ASME Boiler and Pressure Vessel Code requires the inlet connection design to consider stress conditions during valve operation, caused by external loading, vibration, and loads due to thermal expansion of the discharge piping.

The determination of reaction forces during valve discharge is the responsibility of the vessel and/or piping designer. Baker Hughes publishes certain technical information about reaction forces under various fluid flow conditions, but assumes no liability for the calculations and design of the inlet piping.

External loading, by poorly designed discharge piping and support systems, and forced alignment of discharge piping can cause excessive stresses and distortions in the valve as well as the inlet piping. The stresses in the valve may cause a malfunction or leak. Therefore, discharge piping must be independently supported and carefully aligned.

Vibrations in the inlet piping systems may cause valve seat leakage and/or fatigue

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XI. Recommended Installation Practices (Cont.)

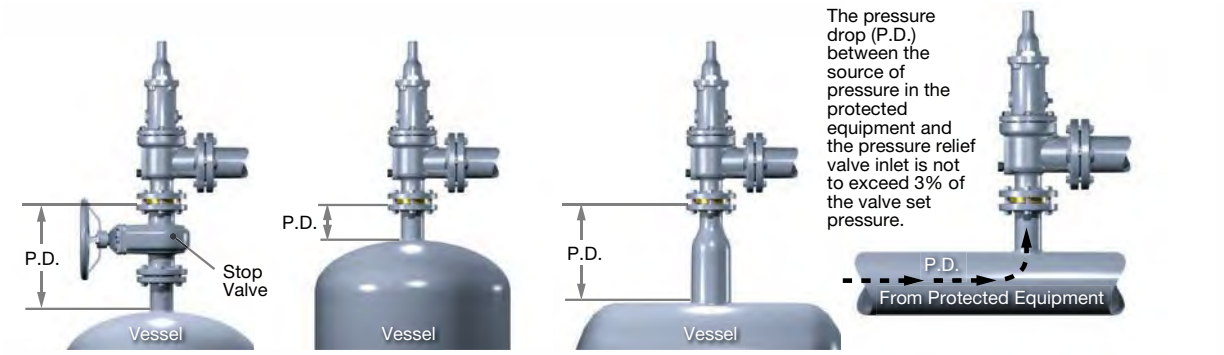


Figure 13: Pressure Drop on the Inlet Piping

failure. These vibrations may cause the disc seat to slide back and forth across the nozzle seat and may result in damage to the seating surfaces. Also, vibration may cause separation of the seating surfaces and premature wear to valve parts. High-frequency vibrations are more detrimental to SRV tightness than low-frequency vibrations. This effect can be minimized by providing a larger difference between the operating pressure of the system and the set pressure of the valve, particularly under high frequency conditions.

Temperature changes in the discharge piping may be caused by fluid flowing from the discharge of the valve or by prolonged exposure to the sun or heat radiated from nearby equipment. A change in the discharge piping temperature will cause a change in the length of the piping, which may cause stresses to be transmitted to the SRV and its inlet piping. Proper support, anchoring or provision for flexibility of the discharge piping can prevent stresses caused by thermal changes. Do not use fixed supports.

C. Outlet Piping

Alignment of the internal parts of the SRV is important to ensure proper operation (see Figure 14). Although the valve body will withstand a considerable mechanical load, unsupported discharge piping consisting of more than a companion flange long-radius elbow, and a short vertical pipe is not recommended. Use spring supports to connect outlet piping to prevent thermal expansion from creating strains on the valve. The discharge piping should be designed to allow for vessel expansion as well as expansion of the discharge pipe itself. This is particularly important on long distance lines.

A continual oscillation of the discharge piping (wind loads) may induce stress distortion in the valve body. The resultant movement of the valve's internal parts may cause leakage.

Where possible, use properly supported drainage piping to prevent the collection of water or corrosive liquid in the valve body.

When two or more valves are piped to discharge into a common header, the built-up backpressure resulting from the opening of one (or more) valve(s) may cause a superimposed backpressure in the remaining valves. Under these conditions, the use of bellows valves is recommended. The use of bellows valves may also permit the use of a smaller-size manifold. In every case, the nominal discharge pipe size should be at least as large as the nominal size of the SRV outlet flange In the case of long discharge piping, the nominal discharge pipe size must sometimes be much larger.

ATTENTION!

All non-bellows valves should have a bonnet plug installed. Bellows valves must have an open bonnet vent.

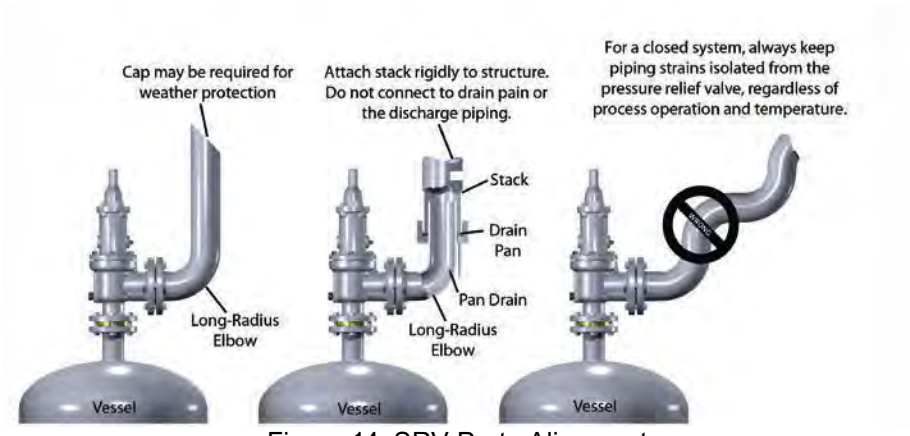


Figure 14: SRV Parts Alignment

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XII. Disassembly of 1900 Series Safety Relief Valves

A. General Information

Consolidated SRVs can be easily disassembled for inspection, the reconditioning of seats or the replacement of internal parts. Appropriate set pressure can be established after reassembly. (See Figures 1 through 10 for parts nomenclature.)

ATTENTION!

Do not interchange parts from one valve with parts from another valve.

B. SRV Disassembly

1. If equipped, remove the lifting lever gear as follows:

- Plain Lever (see Figure 4)
  - Remove cotter pin, lever pin and plain lever [one-piece design] or top lever [two-piece design].
- Packed Lever (see Figure 3)
  - Disassembly not required. Rotate lever counterclockwise, positioning lifting fork so that it clears release nut during cap removal.

2. Remove the cap.
3. Remove the cap gasket (27), if applicable.
4. Remove adjusting ring pin (4) and adjusting ring pin gasket (5).
5. If the existing blowdown is to be restored upon reassembly, determine the position of the adjusting ring (3) with respect to the disc holder (8) as follows:

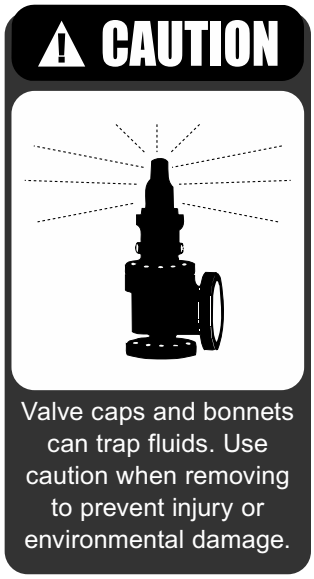
- Turn the adjusting ring counterclockwise (move notches on the adjusting ring from left to right).
  - Record the number of notches that pass the ring pinhole before the ring contacts the disc holder.

ATTENTION!

This procedure does not substitute for actual pressure testing.



Wear necessary protective equipment to prevent possible injury



Valve caps and bonnets can trap fluids. Use caution when removing to prevent injury or environmental damage.



Before disassembling the valve, ensure there is no media pressure in the vessel.



Many pressure vessels protected by Consolidated Safety Relief Valves contain dangerous materials. Decontaminate and clean the valve inlet, outlet, and all external surfaces in accordance with the cleaning and decontaminating recommendations in the appropriate Material Safety Data Sheet.

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XII. Disassembly of 1900 Series Safety Relief Valves (Cont.)

6. Follow the procedure appropriate to the orifice valve type:

- Using a depth micrometer or a dial caliper, measure the distance from the top of the spindle (15) to the top of the adjusting screw (19). This allows the adjusting screw to be readjusted close to the proper spring compression without excessive testing.
- Record the measurement for reference when reassembling the valve.
- D through U orifice valves:
  - Loosen the adjusting screw locknut (20).
  - Remove the adjusting screw from the bonnet (11). Use pliers to prevent the spindle from turning when removing the adjusting screw.
- V and W orifice valves:

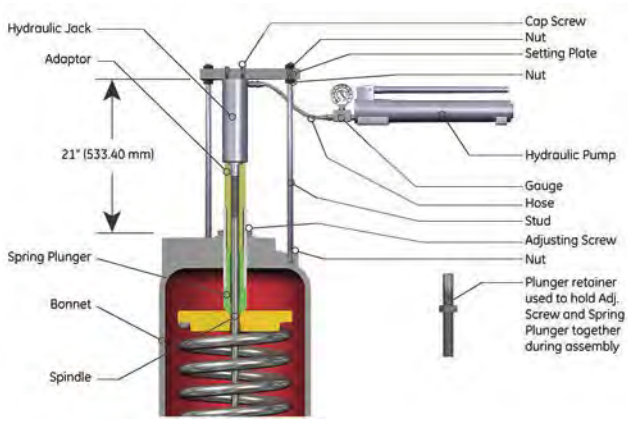


Figure 15: Setting Device for V and W Orifice

  - Attach the setting device (see Figure 15).
  - Apply enough pressure to the plunger using the ram to free the adjusting screw.
  - Loosen the adjusting screw locknut.
  - Completely unscrew the adjusting screw from the bonnet.

7. Remove the stud nuts (14) and lift off the bonnet (11).

ATTENTION!

Set the valve using the setting procedures after reassembly

8. Remove the bonnet gasket (12).
9. Remove the spring (18) and the spring washers (17). Keep the spring and spring washers together as a unit, at all times.
10. Follow the procedure appropriate to the valve type:

- D through L orifice valves:
  - Remove the upper internal parts by carefully pulling “straight up” on the spindle (15). For bellows valves, take care to avoid damaging the bellows or its flange. If parts are fouled use a suitable solvent for loosening the components.
  - Clamp the skirt portion of the disc holder (8) snugly between two wooden V-blocks in a suitable vise.
  - Compress the spindle retainer (16) with a screwdriver or similar tool through the slots provided and remove the spindle.
- M through U orifice valves:

ATTENTION!

Special lifting tools are available for ease of upper internal part removal

  - Use a screwdriver to compress the spindle retainer (16).
  - Remove the spindle (15).
  - Insert the lifting tool (see Figure 16) into the disc holder spindle pocket and tighten the eyebolt.
  - Remove the disc holder (8) and disc (6) by lifting up on the lifting tool.
- Valve V and W orifice valve:
  - Use the lifting lugs to lift the disc holder (8) and to remove all internals (see Figure 16).

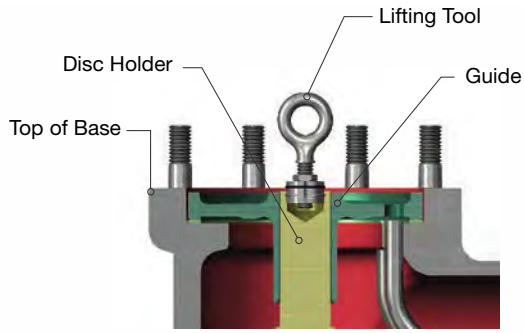


Figure 16: Lifting Tools for M through U Orifice Valves

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XII. Disassembly of 1900 Series Safety Relief Valves (Cont.)

ATTENTION!

The bellows convolutions (see Figure 17) are very thin and fragile. Take care to protect them from damage.

11. Remove the guide (9) from the disc holder (8). (For restricted lift valves, see Checking Lift on Restricted Lift Valves.) For V and W orifice unbolt the bellows from guide before guide removal.

12. For D through U orifice bellows valves (see Figure 7), the bellows is attached to the disc holder (8) by right-hand threads. Use a special spanner wrench on the bellows ring to remove it by turning counterclockwise (see Figure 17).

13. Remove the bellows gasket. For V and W orifice bellows valves (see Figure 9), the bellows is bolted to the disc holder (8). Remove these bolts to disassemble the bellows from the disc holder.

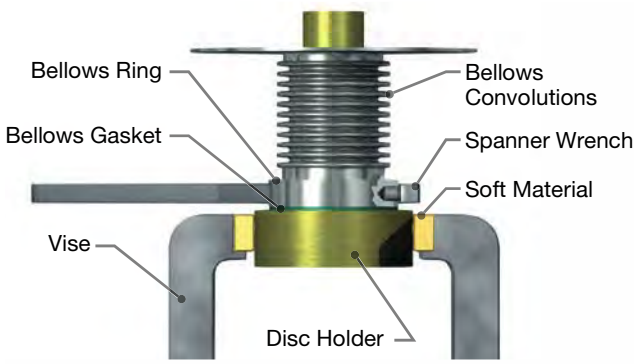


Figure 17: Removing the Bellows Ring

14. Follow the procedure appropriate to the orifice valve type:

- For D through U orifice valves (see Figure 7), remove the disc (6) from the disc holder (8) as follows:
  - Grasp disc holder by the stem portion, disc end down, and firmly strike down onto a clean, wood surface. Disc should dislodge from disc holder.

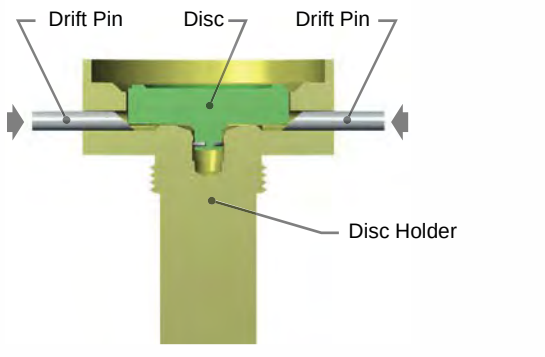


Figure 18: Removing the Disc with Drift Pins

  - If disc did not dislodge from disc holder, then clamp the stem portion of the disc holder, disc end up, firmly between two wooden V-blocks in a vise.
  - Start inserting special drift pins into the holes in the disc holder (see Figure 18) with the tapered portion of the pins working against the top of the disc, as indicated.
  - Use a light machinist hammer to tap each pin alternately until the disc snaps out of the recess in the disc holder.
- For V and W orifice valves (see Figure 9), remove the disc from the disc holder as follows:
  - Turn the disc holder on its side
  - Remove the retaining bolts (7)
  - Attach the lifting lug to the disc and lift out
  - Inspect guide rings (48) for wear and replace if necessary.

15. For O-ring seat seal and universal media soft-seal valves only (See Figures 10a, 10b &10c), remove the retainer lock screw (s), retainer, and O-ring or Teflon™ seal.

16. Remove the adjusting ring (3) by turning it counterclockwise (from left to right).

ATTENTION!

The nozzle (2) is normally removed for routine maintenance and service.

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XII. Disassembly of 1900 Series Safety Relief Valves (Cont.)

- 17. The nozzle (2) is threaded onto the base (1) and is removed by turning it counterclockwise (from right to left). Before removing the nozzle, soak the threaded joint with a suitable penetrating liquid or solvent. If the nozzle is frozen to the base, apply dry ice or other cooling medium to the inside of the nozzle and heat the base from the outside with a blowtorch in the area of the nozzle threads.

ATTENTION!

Should heat be applied, use care to prevent cracking of cast parts.

- 18. Using a three- or four-jaw chuck welded vertically to a stand bolted to a concrete floor, clamp the nozzle (2) into the chuck and break the body loose with a heavy rod or pipe (see Figure 19).

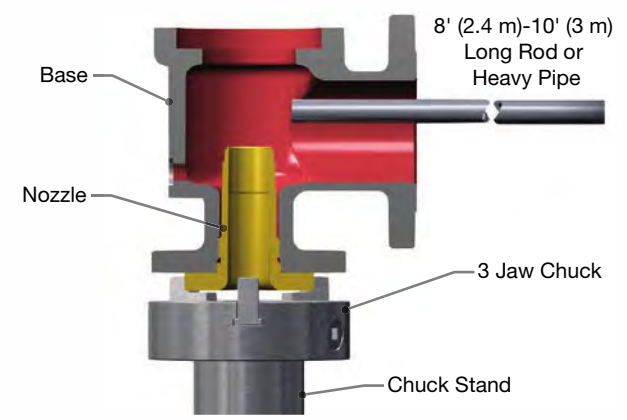


Figure 19: Loosening the Nozzle from the Base

ATTENTION!

Exercise care when inserting a rod or pipe in the outlet. Ensure the valve nozzle is not damaged during the operation.

19. Use a large pipe wrench on the nozzle flange to remove the nozzle (2) from the base (1) (see Figure 20).

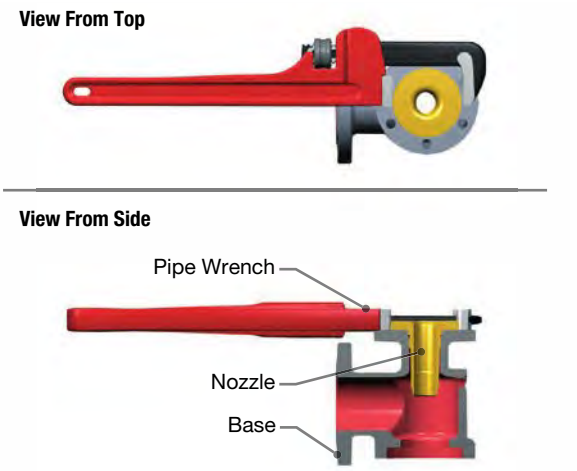


Figure 20: Removing the Nozzle from the Base

C. Cleaning



1900 Series SRV internal parts may be cleaned with industrial solvents, cleaning solutions, and wire brushes. If cleaning solvents are used, take precautions to protect yourself from potential danger from fume inhalation, chemical burns, or explosion. See the solvent's Material Safety Data Sheet (MSDS) for safe handling recommendations and equipment.

Do not sandblast internal parts because it can reduce the dimensions of the parts. The base (1), bonnet (11), and screwed cap (21) may be sand-blasted, but take care not to erode internal surfaces or damage machined surfaces.

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XIII. Maintenance Instructions

A. General Information

After the valve has been disassembled, closely inspect the seating surfaces. Usually, a lapping of seats is all that is necessary to return a valve to working order. If an inspection shows badly damaged valve seating surfaces, machining will be required before lapping. O-ring seat seal valve nozzles can only be reconditioned by machining, not lapping. (For specific information concerning the machining of nozzle and disc seating surfaces, see the Re-Machining Nozzle Seats and Bores and Re-Machining the Disc Seat sections.)

ATTENTION!

See Optional **Glide-Aloy™** Parts to determine if the valve contains Glide-Aloy treated components (i.e., the disc holder and/or the guide). Coding on the valve nameplate identifies these components.

The seating surfaces of the metal-seated Consolidated SRV are flat. The nozzle seat is relieved by a 5º angle on the outside of the flat seat. The disc seat is wider than the nozzle seat; thus, the control of

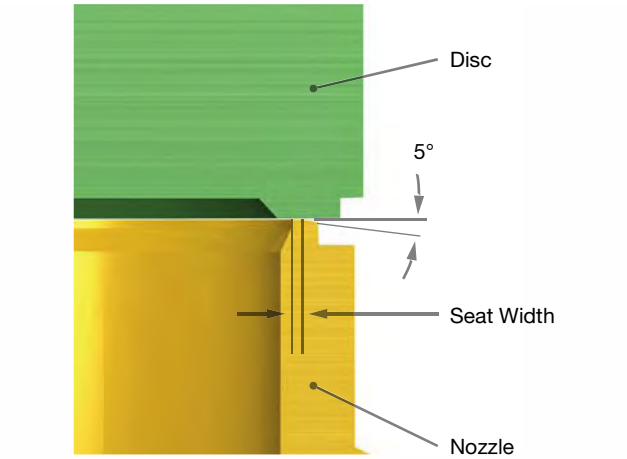


Figure 21: Seating Surface

seat width is the nozzle seat (see Figure 21).

A cast iron lap, coated with a lapping compound, is used for reconditioning the seating surfaces of the nozzle (2) and disc (6).

ATTENTION!

To establish leak-free valve seats, the nozzle seating surface and the disc seating surface must be lapped flat.

B. Lapping Nozzle Seats (Non-O-Ring Styles)

ATTENTION!

Nozzle laps (See Figure 22) are available from Baker Hughes. Do not use these laps if the valve nozzle can be removed and machined to the proper seat dimensions (see Tables 1a and 1c).

Lap the 5º angle of the nozzle first (see Figure 22, View A). Then, invert the nozzle lap and use the flat side as a “starter” lap to ensure the seat is square (see Figure 22, View B). Use a ring lap in a circular motion to finish lapping see Figure 22, View C and Reconditioning of Laps (Figure 24 in Section XIII.G). Keep the lap squarely on the flat surface and avoid rocking it. Rocking will cause rounding of the seat.

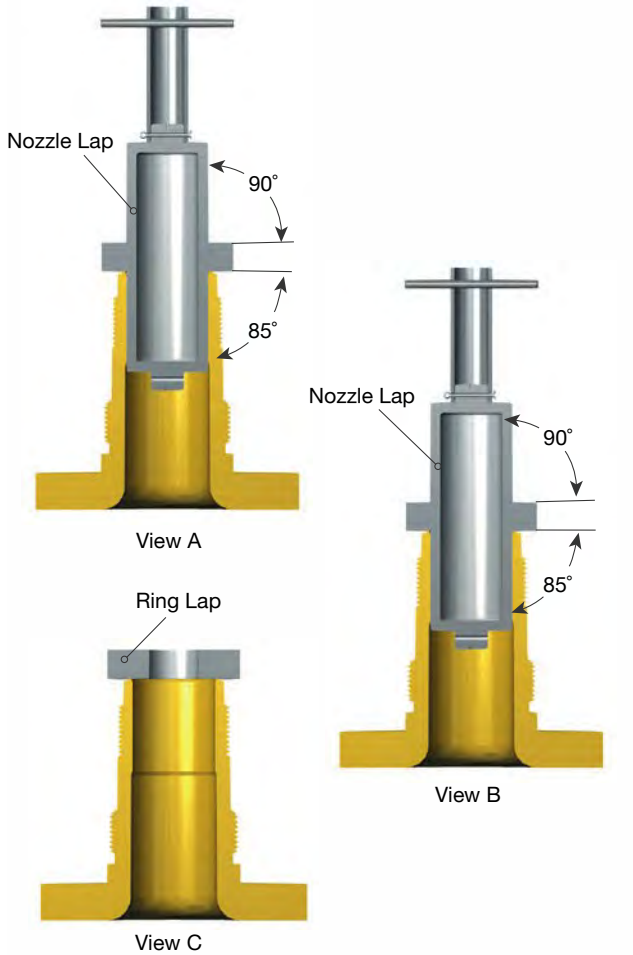


Figure 22: Lapping Nozzle Seats

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XIII. Maintenance Instructions (Cont.)

C. Lapped Nozzle Seat Widths

A wide nozzle seat will induce simmer, especially in the smaller-orifice, lower-pressure valves. For this reason, the seats of valves other than O-ring valves should be as narrow as is practical. Since the seat must be wide enough to carry the bearing load imposed upon it by the spring force, the higher-pressure valves must have wider seats than the lower-pressure valves. The nozzle seat width should conform to the measurements in Tables 1a to 1c.

To measure the seat width, use a Model S1-34-35-37 Bausch and Lomb Optical Co. measuring magnifier or an equivalent seven-power glass with a .750" (19.05 mm) scale showing graduations of .005 inch (0.13 mm). Figures 21a and 21b illustrate the use of this tool in measuring the nozzle seat width.

If additional lighting is required for measuring, use a gooseneck flashlight similar to the Type A Lamp Assembly (Standard Molding Corp.), or equivalent.

Table1a: Nozzle Seat Width Standard 1900 Series Metal Seat Design [3]

Orifice	Set Pressure Range		Lapped Seat Width	
	psig	barg	in.	mm
D-G	1 – 50	0.06 – 3.44	.012 – .015	0.30 – 0.38
	51 – 100	3.51 – 6.89	.015 – .022	0.38 – 0.55
	101 – 250	6.96 – 17.23	.022 – .028	0.55 – 0.71
	251 – 400	17.30 – 27.57	.028 – .035	0.71 – 0.88
	401 – 800	27.64 – 55.15	.035 – .042	0.88 – 1.06
	801 – Above	55.22 – Above	.042 + .005 per 100 psig (.070 ± .005 max)	1.06 + .12 per 6.89 barg (1.77 ± 0.12 max)
H-J	1 – 50	0.06 – 3.44	.019 – .022	0.48 – 0.55
	51 – 100	3.51 – 6.89	.022 – .027	0.55 – 0.68
	101 – 250	6.96 – 17.23	.027 – .031	0.68 – 0.78
	251 – 400	17.30 – 27.57	.031 – .035	0.78 – 0.88
	401 – 800	27.64 – 55.15	.035 – .040	0.88 – 1.01
	801 – Above	55.22 – Above	.040 + .005 per 100 psig (.070 ± .005 max)	1.06 + 0.12 per 6.89 barg (1.77 ± 0.12 max)
K-N	1 – 50	0.06 – 3.44	.025 – .028	0.63 – 0.71
	51 – 100	3.51 – 6.89	.028 – .033	0.71 – 0.83
	101 – 250	6.96 – 17.23	.033 – .038	0.83 – 0.96
	251 – 400	17.30 – 27.57	.038 – .043	0.96 – 1.09
	401 – 800	27.64 – 55.15	.043 – .048	1.09 – 1.21
	801 – Above	55.22 – Above	.048 + .005 per 100 psig (.070 ± .005 max)	1.06 + 0.12 per 6.89 barg (1.77 ± 0.12 max)
P-R	1 – 50	0.06 – 3.44	.030 – .034	0.76 – 0.86
	51 – 100	3.51 – 6.89	.034 – .041	0.86 – 1.04
	101 – 251	6.96 – 17.3	.041 – .049	1.04 – 1.24
	251 – 400	17.30 – 27.57	.049 – .056	1.24 – 1.42
	401 – 800	27.64 – 55.15	.056 – .062	1.42 – 1.57
	801 – Above	55.22 – Above	.062 – .064	1.57 – 1.62
T	1 – 50	0.06 – 3.44	.040 – .043	1.01 – 1.09
	51 – 100	3.51 – 6.89	.043 – .049	1.09 – 1.24
	101 – 250	6.96 – 17.23	.049 – .057	1.24 – 1.44
	251 – 300	17.30 – 20.68	.057 – .060	1.44 – 1.52
U	1 – 50	0.06 – 3.44	.040 – .043	1.01 – 1.09
	51 – 100	3.51 – 6.89	.043 – .049	1.09 – 1.24
	101 – 250	6.96 – 17.23	.049 – .057	1.24 – 1.44
	251 – 300	17.30 – 20.68	.057 – .060	1.44 – 1.52
V	1 – 50	0.06 – 3.44	.075 – .083	1.90 – 2.10
	51 – 100	3.51 – 6.89	.083 – .103	2.10 – 2.61
	101 – 250	6.96 – 17.23	.103 – .123	2.61 – 3.12
	251 – 300	17.30 – 20.68	.123 – .130	3.12 – 3.30
W	1 – 50	0.06 – 3.44	.100 – .110	2.54 – 2.79
	51 – 100	3.51 – 6.89	.110 – .130	2.79 – 3.30
	101 – 250	6.96 – 17.23	.130 – .150	3.30 – 3.81
	251 – 300	17.30 – 20.68	.150 – .160	3.81 – 4.06

[3] + .005" (0.13 mm) per 100 psig (6.89 barg) [.070"(1.78 mm) ± .005"(0.13) max].

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XIII. Maintenance Instructions (Cont.)

Table 1b: Nozzle Seat Width Standard 1900 Series Thermodisc and Cryodisc Design [3]				
Orifice	Set Pressure Range		Lapped Seat Width	
	psig	barg	in.	mm
D-F	1 – 100	0.07 – 6.89	.020 – .030	0.51 – 0.76
	101 – 300	6.96 – 20.68	.035 – .045	0.89 – 1.14
	301 – 800	20.75 – 55.16	.045 – .055	1.14 – 1.40
	801 – Above	55.23 – Above	Full Width[3]	Full Width[3]
G-J	1 – 100	0.07 – 6.89	.025 – .035	0.64 – 0.89
	101 – 300	6.96 – 20.68	.035 – .045	0.89 – 1.14
	301 – 800	20.75 – 55.16	.045 – .055	1.14 – 1.40
	801 – Above	55.23 – Above	Full Width[3]	Full Width[3]
K-N	1 – 100	0.07 – 6.89	.035 – .045	0.89 – 1.14
	101 – 300	6.96 – 20.68	.045 – .055	1.14 – 1.40
	301 – 800	20.75 – 55.16	.055 – .065	1.40 – 1.65
	801 – Above	55.23 – Above	Full Width[3]	Full Width[3]
P-R	1 – 100	0.07 – 6.89	.040 – .050	1.02 – 1.27
	101 – 130	6.96 – 8.96	.050 – 0.065	1.27 – 1.65
	131 – 800	9.03 – 55.16	.060 – .070	1.52 – 1.78
	801 – Above	55.23 – Above	Full Width[3]	Full Width[3]
T	1 – 100	0.07 – 6.89	.050 – .065	1.27 – 1.65
	101 – 300	6.96 – 20.68	.060 – .075	1.52 – 1.91
U	1 – 100	0.07 – 6.89	.050 – .065	1.27 – 1.65
	101 – 300	6.96 – 20.68	.060 – .075	1.52 – 1.91
V	1 – 100	0.07 – 6.89	.075 – .100	1.52 – 2.54
	101 – 300	6.96 – 20.68	.100 – .130	2.54 – 3.30
W	1 – 100	0.07 – 6.89	.100 – .125	2.54 – 3.18
	101 – 300	6.96 – 20.68	.120 – .160	3.05 – 4.06

[3] Not to exceed .070"(1.78 mm) ± .005"(0.13).

Table 1c. Nozzle Seat Width 1900 DM/UM Metal Seat and Cryodisc Design[4]							
Size	**Set Pressure Range**		**Seat width, inch**	**Size**	**Set Pressure Range**		**Seat width, inch**
	psig	**barg**			**psig**	**barg**	
D - G	15 - 1000	2.04 - 69.9	0.010 – 0.015	**L - N**	15 - 750	2.04 - 52.7	0.015 - 0.020
	1001 - 1500	70.0 - 104.4	0.015 – 0.020		751 - 1000	52.7 - 69.9	0.020 - 0.030
	1501 - 2000	104.5 - 138.9	0.020 – 0.025		1001 - 1250	70.0 - 87.1	0.030 - 0.040
	2001 - 2500	138.9 - 173.3	0.025 – 0.030		1251 - 1600	87.2 - 111.3	0.040 - 0.050
	2501 - 4000	173.4 - 276.8	0.030 – 0.040	**P**	15 - 750	2.04 - 52.7	0.025 - 0.035
	4001 - 6250	276.8 - 431.9	0.040 – 0.060		751 - 1000	52.7 - 69.9	0.030 - 0.040
H - J	15 - 750	2.04 - 52.7	0.010 – 0.015		1001 - 1250	70.0 - 87.1	0.040 - 0.050
	751 – 1250	52.7 - 87.1	0.015 – 0.020		1251 - 1700	87.2 - 118.2	0.050 - 0.060
	1251 – 1750	87.2 - 121.6	0.020 – 0.025	**Q**	15 - 600	2.04 - 42.3	0.025 - 0.035
	1751 – 2250	121.7 - 156.1	0.025 – 0.030		601 - 900	42.4 - 63.0	0.035 - 0.060
	2251 – 2750	156.2 - 190.6	0.030 – 0.040	**R**	15 - 400	2.04 - 28.5	0.020 - 0.030
	2751 – 3300	190.6 - 228.5	0.040 – 0.060		401 - 650	28.6 - 45.8	0.030 - 0.050
K	15 – 1000	2.04 - 69.9	0.015 – 0.020	**T - U**	15 - 360	2.04 - 25.8	0.025 - 0.045
	1001 – 1500	70.0 - 104.4	0.020 – 0.025				
	1501 – 2000	104.5 - 138.9	0.025 – 0.030				
	2001 – 2750	138.9 - 200.9	0.030 – 0.045				

[4] For 1900DM/UM Soft Seat, the nozzle seat shall not be lapped and left at the 5-degree angle. The corner should be inspected to ensure its rounded. The corner should be deburred if needed.

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XIII. Maintenance Instructions (Cont.)

D. Lapping Disc Seats

Use a ring lap or lapping plate to lap the disc in a circular motion, applying uniform pressure and slowly rotating the disc or lap.

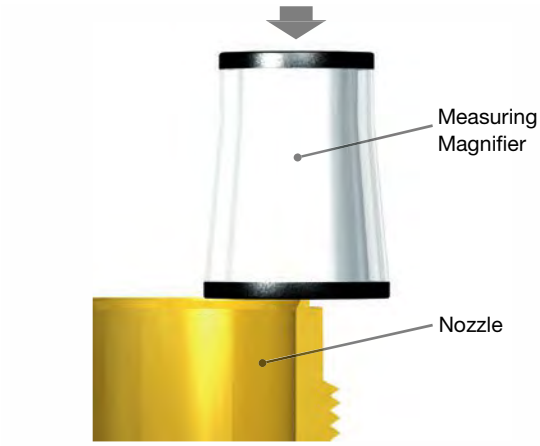


Figure 23a: Measuring Magnifier

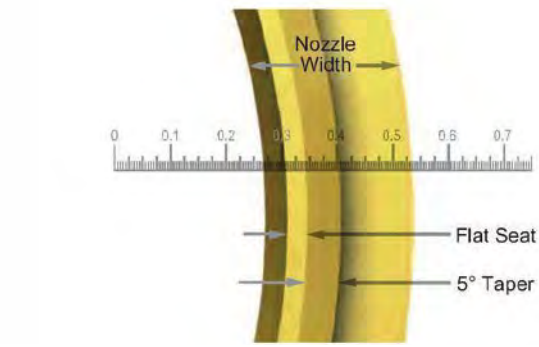


Figure 23b: Measuring Magnifier Detail

E. Precautions and Hints for Lapping Seats

To ensure a quality lapping process, observe precautions and guidelines as follows:

- Keep work materials clean.
- Always use a fresh lap. If signs of wear (out of flatness) are evident, recondition the lap.
- Apply a very thin layer of lapping compound to the lap to prevent rounding off the edges of the seat.
- Keep the lap squarely on the flat surface, and avoid rocking the lap, which causes rounding of the seat.
- When lapping, keep a firm grip on the lapped part to prevent dropping it and damaging the seat.
- Lap in a circular motion while applying a uniform pressure. Slowly rotate the lap to evenly distribute the lapping compound.
- Wipe off the old compound and replace it with new compound frequently. Apply more pressure to speed the cutting action of the compound.
- To check the seating surfaces, remove all compound from the seat and the lap. Then, shine the seat with the same lap using the lapping method as described above. Low sections on the seating surface show up as shadow in contrast to the shiny portion.
- If shadows are present, further lapping is necessary. Only laps known to be flat can be used. It should take only a few minutes to remove the shadows.
- When lapping is complete, any lines appearing as cross-scratches can be removed by rotating the lap on its axis (which has been wiped clean of compound) on the seat.
- Thoroughly clean the lapped seat using a lint free cloth and a cleansing fluid.

ATTENTION!

Before assembly, lap the contact surfaces of the nozzle, soft-seat disc (DM DA) and o-ring retainer to provide metal-to-metal seat tightness in the event of O-ring failure.

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XIII. Maintenance Instructions (Cont.)

F. Lapping O-Ring Seating Surfaces

Refer to Figures 10a and 10b and assemble the O-ring retainer to the disc holder (8) (D through J orifice) or disc (6) (K through U orifice) using the retainer lock screw(s)
as follows:

1. Apply 3A lapping compound to the retainer seating surface.
2. Place the O-ring retainer on the nozzle seat (see Figure 10a and 10b) and lap the O-ring retainer to the nozzle (2).
3. Once uniform contact is established, clean the nozzle (2) and O-ring retainer.
4. Repeat the procedure with 1000-grit compound.
5. Remove the retainer lock screw(s) and O-ring retainer, and thoroughly clean the O-ring retainer, retainer lock screws, and disc holder (8) or disc (6).

G. Reconditioning of Laps

Ring laps are reconditioned by lapping them on a flat lapping plate in a figure-eight motion (see Figure 24). To ensure the best results, recondition the ring laps after each use. Use an optical flat to check the quality of the lap.

Nozzle laps (see Figure 25) must be re-machined to recondition the lapping surfaces. Place the nozzle lap in a lathe between centers (see Figure 25). The surfaces marked A and B must be running concentrically.

One lapping surface is 90º and the other is 85º. The angle of each surface is marked on the lap. Machine surfaces C and D by taking light cuts at the proper angle until the lapping surfaces are reconditioned.

H. Re-Machining Nozzle Seats and Bores

1. Remove the nozzle (2) from the valve to be

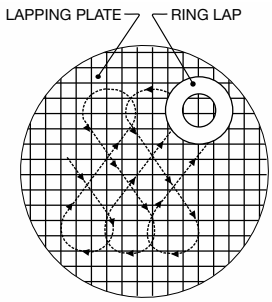


Figure 24: Lapping Pattern

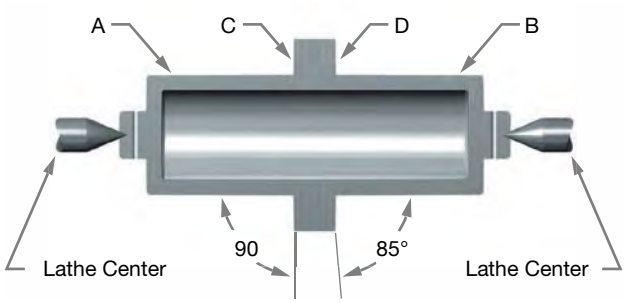


Figure 25: Nozzle Lap in a Lathe

remachined. If it cannot be removed from the base (1), re-machine it inside the base.

2. Set-up the lathe and nozzle (2) as follows:

- Grip the nozzle in a four-jaw independent chuck (or collet, if appropriate) using a piece of soft material such as copper or fiber between the jaws and the nozzle (see Figure 26).
- True-up the nozzle so that the surfaces marked B, C, and D run true within .001” (.025 mm) on the total indicator reading (see Figure 26).

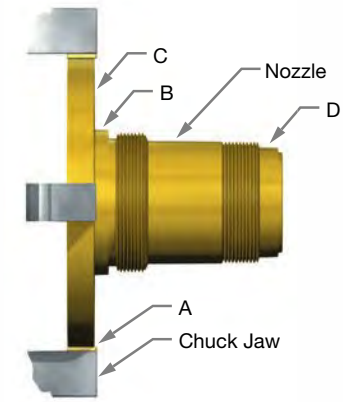


Figure 26: Nozzle Positioned in a Jaw

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XIII. Maintenance Instructions (Cont.)

3. Re-machine the metal-to-metal seat (see Figure 21 and Tables 1a, 1b and 1c) as follows:

- Make light cuts across the surface L at 5º until the damaged areas are removed. Turn to the smoothest possible finish.
- Cut back the outside surface at G until dimension N is obtained. The surface at G is common to all nozzles.
- Re-machine diameter H, until dimension E is obtained. Reestablish angle P.

The nozzle is now ready for lapping.

- Discard the nozzle when the minimum dimension D (see Figure 29a, 29b and 29c and Table 3a, 3b, 3c) is reached.

4. Re-machine the o-ring seat seal (see Figure 29b and Table 3b) as follows:

- Make light cuts across surface A at 45º until the damaged areas are removed. Turn to the smoothest possible finish.
- Cut back the outside surface at M until dimension J is obtained. Re-machine radius B.

I. Re-Machining the Disc Seat

Machine the standard disc seating surface (see Figure 27) as follows:

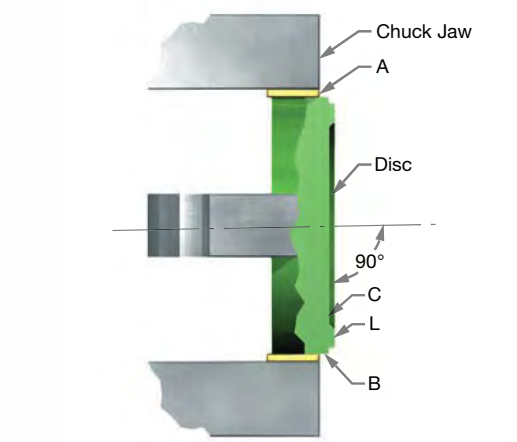


Figure 27: Standard Disc Seating Surface

1. Grip the disc (6) in a four-jaw independent chuck (or collet, if appropriate), using a piece of soft material such as copper or fiber between the jaws and the disc (see Figure 27).
2. True-up the disc (6) so that the surface marked B and C run true within .001" (0.025 mm) on the total indicator reading (see Figure 27).
3. Make light cuts across the seating surface L until damaged areas are removed. Turn to the smoothest possible finish.

   The disc (6) is now ready for lapping.

   - Discard the disc if the minimum dimension N or T (Figures 32a, 32b, 32c and Tables 5a and 5b) is reached. Do not reestablish surface C (see Figure 27).

ATTENTION!

Do not machine a Thermodisc, o-ring Seat disc, or Soft-seat (DM DA) disc.

J. Checking Spindle Concentricity

It is important that the spindle (15) of an SRV be straight in order to transmit the spring load to the disc (6) without binding laterally. Over-gagging is a common cause of bent spindles. Check the essential working surfaces of the spindle using any of the recommended methods as follows:

1. Set up the V-block support (see Figure 28) as follows:

- Place the ball-pointed spindles in a piece of material B that has been recessed to permit free rotation of the spindle (15). For hollow spindles, a ball-pointed support is required.
- Support the spindle with a V-block A placed near the upper end of the spindle, but below the threads.
- Apply a dial indicator at approximately 45º to the outer edge of the spring washer seat at C.
- Rotate the spindle. The total indicator reading should not exceed .007” (.17 mm). Straighten the spindle, if necessary. To straighten the spindle, place the unthreaded portion of the small and large end in padded V-blocks, with the point of maximum indicator readout upward, and then apply a downward force with a padded press or jack as required, until the spindle is within the specifications.

K. Set Pressure Change-Disc Holder

The disc holder (8) must be replaced if the set

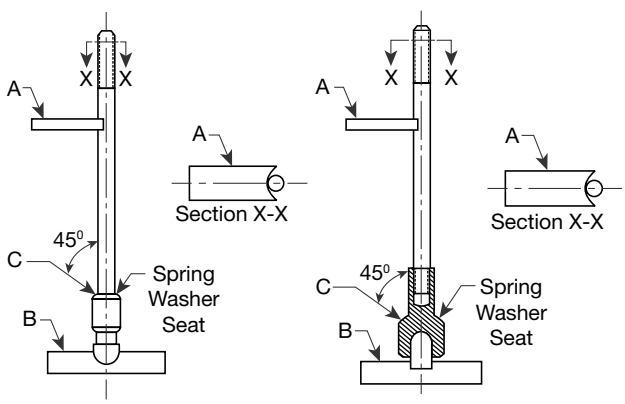


Figure 28: V-Block Support Setup

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pressure must be changed and the change involves crossing the dividing line between high pressure and low pressure. Determine whether the disc holder must be changed when changing the set pressure (see Tables 2a and 2b).

L. Checking Lift on Restricted Lift Valves

ATTENTION!

Restricted lift valves may be identified by the restricted lift value stamped on the nameplate.

General

Restricted lift valves have a limit washer that prevents the disc (6) and disc holder (8) from lifting beyond the required lift and resulting capacity. The D-2 and E-2 valves are naturally a restricted lift valve, as the seat dimensions and bore diameter are identical to the F orifice nozzle. The 1900 DM D and E have components identical to the 1900 F DM, but with limit washers.

Other 1900 Series valves may be restricted in the same manner when necessary. These valves may be restricted to a minimum lift of 30% of the full rated capacity or .080″ (2.03 mm).

It is important to check lift on all restricted lift valves after servicing or replacing parts. This procedure is necessary to ensure reliability of the nameplate capacity.

ATTENTION!

The required lift for a restricted lift valve is indicated on the valve nameplate (see Figure 29). The minimum certified lift shall be per National Board NB-18 document.

Note: The values to be subtracted from the full lift measurement given in the “Value to be subtracted” chart on page 33 are not in all cases the same as the lift value given in NB-18 document. This is due to accounting for O-ring expansion on O-ring seated valves. Nameplate lift values shall be per NB-18 document.

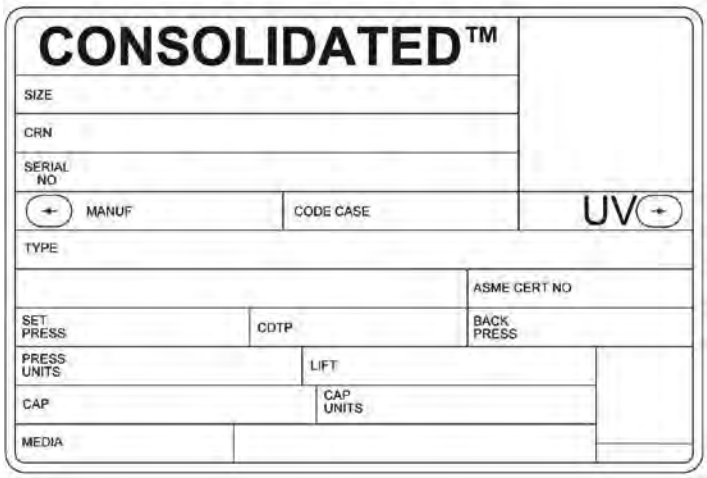


Figure 29: Valve Nameplate
(**Note:** Lift value to be obtained from NB-18 document)

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XIII. Maintenance Instructions (Cont.)

Table 2a: Standard 1900 Series Disc Holder Selection

Orifice Size	Air/Gas (Non-Liquid, Non-O-Ring) Low Pressure Disc Holder	Air/Gas (Non-Liquid, Non-O-Ring) High Pressuer Disc Holder	Liquid Service (LS)	Liquid Service O0Ring (DL or LS-DA)	Air/Gas O-Ring High Pressure (DA)	Air/Gas O-Ring Low Pressuer (DA)	Lqiuid Service (LA)	Liquid Service O-Ring (LA-DA) High Pressuer	Liquid Service O-Ring (LA-DA) Low Pressure
D-1 Sup-planted	-	All Pressures	All Pressures	All Pressures	-	All Pressures (Same as "DL" Disc Holder)	All Pressures	N/A	N/A
30D-1 Sup-planted	-	All Pressures	All Pressures	All Pressures	-	All Pressures (Same as "DL" Disc Holder)	All Pressures	N/A	N/A
E-1 Sup-planted	100 psig and Below	Above 100 psig	All Pressures	All Pressures	36 psig and Above (Same as "DL" Disc Holder)	5 - 35 psig	All Pressures	N/A	N/A
30E-1 Sup-planted	100 psig and Below	Above 100 psig	All Pressures	All Pressures	36 psig and Above (Same as "DL" Disc Holder)	5 - 35 psig	All Pressures	N/A	N/A
D - 2 E - 2	100 psig and Below	Above 100 psig	All Pressures (Same as Low Pressure Aig/Gas Disc Holder)	All Pressures	36 psig and Above (Same as "DL" Disc Holder)	5 - 35 psig	All Pressures	Above 75 psig	75 psig and Below
30D - 2 30E - 2	100 psig and Below	Above 100 psig	All Pressures (Same as Low Pressure Air/Gas Disc Holder)	All Pressures	36 psig and Above (Same as "DL" Disc Holder)	5 - 35 psig	All Pressures	Above 75 psig	75 psig and Below
F - 1	100 psig and Below	Above 100 psig	All Pressures (Same as Low Pressure Air/Gas Disc Holder)	All Pressures	36 psig and Above (Same as "DL" Disc Holder)	5 - 35 psig	All Pressures	Above 75 psig	75 psig and Below
30F - 1	100 psig and Below	Above 100 psig	All Pressures (Same as Low Pressure Air/Gas Disc Holder)	All Pressures	36 psig and Above (Same as "DL" Disc Holder)	5 - 35 psig	All Pressures	Above 75 psig	75 psig and Below
G - 1	50 psig and Below	Above 50 psig	All Pressures (Same as Low Pressure Air/Gas Dis Holder)	All Pressures	121 psig and Above	5 - 120 psig	All Pressures	All Pres-sures	-
30G - 1	50 psig and Below	Above 50 psig	All Pressures (Same as Low Pressure Air/Gas Dis Holder)	All Pressures	121 psig and Above	5 - 120 psig	All Pressures	All Pres-sures	-
H - 1	50 psig and Below	Above 50 psig	All Pressures (Same as Low Pressure Air/Gas Dis Holder)	All Pressures	121 psig and Above	5 - 120 psig	All Pressures	All Pres-sures	-
30H - 1	50 psig and Below	Above 50 psig	All Pressures (Same as Low Pressure Air/Gas Dis Holder)	All Pressures	121 psig and Above	5 - 120 psig	All Pressures	All Pres-sures	All Pres-sures
J - 2	50 psig and Below	Above 50 psig	All Pressures (Same as Low Pressure Air/Gas Dis Holder)	All Pressures	121 psig and Above	5 - 120 psig	All Pressures	All Pres-sures	All Pres-sures
K - 1	-	All Pressures	All Pressures	All Pressures	All Pressures	All Pressures	-	All Pres-sures	All Pres-sures

Table 2b: Disc Holder Selection Criteria Universal Media (UM)

Orifice	Low Pressure Disc Holder		Medium Pressure Disc Holder		High Pressure Disc Holder	
	psig	barg	psig	barg	psig	barg
D-F	50 & below	3.45 & below	51 - 100	3.52 - 6.89	101 & Above	6.96 & Above
G	80 & below	5.52 & below	-	-	81 & Above	5.58 & Above
H	60 & below	4.14 & below	-	-	61 & Above	4.21 & Above
J	40 & below	2.76 & below	-	-	41 & Above	2.83 & Above
K-U	Not Applicable	Not Applicable	-	-	All Pressures	All Pressures
V-W	Not Applicable	Not Applicable	-	-	15 & Above	1.03 & Above

Table 2c: Disc Holder Selection Criteria - Dual Media (DM)

Orifice Size	Low Pressure Disc Holder		High Pressure Disc Holder	
	psig	barg	psig	barg
D - F	100 & below	7.90 & below	101 & above	7.97 & above
G	123 & below	9.49 & below	124 & above	9.56 & above
H	60 & below	5.15 & below	61 & above	5.21 & above
J	40 & below	3.77 & below	41 & above	3.84 & above
K - W	-	-	ALL PRESSURES	

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XIII. Maintenance Instructions (Cont.)

M. Determining the Correct Limit Washer Length

Determine the correct limit washer length (see Figure 30) as follows:

1. Assemble the disc (6) and disc holder (8) (installing the bellows gasket and bellows, if applicable) as follows:

ATTENTION!

Do not use an impact wrench on bellows valves.

ATTENTION!

For O-ring seated valves, leave out the O-ring when determining the limit washer length.

- Place the guide over the disc holder barrel and connect the spindle (15) to the disc holder (8).
- Install the eductor tube (40) in base (1), if applicable.
- Install the adjusting ring (3) below the seat.

2. Install the guide gasket (10), and insert the disc assembly from Step 1 into the base (1).
3. Install the bonnet gasket (12) and bonnet (11) (leaving out the spring assembly at this time).
4. Tighten the stud nuts (14) to compress the bonnet gasket (12).
5. Place a dial indicator on the bonnet (11) and over the spindle (15) and then zero the indicator. Measure total lift by pushing the disc (6) upward. Subtract the required lift of the valve from the measured lift to find the required limit washer length. Value to be subtracted shall be per chart below.
6. Machine the limit washer to the required length.
7. Machine the inside chamfer, deburring and polishing as required.
8. Disassemble the valve.
9. Install the limit washer with the chamfer down and reassemble the valve as described in Steps 2 through 4.
- 10. Measure the lift of the valve and compare it with the required lift as given on the NB-18 document (-0.000”, +0.005” [-0.000 mm, +0.127 mm]). Take one of the following steps, based on the results, if the lift is not correct:
- If the actual lift is less than required, machine the limit washer as necessary to obtain the required lift. (Machine chamfer, deburr and polish before installation into the valve.)
- If the actual lift is greater than required, obtain a new limit washer, and return to Step 7. (Machine chamfer, deburr and polish before installation into valve.)

11. Once correct lift is obtained, disassemble the valve. Install spring assembly and O-ring (if required).

ATTENTION!

Ensure the limit washer has been chamfered to fit over the radius of the disc holder (8). The limit washer must be installed so that the chamfered end is mating to the back face of disc holder.

ATTENTION!

Check all dimension requirements for each valve. Do not interchange internal parts or use a different base after a set of parts has been custom-fit.

ATTENTION!

For bellows Type D and E valves, check the outside diameter and, if necessary, emery cloth down to .680″ (17.3 mm) maximum diameter in order to avoid interference with the bellows threads.

Orifice	VALUE TO BE SUBTRACTED							
	STD. 1900 & 1900 TD Steam, Air & Gas	1900 XDA Steam, Air & Gas	1900 Liquid Valves on Liquid Valve Applications				1900 DM Gas & Liquid	
			XLS	LA	XDL	DALA	MS	DA
D-2	0.066 in.	0.100 in.	0.063 in.	0.056 in.	0.100 in.	0.100 in.	.067 in.	.080 in.
E-2	0.119 in.	0.139 in.	0.100 in.	0.093 in.	0.139 in.	0.139 in.	.105 in.	.130 in.

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XIII. Maintenance Instructions (Cont.)

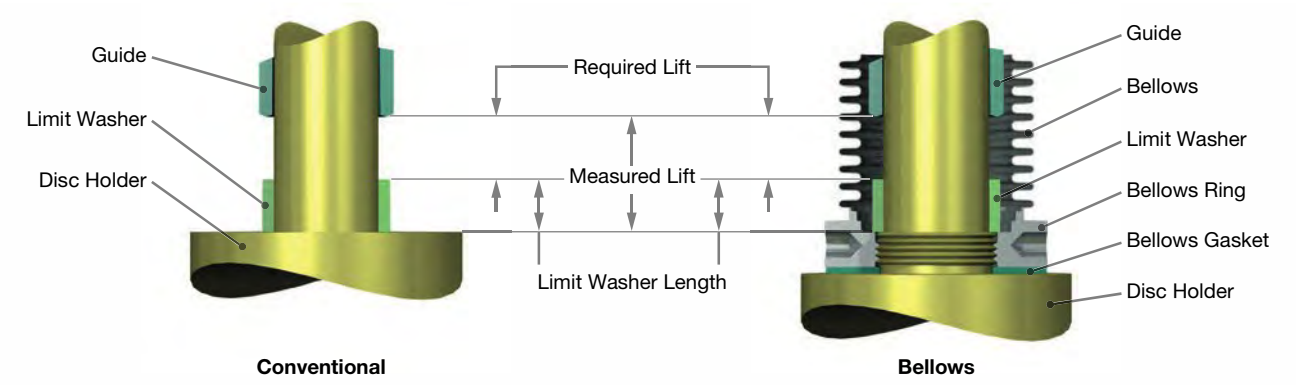


Figure 30: Determining Lift and Limit Washer Length

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XIV. Inspection and Part Replacement

A. Nozzle Inspection Criteria

Nozzle should be replaced if:

- Dimension from seat to first thread, after re-machining and lapping, is less than D min. (see Tables 3).
- Threads are damaged from pitting and/or corrosion.
- Top of flange and intersecting surface are damaged from galling and/or tearing.
- Seat width is outside specification and can not be reestablished per Nozzle Dimensions in Table 3a & 3c (see Tables 3a, 3b or 3c).

B. Nozzle Seat Width

Using a measuring magnifying glass (see Lapped Nozzle Seat Widths), determine whether the seating surface must be machined before lapping. If the seat can be lapped flat without exceeding the required seat width (see Tables 1a, 1b or 1c), it does not require machining. To reduce the seat width, the 5º angle surface must be machined and all seat dimensions need to be verified, and reestablished if necessary. The nozzle must be replaced if the D dimension is reduced below the minimum (see Tables 3).

ATTENTION!

Flange thickness changes the center-to-face dimension. Ensure the minimum dimension for orifice D through P is .656" (16.67 mm), and for Q through W is .797" (20.24 mm).

C. Nozzle Bore Inspection

All 1900 Series SRV nozzles manufactured after August 1978 have increased bore diameters. Original and new nozzles are interchangeable, but the rated capacities are different (see Tables 4).

D. 1900 Series SRV Standard Disc Inspection Areas

The standard 1900 Series disc (see Figure 32) can be machined until the N dimension is reduced to its minimum size (see Table 5). The T dimension is provided to ensure the disc has not been machined beyond its limits. If re-machining reduces the thickness of the disc (T min.), the entire disc holder assembly drops with respect to the seating plane of the nozzle. This creates a significant change in the huddle chamber configuration and results in significantly more simmer before opening.

E. 1900 Series Thermodisc Replacement Criteria

The Thermodisc must be replaced if:

- Seat defects and damage cannot be lapped out without reducing the A dimension below those listed in Table 6 (see Figure 33).

F. 1900 Series Cryodisc Replacement Criteria

The Cryodisc must be replaced if:

- Seat defects and damage cannot be lapped out without reducing the A dimension below those listed in Table 7 (see Figure 34).

ATTENTION!

The A dimension on orifice D through H of the thermal lip disc is difficult to measure. If the .006" (0.15 mm) minimum thickness of the thermal lip cannot be measured, replace the Thermodisc. The A dimension on orifice D through H of the cryogenic disc is also difficult to measure. If the .008" (0.19 mm) (D, E, F orifice), .009" (0.23 mm) (G orifice), or .011" (0.27 mm) (H orifice) minimum thickness of the cryogenic disc lip cannot be measured, replace the Cryodisc.

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XIV. Inspection and Part Replacement (Cont.)

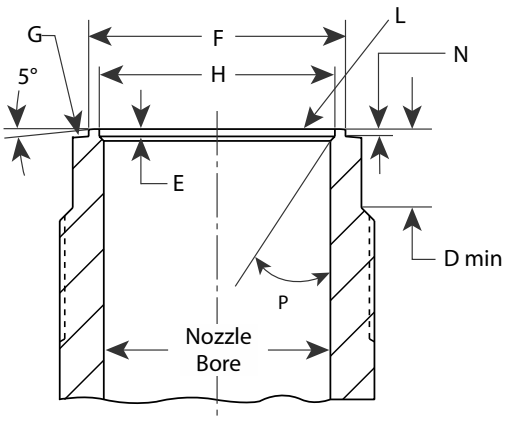


Figure 31a:
Metal Seated Nozzle

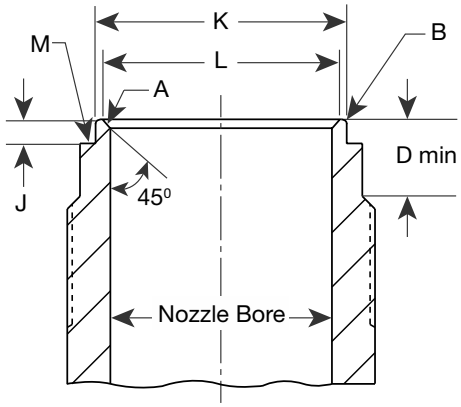


Figure 31b:
O-Ring Seal Nozzle

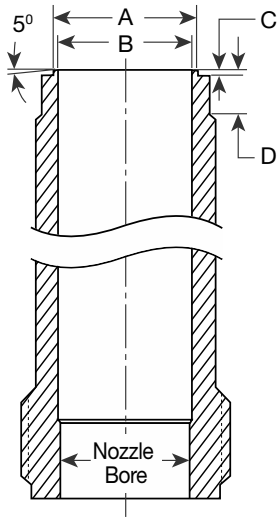


Figure 31c:
DM Soft-Seat O-Ring Nozzle

Figure 31: Metal Seated and O-Ring Nozzles

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XIV. Inspection and Part Replacement (Cont.)

Table 3a: Nozzle Machined Dimensions (Metal Seated Nozzle) English Units: Inch										
Nozzle		Metal-To-Metal					O-Ring Seat Seal			
Orifice	D Min.	E ± .005 .000	F ± .005 .000	H ± .005 .000	N ± .005 .000	P± 1/2˚	Radius B ± .005 .000	J ± .005 .000	K	L Max.
D-1	13/32	0.015	-	0.518	-	30˚	0.015	0.062	0.573 +.000 -.002	0.537
E-1	15/32	0.020	0.788	0.686	0.025	30˚	0.015	0.060	0.733 +.000 -.002	0.688
D-2, E-2, F	5/16	0.030	0.955	0.832	0.035	30˚	0.015	0.079	0.868 +.000 -.003	0.814
G	5/16	0.035	1.094	0.954	0.035	30˚	0.021	0.090	1.060 +.000 -.003	0.999
H	1/4	0.035	1.225	1.124	0.035	45˚	0.021	0.060	1.216 +.000 -.003	1.167
J	3/8	0.035	1.546	1.436	0.035	45˚	0.021	0.074	1.534 +.000 -.003	1.481
K	7/16	0.063	1.836	1.711	0.063	45˚	0.021	0.126	1.838 +.000 -.004	1.781
L	7/16	0.063	2.257	2.132	0.063	45˚	0.016	0.126	2.208 +.000 -.004	2.158
M	7/16	0.063	2.525	2.400	0.063	45˚	0.021	0.126	2.536 +.000 -.004	2.480
N	1/2	0.063	2.777	2.627	0.063	45˚	0.021	0.101	2.708 +.000 -.004	2.652
P	5/8	0.093	3.332	3.182	0.093	45˚	0.021	0.150	3.334 +.000 -.004	3.279
Q	7/8	0.093	4.335	4.185	0.093	45˚	0.021	0.188	4.338 +.000 -.006	4.234
R	1	0.093	5.110	4.960	0.093	45˚	0.021	0.215	5.095 +.000 -.006	5.036
T	3/4	-	6.234	6.040	0.093	-	0.021	0.142	6.237 +.000 -.007	6.174
W	1 3/4	0.350	11.058	10.485	0.348	30˚	-	-	-	-

Table 3b: Nozzle Machined Dimensions (O-Ring Seat Nozzle) Metric Units: mm										
Nozzle		Metal-To-Metal					O-Ring Seat Seal			
Orifice	D Min.	E ± .127 .000	F ± .127 .000	H ± .127 .000	N ± .127 .000	P± 1/2˚	Radius B ± .127 .000	J ± .127 .000	K	L Max.
D-1	10.3	0.38	-	13.16	-	30˚	0.38	1.57	14.55 +.000 -.051	13.64
E-1	11.9	0.51	20.01	17.43	0.64	30˚	0.38	1.52	18.62 +.000 -.051	17.47
D-2, E-2, F	7.9	0.76	24.26	21.13	0.89	30˚	0.38	2.01	22.05 +.000 -.076	20.68
G	7.9	0.89	27.79	24.24	0.89	30˚	0.53	2.29	26.92 +.000 -.076	25.37
H	6.3	0.89	31.12	28.55	0.89	45˚	0.53	1.52	30.89 +.000 -.076	29.64
J	9.5	0.89	39.27	36.47	0.89	45˚	0.53	1.88	38.96 +.000 -.076	37.62
K	11.1	1.60	46.63	43.46	1.60	45˚	0.53	3.20	46.69 +.000 -.10	45.24
L	11.1	1.60	57.33	54.15	1.60	45˚	0.41	3.20	56.08 +.000 -.10	54.81
M	11.1	1.60	64.14	60.96	1.60	45˚	0.53	3.20	64.41 +.000 -.10	62.99
N	12.7	1.60	70.54	66.73	1.60	45˚	0.53	2.57	68.78 +.000 -.10	65.07
P	15.9	2.36	84.63	80.82	2.36	45˚	0.53	3.81	84.68 +.000 -.10	83.28
Q	22.2	2.36	110.11	106.30	2.36	45˚	0.53	4.78	110.19 +.000 -.152	107.54
R	25.4	2.36	129.79	125.98	2.36	45˚	0.53	5.46	129.41 +.000 -.152	127.92
T	19.0	-	158.34	153.42	2.36	-	0.53	3.61	158.42 +.000 -.178	156.82
W	44.5	8.89	280.90	266.30	8.84	30˚	-	-	-	-

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XIV. Inspection and Part Replacement (Cont.)

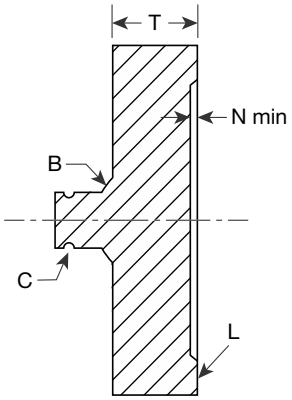
Table 3c: Nozzle Machined Dimensions (DM Soft-Seat Nozzle)								
Orifice	D min.		A		B		C	
	in.	mm	in.	mm	in.	mm	in.	mm
D	.313	7.95	.906	23.01	.831	21.11	.026	0.66
E	.313	7.95	.906	23.01	.831	21.11	.026	0.66
F	.313	7.95	.906	23.01	.831	21.11	.026	0.66
G	.313	7.95	1.039	26.39	.953	24.21	.030	0.76
H	.250	6.35	1.224	31.09	1.123	28.52	.035	0.89
J	.375	9.53	1.564	39.73	1.435	36.45	.045	1.14
K	.438	11.13	1.866	47.40	1.712	43.48	.053	1.35
L	.438	11.13	2.325	59.06	2.133	54.18	.066	1.68
M	.438	11.13	2.616	66.45	2.400	60.96	.075	1.91
N	.500	12.70	2.863	72.72	2.627	66.73	.082	2.08
P	.625	15.88	3.468	88.09	3.182	80.82	.099	2.51
Q	.875	22.23	4.561	115.85	4.185	106.30	.130	3.30
R	1.000	25.40	5.406	137.31	4.960	125.98	.155	3.94
T	.750	19.05	6.883	174.83	6.315	160.40	.197	5.00
U	.750	19.05	7.409	188.19	6.798	172.67	.212	5.38
V	1.250	31.75	9.086	230.78	8.336	211.73	.260	6.60
W	1.750	44.45	11.399	289.53	10.458	265.63	.326	8.28

Table 4: Nozzle Bore Diameter									
Orifice		Pre-1978				Current			
		min.		max.		min.		max.	
Std.	DM	in.	mm	in.	mm	in.	mm	in.	mm
D-1	-	.393	9.98	.398	10.11	404	10.26	.409	10.39
E-1	-	.524	13.31	.529	13.44	.539	13.69	.544	13.82
D-2	D	.650	16.51	.655	16.64	.674	17.12	.679	17.25
E-2	E	.650	16.51	.655	16.64	.674	17.12	.679	17.25
F	F	.650	16.51	.655	16.64	.674	17.12	.679	17.25
G	G	.835	21.21	.840	21.34	.863	21.92	.868	22.05
H	H	1.045	26.54	1.050	26.67	1.078	27.38	1.083	27.51
J	J	1.335	33.91	1.340	34.04	1.380	35.05	1.385	35.18
K	K	1.595	40.51	1.600	40.64	1.650	41.91	1.655	42.04
L	L	1.985	50.42	1.990	50.55	2.055	52.20	2.060	52.32
M	M	2.234	56.74	2.239	56.87	2.309	58.65	2.314	58.78
N	N	2.445	62.10	2.450	62.23	2.535	64.39	2.540	64.52
P	P	2.965	75.31	2.970	75.44	3.073	78.05	3.078	78.18
Q	Q	3.900	99.06	3.905	99.19	4.045	102.74	4.050	102.87
R	R	4.623	117.42	4.628	117.55	4.867	123.62	4.872	123.75
T, -2T, T-3	-	6.000	152.40	6.005	152.52	6.037	153.34	6.042	153.47
T-4	T	-	-	-	-	6.202	157.53	6.208	157.68
U	U	-	-	-	-	6.685	169.80	6.691	169.95
V	V	-	-	-	-	8.000	203.20	8.005	203.33
W	W	-	-	-	-	10.029	254.74	10.034	254.86

Note: ***If an old style nozzle is machined to the new configuration, it should be done to a 63 micro inch finish and shall be concentric and parallel to the original centerline within .004" (0.10 mm) T.I.R.***

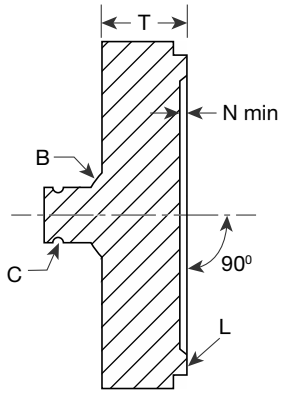
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XIV. Inspection and Part Replacement (Cont.)



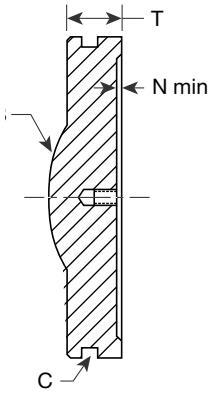
Type 1

Figure 32a: D - H Orifice Discs
D - U Orifice Discs (DM)



Type 2

Figure 32b:
J - U Orifice Discs



Type 3

Figure 32c: V & W Orifice Discs
(Std. & DM)

Figure 32: Disc Inspection Areas

Table 5a: Minimum Dimensions after Machining of the Disc Seat (Standard)

Disc Type	Orifice	T min.		N min.	
		in.	mm	in.	mm
Type 1	D-1	0.155	3.94	.005	.013
	E-1	0.158	4.00	.005	.013
	D-2	0.174	4.42	.010	0.25
	E-2	0.174	4.42	.010	0.25
	F	0.174	4.42	.010	0.25
	G	0.174	4.42	.010	0.25
	H	0.335	8.51	.010	0.25
Type 2	J	0.359	9.12	.010	0.25
	K	0.422	10.72	.015	0.38
	L	0.457	11.60	.015	0.38
	M	0.457	11.60	.015	0.38
	N	0.495	12.57	.015	0.38
	P	0.610	15.49	.015	0.38
	Q	0.610	15.49	.015	0.38
	R	0.610	15.49	.015	0.38
	T-3	0.822	20.88	.015	0.38
	T-4	0.822	20.88	.015	0.38
	U	0.822	20.88	.015	0.38
Type 3	V	1.125	28.57	.015	0.38
	W	1.692	42.97	.015	0.38

Table 5b: Minimum Dimensions after Machining of the Disc Seat (DM)

Disc Type	Orifice	T min.		N min.	
		in.	mm	in.	mm
Type 1	D	.175	4.45	.010	0.25
	E	.175	4.45	.010	0.25
	F	.175	4.45	.010	0.25
	G	.169	4.29	.013	0.33
	H	.343	8.71	.018	0.46
	J	.406	10.31	.026	0.66
	K	.477	12.12	.033	0.84
	L	.530	13.46	.052	1.32
	M	.543	13.79	.059	1.50
	N	.579	14.71	.063	1.60
	P	.716	18.19	.073	1.85
	Q	.747	18.97	.099	2.51
	R	.769	19.53	.120	3.05
	T	1.013	25.73	.156	3.96
	U	1.019	25.88	.169	4.29
Type 3	V	1.258	31.95	.210	5.33
	W	1.888	47.96	.267	6.78

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XIV. Inspection and Part Replacement (Cont.)

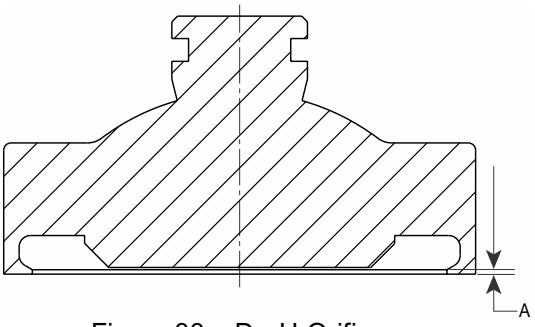


Figure 33a: D - H Orifices

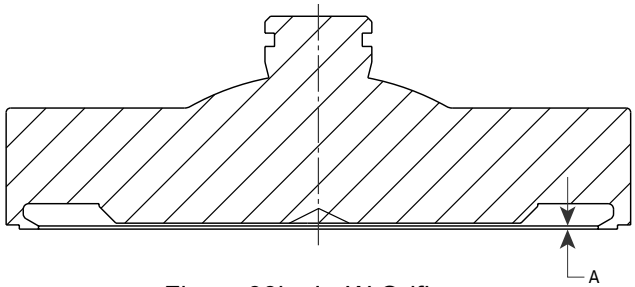


Figure 33b: J - W Orifices

Figure 33: Thermodisc Design (D - W Orifices)

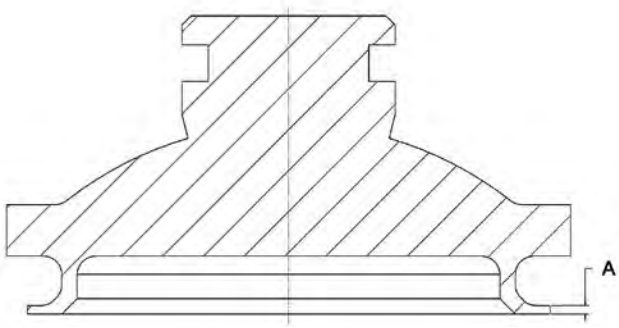


Figure 34: Cryodisc Design (D-U Orifices)

Table 6: Minimum A Dimensions (Thermodisc)		
Orifice	A min.	
	in.	mm
D	0.006	0.15
E	0.006	0.15
F	0.006	0.15
G	0.006	0.15
H	0.006	0.15
J	0.012	0.30
K	0.014	0.36
L	0.014	0.36
M	0.014	0.36
N	0.014	0.36
P	0.014	0.36
Q	0.015	0.38
R	0.015	0.38
T-4	0.024	0.61
U	0.024	0.61
V	0.033	0.84
W	0.033	0.84

Table 7: Minimum A Dimensions (Cryodisc)		
Orifice	A min.	
	in.	mm
D	0.008	0.19
E	0.008	0.19
F	0.008	0.19
G	0.009	0.23
H	0.011	0.27
J	0.019	0.48
K	0.023	0.58
L	0.026	0.67
M	0.034	0.86
N	0.037	0.94
P	0.046	1.17
Q	0.051	1.29
R	0.061	1.55
T-4	0.094	2.39
U	0.101	2.57

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XIV. Inspection and Part Replacement (Cont.)

G. Disc Holder Inspection Criteria

Several disc holder designs are available, depending on the service and the type of valve (see Figure 35).

For identification, the G diameter (Dia.) is provided (see Tables 7a and 7b).

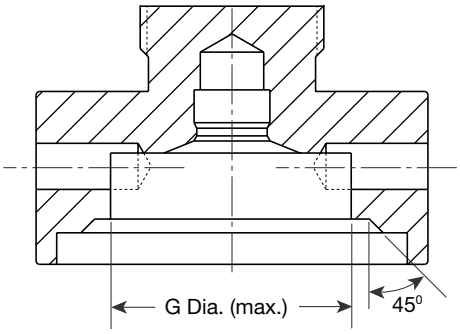


Figure 35a: Detail 1
Standard Disc Holder

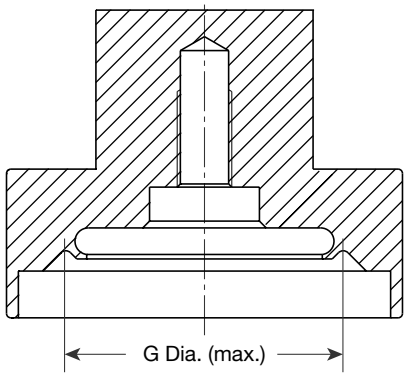


Figure 35b: Detail 2
O-Ring Disc Holder

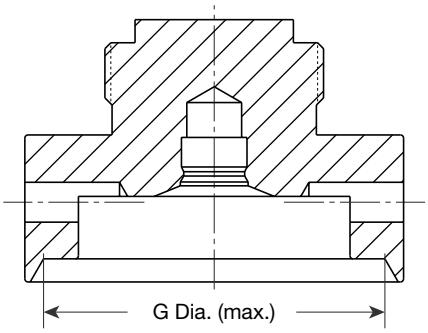


Figure 35c: Detail 3
Liquid Service Disc Holder
(LA Design)

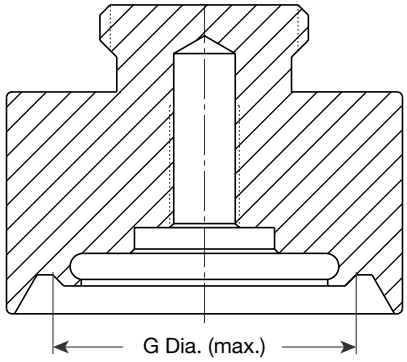


Figure 35d: Detail 4
O-Ring Liquid Service (DALA Design)
D-2, E-2, F & G Orifice

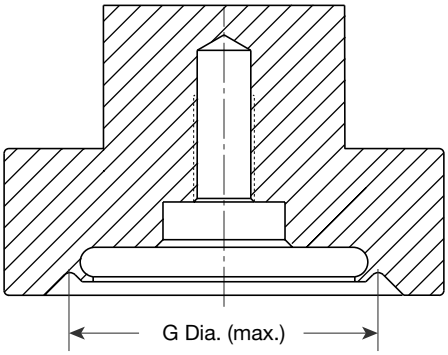


Figure 35e: Detail 5
O-Ring Liquid Service (DALA
Design) - H & J Orifice

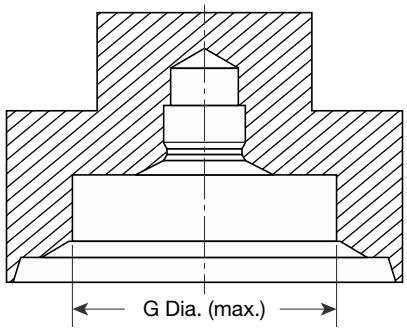


Figure 35f: Detail 6
Dual Media Service
(DM Design)

Figure 35: Disc Holder Designs

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XIV. Inspection and Part Replacement (Cont.)

Table 8a: Maximum Inside Diameter (G) for Disc Holder Identification

Orifice	Standard Disc Holder						O-Ring Disc Holder					
	Air/Gas Trim				Liquid Trim		Air/Gas Trim				Liquid Trim	
	Low Pressure		High Pressure		LA Design		Low Pressure		High Pressure		DALA Design	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
D-1	.715	18.16	.715	18.16	.765	19.43	.811	20.60	.811	20.60	N/A	N/A
E-1	1.012	25.70	.922	23.41	1.061	26.95	.940	23.87	.971	24.66	N/A	N/A
D-2	1.167	29.64	1.032	26.21	1.265(3)	32.13(3)	1.105(2)	28.07(2)	1.032	26.21	1.092(4)	27.74(4)
E-2	1.167	29.64	1.032	26.21	1.265(3)	32.13(3)	1.105(2)	28.07(2)	1.032	26.21	1.092(4)	27.74(4)
F	1.167	29.64	1.032	26.21	1.265(3)	32.13(3)	1.105(2)	28.07(2)	1.032	26.21	1.092(4)	27.74(4)
G	1.272	32.31	1.183	30.05	1.375(3)	34.93(3)	1.275(2)	32.39(2)	1.183	30.05	1.265(4)	32.13(4)
H	1.491	37.87	1.394	35.41	1.656(3)	42.06(3)	1.494(2)	37.95(2)	1.394	35.41	1.494(5)	37.95(5)
J	1.929	49.00	1.780	45.21	2.156(3)	54.76(3)	1.856(2)	47.14(2)	1.780	45.21	2.155(4)	54.74(4)
K	2.126	54.00	2.126	54.00	2.469(3)	62.71(3)	2.264	57.51	2.264	57.51	2.469(3)	62.71(3)
L	2.527	64.19	2.527	64.19	3.063(3)	77.80(3)	2.527	64.19	2.527	64.19	3.063(3)	77.79(3)
M	2.980	75.69	2.980	75.69	3.359(3)	85.32(3)	2.980	75.69	2.980	75.69	3.359(3)	85.32(3)
N	3.088	78.44	3.088	78.44	3.828(3)	97.23(3)	3.088	78.44	3.088	78.44	3.828(3)	97.23(3)
P	3.950	100.33	3.950	100.33	4.813(3)	122.25(3)	3.950	100.33	3.950	100.33	4.813(3)	122.25(3)
Q	5.197	132.00	5.197	132.00	6.109(3)	155.17(3)	5.197	132.00	5.197	132.00	6.109(3)	155.18(3)
R	6.155	156.34	6.155	156.34	7.219(3)	183.36(3)	6.155	156.34	6.155	156.34	7.219(3)	183.36(3)
T, -2T, T-3	7.494	190.35	7.494	190.35	8.624(3)	219.05(3)	7.494	190.35	7.494	190.35	8.624(3)	219.05(3)
T-4	7.841	199.16	7.841	199.16	8.625(3)	219.08(3)	7.841	199.16	7.841	199.16	8.625(3)	219.08(3)
U	8.324	211.43	8.324	211.43	•	•	•	•	•	•	•	•
V	10.104	256.64	10.104	256.64	11.844(3)	300.84(3)	10.594	269.08	10.594	269.08	11.844(3)	300.84(3)
W	12.656	321.46	12.656	321.46	14.641(3)	371.88(3)	13.063	331.80	13.063	331.80	14.641(3)	371.88(3)

• Contact the factory for this information

(2) Figure 35: Detail 2

(3) Figure 35: Detail 3

(4) Figure 35: Detail 4

(5) Figure 35: Detail 5

Table 8b: Maximum Inside Diameter (G) for Disc Holder Identification - DM Disc Holder (Detail 6)

Orifice	Low Pressure		Medium Pressure		High Pressure	
	in.	mm	in.	mm	in.	mm
D	1.131	28.73	1.081	27.46	1.031	26.19
E	1.131	28.73	1.081	27.46	1.031	26.19
F	1.131	28.73	1.081	27.46	1.031	26.19
G	1.297	32.94	-	-	1.182	30.02
H	1.528	38.81	-	-	1.393	35.38
J	1.953	49.61	-	-	1.780	45.21
K	2.124	53.95	-	-	2.124	53.95
L	2.646	67.21	-	-	2.646	67.21
M	2.977	75.62	-	-	2.977	75.62
N	3.259	82.78	-	-	3.259	82.78
P	3.947	100.25	-	-	3.947	100.25
Q	5.191	131.85	-	-	5.191	131.85
R	6.153	156.29	-	-	6.153	156.29
T	7.833	198.96	-	-	7.833	198.96
U	8.432	214.17	-	-	8.432	214.17
V	10.340	262.64	-	-	10.340	262.64
W	12.972	329.49	-	-	12.972	329.49

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XIV. Inspection and Part Replacement (Cont.)

Set Pressure Change: If it is necessary to change valve set pressure, it may also be necessary to change the disc holder (8). Determine if the disc holder must be changed to/from low pressure from/ to high pressure when changing the set pressure (see Tables 2).

Media Change: If the protected media is changed in form from a compressible fluid (air, gas, or steam) to a non-compressible fluid (liquid), it is necessary to change from a standard to a liquid trim disc holder for non-DM valves. No change in disc holder is required for the DM valve when the protected media changes from compressible to non-compressible, or vise-versa.

Bellows Conversion: If a conventional 1900 Series SRV has a D, E, F, G or H orifice disc holder (8), the disc holder must be replaced with a new disc holder included in the bellows conversion kit.

O-Ring Conversion: If a standard metal-seated 1900 Series SRV is to be converted to an o-ring valve, the disc holder (8) must be replaced with an o-ring disc holder which is included in the o-ring conversion kit. For K through U orifice valves, the standard disc holder may be machined to receive the larger o-ring disc.

Soft-Seat Universal Media Conversion: If a DM metal-seated 1900 Series SRV is to be converted to a soft-seat valve, the disc (2) must be replaced with an soft-seat disc (2) which is included in the soft-seat conversion kit.

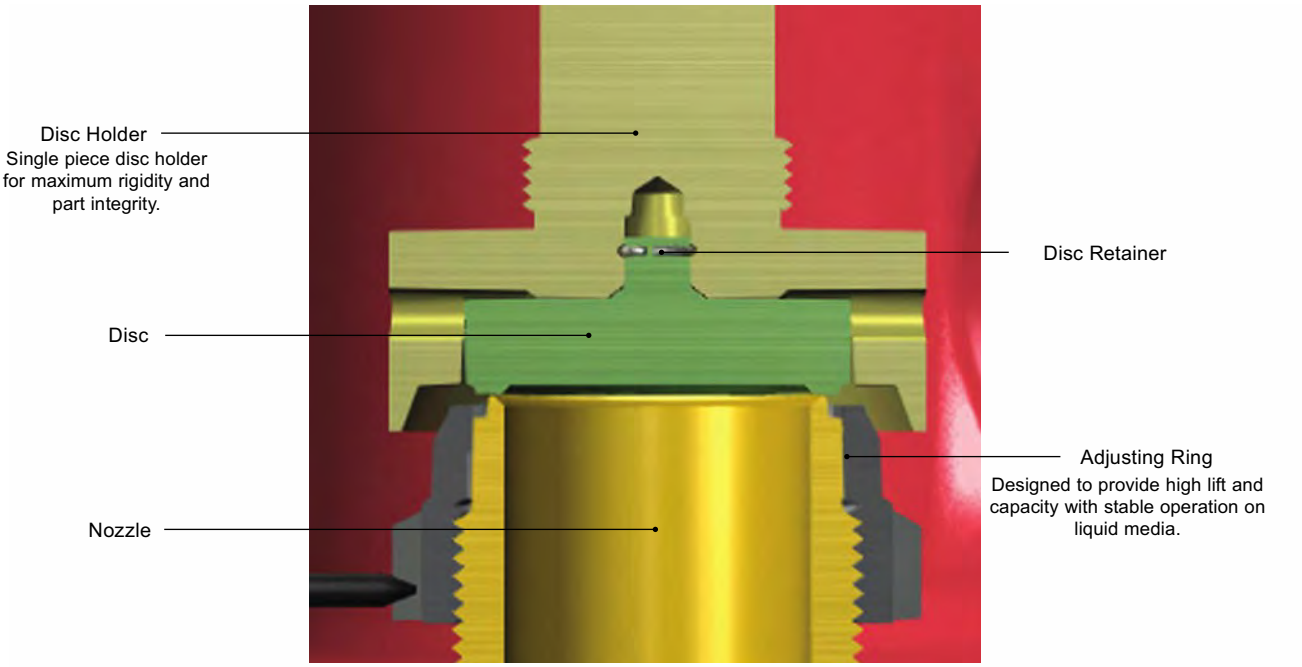


Figure 36: 1900 Series Liquid Service (LA) Internals

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XIV. Inspection and Part Replacement (Cont.)

H. Guide Inspection Criteria

Replace the guide (9) if:

- Visible galling is present on the inside guiding surface.
- Gasket seating areas are pitted and cause the valve to leak between the bonnet (11) and base (1).

The guide (9) type varies depending on the valve type: O-ring valve, bellows valve, or standard valve.

Inspect the guide as follows:

- Find the correct valve orifice size and disc holder (8) measurements (see Table 9).
- Measure the barrel portion of the disc holder and compare it to the nominal measurement on Table 6 to determine the maximum allowable clearance between the disc holder and the guide.
- Replace the guide and disc holder if the clearance between the inner diameter (I.D) and the guide and/or the outer diameter (O.D) of the disc holder is not within the clearance dimensions.

I. Spindle Inspection Criteria

Replace the spindle (15) if:

- The bearing point is pitted, galled, or distorted.
- Threads are torn so that release nut and/or release locknut will not thread on or off.
- The spindle cannot be straightened less than the .007″ (0.17 mm) total indicator reading (See Checking Spindle Concentricity and Figure 28).

Table 9: Allowable Clearance for Guide and Disc Holder (Std.(1 and 2) and DM(2))

Orifice		Bellows Type (-30)						Non-Bellows Type (-00)					
		Disc Holder Barrel O.D		Clearance				Disc Holder Barrel O.D		Clearance			
		min.		min.		max.		min.		min.		max	
Std.	DM	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
D-1	D	.448	11.38	.003	0.08	.007	0.18	.993	25.22	.005	0.13	.008	0.20
E-1	E	.448	11.38	.003	0.08	.007	0.18	.993	25.22	.005	0.13	.008	0.20
D-2	D	.448	11.38	.003	0.08	.007	0.18	.993	25.22	.005	0.13	.008	0.20
E-2	E	.448	11.38	.003	0.08	.007	0.18	.993	25.22	.005	0.13	.008	0.20
F	F	.448	11.38	.003	0.08	.007	0.18	.993	25.22	.005	0.13	.008	0.20
G	G	.494	12.55	.003	0.08	.007	0.18	.993	25.22	.005	0.13	.008	0.20
H	H	.680	17.27	.004	0.10	.008	0.20	1.117	28.37	.005	0.13	.009	0.23
J	J	.992	25.20	.005	0.13	.009	0.23	0.992	25.20	.005	0.13	.009	0.23
K	K	1.240	31.50	.007	0.18	.011	0.28	1.240	31.50	.007	0.18	.011	0.28
L	L	1.365	34.67	.007	0.18	.011	0.28	1.365	34.67	.007	0.18	.011	0.28
M	M	1.742	44.25	.005	0.13	.009	0.23	1.742	44.25	.005	0.13	.009	0.23
N	N	1.868	47.45	.004	0.10	.008	0.20	1.868	47.45	.004	0.10	.008	0.20
P	P	2.302	58.47	.008	0.20	.012	0.30	2.302	58.47	.008	0.20	.012	0.30
Q	Q	2.302	58.47	.008	0.20	.012	0.30	2.302	58.47	.008	0.20	.012	0.30
R	R	2.302	58.47	.008	0.20	.012	0.30	2.302	58.47	.008	0.20	.012	0.30
T-4	T	2.302	58.47	.007	0.18	.011	0.28	2.302	58.47	.007	0.18	.011	0.28
U	U	2.302	58.47	.007	0.18	.011	0.28	2.302	58.47	.007	0.18	.011	0.28
V	V	6.424	163.17	.018	0.46	.023	0.58	6.424	163.17	.018	0.46	.023	0.58
W	W	8.424	213.97	.018	0.46	.023	0.58	8.424	213.97	.018	0.46	.023	0.58

(1) For valves manufactured prior to 1978, contact the factory for dimensions and clearances.

(2) Guide and disc holder assembly: The disc holder and the guide may be retained provided their diametrical clearance falls within the limits within the table. If the fit between the assembled parts is outside the allowable clearance, replace either component or both to provide proper assembly clearance.

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XIV. Inspection and Part Replacement (Cont.)

J. Spring Inspection Criteria

Replace the spring (18) if:

- Pitting and corrosion of the coils reduce coil diameter.
- Spring ends are not parallel in the free height condition.
- Obvious uneven coil spacing or spring distortion is present.
- The maximum clearance between A and A_1 and between B and B_1 (see Figure 37) is more than:

– .031" (.79 mm) for springs with an inner diameter (ID) of less than 4" (100 mm).

– .047" (1.19 mm) for springs with an ID of 4" (100 mm) or greater.

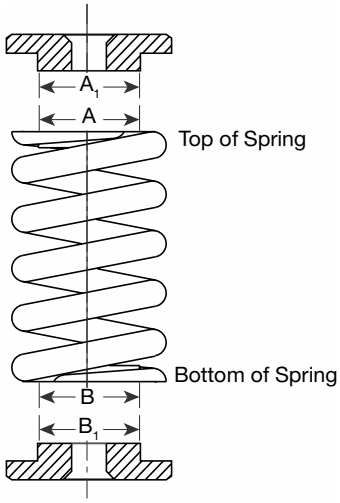


Figure 37: Spring Allowed Tolerance

If there is constant backpressure in a conventional 1900 Series SRV (without balancing bellows), check that the cold differential set pressure of the replacement spring (18) is within the recommended range. If the relieving temperature causes the cold differential set pressure, then select a spring based on the valve's actual set pressure, not on the cold differential set pressure (See Set Pressure Compensation).

ATTENTION!

If a spring must be replaced, order a spring assembly, as it includes custom fit spring washers.

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XV. Reassembly of 1900 Series SRV

A. General Information

The 1900 Series SRV can be easily reassembled after the required internal parts maintenance has been performed. All parts should be clean before reassembly.

B. Preparation

Before beginning reassembly take these steps as follows:

1. Inspect guiding surfaces, bearing surfaces, flange faces, retainer recesses, and grooves for cleanliness (See Replacement Parts Planning for recommended compounds and tools).
2. Check all gaskets used during reassembly. Reuse undamaged, solid metal gaskets (not pitted or creased) and replace all soft gaskets.
3. Before installing the (flat) gaskets, apply a light uniform coating of lubricant to the surface to be sealed. Then coat the top of the gasket with lubricant.
4. If lapping of bearing points was necessary, ensure all lapping compound is removed. Then, thoroughly clean both surfaces and rinse with alcohol or another suitable cleaner.
5. Apply a light, uniform layer of lubricant to each bearing surface.
6. If the valve has an O-ring seat seal, the O-ring should be replaced. Please refer to its tag plate (see Figure 38) to determine O-ring material and “as-built” part number.

C. Lubrication

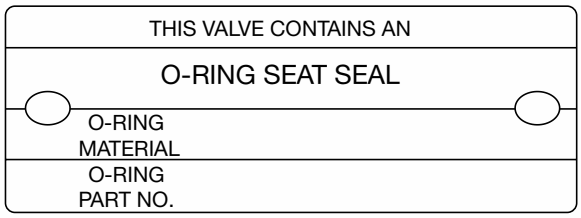


Figure 38: Valve O-Ring Tag

Use a nickel-based, anti-seize lubricant on all threads and bearing surfaces. Recommended lubricant is Jet – Lube, Baker Hughes Non-metallic, product code #14613.

D. Reassembly Procedure

1. If the nozzle (2) was removed, apply thread lubricant to the nozzle threads before reinstalling it in the valve base (1).
2. Insert the nozzle (2) into the inlet flange of the base (1) and torque to the correct value (see Table 10).

Table 10: Nozzle Torque (Values +10% - 0%)

Orifice		Required Torque	
Std.	DM	ft-lbs	Nm
D-1	D	95	129
E-1	E	165	224
D-2	D	95	129
E-2	E	165	224
F	F	165	224
G	G	145	197
H	H	165	224
J	J	335	454
K	K	430	583
L	L	550	746
M	M	550	746
N	N	640	868
P	P	1020	1383
Q	Q	1400	1898
R	R	1070	1451
T-4	T	1920	2603
U	U	1920	2603
V	V	1960	2657
W	W	2000	2712

3. Install the adjusting ring (3) on the nozzle (2) below the seat level so that the disc (6) will seat on the nozzle and not on the adjusting ring.
4. For restricted lift valves:

If the nozzle (2) did not require machining, the same limit washer (tagged during disassembly) may possibly be reused. However, lift should be checked and verified as described in Checking Lift on Lift-Restricted Valves.

If the nozzle was remachined, measure the required lift as described in Checking Lift on Lift-Restricted Valves and replace limit washer if necessary.

5. Assemble the disc/disc holder as follows:

- Before assembly of the disc (6) into the disc holder (8), remove the disc retainer (7) from the back of the disc.

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XV. Reassembly of 1900 Series SRV (Cont.)

- Use 1000-grit lapping compound on the bearing surface to lap the disc (6) into the disc holder (8) and to properly establish the bearing surface.
- For D through U orifice valves with metal-to-metal discs (see Figure 1 to 6), place the disc retainer (7) into the groove in the disc (6). The retainer should "snap" into the disc holder (8) with moderate finger or hand force. Check that the disc "rocks" after set in place.
- For V and W orifice discs (see Figure 9), place the disc into the disc holder and secure it with disc retaining bolts.

ATTENTION!

Do not use excessive force to insert the disc (6) into the disc holder (8).

- For O-ring disc sizes D through J (see Figure 10a), reassemble the disc holder using a new O-ring Seat Seal, O-ring retainer, and retainer lock screw(s).
- For O-ring disc sizes K through U (see Figure 10b), reassemble the disc using a new O-ring Seat Seal, O-ring retainer, and retainer lock screws. Assemble the disc into the disc holder.
- For O-ring seat Dual Media (DM DA), follow the instructions in Appendix A.

6. Install the bellows gasket and bellows ring as follows:

- For bellows valves D through U (see Figure 7):
  - Clamp the stem portion of the disc holder (8), barrel-end up, firmly between two wooden V-blocks in a vise.
  - Place a new bellows gasket on the disc holder.
  - Thread the bellows ring, hand-tight, down to the gasket on the disc holder.
  - Use a pin spanner wrench or special cable-type wrench to tighten the bellows ring until a pressure-tight joint is formed.
- For bellows valves V and W:
  - Place a new bellows gasket on the disc holder.
  - Bolt the assembly in place and tighten bolts to 7-9 ft-lbs (9.5-12.2 Nm).

7. On restricted lift valves, install the limit washer with the chamfered side down.
8. For D through U valves:

- Place the guide (9) over the disc holder (8). If bellows are present, the weight of the guide will slightly compress the bellows.
- For V and W orifice valves:
  - Install guide rings into the grooves located inside the guide ID. Make sure the space where the upper and lower guide ring ends meet is positioned 180° apart. Mark both the guide and disc holder at the point where the bottom guide ring ends meet. This mark must be faced 180° away from the outlet when the assembly is place into the valve. Gently lower the guide down onto the disc holder ensuring that guide rings remain in their respective groove.

9. Set the disc holder (8), disc side down, on the work surface. Place a small amount of 1000- grit lapping compound onto the ball end of the spindle (15) and place it in the spindle socket of the disc holder. Turn the spindle clockwise and then counterclockwise to seat the spindle/disc holder bearing point. When finished, clean lapping compound from all parts.
10. Spread a small amount of 320-grit lapping compound on the spring washer bearing surface.
11. Place the spring washer (17) over the spindle/ spring washer bearing surface and turn it clockwise and then counterclockwise to seat it on the bearing surface. In the same manner, lap the adjusting screw (19) into the bearing surface of the upper spring washer to establish a smooth bearing surface. When finished, clean lapping compound from all parts.
12. Place the spindle retainer (16) over the end of the spindle head or disc holder (8), as applicable.
13. Apply lubricant sparingly to the ball tip of the spindle (15).
14. Place a new guide gasket (10) in the base (1).
15. Install the spindle/disc guide assembly as follows:

- For D through L size valves:
  - Place the spindle (15) in the disc holder (8) and align the spindle retainer (16) so that the gap is midway between the two slots.
  - Use a screwdriver to compress the spindle retainer and guide it into the retaining groove. Ensure the spindle turns freely.
  - Lift complete assembly and carefully lower it into the valve base (1).
  - Ensure proper fit for a conventional valve by aligning the hole in the guide (9) over the

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XV. Reassembly of 1900 Series SRV (Cont.)

extended end of the eductor tube (40).

- For M through U size valves:
  - Install lifting tool (see Figure 16) onto disc holder and carefully lower the disc holder assembly into the valve base.
  - Ensure proper fit for a conventional valve by aligning the hole(s) in the guide over the extended end of the eductor tube(s).
  - Then, install the spindle in the disc holder and align the spindle retainer so that the gap is midway between the two slots.
  - Use a screwdriver to compress the spindle retainer and guide it into the retaining groove. Ensure the spindle turns freely.
- For V and W size valves:
  - Using the same lifting lugs used during disassembly (see Figure 16), carefully lower the disc holder assembly into the valve base.
  - Install the spindle in the disc holder and align the spindle retainer so that the gap is midway between the two slots.
  - Use a screwdriver to compress the spindle retainer and guide it into the retaining groove. Ensure the spindle turns freely.

- 16. Apply a small quantity of lubricant to the spring washer bearing surface of the spindle (15).
- 17. Place the spring assembly on the spindle (15).
- 18. Place a new bonnet gasket (12) in the base (1) before installing the bonnet (11). Uniformly tighten the stud nuts (14) using the appropriate bolt tightening pattern (see Figure 39). Determine the required torque for the subject valve (see Table 11). Determine the torque values for each round of the pattern (see Table 11). The last round ensures that all stud nuts are at the required torque.
- 19. With the adjusting screw locknut (20) assembled near the top of the adjusting screw (19), apply a small quantity of lubricant to the spherical end and threads of the adjusting screw.

20. Thread the adjusting screw (19) into the bonnet (11) until it contacts the spring washer (17).

- For V and W orifices, use the setting device to assemble the spring plunger and adjusting screw. Contact the factory for procedure on how to use the setting device.

Table 11: Bonnet Nut Torque

Orifice		1905		1906		1910		1912		1914		1916		1918	
Std.	DM	ft lb	Nm	ft lb	Nm	ft lb	Nm	ft lb	Nm	ft lb	Nm	ft lb	Nm	ft lb	Nm
D-1	-	55	75	55	75	55	75	60	81	60	81	60	81	120	163
E-1	-	55	75	55	75	55	75	60	81	60	81	60	81	120	163
D-2	-	55	75	55	75	55	75	60	81	60	81	60	81	120	163
E-2	-	55	75	55	75	55	75	60	81	60	81	60	81	120	163
F	F	55	75	55	75	55	75	60	81	70	95	70	95	115	156
G	G	55	75	55	75	55	75	60	81	70	95	70	95	75	102
H	H	90	122	90	122	60	81	75	102	65	88	65	88	----	----
J	J	60	81	60	81	75	102	100	136	100	136	100	136	----	----
K	K	65	88	65	88	60	81	60	81	135	183	145	197	----	----
L	L	75	102	75	102	90	122	90	122	140	190	140	190	----	----
M	M	95	129	95	129	110	149	95	129	95	129	----	----	----	----
N	N	105	142	105	142	130	176	85	115	85	115	----	----	----	----
P	P	120	163	120	163	145	197	125	169	125	169	----	----	----	----
Q	Q	105	142	105	142	125	169	150	203	----	----	----	----	----	----
R	R	115	156	115	156	115	156	135	183	----	----	----	----	----	----
T-4	T	95	129	95	129	95	129	----	----	----	----	----	----	----	----
U	U	95	129	95	129	95	129	----	----	----	----	----	----	----	----
V	V	130	176	130	176	130	176	----	----	----	----	----	----	----	----
W	W	130	176	130	176	130	176	----	----	----	----	----	----	----	----

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XV. Reassembly of 1900 Series SRV (Cont.)

Table 11 (Cont.): Bonnet Nut Torque

Orifice		1920		1921		1922		1923		1924		1926		1928	
Std.	DM	ft lb	Nm	ft lb	Nm	ft lb	Nm	ft lb	Nm	ft lb	Nm	ft lb	Nm	ft lb	Nm
D-1	-	55	75	----	----	55	75	----	----	60	81	60	81	115	156
E-1	-	55	75	----	----	55	75	----	----	60	81	60	81	115	156
D-2	-	55	75	----	----	55	75	----	----	60	81	60	81	115	156
E-2	-	55	75	----	----	55	75	----	----	60	81	60	81	115	156
F	F	55	75	----	----	55	75	----	----	70	95	70	95	115	156
G	G	55	75	----	----	60	81	----	----	70	95	70	95	75	102
H	H	60	81	----	----	60	81	----	----	75	102	85	115	----	----
J	J	75	102	----	----	75	102	----	----	100	136	100	136	----	----
K	K	60	81	----	----	60	81	----	----	60	81	140	190	----	----
L	L	90	122	----	----	90	122	----	----	140	190	140	190	----	----
M	M	90	122	----	----	95	129	----	----	95	129	----	----	----	----
N	N	130	176	----	----	85	115	----	----	85	115	----	----	----	----
P	P	145	197	----	----	----	----	125	169	125	169	----	----	----	----
Q	Q	105	142	----	----	150	203	----	----	----	----	----	----	----	----
R	R	115	156	----	----	135	183	----	----	----	----	----	----	----	----
T-4	T	125	169	----	----	----	----	----	----	----	----	----	----	----	----
U	U	125	169	----	----	----	----	----	----	----	----	----	----	----	----
V	V	130	176	----	----	----	----	----	----	----	----	----	----	----	----
W	W	130	176	----	----	----	----	----	----	----	----	----	----	----	----

- 21. Use pliers to hold the spindle (15) and prevent it from turning in the disc holder (8). Turn the adjusting screw (19) clockwise until the original distance between the end of the spindle and the top of the adjusting screw is obtained. This method of compressing the spring (18) will approximately reestablish the original set pressure. The valve must still be reset for the required pressure.

22. Restore the adjusting ring (3) to its original position, with reference to the disc holder (8), as recorded.

23. Fit the adjusting ring pin (4) with a new adjusting ring pin gasket (5).

24. Install the adjusting ring pin (4) in the valve assembly in the original position. If the original position is not known, verify the number of notches on the adjusting ring (3) and refer to Tables 12, 13, 14 or 15 depending on the valve serial number or trim. Set the ring position according to the applicable set pressure and orifice size.

The valve is now ready for setting and testing.

Table 12: Torque Required for Each Round of Pattern

Round	Percentage of Required Torque
1	Wrench Tight
2	25
3	60
4	100
5	100

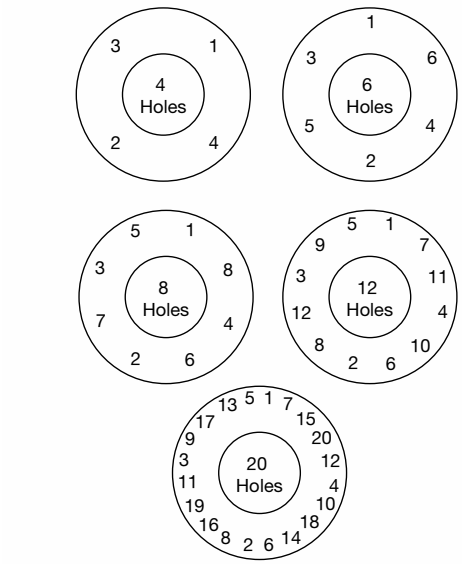


Figure 39: Bolt Tightening Patterns

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XV. Reassembly of 1900 Series SRV (Cont.)

Table 13a: Adjusting Ring Setting (Standard Trim) for Valves with Serial Numbers BEFORE TK-68738[2]

Orifice	No. of Notches on Adj. RIng	Set Pressure 100 psig (6.90 bar) and Below	Set Pressure Above 100 psig (6.90 bar)
D-1	16	1 Notch	4 Notches
D-2	16 24	1 Notch 2 Notches	4 Notches 6 Notches
E-1	16	1 Notch	4 Notches
E-2	16 24	1 Notch 2 Notches	4 Notches 6 Notches
F	16 24	1 Notch 2 Notches	4 Notches 6 Notches
G	18 30	1 Notch 2 Notches	4 Notches 6 Notches
H	24 30	1 Notch 2 Notches	5 Notches 6 Notches
J	24 30	1 Notch 2 Notches	5 Notches 8 Notches
K	24 32	6 Notches 8 Notches	14 Notches 19 Notches
L	24 40	6 Notches 10 Notches	18 Notches 31 Notches
M	24 40	7 Notches 10 Notches	20 Notches 30 Notches
N	24 40	7 Notches 10 Notches	20 Notches 30 Notches
P	24 40	8 Notches 14 Notches	24 Notches 42 Notches
Q	28 48	10 Notches 17 Notches	28 Notches 47 Notches
R	32 48	28 Notches 42 Notches	36 Notches 64 Notches
T	24	30 Notches	38 Notches
W	–	–	–

[2] Valve Serial Numbers are alphabetically and numerically chronological.

Table 13b: Adjusting Ring Setting (Standard Trim) for Valves with Serial Numbers AFTER TK-68738[2]

Orifice	No. of Notches on Adj. RIng	Set Pressure 100 psig (6.90 bar) and Below	Set Pressure Above 100 psig (6.90 bar)
D-1	16	1 Notch	4 Notches
D-2	16 24	1 Notch 2 Notches	4 Notches 6 Notches
E-1	16	1 Notch	4 Notches
E-2	16 24	1 Notch 2 Notches	4 Notches 6 Notches
F	16 24	1 Notch 2 Notches	4 Notches 6 Notches
G	18 30	1 Notch 2 Notches	4 Notches 6 Notches
H	24 30	1 Notch 2 Notches	5 Notches 6 Notches
J	24 30	1 Notch 2 Notches	5 Notches 8 Notches
K	24 32	2 Notches 2 Notches	5 Notches 7 Notches
L	24 40	2 Notches 4 Notches	6 Notches 11 Notches
M	24 40	2 Notches 4 Notches	7 Notches 12 Notches
N	24 40	3 Notches 4 Notches	8 Notches 13 Notches
P	24 40	3 Notches 5 Notches	9 Notches 16 Notches
Q	28 48	5 Notches 8 Notches	15 Notches 25 Notches
R	32 48	7 Notches 10 Notches	20 Notches 30 Notches
T	24	6 Notches	19 Notches
W	24	10 Notches	30 Notches

[2] Valve Serial Numbers are alphabetically and numerically chronological.

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XV. Reassembly of 1900 Series SRV (Cont.)

Table 14: Liquid Trim (LA) Adjusting Ring Settings				
Orifice	No. of Notches	Metal Seat Liquid Trim (MS - LA)[1]	Soft Seat Liquid Trim (DA - LA)	
		Position[2]	Pressure Range	Position[2]
D-2	24	5 Notches	Set < 100 psig (6.89 barg) Set > 100 psig (6.89 barg)	1 Notch[3] 3 Notches[3]
E-2	24	5 Notches	Set < 100 psig (6.89 barg) Set > 100 psig (6.89 barg)	1 Notch[3] 3 Notches[3]
F	24	5 Notches	Set < 100 psig (6.89 barg) Set > 100 psig (6.89 barg)	1 Notch[3] 3 Notches[3]
G	30	5 Notches	Set < 100 psig (6.89 barg) Set > 100 psig (6.89 barg)	1 Notch 5 Notches
H	30	5 Notches	All Pressures	7 Notches[3]
J	30	5 Notches	Set < 80 psig (5.52 barg) Set > 80 psig (5.52 barg)	1 Notch[3] 5 Notches[3]
K	32	5 Notches	All Pressures	5 Notches
L	40	5 Notches	All Pressures	5 Notches
M	40	5 Notches	All Pressures	5 Notches
N	40	5 Notches	All Pressures	5 Notches
P	40	5 Notches	All Pressures	5 Notches
Q	48	5 Notches	All Pressures	5 Notches
R	48	5 Notches	All Pressures	5 Notches
T-4	24	5 Notches	All Pressures	5 Notches
U	24	5 Notches	All Pressures	5 Notches

[1] MS-LA uses standard trim adjusting ring
[2] Position Below Disc Holder
[3] Ring setting to be made with no pressure acting on the valve and no compression on the spring

Orifice	Table 15: 1900 DM Metal Seat (MS) Adjusting Ring Settings[1]															
	3N		5N		8N		10N		15N		20N		25N		30N	
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
D-2	15-100	1.03-6.8	-	-	101-200	6.9-13.7	201-400	13.8-27.5	401+	27.6+	-	-	-	-	-	-
E-2	15-100	1.03-6.8	-	-	101-200	6.9-13.7	201-400	13.8-27.5	401+	27.6+	-	-	-	-	-	-
F	15-100	1.03-6.8	-	-	101-200	6.9-13.7	201-400	13.8-27.5	401+	27.6+	-	-	-	-	-	-
G	15-200	1.03-13.7	201-400	13.8-27.5	401-800	27.6-55.1	801+	55.2+	-	-	-	-	-	-	-	-
H	15-100	1.03-13.7	101-200	6.9-13.7	201-400	13.8-27.5	401+	27.6+	-	-	-	-	-	-	-	-
J	-	-	15-50	1.03-3.4	51-125	3.5-8.6	126-250	8.6-17.2	251+	17.3+	-	-	-	-	-	-
K	-	-	15-50	1.03-3.4	51-125	3.5-8.6	126-250	8.6-17.2	251+	17.3+	-	-	-	-	-	-
L	-	-	15-50	1.03-3.4	51-125	3.5-8.6	126-250	8.6-17.2	251+	17.3+	-	-	-	-	-	-
M	-	-	15-25	1.03-1.7	26-50	1.79-3.44	51-125	3.5-8.6	126-250	8.6-17.2	251+	17.3+	-	-	-	-
N	-	-	15-25	1.03-1.7	26-50	1.79-3.44	51-125	3.5-8.6	126-250	8.6-17.2	251+	17.3+	-	-	-	-
P	-	-	15-25	1.03-1.7	26-50	1.79-3.44	51-125	3.5-8.6	126-250	8.6-17.2	251+	17.3+	-	-	-	-
Q	-	-	-	-	-	-	15-25	3.5-8.6	26-50	1.79-3.44	51-100	3.5-6.8	101-200	6.9-13.7	201+	13.8+
R	-	-	-	-	-	-	-	-	15-25	1.03-1.7	26-50	1.79-3.44	51-100	3.5-6.8	101+	6.9+
T	-	-	15-25	1.03-1.7	26-50	1.79-3.44	51-100	3.5-6.8	101-200	6.9-13.7	201+	13.8+	-	-	-	-
U	-	-	-	-	-	-	-	-	15-25	1.03-1.7	26-50	1.79-3.44	51-100	3.5-6.8	101+	6.9+
V	-	-	-	-	-	-	-	-	15-25	1.03-1.7	26-50	1.79-3.44	51-100	3.5-6.8	101+	6.9+
W	-	-	-	-	-	-	-	-	15-25	1.03-1.7	26-50	1.79-3.44	51-100	3.5-6.8	101+	6.9+

[1] Position Relative to Disc Holder

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Table 16: 1900 DM Soft Seat (DA) Adjusting Ring Settings[1]							
Orifice size	**psig**	**barg**	**Adjusting ring setting**	**Orifice size**	**psig**	**barg**	**Adjusting ring setting**
D-2, E-2, F	15-500	1.03-34.4	2N (without spring load)	P	15-100	1.03-6.8	7N
	500-750	34.4-51.7	1N		100-500	6.8-34.4	12N
	750-1000	51.7-68.9	3N		500+	34.4+	22N
	1000+	68.9+	5N	Q	15-100	1.03-6.8	12N
G	15-500	1.03-34.4	2N (without spring load)		100-250	6.8-17.2	15N
	500-750	34.4-51.7	1N		250+	17.2+	23N
	750-1000	51.7-68.9	4N	R	15-100	1.03-6.8	14N
	1000+	68.9+	7N		100-250	6.8-17.2	18N
H	15-350	1.03-24.1	1N (without spring load)		250+	17.2+	27N
	350-750	24.1-51.7	1N	T	0-50	0-3.44	8N
	750-1000	51.7-68.9	4N		50-100	3.44-6.8	10N
	1000+	68.9+	7N		100+	6.8+	14N
J	15-100	1.03-6.8	3N	U	0-50	0-3.44	9N
	100-500	6.8-34.4	5N		50-100	3.44-6.8	11N
	501-1000	34.5-68.9	7N		100+	6.8+	15N
	1000+	68.9+	9N	V	0-50	0-3.44	8N
K	15-100	1.03-6.8	3N		50-100	3.44-6.8	9N
	100-500	6.8-34.4	8N		100+	6.8+	14N
	501-1000	34.5-68.9	9N	W	0-50	0-3.44	14N
	1000+	68.9+	11N		50-100	3.44-6.8	17N
L	15-100	1.03-6.8	5N		100+	6.8+	23N
	100-500	6.8-34.4	8N				
	500+	34.4+	14N				
M	15-100	1.03-6.8	5N				
	100-500	6.8-34.4	9N				
	500+	34.4+	16N				
N	15-100	1.03-6.8	6N				
	100-500	6.8-34.4	9N				
	500+	34.4+	18N				

(1) Position Relative to Disc Holder

ATTENTION!

If the valve has an O-ring seal, tighten the lock and adjusting screw (19) before final setting of the adjusting ring (3).

ATTENTION!

Ensure the adjusting ring pin (4) enters the notch in the adjusting ring (3), but does not bind the adjusting ring. If binding occurs, cut the adjusting ring pin until adjusting ring moves freely from side-to-side within the notch.

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XVI. Setting and Testing

A. General Information

Before putting the reconditioned valve in service, it must be set to open at the required set pressure as shown on the nameplate. Although the valve can be set on the service installation, it is more convenient to set the valve and check seat tightness on a test stand. Any spring replacement shall be in accordance with current Baker Hughes guidelines.



Mount safety relief valves in a vertical, upright position only.

B. Test Equipment

The test stand used for testing SRVs normally consists of a pressure source supply line with a throttle valve and receiver that have the following features:

- Outlet for attaching the valve to be tested
- Pressure gauge with a shut-off valve
- Drain line with a shut-off valve
- Adequate receiver volume for the valve to be tested and to achieve proper operation



Do not mount valve at the end of pipe through which there is normally no flow or near elbows, tees, bends, etc.

C. Test Media

For best results, valves shall be tested by type as follows:

- Steam valves are tested on saturated steam.
- Air or gas valves are tested on air or gas at ambient temperature.
- Liquid valves are tested on water at ambient temperature.

D. Setting the Valve

Set the valve to open at the set pressure as shown on the nameplate. If a cold differential set pressure is indicated on the nameplate, set the valve to open at that pressure. (The cold differential set pressure is the set pressure corrected to compensate for backpressure and/or operating temperature.) A new cold differential set pressure may need to be determined if changes are to be made to the set pressure or backpressure or if the service temperature changes.

E. Set Pressure Compensation

Cold Differential Set Pressure for Temperature Compensation

During production testing, the SRV is often tested at temperatures that are different from the temperatures the SRV will be exposed to in service. Increasing the temperature from ambient temperature causes the set pressure to decrease. The decrease in set pressure is due to thermal expansion of the seating area and spring relaxation. Therefore, it is important to compensate for the difference between production test temperature and service temperature. The service temperature is the normal operating temperature of the SRV. If the operating temperature is unavailable, do not correct the SRV set pressure.

Table 17 lists the set pressure multipliers to be used when computing the cold differential set (CDS) pressure for valves being set on an air or water test stand at ambient temperatures

Valves to be used in saturated steam service are tested on saturated steam. Therefore, no CDS is required. However, valves in superheated steam service are tested on saturated steam and require a CDS.

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XVI. Setting and Testing (Cont.)

Table 17: Set Pressure Multipliers for Cold Differential Set Pressure at Ambient Temperature					
Operating Temp.		Multiplier	Operating Temp.		Multiplier
^{0}F	^{0}C		^{0}F	^{0}C	
250	120	1.003	900	498	1.044
300	149	1.006	950	510	1.047
350	177	1.009	1000	538	1.050
400	204	1.013	1050	565	1.053
450	248	1.016	1100	593	1.056
500	260	1.019	1150	621	1.059
550	288	1.022	1200	649	1.063
600	316	1.025	1250	676	1.066
650	343	1.028	1300	704	1.069
700	371	1.031	1350	732	1.072
750	415	1.034	1400	760	1.075
800	427	1.038	1450	788	1.078
850	454	1.041	1500	815	1.081

Table 17 lists the multiplier to be used based on temperature above the saturated temperature at operating pressure (degrees of superheat).

Table 18: Set Pressure Multipliers for Cold Differential Set Pressure		
Degrees of Superheat, Temp. above Sat.		Multiplier
^{0}F	^{0}C	
100	55.6	1.006
200	111.1	1.013
300	166.7	1.019
400	222.2	1.025
500	277.8	1.031
600	333.3	1.038
700	388.9	1.044
800	444.4	1.050

Cold Differential Set Pressure for Back Pressure Compensation

ATTENTION!

Install a bellows to allow the set pressure to remain constant for valves with variable superimposed backpressure.

When a conventional 1900 Series SRV operates with a constant backpressure, the cold differential set (CDS) pressure is the set pressure minus the constant backpressure.

When Consolidated Type 1900-30 D-2, 1900-30 E-2, and 1900-30 F through W balanced bellows valves are used with constant or variable backpressure, no compensation to the valve's set pressure is required due to backpressure.

Sample Calculations for 1900 Series Consolidated Safety Relief Valve

Set pressure 2500 psig (172.37 barg), temperature 500ºF (260ºC), backpressure atmospheric.

Set Pressure . . . . . 2500 psig (172.37 barg)

Multiplier (see Table 17) X1.019

Cold Differential Set Pressure. . . . 2548 psig (175.68)

Set pressure 2500 psig (172.37 barg), temperature 500ºF (260ºC), constant backpressure. . . . . 150 psig (10.34 barg)

Set Pressure . . . . . 2500 psig (172.37 barg)

Minus Constant Back Pressure -150 psig (-10.34 barg)

Differential Pressure . . . . . 2350 psig (162.03 barg)

Multiplier (see Table 18) X1.019

Cold Differential Set Pressure. . . . . 2395 psi

Set pressure 2500 psig (172.37 barg), temperature 100º F (260ºC), constant backpressure. . . . . 150 psig (10.34 barg)

Set Pressure . . . . . 2500 psig (172.37 barg)

Minus Constant Back Pressure -150 psig (-10.34 barg)

Cold Differential Set Pressure 2350 psig (162.03 barg)

Set pressure 400 psig (27.58 barg) on superheated steam, temperature 650º F (343.3 ºC), backpressure atmospheric Operating Temperature . . . . . 650º F (343.3 ºC)

Operating pressure . . . . . 330 psig (27.75 barg)

Minus Temperature of Saturated Steam at 330 psig (27.75 barg). . . . . .-430º F (-221.1ºC)

Degrees of Superheat . . . . . .220º F (104.4ºC)

Set Pressure . . . . . 400 psig (27.58 barg)

Multiplier (see Table 17) X1.014

Cold Differential Set Pressure 405.6 psig (27.97 barg).

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XVI. Setting and Testing (Cont.)

ATTENTION!

- Ensure valves for steam service are set using saturated steam.
- Ensure valves for gaseous service are set using air or nitrogen.
- Ensure valves for liquid service are set using water.

ATTENTION!
STANDARD 1900 SERIES (GS, LA & SS TRIMS)

The ASME Boiler and Pressure Vessel Code Section XIII (UV) set pressure tolerance is:
+/- 2 psi (.14 bar) ≤ 70 psi (4.8 bar)
and +/- 3% > 70 psi (4.8 bar)

ATTENTION!
1900 DUAL MEDIA (DM) SERIES

The 1900 DM set pressure tolerance is more conservative than the ASME Boiler and Pressure Vessel Code Section XIII (UV) criteria. The set pressure tolerance shall be as follows:

Air / Nitrogen
+0 psi, -2 psi (.14 bar) ≤ 70 psi (4.8 bar)
+0%, -3% > 70 psi (4.8 bar)

Water
+ 2 psi (.14 bar), -0 psi ≤ 70 psi (4.8 bar)
+3%, -0% > 70 psi (4.8 bar)

F. Setting the Pressure

1. Before mounting the valve on the test stand, remove all dirt, sediment, or scale from the test tank nozzle and the inlet port of the valve. Ensure the test gauge has recently been calibrated on a deadweight gauge tester.
2. Mount the valve on the test stand.
3. If the adjusting screw (19) of the reconditioned valve has been turned down to its original position, slowly bring the pressure up in the test tank to the CDS pressure. If the valve opens before the desired pressure is reached, additional compression is required on the spring (18), as follows:

- Hold the spindle (15) to prevent rotation and turn the adjusting screw clockwise.
- If the valve does not open at the desired pressure, maintain the required pressure in the test tank and slowly release the compression on the spring by turning the adjusting screw counterclockwise until the valve opens.
- Continue adjustment until the valve opens at the desired pressure.

4. After the required set pressure is obtained, tighten the adjusting screw locknut (20) and repeat the test. Obtain at least two repeat openings at the same pressure to ensure the valve is set accurately.

ATTENTION!

On compressible fluids, set pressure is defined as the pressure where the valve pops open, NOT as the pressure when it begins to simmer.

ATTENTION!

On liquid valves, set pressure is indicated by the first continuous flow of water from the valve outlet.

G. Seat Tightness Testing

General Information: Set up a typical test arrangement for determining seat tightness for SRVs on air or gas service (in accordance with ANSI B147.1/ API RP 527) (see Figure 40).

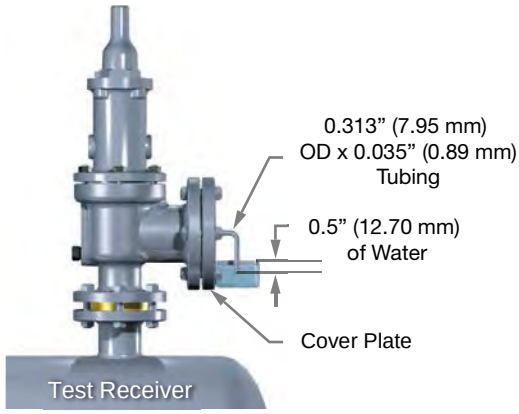


Figure 40: Typical Test Arrangement

ATTENTION!

Leakage may be detected by application of a soap solution, or equivalent, at points of possible leakage.

1. Cut the end of a piece of .313″ (7.93 mm) OD tubing with .035″ (0.89 mm) wall so that it is square and smooth.
2. Insert the tubing so that it is perpendicular to and .5″ (12.7 mm) below the surface of the water.
3. Use the tubing to take a leakage measurement.

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XVI. Setting and Testing (Cont.)

G.1 Metal-to-Metal Seats

1. With the valve mounted vertically (see Figure 40), determine the leakage rate, in bubbles per minute, with pressure at the SRV inlet held at 90% of the set pressure immediately after popping. For valves set at 50 psig (3.45 barg) or below, hold pressure at 5 psig (0.34 barg) below set point. The test pressure shall be applied for a minimum of 1 minute for valves on inlet sizes through 2″ (50.8 mm); 2 minutes for sizes 2.5″ (63.5 mm), 3″ (76.2 mm) and 4″ (101.6 mm), and 5 minutes for the 6″ (152.4 mm), 8″ (203.2 mm), 10″ (254 mm) and 12″ (304.8 mm) sizes. For metal-to-metal valves designated for gaseous service, the leakage rate shall not exceed maximum bubbles per minute (see Table 19). When using saturated steam as the test medium, the test pressure shall be held for at least 3 minutes.
2. Check that there is no visible leakage for valves designated for steam service (and tested on steam) or for liquid service (and tested on water).

G.2 O-Ring Seat Seal Valve

The tightness standard for O-ring seat seal valves shall be no leakage at or below the test pressures listed (see Table 20).

Table 19: Valve Leakage Rate (Metal Seat)

Set Pressure (60°F or 15.6°C)		Valve Orifice D & E			Valve Orifice F and Larger		
		Approximate Leakage per 24 hrs			Approximate Leakage per 24 hrs		
Pressure		Leakage Rate (Bubbles per Minute)	ft^3	m^3	Leakage Rate (Bubbles per Minute)	ft^3	m^3
(psig)	(barg)						
15-1000	1.03-68.95	40	0.6	0.02	20	0.3	0.01
1500	103.42	60	0.9	0.03	30	0.45	0.01
2000	137.90	80	1.2	0.03	40	0.6	0.02
2500	172.37	100	1.5	0.04	50	0.75	0.02
3000	206.84	100	1.5	0.04	60	0.9	0.03
4000	275.79	100	1.5	0.04	80	1.2	0.03
5000	344.74	100	1.5	0.04	100	1.5	0.04
6000	413.69	100	1.5	0.04	100	1.5	0.04

Table 20: Leakage Rate (Soft Seat)

Set Pressure		Test Pressure [1]	
(psig)	(barg)	(psig)	(barg)
3	2.07	1.5	1.03
4	2.76	2	1.38
5	3.45	2.5	1.72
6	4.14	3	2.07
7.0 – 14.0	4.83 – 9.65	3.0 below Set	2.07 below set
15.0 – 30.0	10.34 – 20.68	90% of Set	90% of Set
31.0 – 50.0	22.06 – 34.47	92% of Set	92% of Set
51.0 – 100.0	35.16 – 68.95	94% of Set	94% of Set
Set > 100.0	Set > 68.95	95% of Set	95% of Set

[1] Set pressures below 15 psig are outside the scope of API 527.

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XVI. Setting and Testing (Cont.)

H. Recommended Backpressure Testing for Joint Leakage

If the valve is to be used in a closed discharge system, backpressure-test the valve after it has been set for the correct opening pressure. Conduct testing by installing the screwed cap (21) with a cap gasket (27) and applying air or nitrogen to the base drain connection or to the valve outlet. Seal all other openings.

Test pressure should be the greater of 30 psig (2 barg) or the actual valve backpressure. Hold air or nitrogen pressure for 3 minutes before applying leak detector solution to all connections (joints).

On bellows valves, hand-tighten a clean pipe plug in the bonnet vent connection in order to obtain the smallest possible leak path. Remove this plug after the test.

Apply liquid leak detector to the following SRV components and examine for leakage during backpressure testing:

- Nozzle/base joint.
- Adjusting ring pin seal.
- Base/bonnet joint.
- Bonnet/cap joint.
- “Tight” bonnet vent plug, if conventional valve.
- “Loose” bonnet vent plug, if bellows valve.



Gag the safety valve during ring adjustments to avoid possible severe personal injury or death.

If a leak is discovered, attempt repair of the leaking joint(s) by tightening it while the SRV is still on the stand. If the leak continues, tear down the leaking joint(s) and inspect both the metal surface(s) and gasket(s). If the valve internals have been disturbed, it is necessary to retest in accordance with the instructions within this manual. Otherwise, repeat the backpressure tests outlined above.

I. Blowdown Adjustment

Blowdown adjustments are made by means of the adjusting ring (3) on 1900 Series SRVs.

If longer or shorter blowdown is required, it can be obtained as follows:

ATTENTION!

Unless the test stand capacity is equal to or greater than that of the valve, return the adjusting ring (3) to the recommended position and do not attempt to set blowdown (see Tables 12 through 15).

To increase the blowdown (lower reseating pressure), raise the adjusting ring (3) by moving the notches from left to right past the ring pin hole.

ATTENTION!

The valve will not achieve rated relieving capacity if the adjusting ring (3) is positioned too low.

To decrease the blowdown (raise reseating pressure), lower the adjusting ring by moving the notches from right to left past the adjusting ring pin hole.

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XVI. Setting and Testing (Cont.)

J. Hydrostatic Testing and Gagging

When hydrostatic tests are required after installation of an SRV, remove the SRV and replace it with a blind flange If the hydrostatic test pressure will not be greater than the operating pressure of the equipment, a test gag may be used. Very little force, i.e., hand-tight pressure, on the test gag is sufficient to hold hydrostatic pressures. Too much force applied to the gag may bend the spindle (15) and damage the seat. After a hydrostatic test, the gag must be removed and replaced by the sealing plug furnished for this purpose (see Figure 41). (Test gags for Consolidated SRVs can be furnished for all types of caps and lifting gears.)

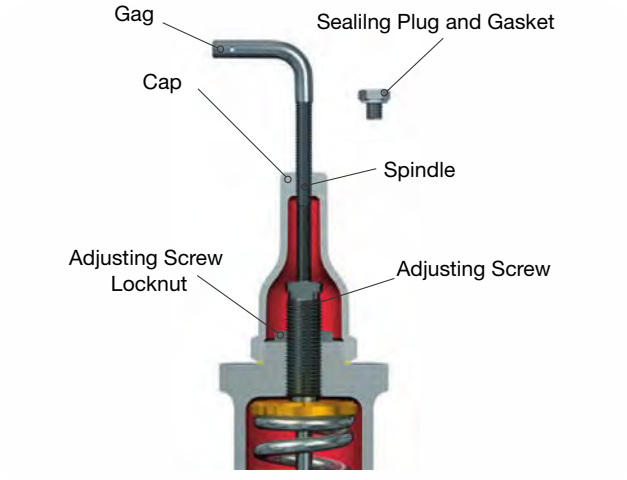


Figure 41: Hydrostatic Testing

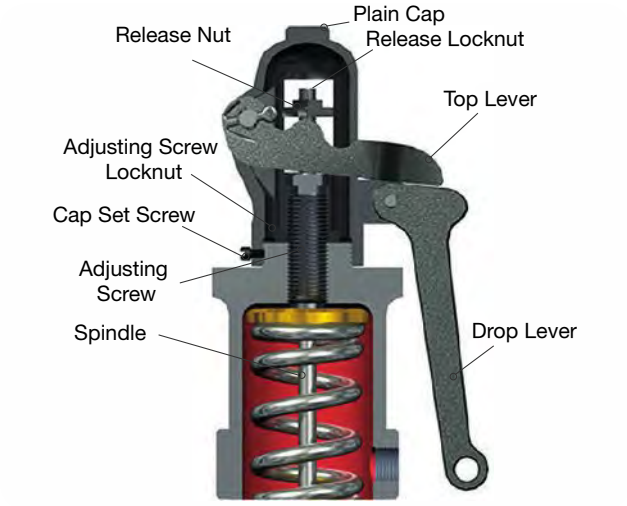


Figure 42: Plain Lever

K. Manual Popping of the Valve

Consolidated SRVs are furnished, when so ordered, with packed or plain lifting levers for hand-popping or with an air-operated lifting device for remote control (see Figures 42 through 44).

When the valve is to be opened by hand, ensure the pressure at the valve inlet is at least 75% of the valve's set pressure. Under flowing conditions, the valve must be fully lifted from its seat so that dirt, sediment, and scale do not become trapped on the seating surfaces. When allowing the valve to close under flowing conditions, completely release the lever from maximum lift to snap the valve back on its seat.

Since the deadweight of a Packed Lever, and Air-Operated Packed Lever has a tendency to lift the valve, the lever should be supported or counterweighted so that the lifting fork does not contact the release nut (see Figures 43 and 44)

The air-operated lifting device is designed to fully open the valve with 75% of set pressure under the valve disc in compliance with ASME Section XIII (UV). For certain applications, the air operator may be designed to fully open the valve with no pressure at the valve inlet. An air-operated device can be operated from a remote point and can be used as a "drop out" valve. (A typical design is shown in Figure 44, and can be purchased from Baker Hughes.)

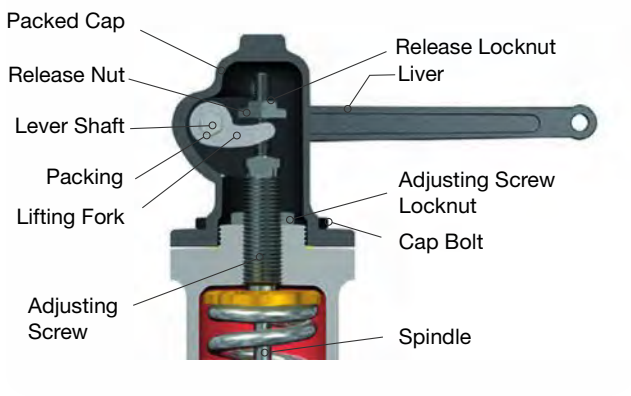


Figure 43: Packed Lever

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XVII. Troubleshooting 1900 Series SRVs

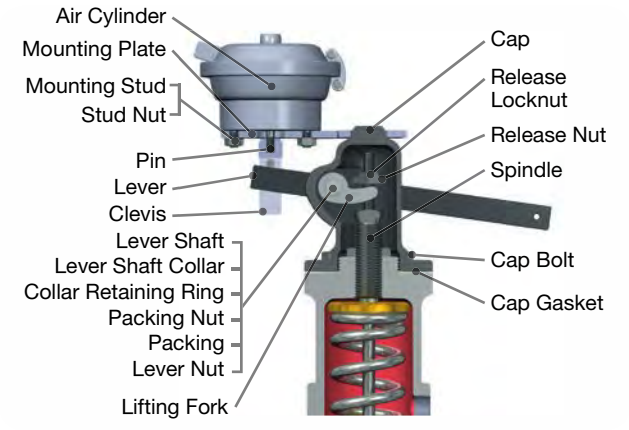


Figure 44: Air-Operated Packed Lever

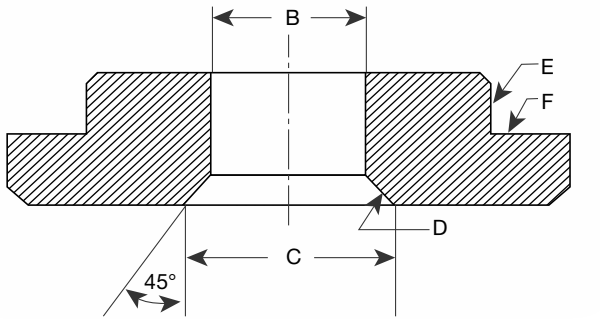


Figure 45: Lower Spring Washer

Table 21: Troubleshooting Seat Leakage, Simmer, and Chatter		
Malfunction	Cause	Solution
Seat Leakage	Damaged seats.	Rework seats or replace part.
	Improper installation.	Inspect installation, i.e., piping.
	Operating pressure too close to set pressure.	Increase differential.
	Excessive system vibration.	Recheck application.
	Misalignment of valve components.	Ensure valve is installed vertically. Ensure valve has been properly assembled.
	Debris trapped on seats.	Pop valve to clean seats. Rework seats.
Simmer	Damaged seats.	Rework seats or replace part.
	Wide nozzle seat.	Rework seat.
	Improper adjusting ring setting.	Check ring setting.
	Misalignment/binding.	Inspect valve and installation.
Chatter	Improper installation or valve sizing.	Check for piping restrictions. Check required capacity.
	Built-up back pressure.	Check outlet piping.
	Improper ring setting.	Check ring setting.

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XVIII. 1900 Series Safety Relief Valve Options

A. General Information

Consolidated Type 1900 Flanged SRVs can be readily converted from conventional to bellows style, or vice versa, in the customer's repair shops. Table 22 shows the parts necessary for the typical conversion.

B. Conversion from Conventional to Bellows Type

ATTENTION!

Remove the bonnet plug (41) from the bellows valves (see Figure 7) and vent the bonnet (11) to a safe area.

Convert from a conventional to a bellows type valve as follows:

1. Remove the eductor tube (40) from the base (1) by selecting a drill bit approximately .016" (0.40 mm) smaller in diameter than the outside diameter of the eductor tube. Drill into the bore of the eductor tube where the tubing is attached to the base. This will reduce the tube wall thickness to the extent that it can easily be collapsed for removal. The bellows flange will cover the hole in the guide surface which will remain after the tube is removed.
2. Machine the existing lower spring washer (17) (see Figure 45 and Table 22).

Table 22: Conversion Parts: Conventional and Bellows Style Valves

Valve Orifice Size	New Parts to Convert From	
	Conventional to Bellows Valve	Bellows to Conventional Valve
D, E, F, G, H	1. Bellows assembly - Standard Material, 316L Stainless Steel. 2. Set of gaskets for bellows valve. 3. Guide for bellows valve. 4. Disc holder for bellows valve. 5. Spindle for bellows valve (F, G and H only). 6. Spindle retainer for bellows valve. 7. Base studs for bellows valve (D, E, F and G only). 8. Machine existing lower spring washer (F, G and H orifices only). Upper spring washer, no change. 9. Drill .719″ (18.26 mm) dia. on bonnet boss and tap 1/2" N.P.T. (as required) (1)	1. Eductor tube for conventional valve. (Not required for UM valves.) 2. Set of gaskets for conventional valve. 3. Guide for conventional valve. 4. Disc holder for conventional valve. 5. Spindle for conventional valve (F, G and H only). 6. Spindle retainer for conventional valve. 7. Base studs for conventional valve (D, E, F and G only). 8. New lower spring washer for conventional valve (F, G and H orifices only). Upper spring washer, no change. 9. Bonnet vent plugged (if desired).

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XVIII. 1900 Series Safety Relief Valve Options (Cont.)

Table 22 (Cond.): Conversion Parts: Conventional and Bellows Style Valves		
Valve Orifice Size	New Parts to Convert From	
	Conventional to Bellows Valve	Bellows to Conventional Valve
K, L, M, Q, R, T, U Also J, N, P manufactured after 1981.(2)	• 1. Bellows assembly - Standard Material, 316L Stainless Steel. • 2. Set of gaskets for bellows valve. • 3. Drill .719″ (18.26 mm) dia. on bonnet boss and tap 1/2" N.P.T. (as required) (1) • 4. Studs (1905-30 K and L, 1906-30 K and L only).	• 1. Eductor tube for conventional valve. (Not required for UM valves.) • 2. Set of gaskets for conventional valve. • 3. Bonnet vent plugged (if desired). • 4. Studs (1905 K and L, 1906 K and L only).
J, N, P Manufactured before 1982.(2)	• 1. Bellows assembly - Standard Material, 316L Stainless Steel. • 2. Set of gaskets for bellows valve. • 3. Guide for bellows valve. • 4. Disc holder for bellows valve. • 5. Drill .719″ (18.26 mm) dia. on bonnet boss and tap 1/2 N.P.T. (as required). (1) • 6. Studs (1905-30 N and P, 1906-30 N and P only).	• 1. Eductor tube for conventional valve. (Not required for UM valves.) • 2. Set of gaskets for conventional valve. • 3. Bonnet vent plugged (if desired). • 4. Drill .438″ (11.11 mm) dia. through guide flange 1.813 (46.04 mm) from guide bore centerline (J orifice only). • 5. Studs (1905 N and P, 1906 N and P only).
V, W	• 1. Bellows assembly. • 2. Set of gaskets for bellows valve. • 3. Disc holder for bellows valve. • 4. Guide for bellows valve. • 5. Lift restricting ring. • 6. Studs.	• 1. Set of gaskets for conventional valve. • 2. Bonnet vent plug (if desired).

(1) Valves manufactured after 1980 are furnished with bonnet vent machined.

(2) J, N, P orifice valves manufactured after 1981 are furnished with threaded disc holder and reduced guide bore for balanced bellows conversion.

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C. Conversion from Bellows to Conventional Type

Convert from a bellows to a conventional type valve as follows:

1. Secure the eductor tube (40) in the base (1) by expanding or swaging into the hole provided. The upper end of the eductor tube should project above the guide surface of the base approximately .125″ (3.18 mm) and the lower end should point directly and squarely toward the valve outlet. When the valve is assembled, the hole at the outer edge of the guide flange must fit loosely around the projection of the eductor tube.
2. For F, G and H orifice valves only, machine the new lower spring washer (17) (see Figure 46 and Table 23).

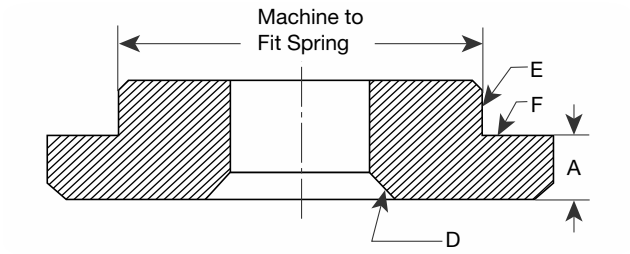


Figure 46: Lower Spring Washer F, G, and H Valves

ATTENTION!

For all 1900 Series SRVs, dimension A may not be less than specified in Table 24.

Table 23: Machining Conventional to Bellows Type Lower Spring Washer

Valve Type		B		C	
		in.	mm	in.	mm
1905F	1906F	.688	17.46	1.000	25.40
1910F	1912F				
1920F	1922F				
1905G	1906G				
1910G	1912G				
1920G	1922G				
1914F	1916G	.875	22.23	1.250	31.75
1924F	1926F				
1914G	1916G				
1918G	1924G				
1926G	1928G				
1918F	1928F	1.000	25.40	1.438	36.53
1905H	1906H	.688	17.46	1.126	28.60
1910H					
1920H	1922H				
1912H	1924H	.875	22.2	1.313	33.34
1914H	1916H	1.000	25.40	1.500	38.10
1926H					

Note: When indicated at surfaces D and E (see Figure 46), run out at surface F is not to exceed .005″ (.127 mm) full indicator reading.

Table 24: Machining Bellows Type to Conventional Lower Spring Washer

Valve Type			A	
			in.	mm
1905-30F	1906-30F	1910-30F	.250	6.35
1920-30F	1922-30F	1905-30G		
1906-30G	1910-30G	1920-30G		
1905-30H	1906-30H			
1912-30F	1922-30G		.313	7.94
1910-30H	1920-30H			
1922-30H				
1914-30F	1916-30F	1924-30F	.375	9.53
1926-30F	1914-30G	1916-30G		
1918-30G	1924-30G	1926-30G		
1928-30G	1912-30H	1924-30H		
1918-30F	1928-30F		.438	11.11
1914-30H	1916-30H	1926-30H	.500	12.70

Note: When indicated at surfaces D and E (see Figure 46), run out at surface F is not to exceed .005″ (.13 mm) full indicator reading.

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XVIII. 1900 Series Safety Relief Valve Options (Cont.)

D. Optional Glide-Aloy Parts

Optional Glide-Aloy Parts and the Repair Processing of Such Components

Glide-Aloy is a proprietary process of Baker Hughes utilized to provide a combination of a low coefficient of friction between sliding components and to protect the surfaces of the components to which the process has been applied. A Glide-Aloy surface-hardened valve component may be recognized by its flat, dull gray color and slick surface. The parent metal should not be visible on a new component.

ATTENTION!

Do not attempt to remove the coating of a Glide-Aloy treated component.

The Glide-Aloy reaction bonding process is commonly applied to Consolidated 1900 Series SRV disc holders and/or guides, when specified. Although the entire surface area of the component is treated, only the guiding surface is critical. When Consolidated 1900 Series SRVs contain Glide-Aloy parts, they may be identified by the coding found on the valve nameplate.

Example: 1905Jc-2-G1 where the “G” designation indicates Glide-Aloy:

G1 - Glide-Aloy Holder

G2 - Glide-Aloy Guide

G3 - Glide-Aloy Holder and Guide

Glide-Aloy treated components may be cleaned by low-pressure compressed air, microbead blasting, or brushing. Also, a non-chlorinated, hydrocarbon shop solvent may be used. The latter is for personnel safety reasons and not because of any incompatibility between chlorides and Glide-Aloy.

Regarding personnel safety, all personnel should be familiar with the appropriate processes as well as the material safety data sheets (MSDS) supplied by the vendor of any cleaning compounds used. Personal protective equipment (protective gloves, goggles, etc.) should be worn so as to avoid contact with materials that may be splashed during the cleaning process.

For a component in service after the cleaning process is completed, visually inspect parts to ensure all debris is removed, and that the components have the required finish.

Baker Hughes’ experience indicates that if the components have been properly cleaned, adequate coating will remain to ensure proper operation. The coating may appear lighter or missing in some areas, but the desired results will be achieved as a result of the coating characteristics imparted to the parent metal during the original coating process.

Components that are deeply gouged or galled, and that do not meet dimensional requirements, cannot be cleaned and returned to service. Machining removes the coating and renders the parts unacceptable. The surface-hardness approximates that of diamonds, and is approximately .002″ (0.051 mm) thick.

ATTENTION!

Do not machine the guiding surfaces that have been Glide-Aloy treated.

ATTENTION!

Follow recommendations for safe handling of solvents as specified in the MSDS and observe safe practices for any cleaning method.

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XIX. Maintenance Tools and Supplies

Table 25: Nozzle Bore Diameters									
Orifice		Original Nozzle[1]			New Nozzle[1] (Std.& DM)			Nozzle Lap Handle[2]	Ring Lap[3]
		Nozzle Bore Diameter		Nozzle Lap Part No.	Nozzle Bore Diameter		Nozzle Lap Part No.		
Std.	DM	in.	mm		in.	mm			
D-2	D	.393 to .398	9.98 to 10.11	543001	.404 to .409	10.26 to 10.39	4451501	544603	1672805
E-2	E	.524 to .529	13.31 to 13.44	543002	.539 to .544	13.69 to 13.82	4451502	544601	1672805
F	F	.650 to .655	16.51 to 16.64	543003	.674 to .679	17.12 to 17.25	4451503	544601	1672805
G	G	.835 to .840	21.21 to 21.34	543004	.863 to .868	21.92 to 22.05	4451504	544601	1672805
H	H	1.045 to 1.050	26.54 to 26.67	543005	1.078 to 1.083	27.38 to 27.51	4451505	544601	1672805
J	J	1.335 to 1.340	33.91 to 34.04	543006	1.380 to 1.385	35.05 to 35.18	4451506	544601	1672805
K	K	1.595 to 1.600	40.51 to 40.64	543007	1.650 to 1.655	41.91 to 42.04	4451507	544601	1672807
L	L	1.985 to 1.990	50.42 to 50.55	543101	2.055 to 2.060	52.20 to 52.32	4451601	544601	1672807
M	M	2.234 to 2.239	56.74 to 56.87	543102	2.309 to 2.314	58.65 to 58.78	4451602	544601	1672809
N	N	2.445 to 2.450	62.10 to 62.23	543103	2.535 to 2.540	64.39 to 64.52	4451603	544601	1672809
P	P	2.965 to 2.970	75.31 to 75.44	543104	3.073 to 3.078	78.05 to 78.18	4451604	544602	1672810
Q	Q	3.900 to 3.905	99.06 to 99.19	543105	4.045 to 4.050	102.74 to 102.87	4451605	544602	1672812
R	R	4.623 to 4.628	117.42 to 117.55	543106	4.867 to 4.872	123.62 to 123.75	4451606	544602	1672812
T-4	T	N/A	N/A	N/A	6.202 to 6.208	157.53 to 157.68	4451608	544602	1672814
U	U	N/A	N/A	N/A	6.685 to 6.691	169.80 to 169.95	None	None	1672814
V	V	N/A	N/A	N/A	8.000 to 8.005	203.20 to 203.33	None	None	6267201
W	W	N/A	N/A	N/A	10.029 to 10.034	254.74 to 254.86	None	None	4875201

[1] After August 1978, all 1900 SRV Nozzles manufactured have increased bore diameter. The above chart shows how each orifice was affected. Nozzles - original vs. new - are interchangeable, but nozzle laps are not. On the outer diameter (O.D) of the new nozzles, the letter “C” is stamped. If this stamp becomes obliterated, the nozzle bore diameter must be measured to select the correct nozzle lap from above chart (see Table 24).

[2] Nozzle lap handles are interchangeable between original and new nozzle laps.

[3] Ring laps - One set of three (3) ring laps is recommended for each orifice to assure ample flat laps are available at all times.

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XIX. Maintenance Tools and Supplies (Cont.)

A. Lapping Tools

The following tools are required for proper maintenance of Consolidated Safety Relief seats, and may be purchased from Baker Hughes.

Nozzle Lap - The nozzle lap is used for lapping the nozzle seat and has one flat side, and one side with a 5º angle. This lap guides in the bore of the nozzle; therefore, a different size lap is required for each valve orifice.

Ring Lap - The ring lap is used for lapping the disc seat and finish lapping the nozzle seat.

Lapping Plate - The lapping plate is used for reconditioning the ring lap. It may also be used for lapping the disc (6). One 11″ (279.40 mm) diameter plate is required for the entire line of valves (Part No. 0439004).

Lapping Compound - Lapping compound is used as a cutting medium when lapping the valve seats (see Table 26).

Table 26: Lapping Compound Types

Brand	Grade	Grit	Lapping Function	Size Container	Part No.
Clover	1A	320	General	4 oz	199-3
Clover	3A	500	Finishing	4 oz	199-4
Kwik-Ak -Shun	----	1000	Polishing	1 lb 2 oz	199-11 199-12

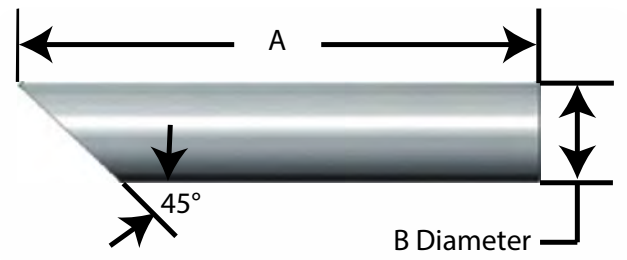


Figure 47: Drift Pins Specification

Drift Pins - Two drift pins are required for the removal of the disc (6) from the disc holder (8) (see Figure 47 and Table 27a).

Lifting Tools - Lifting tools are used for the removal of the upper internal parts of larger valves (see Table 27b).

Table 27a: Drift Pin Types

Orifice	A		B		Part No.
	in.	mm	in.	mm	
D,E,F,G,H,J,K	1.75	44.5	.22	5.6	0430401
L,M,N,P	2.50	63.5	.38	9.5	0430402
Q,R	3.00	76.2	.63	15.9	0430403
T,U	3.50	88.9	.88	22.2	0430404

Table 27b: Lifting Tool Types

Orifice	Part No.
M, N	4464602

Spanner Wrench - Spanner wrench is used for the removal of the bellows from the disc holder (8) (see Table 28).

Table 28: Spanner Wrench Types

Valve Orifice	Description of Wrench				Pin Spanner Wrench No.
	Radius		Pin Dia.		
	in.	mm	in.	mm	
D, E, F	.750	19.05	.219	5.56	4451801
G	.750	19.05	.219	5.56	4451801
H	.875	22.23	.234	5.94	4451802
J	1.125	28.58	.266	6.76	4451803
K	1.250	31.75	.281	7.14	4451804
L	1.375	34.93	.297	7.54	4451805
M	1.625	41.28	.328	8.33	4451806
N	1.875	47.63	.359	9.12	4451807
P	1.875	47.63	.359	9.12	4451807
Q	2.500	63.50	.438	11.13	4451808
R	3.000	76.20	.500	12.70	4451809
T	3.750	95.25	.500	12.70	4451810
U	3.750	95.25	.500	12.70	4451810

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XX. Replacement Parts Planning

A. Basic Guidelines

Use the following guidelines as reference for developing a replacement parts plan:

1. Classify the total number of valves in service by size, type, and temperature class.
2. Classify parts inventory by the tendency to require replacement.

- Class I - Most frequently replaced
- Class II - Less frequently replaced but critical in an emergency

3. Parts for the valve types covered by this manual are classified on Tables 27 and 28. “Qty. Parts” is the number of parts or sets recommended to achieve a desired need probability as it relates to the total number of valves in service by size and type. For example, a “Qty. Parts of 1” (25.4 mm) for “Valves in Service of 5” (127.00 mm) means that one part should be stocked for every five valves of the same type and size in service.
4. When ordering replacement parts, state the size, type, and serial number of the valve for which parts are required using correct nomenclature (see Figures 1 through 10).
5. Predicted availability indicates the percentage chance the user plant will have the right parts to make a proper repair (i.e., if Class I parts are stocked at the owner’s facility, the parts needed to repair the valve in question will be immediately available in 70% of all instances).

B. Replacement Parts List

Consult the Recommended Spare Parts list (see Tables 27 and 28) to define the parts to be included in the inventory plan. Select the desired parts and determine those required for proper maintenance of the valve population in the plant.

C. Identification and Ordering Essentials

When ordering service parts, furnish the following information to ensure receipt of the correct replacement parts:

1. Identify valve by the following nameplate data:

- Size
- Type
- Temperature Class
- Serial Number
  - Example 1: 1.5″ (38.10 mm) 1910Fc S/N TD-94578

2. Specify parts required by:

- Part Name (see Figures 1 through 10)
- Part Number (if known)
- Quantity

In addition, the serial number is stamped on the top edge of the outlet flange. Include the one or two letters preceding the figures in the serial number.

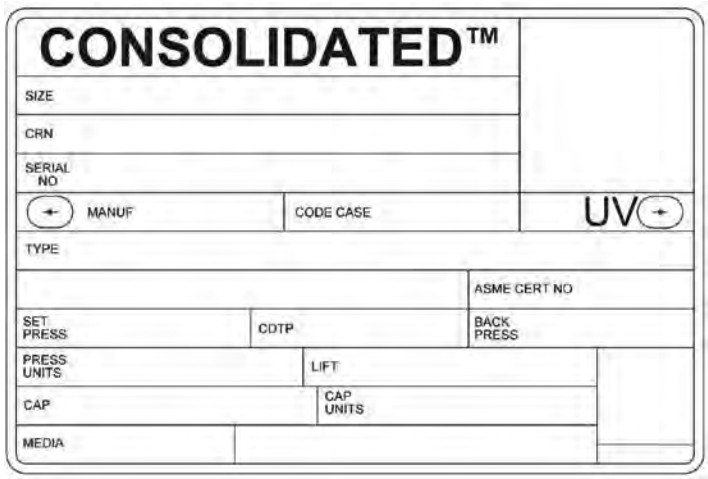


Figure 48: Typical Valve Nameplate

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XX. Replacement Parts Planning (Cont.)

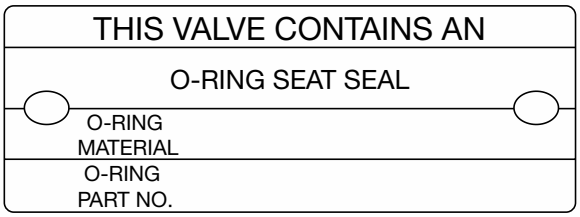


Figure 49: Typical Valve Nameplate

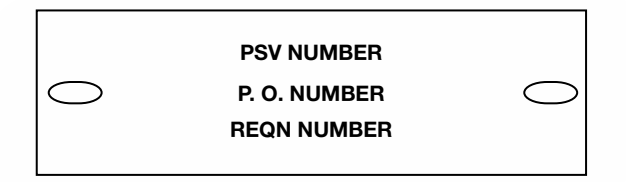


Figure 50: Optional Tag Number Nameplate

When the SRV is repaired, a metal repair nameplate (see Figure 51), Board “VR” symbol and stamp number, and the date of repair is permanently attached to the valve near the original nameplate. This repair nameplate may also contain information regarding altered set pressures, capacities, or blowdown, as applicable.

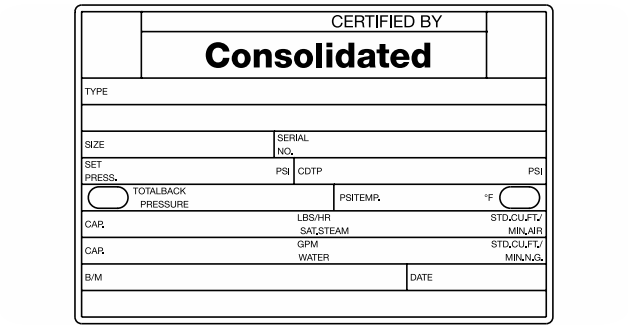


Figure 51: Repair Nameplate

ATTENTION!

To determine if the valve contains Glide-Aloy components (i.e., the disc holder (8) and/or the guide (9)), which are identified by the coding found on the valve nameplate, see Optional Glide-Aloy Parts.

XXI. Genuine Consolidated Parts

Each time replacement parts are needed, keep these points in mind:

- Baker Hughes designed the parts
- Baker Hughes guarantees the parts
- Consolidated valve products have been in service since 1879
- Baker Hughes has worldwide service
- Baker Hughes has fast response availability for parts

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XXII. Recommended Spare Parts for 1900 Series SRVs

Table 29: 1900 Conventional and 1900-30 Bellows 1900 Conventional and 1900-30 Bellows with Liquid Trim (LA) 1900 Conventional and 1900-30 Bellows with Thermodisc (TD) 1900 Dual Media (DM) and 1900 DM -30 Bellows				
Class	Part Name	C-conventional B-bellows	Qty. Parts/Same Valves in Service	Need Probability Coverage
I. Stocking Class I parts at the Qty. Parts column rate provides sufficient replacements for 70% of maintenance requirements	Disc (TD and CD)	C and B	1/1	70%
	Disc (Std. & DM)	C and B	1/3	
	Nozzle (Std. & DM)	C and B	1/10	
	Limit Washer1 (Std. & DM)	C and B	1/1	
	Bellows (Std. & DM)	B	1/3	
	Adj. Ring Pin (Std. & DM)	C and B	1/3	
	Disc and Spindle Retainers (Std. & DM)	C and B	1 Set/1	
	Gasket (Set)			
	• Cap Gasket (Std. & DM)	C and B	1/1	
	• Bonnet Gasket (Std. & DM)	C and B	1/1	
	• Guide Gasket (Std. & DM)	C and B	1/1	
	• Adj. Ring Pin Gasket (Std. & DM)	C and B	1/1	
	• Bellows Gasket (Std. & DM)	B	1/1	
II. Stocking Class II parts, in addition to Class I, at the Qty. Parts column rate provides sufficient replacements for 85% of maintenance requirements	Disc Holder (Std. & DM)	C and B	1/6	85%
	Spindle (Std. & DM)	C and B	1/6	
	Guide (Std. & DM)	C and B	1/6	
	Studs, Base (Std. & DM)	C and B	1 Set/6	
	Nuts, Base Stud (Std. & DM)	C and B	1 Set/6	

• For restricted lift valves only.

YOUR SAFETY IS OUR BUSINESS!!!

Baker Hughes has not authorized any company or any individual to manufacture replacement parts for its valve products. When ordering replacement valve parts, please specify in your purchase order: “ALL PARTS MUST BE DOCUMENTED AS NEW AND SOURCED FROM Baker Hughes.”

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XXII. Recommended Spare Parts for 1900 Series SRVs (Cont.)

Table 30: 1900 Conventional and 1900-30 Bellows with O-Ring Seat Seal Design (DA) 1900 Conventional and 1900-30 Bellows with O-Ring Seat Seal Design and Liquid Trim (DALA) 1900 Dual Media (DM) and 1900 DM -30 Bellows with Soft-Seat Design (DM DA)				
Class	Part Name	C-conventional B-bellows	Qty. Parts/Same Valves in Service	Need Probability Coverage
I. Stocking Class I parts at the Qty. Parts column rate provides sufficient replacements for 70% of maintenance requirements.	O-Ring (Std.)	C and B	1/1	70%
	Disc (Std.: K-U only & UM DA)	C and B	1/10	
	O-Ring Retainer (Std.)	C and B	1/5	
	Soft-Seat Retainer (DM DA)	C and B	1/5	
	Retainer Lock Screw (Std. & DM)	C and B	1 Set/1	
	Limit Washer1 (Std. & DM)	C and B	1/1	
	Nozzle (Std. & DM)	C and B	1/5	
	Adj. Ring Pin (Std. & DM)	C and B	1/1	
	Gasket (Set)		1 Set/1	
	• Cap Gasket (Std. & DM)	C and B	1/1	
	• Bonnet Gasket (Std. & DM)	C and B	1/1	
	• Guide Gasket (Std. & DM)	C and B	1/1	
	• Adj. Ring Pin Gasket (Std. & DM)	C and B	1/1	
	• Bellows Gasket (Std. & DM)	B	1/1	
	Bellows (Std. & DM)	B	1/3	
	Disc Retainer (Std.: K-U only & DM)	C and B	1/1	
	Spindle Retainer (Std. & DM)	C and B	1/1	
II. Stocking Class II parts, in addition to Class I, at the Qty. Parts column rate provides sufficient replacements for 85% of maintenance requirements.	Disc Holder (Std. & DM)	C and B	1/6	85%
	Spindle (Std. & DM)	C and B	1/6	
	Guide (Std. & DM)	C and B	1/6	
	Studs, Base (Std. & DM)	C and B	1 Set/6	
	Nuts, Base Stud (Std. & DM)	C and B	1 Set/6	

• For restricted lift valves only.

YOUR SAFETY IS OUR BUSINESS

Baker Hughes has not authorized any company or any individual to manufacture replacement parts for its valve products. When ordering replacement valve parts, please specify in your purchase order: "ALL PARTS MUST BE DOCUMENTED AS NEW AND SOURCED FROM Baker Hughes."

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XXIII. Manufacturer's Field Service, Repair and Training Program

A. Field Service

Baker Hughes maintains the largest and most competent field service staff in the industry. Service technicians are located at strategic points throughout the United States to respond to customer's requirements for service. Each Service technician is trained and experienced in servicing Consolidated products.

It is highly recommended that the professional expertise of a Consolidated Field Service Engineer be employed to make final field adjustments during the initial setting of all Consolidated Safety Valves.

For further information, please contact your local **Green Tag™ Center**.

B. Factory Repair Facilities

The Baker Hughes Consolidated Repair Department, in conjunction with the manufacturing facilities, is equipped to perform specialized repairs and product modifications, e.g. butt-weld, bushing replacements, code welding, pilot replacement, etc.

For further information, please contact your *Green* Tag Center.

C. Maintenance Training

Rising costs of maintenance and repair in the Utility and Process Industries indicate the need for trained maintenance personnel. Baker Hughes conducts service seminars that can help your maintenance and engineering personnel to reduce these costs.

Seminars, conducted either at your site, or at our manufacturing plant, provide participants with an introduction to the basics of preventative maintenance. These seminars help to minimize downtime, reduce unplanned repairs and increase valve safety. While they do not make "instant" experts, they do provide the participants with "Hands On" experience with Consolidated Valves. The seminar also includes valve terminology and nomenclature, component inspection, trouble shooting, setting and testing, with emphasis on the ASME Boiler and Pressure Vessel Code.

For further information, Please contact your local Green Tag Center.

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Appendix A - 1900 DM Soft Seat Disc Retainer Assembly

Place O-ring [55] into disc [6] as shown in Figure 10b.

Place the O-ring retainer [54] into the inside diameter of the O-ring [55].

Insert retainer screw(s) [49] through the retainer [54] and into the disc [6].

Insert disc assembly into assembly fixture. Apply an adequate amount of force with the assembly tool till the oring retainer clicks into the disc. The assembly fixture can be fabricated by the assembler. The assembler has the liberty to choose the axial tightening mechanism, mechanical/hydraulic etc. The Consolidated factory uses Enerpac hydraulic cylinder to provide the axial clamping force. The layout of the soft seat assembly tool and the cut drawings is provided in the Appendix B.

Tighten the retainer screw(s) [49] per Table 1 below.

Loosen assembly fixture, remove the disc assembly, and continue with next step.

Table 31: Retainer Screw Torque Values

Orifice	Torque in-lb (Nm)	Orifice	Torque in-lb (Nm)
D	10 (1.13)	M	15 (1.69)
E	10 (1.13)	N	15 (1.69)
F	10 (1.13)	P	15 (1.69)
G	10 (1.13)	Q	18 (2.03)
H	18 (2.03)	R	18 (2.03)
J	18 (2.03)	T	18 (2.03)
K	18 (2.03)	U	18 (2.03)
L	18 (2.03)		

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Appendix B - 1900 DM Soft Seat (DA) Disc Retainer Assembly Fixture Drawings

DEF Orifice Assembly

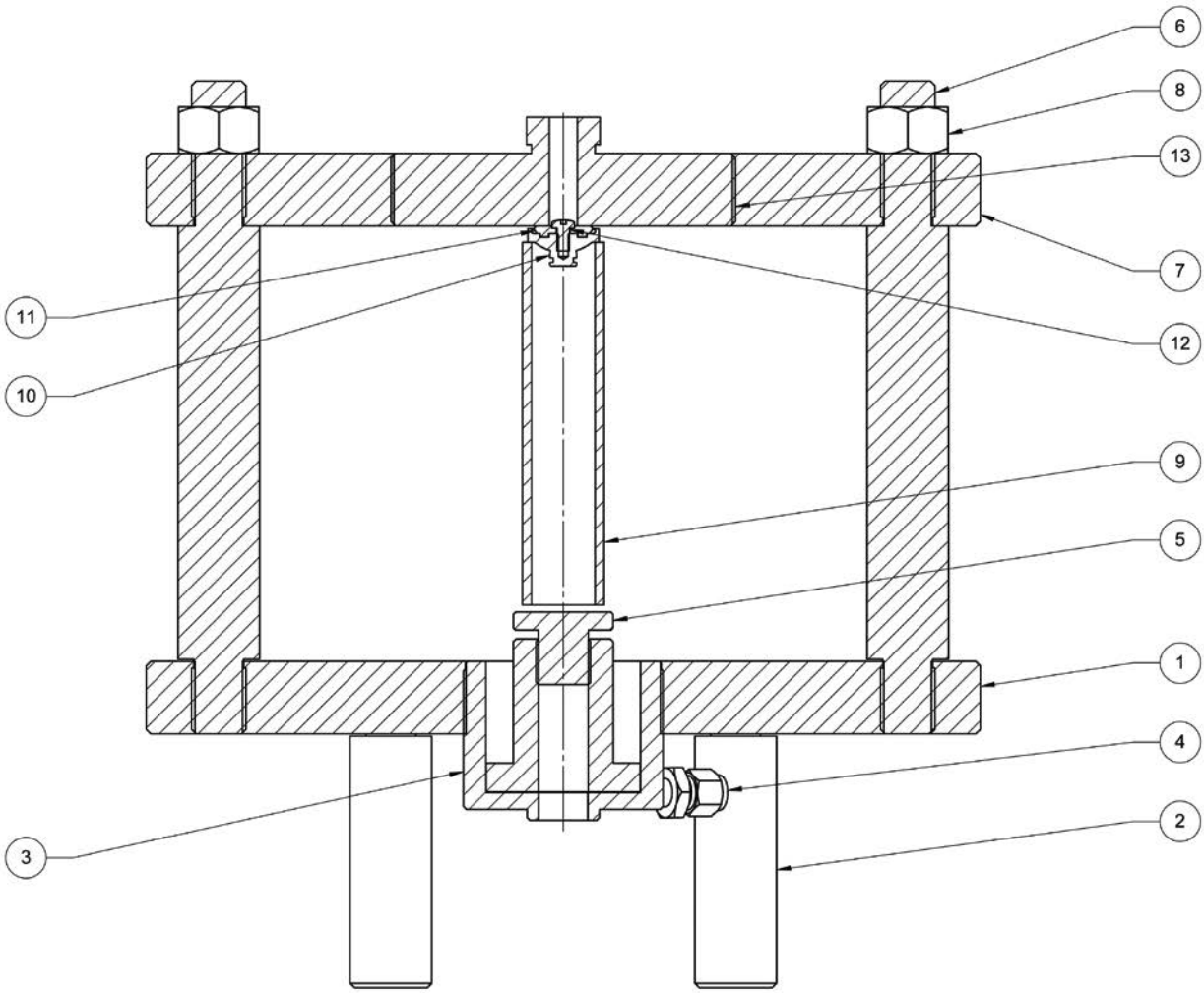


Figure 52: DEF Orifice Assembly

Item	Nomenclature	Qty.
1	Bottom Plate	1
2	Leg Rods	3
3	RCH 120 ENERPAC	1
4	Swagelok	1
5	ENERPAC Thread Adaptor	1
6	Guide Rods	3
7	Top Plate	1
8	.750-10UNC Nut	3
9	Cylinder	1
10	Disc	1
11	O-Ring Retainer	1
12	Lock Screw	1
13	Orifice Adaptor	1

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U Orifice Disc Assembly

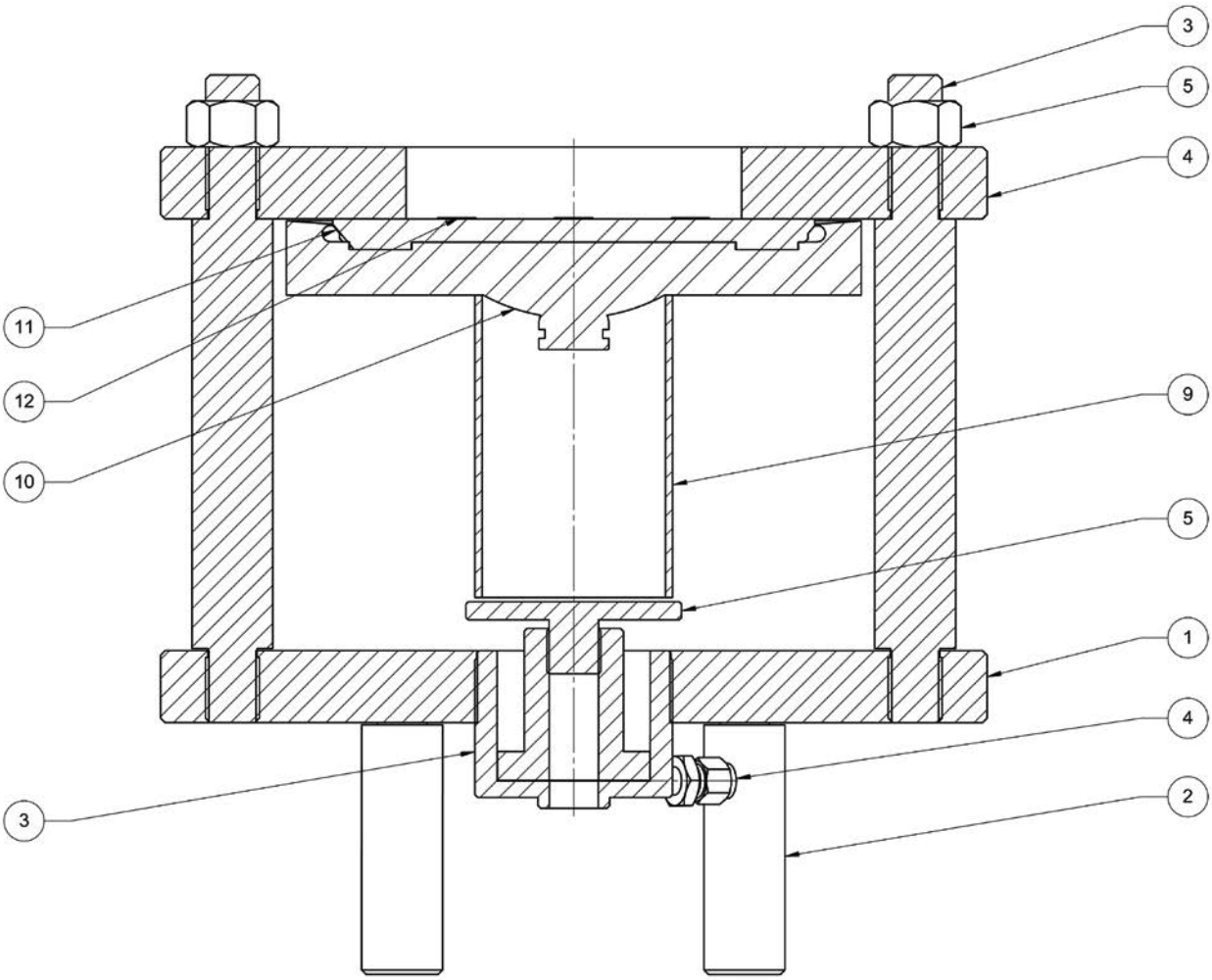


Figure 53: U Ofifice Disc Assembly

Item	Nomenclature	Qty.
1	Bottom Plate	1
2	Leg Rods	3
3	RCH 120 ENERPAC	1
4	Swagelok	1
5	ENERPAC Thread Adaptor	1
6	Guide Rods	3
7	Top Plate	1
8	.750-10UNC Nut	3
9	Cylinder	1
10	Disc	1
11	O-Ring Retainer	1
12	Lock Screw	6

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Soft Seat Assembly Fixture Component Drawings

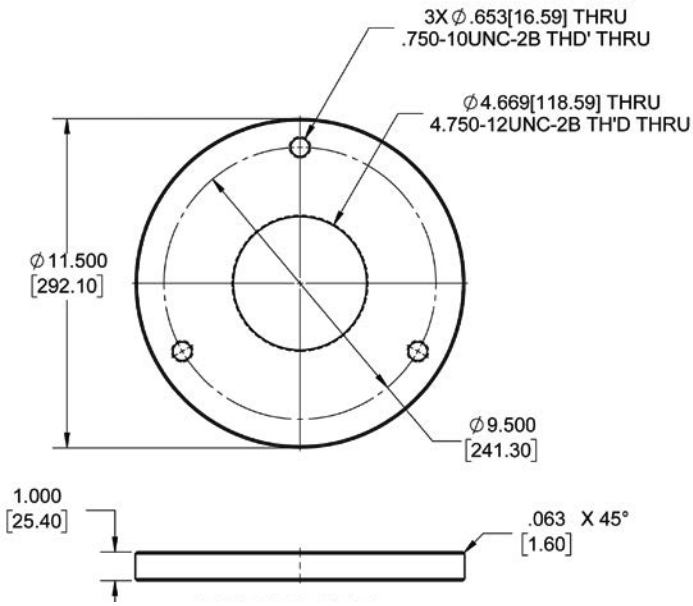


Figure 54: Top Plate

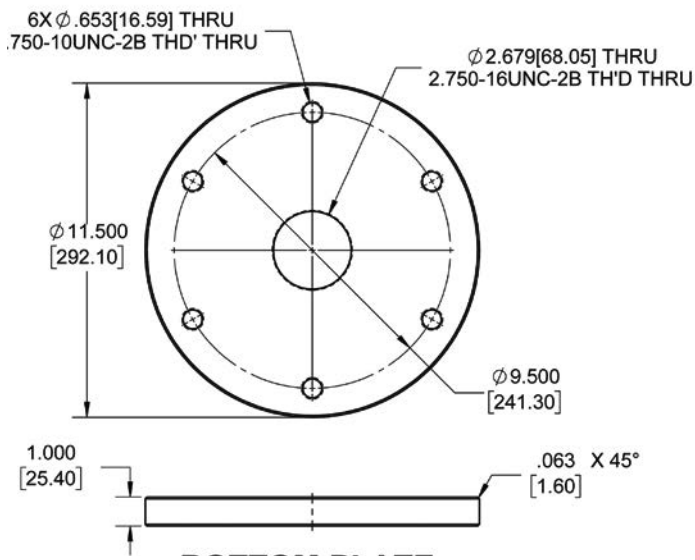


Figure 55: Bottom Plate

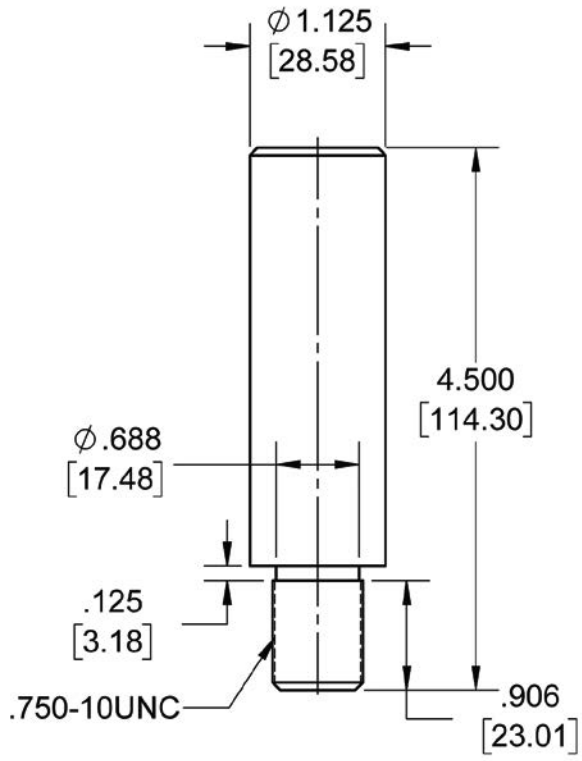


Figure 56: Leg Rods

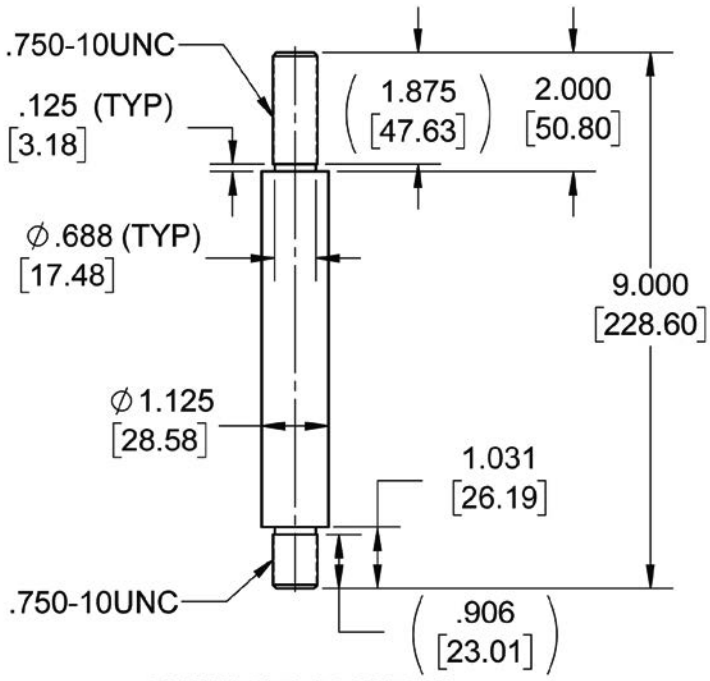


Figure 57: Guide Rods

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Orifice Adaptor Drawings

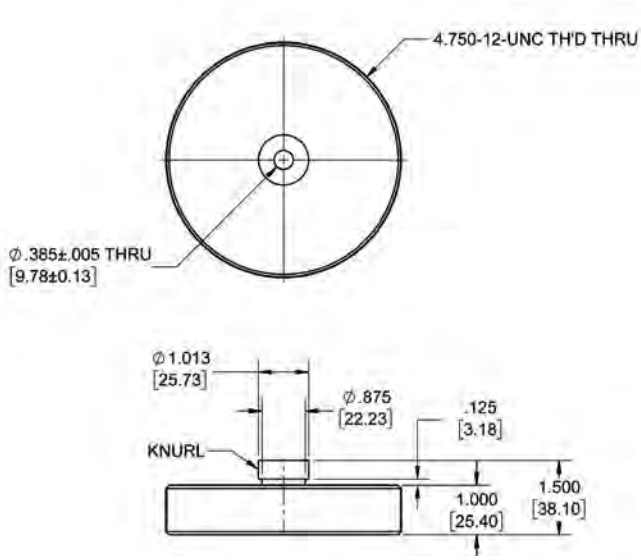


Figure 58: Orifice DEFGHJ Adaptor

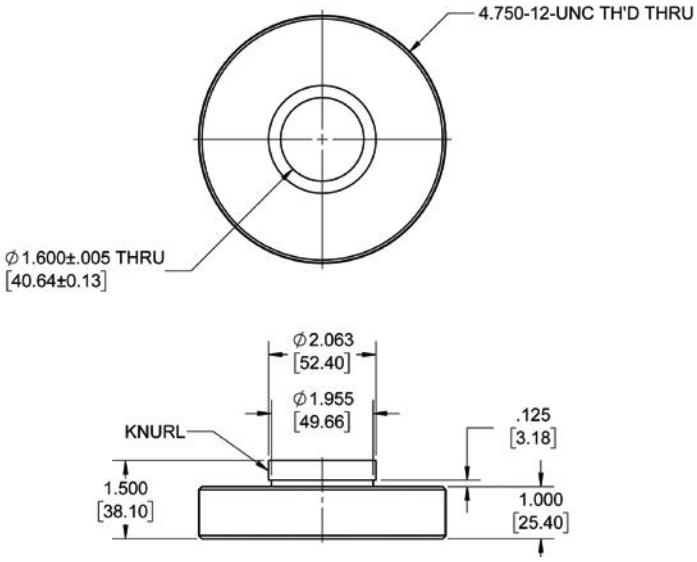


Figure 59: Orifice KLM Adaptor

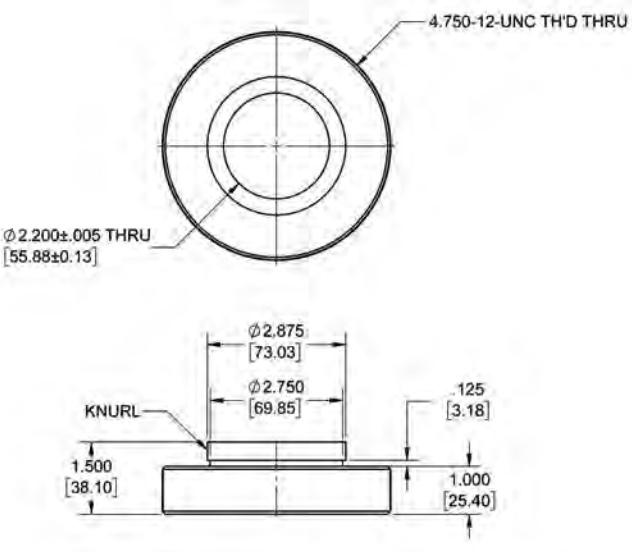


Figure 60: Orifice NP Adaptor

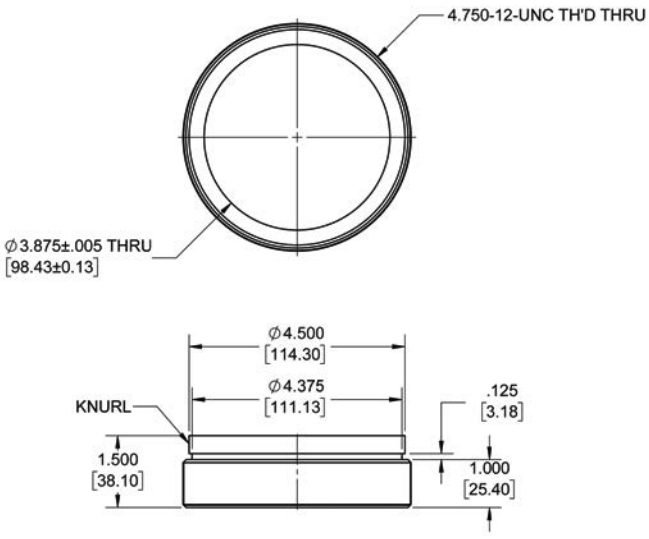


Figure 61: Orifice QR Adaptor

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Cylinder and ENERPAC Thread Adaptor Drawings

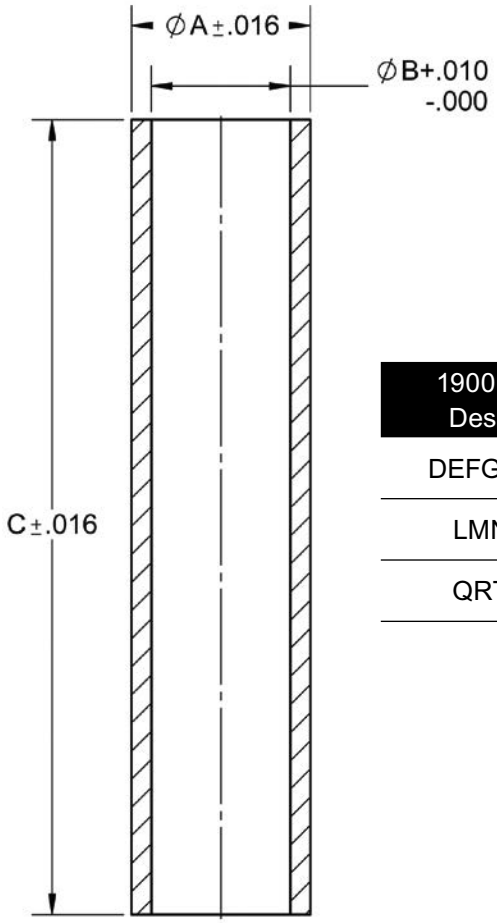
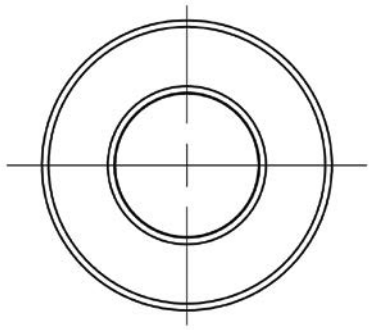


Figure 62: Cylinder

1900 DM Design	A	B	C
DEFGHJK	1.125 [28.57]	.875 [22.22]	5.000 [127.00]
LMNP	2.000 [50.80]	1.625 [41.27]	4.550 [15.57]
QRTU	2.750 [69.85]	2.550 [64.77]	4.200 [106.68]



1900 DM Design	Ø "A"
DEFGHJ	1.375 [34.93]
KLM	2.250 [57.15]
NP	2.250 [57.15]
QR	2.938 [74.61]

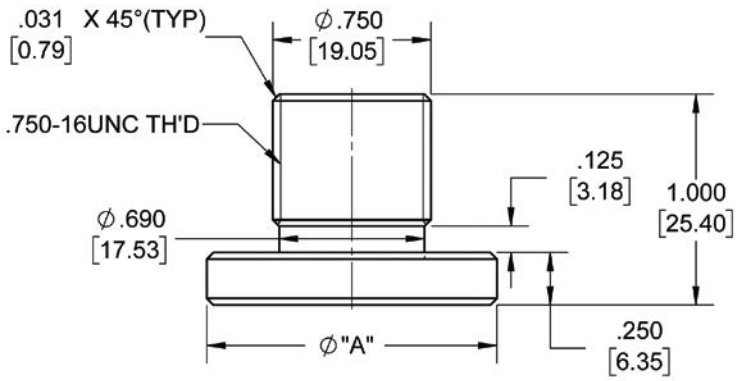


Figure 63: ENERPAC Thread Adaptor

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Notes:

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Notes:

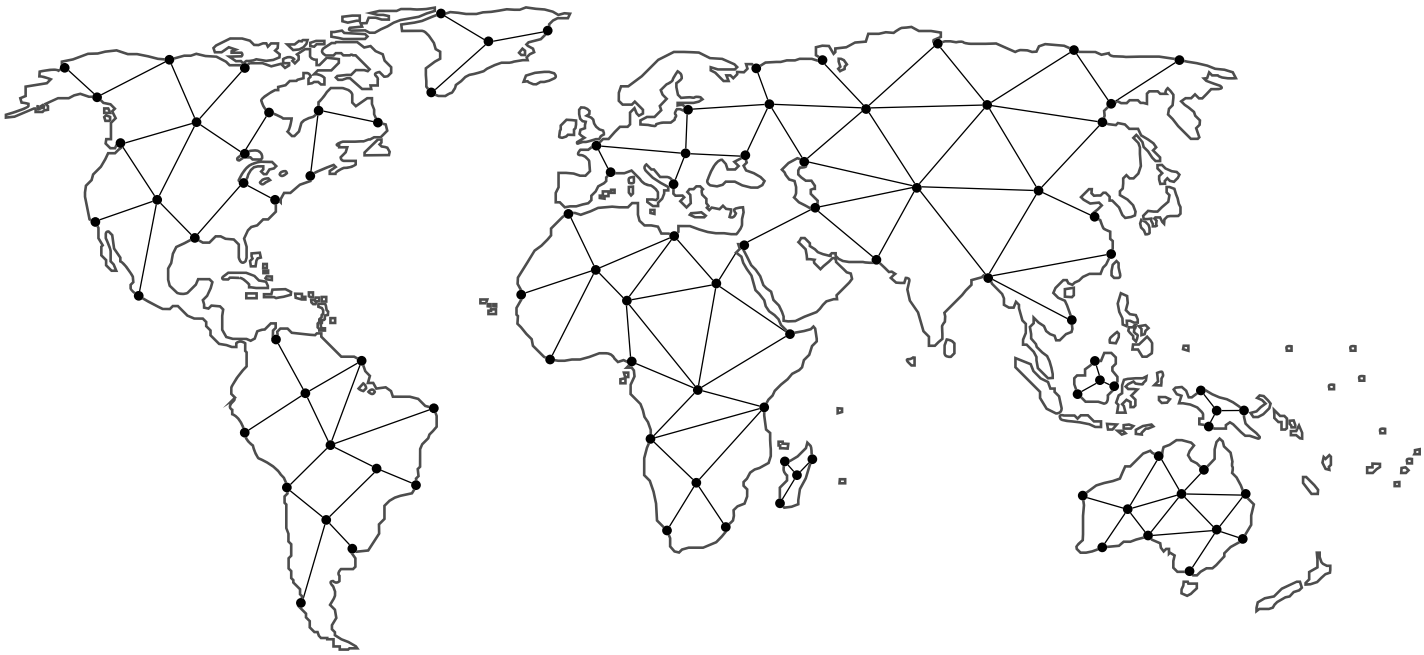
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BHCN-1900-1900DM-IOM-19379L-0124 01/2024

7.10 IOM for Heaters

Caloritech™

Immersion Heaters

CX & DX Series

Installation, Operation, & Maintenance Instructions

Special Notes



CAUTION

ELECTRIC SHOCK HAZARD. All electric heating equipment installations must be performed by qualified personnel in accordance with the local electrical codes and standards and must be effectively grounded to eliminate shock hazard.

WARNING

FIRE/EXPLOSION HAZARD. This heater shall be used with protection controls. The following controls are recommended:

Liquid Immersion Applications

a. Liquid level control to maintain all the heating elements totally immersed at all times, in conjunction with temperature controls to limit the liquid temperature below the maximum allowable process design temperature, or
b. Heating elements sheath temperature controls to limit to the maximum allowable sheath design temperature

Gaseous and/or vapour phase immersion applications

a. Heating elements sheath temperature controls to limit to the maximum allowable sheath design temperature.

Note: This heater is not intended to be used in hazardous locations and does not bare the required certification or product markings required to be used in hazardous locations.

WARNING

FIRE/EXPLOSION HAZARD. Do not exceed the ratings of the flange as listed in ANSI BI6.5. In case of code stamped of registered heater, do not exceed the rating as stated in the data report and/or registration documents. Do not operate the heater in the presence of combustible gases, vapours, dusts or fibres unless the heater is specifically marked for the hazardous location and heater operating temperature does not exceed the temperature code rating. Corrosion of the sheath could result in a ground fault which, depending upon the fluid being heated, could cause a fire or an explosion.

WARNING

FIRE HAZARD. If a thermostat is provided, it is designed for temperature control service only. Since the thermostat does not fail safe, it should not be used for temperature limiting duty. Wiring to this device is the users' responsibility.

Heaters are capable of developing high temperatures, therefore extreme care should be taken to:

a. Do not use this heater in area classified as hazardous locations.
b. Maintain distance between heater and combustible materials.

CAUTION

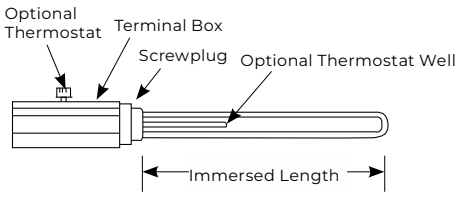
CAUTION. This document presents the minimum requirement pertaining to the installation, operation, and maintenance of the respective equipment as required by the manufacturer only. Any additional considerations, including but not limited to any design consideration, in-service inspection, and fitness-for-service assessment for all pressure boundary components to meet any safety principles and local jurisdictional regulatory requirements, shall be the responsibility of the user.

Part No. MI110 Rev.13.0 November 2023 Printed in Canada

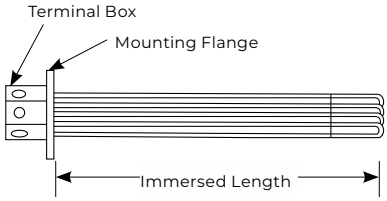
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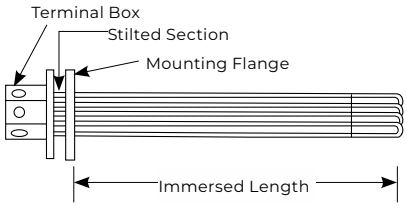
A. DIAGRAMS



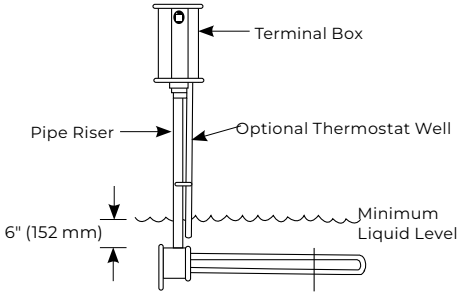
Screwplug Immersion Heater



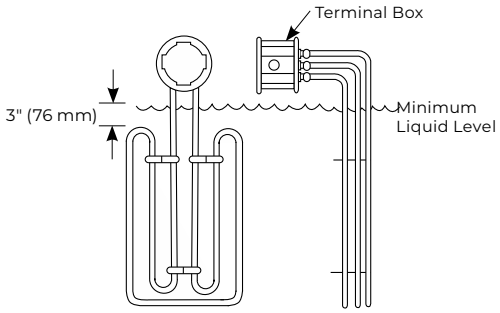
Flanged Immersion Heater



Flanged Immersion Heater
(with optional stilted terminal box)



Over-the-Side Immersion Heater
(bottom mount)



Over-the-Side Immersion Heater
(side mount)

B. DESCRIPTION

1. Immersion heaters for liquid service are designed for operation only while completely immersed in liquids. Never allow the heating elements to be exposed while energized or failure will result.

CAUTION

CAUTION Use the heater only in liquids and at pressures for which it was designed (unless specifically designed for non-liquid applications). Normally copper sheath is recommended in water, steel or alloy sheath in oil, and the appropriate alloy sheath for heating chemical solutions. Check factory for recommendations.

2. In the case of flanged (and some screwplug type) heaters where a gasket seal is required, the gasket surface should be clean and dry before the heater is seated.

WARNING

WARNING DO NOT insulate over the heater flange, stilted area and terminal enclosure.

3. The terminals must be protected at all times from moisture or vapour. In hazardous locations, explosion resistant terminal housings must be used. In outdoor locations, moisture resistant housings are required. It is recommended to use a drip loop to prevent moisture from entering the terminal box via the wire.

4. Protect terminals of heating elements from drippings, condensation, fumes, spray or any other substance which could result in element contamination.

5. When melting solids by direct immersion, a surface vent should be provided to allow gases to escape. Operate the heater on ½ voltage until melted material completely covers the heating elements. Heaters used for this purpose may require special design features. Check factory for recommendations.

C. INSTALLATION



CAUTION Heaters with overtemperature devices require specific installation orientation.



ELECTRIC SHOCK HAZARD Disconnect all power before installing or servicing the heater. Failure to do so could result in personal injury and/or property damage. All maintenance and installation should be done by qualified personnel in compliance with local codes.



FIRE OR SHOCK HAZARD Moisture accumulation on the dielectric material of the elements, sheath corrosion or overtemperature on the heaters could cause a fault to ground generating arcing and molten metal. Install proper ground fault protections to prevent personal injury or property damage.



WARNING Heaters are electrical components, designers are responsible for the proper integration to the electrical systems, including protections, backups, and controls.

1. Unpack and check heater for any damage that may have been caused during shipping.
2. Remove any protective packaging in the screw or flange connecting fitting.
3. Remove any dessicant material in the electrical box.
4. Insert heater into vessel/reservoir and verify that the heating elements are not making contact with the surface of the vessel.
5. Check that all terminal connections are tight.



CAUTION Use copper conductors only with sufficient current carrying capacity for the heater circuit load and in accordance with the local electrical code. Check the heater nameplate for minimum conductor temperature rating. Temperature deration factors must be applied for heaters operating above 30°C (86°F).

6. Check supply voltage for compliance with heater nameplate voltage. DO NOT connect the heater to a voltage source other than listed on the heater nameplate.
7. A line voltage or pilot duty thermostat should be used to control the heater. The pilot duty thermostat must be used with a contactor and (if required) a transformer. Generally, heaters supplied with built-in thermostats will be factory prewired if suitable for line voltage operation. Integral thermostats not factory prewired are usually intended for pilot duty.
8. It is recommended that the control circuits be supplied from the isolated secondary windings of transformers avoiding the need for two supply circuits, or as an alternative, that mechanical or electrical interlocking be provided so that both supplies must be disconnected before live parts can be made accessible.
9. If there is even the slightest possibility that the liquid level may fall below the elements, a level control switch or overtemperature sensing device affixed to the uppermost heating element is required. Check factory for recommendations.
10. If the heater is installed in a pressurized system, a safety relief valve must be used to prevent a hazardous pressure buildup.
11. Horizontal element support bundles may be necessary with an immersed length over 1270 mm (50").
12. For flange heaters installed in a pressurized system, proper bolting hardware must be used that is suitable for the pressures and temperatures of the equipment. Use an appropriate gasket for the pressure and temperature; torque the bolts on an even clockwise or counter clockwise pattern.

D. OPERATION



RISK OF EXPLOSION Do not operate heater at voltages higher than the rating specified on the nameplate. Failure to do this will cause elevated temperatures.



WARNING For metal sheathed heaters, prior to operation an insulation resistance check must be performed. Heater with values less than 0.5 MΩ should follow a drying process. Please contact factory for details on procedure if heater is under 0.5 MΩ.



FIRE Hazard Heater should be submersed in the fluid for proper operation and to avoid element overheating that could result in fire or damage of the heater.



WARNING When operating the heaters in a closed system or vessel, system designers must ensure that proper controls are used to maintain the temperature and pressure at normal levels.



WARNING Low megohm on heating elements with epoxy or hermetic seals cannot be serviced in the field. Typical resistance values when sealed are 1000 MΩ or greater.

1. Check that all connections are tight.
2. If a thermostat is provided, verify that it is operating properly by cycling it and verifying cutout.
3. Perform an IR test prior to energization and verify that levels are acceptable (500,000 ohms min).
4. Energize the heater and check for signs of hotspots in the electrical connections or vessel.
5. Retorque all bolted fitting connections and all electrical connections after 10 cycles.
6. Always maintain a minimum of 51 mm (2") of liquid above the heated portion of the element or element failure may result.
7. Heating elements should be kept above sediment deposits or it may overheat and shorten life expectancy.

E. MAINTENANCE



WARNING Disconnect all power before servicing the heater or heated equipment. Failure to do so could result in personal injury and/or property damage. All maintenance and installation should be done by qualified personnel in compliance with local codes.

1. Heaters stored for prolonged periods may absorb moisture. Using a 500V DC megger (insulation resistance tester) check the value of the insulation resistance to ground for each circuit. Initial readings of over 500,000 ohms to ground are normally acceptable. Should lower readings be observed, check factory for instructions.
2. Periodically check electrical connections for tightness and check wire insulation for any damage and replace if necessary.
3. Remove the immersion heater periodically to inspect for corrosion, sludge build-up and for scale removal. Do not continue to use a heater showing visible signs of damage.

Caloritech™

PLEASE ADHERE TO INSTRUCTIONS IN THIS MANUAL
Failure to do so may be dangerous and may void certain provisions of your warranty.

For further assistance, please call 24hr hotline: 1-877-325-3473 (U.S.A. and Canada)
Please have model and serial numbers available before calling.

WARRANTY: Under normal use the Company warrants to the purchaser that defects in material or workmanship will be repaired or replaced without charge for a period of 18 months from date of shipment, or 12 months from the start date of operation, whichever expires first. Any claim for warranty must be reported to the sales office where the product was purchased for authorized repair or replacement within the terms of this warranty.

Subject to State or Provincial law to the contrary, the Company will not be responsible for any expense for installation, removal from service, transportation, or damages of any type whatsoever, including damages arising from lack of use, business interruptions, or incidental or consequential damages.

The Company cannot anticipate or control the conditions of product usage and therefore accepts no responsibility for the safe application and suitability of its products when used alone or in combination with other products. Tests for the safe application and suitability of the products are the sole responsibility of the user.

This warranty will be void if, in the judgment of the Company, the damage, failure or defect is the result of:

- Vibration, radiation, erosion, corrosion, process contamination, abnormal process conditions, temperature and pressures, unusual surges or pulsation, fouling, ordinary wear and tear, lack of maintenance, incorrectly applied utilities such as voltage, air, gas, water, and others or any combination of the aforementioned causes not specifically allowed for in the design conditions or,
- Any act or omission by the Purchaser, its agents, servants or independent contractors which for greater certainty, but not so as to limit the generality of the foregoing, includes physical, chemical or mechanical abuse, accident, improper installation of the product, improper storage and handling of the product, improper application or the misalignment of parts.

No warranty applies to paint finishes except for manufacturing defects apparent within 30 days from the date of installation.

The Company neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with the product(s).

The Purchaser agrees that all warranty work required after the initial commissioning of the product will be provided only if the Company has been paid by the Purchaser in full accordance with the terms and conditions of the contract.

The Purchaser agrees that the Company makes no warranty or guarantee, express, implied or statutory, (including any warranty of merchantability or warranty of fitness for a particular purpose) written or oral, of the Article or incidental labour, except as is expressed or contained in the agreement herein.

LIABILITY: Technical data contained in the catalog or on the website is subject to change without notice. The Company reserves the right to make dimensional and other design changes as required. The Purchaser acknowledges the Company shall not be obligated to modify those articles manufactured before the formulation of the changes in design or improvements of the products by the Company.

The Company shall not be liable to compensate or indemnify the Purchaser, end user or any other party against any actions, claims, liabilities, injury, loss, loss of use, loss of business, damages, indirect or consequential damages, demands, penalties, fines, expenses (including legal expenses), costs, obligations and causes of action of any kind arising wholly or partly from negligence or omission of the user or the misuse, incorrect application, unsafe application, incorrect storage and handling, incorrect installation, lack of maintenance, improper maintenance or improper operation of products furnished by the Company.

Visit www.thermon.com to contact a Thermon representative near you.

HEAD OFFICE: 7171 SOUTHWEST PKWY | BUILDING 300 SUITE 200 | AUSTIN, TX | 78735 | UNITED STATES
CALORITECH: 2721 PLYMOUTH DRIVE | OAKVILLE, ON | L6H-5R5 | CANADA

Caloritech™

Thermoplongeurs

Séries CX et DX

ISO 9001

Instructions pour l'installation, le fonctionnement et l'entretien

Remarques particulières



MIS EN GARDE

RISQUE D'ÉLECTROCUTION. Toutes les installation d'équipment électrique de chauffage doivent être réalisées par un personnel qualifié, conformément aux codes et normes électriques locaux, et doivent être dûment mises à la terre afin de suppreimer les risques d'électrocution.

DANGERS D'INCENDIE/D'EXPLOSION LIÉS. Cet appareil de chauffage doit être utilisé avec des commandes de protection. Les contrôles suivants sont recommandés :

ATTENTION

Applications d'immersion liquide

a. un régulateur de niveau de liquide pour maintenir tous les éléments chauffants entièrement immergés en tout temps, ou

b. des régulateurs de gaine de contrôle de températures élevées afin de limiter la température maximale permise de la gaine.

Applications d'immersion en phase gazeuse et/ou vapeur

ATTENTION

a. des régulateurs de gaine de contrôle de températures élevées afin de limiter la température maximale permise de la gaine.

Note: Cet appareil de chauffage n'est pas destiné à être utilisé dans des endroits dangereux et ne porte pas la certification ou les marques de produit requises pour être utilisé dans des endroits dangereux.

RISQUE D'INCENDIE ET D'EXPLOSION. Ne depassez pas les puissances nominales de la bride figurant dans la norme B16.5 ANSI. En présence d'un code imprimé sur un appareil chauffant enregistré, ne pas dépasser la valeur indiquée dans le rapport de données et/ou les documents d'enregistrement. Ne faites pas fonctionner le thermoplongeur en presence de gaz combustibles, de vapeurs combustibles, de poussieres combustibles ou de fibres combustibles, a moins que le thermoplongeur ne soit specialement prevu pour un tel emplacement dangereux, et que la temperature de fonctionnement du thermoplongeur ne depasse pas le code de temperature. La corrosion de la gaine peut resulter en un defaut à la terre, qui, selon la nature du liquide en cours de rechauffement, pourrait causer un incendie ou une explosion.

ATTENTION

RISQUE D'INCENDIE. Si un thermostat est fourni, il est conçu uniquement à des fins de contrôle de la température. Puisque le thermostat ne dispose daucun système le protégeant des défaillances, il ne faut pas s'en servir pour limiter la température. C'est à l'utilisateur qu'il revient d'effectuer le câblage de ce dispositif.

Les thermoplongeurs peuvent atteindre des températures élevées, c'est pourquoi il faut faire extrêmement attention de prendre les mesures suivantes:

a. N'utilisez pas cet appareil de chauffage dans une zone classée comme zone dangereuse.

b. Conserver une certaine distance entre le thermoplongeur et les matières combustibles.

MISE EN GARDE

MISE EN GARDE. Ce document présente les exigences minimales relatives à l'installation, au fonctionnement et à l'entretien de chaque équipement, tel que requis par le fabricant. Toute considération supplémentaire, y compris, mais sans s'y limiter, toute considération de conception, d'inspection en service et d'évaluation de l'aptitude au service, pour tous les composants à limite de pression, afin de respecter des principes de sécurité et des exigences réglementaires locales, relève de la responsabilité de l'utilisateur.

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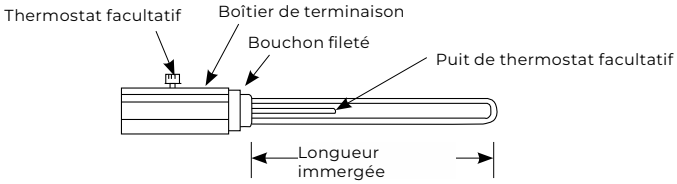
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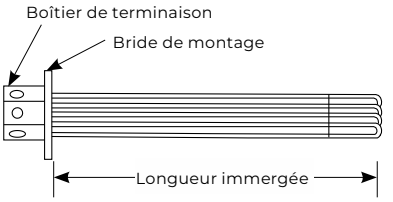
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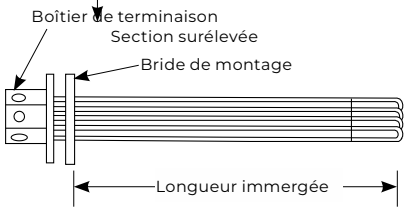
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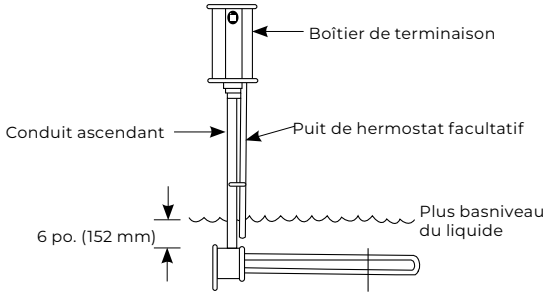
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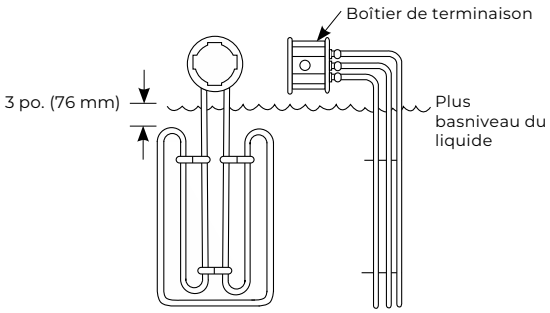
Thermoplongeur à bride



Thermoplongeur à bride
(avec boîtier de terminaison surélée facultatif)



Thermoplongeur amovibles pour montage de fond



Thermoplongeur amovibles pour montage de fond

B. DESCRIPTION

1. Les thermoplongeurs employes pour des liquides sont conçus pour ne fonctionner que s'ils sont completement immerges dans des liquides. Ne laissez jamais les elements chauffants a l'air libre tandis qu'ils fonctionnent, sans quoi une panne se produira.

MIS EN GARDE

MIS EN GARDE. Ne vous servez du thermoplongeur que dans des liquides, et a des pressions pour lesquelles ii a ete conqu (a moins qu'il n'ait ete conqu particulierement pour des applications non liquides). Normalement, la gaine en cuivre est recommandee dans l'eau, la gaine en acier ou en alliage dans l'huile, et la gaine en alliage appropriee sert a chauffer /es solutions chimiques. Demandez a l'usine de vous donner ses recommandations.

2. Dans le cas des thermoplongeurs a bride (et certains modeles a bouchon filete), si un joint d'etancheite est necessaire, la surface du joint d'etancheite doit être propre et seche avant que le thermoplongeur ne soil mis en place.

ATTENTION

ATTENTION. Defense d'isoler par-dessus la bride, la zone surélevée et le boîtier de terminaison du thermoplongeur.

3. Les bornes doivent etre protegees a tout moment de l'humidite et des emanations. Dans les lieux a risques, il faut employer des boîtiers de terminaison antideflagrants. À l'exterieur, des boîtiers resistants a l'humidite sont obligatoires. Il est recommande d'employer un anneau d'ecoulement pour empecher l'humidite de penetrer dans le boîtier de terminaison a travers le cable.
4. Protegez les bornes des elements chauffants contre les ecoulements, la condensation, les emanations, les pulverisations ou contre toute autre substance qui pourrait provoquer une contamination des elements.
5. Lorsque vous faites fusionner des solides par immersion directe, il faut prévoir un orifice de ventilation à la surface, afin de laisser les gaz s'échapper. Faites fonctionner le thermoplongeur à ½ tension, jusqu'à ce que la matière fusion-née recouvre complètement les éléments chauffants. Les thermoplongeurs utilisés dans ce but peuvent nécessiter des caractéristiques de conception spéciales. Demandez à l'usine de vous donner ses recommandations.

C. INSTALLATION



MIS EN GARDE. Les thermoplongeurs dotes de dispositifs de surchauffe necessitent une orientation particulière d'installation.



RISQUE D'ÉLECTROCUTION. Debranchez toute l'alimentation électrique avant d'installer, de reparer ou d'entretenir le thermoplongeur. Faute de quoi, il y a un risque de blessures physiques et/ou d'endommagement des lieux et objets qui s'y trouvent. L'entretien et l'installation, dans leur ensemble, doivent être effectues par un personnel qualifie et se conformer aux codes locaux.



RISQUE D'IN CENDIE OU RISQUE D'ÉLECTROCUTION. L'accumulation d'humidité sur la matière dielectrique des éléments, la corrosion des gaines, ou la surchauffe des thermoplongeurs peut provoquer un defaut de la mise à la terre, ce qui produira des etincelles et la fusion du metal. Pour éviter toute blessure physique ou tout endommagement des lieux et objets qui s'y trouvent, installez des protections adequates contre les défauts de mise a la terre.



MIS EN GARDE. Les thermoplongeurs sont des composants electriques. Les concepteurs sont responsables de l'intégration correcte dans les systèmes électriques, ce qui englobe les protections, les systèmes de relève et les contrôles.

1. Deballez le thermoplongeur. Verifiez-le pour détecter tout dégât qui aurait pu survenir pendant le transport.
2. Retirez le conditionnement de protection du raccord de couplage à bouchon fileté ou à bride.
3. Retirez le produit dessicant situe dans le coffret électrique.
4. Insérez le thermoplongeur dans la cuve ou le réservoir. Vérifiez que les elements chauffants ne sont pas en contact avec la surface de la cuve.
5. Vérifiez que tous les raccordements des bornes sont bien serrés.
6. Vérifiez que la tension de l'alimentation est conforme à la tension figurant sur la plaque signaletique du thermoplongeur. NE BRANCHEZ PAS le thermoplongeur à une source de tension autre que celle figurant sur la plaque signalétique du thermoplongeur.



ATTENTION. Utilisez uniquement des conducteurs en cuivre dont l'intensité de courant admissible est suffisante pour la charge du circuit du thermoplongeur, conformément au code électrique local. Consultez la plaque signalétique du thermoplongeur pour connaître les caractéristiques thermiques minimales du conducteur. Les facteurs de réduction de la valeur nominate du courant doivent être appliqués pour les thermoplongeurs fonctionnant à plus de 30°C (soit 86°F).

7. II faut se servir d'un thermostat de circuit de commande ou de tension de ligne pour commander le thermoplongeur. Le thermostat de circuit de commande doit être utilisé avec un contacteur et (au besoin) un transformateur. En général, les thermoplongeurs fournis avec des thermostats integres seront câblés d'avance à l'usine si cela convient à un fonctionnement sur tension de secteur. Les thermostats intégraux qui ne sont pas cables d'avance à l'usine sont normalement prevus pour une fonction avec un circuit de commande.
8. II est recommandé d'alimenter les circuits de commande à partir des bobinages secondaires isolés des transformateurs, en évitant le besoin de deux circuits d'alimentation. Autrement, il est recommande de fournir l'enclenchement électrique afin que les deux alimentations soient débranchées avant que des parties electrifiees ne puissent être rendues accessibles.
9. S'il existe une possibilité, même faible, de voir le niveau de liquide tomber au-dessous des éléments, il est obligatoire d'avoir un commutateur de controle du niveau ou un dispositif de détection de surchauffe, fixé sur l'élement chauffant le plus haut. Demandez à l'usine de vous donner ses recommandations.
10. Si le thermoplongeur est installé dans un systéme pressurisé, une soupape de sûreté et de decharge doit être employee pour empêcher une accumulation dangereuse de la pression.
11. Des faisceaux horizontaux de soutien des éléments peuvent s'avérer nécessaires si la longueur immergee dépasse 1270 mm (50 po).
12. Pour les thermoplongeurs a bride installes dans un systéme pressurisé, la quincaillerie de boulonnage adéquate doit être employée. Elle doit convenir aux pressions et aux températures de l'équipement. Employez un joint d'étanchéité adéquat pour la pression et la temperature de l'équipment. Serrez les boulons selon un schéma uniforme, soit dans le sens des aiguilles d'une montre, soit dans le sens inverse des aiguilles d'une montre.

D. FONCTIONNEMENT



RISQUE D'EXPLOSION. Ne faites pas fonctionner le thermoplongeur à des tensions supérieures à la puissance nominale figurant sur la plaque signaletique. Faute de quoi, vous provoquerez des temperatures élevées.



ATTENTION. Pour les thermoplongeurs à gaine demétal, il faut effectuer une vérification de la résistance del'isolation avant le fonctionnement. Un thermoplongeur dont les valeurs sont inférieures à 0,5 MΩ doit êtresoumis à un processus d'assèchement. Adressez-vousà l'usine qui vous exploquera la procédure si les valeursdu thermoplongeur sont inférieures à 0,5 MΩ.



RISQUE D'INCENDIE. Pour que le thermoplongeur fonctionne bien, et pour éviter la surchauffe des éléments chauffants, qui pourrait provoquer un incendie ou endommager le thermoplongeur, il faut que le thermoplongeur soit immergé dans le liquide.



ATTENTION. Quand on fait fonctionner les thermoplongeur dans un systéme fermé ou dans un cuve, les concepteurs due systéme doivent fair attention que les contrôles adéquats sont employés pour conserver la température et la pression a un niveau normal.



ATTENTION. Le probleme d'un re/eve faible des megohms sur /es elements chauffants dotes de sceauxen epoxy or hermetiques ne peut pas etre resolu sur place. Les valeurs normales de la résistance, en présence de sceaux, sont de 1000 MΩ ou plus.

1. Verifiez que tous les branchements sont serrés.
2. Si un thermostat est fourni, vérifiez qu'il fonctionne correctement en le faisant passer par son cycle et en vérifiant la coupure du circuit.
3. Effectuez un test IR avant la mise sous tension. Vérifiez que les niveaux sont acceptables, à 500,000 ohms.
4. Mettez le thermoplongeur sous tension. Vérifiez les signes de pointes locales de temperature dans les raccords électriques ou dans la cuve.
5. Au bout de dix cycles, resserrez toutes les raccords de coupage à boulons, et tous les raccords électriques.
6. Maintenez toujours un minimum de 51 mm (2 po) de liquide au-dessus de la partie chauffée de l'élément, sans quoi l'élment peut tomber en panne.
7. Les éléments chauffants doivent être gardes au-dessus des dépôts de sédiments, sans quoi, ils peuvent surchauffer et s'user prématurément.

E. ENTRETIEN



ATTENTION. Debranchez toute l'alimentation électrique avant d'installer, de réparer ou d'entretenir le thermoplongeur. Faute de quoi, il ya un risque de blessures physiques et/ou d'endommagement des lieux et objets qui s'y trouvent. L'entretien et l'installation, dans leur ensemble, doivent être effectues par un personnel qualifié et se conformer aux codes locaux.

1. Les thermoplongeurs entreposes pendant de longues periodes peuvent absorber de l'humidité. À l'aide d'un mégohmmétre 500 VDC (appareil de mesure de résistance de l'isolation), érifiez la valeur de la resistance de l'isolation à la terre pour chaque circuit. Des relevés initiaux de plus de 500,000 ohms à la terre sont normalement acceptables. Si vous obtenez des relevés inferieurs, consultez l'usine qui vous donnera ses instructions.
2. De temps en temps, vérifiez que les branchements électriques sont serres. Vérifiez que l'isolation des câbles n'est pas endommagée. Remplacez-la au besoin.
3. De temps en temps, retirez le thermoplongeur afin de l'inspecter et de détecter toute corrosion ou accumulation de dépôts, et de retirer le calcaire. Ne continuez pas à vous servir d'un thermoplongeur sur lequel des signes de dommages sont visibles.

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VEUILLEZ RESPECTER LES CONSIGNES DE CE MANUEL

Á défaut de quoi vous prenez des risques et certaines dispositions de votre garantie seront annulées.

Pour de l'aide supplémentaire, veuillez composer notre numéro d'urgence 24 h par jour: 1-800-410-3131 (U.S.A. et Canada). Merci de préparer vos numéros de modèle et de série avant d'appeler.

GARANTIE: Dans des conditions normales d'utilisation, la Société garantit à l'acheteur que les produits ayant des défauts matériels ou de fabrication seront réparés ou remplacés sans frais pour une période de 18 mois à compter de la date d'expédition ou 12 mois à partir de la date de début de fonctionnement, selon la date qui arrive à expiration la première. Toute réclamation dans le cadre de la garantie doit être adressée à l'agence commerciale dans laquelle le produit a été acheté afin d'obtenir une réparation ou un remplacement selon les termes de cette garantie.

Non obstant toute loi fédérale ou provinciale au contraire, la Société ne pourra être tenue pour responsable des frais encourus pour l'installation, le retrait du service, le transport ou les dommages de quelque nature que ce soit, y compris les dommages résultant d'un manque d'utilisation, d'interruptions d'activité ou de dommages directs ou indirects.

La Sociéte ne peut anticiper ou contrôler les conditions d'utilisation du produit et, par conséquent, décline toute responsabilité quant à l'application et l'adaptation en toute sécurité de ses produits lors de leur utilisation seuls ou en combinaison avec d'autres produits. Il est de la seule responsabilité de l'utilisateur d'effectuer des tests pour vérifier l'application et l'adaptation en toute sécurité des produits.

Cette garatie sera nulle si, à l'appréciation de la Societété, le dommage, la panne ou le défaut a été causé par:

- Des vibrations, des radiations, de l'érosion, de la corrosion, une contamination du processus, des conditions opératiores anormales, le températion et la pression, une poussée ou une pulsation anormale, l'encrassement, une usure normale, un manque d'entretien, des services appliqués de manière inappropriée tels que le voltage, l'air, le gaz l'eau et autres, ou toute autoriées par les conditions de régime; ou
- Tout acte omission de la part de l'Acheteur ses agents, employés ou entrepreneur indépendant, comprenant pour une plus grande précision, mais pas au point de limiter la généralité de ce qui précède, une mauvaise utilisation physique, chimique ou mécanique, un accident, une mauvaise installation du produit, de mauvaises conditions de stockage ou de manipulation du produit, une application inappropriée ou en défaut d'alignment des pièces.

Aucune garantie ne s'applique à la finition de peinture, excepté dans le cas de défauts de fabrication apparents dans les 30 jours à compter de la date d'installation.

Le Société n'assume ni m'autorise auncune personne à assumer en son nom toute autre obligation ou responsabilité en rapport avec le/les produit(s).

L'Acheteur accepte que la Société ne fournisse aucune garantie, expresse, implicite ou légale (y comprise toute garantie de qualité marchande ou de convenance à des fins particulières), écrite ou orale, du produit ou de la main-d'oeuvre indirecte, à l'exception des dispositions exprimées ou contenues dans le présent accord.

RESPONSABILITÉ: Les données techniques contenues dans le catalogue ou sur le site Web song sujettes à modification sans préavis. La Société se réserve le droit d'apporter des modifications par rapport aux dimensions ou à la conception si nécessaire. L'Acheteur reconnaît que la Société ne sera pas dans l'obligation de modifier ces articles manufacturés avant la formulation des modifications de conception ou des améliorations apportées aux produit par la Société

La Société ne sera pas tenue de dédomanger ou d'indemniser l'Acheteur, l'utilisateur final ou toute autre partie pour les actions, les réclamations les responsabilités, les préjudices les sinistres, la perte d'usage, le perte d'activité, les dommages, les dommages indirects ou consécutifs, les demands, les sanctions, les amendes, les dépanses (y compris les dépenses légales), les pertes, les obligations et les conséquences d'une action de quelque nature que ce soit découlant entièrement ou en partie de la négligence ou de l'omission de l'utilisateur ou de la mauvise utilisation, de la mauvaise application, de l'utilisation dangereuse, de mauvaise installation, du manque d'entretien, du mauvaise entretien ou de la mauvaise opération des produits fournis par la Société.

Visit www.thermon.com to contact a Thermon representative near you.

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CALORITECH: 2721 PLYMOUTH DRIVE | OAKVILLE, ON | L6H-5R5 | CANADA

7.11 IOM for SKIMMER

INSTRUCTIONS MANUAL

Item:

01-Z-6417-61

CANNON ARTES S.p.A. Job No.: 1323132870

Purchase Order No.:
-30 2400452 Rev.0

Site Location: N.A.

FLUEight S.r.l. Job. No.: 24155BESK

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1. Supply Description and Installation Instruction

FLUEight S.r.l. General Scope of Work related to CANNON ARTES S.p.A. order No. -30 2400452 Rev.0 dated February 2nd, 2024 is the supply of the following components:

1. No. 1 Model 8® Belt Oil Skimmers in un-painted SS 316 w/ 3" NPT Oil Discharge (Flat Mount), w/ out motor, w/ standard capacity tail pulley, Corrosion Resistant Steel belt length 876mm (from center of head pulley to center of tail pulley), wiper blades inserts Hybrid Ceramic impregnated and No. 1 Support Plate in SS 304 [bolts, nuts and washers for securing oil skimmer included].

This is the manual for all Items.

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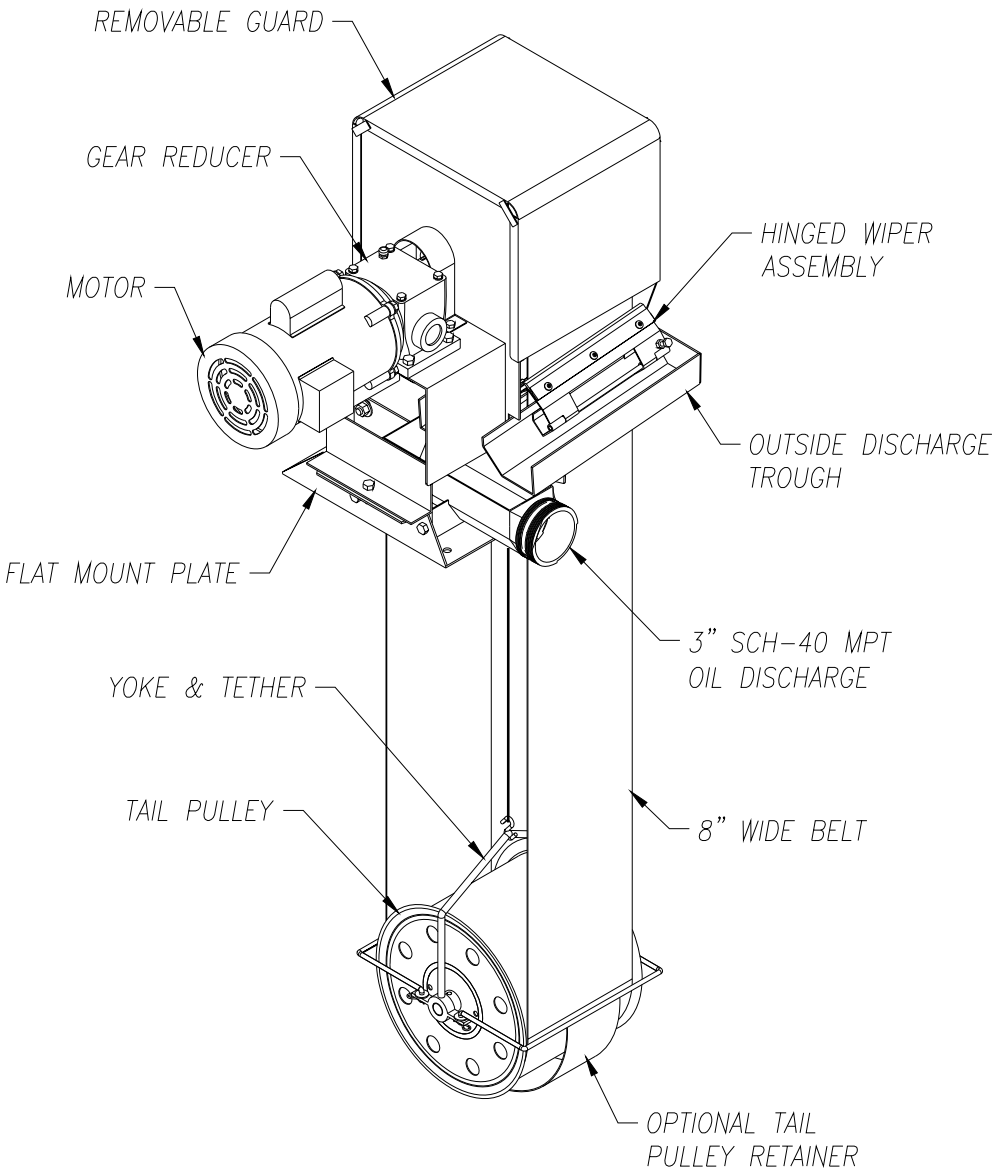
2. Connections

2.1 Mechanical Connections

- Belt Oil Skimmer Model 8® must be secured by placing and bolting it to its corresponding plate. Plate shall be bolted to Support Structure on CANNON/End User end and Support must be firmly clamped / doweled to the floor.

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3. Model 8® Belt Oil Skimmer Installation & maintenance instructions



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3.1 Installation and setup

Oil Grabber® Model 8 is composed by:

1. Base Unit w/ gear reducer
2. Tail Pulley w/ its Yoke, Cable/Tether and Shaft
3. Belt

Step 1. Mounting the base unit.

Although the Oil Grabber can be put on any part of the tank, it is best positioned where the bulk of the oil is accumulating.

MOUNTING: (See Fig. 1)

Mounting surface should be level.

A. Disassemble the base mounting assembly, flat mount trough and flat mount plate, noting the position of all bolts, nuts, and washers, as well as the adjustment cam.
B. Drill four ½" clearance holes in mounting surface (matching those on the flat mount plate) and securely bolt the flat mount plate in place.
C. Assemble base assembly and flat mount trough on top of flat mount plate making sure to reinsert the adjusting cam in its correct position.
D. Replace the bolts removed putting light tension on the (3) bolts holding the main base to the flat mount plate. **Do not** tighten until final belt adjustment is made. (Step 12)

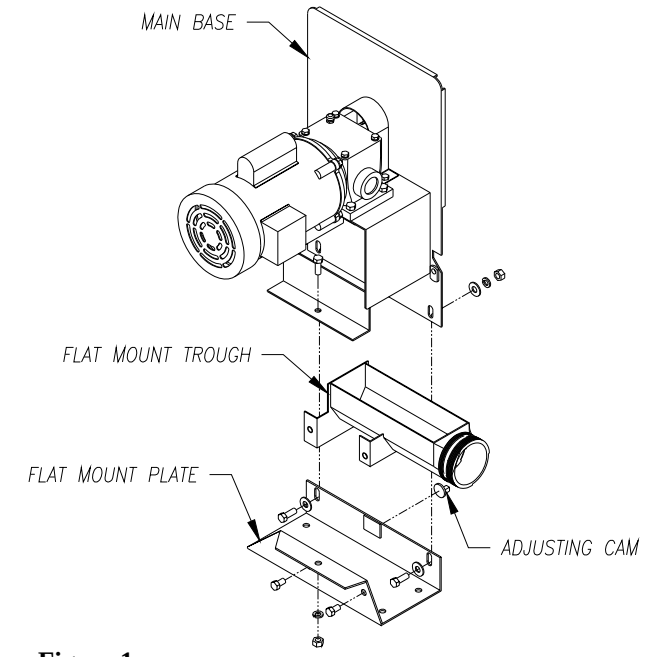


Figure 1

Step 2. Remove the guard over the head pulley by lifting straight up.

Step 3. Locate the adjustable wiper assembly on the outside trough and loosen the locknut. Turn adjusting screw clockwise until wiper is completely open. **(See Fig. 2)**

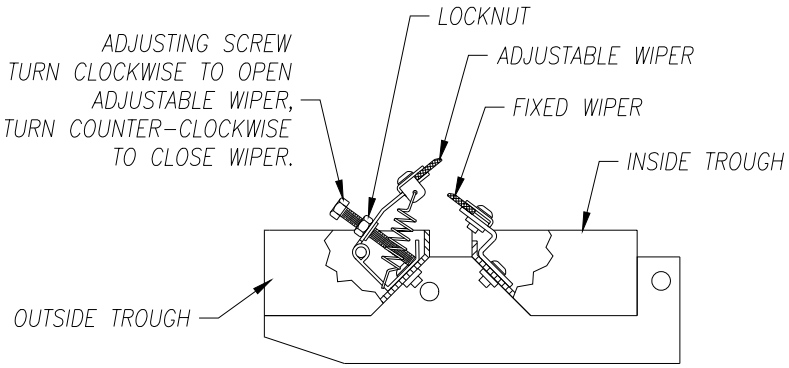


Figure 2

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Step 4. Unpack the belt carefully following the directions in the carton.

A. When handling metal belts wear cloth gloves.
B. Dents or creases can cause premature wear.

Step 5. Insert the belt between the troughs, lifting the belt over onto the head pulley between the head pulley flanges. **(See Fig. 3)**

Step 6. **(See Fig. 4)** If you have purchased the *Yoke and Tether* option continue with step 7.

Note: Whichever option you have, the tail pulley must be fully submerged below the surface.

Step 7. Place an "S" hook through the hole on the inside support angle, **(See Fig. 4)** and hook the last link of the chain onto the bottom loop of the "S" hook. Lower the tail pulley into the belt. The tail pulley is supported by the belt, not the chain. Make certain that the belt is taut by the weight of the tail pulley and that the chain is loose by two links. **Note:** Tail pulley must be fully submerged below the surface.

Step 8. Carefully turn the adjustment screw on the adjustable wiper blade so that the blade is gently touching the belt with even contact for the length of the blade. Do not set blade too tight. This could reduce the life expectancy of the belt. After this adjustment, tighten locknut securely.

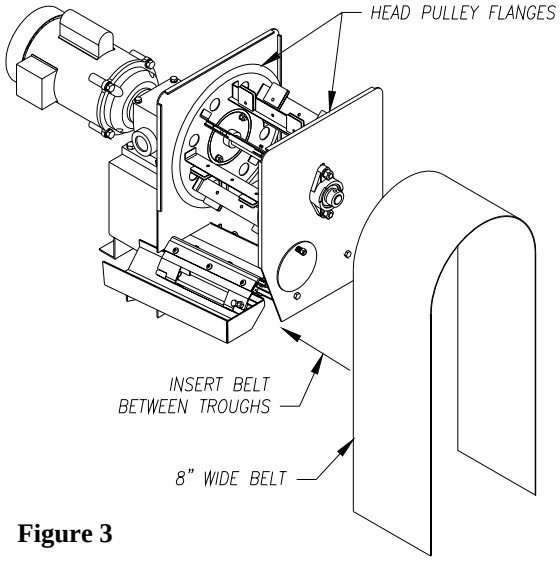
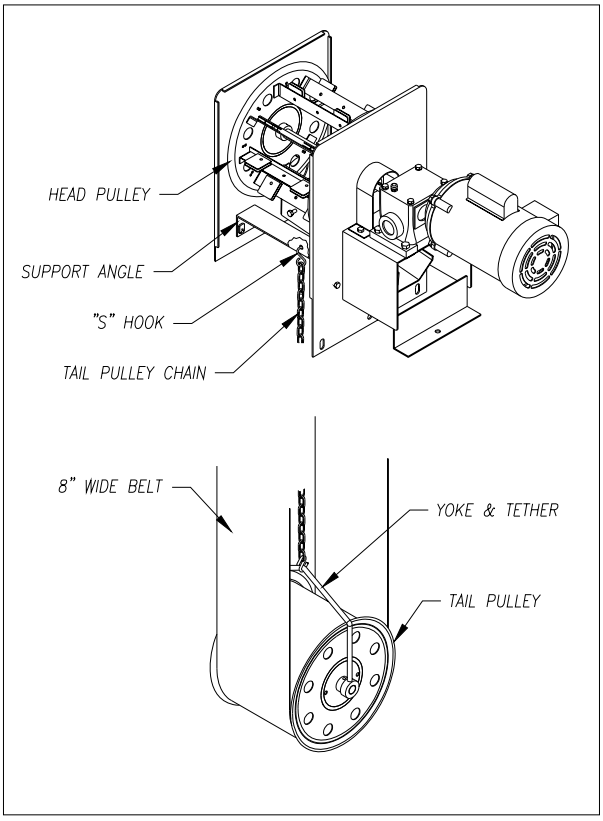


Figure 3



Step 9.

A. Remove the plastic protective plug from the gear reducer top and replace with breather plug supplied. **(SeeFig.5)**
The reducer has already been filled at the factory. Check and if necessary, refill with 600W viscosity oil for reducers up to the level plug

B. Motor/Gear Reducer Key Installation:

NOTE: Do Not use key provided with motor. Use only key provided with gear reducer.

1. Apply grease to motor shaft.
2. Place key FLUSH with end of motor shaft.
3. Carefully insert motor shaft into gear reducer. **DO NOT FORCE.**
4. If motor and gear reducer do not easily slide together, the key is binding. Repeat steps 1 & 2.
5. Bolt motor to gearbox with four bolts and lock washers provided.

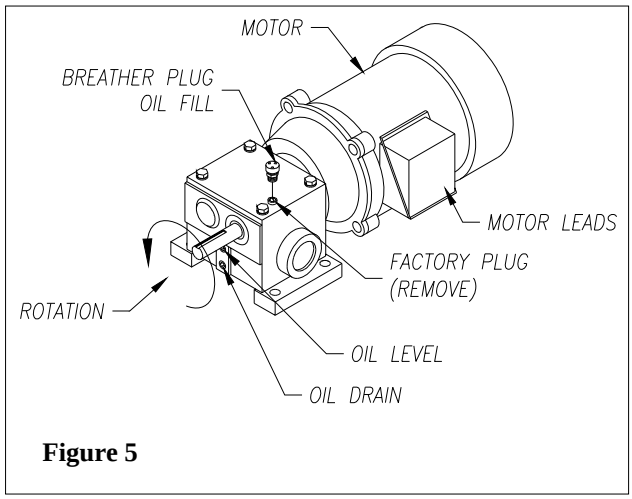


Figure 5

C. Connect motor leads to power so that the belt is carried downward through the wiper blades. (Rotation is in direction of the red arrow on the back of the base unit) **(See Fig. 5).**

Step 10. Leveling the Belt (See Fig. 6)

Be sure the unit is as level as possible. Unit should not be tilted side to side, nor front to rear. Turn motor on and observe the unit. The belt should run without rubbing on the flanges of the head pulley. If the belt is rubbing, unit can be adjusted by turning the leveling cam located on the inside bottom of the inboard plate **(See Fig. 6)**. The cam must be turned slowly, and observe the belt after each 1/16th of a turn.

After belt is running smoothly between the head pulley flanges, tighten down the three mounting bolts on the flat mount plate (flat mount).

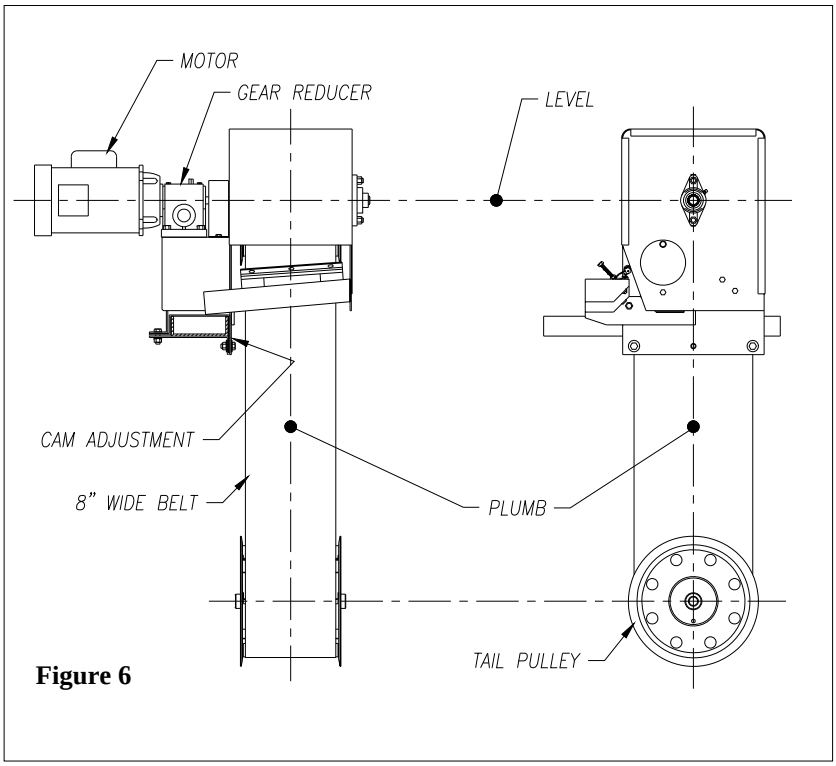


Figure 6

Step 13. Place the guard back into place.

3.2 General Maintenance

1. Check magnetized head pulley for buildup of any metallic parts and clean if necessary.
2. Clean or flush discharge hose and discharge troughs to remove accumulated sludge or waste.
3. Check belt condition for evidence of wear or cracks and replace if necessary. Make certain belt is running near center of head pulley and tail pulley, and not touching the outer plates.
4. Check oil level in the gear reducer, and follow gear reducer maintenance.
5. Fitting on 3/4" flange bearing (Item #14 on parts list) should be greased at the same time (every 6-8 months) as changing the oil in the gear reducer.
6. Check wiper blades for wear and proper setting. Reset adjustable wiper for proper wiping action if necessary.
7. FLUEight Srl recommends keeping a spare belt and a set of wiper blades in stock.

3.2.1 Gear reducer Maintenance

For gear reducer use any brand of 600 weight oil

Oil Capacity is 3.1 ounces (88 gr).

Change oil after first 6 months. After 6-8 months thereafter.

May operate at 205°F (96°C).

Top plug should be removed (if not already done from step 9A) and replaced with breather plug (furnished with reducer).
Bottom plug is for drain.
Center plug is oil level. Fill to this point.
Bottom plug and center plug are located below output shaft.

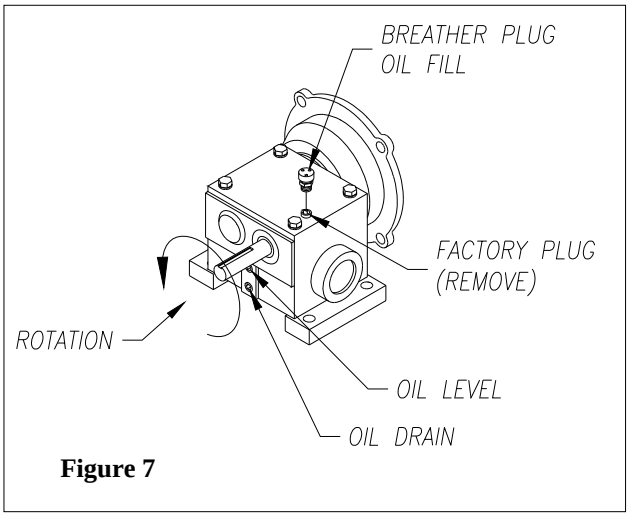
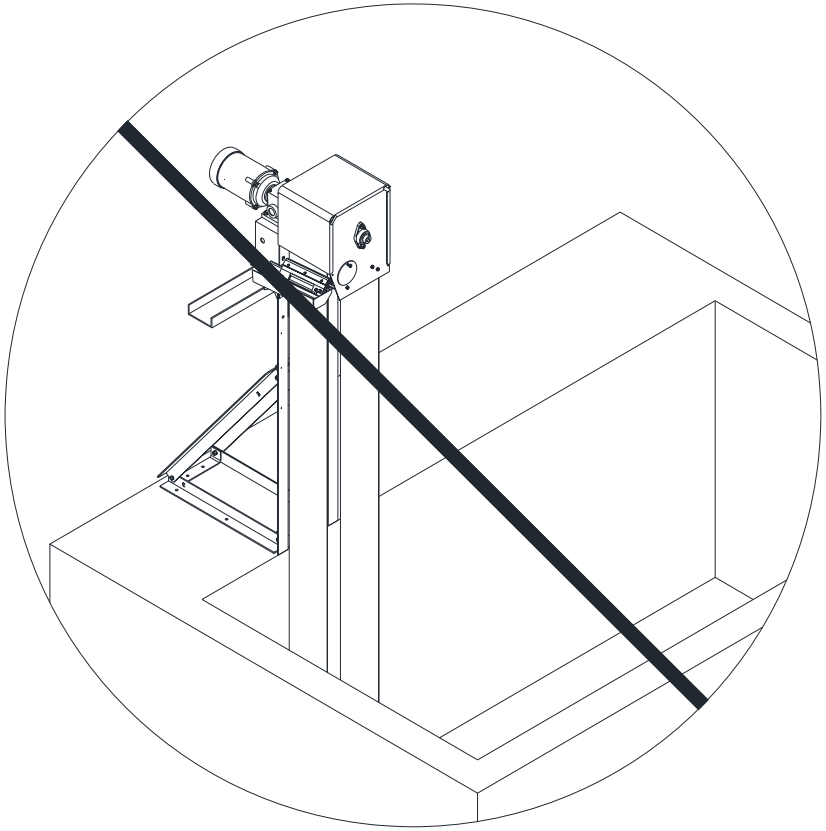


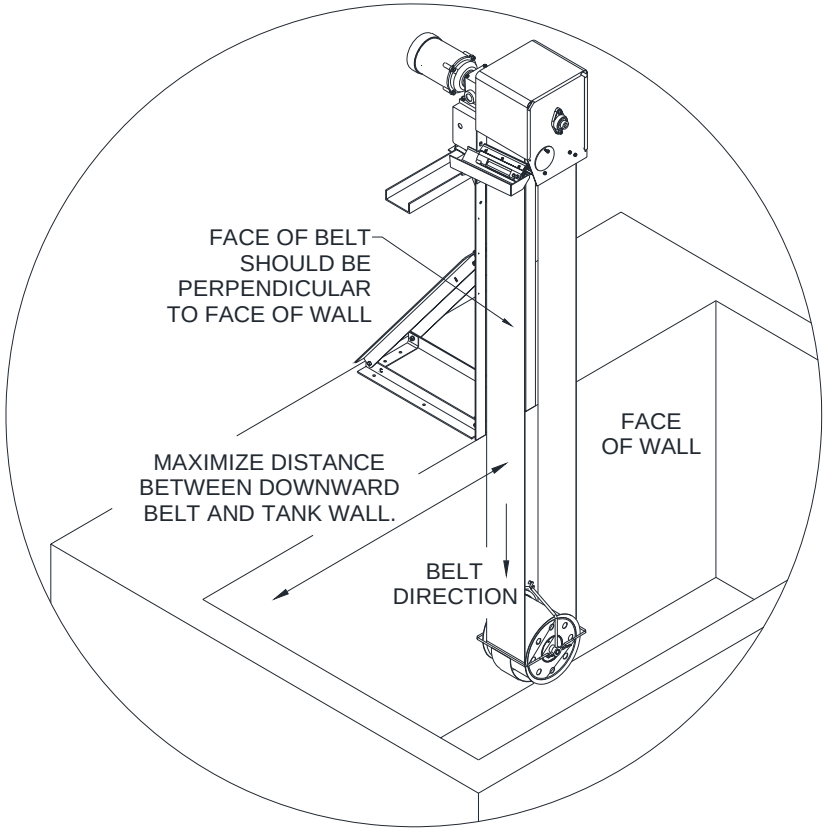
Figure 7

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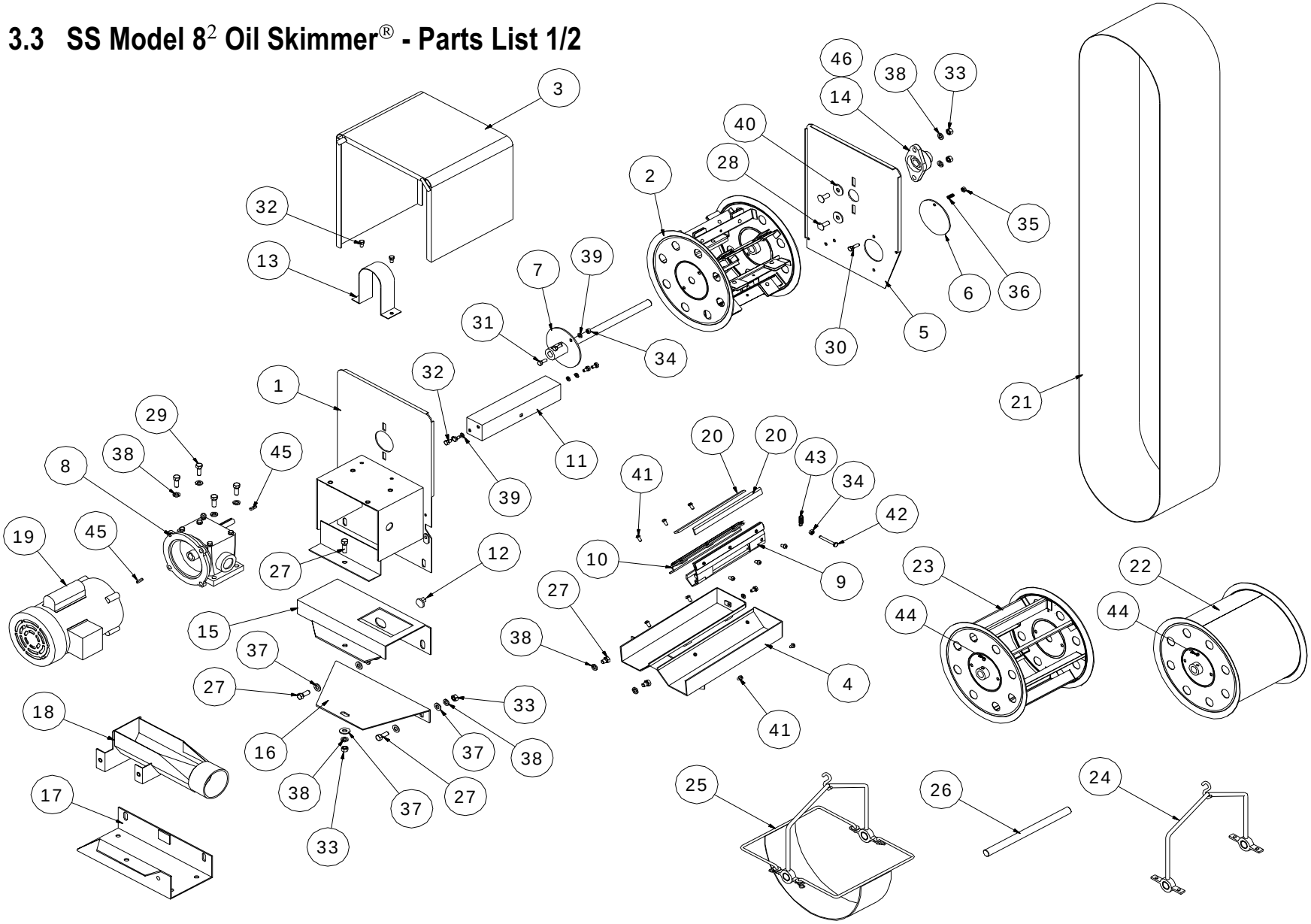
IMPORTANT INSTALLATION NOTE:

Your Abanaki Model 8^2 Oil Skimmer picks up the majority of its oil on the downward side of the belt. When deciding on where to place your skimmer, locate the downward belt as far from any walls as possible. The face of the belt should be perpendicular to the face of the wall as shown. Keeping the downward belt towards an open side of the tank will help with belt pickup of any oil.





3.3 SS Model 8² Oil Skimmer® - Parts List 1/2



3.3 SS Model 8² Oil Skimmer® - Parts List 2/2

ITEM	QTY	PART NAME	PART NUMBER	ITEM	QTY.	PART NAME	PART NUMBER
1	1	Main Base Weldment	PM8S16-01	24	1	Yoke w/Shaft	PM8S16-13B
2	1	Head Pulley	PM8S16-07	25	1	Retainer/Yoke (Optional)	-
3	1	Removable Cover Guard	PM8S16-04D	26	1	Tail Pulley Shaft	-
4	1	Discharge Trough Weldment	PM8S16-05A	27	3	3/8-16 x 1" Lg. Hex Hd. Bolt	N/A
5	1	Side Plate (Bearing)	PM8S16-01A	28	2	3/8-16 x 1" Lg. Carriage Bolt	N/A
6	1	Cover Plate	PM8S16-01D	29	4	3/8-16 x 1.50" Lg. Hex Hd. Bolt	N/A
7	1	Head Pulley Shaft	PM8S16-12	30	1	1/4-20 x 1.25" Lg. Hex Hd. Bolt	N/A
8	1	Gear Reducer (Std. US/Canada 56-C Face)	PGR-A	31	2	1/4-20 x .75" Lg. Hex Hd. Bolt	N/A
9	1	Adjustable Wiper Blade Assembly	PM8S16-09A	32	7	1/4-20 x .62" Lg. Hex Hd. Bolt	N/A
10	1	Fixed Wiper Blade Assembly	PM8S16-09F	33	7	3/8-16 Hex Nut	N/A
11	1	Support Angle Spacer	PM8S16-02E	34	3	1/4-20 Hex Nut	N/A
12	1	Adjusting Cam	PM8S16-01B	35	1	1/4-20 Locknut	N/A
13	1	Coupling Guard	PM8S16-01C	36	1	Spring 3/8x3/4x.032	POG-51B
14	1	3/4" Flange Bearing w/Collar	POG-37	37	5	3/8" Flat Washer	N/A
15	1	Channel Mount Clamp	-	38	4	3/8" Lock Washer	N/A
16	1	Support Gusset (Channel Mount)	-	39	2	1/4" Lock Washer	N/A
17	1	Flat Mount Plate	PM8S16-05G	40	2	3/8" Fender Washer	N/A
18	1	Flat Mount Discharge Trough	PM8S16-05	41	10	1/4-20 x .50" Lg. Button Hd.	N/A
19	1	Motor	-	42	1	1/4-20 x 2" Lg. Hx Hd Full Thd Bolt	N/A
20	1	Wiper Insert	See Spare Parts List	43	1	Hinged Wiper Ass'y Extn. Spring	POG-51A
21	1	8" Wide Belt	See Spare Parts List	44	2	1/4-20 X .25" Lg. Set Screw	N/A
22	1	Tail Pulley – Std.	See Spare Parts List	45	2	3/16" x 3/16" x 3/4" Lg. Key	N/A
23	1	Tail Pulley – High Capacity (Optional)	-	46	1	1/4-28 X .25" Lg. Set Screw	N/A

All parts shown may not be standard.

7.12 IOM for OIL SKIMMER MOTOR

Baldor-Reliance ® Integral Horsepower AC Induction Motors

ODP, WPI Enclosures, TENV, TEAO, TEFC Enclosure, Explosion Proof

Installation and Operating Manual

BALDOR • RELIANCE

April 2019

MN408 April 2019

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Important:
Be sure to check www.baldor.com to download the latest version of this manual in Adobe Acrobat PDF format.

Note! The manufacturer of these products, Baldor Electric Company became ABB Motors and Mechanical Inc. on March 1, 2018. Nameplates, Declaration of Conformity and other collateral material may contain the company name of Baldor Electric Company and the brand names of Baldor-Dodge and Baldor-Reliance until such time as all materials have been updated to reflect our new corporate identity.

Section 1

General Information

Overview

This manual contains general procedures that apply to Baldor Motor products. Be sure to read and understand the Safety Notice statements in this manual. For your protection, do not install, operate or attempt to perform maintenance procedures until you understand the Warning and Caution statements.
A Warning statement indicates a possible unsafe condition that can cause harm to personnel.
A Caution statement indicates a condition that can cause damage to equipment.

Important: **This instruction manual is not intended to include a comprehensive listing of all details for all procedures required for installation, operation and maintenance. This manual describes general guidelines that apply to most of the motor products shipped by Baldor. If you have a question about a procedure or are uncertain about any detail, Do Not Proceed. Please contact your Baldor distributor for more information or clarification.**

Before you install, operate or perform maintenance, become familiar with the following:

- NEMA Publication MG-2, Safety Standard for Construction and guide for Selection, Installation and Use of Electric Motors and Generators.
- IEC 34–1 Electrical and IEC72–1 Mechanical specifications
- ANSI C51.5, the National Electrical Code (NEC) and local codes and practices.

Limited Warranty

www.baldor.com/support/warranty_standard.asp

Safety Notice: **This equipment contains high voltage! Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt installation, operation and maintenance of electrical equipment. Be sure that you are completely familiar with NEMA publication MG-2, safety standards for construction and guide for selection, installation and use of electric motors and generators, the National Electrical Code and local codes and practices. Unsafe installation or use can cause conditions that lead to serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.**

WARNING: **Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.**

WARNING: **Disconnect all electrical power from the motor windings and accessory devices before disassembly of the motor. Electrical shock can cause serious or fatal injury.**

WARNING: **Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that all grounding instructions have been followed. Electrical shock can cause serious or fatal injury. National Electrical Code and Local codes must be carefully followed.**

WARNING: **Avoid extended exposure to machinery with high noise levels. Be sure to wear ear protective devices to reduce harmful effects to your hearing.**

WARNING: **Surface temperatures of motor enclosures may reach temperatures which can cause discomfort or injury to personnel accidentally coming into contact with hot surfaces. When installing, protection should be provided by the user to protect against accidental contact with hot surfaces. Failure to observe this precaution could result in bodily injury.**

WARNING: **This equipment may be connected to other machinery that has rotating parts or parts that are driven by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt to install operate or maintain this equipment.**

WARNING: **Do not by-pass or disable protective devices or safety guards. Safety features are designed to prevent damage to personnel or equipment. These devices can only provide protection if they remain operative.**

WARNING: **Avoid the use of automatic reset devices if the automatic restarting of equipment can be hazardous to personnel or equipment.**

WARNING: **Be sure the load is properly coupled to the motor shaft before applying power. The shaft key must be fully captive by the load device. Improper coupling can cause harm to personnel or equipment if the load decouples from the shaft during operation.**

WARNING: **UL Listed motors must only be serviced by UL Approved Authorized Baldor Service Centers if these motors are to be returned to a hazardous and/or explosive atmosphere.**

WARNING: **Thermostat contacts automatically reset when the motor has slightly cooled down. To prevent injury or damage, the control circuit should be designed so that automatic starting of the motor is not possible when the thermostat resets.**

WARNING: **Use proper care and procedures that are safe during handling, lifting, installing, operating and maintaining operations. Improper methods may cause muscle strain or other harm.**

WARNING: **Pacemaker danger – Magnetic and electromagnetic fields in the vicinity of current carrying carrying conductors and permanent magnet motors can result result in a serious health hazard to persons with cardiac pacemakers, metal implants, and hearing aids. To avoid risk, stay way from the area surrounding a permanent magnet motor.**

WARNING: **Before performing any motor maintenance procedure, be sure that the equipment connected to the motor shaft cannot cause shaft rotation. If the load can cause shaft rotation, disconnect the load from the motor shaft before maintenance is performed. Unexpected mechanical rotation of the motor parts can cause injury or motor damage.**

Continued on next page.

Safety Notice Continued

WARNING: **Do not use non UL/CSA listed explosion proof motors in the presence of flammable or combustible vapors or dust. These motors are not designed for atmospheric conditions that require explosion proof operation.**

WARNING: **Motors that are to be used in flammable and/or explosive atmospheres must display the UL label on the nameplate along with CSA listed logo. Specific service conditions for these motors are defined in NFPA 70 (NEC) Article 500.**

WARNING: **Guards must be installed for rotating parts such as couplings, pulleys, external fans, and unused shaft extensions, should be permanently guarded to prevent accidental contact by personnel. Accidental contact with body parts or clothing can cause serious or fatal injury.**

WARNING: **Depending on operating conditions, sound levels for electric motors may exceed 70 dB. Protective measures such as hearing protection may be needed when in close proximity to a motor in operation.**

Caution: **To prevent premature equipment failure or damage, only qualified maintenance personnel should perform maintenance.**

Caution: **Do not over tension belts. Excess tension may damage the motor or driven equipment.**

Caution: **Do not over–lubricate motor as this may cause premature bearing failure.**

Caution: **Do not lift the motor and its driven load by the motor lifting hardware. The motor lifting hardware is adequate for lifting only the motor. Disconnect the load (gears, pumps, compressors, or other driven equipment) from the motor shaft before lifting the motor.**

Caution: **If eye bolts are used for lifting a motor, be sure they are securely tightened. The lifting direction should not exceed a 20 ° angle from the shank of the eye bolt or lifting lug. Excessive lifting angles can cause damage.**

Caution: **To prevent equipment damage, be sure that the electrical service is not capable of delivering more than the maximum motor rated amps listed on the rating plate.**

Caution: **If a HI POT test (High Potential Insulation test) must be performed, follow the precautions and procedure in NEMA MG1 and MG2 standards to avoid equipment damage.**

Caution: **The space heaters are designed to operate at or below the maximum surface temperature stated on the nameplate. If the marked ambient and/or voltage are exceeded this maximum surface temperature can be exceeded and can damage the motor windings. If applied in a division 2 or zone 2 environment this excessive temperature may cause ignition of hazardous materials.**

Caution: **Shaker Duty motors must be properly lubricated prior to Start Up to prevent damage. See Section 3.**

If you have any questions or are uncertain about any statement or procedure, or if you require additional information please contact your Baldor distributor or an Authorized Baldor Service Center.

Receiving

Each Baldor Electric Motor is thoroughly tested at the factory and carefully packaged for shipment. When you receive your motor, there are several things you should do immediately.

1. Observe the condition of the shipping container and report any damage immediately to the commercial carrier that delivered your motor.
2. Verify that the part number of the motor you received is the same as the part number listed on your purchase order.

Handling

The motor should be lifted using the lifting lugs or eye bolts provided.

Caution: **Do not lift the motor and its driven load by the motor lifting hardware. The motor lifting hardware is adequate for lifting only the motor. Disconnect the load (gears, pumps, compressors, or other driven equipment) from the motor shaft before lifting the motor.**

1. Use the lugs or eye bolts provided to lift the motor. Never attempt to lift the motor and additional equipment connected to the motor by this method. The lugs or eye bolts provided are designed to lift only the motor. Never lift the motor by the motor shaft or the hood of a WPII motor.
2. To avoid condensation inside the motor, do not unpack until the motor has reached room temperature. (Room temperature is the temperature of the room in which it will be installed). The packing provides insulation from temperature changes during transportation.
3. When lifting a WPII (Weather Proof Type 2) motor, do not lift the motor by inserting lifting lugs into holes on top of the cooling hood. These lugs are to be used for hood removal only. A spreader bar should be used to lift the motor by the cast lifting lugs located on the motor frame.
4. If the motor must be mounted to a plate with the driven equipment such as pump, compressor etc., it may not be possible to lift the motor alone. For this case, the assembly should be lifted by a sling around the mounting base. The entire assembly can be lifted as an assembly for installation. Do not lift the assembly using the motor lugs or eye bolts provided. Lugs or eye bolts are designed to lift motor only. If the load is unbalanced (as with couplings or additional attachments) additional slings or other means must be used to prevent tipping. In any event, the load must be secure before lifting. If the load is unbalanced (as with couplings or additional attachments) additional slings or other means must be used to prevent tipping. In any event, the load must be secure before lifting.

Storage

Storage requirements for motors and generators that will not be placed in service for at least six months from date of shipment.

Improper motor storage will result in seriously reduced reliability and failure. An electric motor that does not experience regular usage while being exposed to normally humid atmospheric conditions is likely to develop rust in the bearings or rust particles from surrounding surfaces may contaminate the bearings. The electrical insulation may absorb an excessive amount of moisture leading to the motor winding failure.

A wooden crate "shell" should be constructed to secure the motor during storage. This is similar to an export box but the sides & top must be secured to the wooden base with lag bolts (not nailed as export boxes are) to allow opening and reclosing many times without damage to the "shell".

Minimum resistance of motor winding insulation is 5 Meg ohms or the calculated minimum, which ever is greater. Minimum resistance is calculated as follows: Rm = kV + 1

where: (Rm is minimum resistance to ground in Meg–Ohms and kV is rated nameplate voltage defined as Kilo–Volts.)

Example: For a 480VAC rated motor Rm =1.48 meg–ohms (use 5 M Ω).

For a 4160VAC rated motor Rm = 5.16 meg–ohms.

Preparation for Storage

1. Some motors have a shipping brace attached to the shaft to prevent damage during transportation. The shipping brace, if provided, must be removed and stored for future use. The brace must be reinstalled to hold the shaft firmly in place against the bearing before the motor is moved.
2. Store in a clean, dry, protected warehouse where control is maintained as follows:
   a. Shock or vibration must not exceed 2 mils peak-to-peak maximum at 60 hertz, to prevent the bearings from brinelling. If shock or vibration exceeds this limit vibration isolation pads must be used.
   b. Storage temperatures of 10 ºC (50 ºF) to 49 ºC (120 ºF) must be maintained.
   c. Relative humidity must not exceed 60%.
   d. Motor space heaters (when present) are to be connected and energized whenever there is a possibility that the storage ambient conditions will reach the dew point. Space heaters are optional.

Note: Remove motor from containers when heaters are energized, reprotect if necessary.

3. Measure and record the resistance of the winding insulation (dielectric withstand) every 30 days of storage.
   a. If motor insulation resistance decreases below the minimum resistance, contact your Baldor District office.
   b. Place new desiccant inside the vapor bag and re–seal by taping it closed.
   c. If a zipper–closing type bag is used instead of the heat–sealed type bag, zip the bag closed instead of taping it. Be sure to place new desiccant inside bag after each monthly inspection.
   d. Place the shell over the motor and secure with lag bolts.
4. Where motors are mounted to machinery, the mounting must be such that the drains and breathers are fully operable and are at the lowest point of the motor. Vertical motors must be stored in the vertical position. Storage environment must be maintained as stated in step 2.
5. Motors with anti–friction bearings are to be greased at the time of going into extended storage with periodic service as follows:
   a. Motors marked "Do Not Lubricate" on the nameplate do not need to be greased before or during storage.
   b. Ball and roller bearing (anti–friction) motor shafts are to be rotated manually every 3 months and greased every 6 months in accordance with the Maintenance section of this manual.
   c. Sleeve bearing (oil lube) motors are drained of oil prior to shipment. The oil reservoirs must be refilled to the indicated level with the specified lubricant, (see Maintenance). The shaft should be rotated monthly by hand at least 10 to 15 revolutions to distribute oil to bearing surfaces.
   d. "Provisions for oil mist lubrication" – These motors are packed with grease. Storage procedures are the same as paragraph 5b.
   e. "Oil Mist Lubricated" – These bearings are protected for temporary storage by a corrosion inhibitor. If stored for greater than 3 months or outdoor storage is anticipated, connected to the oil mist system while in storage. If this is not possible, add the amount of grease indicated under "Standard Condition" in Section 3, then rotate the shaft 15 times by hand.

6. All breather drains are to be fully operable while in storage (drain plugs removed). The motors must be stored so that the drain is at the lowest point. All breathers and automatic “T” drains must be operable to allow breathing and draining at points other than through the bearings around the shaft. Vertical motors should be stored in a safe stable vertical position.
7. Coat all external machined surfaces with a rust preventing material.
   An acceptable product for this purpose is Exxon Rust Ban # 392.
8. Carbon brushes should be lifted and held in place in the holders, above the commutator, by the brush holder fingers. The commutator should be wrapped with a suitable material such as cardboard paper as a mechanical protection against damage.

Non–Regreaseable Motors

Non–regreasable motors with “Do Not Lubricate” on the nameplate should have the motor shaft rotated 15 times to redistribute the grease within the bearing every 3 months or more often.

All Other Motor Types

Before storage, the following procedure must be performed.

1. Remove the grease drain plug, if supplied, (opposite the grease fitting) on the bottom of each bracket prior to lubricating the motor.
2. The motor with regreasable bearing must be greased as instructed in Section 3 of this manual.
3. Replace the grease drain plug after greasing.
4. The motor shaft must be rotated a minimum of 15 times after greasing.
5. Motor Shafts are to be rotated at least 15 revolutions manually every 3 months and additional grease added every nine months (see Section 3) to each bearing.
6. Bearings are to be greased at the time of removal from storage.

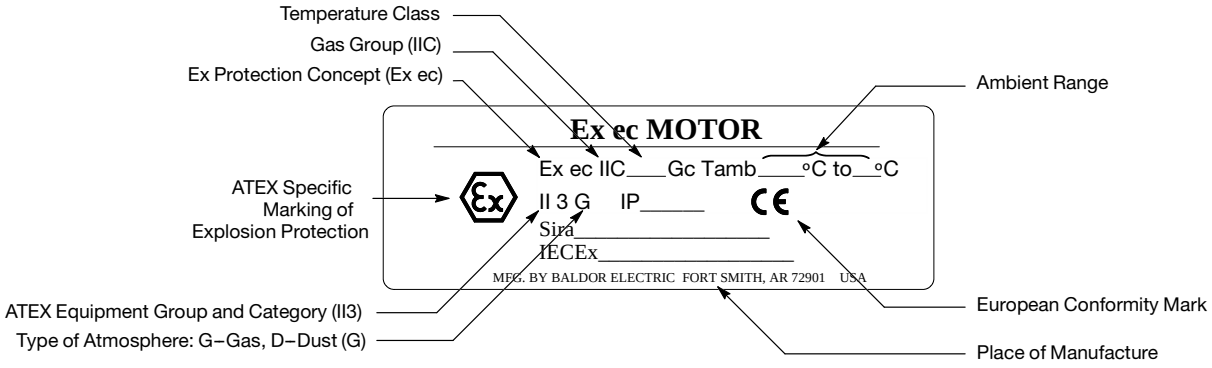
Removal From Storage

1. Remove all packing material.
2. Measure and record the electrical resistance of the winding insulation resistance meter at the time of removal from storage. The insulation resistance must not be less than 50% from the initial reading recorded when the motor was placed into storage. A decrease in resistance indicates moisture in the windings and necessitates electrical or mechanical drying before the motor can be placed into service. If resistance is low, contact your Baldor District office.
3. Regrease the bearings as instructed in Section 3 of this manual.
4. Reinstall the original shipping brace if motor is to be moved. This will hold the shaft firmly against the bearing and prevent damage during movement.

Equipment Marking for IEC Certified Product

IEC certified products have special markings that identify the protection concept and environment requirements. An example is shown in Figure 1-1.

Figure 1-1 IEC Certified Product Markings



Specific Conditions of Use:

If the motor certificate number is followed by the symbol "X", this indicates that the motor has specific conditions of use which are indicated on the certificate. It is necessary to review the product certification certificate in conjunction with this instruction manual.

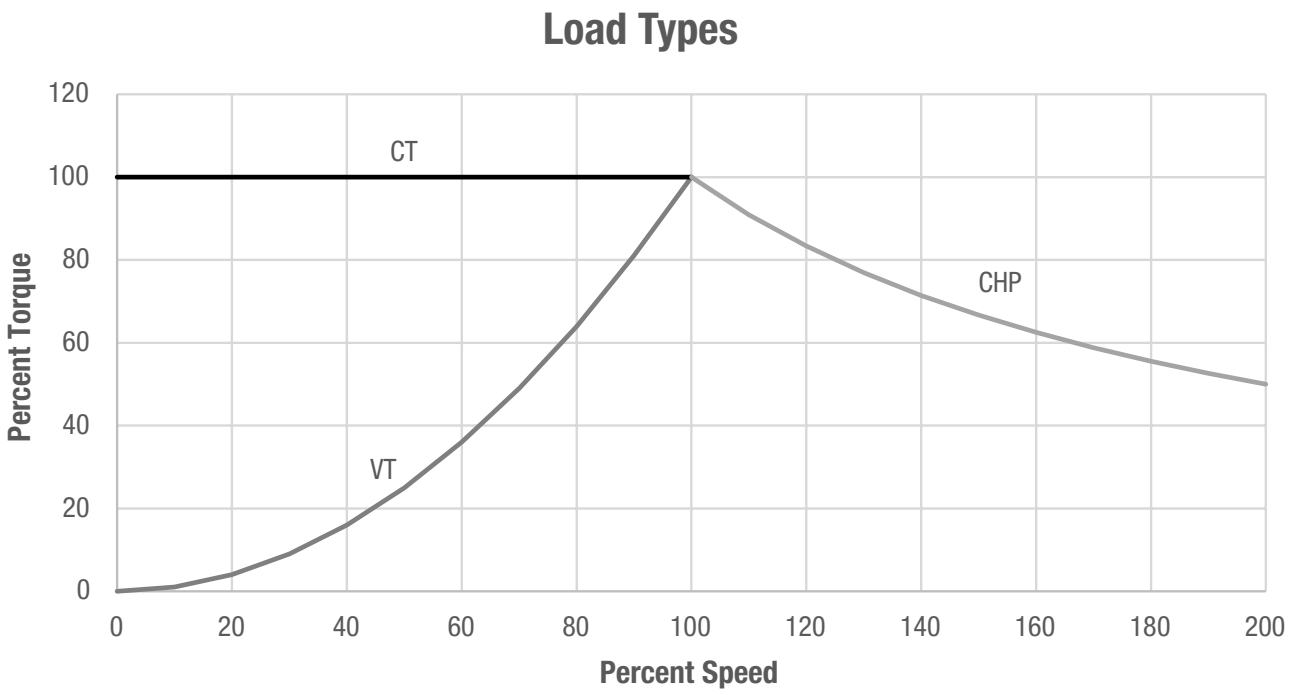
Operation On Frequency Converters:

If the motor is evaluated for operation with an adjustable speed drive, the type of converter (for example PWM for Pulse Width Modulated) and safe speed ranges (for example 0- 120Hz) will be specified in the certification documents or on motor nameplates. It is necessary to consult the adjustable speed drive manual for proper set up. IECEx Certificates are available online at www.iecex.com

Unit Conversions	
Inches to Millimeters	Inches x 25.4 = mm
Millimeters to Inches	mm x .03937 = Inches
Horsepower to Kilowatts	Hp x .746 = Kw
Kilowatts to Horsepower	Kw x 1.341 = Hp
Pounds to Kilograms	Lbs x .454 = Kg
Kilograms to Pounds	Kg x 2.205 = Lbs

Typical Speed vs Torque Curves are shown in Figure 1-2. For values relative to your specific motor, consult the motor nameplate marking.

Figure 1-2 Typical Speed vs Torque Curves



EMC Compliance Statement for European Union

The motors described in this instruction manual are designed to comply 2014/30/EU. These motors are commercial in design and not intended for residential use. When used with converters, please consult converter manufacturers literature regarding recommendations on cable types, cable shielding, cable shielding termination, connection recommendations and any filters which may be recommended for EMC compliance. For additional information, consult Baldor MN1383.

Section 2

Installation & Operation

Overview

Installation should conform to the National Electrical Code as well as local codes and practices. When other devices are coupled to the motor shaft, be sure to install protective devices to prevent future accidents. Some protective devices include, coupling, belt guard, chain guard, shaft covers etc. These protect against accidental contact with moving parts. Machinery that is accessible to personnel should provide further protection in the form of guard rails, screening, warning signs etc.

Location

It is important that motors be installed in locations that are compatible with motor enclosure and ambient conditions. Improper selection of the motor enclosure and ambient conditions can lead to reduced operating life of the motor.

For Group I Mining Motors where breather drains are used specified, Breather drain shall be mounted or protected in installation such that it is guarded from direct impact."

Proper ventilation for the motor must be provided. Obstructed airflow can lead to reduction of motor life.

1. **Open Drip–Proof/WPI** motors are intended for use indoors where atmosphere is relatively clean, dry, well ventilated and non–corrosive.
2. **Totally Enclosed and WPII** motors may be installed where dirt, moisture or dust are present and in outdoor locations.

Severe Duty, IEEE 841 and Washdown Duty enclosed motors are designed for installations with high corrosion or excessive moisture conditions. These motors should not be placed into an environment where there is the presence of flammable or combustible vapors, dust or any combustible material, unless specifically designed for this type of service. IEEE841 motors are suitable for application in Class I Division 2 and Class I Zone 2 areas on sine wave power in accordance with the applicable codes and standards.

Hazardous Locations are those where there is a risk of ignition or explosion due to the presence of combustible gases, vapors, dust, fibers, or flyings. Facilities requiring special equipment for hazardous locations are typically classified in accordance with local requirements. In the US market, guidance is provided by the National Electric Code.

EMC Compliance Statement for European Union

The motors described in this instruction manual are designed to comply 2014/30/EU . These motors are commercial in design and not intended for residential use.

Mounting Location

The motor should be installed in a location compatible with the motor enclosure and specific ambient. To allow adequate air flow, the following clearances must be maintained between the motor and any obstruction:

Table 2-1 Enclosure Clearance

TEFC / TENV (IC0141) Enclosures	
Fan Cover Air Intake	180 – 210T Frame 1" (25mm)
Fan Cover Air Intake	250 – 449T Frame 4" (100mm)
	IEC 112 – 132 1" (25mm)
	IEC 160 – 280 4" (100mm)
Exhaust	Envelope equal to the P Dimension on the motor dimension sheet
OPEN/Protected Enclosures	
Bracket Intake	Same as TEFC
Frame Exhaust	Exhaust out the sides envelope A minimum of the P dimension plus 2" (50mm) Exhaust out the end same as intake.

The motor must be securely installed to a rigid foundation or mounting surface to minimize vibration and maintain alignment between the motor and shaft load. Failure to provide a proper mounting surface may cause vibration, misalignment and bearing damage.

Foundation caps and sole plates are designed to act as spacers for the equipment they support. If these devices are used, be sure that they are evenly supported by the foundation or mounting surface.

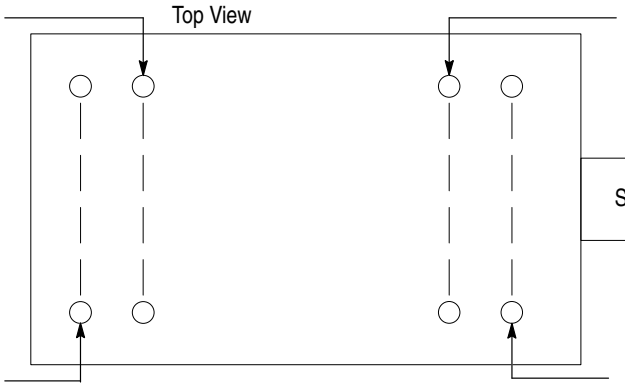
When installation is complete and accurate alignment of the motor and load is accomplished, the base should be grouted to the foundation to maintain this alignment.

The standard motor base is designed for horizontal or vertical mounting. Adjustable or sliding rails are designed for horizontal mounting only. Consult your Baldor distributor or authorized Baldor Service Center for further information.

Frame Mounting Holes

Some motors have standardized frames containing 6 or 8 mounting holes. 6 hole frames are not suitable for field reversal of mounting from F–1 to F–2, etc. Figure 2-1 indicates the proper mounting holes to use.

Figure 2-1 6 & 8 Hole Motor Frame Mounting



Caution: **Do not lift the motor and its driven load by the motor lifting hardware. The motor lifting hardware is adequate for lifting only the motor. Disconnect the load (gears, pumps, compressors, or other driven equipment) from the motor shaft before lifting the motor.**

In the case of assemblies on a common base, any lifting means provided on the motor should not be used to lift the assembly and base but, rather, the assembly should be lifted by a sling around the base or by other lifting means provided on the base. Assure lifting in the direction intended in the design of the lifting means. Likewise, precautions should be taken to prevent hazardous overloads due to deceleration, acceleration or shock forces.

Alignment

Accurate alignment of the motor with the driven equipment is extremely important. The pulley, sprocket, or gear used in the drive should be located on the shaft as close to the shaft shoulder as possible. It is recommended to heat the pulley, sprocket, or gear before installing on the motor shaft. Forcibly driving a unit on the motor shaft will damage the bearings.

1. Direct Coupling
   For direct drive, use flexible couplings if possible. Consult the drive or equipment manufacturer for more information. Mechanical vibration and roughness during operation may indicate poor alignment. Use dial indicators to check alignment. The space between coupling hubs should be maintained as recommended by the coupling manufacturer.
2. End-Play Adjustment
   The axial position of the motor frame with respect to its load is also extremely important. The standard motor bearings are not designed for excessive external axial thrust loads. Improper adjustment will cause failure.
3. Pulley Ratio
   The best practice is to not exceed an 8:1 pulley ratio.

Caution: **Do not over tension belts. Excess tension may damage the motor or driven equipment.**

4. Belt Drive
   Align sheaves carefully to minimize belt wear and axial bearing loads (see End-Play Adjustment). Belt tension should be sufficient to prevent belt slippage at rated speed and load. However, belt slippage may occur during starting.

Doweling & Bolting

After proper alignment is verified, dowel pins should be inserted through the motor feet into the foundation. This will maintain the correct motor position should motor removal be required. (Baldor•Reliance motors are designed for doweling.)

1. Drill dowel holes in diagonally opposite motor feet in the locations provided.
2. Drill corresponding holes in the foundation.
3. Ream all holes.
4. Install proper fitting dowels.
5. Mounting bolts must be carefully tightened to prevent changes in alignment.

Use a flat washer and lock washer under each nut or bolt head to hold the motor feet secure.

Flanged nuts or bolts may be used as an alternative to washers.

WARNING: **Guards must be installed for rotating parts such as couplings, pulleys, external fans, and unused shaft extensions, should be permanently guarded to prevent accidental contact by personnel. Accidental contact with body parts or clothing can cause serious or fatal injury.**

Guarding

Guards must be installed for rotating parts such as couplings, pulleys, external fans, and unused shaft extensions. This is particularly important where the parts have surface irregularities such as keys, key ways or set screws. Some satisfactory methods of guarding are:

1. Covering the machine and associated rotating parts with structural or decorative parts of the driven equipment.
2. Providing covers for the rotating parts. Covers should be sufficiently rigid to maintain adequate guarding during normal service.

Power Connection

Motor and control wiring, overload protection, disconnects, accessories and grounding should conform to the National Electrical Code and local codes and practices.

For ExnA hazardous location motors, it is a specific condition of use that all terminations in a conduit box be fully insulated. Fully insulated and lugged terminations must be bolted and provided with lock washer to prevent rotation. Flying leads must be insulated with two full wraps of electrical grade insulating tape or heat shrink tubing.

Grounding

In the USA consult the National Electrical Code, Article 430 for information on grounding of motors and generators, and Article 250 for general information on grounding. In making the ground connection, the installer should make certain that there is a solid and permanent metallic connection between the ground point, the motor or generator terminal housing, and the motor or generator frame. In non–USA locations consult the appropriate national or local code applicable.

Motors with resilient cushion rings usually must be provided with a bonding conductor across the resilient member. Some motors are supplied with the bonding conductor on the concealed side of the cushion ring to protect the bond from damage. Motors with bonded cushion rings should usually be grounded at the time of installation in accordance with the above recommendations for making ground connections. When motors with bonded cushion rings are used in multimotor installations employing group fusing or group protection, the bonding of the cushion ring should be checked to determine that it is adequate for the rating of the branch circuit over current protective device being used.

There are applications where grounding the exterior parts of a motor or generator may result in greater hazard by increasing the possibility of a person in the area simultaneously contacting ground and some other nearby live electrical parts of other ungrounded electrical equipment. In portable equipment it is difficult to be sure that a positive ground connection is maintained as the equipment is moved, and providing a grounding conductor may lead to a false sense of security.

Select a motor starter and over current protection suitable for this motor and its application. Consult motor starter application data as well as the National Electric Code and/or other applicable local codes.

For motors installed in compliance with IEC requirements, the following minimum cross sectional area of the protective conductors should be used:

Crosssectional area of phase conductors, *S*	Minimum crosssectional area of the corresponding protective conductor, S_p
mm2	mm2
6	6
10	10
16	16
25	25
35	25
50	25
70	35
95	50
120	70
150	70

Equipotential bonding connection shall made using a conductor with a cross-sectional area of at least 4 mm^2.

Conduit Box For ease of making connections, an oversize conduit box is provided. Most conduit boxes can be rotated 360 ° in 90 ° increments. In the case that a conduit box needs to be adjusted, remove conduit box mounting screws. Rotate conduit box in 90 ° increments to desired location. Reinsert mounting screws and tighten to grade 2 torque.

Auxiliary conduit boxes are provided on some motors for accessories such as space heaters, RTD's etc.

AC Power Motors with flying lead construction must be properly terminated and insulated.

Connect the motor leads as shown on the connection diagram located on the name plate or inside the cover on the conduit box. Be sure the following guidelines are met:

1. AC power is within ±10% of rated voltage with rated frequency. (See motor name plate for ratings).

OR

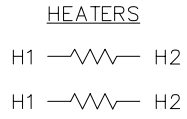
2. AC power is within ±5% of rated frequency with rated voltage.

OR

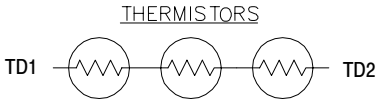
3. A combined variation in voltage and frequency of ±10% (sum of absolute values) of rated values, provided the frequency variation does not exceed ±5% of rated frequency.

Performance within these voltage and frequency variations are shown in Figure 2-3.

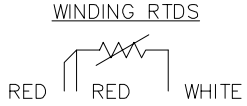
Figure 2-2 Accessory Connections



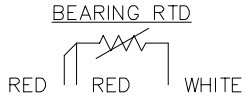
One heater is installed in each end of motor.
Leads for each heater are labeled H1 & H2.
(Like numbers should be tied together).



Three thermistors are installed in windings and tied in series.
Leads are labeled TD1 & TD2.



Winding RTDs are installed in windings (2) per phase.
Each set of leads is labeled 1TD1, 1TD2, 1TD3, 2TD1, 2TD2, 2TD3 etc.



* One bearing RTD is installed in Drive endplate (PUEP), leads are labeled RTDDE.
* One bearing RTD is installed in Opposite Drive endplate (FREP), leads are labeled RTDODE.
* Note RTD may have 2−Red/1−White leads; or 2−White/1−Red Lead.

Rotation

All three phase motors are reversible. To reverse the direction of rotation, disconnect and lock out power and interchange any two of the three line leads for three phase motors. For single phase motors, check the connection diagram to determine if the motor is reversible and follow the connection instructions for lead numbers to be interchanged. Not all single phase motors are reversible.

Adjustable Frequency Power Inverters used to supply adjustable frequency power to induction motors produce wave forms with lower order harmonics with voltage spikes superimposed. Turn–to–turn, phase–to–phase, and ground insulation of stator windings are subject to the resulting dielectric stresses. Suitable precautions should be taken in the design of these drive systems to minimize the magnitude of these voltage spikes. Consult the drive instructions for maximum acceptable motor lead lengths, and proper grounding.

Note: Main power leads for CE Marked Motors may be marked U,V,W – for standard configurations, please consult connection diagrams.

Caution: **The space heaters are designed to operate at or below the maximum surface temperature stated on the nameplate. If the marked ambient and/or voltage are exceeded this maximum surface temperature can be exceeded and can damage the motor windings. If applied in a division 2 or zone 2 environment this excessive temperature may cause ignition of hazardous materials.**

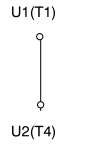
AC Motor Connection Diagram

IEC VERSUS NEMA LEAD MARKING

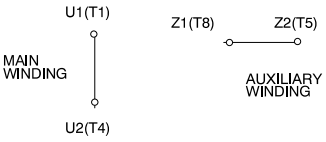
EXAMPLE COMPARISIONS OF IEC AND NEMA LEADING MARKINGS FOR COMMON CONNECTION TYPES ARE SHOWN BELOW.

SINGLE PHASE MOTORS

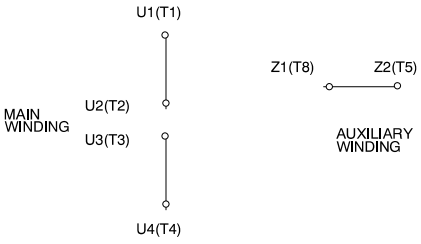
SINGLE VOLTAGE NON REVERSIBLE



SINGLE VOLTAGE REVERSIBLE



DUAL VOLTAGE REVERSIBLE



AC Motor Connection Diagram

THREE PHASE

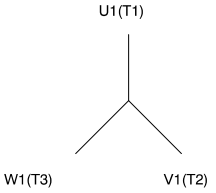
FOR SINGLE WINDING 3 PHASE MOTORS, LEAD MARKINGS CAN BE DIRECTLY TRANSLATED BETWEEN IEC AND NEMA DESIGNATIONS. FOR THESE MOTORS, THE LEAD MARKINGS ARE EQUIVALENT AS FOLLOWS:

U1=T1	U2=T4	U5=T7	U6=T10
V1=T2	V2=T5	V5=T8	V6=T11
W1=T3	W2=T6	W5=T9	W6=T12

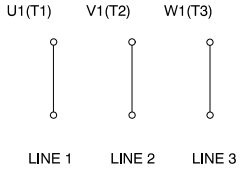
EXAMPLES OF COMMON CONNECTIONS ARE GIVEN BELOW.

THREE LEADS

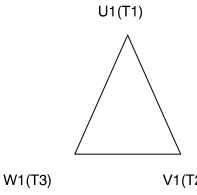
WYE CONNECT



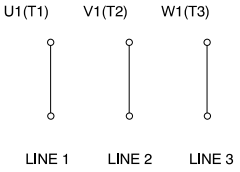
WIRING DIAGRAM



DELTA CONNECT



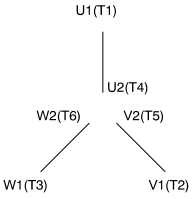
WIRING DIAGRAM



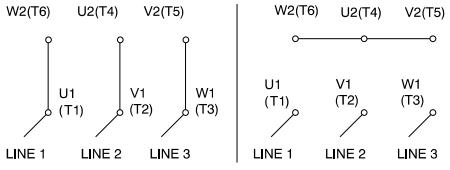
AC Motor Connection Diagram

SIX LEADS

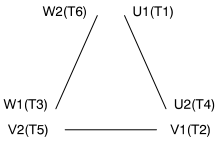
DELTA-WYE CONNECT



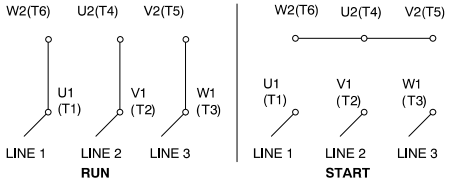
DUAL VOLTAGE-HIGH TO LOW VOLTAGE RATIO 1.73:1



WYE-DELTA CONNECT



WYE START-DELTA RUN SINGLE VOLTAGE

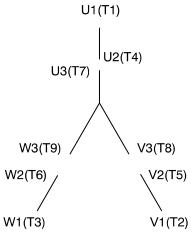


AC Motor Connection Diagram

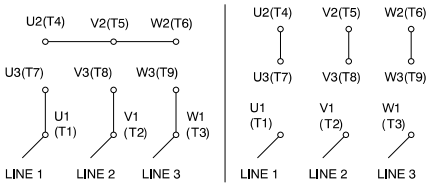
NINE LEADS

DUAL VOLTAGE-HIGH TO LOW VOLTAGE RATIO 2:1

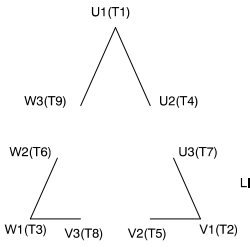
WYE CONNECT



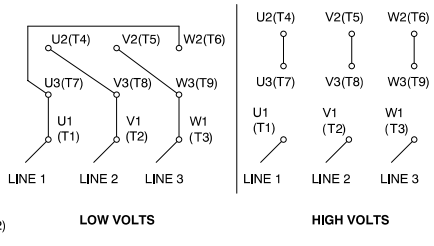
WIRING DIAGRAM



DELTA CONNECT



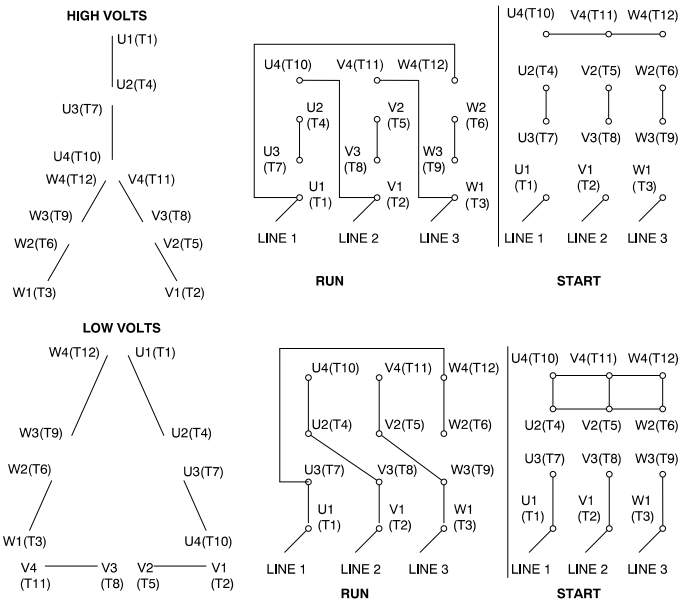
WIRING DIAGRAM



AC Motor Connection Diagram

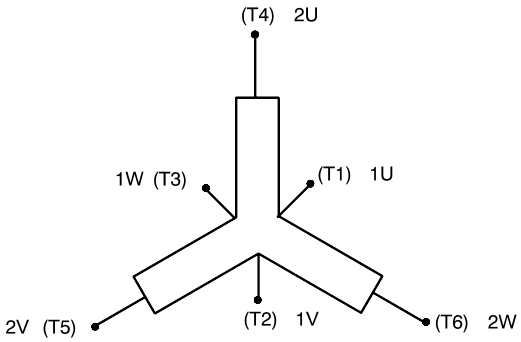
TWELVE LEADS

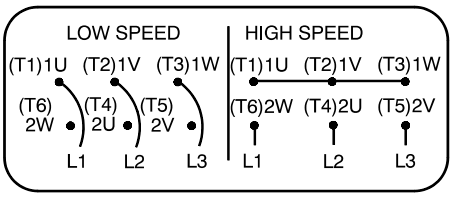
DUAL VOLTAGE WYE START – DELTA – RUN



AC Motor Connection Diagram

SINGLE WINDING MULTI-SPEEDS CONSTANT TORQUE

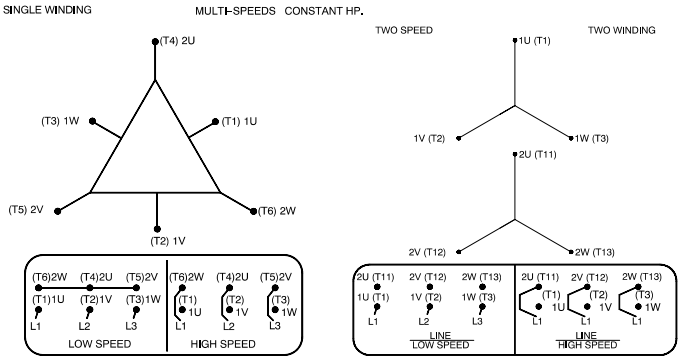




(N.P. 1634-DE)

AC Motor Connection Diagram

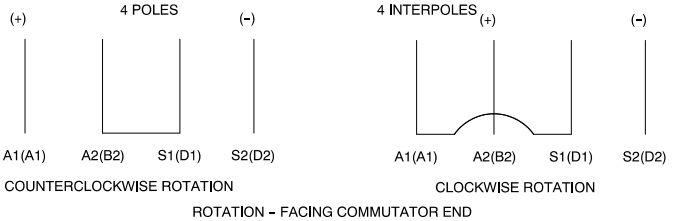
SINGLE WINDING MULTI-SPEEDS CONSTANT HP.



MOTOR WINDING THERMOSTATS		
CONTACTS _____ @ _____ °C		
FIGURE NUMBER _____		
CONTACT RATING		
VOLTS	**CONTINUOUS AMPERES**	**INRUSH AMPERES**
110 - 120	3.0	30
220 - 240	1.5	15
440 - 480	0.75	7.5
550 - 600	0.60	6.0

DC Motor Connection Diagram

WIRING DIAGRAM TYPE "T" MOTOR



ROTATION – FACING COMMUTATOR END

COMPARISON OF IEC AND NEMA LEAD MARKINGS
FOR DIRECT CURRENT MOTORS

A1--A1
A2--B2
S1--D1

S2--D2

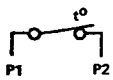
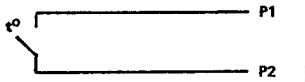
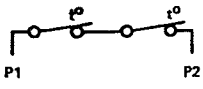
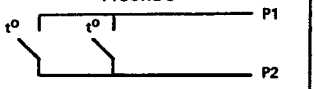
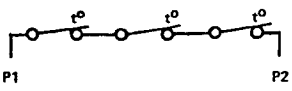
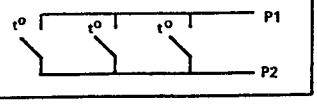
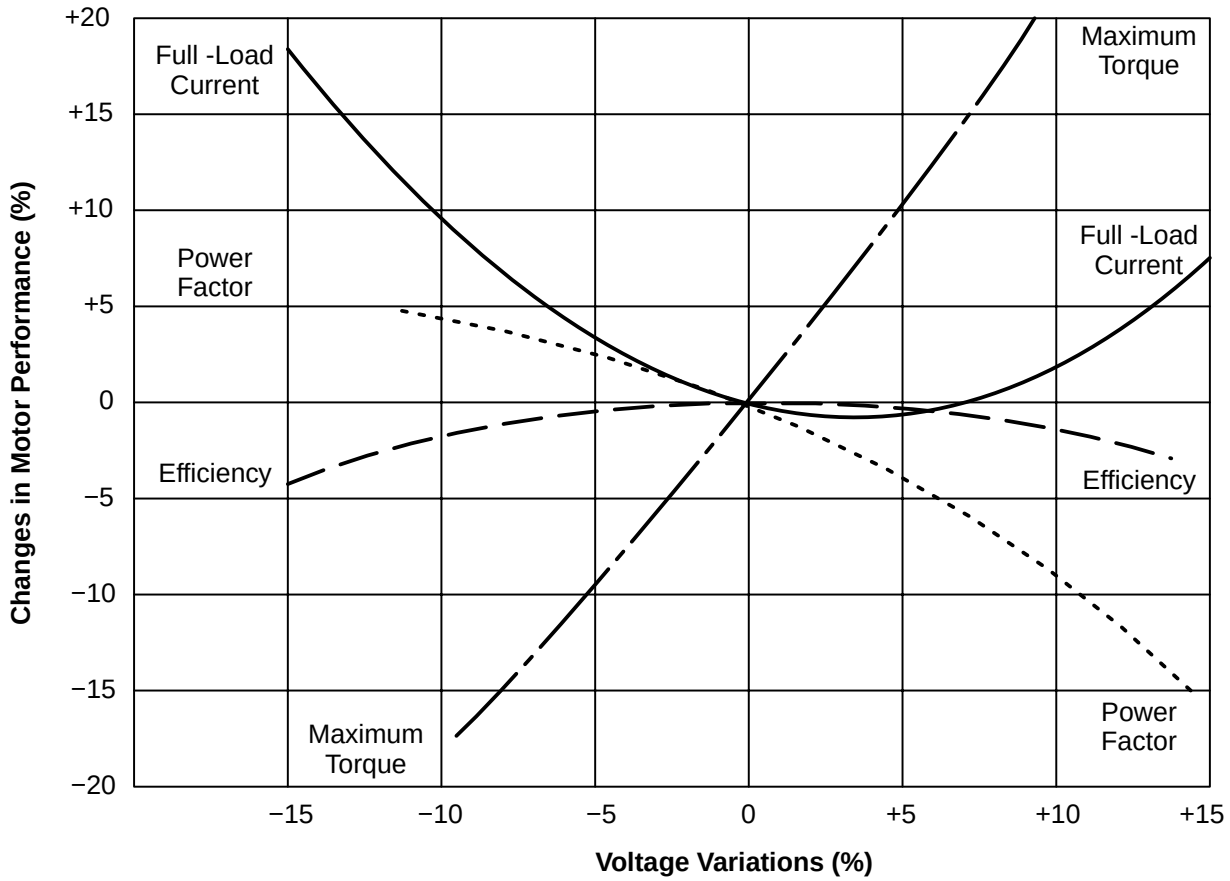
THERMOSTATS	
NORMALLY CLOSED	**NORMALLY OPEN**
FIGURE 1 	**FIGURE 4** 
FIGURE 2 	**FIGURE 5** 
FIGURE 3 	**FIGURE 6** 

Figure 2-3 Typical Motor Performance VS Voltage Variations



Initial Lubrication

Baldor•Reliance motors are shipped from the factory with the bearings properly packed with grease and ready to operate. Where the unit has been subjected to extended storage (6 months or more) the bearings should be relubricated (regreasable type) prior to starting. When motors are equipped for oil mist lubrication refer to the instruction manual for installation, operation, and maintenance of oil mist lubrication systems.

Caution: **Shaker Duty motors must be properly lubricated prior to Start Up to prevent damage. See Section 3.**

First Time Start Up

Be sure that all power to motor and accessories is off. Be sure the motor shaft is disconnected from the load and will not cause mechanical rotation of the motor shaft.

1. Make sure that the mechanical installation is secure. All bolts and nuts are tightened etc.
2. If motor has been in storage or idle for some time, check winding insulation integrity.
3. Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity.
4. Be sure all shipping materials and braces (if used) are removed from motor shaft.
5. Manually rotate the motor shaft to ensure that it rotates freely.
6. Replace all panels and covers that were removed during installation.
7. Momentarily apply power and check the direction of rotation of the motor shaft.
8. If motor rotation is wrong, be sure power is off and change the motor lead connections. Verify rotation direction before you continue.
9. Start the motor and ensure operation is smooth without excessive vibration or noise. If so, run the motor for 1 hour with no load connected.
10. After 1 hour of operation, disconnect power and connect the load to the motor shaft. Verify all coupling guards and protective devices are installed. Ensure motor is properly ventilated.

11. If motor is totally enclosed fan–cooled or non–ventilated it is recommended that condensation drain plugs, if present, be removed. These are located in the lower portion of the end–shields. Totally enclosed fan–cooled “XT” motors are normally equipped with automatic drains which may be left in place as received.

Coupled Start Up

This procedure assumes a coupled start up. Also, that the first time start up procedure was successful.

1. Check the coupling and ensure that all guards and protective devices are installed.
2. Check that the coupling is properly aligned and not binding.
3. The first coupled start up should be with no load. Apply power and verify that the load is not transmitting excessive vibration back to the motor though the coupling or the foundation.
   Vibration should be at an acceptable level.
4. Run for approximately 1 hour with the driven equipment in an unloaded condition.

The equipment can now be loaded and operated within specified limits. Do not exceed the name plate ratings for amperes for steady continuous loads.

Jogging and Repeated Starts

Repeated starts and/or jogs of induction motors generally reduce the life of the motor winding insulation. A much greater amount of heat is produced by each acceleration or jog than by the same motor under full load. If it is necessary to repeatedly start or jog the motor, it is advisable to check the application with your local Baldor distributor or Baldor Service Center.

Heating - Duty rating and maximum ambient temperature are stated on the motor name plate.
Do not exceed these values. If there is any question regarding safe operation, contact your local Baldor distributor or Baldor Service Center.

Hazardous Locations

Hazardous locations are those where there is a risk of ignition or explosion due to the presence of combustible gases, vapors, dust, fibers or flyings.

Selection

Facilities requiring special equipment for hazardous locations are typically classified in accordance with local requirements. In the US market, guidance is provided by the National Electric Code. In international hazardous location areas, guidance for gas / vapor / mist classification is given in IEC60079–14, or for dust in IEC61241–14. This classification process lets the installer know what equipment is suitable for installation in that environment, and identifies what the maximum safe temperature or temperature class is required.
It is the customer or users responsibility to determine the area classification and select proper equipment.

Areas are classified with respect to risk and exposure to the hazard. In the US market, areas are typically classified as follows Class, Division, Group and Temperature Class. In some newer installations in the US and in most international markets, areas are classified in Zones.

Protection Concepts

Class I Division 1 / Zone 1 [Equipment Group I (mining) or II (surface), Equipment Protection Level (EPL) Gb, Mb]

Baldor offers a range of motors suitable for installation in a Division 1 or Zone 1 environment.
These motors are known as explosion proof or flameproof.
Motors that are explosion proof or flameproof use specially machined flameproof joints between the end bell or bracket and the frame, as well as along the rotating shaft and at connection box covers and entries.
The fit of these flameproof joints are designed to contain the combustion or quench the flame of an explosive gas atmosphere prior to it exiting the motor. These flameproof joints have lengths and widths selected and tested based on the gas group present in the atmosphere. Baldor•Reliance motors are typically designed to meet Class I (Division 1) Group C and D (explosion proof) or Ex d IIB (flameproof).

An application note regarding equipment applied in accordance with the US National Electric Code (NFPA 70–2008) – according to Article 500.8(C) Marking, sub clause (2) in the fine print note, it is noted that Equipment not marked to indicate a division is suitable for both Division 1 and Division 2 locations.
These motors are not gas tight. To the contrary, this protection concept assumes that due to the normal heating and cooling cycle of motor operation that any gas present will be drawn into the motor. Since flameproof or explosion proof motors are designed to contain the combustion and extinguish any flame transmission, for this protection concept, only external surface temperatures are of concern. Thermal limiting devices such as thermostats, thermistors or RTDs may be provided on these motors to limit the external surface temperature during overload conditions.

When explosion proof or flameproof motors are provided with intrinsically safe sensors, the integrity of that system relies upon the proper application and selection of barriers and cables as described in the sensor manufacturers control drawing. The control drawing will be shipped with the motor, and it is important that those instructions be provided to the equipment installer.

If thermostats are provided as a condition of certification, it is the installer's responsibility to make sure that these devices are properly connected to a suitable switching device. The ATEX directive requires that motor shutdown on thermal trip be accomplished without an intermediate software command. Where intermediate circuitry is involved the circuit shall fall within the scope of a safety, controlling and regulating device as defined in article 1(2) of European Directive 2014/34/EU, and shall be covered by an appropriate EC Type Examination Certificate.

Flameproof motors, internationally referred to as Ex d use a protection concept similar to that used in Class I Division 1 motors, with minor differences in the flameproof joints and cable entry designs. Flameproof and explosion proof motors are both type tested. Representative motors are connected to a reference gas and ignited in laboratory conditions to verify that the flame is not transmitted outside the motor enclosure and to determine the maximum internal pressure encountered.

Explosion proof and Flame proof motors shipped without a conduit box require use of a certified box of suitable dimensions and that is appropriate for the classification. Openings in connection boxes must be closed with suitably certified and dimensioned device.

Hazardous location motors equipped with NPT pipe nipples are designed and built such that the pipe nipple is securely attached to the motor frame. This is accomplished externally by interference between the threads as well as tack welding. The conduit box is securely attached to the pipe nipple at the factory per:

1. Standard Commercial NPT & Explosion Proof IEC/ATEX parts : L-1 gauging notch +/- 1 thread (ref. ANSI/ASME B1.20.1 and Clarification Sheet ExNB/98/06/010/CS) Note: Clarification Sheet ExNB/98/06/010/CS provides inspection criteria to meet (6 threads minimum per engineering part drawing for ATEX parts).
2. Explosion Proof UL conduit boxes & MSHA parts: L-1 gauging notch "+1 min to + 3 1/2 max threads. Note: Provides inspection criteria to meet (5 threads minimum per engineering part drawing for MSHA parts and meet UL 1203 requirement for L-1 gauging notch flush to + 3 1/2 max threads).

This allows the end user to position the conduit box according to the application then secure when in place. For obvious reasons having the conduit box snug prior to affixing to the pipe nipple is preferable. However, the guidance in numbers 1 and 2 above can be used in determining thread engagement.

Note: In the United States most non-mining applications have rigid conduit for cabling, therefore not tack welding the conduit box to the pipe nipple is standard. In markets outside the United States, flexible conduit/cabling are common and end users should take note to secure the conduit box to the pipe nipple once in position. Further, the flexible leads should be secured to inhibit forces acting on the conduit box.

Class I Division 2 / Zone 2 Ex nA, [Equipment Protection Level (EPL) Gc]

This protection concept relies on having no sources of ignition present such as arcing parts or hot surfaces. For this protection concept, internal temperatures as well as external temperatures are considered. In many cases, the internal temperatures are higher than the external temperatures and therefore become the limiting factor in determination of temperature code designation. In these applications, it is very important to use a motor that has been evaluated thermally for use with an inverter or converter, if variable speed operation is desired. Thermostats used for Class I Division 2 and Ex nA motors are used to protect the motor only. For motors using flying lead construction, it is important to use connection lugs and insulate with heat shrink tubing or a double wrap of insulation grade electrical tape to avoid the risk of spark or ignition.

Class II Division 1 / Zone 21 [Equipment Group III, Equipment Protection Level (EPL) Db]

This area classification is one where the risk of ignitable concentrations of dust is present at all or some of the time. The protection concepts used for Class II Division 1 is similar to flamepath, except with additional dust exclusion paths designed for the rotating shaft. In the international designations, this concept is referred to as dust ignition proof or Ex tD. External surface temperature remains the limiting factor. Thermal limiting devices such as thermostats, thermistors or RTDs may be provided on these motors to limit the external surface temperature during overload conditions. If thermostats are provided as a condition of certification, it is the installer's responsibility to make sure that these devices are properly connected to a suitable switching device.

Note: In the North American area classification system, Class III exists for fibers and flyings.
In the IEC designation, both dusts and flyings are absorbed into Group III.

Class II Division 2 / Zone 22 [Equipment Group III, Equipment Protection Level (EPL) Dc]

This area classification is one where the risk of exposure to ignitable concentrations of dust are not likely to occur under normal operating conditions and relies heavily on the housekeeping practices within the installation.

Sine Wave Power Operation for Division 1 or 2 and Zone 1 or 2 and Zone 21 or 22 Hazardous Location.

These motors are designed to operate at or below the maximum surface temperature (or T–Code) stated on the nameplate. Failure to operate the motor properly can cause this maximum surface temperature to be exceeded. If applied in a Division 1 or 2 / Zone 1 or 2 and Zone 21 or 22 environment, this excessive temperature may cause ignition of hazardous materials. Operating the motor at any of the following conditions can cause the marked surface temperature to be exceeded.

1. Motor load exceeding service factor nameplate value
2. Ambient temperatures above nameplate value
3. Voltages above or below nameplate value
4. Unbalanced voltages
5. Loss of proper ventilation
6. Altitude above 3300 feet / 1000 meters
7. Severe duty cycles of repeated starts
8. Motor stall
9. Motor reversing
10. Single phase operation of polyphase equipment
11. Variable frequency operation

Variable Frequency Power Operation for Division 1 or 2 and Zone 1 or 2 and Zone 21 or 22

Hazardous Location (motors with maximum surface temperature listed on the nameplate).
Only motors with nameplates marked for use on inverter (variable frequency) power, and labeled for specific hazardous areas may be used in those hazardous areas on inverter power. The motor is designed to operate at or below the maximum surface temperature (or T–Code) stated on the nameplate.
Failure to operate the motor properly can cause this maximum surface temperature to be exceeded.

If applied in a Division 1 or 2 / Zone 1 or 2 and Zone 21 or 22 environment, this excessive temperature may cause ignition of hazardous materials. Operating the motor at any of the following conditions can cause the marked surface temperature to be exceeded.

1. Motor load exceeding service factor nameplate value
2. Ambient temperature above nameplate value
3. Voltage (at each operating frequency) above or below rated nameplate value
4. Unbalanced voltages
5. Loss of proper ventilation
6. Operation outside of the nameplate speed / frequency range
7. Altitudes above 3300 feet / 1000 meters
8. Single phase operation of polyphase equipment
9. Unstable current wave forms
10. Lower than name plate minimum carrier frequency

Thermal Limiting
Thermal limiting devices are temperature sensing control components installed inside the motor to limit the internal temperature of the motor frame by interrupting the circuit of the holding coil of the magnetic switch or contactor. They are required for most Division 1 and Zone 1 applications. For Division 2 or Zone 2 applications, motors should be selected that preclude running temperatures from exceeding the ignition temperatures for the designated hazardous material. In Division 2 or Zone 2 classified locations, thermal limiting devices should only be used for winding protection and not considered for limiting all internal motor temperatures to specific ignition temperatures.

Equipotential Bonding and Shaft Current Reduction
Larger motors (ie WP construction) may require proper bonding between motor enclosures and covers to avoid the risk of stray currents during start up. Fastening methods and bonding straps must not be modified. Bearing currents can exist in some motors for both line–fed and inverter–fed applications. Larger line–fed motors may require at least one insulated bearing to prevent a flow of current through the bearings. Do not defeat such insulation whether the motor is line–fed or inverter–fed applications. Inverter–fed motors may require additional bearing insulation or even a shaft brush. Do not defeat such features. When the motor and the coupled load are not on a common conductive baseplate, it may also be necessary to electrically bond together the stationary parts of the motor and the coupled equipment.

Repair of Motors used in Hazardous Locations

Repair of hazardous certified motors requires additional information, skill, and care. It is the customer's responsibility to select service shops with proper qualifications to repair hazardous location motors. Contact the manufacture for additional repair details. Use only original manufacturer's parts.

Repair of Explosion Proof or Flame Proof Motors Class I Division 1 and Zone 1

In the North American market, recertification programs are offered by Underwriters Laboratories and Canadian Standards Association which allow authorized service shops to mark the rebuilt motors as certified. In the international markets using IEC based requirements, repair should be undertaken only after consulting IEC60079–19 Explosive Atmospheres–Part 19 Equipment repair, overhaul and reclamation. If use of a certified repair facility is desired, consult the IECEX Repair Scheme at http://www.iecex.com/service_facilities.htm

Explosion proof and flameproof motors achieve their safety based on the mechanical construction – flameproof joints and bearing clearance, and the electrical design including any thermal limiting devices. If it is necessary to repair a flameproof or explosion proof motor, it is critical that the mechanical flameproof joints be maintained. Consult Baldor Electric Company for flameproof joint construction details.
Use only Baldor•Reliance supplied parts. Baldor does not recommend reclamation of parts.
Since this protection method also relies on temperature being maintained, make sure that any rewinding uses the original electrical designs, including any thermal protection that may be present.

Repair of Dust Ignition Proof Motors – Class II Division 1 and 2, Zone 21 and 22.

For Dust Ignition Proof, proper sealing is required. Do not modify the motor construction to add any additional opening, and ensure that proper sealing is maintained in the connection box and at the shaft seal. Since this protection method also relies on temperature being maintained, make sure that any rewinding uses the original electrical designs, including any thermal protection that may be present

Repair of Class I Division 2 and Zone 2 motors

For Division 2 and Zone 2, the internal and external temperatures are of concern. Since this protection method also relies on temperature being maintained, make sure that any rewinding uses the original electrical designs, including any thermal protection that may be present. Use only Baldor replacement thermostats, if provided.

Section 3

Maintenance & Troubleshooting

WARNING: UL and EX Listed motors must only be serviced by UL or EX Approved Authorized Baldor Service Centers if these motors are to be returned to a hazardous and/or explosive atmosphere.

General Inspection

Inspect the motor at regular intervals, approximately every 500 hours of operation or every 3 months, whichever occurs first. Keep the motor clean and the ventilation openings clear. The following steps should be performed at each inspection:

WARNING: Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

1. Check that the motor is clean. Check that the interior and exterior of the motor is free of dirt, oil, grease, water, etc. Oily vapor, paper pulp, textile lint, etc. can accumulate and block motor ventilation. If the motor is not properly ventilated, overheating can occur and cause early motor failure.
2. Perform a dielectric with stand test periodically to ensure that the integrity of the winding insulation has been maintained. Record the readings. Immediately investigate any significant decrease in insulation resistance.
3. Check all electrical connectors to be sure that they are tight.

Relubrication & Bearings

Bearing grease will lose its lubricating ability over time, not suddenly. The lubricating ability of a grease (over time) depends primarily on the type of grease, the size of the bearing, the speed at which the bearing operates and the severity of the operating conditions. Good results can be obtained if the following recommendations are used in your maintenance program.

Type of Grease A high grade ball or roller bearing grease should be used. Baldor motors are pregreased, normally with Polyrex EM (Exxon Mobil) or as stated on the nameplate.
Do not mix greases unless compatibility has been checked and verified.

Ball Bearing Motors

Operating Temperature –25 ºC (–15 ºF) to 50 ºC (120 ºF)

EXXON	POLYREX EM (Standard on Baldor motors)
EXXON	UNIREX N2
EXXON	BEACON 325
CHEVRON OIL	SRI NO. 2 (Compatible with Polyrex EM)
CHEVRON OIL	BLACK PEARL
TEXACO, INC.	PREMIUM RB
TEXACO, INC.	POLYSTAR
AMOCO	RYKON # 2
PENNZOIL	PENNZLUBE EM–2
DARMEX	DARMEX 707
DARMEX	DARMEX 711
PETRO–CANADA	PEERLESS LLG
SHELL OIL	DOLIUM BRB

Minimum Starting Temperature –60 ºC (–76 ºF)

SHELL OIL CO.	AEROSHELL 7 (Standard on Baldor motors)
MOBIL	MOBIL 28
MOBIL	MOBILITH SHC 100 (Low Temperature – Arctic Duty)

Roller Bearing Motors

Operating Temperature –25 ºC (–15 ºF) to 50 ºC (120 ºF)

TEXACO, INC.	PREMIUM RB
MOBIL	MOBILITH SHC 220 (Standard on Baldor motors)
CHEVRON OIL	BLACK PEARL

Relubrication Intervals

Recommended relubrication intervals are shown in Table 3-1. It is important to realize that the recommended intervals of Table 3-2 are based on average use.

Refer to additional information contained in Tables 3-2, 3-3 and 3-4.

Table 3-1 Relubrication Intervals *

NEMA / (IEC) Frame Size	Rated Speed - RPM					
	10000	**6000**	**3600**	**1800**	**1200**	**900**
Up to 210 incl. (132)	**	2700 Hrs.	5500 Hrs.	12000 Hrs.	18000 Hrs.	22000 Hrs.
Over 210 to 280 incl. (180)		**	3600 Hrs.	9500 Hrs.	15000 Hrs.	18000 Hrs.
Over 280 to 360 incl. (225)		**	* 2200 Hrs.	7400 Hrs.	12000 Hrs.	15000 Hrs.
Over 360 to 449 incl. (315)		**	*2200 Hrs.	3500 Hrs.	7400 Hrs.	10500 Hrs.

* Relubrication intervals are for ball bearings.
For vertically mounted motors and roller bearings, divide the relubrication interval by 2.

** For motors operating at speeds greater than 3600 RPM, contact Baldor for relubrication recommendations.

Table 3-2 Service Conditions

Severity of Service	Hours per day of Operation	Ambient Temperature Maximum	Atmospheric Contamination
Standard	8	40 ºC	Clean, Little Corrosion
Severe	16 Plus	50 ºC	Moderate dirt, Corrosion
Extreme	16 Plus	>50 ºC* or Class H Insulation	Severe dirt, Abrasive dust, Corrosion, Heavy Shock or Vibration
Low Temperature		<–29 ºC **	

* Special high temperature grease is recommended (Dow Corning DC44). Note that Dow Corning DC44 grease does not mix with other grease types. Thoroughly clean bearing & cavity before adding grease.

** Special low temperature grease is recommended (Aeroshell 7).

Table 3-3 Relubrication Interval Multiplier

Severity of Service	Multiplier
Standard	1.0
Severe	0.5
Extreme	0.1
Low Temperature	1.0

Some motor designs use different bearings on each motor end. This is normally indicated on the motor nameplate. In this case, the larger bearing is installed on the motor Drive endplate. For best relubrication results, only use the appropriate amount of grease for each bearing size (not the same for both).

Table 3-4 Bearings Sizes and Types

Frame Size NEMA (IEC)	Bearing Description (These are the "Large" bearings (Shaft End) in each frame size)			
	Bearing	Weight of Grease to add * oz (Grams)	Volume of grease to be added	
			in^3	teaspoon
56 to 140 (90)	6203	0.08 (2.4)	0.15	0.5
140 (90)	6205	0.15 (3.9)	0.2	0.8
180 (100–112)	6206	0.19 (5.0)	0.3	1.0
210 (132)	6307	0.30 (8.4)	0.6	2.0
250 (160)	6309	0.47 (12.5)	0.7	2.5
280 (180)	6311	0.61 (17)	1.2	3.9
320 (200)	6312	0.76 (20.1)	1.2	4.0
360 (225)	6313	0.81 (23)	1.5	5.2
400 (250)	6316	1.25 (33)	2.0	6.6
440 (280)	6318	1.52(40)	2.5	8.2
440 (280)	6319	2.12 (60)	4.1	13.4
5000 to 5800 (315–355)	6328	4.70 (130)	9.2	30.0
5000 to 5800 (315–355)	NU328	4.70 (130)	9.2	30.0
360 to 449 (225–280)	NU319	2.12 (60)	4.1	13.4
AC Induction Servo				
76 Frame 180 (112)	6207	0.22 (6.1)	0.44	1.4
77 Frame 210 (132)	6210	0.32 (9.0)	0.64	2.1
80 Frame 250(160)	6213	0.49 (14.0)	0.99	3.3

* Weight in grams = .005 DB of grease to be added

Note: Not all bearing sizes are listed. For intermediate bearing sizes, use the grease volume for the next larger size bearing.

Caution: **To avoid damage to motor bearings, grease must be kept free of dirt. For an extremely dirty environment, contact your Baldor distributor or an authorized Baldor Service Center for additional information.**

Relubrication Procedure Be sure that the grease you are adding to the motor is compatible with the grease already in the motor. Consult your Baldor distributor or an authorized service center if a grease other than the recommended type is to be used.

Caution: **Do not over–lubricate motor as this may cause premature bearing failure.**

With Grease Outlet Plug

1. With the motor stopped, clean all grease fittings with a clean cloth.
2. Remove grease outlet plug.

Caution: **Over–lubricating can cause excessive bearing temperatures, premature lubrication breakdown and bearing failure.**

3. Add the recommended amount of grease.
4. Operate the motor for 15 minutes with grease plug removed. This allows excess grease to purge.
5. Re-install grease outlet plug.

Without Grease Provisions

Note: Only a Baldor authorized and UL or CSA certified service center can disassemble a UL/CSA listed explosion proof motor to maintain it's UL/CSA listing.

1. Disassemble the motor.
2. Add recommended amount of grease to bearing and bearing cavity. (Bearing should be about 1/3 full of grease and outboard bearing cavity should be about 1/2 full of grease.)
3. Assemble the motor.

Sample Relubrication Determination

Assume - NEMA 286T (IEC 180), 1750 RPM motor driving an exhaust fan in an ambient temperature of 43 °C and the atmosphere is moderately corrosive.

1. Table 3-2 list 9500 hours for standard conditions.
2. Table 3-3 classifies severity of service as "Severe".
3. Table 3-5 shows that 1.2 in^3 or 3.9 teaspoon of grease is to be added.

Note: Smaller bearings in size category may require reduced amounts of grease.

Shaker Duty Motors only

Caution: **Shaker Duty motors must be properly lubricated prior to Start Up to prevent damage. See Table 3-6.**

Lubrication should be performed before Start Up and at regular maintenance intervals. Follow these recommendations to ensure proper lubrication.

Recommended Lubricant

For ambient temperatures between –15 °F to 120 °F the following lubricants are recommended: Mobil PolyrexEM, Texaco Premium RB, Exxon Unirex N–2.

Do not mix greases unless compatibility has been checked and verified.

Table 3-5 Lubrication Volume

NEMA Frame Size	Volume in Cubic Inches					
	Normal Duty		Severe Duty		Extreme Duty	
	Start Up	Relub	Start Up	Relub	Start Up	Relub
184TY	1.4	0.5	1.4	0.5	2.7	0.5
215TY	1.6	0.5	1.6	0.5	4.5	1
256TY	7	1			11	2
286TY	9	1			15	3

Lubrication Frequency

Normal Duty 8 hours per day (16 hours per day in a clean environment). Lubricate every 2 months.

Severe Duty 16 hours per day or more in a dirty environment (corrosive atmosphere, chemical fumes, acids, alkalies or extreme high humidity). Lubricate every month or 700 hours of operation.

Extreme Duty operation in extremely dirty or dusty environments and high ambient temperatures exceeding 104 °F (40 °C). Lubricate twice a month or 350 hours of operation.

Lubrication Procedure

1. Locate the grease inlet and outlet. Clean the areas.
2. Remove the plug(s) and install a grease fitting in the inlet if grease fitting is not already installed.
3. Add the recommended amount of lubricant.
4. Run the motor for two hours with the outlet plug removed.
5. Install outlet plug.

Note: To loosen hardened grease it may be necessary to insert a rod or wire into the grease inlet and outlet holes.

Table 3-6 Troubleshooting Chart

Symptom	Possible Causes	Possible Solutions
Motor will not start	Usually caused by line trouble, such as, single phasing at the starter.	Check source of power. Check overloads, fuses, controls, etc.
Excessive humming	High Voltage. Eccentric air gap.	Check input line connections. Have motor serviced at local Baldor service center.
Motor Over Heating	Overload. Compare actual amps (measured) with nameplate rating.	Locate and remove source of excessive friction in motor or load. Reduce load or replace with motor of greater capacity.
	Single Phasing.	Check current at all phases (should be approximately equal) to isolate and correct the problem.
	Improper ventilation.	Check external cooling fan to be sure air is moving properly across cooling fins. Excessive dirt build-up on motor. Clean motor.
	Unbalanced voltage.	Check voltage at all phases (should be approximately equal) to isolate and correct the problem.
	Rotor rubbing on stator.	Check air gap clearance and bearings. Tighten “Thru Bolts”.
	Over voltage or under voltage.	Check input voltage at each phase to motor.
	Open stator winding.	Check stator resistance at all three phases for balance.
	Grounded winding.	Perform dielectric test and repair as required.
	Improper connections.	Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity. Refer to motor lead connection diagram.
Bearing Over Heating	Misalignment.	Check and align motor and driven equipment.
	Excessive belt tension.	Reduce belt tension to proper point for load.
	Excessive end thrust.	Reduce the end thrust from driven machine.
	Excessive grease in bearing.	Remove grease until cavity is approximately 3/4 filled.
	Insufficient grease in bearing.	Add grease until cavity is approximately 3/4 filled.
	Dirt in bearing.	Clean bearing cavity and bearing. Repack with correct grease until cavity is approximately 3/4 filled.
Vibration	Misalignment.	Check and align motor and driven equipment.
	Rubbing between rotating parts and stationary parts.	Isolate and eliminate cause of rubbing.
	Rotor out of balance.	Have rotor balance checked are repaired at your Baldor Service Center.
	Resonance.	Tune system or contact your Baldor Service Center for assistance.
Noise	Foreign material in air gap or ventilation openings.	Remove rotor and foreign material. Reinstall rotor. Check insulation integrity. Clean ventilation openings.
Growling or whining	Bad bearing.	Replace bearing. Clean all grease from cavity and new bearing. Repack with correct grease until cavity is approximately 3/4 filled.

Suggested bearing and winding RTD setting guidelines for Non–Hazardous Locations ONLY

Most large frame AC Baldor motors with a 1.15 service factor are designed to operate below a Class B (80 ºC) temperature rise at rated load and are built with a Class H winding insulation system. Based on this low temperature rise, RTD (Resistance Temperature Detectors) settings for Class B rise should be used as a starting point. Some motors with 1.0 service factor have Class F temperature rise.

The following tables show the suggested alarm and trip settings for RTDs. Proper bearing and winding RTD alarm and trip settings should be selected based on these tables unless otherwise specified for specific applications.

If the driven load is found to operate well below the initial temperature settings under normal conditions, the alarm and trip settings may be reduced so that an abnormal machine load will be identified.

The temperature limits are based on the installation of the winding RTDs imbedded in the winding as specified by NEMA. Bearing RTDs should be installed so they are in contact with the outer race on ball or roller bearings or in direct contact with the sleeve bearing shell.

Table 3-7 Winding RTDs – Temperature Limit In ºC (40 ºC Maximum Ambient)

Motor Load (Typical Design)	Class B Temp Rise ≤ 80 ºC		Class F Temp Rise ≤ 105 ºC		Class H Temp Rise ≤ 125 ºC	
	Alarm	Trip	Alarm	Trip	Alarm	Trip
≤ Rated Load	130	140	155	165	175	185
Rated Load to 1.15 S.F.	140	150	160	165	180	185

Note: • Winding RTDs are factory production installed, not from Mod–Express.

When Class H temperatures are used, consider bearing temperatures and relubrication requirements.

Table 3-8 Bearing RTDs – Temperature Limit In oC (40 ºC Maximum Ambient)

Bearing Type Oil or Grease	Anti–Friction		Sleeve	
	Alarm	Trip	Alarm	Trip
Standard*	95	100	85	95
High Temperature**	110	115	105	110

Notes: * Bearing temperature limits are for standard design motors operating at Class B temperature rise.

** High temperature lubricants include some special synthetic oils and greases.

Greases that may be substituted that are compatible with Polyrex EM (but considered as “standard” lubricants include the following:

– Texaco Polystar – Rykon Premium #2 – Chevron SRI #2

– Mobilith SHC–100 – Pennzoil Pennzlube EM–2 – Chevron Black Pearl

– Darmex 707 – Darmex 711 – Petro–Canada Peerless LLG

See the motor nameplate for replacement grease or oil recommendation.

Contact Baldor application engineering for special lubricants or further clarifications.

Notes

Notes

Section 4

Appendix - IEC 60079 Series

INFORMATION REQUIRED PER IEC 60079-0:2017 Ed7

All *italicized* information below is quoted from the standard, clause 30.

Clause 30 (instructions) – Instructions are provided with each motor, the most recent version of this manual can be download at baldor.com.

Instructions for purposes of this standard consists of the following that are shipped with your motor in the literature package:

- Instruction Manual MN408
- Ex Certificates applicable for your motor
- Nameplate marking photos for your motor

Clause 30.1 (general)

The instructions prepared by the manufacturer shall include the following particulars as a minimum.

Marking

A recapitulation of the information with which the equipment is marked, except for the serial number (see Clause 29), together with any appropriate additional information to facilitate maintenance (for example, address of the importer, repairer, etc.)

A copy of the nameplates is included in the literature package and is shipped with each motor. These instructions are used for a range of mining motors. An example of typical certification marking is shown in Section 1. For motor specific information, please refer to the certification nameplate photos, electrical rating information and any specific conditions conveyed in the motor marking such as but not limited to ambient range, water flow, converter set up parameters and refer to the data package shipped with the product.

on-site assembling:

Not typically required.

installation and erection:

iii) guidance for the selection of flameproof entry devices for termination compartments with reference pressure greater than ...1 333 kPa for Group I and 2 000 kPa for Group II .

The reference pressure encountered in this Group I range of motors is below 1 333 kPa and is below 2 000 kPA for the Group II range of motors.

adjustment and parameter setting

If operated on a converter, refer to nameplate marking for set-up parameters.

putting into service - of the equipment / of the whole installation:

i) information about verifications / tests prior to (first) use

Refer to Section 2, Installation and Operation

ii) detailed information about any special installation requirements for the Type of Protection(s) employed

For flanged joints, inspect with feeler gauge 0,40mm maximum

Use and setting-up;

Ratings such as electrical values, ambient temperatures and pressures, maximum surface temperatures and other limit values related to a designated use are included on the product nameplate photos and in the product data package..

- ***maintenance;***

ii) Information such as cleaning, oil level check or recalibration requirements;

Information on bearing inspection is in the Maintenance Section 3

iii) Requirements for the maintenance of the explosion protection.

Flameproof joints should be inspected during repair and overhaul contact manufacturer for schedule drawings if needed for repair.

- repair

i) Repair should be conducted in accordance with the requirements given in IEC 60079-19

Refer to Repair of Motors used in Hazardous Locations

Information related to the fitting or removal of parts / components; As each motor design is unique, it is necessary to Contact the manufacture for additional repair details. Use only original manufacturer's parts.

ii) information related to the fitting or removal of parts / components

Contact ABB regarding any spare parts.

iii) Information about spare parts

Contact ABB regarding any spare parts.

iv) Requirements for a documentation of such repairs.

As any repair is undertaken after consultation with IEC60079-19, the documentation requirements for the repair in this standard apply.

- taking out of service and dismantling

i) Use appropriate lock out tag out procedures to prevent restart and prior to making or breaking any electrical connection.

- ***where applicable, Specific Conditions of Use according to 29.3 e)***

As Specific Conditions of Use may vary with each certificate, if Specific Conditions are applied, the certificate is shipped with each motor forming part of the Instructions. Refer to Marking and Acceptance section for an explanation of the "X" suffix to certificate numbers.

Clause 30.3 (electrical machines)

In addition to the information required according to 30.1, the following additional information shall be prepared for electrical machines, as applicable:

machines intended to be supplied by a converter

For speed torque information on motors intended to be supplied by converter, consult motor nameplate.

bearing lubrication requirements for both commissioning and maintaining;

Instructions for lubrication are included in the Bearing Maintenance Section. Only use ABB recommended grease or contact ABB Motors and Mechanical Inc., product support team for guidance on equivalents suitable for hazardous locations.

the permitted axial and radial loading of the shaft;

Table 4-1 Table to Address Permissible Radial and Axial Shaft Loads

AC Motors		
Frame Size	Permissible Radial Shaft Load (kN)*	Permissible Axial Shaft Thrust (kN)*
150	0.60	0.67
188	0.70	0.67
210	0.80	0.67
X215TCZ	0.90	0.67
240	0.95	0.67
XRL25OAY	4.30	1.60
XRL25OAY	3.80	1.50
XRL25OAY	11.60	15.00
250	1.00	0.67
0280	1.00	1.00
X286TCZ	1.40	1.00
320	1.60	1.00
X326TCZ	1.70	1.00
350	1.90	1.00
360	2.00	1.00
400	4.50	1.00
440	4.50	3.00
470	4.80	3.00
500	5.00	3.00
580	7.50	4.00
Furnace Fan Ex ec Motors		
Frame Size	Permissible Radial Shaft Load (kN)*	Permissible Axial Shaft Thrust (kN)*
326TY	5.9	2.2
Medium AC Ex d Motors (at 1800 RPM L10 of 100,000 hours)		
Frame Size	Permissible Radial Shaft Load (kN)*	Permissible Axial Shaft Thrust (kN)*
180	.5	--
210	.7	--
250	1.6	--
280	1.8	--
320	2.0	--
360	2.6	--
400	3.3	--
440	2.8	--

DC Motors		
Frame Size	Permissible Radial Shaft Load (kN)*	Permissible Axial Shaft Thrust (kN)*
41-6,9	2.00	1.00
48-9,12	2.00	1.00
51-7,11,15	2.00	1.60
51-9	2.00	1.60

*Permissible shaft loads are for specified frame size mounted horizontally and are calculated for an extended service life of 17,500 operating hours of bearing according to DIN ISO 281. Consult engineering for application specific solutions that require larger permissible shaft loads than those provided in this table. This table assumes pure radial loading for permissible radial shaft loads and pure axial loading for permissible axial shaft thrust.

- ***the thermal expansion of the shaft and housing under rated conditions***

  Maintain minimum clearances necessary to accommodate thermal growth of up to 3mm of the frame and up to 5mm (8mm for Furnace Fan Motor Designs) of the shaft during design operating conditions. Consult engineering for application specific solutions where these minimum clearances are not permissible.

- ***any necessary maintenance of the protection provided by the manufacturer against stray circulating currents in the bearings or shafts.***

  Ensure that the motor is properly earthed and bonded. For motors operated by converter, consult converter manufacturers instructions relative to cable recommendations.

- ***any necessary protection of the bearings from vibration, including during transportation, storage, or standby service;***
  Protection of bearings from vibration during storage and transportation are addressed in General. Bearings requiring blocking are blocked during shipment.

- ***guidance on maintenance and replacement intervals for bearings based on the operating conditions.***

  Instructions for lubrication are included in the Bearing Maintenance Section

INFORMATION REQUIRED PER IEC 60079-1:2014

If it is necessary to repair a flameproof or explosion proof motor, it is critical that the mechanical flameproof joints be maintained. Consult ABB Motors and Mechanical Inc., product support team for flameproof joint construction details. Use only Baldor/Reliance supplied parts. ABB does not recommend reclamation of Baldor/Reliance parts.

ABB Motors and Mechanical Inc.
5711 R.S. Boreham, Jr. Street
Fort Smith, AR 72901
Ph: 1.479.646.4711

new.abb.com/motors-generators

Additional information
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MN408 0419

MN408 April 2019

7.13 IOM for Flow transmitter

Reference manual
00809-0100-4444, Rev AH
June 2024

Rosemount™ 8732EM Transmitter with HART Protocol Reference Manual



ROSEMOUNT™

EMERSON™

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1 Hazard messages

This document uses the following criteria for hazard messages based on ANSI standards Z535.6-2011 (R2017).

⚠ DANGER

Serious injury or death will occur if a hazardous situation is not avoided.

⚠ WARNING

Serious injury or death could occur if a hazardous situation is not avoided.

⚠ CAUTION

Minor or moderate injury will or could occur if a hazardous situation is not avoided.

NOTICE

Data loss, property damage, hardware damage, or software damage can occur if a situation is not avoided. There is no credible risk of physical injury.

Physical access

⚠ WARNING

Unauthorized personnel can potentially cause significant damage and/or misconfiguration of end users' equipment. Protect against all intentional or unintentional unauthorized use.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access to protect users' assets. This is true for all systems used within the facility.

1.1 Safety messages

⚠ WARNING

General hazards

Failure to follow these instructions could result in death or serious injury.

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product.

Installation and servicing instructions are for use by qualified personnel only. Do not perform any servicing other than that contained in the operating instructions, unless qualified.

Verify the installation is completed safely and is consistent with the operating environment.

Do not substitute factory components with non-factory components. Substitution of components may impair Intrinsic Safety.

Do not perform any services other than those contained in this manual.

Process leaks may result in death or serious injury.

Mishandling products exposed to a hazardous substance may result in death or serious injury.

The electrode compartment may contain line pressure; it must be depressurized before the cover is removed.

If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Safety Data Sheet (SDS) for each hazardous substance identified must be included with the returned goods.

The products described in this document are NOT designed for nuclear-qualified applications. Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings. For information on Emerson nuclear-qualified products, contact your local sales representative.

⚠ WARNING

Explosion hazards

Failure to follow these instructions could cause an explosion, resulting in death or serious injury.

If installed in explosive atmospheres (hazardous areas, classified areas, or an “Ex” environment), it must be assured that the device certification and installation techniques are suitable for that particular environment.

Do not remove transmitter covers in explosive atmospheres when the circuit is live. Both transmitter covers must be fully engaged to meet explosion-proof requirements.

Do not disconnect equipment when a flammable or combustible atmosphere is present.

Before connecting a HART-based communicator in an explosive atmosphere, make sure the instruments in the loop are installed in accordance with intrinsically safe or nonincendive field wiring practices.

Do not connect a Rosemount transmitter to a non-Rosemount sensor that is located in an explosive atmosphere. The transmitter has not been evaluated for use with other manufacturers' magnetic flowmeter sensors in hazardous (Ex or Classified) areas. Special care should be taken by the end-user and installer to ensure the transmitter meets the safety and performance requirements of the other manufacturer’s equipment.

Follow national, local, and plant standards to properly earth ground the transmitter and sensor. The earth ground must be separate from the process reference ground.

Flow meters ordered with non-standard paint options or non-metallic labels may be subject to electrostatic discharge. To avoid electrostatic charge build-up, do not rub the flow meter with a dry cloth or clean with solvents.

⚠ WARNING

Electrical hazards

Failure to follow these instructions could cause damaging and unsafe discharge of electricity, resulting in death or serious injury.

Follow national, local, and plant standards to properly earth ground the transmitter and sensor. The earth ground must be separate from the process reference ground.

Disconnect power before servicing circuits.

Allow ten minutes for charge to dissipate prior to removing electronics compartment cover. The electronics may store energy in this period immediately after power is removed.

Avoid contact with leads and terminals. High voltage that may be present on leads could cause electrical shock.

Flow meters ordered with non-standard paint options or non-metallic labels may be subject to electrostatic discharge. To avoid electrostatic charge build-up, do not rub the flow meter with a dry cloth or clean with solvents.

NOTICE

Damage hazards

Failure to follow these instructions could result in damage or destruction of equipment.

The sensor liner is vulnerable to handling damage. Never place anything through the sensor for the purpose of lifting or gaining leverage. Liner damage may render the sensor inoperable.

Metallic or spiral-wound gaskets should not be used as they will damage the liner face of the sensor. If spiral wound or metallic gaskets are required for the application, lining protectors must be used. If frequent removal is anticipated, take precautions to protect the liner ends. Short spool pieces attached to the sensor ends are often used for protection.

Correct flange bolt tightening is crucial for proper sensor operation and life. All bolts must be tightened in the proper sequence to the stated torque specifications. Failure to observe these instructions could result in severe damage to the sensor lining and possible sensor replacement.

In cases where high voltage/high current are present near the meter installation, ensure proper protection methods are followed to prevent stray electricity from passing through the meter. Failure to adequately protect the meter could result in damage to the transmitter and lead to meter failure.

Completely remove all electrical connections from both sensor and transmitter prior to welding on the pipe. For maximum protection of the sensor, consider removing it from the pipeline.

Do not connect mains or line power to the magnetic flow tube sensor or to the transmitter coil excitation circuit.

2 Introduction

2.1 System description

The flowmeter consists of a sensor and a transmitter. The sensor is installed in-line with the process piping; the transmitter can be integrally mounted to the sensor or remotely mounted away from the sensor.

Figure 2-1: Integral field mount transmitter



Figure 2-2: Remote field mount transmitter



There are three Rosemount flow sensors available.

Figure 2-3: 8705 Flanged sensor



Figure 2-4: 8711 Wafer sensor

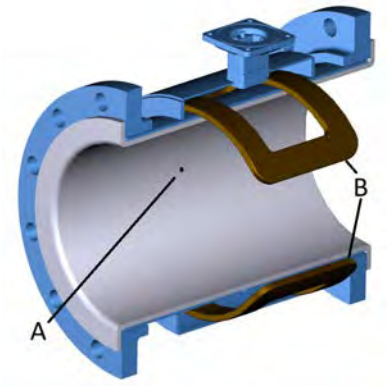


Figure 2-5: 8721 Hygienic sensor



The flow sensor contains two magnetic coils located on opposite sides of the sensor. Two electrodes, located perpendicular to the coils and opposite each other, make contact with the liquid. The transmitter energizes the coils and creates a magnetic field. A conductive liquid moving through the magnetic field generates an induced voltage at the electrodes. This voltage is proportional to the flow velocity. The transmitter converts the voltage detected by the electrodes into a flow reading. A cross-sectional view is show in Figure 2-6.

Figure 2-6: (8705) Sensor cross section



A. Electrode
B. Coils

2.2 Product recycling/disposal

Recycling of equipment and packaging should be taken into consideration and disposed of in accordance with local and national legislation/regulations.

3 Sensor Installation

This chapter provides instructions for handling and installing the flow sensor with or without an integrally mounted transmitter.

Related information

Remote Transmitter Installation

3.1 Handling and Lifting Safety

⚠ CAUTION

To reduce the risk of personal injury or damage to equipment, follow all lifting and handling instructions.

- Handle all parts carefully to prevent damage. Whenever possible, transport the system to the installation site in the original shipping container.
- PTFE-lined sensors are shipped with end covers that protect flange sealing surfaces from both mechanical damage and normal unrestrained distortion. Remove the end covers just before installation.
- Keep the shipping plugs in the conduit ports until you are ready to connect and seal them. Appropriate care should be taken to prevent water ingress.
- The sensor should be supported by the pipeline. Pipe supports are recommended on both the inlet and outlet sides of the sensor pipeline. There should be no additional support attached to the sensor.
- Use proper PPE (Personal Protection Equipment) including safety glasses and safety shoes.
- Do not lift the meter by holding the electronics housing or junction box.
- The sensor liner is vulnerable to handling damage. Never place anything through the sensor for the purpose of lifting or gaining leverage. Liner damage can render the sensor useless.
- Do not drop the device from any height.

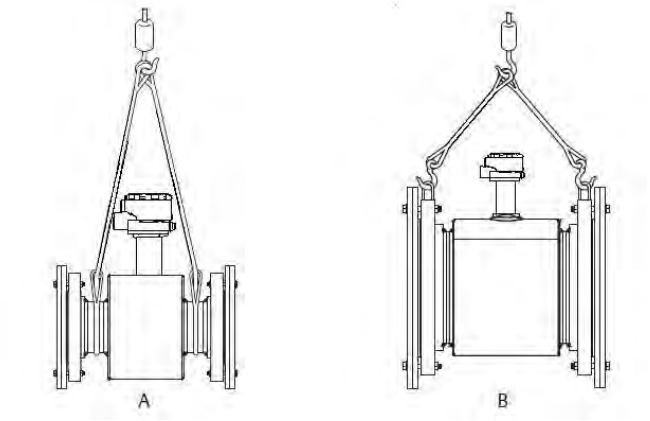
3.1.1 Lifting lugs

⚠ CAUTION

If provided, use the lifting lugs on each flange to handle the flow meter when it is transported and lowered into place at the installation site. If lifting lugs are not provided, the flow meter must be supported with a lifting sling on each side of the housing.

- Standard pressure 3 inch through 36 inch flanged magnetic flow meters come with lifting lugs.
- High pressure (above 600#) 1 inch through 24 inch flanged magnetic flow meters come with lifting lugs.
- Wafers and sanitary magnetic flow meters do not come with lifting lugs.

Figure 3-1: Example lifting without and with lifting lugs



A. Without lifting lugs
B. With lifting lugs

3.2 Location and Position

3.2.1 Environmental considerations

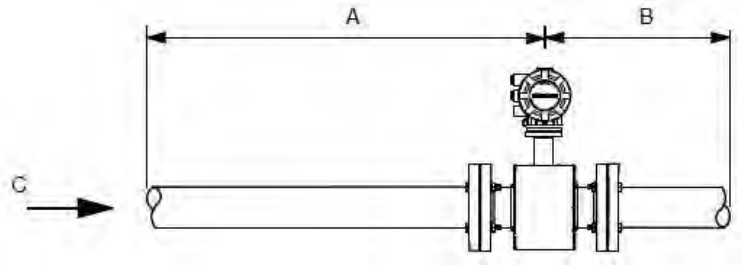
To ensure maximum transmitter life, avoid extreme temperatures and excessive vibration. Typical problem areas include the following:

- High-vibration lines with integrally mounted transmitters
- Tropical/desert installations in direct sunlight
- Outdoor installations in arctic climates

3.2.2 Upstream and downstream piping

To ensure specified accuracy over widely varying process conditions, it is recommended to install the sensor with a minimum of five straight pipe diameters upstream and two pipe diameters downstream from the electrode plane.

Figure 3-2: Upstream and downstream straight pipe diameters



A. Five pipe diameters (upstream)
B. Two pipe diameters (downstream)
C. Flow direction

Installations with reduced upstream and downstream straight runs are possible. In reduced straight run installations, the meter may not meet accuracy specifications. Reported flow rates will still be highly repeatable.

3.2.3 Flow direction

The sensor should be mounted so that the arrow points in the direction of flow.

Figure 3-3: Flow direction arrow

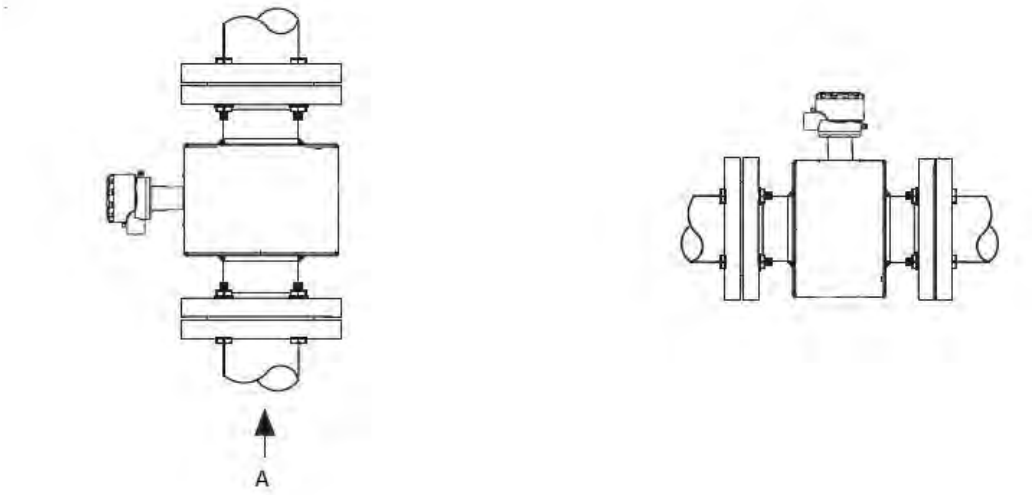


3.2.4 Sensor piping location and orientation

The sensor should be installed in a location that ensures it remains full during operation. Depending on where it is installed, orientation must also be considered.

- Vertical installation with upward process fluid flow keeps the cross-sectional area full, regardless of flow rate.
- Horizontal installation should be restricted to low piping sections that are normally full.

Figure 3-4: Sensor orientation



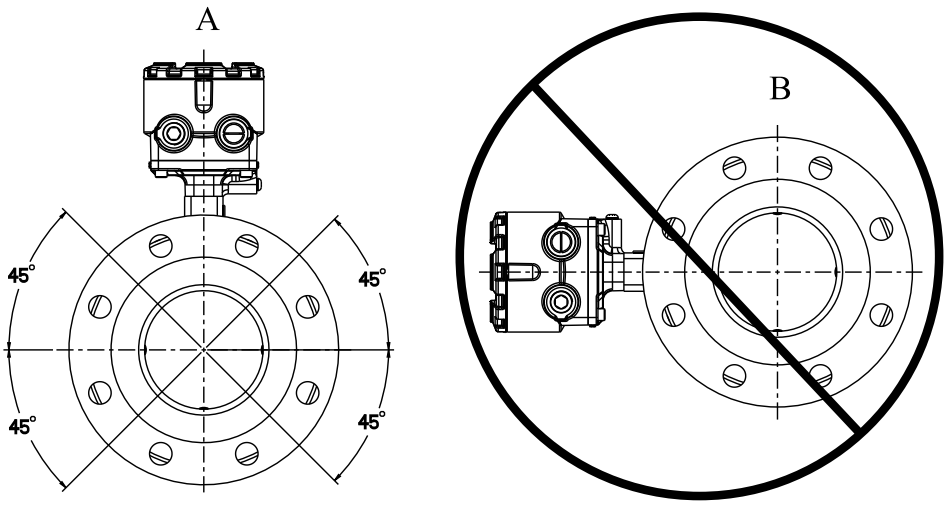
A. Flow direction

3.2.5 Transmitter or remote junction box rotation

To rotate housing, disconnect the interconnecting cables from the electronics board inside the transmitter housing prior to rotation.

3.2.6 Electrode orientation

The electrodes in the sensor are properly oriented when the two measurement electrodes are in the 3 and 9 o'clock positions or within 45 degrees from the horizontal, as shown on the left side of Figure 3-5. Avoid any mounting orientation that positions the top of the sensor at 90 degrees from the vertical position as shown on the right of Figure 3-5.



A. Correct orientation
B. Incorrect orientation

The sensor may require a specific orientation to comply with Hazardous Area T-code rating. Refer to the appropriate reference manual for any potential restrictions.

3.3 Sensor Installation

3.3.1 Flanged sensors

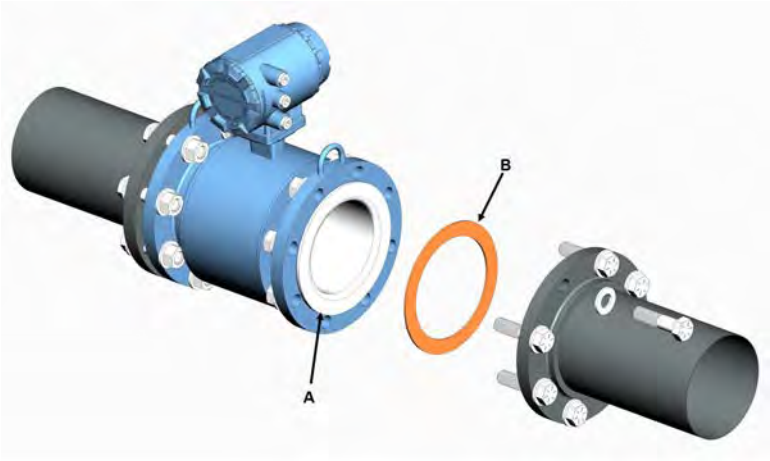
Gaskets

- It is the responsibility of the customer to provide an appropriate gasket for their installation.
- The gasket material must be compatible with the process fluid and process conditions. See note below for more information regarding suitable gasket materials.
- If no ground rings or lining protectors are being used, a gasket is required at each process connection. See Figure 3-6.
- If using grounding ring(s), a gasket is required on each side of each grounding ring. See Figure 3-7.
- If using lining protectors, a gasket is required between each lining protector and each process connection. See Figure 3-8 and Figure 3-9.

Note

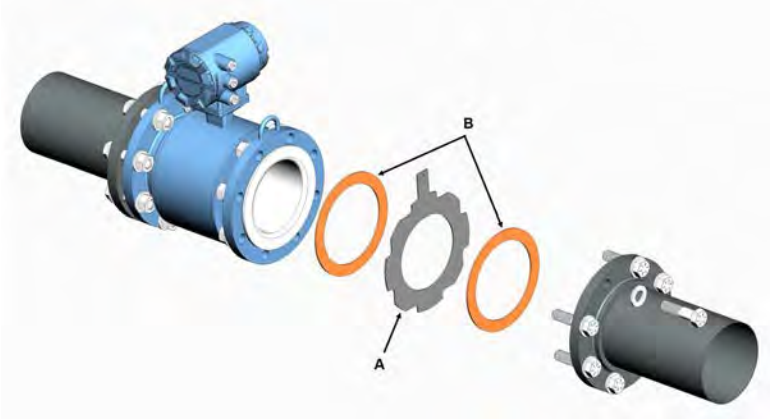
- Metallic or spiral wound gaskets should not be used in contact with the liner face. **They will damage the liner face**. If metallic or spiral wound gaskets are required for the application, then lining protectors must be used.
- Examples of non-metallic gasket materials that will not damage the liner face are rubber, fiber, or PTFE.
- Flat ring gasket types are suitable for raised-face (RF) flanges. Full-face gasket types are suitable for flat-face (FF) flanges. Full-face gaskets may be used with raised-face flanges.

Figure 3-6: Flanged Gasket Placement with no Grounding Ring(s) or Lining Protector(s)



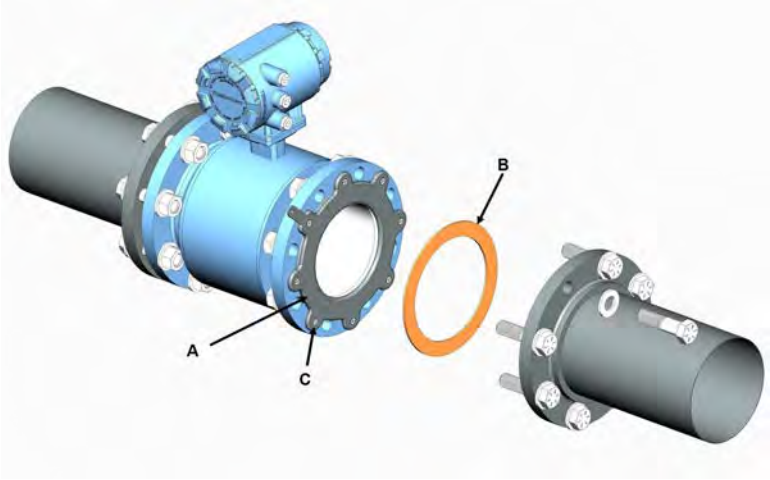
A. Liner face
B. Customer supplied gasket (x2)

Figure 3-7: Flanged Gasket Placement with Grounding Ring(s)



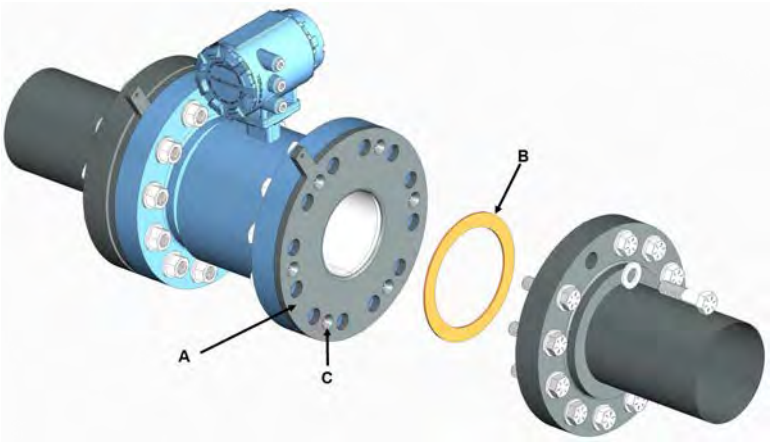
A. Ground ring
B. Customer supplied gaskets (x2 per ground ring)

Figure 3-8: Flanged Gasket Placement with Stamped Lining Protector(s)



A. Stamped lining protector
B. Customer supplied gasket (x1 per lining protector)
C. Lining protector fastening screws — DO NOT REMOVE the screws or the lining protector.

Figure 3-9: Flanged Gasket Placement with Machined Stamped Lining Protector(s)



A. Machined lining protector
B. Customer supplied gasket (x1 per lining protector)
C. Lining protector fastening screws — DO NOT REMOVE the screws or the lining protector.

Bolts

Note
Do not bolt one side at a time. Tighten both sides simultaneously. Example:

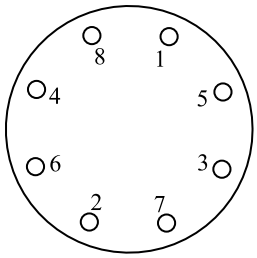
1. Snug upstream
2. Snug downstream
3. Tighten upstream (20%)
4. Tighten downstream (20%)

Do not snug and tighten the upstream side and then snug and tighten the downstream side. Failure to alternate between the upstream and downstream flanges when tightening bolts may result in liner damage.

Suggested torque values by sensor line size and liner type are listed in Table 3-2 for ASME B16.5 flanges and Table 3-3 or Table 3-4 for EN flanges. Consult the factory if the flange rating of the sensor is not listed. Tighten flange bolts on the upstream side of the sensor in the incremental sequence shown in Figure 3-10 to 20% of the suggested torque values. Repeat the process on the downstream side of the sensor. For sensors with greater or fewer flange bolts, tighten the bolts in a similar crosswise sequence. Repeat this entire tightening sequence at 40%, 60%, 80%, and 100% of the suggested torque values.

If leakage occurs at the suggested torque values, the bolts can be tightened in additional 10% increments until the joint stops leaking, or until the measured torque value reaches the maximum torque value of the bolts. Practical consideration for the integrity of the liner often leads to distinct torque values to stop leakage due to the unique combinations of flanges, bolts, gaskets, and sensor liner material.

Check for leaks at the flanges after tightening the bolts. Failure to use the correct tightening methods can result in severe damage. While under pressure, sensor materials may deform over time and require a second tightening 24 hours after the initial installation.



Prior to installation, identify the lining material of the flow sensor to ensure the suggested torque values are applied.

Table 3-1: Lining material

Fluoropolymer liners	Other liners
T - PTFE	P - Polyurethane
F - ETFE	N - Neoprene
A - PFA	L - Linatex (Natural Rubber)
K - PFA+	D - Adiprene

Table 3-2: Suggested flange bolt torque values for Rosemount 8705 (ASME) sensors

Size code	Line size	Fluoropolymer liners		Other liners	
		Class 150 (pound-feet)	Class 300 (pound-feet)	Class 150 (pound-feet)	Class 300 (pound-feet)
005	0.5 inch (15 mm)	4	8	N/A	N /A
010	1 inch (25 mm)	8	19	6	20
015	1.5 inch (40 mm)	17	36	13	38
020	2 inch (50 mm)	34	20	26	21
025	2.5 inch (65 mm)	40	30	30	31
030	3 inch (80 mm)	58	37	44	39
040	4 inch (100 mm)	41	50	31	52
050	5 inch (125 mm)	61	61	46	62
060	6 inch (150 mm)	77	51	59	50
080	8 inch (200 mm)	105	81	79	77
100	10 inch (250 mm)	98	84	74	81
120	12 inch (300 mm)	131	126	99	110
140	14 inch (350 mm)	162	110	123	98
160	16 inch (400 mm)	154	154	117	123
180	18 inch (450 mm)	236	175	179	133
200	20 inch (500 mm)	207	191	157	145
240	24 inch (600 mm)	293	293	222	222
300	30 inch (750 mm)	309	432	234	328
360	36 inch (900 mm)	442	589	335	447

Table 3-3: Suggested flange bolt torque values for Rosemount 8705 sensors with fluoropolymer liners (EN 1092-1)

Size code	Line size	Fluoropolymer liners (in Newton-meters)			
		PN 10	PN 16	PN 25	PN 40
005	0.5 inch (15 mm)	N/A	N/A	N/A	10
010	1 inch (25 mm)	N/A	N/A	N/A	23
015	1.5 inch (40 mm)	N/A	N/A	N/A	49
020	2 inch (50 mm)	N/A	62	N/A	62
025	2.5 inch (65 mm)	N/A	43	N/A	43
030	3 inch (80 mm)	N/A	51	N/A	51
040	4 inch (100 mm)	N/A	53	76	76
050	5.0 inch (125 mm)	N/A	70	N/A	106
060	6 inch (150mm)	N/A	95	132	132

Table 3-3: Suggested flange bolt torque values for Rosemount 8705 sensors with fluoropolymer liners (EN 1092-1) *(continued)*

Size code	Line size	Fluoropolymer liners (in Newton-meters)			
		PN 10	PN 16	PN 25	PN 40
080	8 inch (200 mm)	135	90	134	180
100	10 inch (250 mm)	103	123	200	265
120	12 inch (300 mm)	118	170	205	285
140	14 inch (350 mm)	166	223	344	450
160	16 inch (400 mm)	227	298	445	662
180	18 inch (450 mm)	198	299	391	452
200	20 inch (500 mm)	225	408	474	558
240	24 inch (600 mm)	300	601	625	903

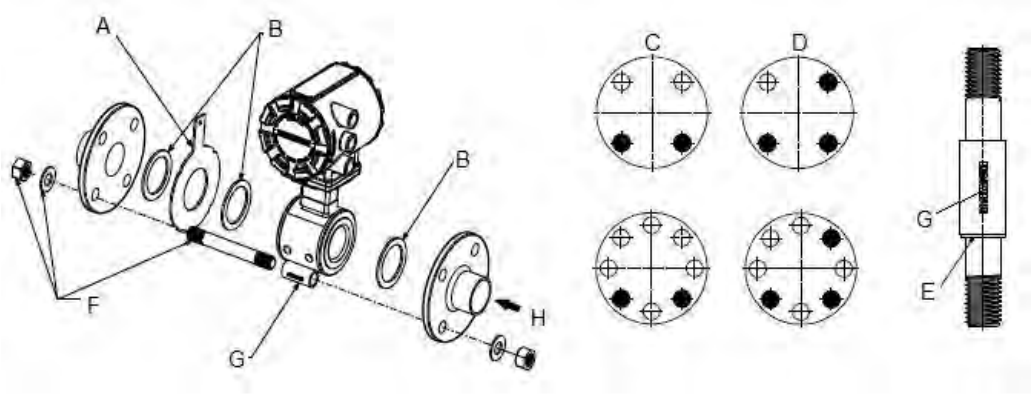
Table 3-4: Suggested flange bolt torque values for Rosemount 8705 sensors with non-fluoropolymer liners (EN 1092-1)

Size code	Line size	Non-fluoropolymer liners (in Newton-meters)			
		PN 10	PN 16	PN 25	PN 40
005	0.5 inch (15 mm)	N/A	N/A	N/A	8
010	1 inch (25 mm)	N/A	N/A	N/A	18
015	1.5 inch (40 mm)	N/A	N/A	N/A	37
020	2 inch (50 mm)	N/A	47	N/A	47
025	2.5 inch (65 mm)	N/A	33	N/A	33
030	3 inch (80 mm)	N/A	38	N/A	38
040	4 inch (100 mm)	N/A	41	57	57
050	5.0 inch (125 mm)	N/A	53	N/A	81
060	6 inch (150mm)	N/A	72	100	100
080	8 inch (200 mm)	103	68	102	137
100	10 inch (250 mm)	78	94	152	201
120	12 inch (300 mm)	89	129	156	216
140	14 inch (350 mm)	126	169	261	341
160	16 inch (400 mm)	172	226	337	502
180	18 inch (450 mm)	150	227	296	343
200	20 inch (500 mm)	170	309	359	423
240	24 inch (600 mm)	228	456	474	685

3.3.2 Wafer sensors

When installing wafer sensors, there are several components that must be included and requirements that must be met.

Figure 3-11: Wafer sensors installation components and assembly requirements



A. Ground ring (optional)
B. Customer supplied gaskets
C. Spacer installation (horizontal meters)
D. Spacer installation (vertical meters)
E. O-ring
F. Installation studs, nuts, and washers (optional)
G. Wafer alignment spacer
H. Flow

Gaskets

The sensor requires a gasket at each process connection. The gasket material selected must be compatible with the process fluid and operating conditions. Gaskets are required on each side of a grounding ring. See Figure 3-11.

Note
Metallic or spiral-wound gaskets should not be used as they will damage the liner face of the sensor.

Alignment spacers

On 1.5 inch through 8 inch (40 through 200 mm) line sizes, alignment spacers are **required** to ensure proper centering of the wafer sensor between the process flanges. To order an Alignment Spacer Kit (quantity 3 spacers), use p/n 08711-3211-xxxx, where xxxx equals the dash number shown in Table 3-5.

Table 3-5: Alignment spacers

Dash-no. (-xxxx)	Line size		Flange rating
	(in)	(mm)	
0A15	1.5	40	JIS 10K-20K
0A20	2	50	JIS 10K-20K
0A30	3	80	JIS 10K
0B15	1.5	40	JIS 40K
AA15	1.5	40	ASME- 150#
AA20	2	50	ASME - 150#
AA30	3	80	ASME - 150#

Table 3-5: Alignment spacers *(continued)*

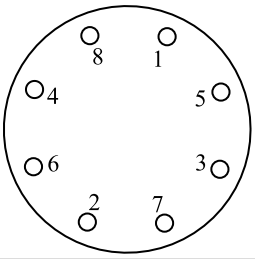
Dash-no. (-xxxx)	Line size		Flange rating
	(in)	(mm)	
AA40	4	100	ASME - 150#
AA60	6	150	ASME - 150#
AA80	8	200	ASME - 150#
AB15	1.5	40	ASME - 300#
AB20	2	50	ASME - 300#
AB30	3	80	ASME - 300#
AB40	4	100	ASME - 300#
AB60	6	150	ASME - 300#
AB80	8	200	ASME - 300#
DB40	4	100	EN 1092-1 - PN10/16
DB60	6	150	EN 1092-1 - PN10/16
DB80	8	200	EN 1092-1 - PN10/16
DC80	8	200	EN 1092-1 - PN25
DD15	1.5	40	EN 1092-1 - PN10/16/25/40
DD20	2	50	EN 1092-1 - PN10/16/25/40
DD30	3	80	EN 1092-1 - PN10/16/25/40
DD40	4	100	EN 1092-1 - PN25/40
DD60	6	150	EN 1092-1 - PN25/40
DD80	8	200	EN 1092-1 - PN40
RA80	8	200	AS40871-PN16
RC20	2	50	AS40871-PN21/35
RC30	3	80	AS40871-PN21/35
RC40	4	100	AS40871-PN21/35
RC60	6	150	AS40871-PN21/35
RC80	8	200	AS40871-PN21/35

Studs

Wafer sensors require threaded studs. See Figure 3-12 for torque sequence. Always check for leaks at the flanges after tightening the flange bolts. All sensors require a second tightening 24 hours after initial flange bolt tightening.

Table 3-6: Stud specifications

Nominal sensor size	Stud specifications
0.15–1-in. (4–25 mm)	316 SST ASTM A193, Grade B8M, Class 1 threaded mounted studs
1½–8-in. (40–200 mm)	CS, ASTM A193, Grade B7, threaded mounting studs



Installation

Procedure

1. Insert studs for the bottom side of the sensor between the pipe flanges and center the alignment spacer in the middle of the stud. See Figure 3-11 for the bolt hole locations recommended for the spacers provided. Stud specifications are listed in Table 3-6.
2. Place the sensor between the flanges. Make sure the alignment spacers are properly centered on the studs. For vertical flow installations slide the o-ring over the stud to keep the spacer in place. See Figure 3-11. Ensure the spacers match the flange size and class rating for the process flanges. See Table 3-5.
3. Insert the remaining studs, washers, and nuts.
4. Tighten to the torque specifications shown in Table 3-7. Do not over-tighten the bolts or the liner may be damaged.

Table 3-7: Rosemount 8711 torque specifications

Size code	Line size	Pound-feet	Newton-meter
15F	0.15 inch (4 mm)	5	7
30F	0.30 inch (8 mm)	5	7
005	½ inch (15 mm)	5	7
010	1 inch (25 mm)	10	14
015	1.5 inch (40 mm)	15	20
020	2 inch (50 mm)	25	34
030	3 inch (80 mm)	40	54
040	4 inch (100 mm)	30	41
060	6 inch (150 mm)	50	68
080	8 inch (200 mm)	70	95

3.3.3 Sanitary sensors

IDF Fitting

The 8721 uses an IDF (international dairy federation) style fitting to connect the process connection fitting to the meter body.

IDF Sanitary fitting torque

Hand tighten IDF nut to approximately 50 in-lbs [5 ½ Newton-meters (N-m)] of torque. Re-tighten after a few minutes until there are no leaks (up to 130 in-lbs [14 ½ Newton-meters (N-m)] of torque). Fittings that continue to leak at a higher torque may be distorted or damaged.

Note
Gaskets are supplied between the IDF fitting and the process connection fitting, such as a Tri-Clamp fitting, on all Rosemount 8721 Sanitary sensors except when the process connection fittings are not supplied and the only connection type is an IDF fitting.

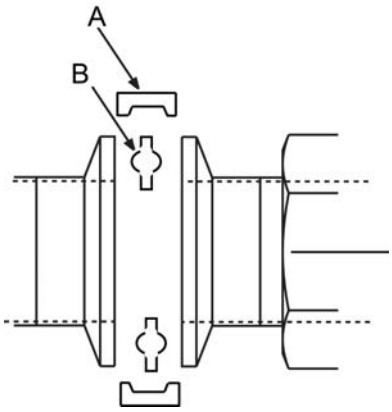
Gaskets

The sensor requires a gasket at each of its connections to adjacent devices or piping. The gasket material selected must be compatible with the process fluid and operating conditions.

Alignment and clamping of user-supplied clamp

Standard plant practices should be followed when installing a magmeter with sanitary fittings. Unique torque values and bolting techniques are not required.

Figure 3-13: Sanitary sensor gasket and clamp alignment



A. User-supplied clamp
B. User-supplied gasket

3.4 Process reference connection

The figures shown in this section illustrate best practice installations for process reference connections only. For installations in conductive, unlined pipe it may be acceptable to use one ground ring or one lining protector to establish a process reference connection. Earth safety ground is also required as part of this installation, but is not shown in the figures. Follow national, local, and plant electrical codes for safety ground.

Use Table 3-8 to determine which process reference option to follow for proper installation.

Table 3-8: Process reference options

Type of pipe	Grounding straps	Grounding rings	Reference electrode	Lining protectors
Conductive unlined pipe	See Figure 3-14	See Figure 3-15	See Figure 3-17	See Figure 3-15

Table 3-8: Process reference options *(continued)*

Type of pipe	Grounding straps	Grounding rings	Reference electrode	Lining protectors
Conductive lined pipe	Insufficient grounding	See Figure 3-15	See Figure 3-14	See Figure 3-15
Non-conductive pipe	Insufficient grounding	See Figure 3-16	Not recommended	See Figure 3-16

Note
For line sizes 10-inch and larger, the ground strap may come attached to the sensor body near the flange. See Figure 3-18.

Figure 3-14: Grounding straps in conductive unlined pipe or reference electrode in lined pipe

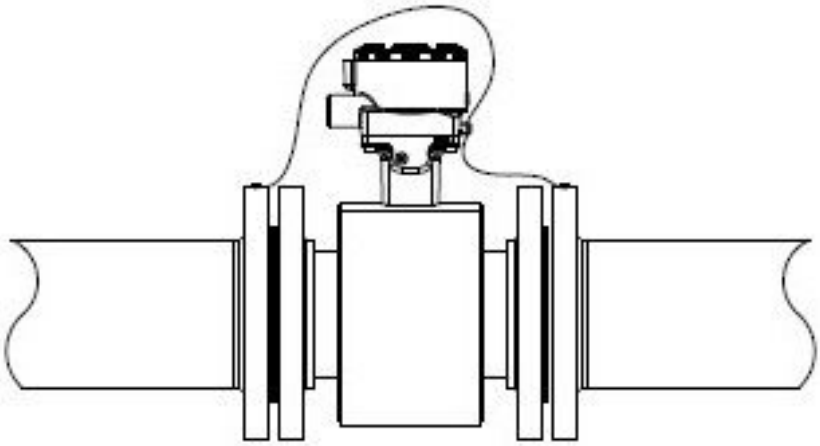
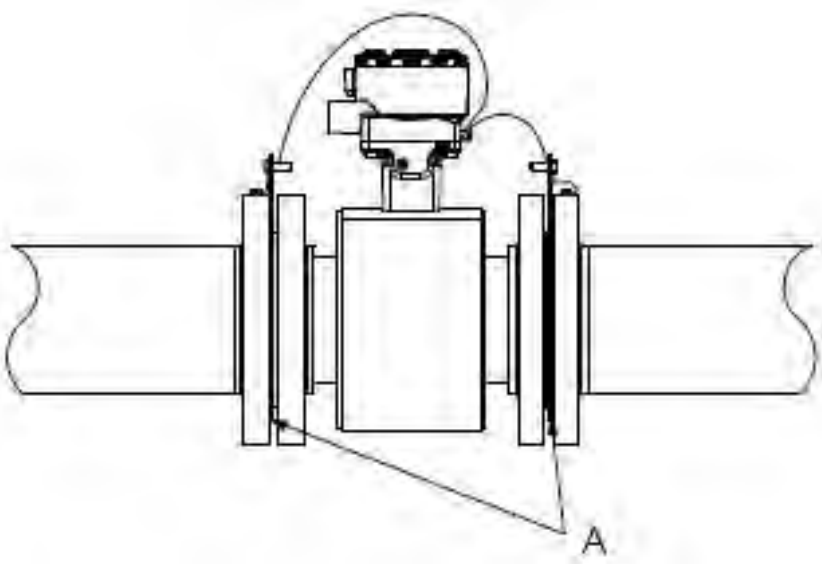
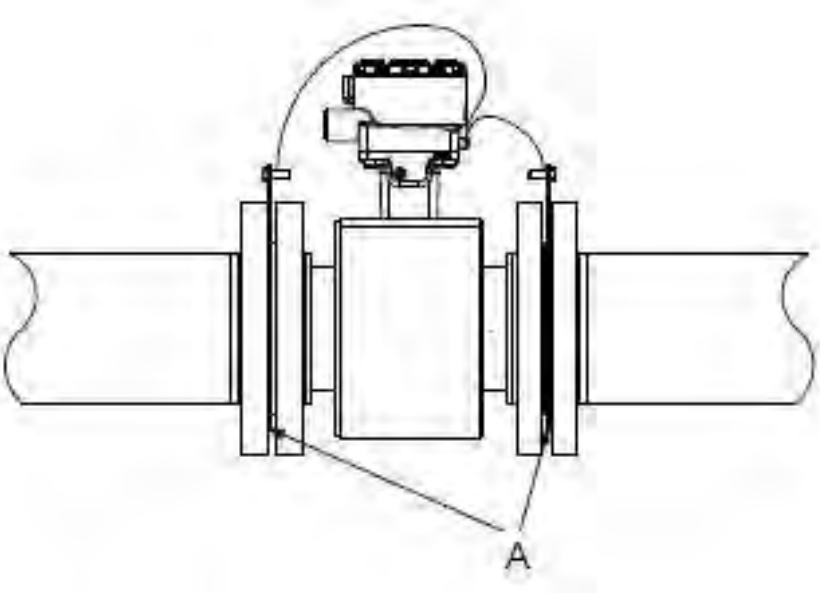


Figure 3-15: Grounding with grounding rings or lining protectors in conductive pipe



A. Grounding rings or lining protectors

Figure 3-16: Grounding with grounding rings or lining protectors in non-conductive pipe



A. Grounding rings or lining protectors

Figure 3-17: Grounding with reference electrode in conductive unlined pipe

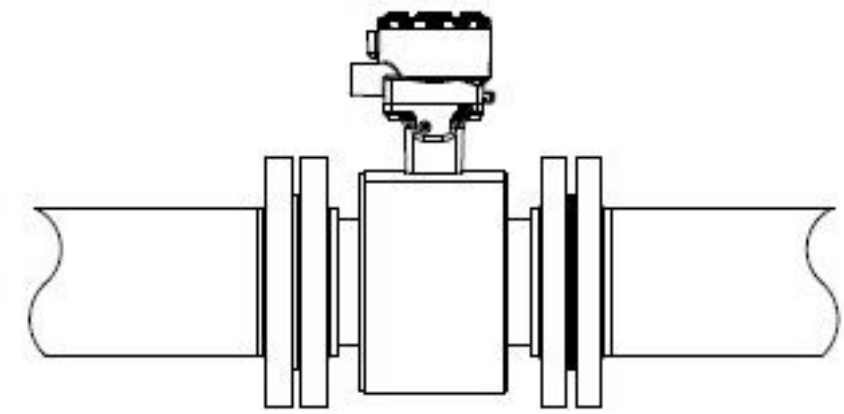
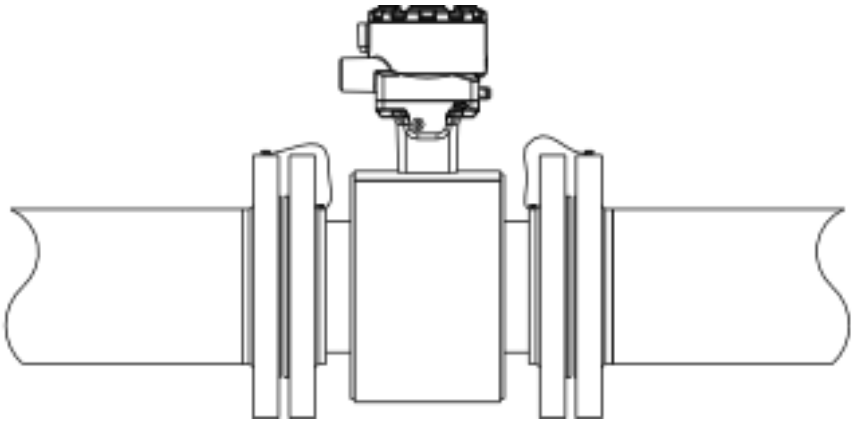


Figure 3-18: Grounding for line sizes 10-in. and larger



4 Remote Transmitter Installation

This chapter provides instructions for installing and wiring a remotely mounted transmitter.

Related information

Sensor Installation

4.1 Pre-installation

Before installing the transmitter, there are several pre-installation steps that should be completed to make the installation process easier:

- Identify options and configurations that apply to your application
- Set the hardware switches if necessary
- Consider mechanical, electrical, and environmental requirements

Note
Refer to Product specifications for more detailed requirements.

Identify options and configurations

The typical transmitter installation includes a device power connection, a 4-20mA output connection, and sensor coil and electrode connections. Other applications may require one or more of the following configurations or options

- Pulse output
- Discrete input/discrete output
- HART multidrop configuration

Hardware switches

The transmitter may have up to four user-selectable hardware switches. These switches set the alarm mode, internal/external analog power, internal/external pulse power, and transmitter security. The standard configuration for these switches when shipped from the factory is as follows:

Table 4-1: Hardware switch default settings

Setting	Factory configuration
Alarm mode	High
Internal/external analog power	Internal
Internal/external pulse power	External
Transmitter security	Off

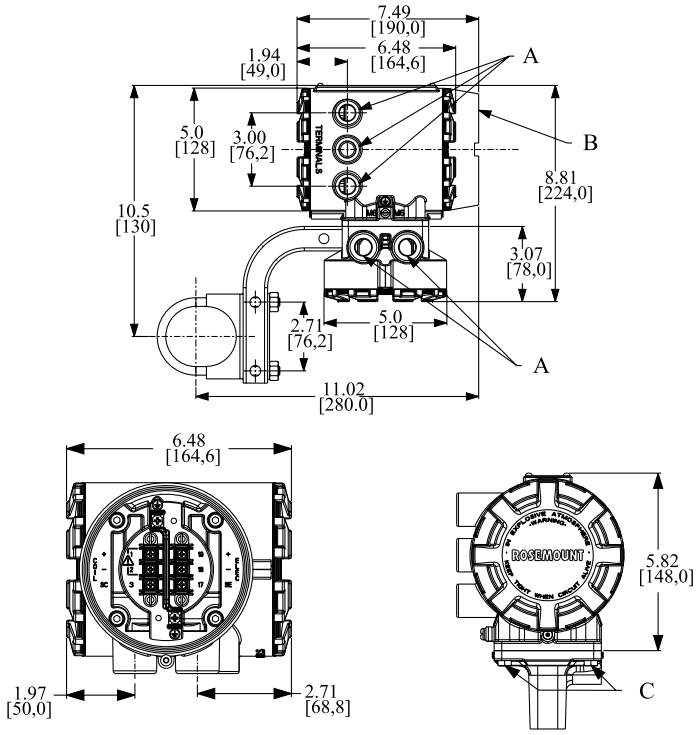
The analog power switch and pulse power switches are not available when ordered with intrinsically safe output, ordering code B.

In most cases, it is not necessary to change the setting of the hardware switches. If the switch settings need to be changed, refer to Hardware switches.

Be sure to identify any additional options and configurations that apply to the installation. Keep a list of these options for consideration during the installation and configuration procedures.

Mechanical considerations

The mounting site for the transmitter should provide enough room for secure mounting, easy access to conduit entries, full opening of the transmitter covers, and easy readability of the Local Operator Interface (LOI) screen (if equipped).



A. Conduit entry ½–14 NPT or M20
B. LOI cover
C. Mounting screws

Electrical considerations

Before making any electrical connections to the transmitter, consider national, local, and plant electrical installation requirements. Be sure to have the proper power supply, conduit, and other accessories necessary to comply with these standards.

The transmitter requires external power. Ensure access to a suitable power source.

Table 4-2: Electrical Data

Rosemount 8732EM Flow Transmitter	
Power input	AC power: 90–250VAC, 0.45A, 40VA
	Standard DC power: 12–42VDC, 1.2A, 15W
	Low power DC: 12–30VDC, 0.25A, 3W

Table 4-2: Electrical Data *(continued)*

Rosemount 8732EM Flow Transmitter	
Pulsed circuit	Internally powered (Active): Outputs up to 12VDC, 12.1mA, 73mW Externally powered (Passive): Input up to 28VDC, 100mA, 1W
4-20mA output circuit	Internally Powered (Active): Outputs up to 25mA, 24VDC, 600mW Externally Powered (Passive): Input up to 25mA, 30VDC, 750mW
Um	250V
Coil excitation output	500mA, 40V max, 9W max

Environmental considerations

To ensure maximum transmitter life, avoid extreme temperatures and excessive vibration. Typical problem areas include the following:

- High-vibration lines with integrally mounted transmitters
- Tropical or desert installations in direct sunlight
- Outdoor installations in arctic climates

Remote mounted transmitters may be installed in the control room to protect the electronics from the harsh environment and to provide easy access for configuration or service.

Table 4-3: Transmitter housing environmental ratings

Type	**Rating**
Ingress protection	IP66, IP69
NEMA	4X
Pollution Degree	2
Maximum altitude rating	• 13,123 ft (4000 m) at rated input power voltage (90–250 VAC) • 16,404 ft (5000 m) at maximum input power voltage of 150 VAC

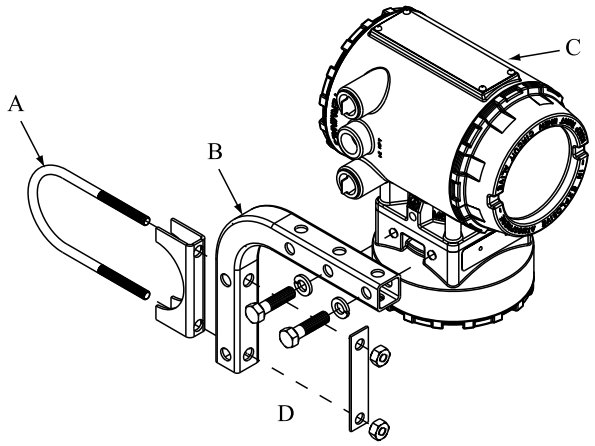
Note
For complete environmental and other specifications, see Product specifications.

4.2 Transmitter symbols

Caution symbol — check product documentation	
	

4.3 Mounting

Remote-mount transmitters are shipped wth a mounting bracket for use on a 2-in. pipe or a flat surface.



A. U-bolt
B. Mounting bracket
C. Transmitter
D. Fasteners (example configuration)

Procedure

1. Assemble the hardware as needed to accommodate the mounting configuration.
2. Secure the transmitter to the mounting hardware.

Postrequisites

The LOI/Display can be rotated in 90 degree increments up to 180 degrees if desired. Do not rotate more than 180 degrees in any one direction.

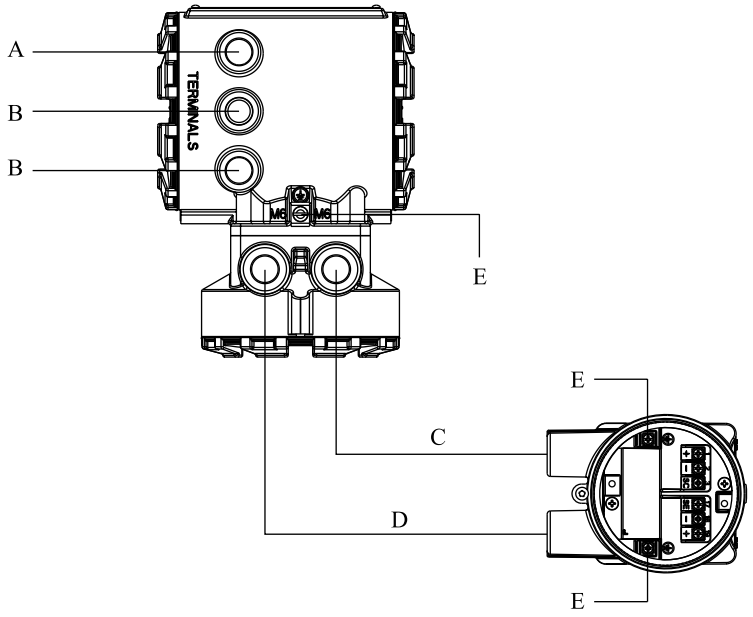
4.4 Wiring

4.4.1 Conduit entries and connections

Transmitter conduit entry ports can be ordered with ½"-14NPT or M20 female threaded connections. Conduit connections should be made in accordance with national, local, and plant electrical codes. Unused conduit entries should be sealed with the appropriate certified plugs. The plastic shipping plugs do not provide ingress protection.

4.4.2 Conduit requirements

- For installations with an intrinsically safe electrode circuit, a separate conduit for the coil cable and the electrode cable may be required. Refer to Product certifications.
- For installations with non-intrinsically safe electrode circuit, or when using the combination cable, a single dedicated conduit run for the coil drive and electrode cable between the sensor and the remote transmitter may be acceptable. Removal of the barriers for intrinsic safety isolation is permitted for non-intrinsically safe electrode installations.
- Bundled cables from other equipment in a single conduit are likely to create interference and noise in the system. See Figure 4-3.
- Electrode cables should not be run together in the same cable tray with power cables.
- Output cables should not be run together with power cables.
- Select conduit size appropriate to feed cables through to the flowmeter.



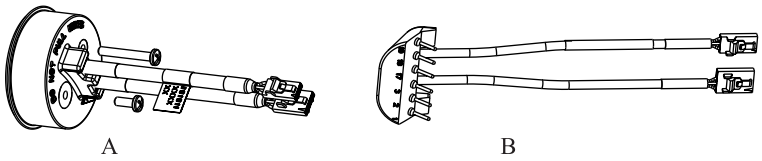
A. Power
B. Output
C. Coil
D. Electrode
E. Safety ground

4.4.3 Sensor to transmitter wiring

Integral mount transmitters

Integral mount transmitters ordered with a sensor will be shipped assembled and wired at the factory using an interconnecting cable. Use only the factory supplied cable provided

with the instrument. For replacement transmitters use the existing interconnecting cable from the original assembly. Replacement cables, if applicable, are available (see Figure 4-4).



A. Socket module 08732-CSKT-0001
B. IMS cable 08732-CSKT-0004

Remote mount transmitters

Remote cable kits are available as individual component cables or as a combination coil/electrode cable. They can be ordered directly using the kit numbers shown in Table 4-4, Table 4-5, and Table 4-6. Equivalent Alpha cable part numbers are also provided as an alternative. To order cable, specify length as quantity desired. Equal length of component cables is required.

Examples:

- 25 feet = Qty (25) 08732-0065-0001
- 25 meters = Qty (25) 08732-0065-0002

Table 4-4: Component cable kits - standard temperature (-20°C to 75°C)

Cable kit #	Description	Individual cable	Alpha p/n
08732-0065-0001 (feet)	Kit, component cables, Std temp (includes Coil and Electrode)	Coil Electrode	2442C 2413C
08732-0065-0002 (meters)	Kit, component cables, Std temp (includes Coil and Electrode)	Coil Electrode	2442C 2413C
08732-0065-0003 (feet)	Kit, component cables, Std temp (includes Coil and I.S. Electrode)	Coil Instrinsically Safe Blue Electrode	2442C Not available
08732-0065-0004 (meters)	Kit, component cables, Std temp (includes Coil and I.S. Electrode)	Coil Instrinsically Safe Blue Electrode	2442C Not available

Table 4-5: Component cable kits - extended temperature (-50°C to 125°C)

Cable kit #	Description	Individual cable	Alpha p/n
08732-0065-1001 (feet)	Kit, Component Cables, Ext Temp. (includes Coil and Electrode)	Coil Electrode	Not available Not available
08732-0065-1002 (meters)	Kit, Component Cables, Ext Temp. (includes Coil and Electrode)	Coil Electrode	Not available Not available
08732-0065-1003 (feet)	Kit, Component Cables, Ext Temp. (includes Coil and I.S. Electrode)	Coil Intrinsically Safe Blue Electrode	Not available Not available

Table 4-5: Component cable kits - extended temperature (-50°C to 125°C) *(continued)*

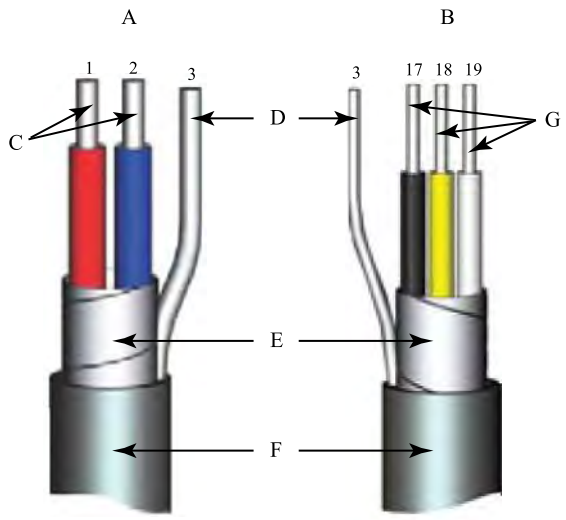
Cable kit #	Description	Individual cable	Alpha p/n
08732-0065-1004 (meters)	Kit, Component Cables, Ext Temp. (includes Coil and I.S. Electrode)	Coil Intrinsically Safe Blue Electrode	Not available Not available

Table 4-6: Combination cable kits - coil and electrode cable (-20°C to 80°C)

Cable kit #	Description
08732-0065-2001 (feet)	Kit, Combination Cable, Standard
08732-0065-2002 (meters)	
08732-0065-3001 (feet)	Kit, Combination Cable, Submersible (80°C dry/60°C Wet) (33ft Continuous)
08732-0065-3002 (meters)	

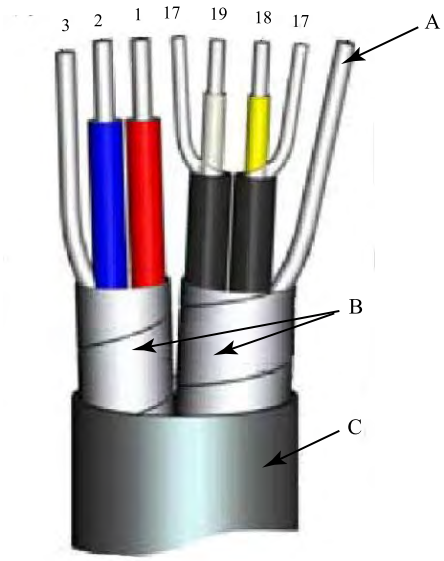
Cable requirements

Shielded twisted pairs or triads must be used. For installations using the individual coil drive and electrode cable, see Figure 4-5. Cable lengths should be limited to less than 500 feet (152 m). Consult factory for length between 500–1000 feet (152–304 m). Equal length cable is required for each. For installations using the combination coil drive/electrode cable, see Figure 4-6. Combination cable lengths should be limited to less than 330 feet (100 m).



A. Coil drive
B. Electrode
C. Twisted, stranded, insulated 14 AWG conductors
D. Drain
E. Overlapping foil shield
F. Outer jacket
G. Twisted, stranded, insulated 20 AWG conductors

- 1 = Red
- 2 = Blue
- 3 = Drain
- 17 = Black
- 18 = Yellow
- 19 = White

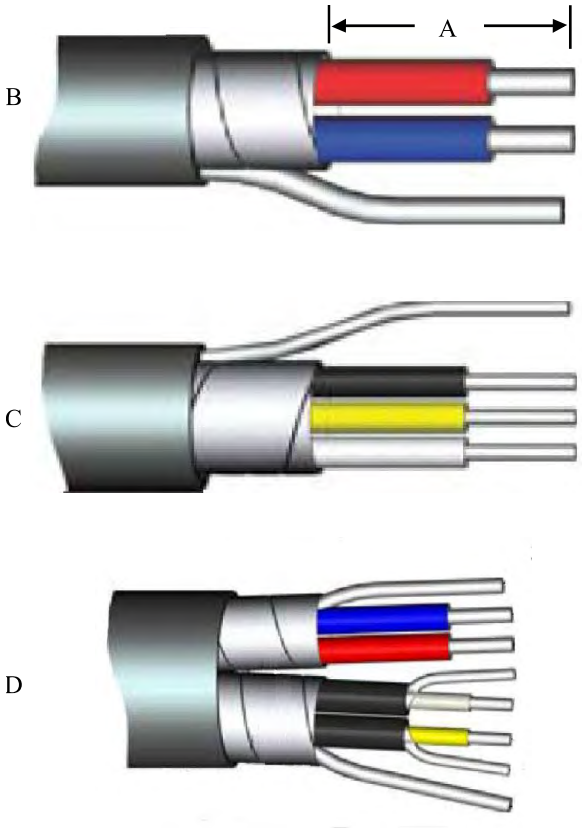


A. Electrode shield drain
B. Overlapping foil shield
C. Outer jacket

- 1 = Red
- 2 = Blue
- 3 = Drain
- 17 = Reference
- 18 = Yellow
- 19 = White

Cable preparation

Prepare the ends of the coil drive and electrode cables as shown in Figure 4-7. Remove only enough insulation so that the exposed conductor fits completely under the terminal connection. Best practice is to limit the unshielded length (D) of each conductor to less than one inch. Excessive removal of insulation may result in an unwanted electrical short to the transmitter housing or other terminal connections. Excessive unshielded length, or failure to connect cable shields properly, may also expose the unit to electrical noise, resulting in an unstable meter reading.



A. Unshielded length
B. Coil
C. Electrode
D. Combination

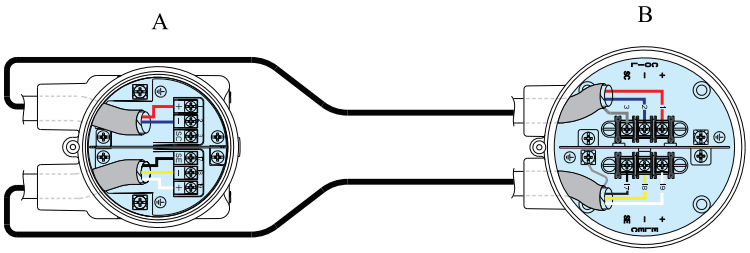
⚠ WARNING

Shock hazard! Potential shock hazard across remote junction box terminals 1 and 2 (40V).

⚠ WARNING

Explosion hazard! Electrodes exposed to process. Use only compatible transmitter and approved installation practices. For process temperatures greater than 284°F (140°C), use a wire rated for 257°F (125°C).

Remote junction box terminal blocks



A. Sensor
B. Transmitter

Note
Junction box appearance and configuration may vary, but terminal numbering is consistent for all junction box types.

Table 4-7: Sensor/transmitter wiring

Wire color	Sensor terminal	Transmitter terminal
Red	1	1
Blue	2	2
Coil drain	3 or float	3
Black	17	17
Yellow	18	18
White	19	19
	⏚	⏚

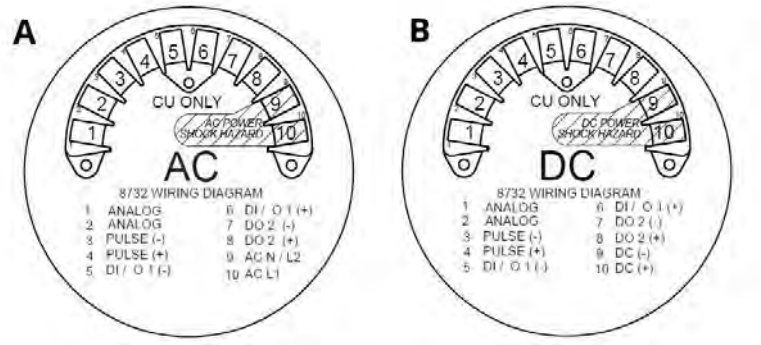
Note
For hazardous locations, refer to Product certifications.

4.4.4 Power and I/O terminal blocks

Remove the back cover of the transmitter to access the terminal block.

Note
To connect pulse output and/or discrete input/output, and for installations with intrinsically safe outputs, refer to Product certifications.

Figure 4-9: Terminal blocks



A. AC version
B. DC version

Table 4-8: Power and I/O terminals

Terminal number	AC version	DC version
1	Analog (mA output)	Analog (mA output)
2	Analog (mA output)	Analog (mA output)
3	Pulse (–)	Pulse (–)
4	Pulse (+)	Pulse (+)
5(1)	Discrete I/O 1 (–)	Discrete I/O 1 (–)
6(1)	Discrete I/O 1 (+)	Discrete I/O 1 (+)
7(1)	Discrete Out 2 (–)	Discrete Out 2 (–)
8(1)	Discrete Out 2 (+)	Discrete Out 2 (+)
9	AC (Neutral)/L2	DC (–)
10	AC L1	DC (+)

(1) Only available with ordering code AX.

4.4.5 Powering the transmitter

Before connecting power to the transmitter, be sure to have the necessary electrical supplies and required power source:

- The AC powered transmitter requires 90–250V AC (50/60Hz).
- The DC (standard) powered transmitter requires 12–42V DC.
- The DC **low power** transmitter requires 12–30V DC.

Wire the transmitter according to national, local, and plant electrical requirements.

If installing in a hazardous location, verify that the meter has the appropriate hazardous area approval. Each meter has a hazardous area approval tag attached to the top of the transmitter housing.

Supply wire requirements

Use 10–18 AWG wire rated for the proper temperature of the application. For wire 10–14 AWG, use lugs or other appropriate connectors. For connections in ambient temperatures above 122 °F (50 °C), use a wire rated for 194 °F (90 °C). For DC powered transmitters with extended cable lengths, verify that there is a minimum of 12 VDC at the terminals of the transmitter with the device under load.

Electrical disconnect requirements

Connect the device through an external disconnect or circuit breaker per national and local electrical code.

Overcurrent protection

The transmitter requires overcurrent protection of the supply lines. Fuse rating and compatible fuses are shown in Line power fuses.

Installation category

The installation category for the transmitter is OVERVOLTAGE CAT II.

AC power system installation requirements

Neutral-earth power requirements

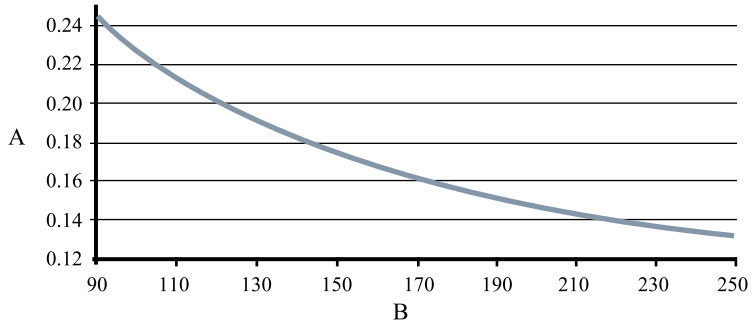
The power system must have a neutral that is locally bonded to earth, or provide both line to earth and neutral to earth voltage limitation of no more than 250 VAC.

Power line impedance

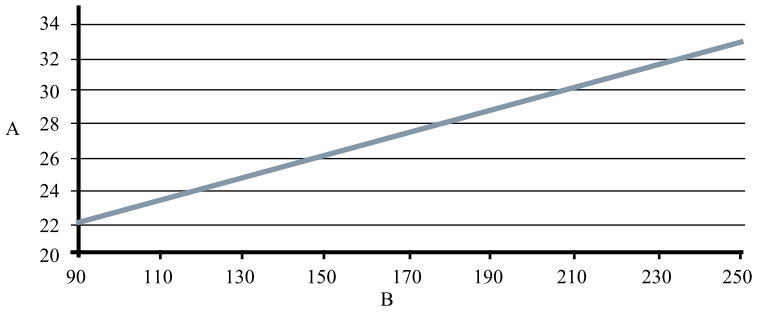
Sources of inductance on the AC power system, such as isolation transformers, must be limited to less than 1 mH at 120 VAC, and 2 mH at 240 VAC.

AC power supply requirements

Units powered by 90 - 250VAC have the following power requirements. Peak inrush is 35.7A at 250VAC supply, lasting approximately 1ms. Inrush for other supply voltages can be estimated with: Inrush (Amps) = Supply (Volts) / 7.0



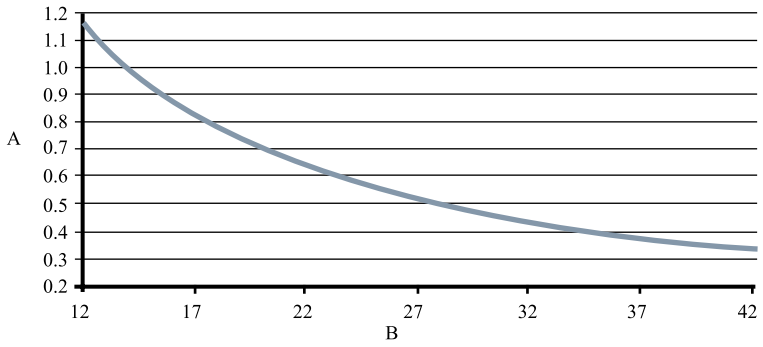
A. Supply current (amps)
B. Power supply (VAC)



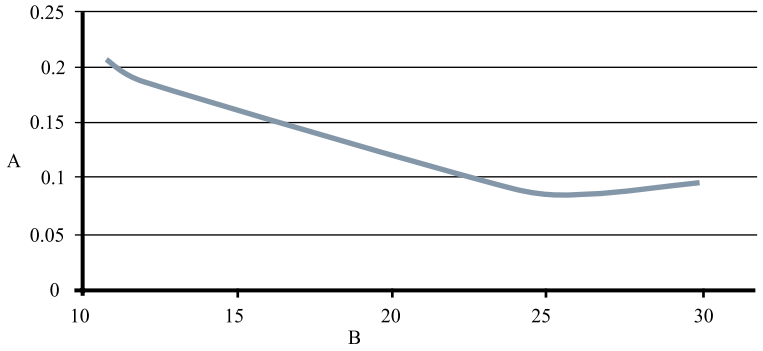
A. Apparent power (VA)
B. Power supply (VAC)

DC power supply requirements

Standard DC units powered by 12VDC power supply may draw up to 1.2A of current steady state. Low power DC units may draw up to 0.25A of current steady state. Peak inrush is 42A at 42VDC supply, lasting approximately 1ms. Inrush for other supply voltages can be estimated with: Inrush (Amps) = Supply (Volts) / 1.0



A. Supply current (amps)
B. Power supply (VDC)



A. Supply current (amps)
B. Power supply (VDC)

Table 4-9: Fuse requirements

Power system	Power supply	Fuse rating	Manufacturer
AC power	90–250VAC	2 Amp quick acting	Bussman AGC2 or equivalent
DC power	12–42VDC	3 Amp quick acting	Bussman AGC3 or equivalent
DC low power	12–30VDC	3 Amp quick acting	Bussman AGC3 or equivalent

Power terminals

For AC powered transmitter (90–250VAC, 50/60 Hz):

- Connect AC Neutral to terminal 9 (AC N/L2) and AC Line to terminal 10 (AC/L1).

For DC powered transmitter:

- Connect negative to terminal 9 (DC -) and positive to terminal 10 (DC +).
- DC powered units may draw up to 1.2A.

Cover jam screw

For flow meters shipped with a cover jam screw, the screw should be installed after the instrument has been wired and powered up. Follow these steps to install the cover jam screw:

1. Verify the cover jam screw is completely threaded into the housing.
2. Install the housing cover and verify the cover is tight against the housing.
3. Using a 2.5 mm hex wrench, loosen the jam screw until it contacts the transmitter cover.
4. Turn the jam screw an additional ½ turn counterclockwise to secure the cover.

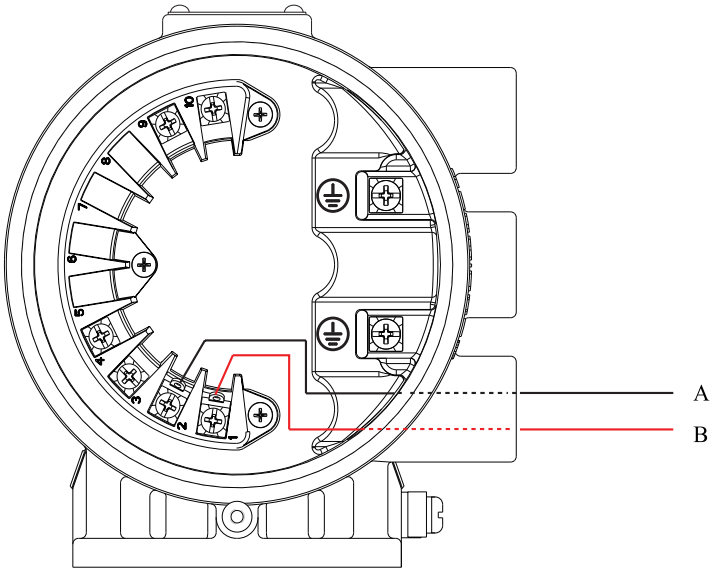
   Note
   Application of excessive torque may strip the threads.

5. Verify the cover cannot be removed.

4.4.6 Analog output

The analog output signal is a 4-20 mA current loop. Depending on the IS output option, the loop can be powered internally or externally via a hardware switch located on the front of the electronics stack. The switch is set to internal power when shipped from the factory. For units with a display, the LOI must be removed to change switch position. Intrinsically safe analog output requires a shielded twisted pair cable. For HART communication, a minimum resistance of 250 ohms is required. It is recommended to use individually shielded twisted pair cable. The minimum conductor size is 24 AWG (0.51 mm) diameter for cable runs less than 5,000 feet (1,500 m) and 20 AWG (0.81 mm) diameter for longer distances.

Note
For more information about the analog output characteristics, see Output signals.



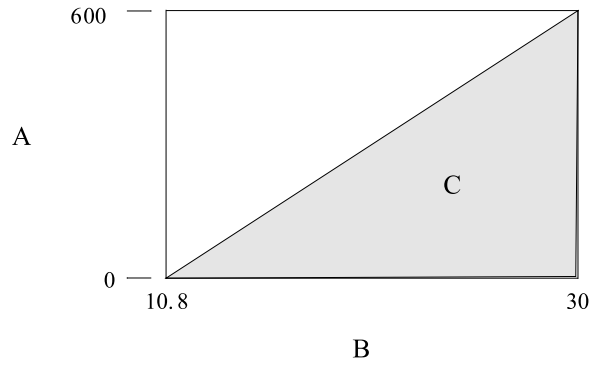
A. Terminal #2
B. Terminal #1

Table 4-10: Terminal assignment by power source type

Power source	Terminal #1	Terminal #2
Internal	4–20 mA negative (–)	4–20 mA positive (+)
External	4–20 mA positive (+)	4–20 mA negative (–)

Table 4-11: Terminal assignment by power source type

Power source	Terminal #7	Terminal #8
Internal	4–20 mA negative (–)	4–20 mA positive (+)
External	4–20 mA positive (+)	4–20 mA negative (–)



A. Load (ohms)
B. Power supply (volts)
C. Operating region

- R_{max} = 31.25 (V_{ps}–10.8)
- V_{ps} = power supply voltage (volts)
- R_{max} = maximum loop resistance (ohms)

5 Basic Configuration

Once the flow meter is installed and power has been supplied, the transmitter must be configured using the LOI, if equipped, or a configuration tool, such as ProLink III Software, AMS Device Manager, or AMS Trex Device Communicator. Configuration settings are saved in nonvolatile memory within the transmitter. Descriptions of more advanced functions are included in Advanced Configuration Functionality.

5.1 Cover jam screw

For flow meters shipped with a cover jam screw, the screw should be installed after the instrument has been wired and powered up. Follow these steps to install the cover jam screw:

Procedure

1. Verify the cover jam screw is completely threaded into the housing.
2. Install the housing cover and verify the cover is tight against the housing.
3. Using a 2.5 mm hex wrench, loosen the jam screw until it contacts the transmitter cover.
4. Turn the jam screw an additional ½ turn counterclockwise to secure the cover.

   Note
   Application of excessive torque may strip the threads.

5. Verify the cover cannot be removed.

5.2 Basic Setup

Tag

Tag is the quickest and shortest way of identifying and distinguishing between transmitters. Transmitters can be tagged according to the requirements of your application. HART Rev 5 supports 8 character short tag. HART Rev 7 supports 8 character short tag and 32 character long tag.

Calibration number

The sensor calibration number is a 16-digit number generated at the factory during flow calibration, is unique to each sensor, and is located on the sensor nameplate.

Flow units (PV)

The flow units variable specifies the format in which the flow rate will be displayed. Units should be selected to meet your particular metering needs. See Measurement units.

Line size

The line size (sensor size) must be set to match the actual sensor connected to the transmitter. The size must be specified in inches.

Upper range value (URV)

The URV sets the 20 mA point for the analog output. This value is typically set to full-scale flow. The units that appear will be the same as those selected under the flow units

parameter. The URV may be set between –39.3 ft/s to 39.3 ft/s (–12 m/s to 12m/s). There must be at least 1 ft/s (0.3 m/s) span between the URV and LRV.

Note
If entering a negative number, the minus sign must be entered in the furthest left position on the LOI.

Lower range value (LRV)

The LRV sets the 4 mA point for the analog output. This value is typically set to zero flow. The units that appear will be the same as those selected under the flow units parameter. The LRV may be set between –39.3 ft/s to 39.3 ft/s (–12 m/s to 12m/s). There must be at least 1 ft/s (0.3 m/s) span between the URV and LRV.

Note
If entering a negative number, the minus sign must be entered in the furthest left position on the LOI.

5.3 Local operator interface (LOI)

To activate the optional LOI, press the DOWN arrow.

Use the UP, DOWN, LEFT(E), and RIGHT arrows to navigate the menu structure.

A complete map of the LOI menu structure is shown in LOI Menu trees.

The display can be locked to prevent unintentional configuration changes. The display lock can be activated through a HART communication device, or by holding the UP arrow for three seconds and then following the on-screen instructions.

5.4 Other configuration tools

Table 5-1 shows the approximate category or location of basic setup parameters for typical configuration tools.

Table 5-1: Approximate setup category/locations for typical configuration tools

Function	Category/Location
Flow Units	**Basic Setup**
PV Upper Range Value (URV)	**Basic Setup → AO**
PV Lower Range Value (LRV)	**Basic Setup → AO**
Calibration Number	**Basic Setup → Setup**
Line Size	**Basic Setup → Setup**
Tag	**Device Info → Identification**
Long Tag	**Device Info → Identification**

5.5 Measurement units

Table 5-2: Volumetric flow units

gal/sec	gal/min	gal/hr	gal/day
L/sec	L/min	L/hr	L/day
ft3/sec	ft3/min	ft3/hr	ft3/day

Table 5-2: Volumetric flow units *(continued)*

	cm3/min		Mgal/day (million gallons)
m3/sec	m3/min	m3/hr	m3/day
Impgal/sec	Impgal/min	Impgal/hr	Impgal/day
B31/sec (1 barrel = 31 gallons)	B31/min (1 barrel = 31 gallons)	B31/hr (1 barrel = 31 gallons)	B31/day (1 barrel = 31 gallons)
B42/sec (1 barrel = 42 gallons)	B42/min (1 barrel = 42 gallons)	B42/hr (1 barrel = 42 gallons)	B42/day (1 barrel = 42 gallons)

Table 5-3: Mass flow units

lbs/sec	lbs/min	lbs/hr	lbs/day
kg/sec	kg/min	kg/hr	kg/day
	(s) tons/min	(s) tons/hr	(s) tons/day
	(m) tons/min	(m) tons/hr	(m) tons/day

Table 5-4: Velocity units

ft/sec	m/sec

6 Advanced installation details

6.1 Hardware switches

Non Intrinsically Safe; Output code A

The electronics are equipped with four user-selectable hardware switches. These switches set the Alarm Mode, Internal/External Analog Power, Transmitter Security, and Internal/External Pulse Power.

Intrinsically Safe; Output code B

The electronics are equipped with two user-selectable hardware switches. These switches set the Alarm Mode and Transmitter Security. The Analog Power and Pulse Power are internally set and only available as External.

6.1.1 Alarm mode

If an event occurs that would trigger an alarm in the electronics, the analog output will be driven high or low, depending on the switch position. The switch is set in the HIGH position when shipped from the factory. Refer to Table 8-1 and Table 8-2 for analog output values of the alarm.

6.1.2 Transmitter security

The **SECURITY** switch allows the user to lock out any configuration changes attempted on the transmitter.

- When the security switch is in the **ON** position, the configuration can be viewed but no changes can be made.
- When the security switch is in the **OFF** position, the configuration can be viewed and changes can be made.

The switch is in the **OFF** position when the transmitter is shipped from the factory.

Note
The flow rate indication and totalizer functions remain active when the **SECURITY** switch is in either position.

6.1.3 Internal/external analog power (Output option code A)

Note
With output option code B, the analog output can only be externally powered and there is no **ANALOG** switch.

The 4–20 mA loop can be powered internally by the transmitter or externally by an external power supply. The **ANALOG** switch determines the source of the 4–20 mA loop power.

- When the switch is in the **INTERNAL** position, the 4–20 mA loop is powered internally by the transmitter.
- When the switch is in the **EXTERNAL** position, a 10-30 VDC external power supply is required. For more information about 4–20 mA external power, see Analog output.

The switch is in the **INTERNAL** position when the transmitter is shipped from the factory.

Note
External power is required for multidrop configurations.

6.1.4 Internal/external pulse power (Output option code A)

Note
With output option code B, the pulse output can only be externally powered and there is no **PULSE** switch.

The pulse loop can be powered internally by the transmitter or externally or by an external power supply. The **PULSE** switch determines the source of the pulse loop power.

- When the switch is in the **INTERNAL** position, the pulse loop is powered internally by the transmitter.
- When the switch is in the **EXTERNAL** position, a 5–28 VDC external supply is required. For more information about pulse external power, see Connect pulse output.

The switch is in the **EXTERNAL** position when the transmitter is shipped from the factory.

6.1.5 Changing hardware switch settings

Note
The hardware switches are located on the top side of the electronics board and changing their settings requires opening the electronics housing. If possible, carry out these procedures away from the plant environment in order to protect the electronics.

Figure 6-1: Electronics Stack and Hardware Switches



Procedure

1. Place the control loop into manual control.
2. Disconnect power to the transmitter
3. Remove the electronics compartment cover.

   If the cover has a cover jam screw, this must be loosened prior to removal of the cover.
4. Remove the LOI/Display, if applicable.
5. Identify the location of each switch (see Figure 6-1).
6. Change the setting of the desired switches with a small, non-metallic tool.
7. Replace the LOI/Display, if applicable.
8. Replace the electronics compartment cover.

   If the cover has a cover jam screw, this must be tightened to comply with installation requirements. See Cover jam screw for details on the cover jam screw.
9. Return power to the transmitter and verify the flow measurement is correct.
10. Return the control loop to automatic control.

6.2 Pulse output and discrete input/outputs

There are three additional loop connections available on the Transmitter:

- Pulse output - used for external or remote totalization (see Pulse output).
- Discrete I/O Channel 1 can be configured as discrete input or discrete output (see Discrete input/output).
- Discrete I/O Channel 2 can be configured as discrete output only (see Discrete input/output).

6.2.1 Connect pulse output

The pulse output function provides a galvanically isolated frequency signal that is proportional to the flow through the sensor. The signal is typically used in conjunction with an external totalizer or control system.

Note

- With output option code A, the pulse output can be internally or externally powered, and the **PULSE** switch must be set accordingly (the default setting is **EXTERNAL**).
- With output option code B, the pulse output can only be externally powered and there is no **PULSE** switch. See Internal/external pulse power (Output option code A).

External power supply

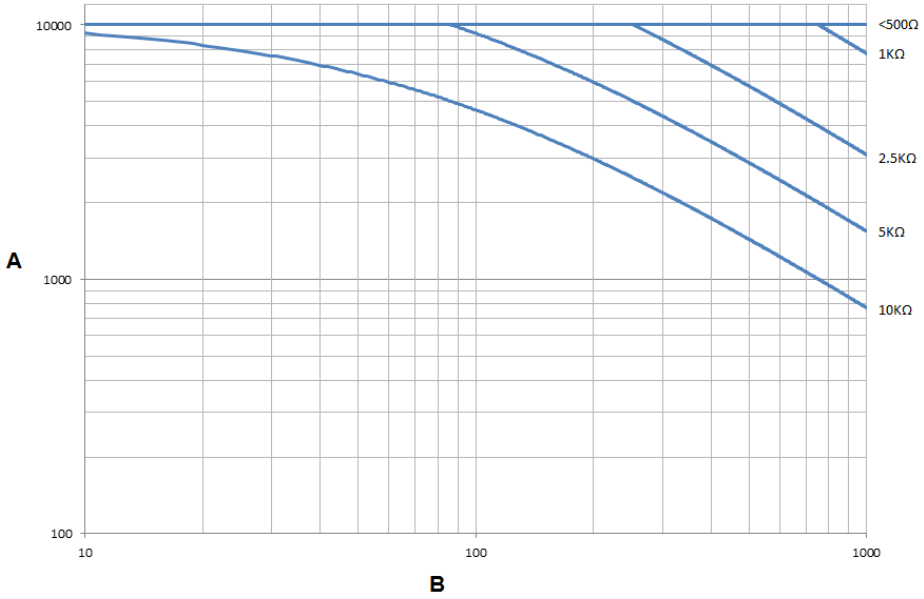
For an externally powered pulse output, the following requirements apply:

- Supply voltage: 5 to 28 VDC
- Maximum current: 100 mA
- Maximum power: 1.0 W
- Load resistance: 200 to 10k Ohms (typical value 1k Ohms). Refer to the figure indicated:

Output option code	Supply voltage	Resistance vs cable length
A	5-28 VDC	See Figure 6-2
B	5 VDC	See Figure 6-3
B	12 VDC	See Figure 6-4
B	24 VDC	See Figure 6-5

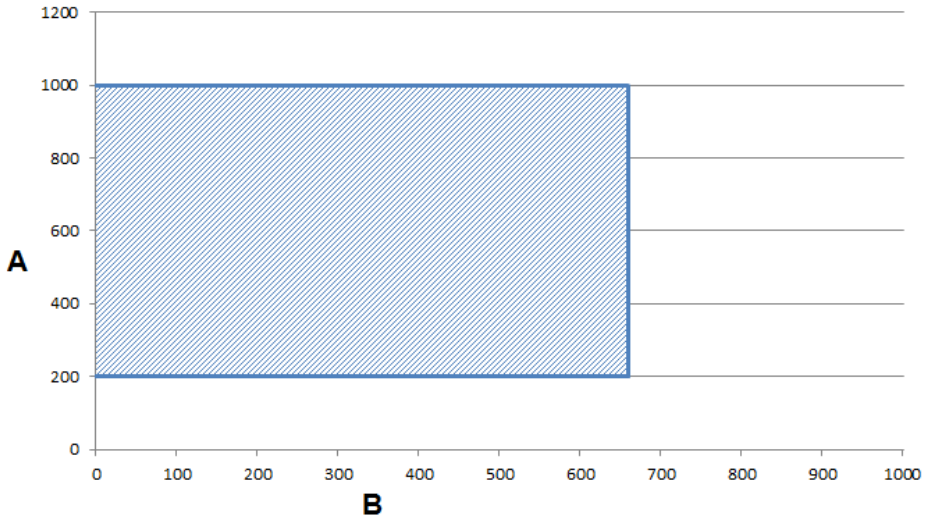
- Pulse mode: Fixed pulse width or 50% duty cycle
- Pulse duration: 0.1 to 650 ms (adjustable)
- Maximum pulse frequency:
  - Output option code A is 10,000 Hz
  - Output option code B is 5000 Hz
- FET switch closure: solid state switch

Figure 6-2: Output Option Code A—Maximum Frequency vs. Cable Length



A. Frequency (Hz)
B. Cable length (feet)

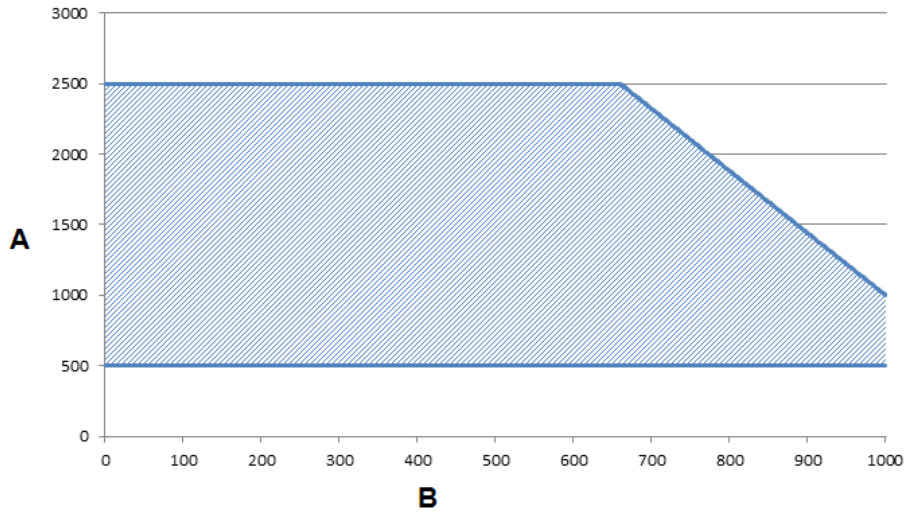
Figure 6-3: Output Option Code B—VDC Supply



A. Resistance (Ω)
B. Cable length (feet)

At 5000 Hz operation with a 5 VDC supply, pull-up resistances of 200 to 1000 Ohms allow cable lengths up to 660 ft (200 m).

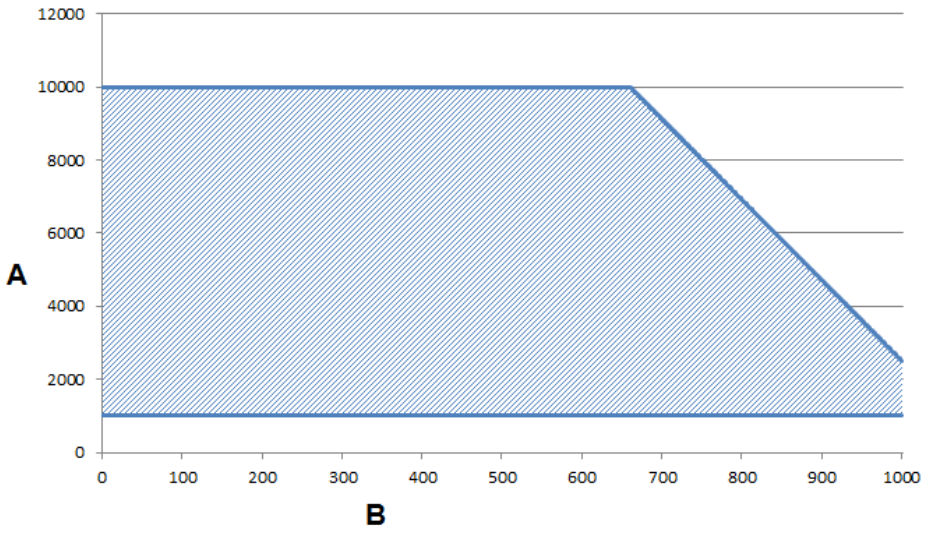
Figure 6-4: Output Option Code B—2 VDC Supply



A. Resistance (Ω)
B. Cable length (feet)

At 5000 Hz operation with a 12 VDC supply, pull-up resistances of 500 to 2500 Ohms allow cable lengths up to 660 ft (200 m). Resistances from 500 to 1000 Ohms allow a cable length of 1000 ft (330 m).

Figure 6-5: Output Option Code B—24 VDC Supply



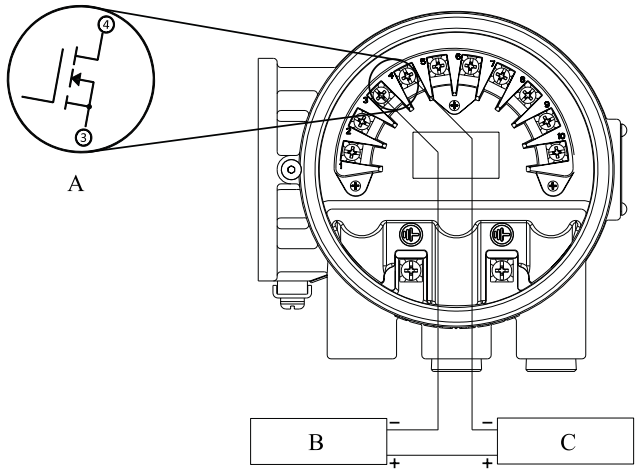
A. Resistance (Ω)
B. Cable length (feet)

At 5000 Hz operation with a 24 VDC supply, pull-up resistances of 1000 to 10,000 Ohms allow cable lengths up to 660 ft (200 m). Resistances from 1000 to 2500 Ohms allow a cable length of 1000 ft (330 m).

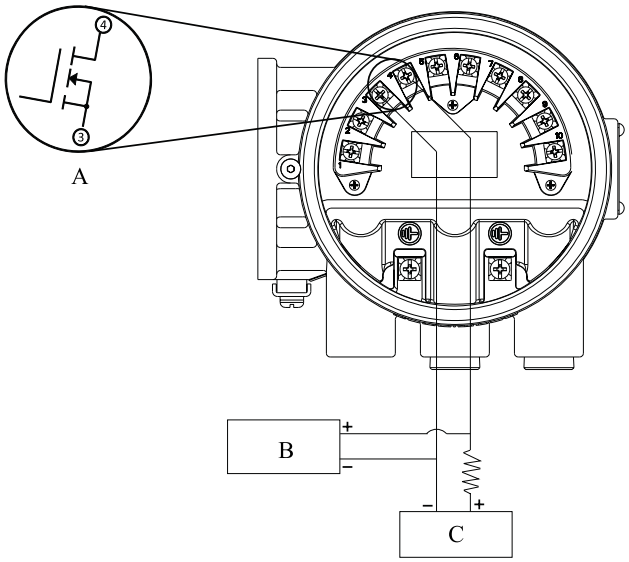
Connecting an external power supply

Note
Total loop impedance must be sufficient to keep loop current below maximum rating. A resistor can be added in the loop to raise impedance.

Figure 6-6: Connecting an electromechanical totalizer/counter with external power



A. Schematic showing FET between terminal 3 and 4
B. 5–24 VDC power supply
C. Electro-mechanical counter



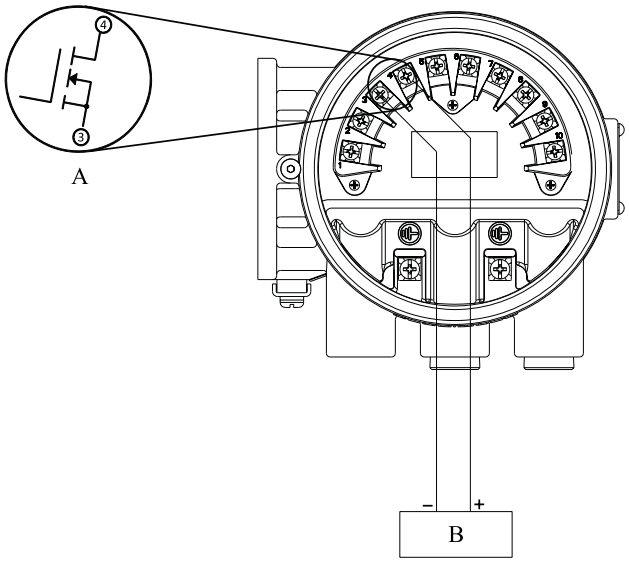
A. Schematic showing FET between terminal 3 and 4
B. Electronic counter
C. 5–24 VDC power supply

Procedure

1. Ensure the power source and connecting cable meet the requirements outlined previously.
2. Turn off the transmitter and pulse output power sources.
3. Run the power cable to the transmitter.
4. Connect - DC to terminal 3.
5. Connect + DC to terminal 4.

Internal power supply

For an internally powered pulse output, the supply voltage from the transmitter can be up to 12 VDC. Connect the transmitter directly to the counter as shown. Internal pulse power can only be used with an electronic totalizer or counter and cannot be used with an electromechanical counter.



A. Schematic showing FET between terminal 3 and 4
B. Electronic counter

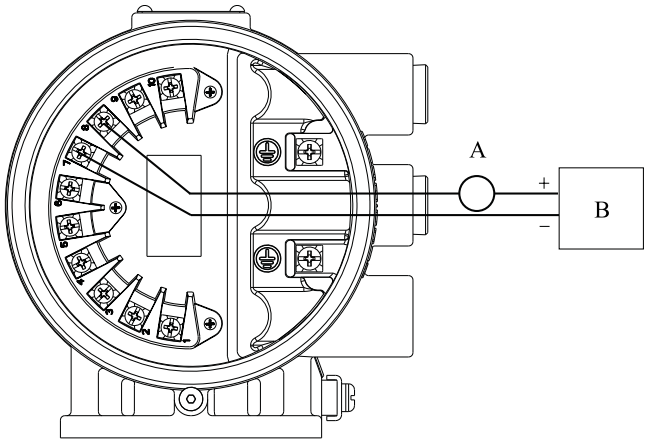
Procedure

1. Turn off the transmitter.
2. Connect wires from the counter to the transmitter as shown.

6.2.2 Connect discrete output

The discrete output control function can be configured to drive an external signal to indicate zero flow, reverse flow, empty pipe, diagnostic status, flow limit, or transmitter status. The following requirements apply:

- Supply Voltage: 5 to 28 VDC
- Maximum Voltage: 28 VDC at 240 mA
- Switch Closure: solid state relay



A. Control relay or input
B. 5–28 VDC power supply

Note
Total loop impedance must be sufficient to keep loop current below maximum current rating. A resistor can be added in the loop to raise impedance.

For discrete output control, connect the power source and control relay to the transmitter. To connect external power for discrete output control, complete the following steps:

Procedure

1. Ensure the power source and connecting cable meet the requirements outlined previously.
2. Turn off the transmitter and discrete power sources.
3. Run the power cable to the transmitter.
4. Connect the DC power supply to the transmitter as shown.

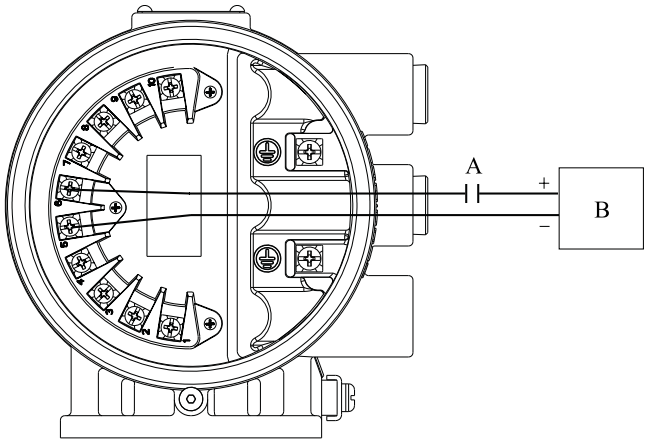
6.2.3 Connect discrete input

- For HART version 5.4 firmware, the discrete input can provide positive zero return (PZR) or net totalizer reset.
- For HART version 5.5 or 7.1 firmware, the discrete input can provide positive zero return (PZR) or reset totalizer (A, B, C, or all totals).

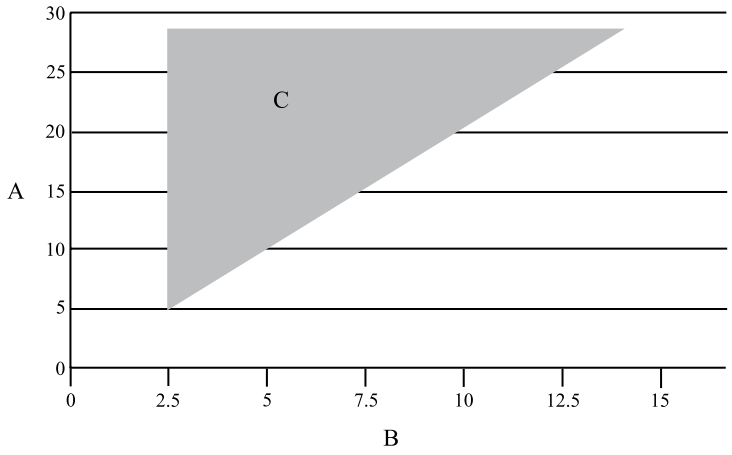
Note
If a particular totalizer is configured to be not resettable, the totalizer will not be reset with this function.

The following requirements apply:

- Supply voltage: 5 VDC to 28 VDC
- Current: 1.5 mA to 20 mA
- Input Impedance: 2.5 k plus 1.2 V diode drop. See Figure 6-11.



A. Relay contactor control system output
B. 5–28 VDC power supply



A. Supply voltage
B. series resistance $\Omega_{in} + \Omega_{ext}$ (KΩ)

To connect the discrete input, complete the following steps.

Procedure

1. Ensure the power source and connecting cable meet the requirements outlined previously.
2. Turn off the transmitter and discrete power sources.
3. Run the power cable to the transmitter.
4. Connect the wires to the transmitter as shown.

6.3 Coil housing configuration

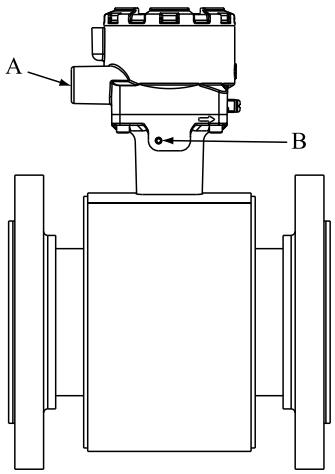
The coil housing provides physical protection of the coils and other internal components from contamination and physical damage that might occur in an industrial environment. The coil housing is an all-welded and gasket-free design.

The 8705 model is available in four coil housing configurations. Configurations are identified by the M0, M1, M2, or M4 options codes found in the model number. The 8711 and 8721 models are only available in one coil housing coil configuration; a separate option code is not available.

6.3.1 Standard coil housing configuration

The standard coil housing configuration is a factory sealed all-welded enclosure and is available for the following models (see Figure 6-12):

- 8705 with option code M0 - 8705xxxxxxxxM0
- 8711 with option code M/L - 8711xxxxxxM/L
- 8721 with option code R/U - 8721xxxxxxR/U



A. Conduit connection
B. No relief port (welded shut or absent)

6.3.2 Process leak protection (option M1)

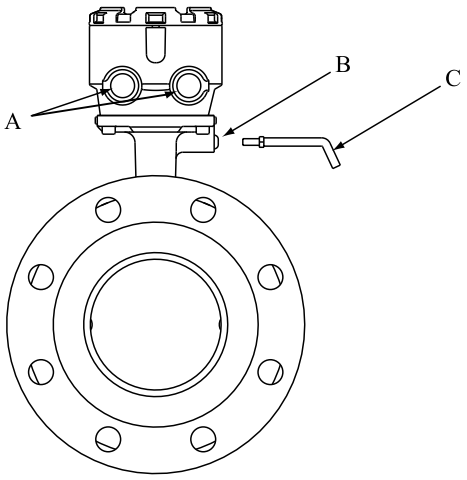
The sensor is available with process leak detection through the use of a threaded connection and pressure relief valve (PRV). This coil housing configuration is a factory sealed all-welded enclosure. The M1 configuration is available for the 8705 only.

- 8705 with option code M1 - 8705xxxxxxxxM1

A PRV can be installed in the threaded connection to prevent possible over-pressuring of the coil housing caused by a primary seal failure. The PRV is capable of venting fugitive emissions when pressure inside the coil housing exceeds five psi. Additional piping may be connected to the PRV to drain any process leakage to a safe location (see Figure 6-13).

In the event of a primary seal failure, this configuration will not protect the coils or other internal components of the sensor from exposure to the process fluid.

Note
The PRV is supplied with the meter to be installed by the customer. Installation of the PRV and any associated piping must be performed in accordance with environmental and hazardous area requirements.



A. Conduit connection
B. M6 threaded pressure relief port with removable cap screw
C. Optional: Use relief port to plumb to safe area (supplied by user).

6.3.3 Process leak containment (Option M2 or M4)

The sensor is available with process leak containment. The coil housing configuration is a factory sealed all-welded enclosure with the addition of sealed electrode compartments. The M2/M4 configuration is available for the 8705 only.

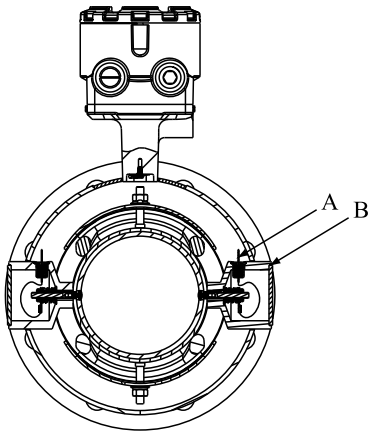
- 8705 with option code M2/M4 - 8705xxxxxxxxM2/M4

This configuration divides the coil housing into separate compartments, one for each electrode and one for the coils. In the event of a primary seal failure, the fluid is contained in the electrode compartment. The sealed electrode compartment prevents the process fluid from entering the coil compartment where it may damage the coils and other internal components. The electrode compartments are designed to contain the process fluid up to a maximum pressure of 740 psig.

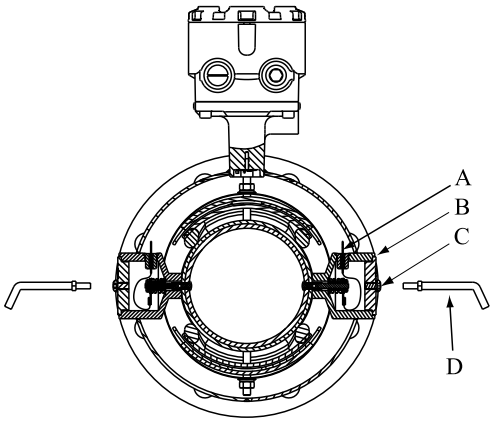
- Code M2 - sealed, welded coil housing with separate sealed and welded electrode compartments (see Figure 6-14).
- Code M4 - sealed, welded coil housing with separate sealed and welded electrode compartments with a threaded port on the electrode tunnel cap, capable of venting fugitive emissions (see Figure 6-15).

Note
To properly vent process fluid from the electrode compartment to a safe location, additional piping is required and must be installed by the user. Installation of any associated piping must be performed in accordance with environmental and hazardous

area requirements. In the event of primary seal failure, the electrode compartment may be pressurized. Use caution when removing the cap screw.



A. 2x fused glass seal
B. 2x sealed electrode compartment



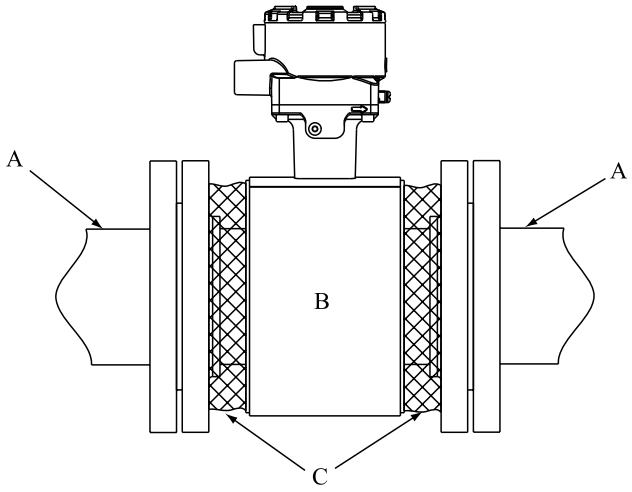
A. 2x fused glass seal
B. 2x sealed electrode compartment
C. M6 threaded pressure relief port with removable cap screw
D. Optional: Use relief port to plumb to safe area (supplied by user).

6.3.4 Higher temperature applications and sensor insulation best practices

Insulation of the magnetic flowmeter sensor is not typically recommended. However, in applications with higher temperature process fluids (above 150°F / 65°C), plant safety, sensor reliability, and sensor longevity can be improved with careful attention to proper insulation.

Procedure

1. In applications where process fluid permeation of the liner has been observed or may be expected, the rate of permeation can be reduced by decreasing the temperature gradient between the process fluid and the outside of the meter body. In these applications only the space between the process flanges and the coil housing should be insulated (see Figure 6-16).

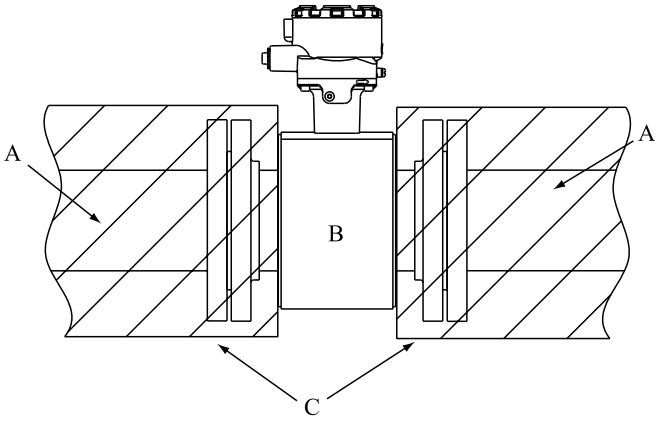


A. Process piping
B. Coil housing
C. Insulation

2. When insulation of the magnetic flowmeter sensor is required due to plant safety standards designed to protect personnel from contact burns, extend the insulation up to the coil housing, covering both ends of the sensor and flanges (Figure 6-17).

   The insulation should NOT cover the coil housing or the terminal junction box. Insulating the coil housing and the terminal junction box can result in overheating of the coil compartment and terminals, resulting in erratic/erroneous flow readings and potential damage or failure of the meter.

Figure 6-17: Insulating a Rosemount Magnetic Flowmeter for Safety/Plant



A. Process piping
B. Coil housing
C. Insulation

7 Operation

7.1 Introduction

The transmitter features a full range of software functions, transmitter configurations, and diagnostic settings. These features can be accessed through the Local Operator Interface (LOI), a Field Communicator, AMS® Device Manager, ProLink III software, or a host control system. Configuration variables may be changed at any time; specific instructions are provided through on-screen instructions.

This section covers the basic features of the LOI (optional) and provides general instructions on how to navigate the configuration menus using the optical buttons. The section also covers the use of a Field Communicator and provides menu trees to access each function. For detailed LOI configuration refer to Configure LOI/Display.

7.2 Local operator interface (LOI)

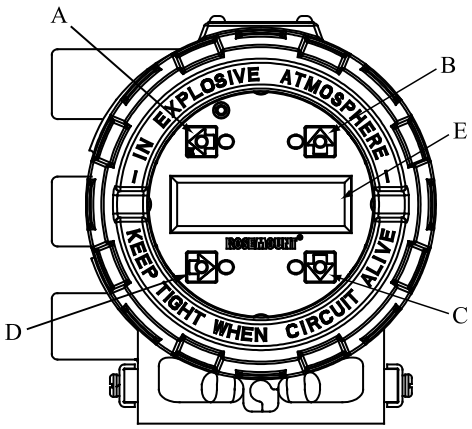
The optional LOI provides a communications center for the transmitter.

The LOI allows an operator to:

- Change transmitter configuration
- View flow and totalizer values
- Start/stop and reset totalizer values
- Run diagnostics and view the results
- Monitor transmitter status

7.2.1 Basic features

The basic features of the LOI include a display window and four navigational arrow keys.



A. ***LEFT*** *(E) key*
B. ***UP*** *key*
C. ***DOWN*** *key*
D. ***RIGHT*** *key*
E. Display window

To access the LOI, press the DOWN arrow one time. Use the UP, DOWN, LEFT, and RIGHT arrows to navigate the menu structure. A map of the LOI menu structure is shown in LOI Menu trees.

7.2.2 Data entry

The LOI keypad does not have alphanumeric keys. Alphanumeric and symbolic data is entered by the following procedure. Use the steps below to access the appropriate functions.

Procedure

1. ⬆ ⬇ ⬅ ➡ to navigate the menu (LOI Menu trees) and access the appropriate alphanumeric parameter.
2. ⬆ ⬇ ➡ to begin editing the parameter.
   - ⬅ to go back without changing the value.
   - For numerical data, scroll through the digits 0-9, decimal point, and dash.
   - For alphabetical data, scroll through the letters of the alphabet A-Z, digits 0-9, and the symbols ?, &, +, -, *, /, $, @,%, and the blank space.
3. ➡ ⬆ ⬇ to select the value.

   ➡ to wrap around and arrive at the character you want to change.
4. ⬅ when all changes are complete to save the entered values.
5. ⬅ again to navigate back to the menu tree.

7.2.3 Data entry examples

Parameter values are classified as *table values* or *select values*.

Table values They are available from a predefined list for parameters such as line size or flow units.

Select values Integers, floating point numbers, or character strings that are entered one character at a time using the arrow keys for parameters such as PV URV and calibration number.

Table value example

Setting the sensor size:

Procedure

1. key to access the menu. See LOI Menu trees.
2. to select line size from the basic setup menu.
3. to increase/decrease the sensor size.
4. .
5. again.

After a moment, the LOI will display VALUE STORED SUCCESSFULLY and then display the selected value.

Select value example

Changing the upper range limit:

Procedure

1. key to access the menu. See LOI Menu trees.
2. to select **PV URV** from the basic setup menu.
3. to position the cursor.
4. to set the number.
5. Repeat Step 3 and Step 4 .
6. again.

After a moment, the LOI will display VALUE STORED SUCCESSFULLY and then display the selected value.

7.2.4 Dynamic variable display pause

To make dynamically changing variables easier to read and record, a pause feature has been built into the LOI.

When viewing a dynamic variable (such as a totalizer value) from the view variable screen, to pause the display value. To return the screen to the dynamic display mode, .

Note
It is important to note this feature pauses only the display. While the display is paused, the transmitter continues to measure all variables dynamically, and continues to increment the totalizer.

7.2.5 Totalizer functionality

Totalizer selection

Procedure

- to access the LOI menu structure. The first option is the totalizers. Under this section, you can view and configure the totalizers.

See Totalizer for more information on the totalizer functionality.

Start all / Stop all

Totalizers can be started or stopped simultaneously. See Totalizer. They cannot be started and stopped individually.

Reset totalizer

The totalizers can be configured to be reset through the LOI. They can be reset individually, or simultaneously through a global command. For details on configuring the reset functionality and on resetting the totalizers, refer to Totalizer.

7.2.6 Display lock

The transmitter has display lock functionality to prevent unintentional configuration changes. The display can be locked manually or configured to automatically lock after a set period of time. When locked, the LOI will display the flow screen.

Manual display lock

To activate, hold the UP arrow for 3 seconds and follow the on-screen instructions. When the display lock is activated, a lock symbol will appear in the lower right hand corner of the display. To deactivate, hold the UP arrow for 3 seconds and follow the on-screen instructions. When the display lock is deactivated, the lock symbol will no longer appear in the lower right hand corner of the display.

Auto display lock

The transmitter can be configured to automatically lock the LOI. Follow the instructions below to access configuration.

Procedure

1. to access the menu. See LOI Menu trees.
2. Scroll to and select **LOI Config** from the Detailed Setup menu.
3. to highlight **Disp Auto Lock** to enter the menu.
4. to select the auto lock time.
5. .
6. .

After a moment, the LOI will display VALUE STORED SUCCESSFULLY and then display the selected value.

7.2.7 Security

The transmitter uses two types of protection to prevent users from making changes to the transmitter configuration. Only one security setting is needed to be ON to prevent changes, both security settings need to be OFF to allow changes.

Write protect

Read-only informational variable that reflects the setting of the hardware security switch. If Write Protect is ON, configuration data are protected and cannot be changed from the LOI , a HART-based communicator or control system. If Write Protect is OFF, configuration data may be changed.

HART Lock (HART 7 only)

This variable reflects the setting of the software security. It can be set to Temporary (turned off by power cycle or Device Reset) or Permanent Lock. If HART Lock is ON, configuration data are protected and cannot be changed from the LOI or a HART-based communicator or control system. If HART Lock is OFF, configuration data may be changed.

7.2.8 Locate device

For HART 7 devices with LCD displays, enabling Locate Device displays the characters "0-0-0-0-0-0-0-0-" on the LCD display. This allows for easy field identification of the device during commissioning or service.

7.2.9 Diagnostic messages

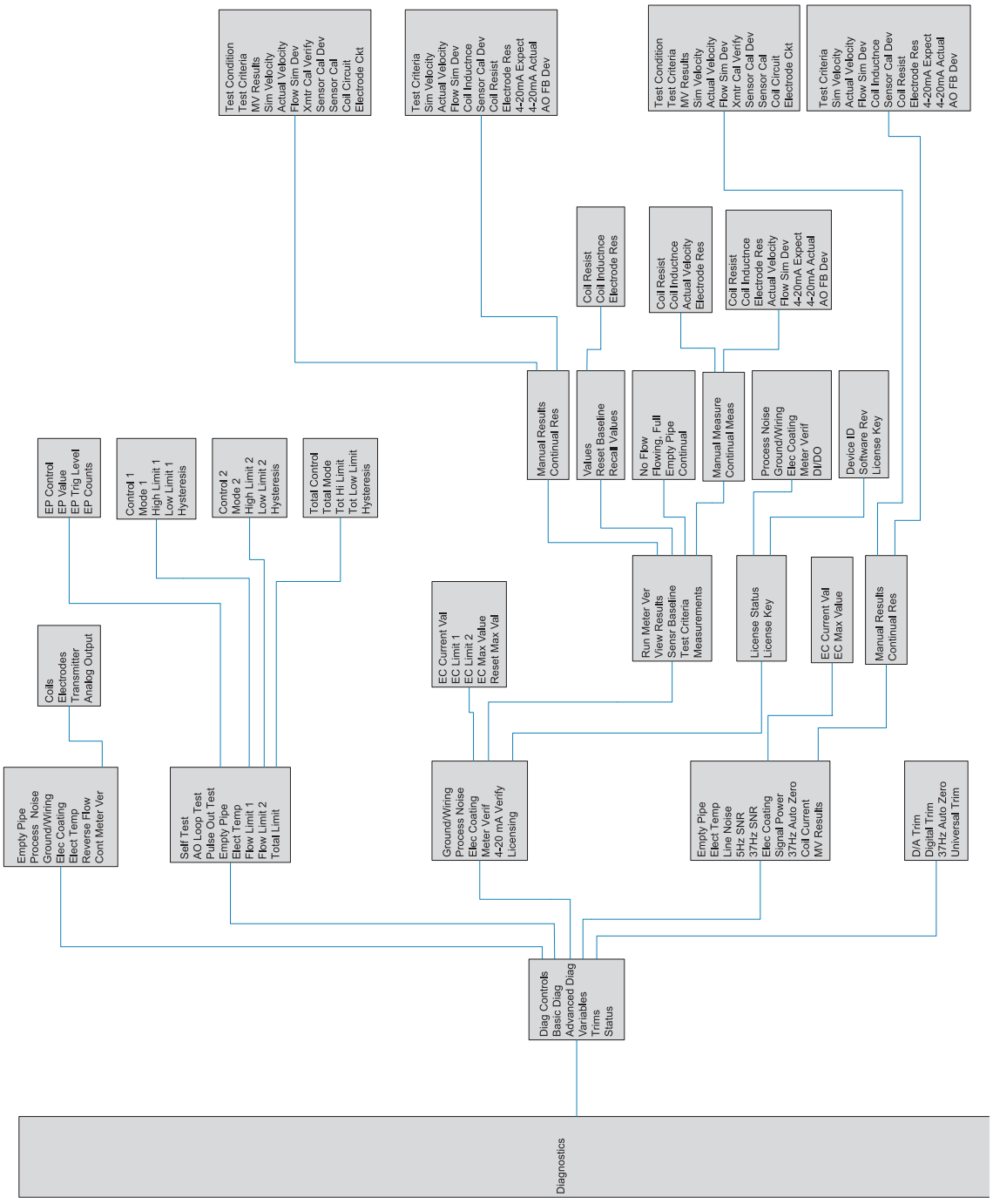
Diagnostic messages may appear on the LOI. See Advanced Diagnostics Configuration for a complete list of messages, potential causes, and corrective actions for these messages.

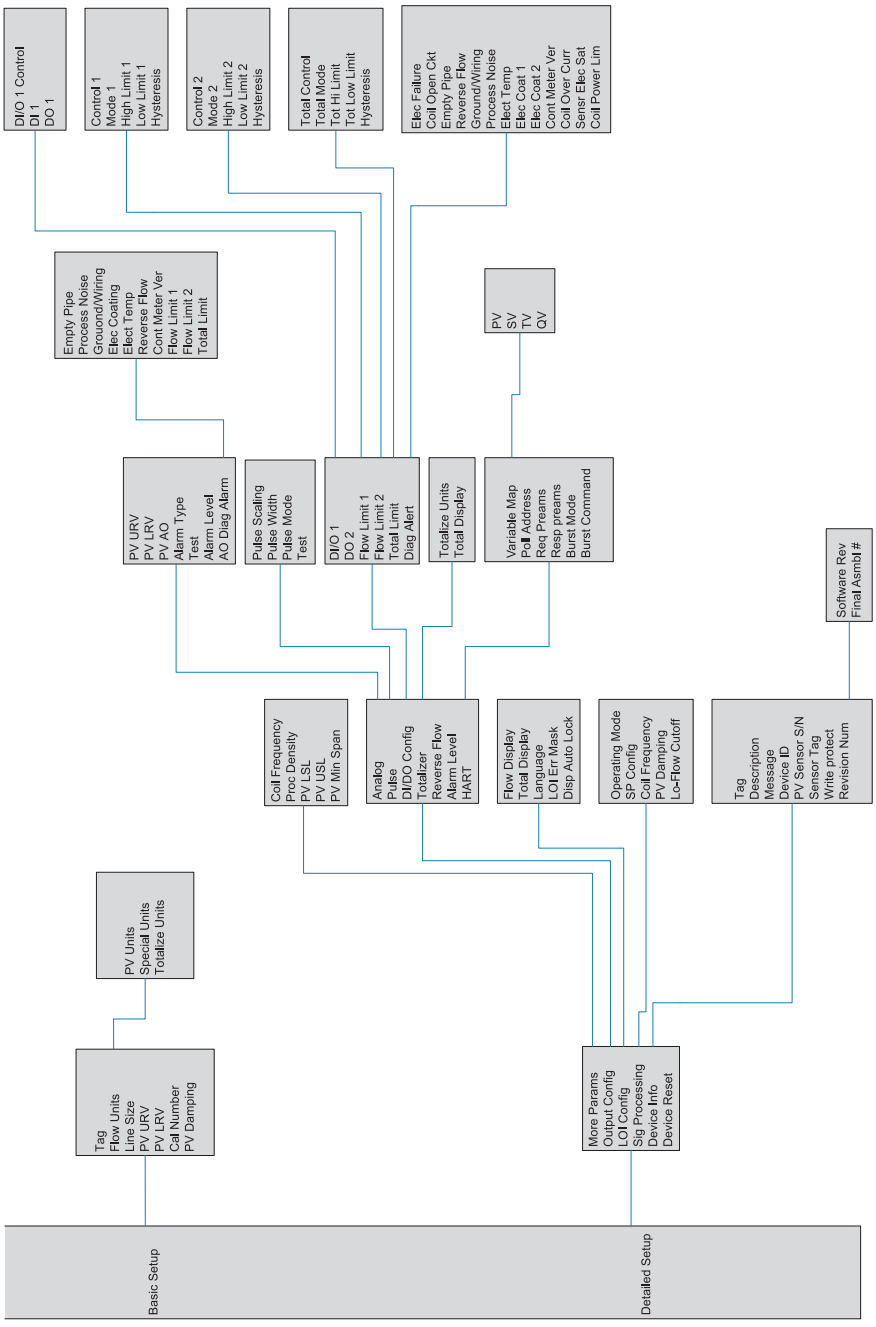
7.2.10 Display symbols

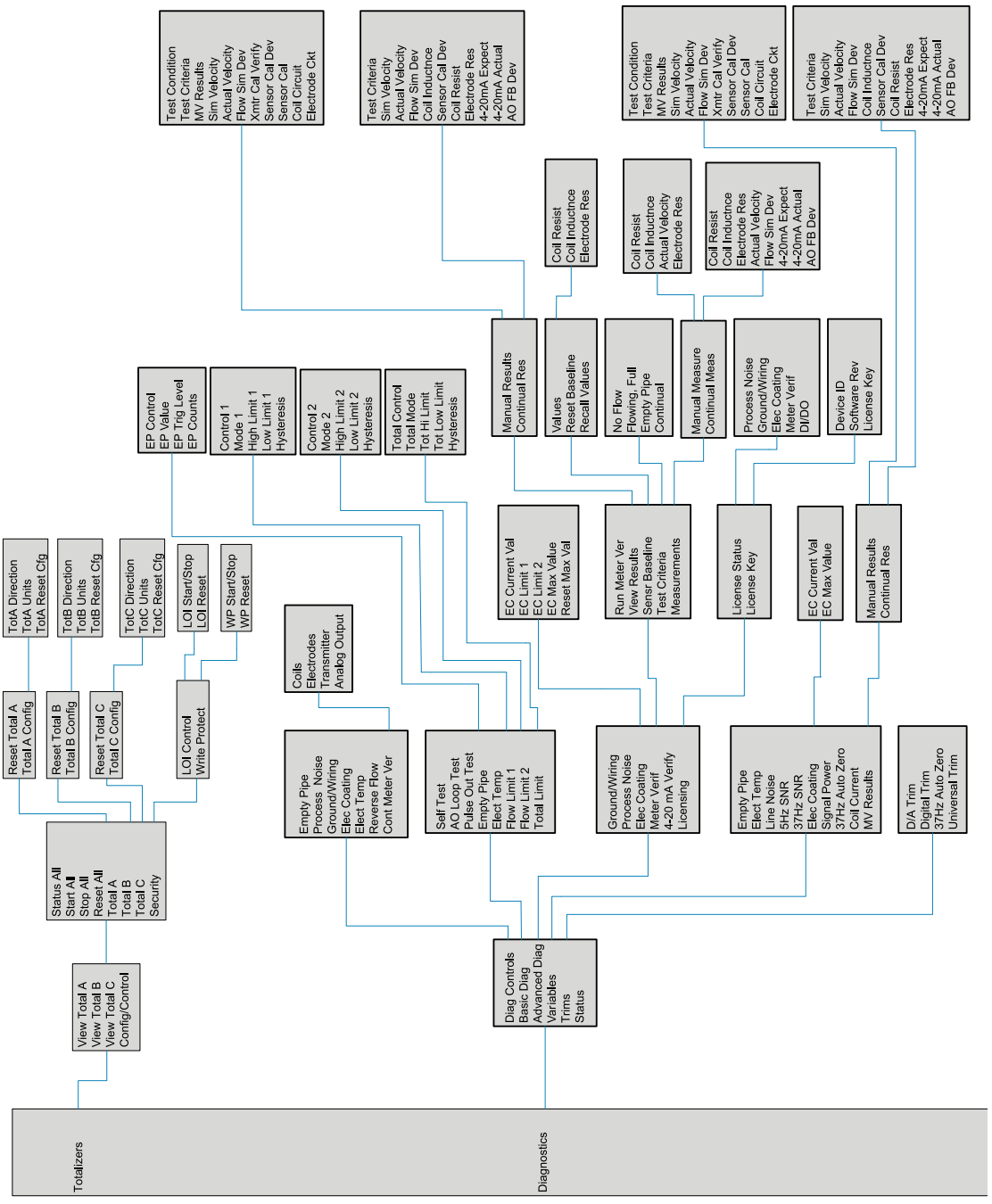
When certain transmitter functions are active, a symbol will appear in the lower-right corner of the display. The possible symbols include the following:

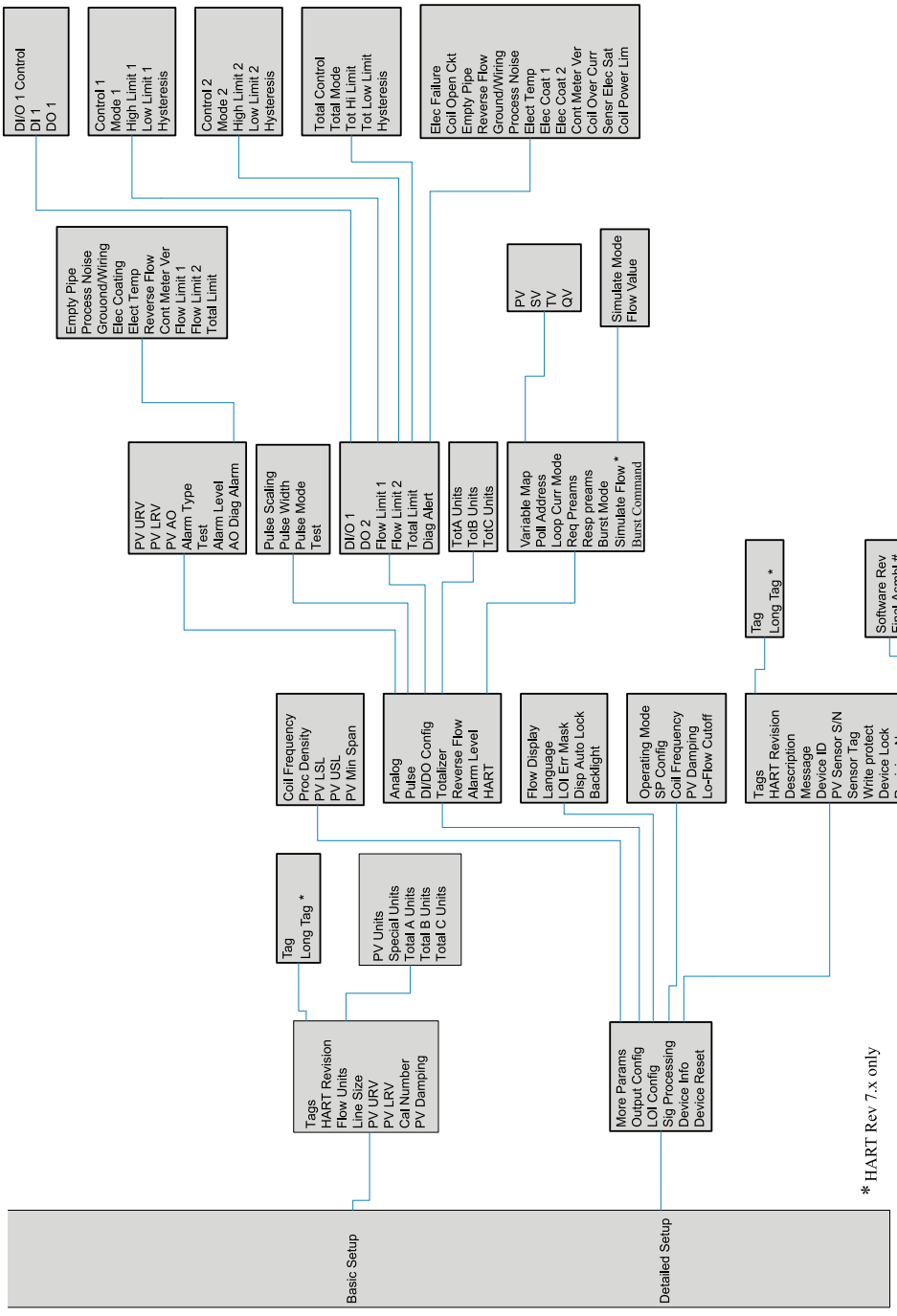
Display Lock	
Totalizer	
Reverse flow	
Continuous meter verification	

7.2.11 LOI Menu trees




DI/O 1 Control
DI 1
DO 1
Control 1
Mode 1
High Limit 1
Low Limit 1
Hysteresis
Control 2
Mode 2
High Limit 2
Low Limit 2
Hysteresis
Total Control
Total Mode
Tot Hi Limit
Tot Low Limit
Hysteresis
Elec Failure
Coil Open Ckt
Empty Pipe
Reverse Flow
Ground/Wiring
Process Noise
Elect Temp
Elec Coat 1
Elec Coat 2
Cont Meter Ver
Coil Over Curr
Sensr Elec Sat
Coil Power Lim
Empty Pipe
Process Noise
Ground/Wiring
Elec Coating
Elect Temp
Reverse Flow
Cont Meter Ver
Flow Limit 1
Flow Limit 2
Total Limit
PV
SV
TV
QV
PV URV
PV LRV
PV AO
Alarm Type
Test
Alarm Level
AO Diag Alarm
Pulse Scaling
Pulse Width
Pulse Mode
Test
DI/O 1
DO 2
Flow Limit 1
Flow Limit 2
Total Limit
Diag Alert
Totalize Units
Total Display
Variable Map
Poll Address
Req Preams
Resp preams
Burst Mode
Burst Command
Software Rev
Final Asmbl #
Coil Frequency
Proc Density
PV LSL
PV USL
PV Min Span
Analog
Pulse
DI/DO Config
Totalizer
Reverse Flow
Alarm Level
HART
Flow Display
Total Display
Language
LOI Err Mask
Disp Auto Lock
Operating Mode
SP Config
Coil Frequency
PV Damping
Lo-Flow Cutoff
Tag
Description
Message
Device ID
PV Sensor S/N
Sensor Tag
Write protect
Revision Num
PV Units
Special Units
Totalize Units
Tag
Flow Units
Line Size
PV URV
PV LRV
Cal Number
PV Damping
More Params
Output Config
LOI Config
Sig Processing
Device Info
Device Reset
Basic Setup
Detailed Setup


Test Condition
Test Criteria
MV Results
Sim Velocity
Actual Velocity
Flow Sim Dev
Xmtr Cal Verify
Sensor Cal Dev
Sensor Cal
Coil Circuit
Electrode Ckt
Test Criteria
Sim Velocity
Actual Velocity
Flow Sim Dev
Coil Inductnce
Sensor Cal Dev
Coil Resist
Electrode Res
4-20mA Expect
4-20mA Actual
AO FB Dev
Test Condition
Test Criteria
MV Results
Sim Velocity
Actual Velocity
Flow Sim Dev
Xmtr Cal Verify
Sensor Cal Dev
Sensor Cal
Coil Circuit
Electrode Ckt
Test Criteria
Sim Velocity
Actual Velocity
Flow Sim Dev
Coil Inductnce
Sensor Cal Dev
Coil Resist
Electrode Res
4-20mA Expect
4-20mA Actual
AO FB Dev
Coil Resist
Coil Inductnce
Electrode Res
Coil Resist
Coil Inductnce
Actual Velocity
Electrode Res
Coil Resist
Coil Inductnce
Electrode Res
Actual Velocity
Flow Sim Dev
4-20mA Expect
4-20mA Actual
AO FB Dev
EP Control
EP Value
EP Trig Level
EP Counts
Control 1
Mode 1
High Limit 1
Low Limit 1
Hysteresis
Control 2
Mode 2
High Limit 2
Low Limit 2
Hysteresis
Total Control
Total Mode
Tot Hi Limit
Tot Low Limit
Hysteresis
Manual Results
Continual Res
Values
Reset Baseline
Recall Values
No Flow
Flowing Full
Empty Pipe
Continual
Manual Measure
Continual Meas
Process Noise
Ground/Wiring
Elec Coating
Meter Verif
DI/DO
Device ID
Software Rev
License Key
TotA Direction
TotA Units
TotA Reset Cfg
TotB Direction
TotB Units
TotB Reset Cfg
TotC Direction
TotC Units
TotC Reset Cfg
LOI Start/Stop
LOI Reset
WP Start/Stop
WP Reset
EC Current Val
EC Limit 1
EC Limit 2
EC Max Value
Reset Max Val
Run Meter Ver
View Results
Sensr Baseline
Test Criteria
Measurements
License Status
License Key
EC Current Val
EC Max Value
Manual Results
Continual Res
Coils
Electrodes
Transmitter
Analog Output
Reset Total A
Total A Config
Reset Total B
Total B Config
Reset Total C
Total C Config
LOI Control
Write Protect
Empty Pipe
Process Noise
Ground/Wiring
Elec Coating
Elect Temp
Reverse Flow
Cont Meter Ver
Self Test
AO Loop Test
Pulse Out Test
Empty Pipe
Elect Temp
Flow Limit 1
Flow Limit 2
Total Limit
Ground/Wiring
Process Noise
Elec Coating
Meter Verif
4-20 mA Verify
Licensing
Empty Pipe
Elect Temp
Line Noise
5Hz SNR
37Hz SNR
Elec Coating
Signal Power
37Hz Auto Zero
Coil Current
MV Results
D/A Trim
Digital Trim
37Hz Auto Zero
Universal Trim
Status All
Start All
Stop All
Reset All
Total A
Total B
Total C
Security
Diag Controls
Basic Diag
Advanced Diag
Variables
Trims
Status
View Total A
View Total B
View Total C
Config/Control
Totalizers
Diagnostics



7.3 Field Communicator interface

The transmitter can be configured with a Field Communicator using HART® Protocol gaining access to the software functions, transmitter configurations, and diagnostic

settings. Refer to the Field Communicator Manual for detailed instructions on how to connect to the device.

7.3.1 Field Communicator user interface

The device driver uses conditional formatting menus. If the diagnostic is not active, the diagnostic will not be displayed as a menu item in the Field Communicator, and menu trees will be resequenced accordingly.

The device dashboard interface is shown in Figure 7-6. The corresponding menu trees are shown in Field Communicator menu trees .

Figure 7-6: Device Dashboard Interface



7.3.2 Field Communicator menu trees

Figure 7-7: Field Communicator Dashboard Menu Tree (HART v5.4, part 1)

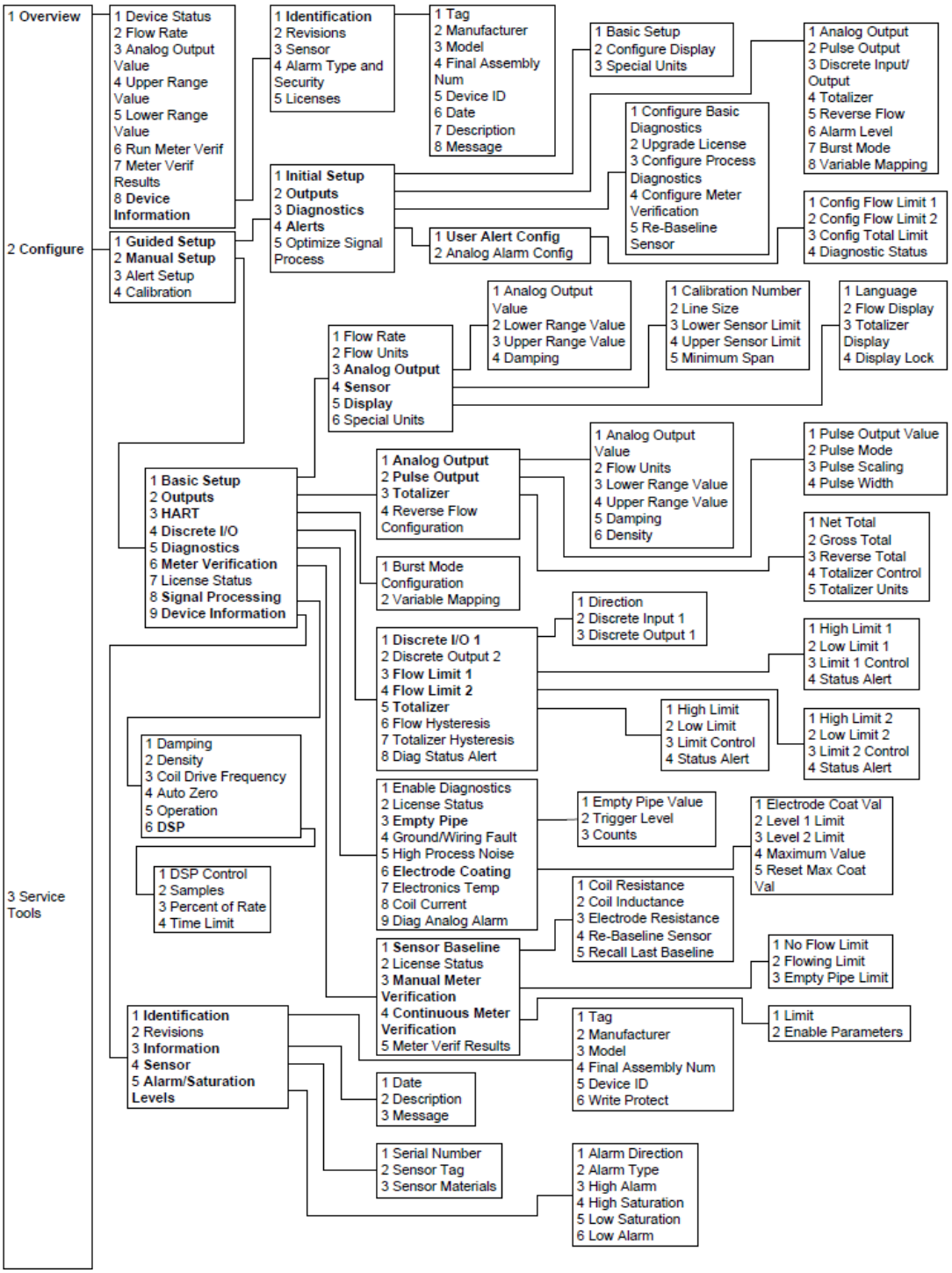
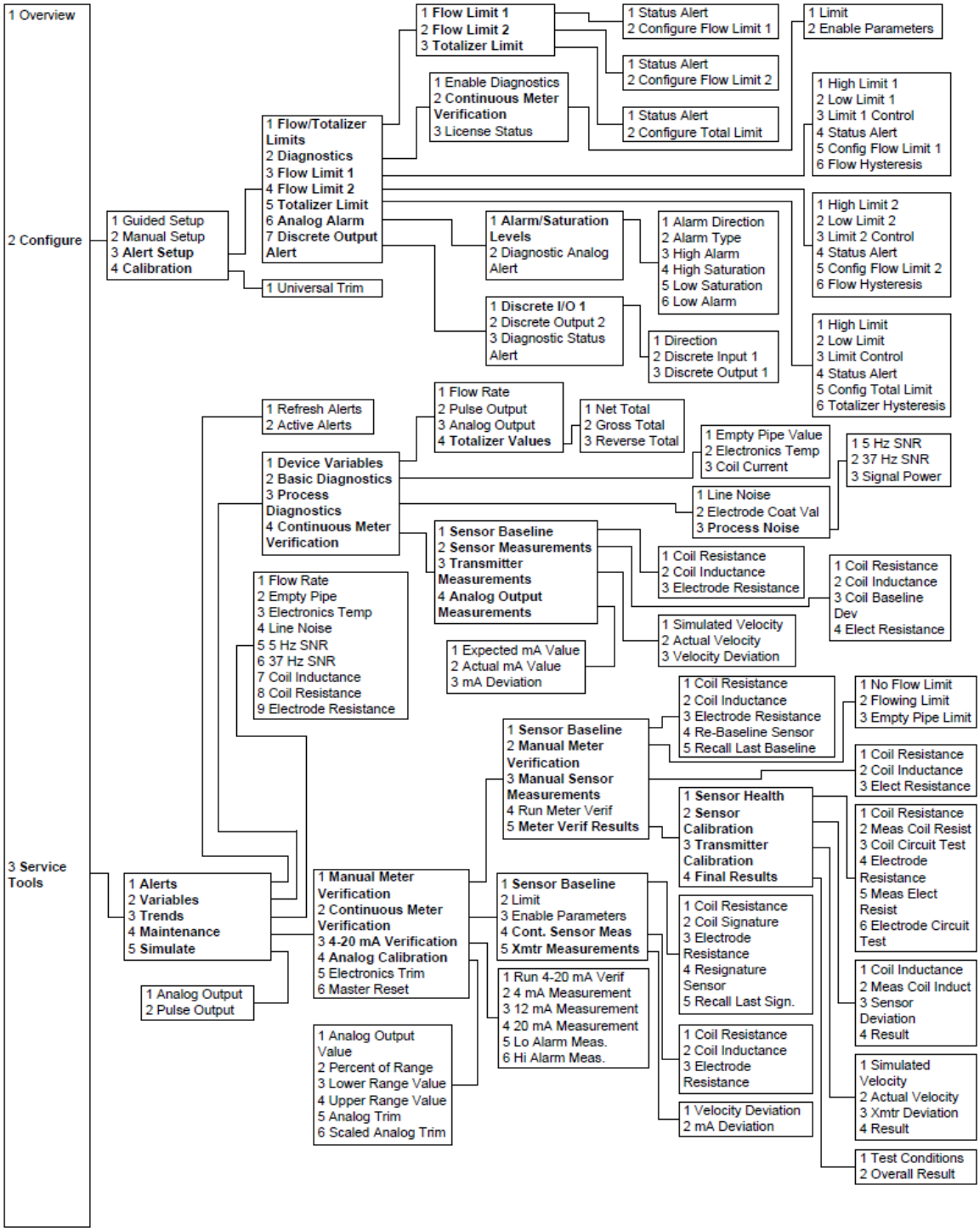
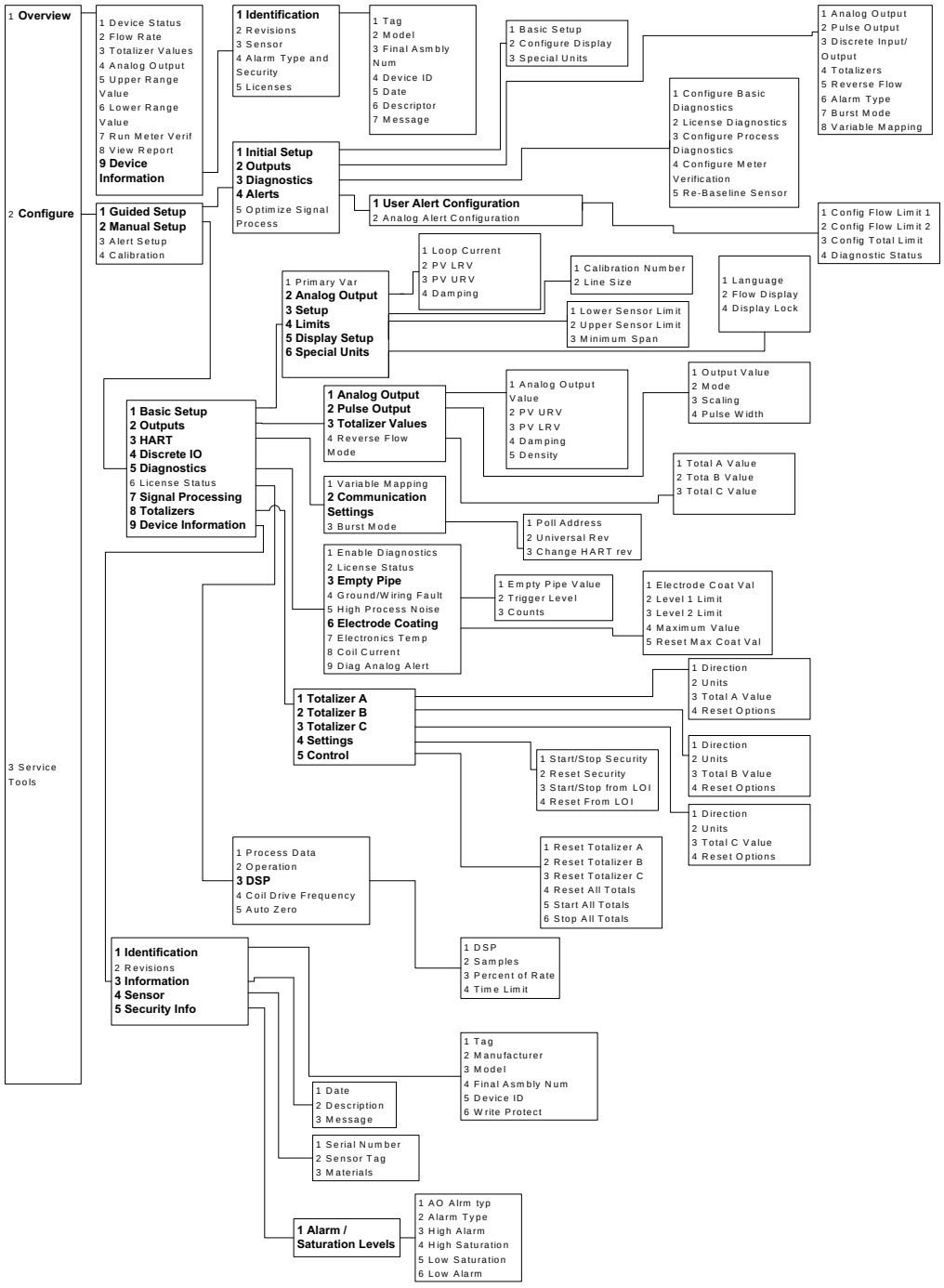
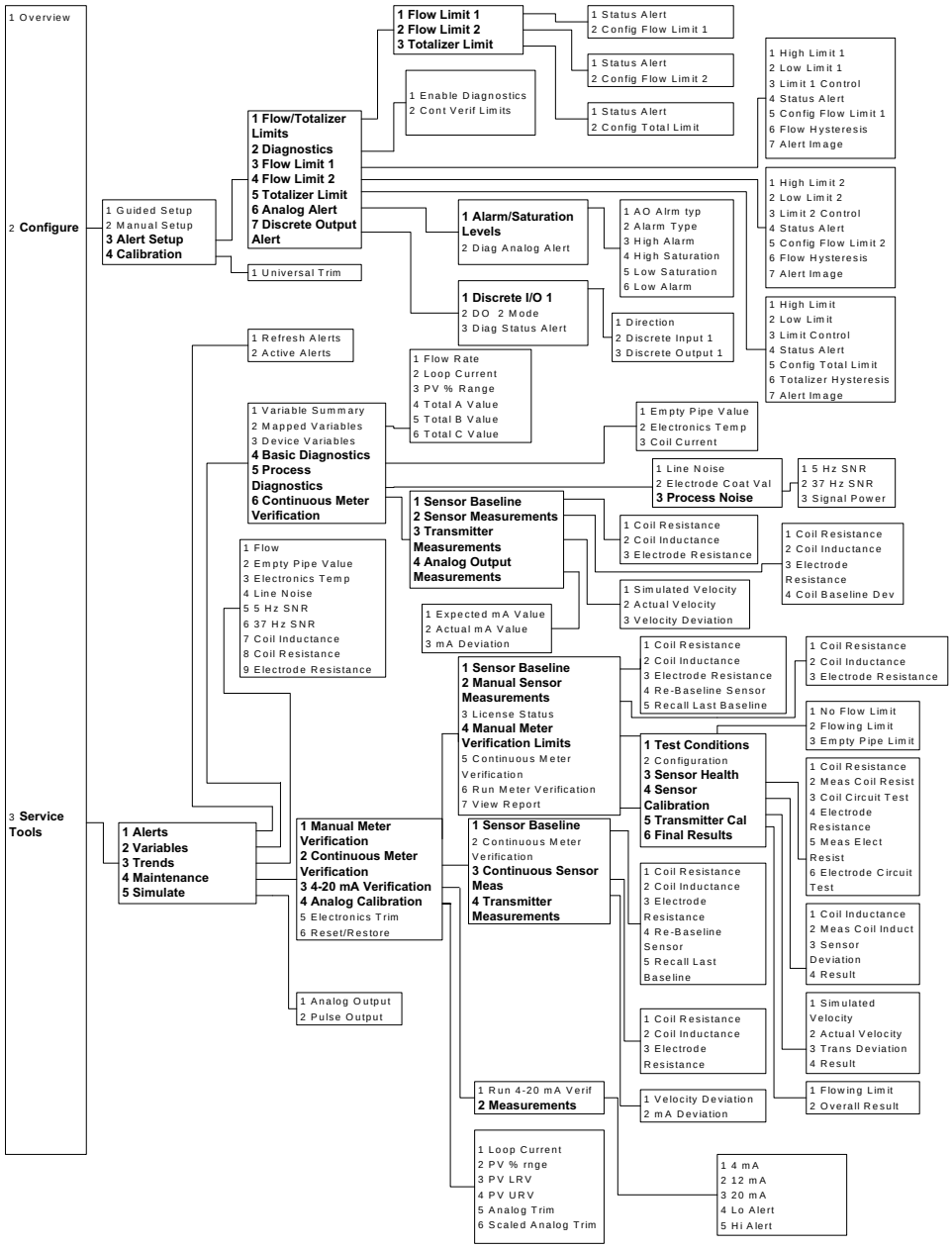
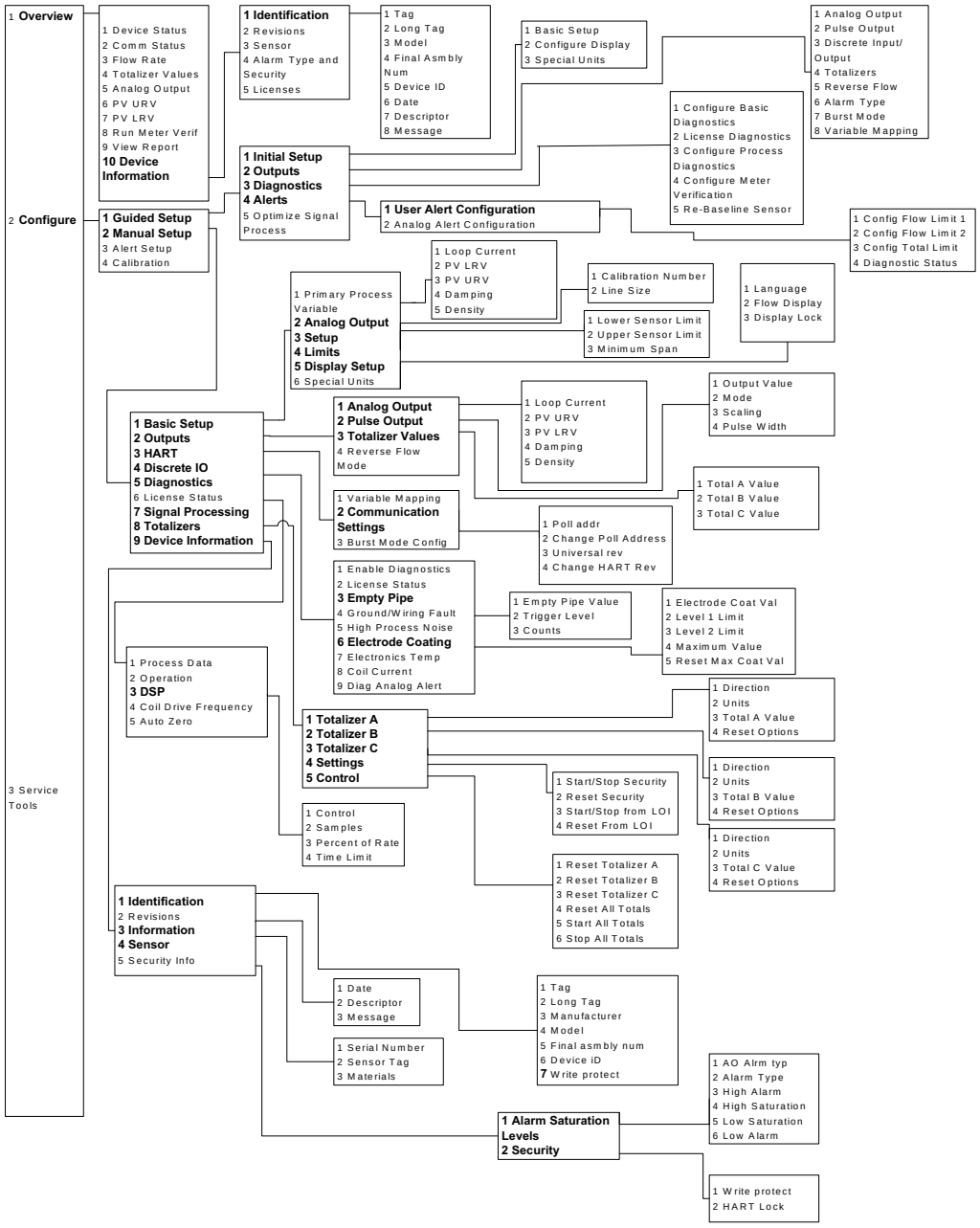


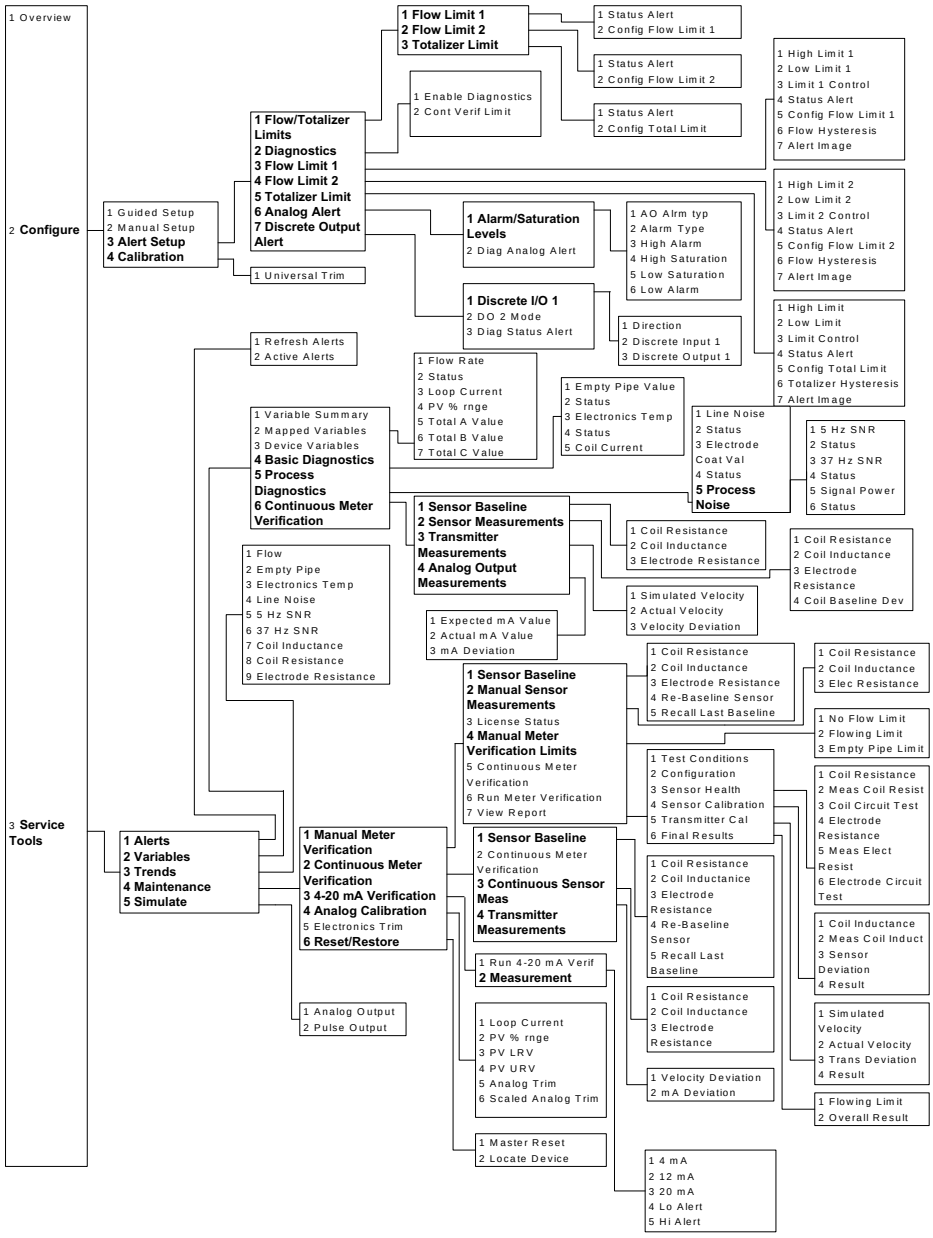
Figure 7-8: Field Communicator Dashboard Menu Tree (HART v5.4, part 2)




1 Overview
1 Device Status
2 Flow Rate
3 Totalizer Values
4 Analog Output
5 Upper Range Value
6 Lower Range Value
7 Run Meter Verif
8 View Report
9 Device Information
2 Configure
1 Guided Setup
2 Manual Setup
3 Alert Setup
4 Calibration
3 Service Tools
1 Identification
2 Revisions
3 Sensor
4 Alarm Type and Security
5 Licenses
1 Tag
2 Model
3 Final Asmbly Num
4 Device ID
5 Date
6 Descriptor
7 Message
1 Initial Setup
2 Outputs
3 Diagnostics
4 Alerts
5 Optimize Signal Process
1 Basic Setup
2 Configure Display
3 Special Units
1 Analog Output
2 Pulse Output
3 Discrete Input/ Output
4 Totalizers
5 Reverse Flow
6 Alarm Type
7 Burst Mode
8 Variable Mapping
1 Configure Basic Diagnostics
2 License Diagnostics
3 Configure Process Diagnostics
4 Configure Meter Verification
5 Re-Baseline Sensor
1 User Alert Configuration
2 Analog Alert Configuration
1 Config Flow Limit 1
2 Config Flow Limit 2
3 Config Total Limit
4 Diagnostic Status
1 Primary Var
2 Analog Output
3 Setup
4 Limits
5 Display Setup
6 Special Units
1 Loop Current
2 PV LRV
3 PV URV
4 Damping
1 Calibration Number
2 Line Size
1 Lower Sensor Limit
2 Upper Sensor Limit
3 Minimum Span
1 Language
2 Flow Display
4 Display Lock
1 Basic Setup
2 Outputs
3 HART
4 Discrete IO
5 Diagnostics
6 License Status
7 Signal Processing
8 Totalizers
9 Device Information
1 Analog Output
2 Pulse Output
3 Totalizer Values
4 Reverse Flow Mode
1 Analog Output Value
2 PV URV
3 PV LRV
4 Damping
5 Density
1 Output Value
2 Mode
3 Scaling
4 Pulse Width
1 Total A Value
2 Tota B Value
3 Total C Value
1 Variable Mapping
2 Communication Settings
3 Burst Mode
1 Poll Address
2 Universal Rev
3 Change HART rev
1 Enable Diagnostics
2 License Status
3 Empty Pipe
4 Ground/Wiring Fault
5 High Process Noise
6 Electrode Coating
7 Electronics Temp
8 Coil Current
9 Diag Analog Alert
1 Empty Pipe Value
2 Trigger Level
3 Counts
1 Electrode Coat Val
2 Level 1 Limit
3 Level 2 Limit
4 Maximum Value
5 Reset Max Coat Val
1 Totalizer A
2 Totalizer B
3 Totalizer C
4 Settings
5 Control
1 Direction
2 Units
3 Total A Value
4 Reset Options
1 Direction
2 Units
3 Total B Value
4 Reset Options
1 Direction
2 Units
3 Total C Value
4 Reset Options
1 Start/Stop Security
2 Reset Security
3 Start/Stop from LOI
4 Reset From LOI
1 Reset Totalizer A
2 Reset Totalizer B
3 Reset Totalizer C
4 Reset All Totals
5 Start All Totals
6 Stop All Totals
1 Process Data
2 Operation
3 DSP
4 Coil Drive Frequency
5 Auto Zero
1 DSP
2 Samples
3 Percent of Rate
4 Time Limit
1 Identification
2 Revisions
3 Information
4 Sensor
5 Security Info
1 Tag
2 Manufacturer
3 Model
4 Final Asmbly Num
5 Device ID
6 Write Protect
1 Date
2 Description
3 Message
1 Serial Number
2 Sensor Tag
3 Materials
1 Alarm / Saturation Levels
1 AO Alrm typ
2 Alarm Type
3 High Alarm
4 High Saturation
5 Low Saturation
6 Low Alarm


1 Overview
2 Configure
1 Guided Setup
2 Manual Setup
3 Alert Setup
4 Calibration
1 Universal Trim
1 Flow/Totalizer Limits
2 Diagnostics
3 Flow Limit 1
4 Flow Limit 2
5 Totalizer Limit
6 Analog Alert
7 Discrete Output Alert
1 Enable Diagnostics
2 Cont Verif Limits
1 Flow Limit 1
2 Flow Limit 2
3 Totalizer Limit
1 Status Alert
2 Config Flow Limit 1
1 Status Alert
2 Config Flow Limit 2
1 Status Alert
2 Config Total Limit
1 High Limit 1
2 Low Limit 1
3 Limit 1 Control
4 Status Alert
5 Config Flow Limit 1
6 Flow Hysteresis
7 Alert Image
1 High Limit 2
2 Low Limit 2
3 Limit 2 Control
4 Status Alert
5 Config Flow Limit 2
6 Flow Hysteresis
7 Alert Image
1 High Limit
2 Low Limit
3 Limit Control
4 Status Alert
5 Config Total Limit
6 Totalizer Hysteresis
7 Alert Image
1 Alarm/Saturation Levels
2 Diag Analog Alert
1 AO Alrm typ
2 Alarm Type
3 High Alarm
4 High Saturation
5 Low Saturation
6 Low Alarm
1 Discrete I/O 1
2 DO 2 Mode
3 Diag Status Alert
1 Direction
2 Discrete Input 1
3 Discrete Output 1
1 Refresh Alerts
2 Active Alerts
1 Flow Rate
2 Loop Current
3 PV % Range
4 Total A Value
5 Total B Value
6 Total C Value
1 Variable Summary
2 Mapped Variables
3 Device Variables
4 Basic Diagnostics
5 Process Diagnostics
6 Continuous Meter Verification
1 Empty Pipe Value
2 Electronics Temp
3 Coil Current
1 Line Noise
2 Electrode Coat Val
3 Process Noise
1 5 Hz SNR
2 37 Hz SNR
3 Signal Power
1 Sensor Baseline
2 Sensor Measurements
3 Transmitter Measurements
4 Analog Output Measurements
1 Coil Resistance
2 Coil Inductance
3 Electrode Resistance
1 Coil Resistance
2 Coil Inductance
3 Electrode Resistance
4 Coil Baseline Dev
1 Simulated Velocity
2 Actual Velocity
3 Velocity Deviation
1 Expected mA Value
2 Actual mA Value
3 mA Deviation
1 Flow
2 Empty Pipe Value
3 Electronics Temp
4 Line Noise
5 5 Hz SNR
6 37 Hz SNR
7 Coil Inductance
8 Coil Resistance
9 Electrode Resistance
3 Service Tools
1 Alerts
2 Variables
3 Trends
4 Maintenance
5 Simulate
1 Manual Meter Verification
2 Continuous Meter Verification
3 4-20 mA Verification
4 Analog Calibration
5 Electronics Trim
6 Reset/Restore
1 Analog Output
2 Pulse Output
1 Sensor Baseline
2 Manual Sensor Measurements
3 License Status
4 Manual Meter Verification Limits
5 Continuous Meter Verification
6 Run Meter Verification
7 View Report
1 Coil Resistance
2 Coil Inductance
3 Electrode Resistance
4 Re-Baseline Sensor
5 Recall Last Baseline
1 Coil Resistance
2 Coil Inductance
3 Electrode Resistance
1 No Flow Limit
2 Flowing Limit
3 Empty Pipe Limit
1 Test Conditions
2 Configuration
3 Sensor Health
4 Sensor Calibration
5 Transmitter Cal
6 Final Results
1 Coil Resistance
2 Meas Coil Resist
3 Coil Circuit Test
4 Electrode Resistance
5 Meas Elect Resist
6 Electrode Circuit Test
1 Sensor Baseline
2 Continuous Meter Verification
3 Continuous Sensor Meas
4 Transmitter Measurements
1 Coil Resistance
2 Coil Inductance
3 Electrode Resistance
4 Re-Baseline Sensor
5 Recall Last Baseline
1 Coil Inductance
2 Meas Coil Induct
3 Sensor Deviation
4 Result
1 Coil Resistance
2 Coil Inductance
3 Electrode Resistance
1 Simulated Velocity
2 Actual Velocity
3 Trans Deviation
4 Result
1 Run 4-20 mA Verif
2 Measurements
1 Velocity Deviation
2 mA Deviation
1 Flowing Limit
2 Overall Result
1 Loop Current
2 PV % rnge
3 PV LRV
4 PV URV
5 Analog Trim
6 Scaled Analog Trim
1 4 mA
2 12 mA
3 20 mA
4 Lo Alert
5 Hi Alert


1 Overview
1 Device Status
2 Comm Status
3 Flow Rate
4 Totalizer Values
5 Analog Output
6 PV URV
7 PV LRV
8 Run Meter Verif
9 View Report
10 Device Information
1 Identification
2 Revisions
3 Sensor
4 Alarm Type and Security
5 Licenses
1 Tag
2 Long Tag
3 Model
4 Final Asmbly Num
5 Device ID
6 Date
7 Descriptor
8 Message
1 Basic Setup
2 Configure Display
3 Special Units
1 Analog Output
2 Pulse Output
3 Discrete Input/ Output
4 Totalizers
5 Reverse Flow
6 Alarm Type
7 Burst Mode
8 Variable Mapping
1 Configure Basic Diagnostics
2 License Diagnostics
3 Configure Process Diagnostics
4 Configure Meter Verification
5 Re-Baseline Sensor
2 Configure
1 Guided Setup
2 Manual Setup
3 Alert Setup
4 Calibration
1 Initial Setup
2 Outputs
3 Diagnostics
4 Alerts
5 Optimize Signal Process
1 User Alert Configuration
2 Analog Alert Configuration
1 Config Flow Limit 1
2 Config Flow Limit 2
3 Config Total Limit
4 Diagnostic Status
1 Loop Current
2 PV LRV
3 PV URV
4 Damping
5 Density
1 Calibration Number
2 Line Size
1 Primary Process Variable
2 Analog Output
3 Setup
4 Limits
5 Display Setup
6 Special Units
1 Lower Sensor Limit
2 Upper Sensor Limit
3 Minimum Span
1 Language
2 Flow Display
3 Display Lock
1 Basic Setup
2 Outputs
3 HART
4 Discrete IO
5 Diagnostics
6 License Status
7 Signal Processing
8 Totalizers
9 Device Information
1 Analog Output
2 Pulse Output
3 Totalizer Values
4 Reverse Flow Mode
1 Loop Current
2 PV URV
3 PV LRV
4 Damping
5 Density
1 Output Value
2 Mode
3 Scaling
4 Pulse Width
1 Total A Value
2 Total B Value
3 Total C Value
1 Variable Mapping
2 Communication Settings
3 Burst Mode Config
1 Poll addr
2 Change Poll Address
3 Universal rev
4 Change HART Rev
1 Enable Diagnostics
2 License Status
3 Empty Pipe
4 Ground/Wiring Fault
5 High Process Noise
6 Electrode Coating
7 Electronics Temp
8 Coil Current
9 Diag Analog Alert
1 Empty Pipe Value
2 Trigger Level
3 Counts
1 Electrode Coat Val
2 Level 1 Limit
3 Level 2 Limit
4 Maximum Value
5 Reset Max Coat Val
1 Process Data
2 Operation
3 DSP
4 Coil Drive Frequency
5 Auto Zero
1 Totalizer A
2 Totalizer B
3 Totalizer C
4 Settings
5 Control
1 Direction
2 Units
3 Total A Value
4 Reset Options
1 Direction
2 Units
3 Total B Value
4 Reset Options
1 Direction
2 Units
3 Total C Value
4 Reset Options
1 Start/Stop Security
2 Reset Security
3 Start/Stop from LOI
4 Reset From LOI
1 Control
2 Samples
3 Percent of Rate
4 Time Limit
1 Reset Totalizer A
2 Reset Totalizer B
3 Reset Totalizer C
4 Reset All Totals
5 Start All Totals
6 Stop All Totals
3 Service Tools
1 Identification
2 Revisions
3 Information
4 Sensor
5 Security Info
1 Date
2 Descriptor
3 Message
1 Tag
2 Long Tag
3 Manufacturer
4 Model
5 Final asmbly num
6 Device ID
7 Write protect
1 Serial Number
2 Sensor Tag
3 Materials
1 Alarm Saturation Levels
2 Security
1 AO Alrm typ
2 Alarm Type
3 High Alarm
4 High Saturation
5 Low Saturation
6 Low Alarm
1 Write protect
2 HART Lock


1 Overview
2 Configure
1 Guided Setup
2 Manual Setup
3 Alert Setup
4 Calibration
1 Universal Trim
1 Flow/Totalizer Limits
2 Diagnostics
3 Flow Limit 1
4 Flow Limit 2
5 Totalizer Limit
6 Analog Alert
7 Discrete Output Alert
1 Flow Limit 1
2 Flow Limit 2
3 Totalizer Limit
1 Enable Diagnostics
2 Cont Verif Limit
1 Status Alert
2 Config Flow Limit 1
1 Status Alert
2 Config Flow Limit 2
1 Status Alert
2 Config Total Limit
1 High Limit 1
2 Low Limit 1
3 Limit 1 Control
4 Status Alert
5 Config Flow Limit 1
6 Flow Hysteresis
7 Alert Image
1 High Limit 2
2 Low Limit 2
3 Limit 2 Control
4 Status Alert
5 Config Flow Limit 2
6 Flow Hysteresis
7 Alert Image
1 Alarm/Saturation Levels
2 Diag Analog Alert
1 AO Alrm typ
2 Alarm Type
3 High Alarm
4 High Saturation
5 Low Saturation
6 Low Alarm
1 Discrete I/O 1
2 DO 2 Mode
3 Diag Status Alert
1 Direction
2 Discrete Input 1
3 Discrete Output 1
1 High Limit
2 Low Limit
3 Limit Control
4 Status Alert
5 Config Total Limit
6 Totalizer Hysteresis
7 Alert Image
1 Refresh Alerts
2 Active Alerts
1 Flow Rate
2 Status
3 Loop Current
4 PV % rnge
5 Total A Value
6 Total B Value
7 Total C Value
1 Empty Pipe Value
2 Status
3 Electronics Temp
4 Status
5 Coil Current
1 Line Noise
2 Status
3 Electrode Coat Val
4 Status
5 Process Noise
1 5 Hz SNR
2 Status
3 37 Hz SNR
4 Status
5 Signal Power
6 Status
1 Variable Summary
2 Mapped Variables
3 Device Variables
4 Basic Diagnostics
5 Process Diagnostics
6 Continuous Meter Verification
1 Sensor Baseline
2 Sensor Measurements
3 Transmitter Measurements
4 Analog Output Measurements
1 Coil Resistance
2 Coil Inductance
3 Electrode Resistance
1 Coil Resistance
2 Coil Inductance
3 Electrode Resistance
4 Coil Baseline Dev
1 Simulated Velocity
2 Actual Velocity
3 Velocity Deviation
1 Flow
2 Empty Pipe
3 Electronics Temp
4 Line Noise
5 5 Hz SNR
6 37 Hz SNR
7 Coil Inductance
8 Coil Resistance
9 Electrode Resistance
1 Expected mA Value
2 Actual mA Value
3 mA Deviation
3 Service Tools
1 Alerts
2 Variables
3 Trends
4 Maintenance
5 Simulate
1 Manual Meter Verification
2 Continuous Meter Verification
3 4-20 mA Verification
4 Analog Calibration
5 Electronics Trim
6 Reset/Restore
1 Sensor Baseline
2 Manual Sensor Measurements
3 License Status
4 Manual Meter Verification Limits
5 Continuous Meter Verification
6 Run Meter Verification
7 View Report
1 Coil Resistance
2 Coil Inductance
3 Electrode Resistance
4 Re-Baseline Sensor
5 Recall Last Baseline
1 Coil Resistance
2 Coil Inductance
3 Elec Resistance
1 No Flow Limit
2 Flowing Limit
3 Empty Pipe Limit
1 Test Conditions
2 Configuration
3 Sensor Health
4 Sensor Calibration
5 Transmitter Cal
6 Final Results
1 Coil Resistance
2 Meas Coil Resist
3 Coil Circuit Test
4 Electrode Resistance
5 Meas Elect Resist
6 Electrode Circuit Test
1 Sensor Baseline
2 Continuous Meter Verification
3 Continuous Sensor Meas
4 Transmitter Measurements
1 Coil Resistance
2 Coil Inductance
3 Electrode Resistance
4 Re-Baseline Sensor
5 Recall Last Baseline
1 Coil Inductance
2 Meas Coil Induct
3 Sensor Deviation
4 Result
1 Run 4-20 mA Verif
2 Measurement
1 Coil Resistance
2 Coil Inductance
3 Electrode Resistance
1 Simulated Velocity
2 Actual Velocity
3 Trans Deviation
4 Result
1 Analog Output
2 Pulse Output
1 Loop Current
2 PV % rnge
3 PV LRV
4 PV URV
5 Analog Trim
6 Scaled Analog Trim
1 Velocity Deviation
2 mA Deviation
1 Flowing Limit
2 Overall Result
1 Master Reset
2 Locate Device
1 4 mA
2 12 mA
3 20 mA
4 Lo Alert
5 Hi Alert

8 Advanced Configuration Functionality

8.1 Introduction

This section contains information for advanced configuration parameters.

The software configuration settings for the transmitter can be accessed through a HART®-based communicator, Local Operator Interface (LOI), AMS, or through a control system. Before operating the transmitter in an actual installation, you should review all of the factory set configuration data to ensure that they reflect the current application.

8.2 Configure outputs

LOI menu path	**Detailed Setup → Output Config**

The configure outputs functionality is used to configure advanced features that control the analog, pulse, auxiliary, and totalizer outputs of the transmitter.

8.2.1 Analog output

LOI menu path	**Detailed Setup → Output Config → Analog**

The analog output function is used to configure all of the features of the 4-20 mA output.

Upper range value

LOI menu path	**Detailed Setup → Output Config → Analog → PV URV**

The *upper range value* (URV) sets the 20 mA point for the analog output. This value is typically set to full-scale flow. The units that appear will be the same as those selected under the units parameter. The URV may be set between –39.3 ft/s to 39.3 ft/s (–12 m/s to 12 m/s) or the equivalent range based on the selected flow units. There must be at least 1 ft/s (0.3 m/s) span or equivalent between the URV and LRV.

Note
If entering a negative number, the minus sign must be entered in the furthest left position on the LOI.

Lower range value

LOI menu path	**Detailed Setup → Output Config, → Analog → PV LRV**

The *lower range value* (LRV) sets the 4 mA point for the analog output. This value is typically set to zero flow. The units that appear will be the same as those selected under the units parameter. The LRV may be set between –39.3 ft/s to 39.3 ft/s (–12 m/s to 12 m/s) or the equivalent range based on the selected flow units. There must be at least 1 ft/s (0.3 m/s) span or equivalent between the URV and LRV.

Note
If entering a negative number, the minus sign must be entered in the furthest left position on the LOI.

Alarm type

LOI menu path	**Detailed Setup → Output Config → Analog → Alarm Type**

The analog output alarm type displays the position of the alarm switch on the electronics board. There are two available positions for this switch:

- High
- Low

Alarm level

LOI menu path	**Detailed Setup → Output Config → Analog → Alarm Level**

The alarm level configuration will drive the transmitter to preset values if an alarm occurs. There are two options:

- Rosemount Alarm and Saturation Values (see table Table 8-1 for specific values)
- NAMUR-Compliant Alarm and Saturation Values (see Table 8-2 for specific values)

Table 8-1: Rosemount Values

Level	4-20 mA saturation	4-20 mA alarm
Low	3.9 mA	3.75 mA
High	20.8 mA	22.5 mA

Table 8-2: NAMUR Values

Level	4-20 mA saturation	4-20 mA alarm
Low	3.8 mA	3.5 mA
High	20.5 mA	22.6 mA

AO diagnostic alarm

LOI menu path	**Detailed Setup → Output Config → Analog → AO Diag Alarm**

There are diagnostics that, when under active conditions, do not drive the analog output to alarm level. The AO diagnostic alarm menu enables selection of these diagnostics to be associated with an analog alarm. If any of the selected diagnostics are active, it will cause the analog output to go to the configured alarm level. For a list of diagnostic alarms that can be configured to drive an analog alarm, see Table 8-3.

Table 8-3: Analog Alarm Diagnostic Options

Diagnostic(1)	Description
Empty Pipe	Drive to an alarm state when empty pipe is detected.
Reverse Flow	Drive to an alarm state when reverse flow is detected.
Grounding / Wiring Fault	Drive to an alarm state when grounding or wiring fault is detected.
High Process Noise	Drive to an alarm state when the transmitter detects high levels of process noise.
Electronics Temperature Out of Range	Drive to an alarm state when the temperature of the electronics exceeds allowable limits
Electrode Coating Limit 2	Drive to an alarm state when electrode coating reaches a point where it impacts the flow measurement
Totalizer Limit 1	Drive to an alarm state when the totalizer value exceeds the parameters set in the totalizer limit configuration (see page 5-x for more details on this functionality)
Flow Limit 1	Drive to an alarm state when the flow rate exceeds the parameters set in the flow limit 1 configuration (see page 5-x for more details on this functionality)
Flow Limit 2	Drive to an alarm state when the flow rate exceeds the parameters set in the flow limit 2 configuration (see page 5-x for more details on this functionality)
Continuous Meter Verification	Drive to an alarm state when the continuous meter verification diagnostic detects a failure of one of the tests

(1) See Troubleshooting for more details on each of the diagnostics

8.2.2 Pulse output

LOI menu path	**Detailed Setup → Output Config → Pulse**

Under this function the pulse output of the transmitter can be configured.

Pulse scaling

LOI menu path	**Detailed Setup → Output Config → Pulse → Pulse Scaling**

Transmitter may be commanded to supply a specified frequency between 1 pulse/ day at 39.37 ft/sec (12 m/s) to 10,000 Hz at 1 ft/sec (0.3 m/s).

Note
The maximum pulse scaling frequency for transmitters with an intrinsically safe output is 5000 Hz.

Note
Line size, special units, and density must be selected prior to configuration of the pulse scaling factor.

The pulse output scaling equates one transistor switch closure pulse to a selectable number of volume units. The volume unit used for scaling pulse output is taken from the numerator of the configured flow units. For example, if gal/min had been chosen when selecting the flow unit, the volume unit displayed would be gallons.

Note
The pulse output scaling is designed to operate between 0 and 10,000 Hz. The minimum conversion factor value is found by dividing the minimum span (in units of volume per second) by 10,000 Hz.

When selecting pulse output scaling, the maximum pulse rate is 10,000 Hz. With the 10 percent over range capability, the absolute limit is 11,000 Hz. For example, if you want the transmitter to pulse every time 0.01 gallons pass through the sensor, and the flow rate is

$$\frac{10{,}000\ gal}{1\ min} \times \frac{1\ min}{(60\ sec)} \times \frac{1\ pulse}{0.01\ gal} = 16{,}666.7\ Hz$$

The best choice for this parameter depends upon the required resolution, the number of digits in the totalizer, the extent of range required, and the maximum frequency limit of the external counter.

Pulse factor units

LOI menu path	**Detailed Setup → Output Config → Pulse → Units**

The pulse factor unit assigns the unit of measure to the pulse scaling factor. The default read-only value is the unit of measure from the configured flow units. For example, if gal/min is selected when configuring the flow units, the pulse factor unit will be gallons.

Pulse width

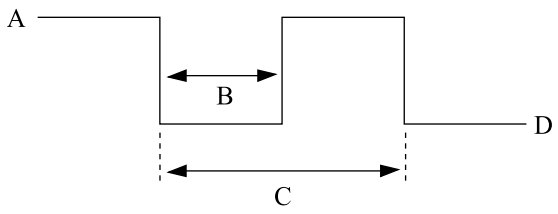
LOI menu path	**Detailed Setup → Output Config → Pulse → Pulse Width**

The factory default pulse width is 0.5 ms.

The width, or duration, of the pulse can be adjusted to match the requirements of different counters or controllers (see Figure 8-1). These are typically lower frequency applications (< 1000Hz). The transmitter will accept values from 0.1 ms to 650 ms.

For frequencies higher than 1000Hz, it is recommended to set the pulse mode to 50% duty cycle by setting the pulse mode to frequency output.

The pulse width will limit the maximum frequency output, If the pulse width is set too wide (more than 1/2 the period of the pulse) the transmitter will limit the pulse output. See example below.



A. Open
B. Pulse width
C. Period
D. Closed

Example

If pulse width is set to 100 ms, the maximum output is 5Hz; for a pulse width of 0.5 ms, the maximum output would be 1000Hz (at the maximum frequency output there is a 50% duty cycle).

Pulse width	Minimum period (50% duty cycle)	Maximum frequency
100 ms		$\frac{1\ cycle}{200\ ms} = 5\ Hz$
0.5 ms		$\frac{1\ cycle}{1.0\ ms} = 1000\ Hz$

To achieve the greatest maximum frequency output, set the pulse width to the lowest value that is consistent with the requirements of the pulse output power source, pulse driven external totalizer, or other peripheral equipment.

The maximum flow rate is 10,000 gpm. Set the pulse output scaling such that the

$$Pulse\ Scaling = 0.0167\ \frac{gal}{pulse}$$

Note
Changes to pulse width are only required when there is a minimum pulse width required for external counters, relays, etc.

The external counter is ranged for 350 gpm and pulse is set for one gallon. Assuming the

$$Frequency = \frac{Flow\ Rate\ (gpm)}{(60\ \frac{sec}{min}) \times (pulse\ scaling\ \frac{gal}{pulse})}$$

$$Pulse\ Scaling = \frac{350\ gpm}{(60\ \frac{sec}{min}) \times\ 1\ \frac{gal}{pulse}}$$

$$Frequency = 5.833\ Hz$$

The upper range value (20mA) is 3000 gpm. To obtain the highest resolution of the pulse

$$Frequency = \frac{Flow\ Rate\ (gpm)}{(60\ \frac{sec}{min}) \times (pulse\ scaling\ \frac{gal}{pulse})}$$

$$Pulse\ Scaling = \frac{3{,}000\ gpm}{(60\ \frac{sec}{min}) \times 10{,}000\ Hz}$$

Pulse mode

LOI menu path	**Detailed Setup → Output Config → Pulse → Pulse Mode**

The pulse mode configures the frequency output of the pulse. It can be set to either 50% duty cycle, or fixed. There are two options that pulse mode can be configured to:

- Pulse Output (user defines a fixed pulse width)
- Frequency Output (pulse width automatically set to 50% duty cycle)

To use pulse width settings, pulse mode must be set to pulse output. Frequency output is not available with Intrinsically Safe output, option code B.

8.2.3 Totalizer

The totalizer provides the total amount of fluid that has passed through the meter. There are three available totalizers: Total A, Total B, and Total C. They can be independently configured for one of the following options:

- Net - increments with forward flow and decrements with reverse flow (reverse flow must be enabled).
- Reverse total - will only increment with reverse flow if reverse flow is enabled
- Forward total - will only increment with forward flow

All totalizer values will be reset if **line size** is changed. This will happen even if the totalizer reset control is set to **non-resettable**.

The totalizers have the capability to increment the total to a maximum value of 50 feet per second of flow (or the volumetric equivalent) for a period of 20 years before roll-over occurs.

View Totals

LOI menu path	Totalizer A: **Totalizers → View Total A** Totalizer B: **Totalizers → View Total B** Totalizer C: **Totalizers → View Total C**

Displays the current value for each totalizer and shows the totalizer incrementing/decrementing based on totalizer configuration and flow direction.

Configure totalizers

LOI menu path	**Totalizers → Config/Control**

Totalizer direction

LOI menu path	Totalizer A: **Totalizers** → **Config/Control** → **Total A** → **Total A Config** → **Direction** Totalizer B: **Totalizers** → **Config/Control** → **Total B** → **Total B Config** → **Direction** Totalizer C: **Totalizers** → **Config/Control** → **Total C** → **Total C Config** → **Direction**

Configure the direction for the totalizers as either Net, Forward, or Reverse.

Totalizer units

LOI menu path	Totalizer A: **Totalizers** → **Config/Control** → **Total A** → **Total A Config** → **TotA Units** Totalizer B: **Totalizers** → **Config/Control** → **Total B** → **Total B Config** → **TotB Units** Totalizer C: **Totalizers** → **Config/Control** → **Total C** → **Total C Config** → **TotC Units**

Configure the units for totalizers.

Table 8-4: Totalizer units

Volume units		**Mass units**		**Other units**	
LOI	**Units**	**LOI**	**Units**	**LOI**	**Units**
gal	Gallons	KG	Kilograms	ft	Feet
l	Liters	Mton	Metric tons	m	Meters
Igal	Imperial gallons	lb	Pounds	Special	Special Units(1)
m3	Cubic meters	Ston	Short tons		
B42	Barrels (42 gallonsJ)				
ft3	Cubic feet				
cm3	Cubic centimeters				
B31	Barrels (31 gallons)				
Mgal	Million gallons				

(1) See Configure special units.

Reset configuration

LOI menu path	Totalizer A: **Totalizers** → **Config/Control** → **Total A** → **Total A Config** → **TotA Reset Config** Totalizer B: **Totalizers** → **Config/Control** → **Total B** → **Total B Config** → **TotB Reset Config** Totalizer C: **Totalizers** → **Config/Control** → **Total C** → **Total C Config** → **TotC Reset Config**

Configure if the totalizer is non-resettable, or if it can be reset through the reset commands.

Reset individual totalizer

LOI menu path	Totalizer A: **Totalizers** → **Config/Control** → **Total A** → **Reset Total A** Totalizer B: **Totalizers** → **Config/Control** → **Total B** → **Reset Total B** Totalizer C: **Totalizers** → **Config/Control** → **Total C** → **Reset Total C**

Independently reset the totalizers. This requires the reset option to be configured as resettable.

Reset all totalizers

LOI menu path	**Totalizers** → **Config/Control** → **Reset All**

This global command will reset totalizer values to zero for all totalizers that have been configured as resettable.

Totalizer security

LOI menu path	**Totalizers** → **Config/Control** → **Security**

Configure totalizer security capabilities for the Local Operator Interface and write protection.

LOI control

LOI menu path	**Totalizers** → **Config/Control** → **Security** → **LOI Control**

Configure the ability to start, stop, and reset the totalizers through the LOI.

LOI totalizer start/stop

LOI menu path	**Totalizers** → **Config/Control** → **Security** → **LOI Control** → **LOI Start/Stop**

Enable/disable the ability to start or stop totalizers through the LOI.

LOI totalizer reset

LOI menu path	**Totalizers** → **Config/Control** → **Security** → **LOI Control** → **LOI Reset**

Enable/disable the ability to reset the totalizers through the LOI.

Totalizer write protection

LOI menu path	**Totalizers** → **Config/Control** → **Security** → **Write Protect**

In addition to controlling the LOI capability to start/stop and reset the totalizers, specific write protect functionality can also be configured adding an additional level of security to the totalizers.

Start/stop write protect

LOI menu path	**Totalizers** → **Config/Control** → **Security** → **Write Protect** → **WP Start/Stop**

Configure write protection on the ability to start or stop the totalizers. This is a global command and applies to all totalizers.

Reset write protect

LOI menu path	**Totalizers → Config/Control → Security → Write Protect → WP Reset**

Configure write protection on the ability to reset the totalizers. This is a global command and applies to all totalizers.

8.2.4 Discrete input/output

This configuration option is only available if the auxiliary output suite (option code AX) was ordered. The auxiliary output suite provides two channels for control.

- For HART version 5.5 or 7.1 firmware, the discrete input can provide positive zero return (PZR) or reset totalizer (A, B, C, or all totals).

  Note
  If a particular totalizer is configured to be not resettable, the totalizer will not be reset with this function.

- The discrete output control function can be configured to drive an external signal to indicate zero flow, reverse flow, empty pipe, diagnostic status, flow limit, or transmitter status.

A complete list and description of the available auxiliary functions is provided below.

Discrete input options (Channel 1 only)

PZR (Positive Zero Return)	When conditions are met to activate the input, the transmitter will force the output to zero flow.
Net Total Reset	When conditions are met to activate the input, the transmitter will reset the net total value to zero.

Discrete output options

Reverse Flow	The output will activate when the transmitter detects a reverse flow condition.
Zero Flow	The output will activate when a no flow condition is detected.
Transmitter Fault	The output will activate when a transmitter fault condition is detected.
Empty Pipe	The output will activate when the transmitter detects an empty pipe condition.
Flow Limit 1	The output will activate when the transmitter measures a flow rate that meets the conditions established for the flow limit 1 alert.
Flow Limit 2	The output will activate when the transmitter measures a flow rate that meets the conditions established for the flow limit 2 alert.
Diagnostic Status Alert	The output will activate when the transmitter detects a condition that meets the configured criteria of the diagnostic status alert.
Total Limit	The output will activate when the transmitter Totalizer A value meets the conditions established for the total limit alert.

Channel 1

Channel 1 can be configured as either a discrete input (DI) or as a discrete output (DO).

DI/O 1 control

LOI menu path	**Detailed Setup → Output Config → DI/DO Config → DI/O 1 → DI/O 1 Control**

This parameter configures the auxiliary output channel 1. It controls whether channel 1 will be a discrete input or discrete output on terminals 5(-) and 6(+).

Note
The transmitter must have been ordered with the auxiliary output suite (option code AX) to have access to this functionality.

Discrete input 1

LOI menu path	**Detailed Setup → Output Config → DI/DO Config → DI/O 1 → DI 1**

This parameter displays the configuration for channel 1 when used as a discrete input.

Discrete output 1

LOI menu path	**Detailed Setup → Output Config → DI/DO Config → DI/O 1 → DO 1**

This parameter displays the configuration for channel 1 when used as a discrete output.

Channel 2

Channel 2 is available as discrete output only.

Discrete output 2

LOI menu path	**Detailed Setup → Output Config → DI/DO Config → DO 2**

This parameter displays the configuration for channel 2.

Flow limit (1 and 2)

There are two configurable flow limits. Configure the parameters that will determine the criteria for activation of a HART alert if the measured flow rate falls within a set of configured criteria. This functionality can be used for operating simple batching operations or generating alerts when certain flow conditions are met. This parameter can be configured as a discrete output if the transmitter was ordered with the auxiliary output suite (option code AX) and the outputs are enabled. If a discrete output is configured for flow limit, the discrete output will activate when the conditions defined under mode configuration are met. See Mode below.

Control

LOI menu path	Flow 1: **Detailed Setup → Output Config → DI/DO Config → Flow Limit 1 → Control 1** Flow 2: **Detailed Setup → Output Config → DI/DO Config → Flow Limit 2 → Control 2**

This parameter turns the flow limit HART alert ON or OFF.

ON The transmitter will generate a HART alert when the defined conditions are met. If a discrete output is configured for flow limit, the discrete output will activate when the conditions for mode are met.

OFF The transmitter will not generate an alert for the flow limit.

Mode

LOI menu path	Flow 1: **Detailed Setup** → **Output Config** → **DI/DO Config** → **Flow Limit 1** → **Mode 1** Flow 2: **Detailed Setup** → **Output Config** → **DI/DO Config** → **Flow Limit 2** → **Mode 2**

The mode parameter sets the conditions under which the flow limit HART alert will activate. High and low limits exist for each channel and can be configured independently.

> High limit	The HART alert will activate when the measured flow rate exceeds the high limit set point.
< Low limit	The HART alert will activate when the measured flow rate falls below the low limit set point.
In range	The HART alert will activate when the measured flow rate is between the high limit and low limit set points.
Out of range	The HART alert will activate when the measured flow rate exceeds the high limit set point or falls below the low limit set point.

High limit

LOI menu path	Flow 1: **Detailed Setup** → **Output Config** → **DI/DO Config** → **Flow Limit 1** → **High Limit 1** Flow 2: **Detailed Setup** → **Output Config** → **DI/DO Config** → **Flow Limit 2** → **High Limit 2**

Set the flow rate value that corresponds to the high limit set point for the flow limit alert.

Low limit

LOI menu path	Flow 1: **Detailed Setup** → **Output Config** → **DI/DO Config** → **Flow Limit 1** → **Low Limit 1** Flow 2: **Detailed Setup** → **Output Config** → **DI/DO Config** → **Flow Limit 2** → **Low Limit 2**

Set the flow rate value that corresponds to the low limit set point for the flow limit alert.

Flow limit hysteresis

LOI menu path	Flow 1: **Detailed Setup** → **Output Config** → **DI/DO Config** → **Flow Limit 1** → **Hysteresis** Flow 2: **Detailed Setup** → **Output Config** → **DI/DO Config** → **Flow Limit 2** → **Hysteresis**

Set the hysteresis band for the flow limit to determine how quickly the transmitter comes out of alert status. The hysteresis value is used for both flow limit 1 and flow limit 2. Changing this parameter under the configuration parameters for one channel will cause it to also change in the other channel.

Total limit

Configure the parameters that will determine the criteria for activating a HART alert if Totalizer A falls within a set of configured criteria. This functionality can be used for operating simple batching operations or generating alerts when certain localized values are met. This parameter can be configured as a discrete output if the transmitter was ordered with auxiliary outputs enabled (option code AX). If a digital output is configured for total limit, the digital output will activate when the conditions for total mode are met.

Total control

LOI menu path	**Detailed Setup → Output Config → DI/DO Config → Total Limit → Total Control**

This parameter turns the total limit HART alert ON or OFF.

ON The transmitter will generate a HART alert when the defined conditions are met.

OFF The transmitter will not generate a HART alert for the total limit.

Total mode

LOI menu path	**Detailed Setup → Output Config → DI/DO Config → Total Limit → Total Mode**

The total mode parameter sets the conditions under which the total limit HART alert will activate. High and low limits exist for each channel and can be configured independently.

> High limit The HART alert will activate when the totalizer value exceeds the high limit set point.

< Low limit The HART alert will activate when the totalizer value falls below the low limit set point.

In range The HART alert will activate when the totalizer value is between the high limit and low limit set points.

Out of range The HART alert will activate when the totalizer value exceeds the high limit set point or falls below the low limit set point.

Total high limit

LOI menu path	**Detailed Setup → Output Config → DI/DO Config → Total Limit → Tot Hi Limit**

Set Totalizer A to a value that corresponds to the high limit set point for the total high limit alert.

Total low limit

LOI menu path	**Detailed Setup → Output Config → DI/DO Config → Total Limit → Tot Low Limit**

Set the net total value that corresponds to the low limit set point for the total low limit alert.

Total limit hysteresis

LOI menu path	**Detailed Setup → Output Config → DI/DO Config → Total Limit → Hysteresis**

Set the hysteresis band for the total limit to determine how quickly the transmitter comes out of alert status.

Diagnostic status alert

LOI menu path	**Detailed Setup → Output Config → DI/DO Config → Diag Alert**

The diagnostic status alert is used to turn on or off the diagnostics that will cause this alert to activate.

ON The diagnostic status alert will activate when a transmitter detects a diagnostic designated as ON.

OFF The diagnostic status alert will not activate when diagnostics designated as OFF are detected.

Alerts for the following diagnostics can be turned ON or OFF:

- Electronics Failure
- Coil Open Circuit
- Empty Pipe
- Reverse Flow
- Ground/Wiring Fault
- High Process Noise
- Electronics Temperature Out of Range
- Electrode Coat Limit 1
- Electrode Coat Limit 2
- Continuous Meter Verification

8.3 Configure HART

The transmitter has four HART variables available as outputs. The variables can be configured for dynamic readings including flow, total, and diagnostic values. The HART output can also be configured for burst mode or multi-drop communication if required.

8.3.1 Variable mapping

LOI menu path	**Detailed Setup → Output Config → HART → Variable Map**

Variable mapping allows configuration of the variables that are mapped to the secondary, tertiary and quaternary variables. The primary variable is fixed to output flow and cannot be configured.

Primary variable (PV)

LOI menu path	**Detailed Setup → Output Config → HART → Variable Map → PV**

The primary variable is configured for flow. This variable is fixed and cannot be configured. The primary variable is tied to the analog output.

Secondary variable (SV)

LOI menu path	**Detailed Setup → Output Config → HART → Variable Map → SV**

The secondary variable maps the second variable of the transmitter. This variable is a HART only variable and can be read from the HART signal with a HART enabled input card, or can be burst for use with a HART Tri-Loop to convert the HART signal to an analog output. Options available for mapping to this variable can be found in Available Variables.

Tertiary variable (TV)

LOI menu path	**Detailed Setup → Output Config → HART → Variable Map → TV**

The tertiary variable maps the third variable of the transmitter. This variable is a HART only variable and can be read from the HART signal with a HART enabled input card, or can be burst for use with a HART Tri-Loop to convert the HART signal to an analog output. Options available for mapping to this variable can be found in Available Variables.

Quaternary variable (QV)

LOI menu path	**Detailed Setup → Output Config → HART → Variable Map → QV**

The quaternary variable maps the fourth variable of the transmitter. This variable is a HART only variable and can be read from the HART signal with a HART enabled input card, or can be burst for use with a HART Tri-Loop™ to convert the HART signal to an analog output. Options available for mapping to this variable can be found in Available Variables.

Available Variables

- Flow Rate
- Pulse Output
- Totalizer A
- Totalizer B
- Totalizer C
- Electronics Temperature
- Line Noise
- 5 Hz SNR
- 37 Hz SNR
- Signal Power
- Empty Pipe Value
- Transmitter Velocity Deviation
- Electrode Coating Value
- Electrode Resistance
- Coil Resistance Value
- Coil Inductance Value
- Coil Baseline Deviation
- Analog Output Feedback Deviation
- Coil Current

8.3.2 Poll address

LOI menu path	**Detailed Setup → Output Config → HART → Poll Address**

Poll address enables the transmitter to be used in point-to-point mode or multi-drop mode. When in multi-drop mode, the poll address is used to identify each meter on the multi-drop line.

The transmitter poll address is set to zero at the factory, allowing standard operation in a point-to-point manner with a 4–20 mA output signal. To activate multi-drop communication:

- HART 5: The transmitter poll address must be changed to a non-zero integer (1-15). This change fixes the analog output current to 4 mA and disables the failure mode alarm signal.
- HART 7: The transmitter poll address must be changed to a non-zero integer (1-63).
- HART 7: The Loop Current Mode may need to be set to ON to fix the output current to 4 mA, or it can be set to OFF if a 4–20 mA output is desired. See Loop current mode.

8.3.3 Loop current mode

LOI menu path	**Detailed Setup → Output Config → HART → Loop Curr Mode**

Available on HART 7 through the LOI only.

When loop current mode is set to **ON**, the analog output current tracks with changes in PV. When loop current mode is **OFF**, the analog output current is fixed at 4 mA.

8.3.4 HART revision

Transmitter electronics supporting software revision v5.4 have a fixed HART 5 menu configuration. Transmitter electronics supporting software revision v5.5 or v7.1 can be configured for either HART 5 or HART 7 menu configurations.

Universal revision

Read-only informational variable that reflects the setting of the HART revision in the transmitter.

Change HART revision

On enabled devices, this function allows the user to change between HART 5 or HART 7.

8.3.5 Burst mode

LOI menu path	**Detailed Setup → Output Config → HART → Burst Mode**

The transmitter includes a burst mode function that can be enabled to broadcast the primary variable or all dynamic variables approximately three to four times per second. Burst mode is a specialized function used in very specific applications. The burst mode function enables you to select the variables that are broadcast while in the burst mode.

Burst mode enables you to set the burst mode as **OFF** or **ON**:

- **OFF** - Turns burst mode off; no data are broadcast over the loop
- **ON** - Turns burst mode on; data selected under burst option are broadcast over the loop

Additional burst mode capabilities, not visible from the LOI, are available through a HART host.

Burst option (burst command)—HART 5 only

LOI menu path	**Detailed Setup → Output Config → HART → Burst Command**

Burst option enables you to select the variable(s) that is broadcast during the transmitter burst. Choose one of the following options:

- 1; PV; Primary Variable - Selects the primary variable

- 2; % range/current; Percent of Range and Loop Current - Selects the variable as percent of range and analog output
- 3; Process vars/crnt; All Variables and Loop Current - Selects all variables and analog output
- 110; Dynamic vars; Dynamic Variables - Burst all dynamic variables in the transmitter

Request preambles

LOI menu path	**Detailed Setup → Output Config → HART → Req Preams**

Request preambles is the number of preambles required by the transmitter for HART communications.

Response preambles

LOI menu path	**Detailed Setup → Output Config → HART → Resp Preams**

Response preambles is the number of preambles sent by the transmitter in response to any host request.

8.4 Configure LOI/Display

8.4.1 Flow and totalizer display

LOI menu path	**Detailed Setup → LOI Config → Flow Display**

Use flow display to configure the parameters that will appear on the LOI flowrate screen. The flowrate screen displays two lines of information. Choose one of the following options:

- Flowrate, % of Span
- Flow, Total A
- % Span, Total A
- Flow, Total B
- % Span, Total B
- Flow, Total C
- % Span, Total C

8.4.2 Language

LOI menu path	**Detailed Setup → LOI Config → Language**

Use language to configure the display language shown on the LOI. Choose one of the following options:

- English
- Spanish
- Portuguese
- German

- French

8.4.3 Display lock

LOI menu path	**Detailed Setup → LOI Config → Disp Auto Lock**

The transmitter has display lock functionality to prevent unintentional configuration changes. The display can be locked manually or configured to automatically lock after a set period of time.

- OFF (default)
- 1 Minute
- 10 Minutes

The display is always locked on the flow screen.

8.4.4 Error mask

LOI menu path	**Detailed Setup → LOI Config → LOI Err Mask**

Use LOI error mask to turn off the analog output power error message (AO No Power). This may be desired if the analog output is not being used.

8.4.5 Backlight control

LOI menu path	**Detailed Setup → LOI Config → Backlight**

To conserve power, the LOI backlight can be configured to automatically turn off after a set amount of time without keypad activity.

- Always OFF (default for low power)
- 10 Seconds
- 20 Seconds
- 30 Seconds
- Always ON (default)

8.5 Additional parameters

The following parameters may be required for detailed configuration settings based on your application.

8.5.1 Coil drive frequency

LOI menu path	**Detailed Setup → More Params → Coil Frequency**

Use coil drive frequency to change the pulse rate of the coils.

- 5 Hz - The standard coil drive frequency is 5 Hz, which is sufficient for nearly all applications.

- 37 Hz - If the process fluid causes a noisy or unstable output, increase the coil drive frequency to 37.5 Hz. If the 37 Hz mode is selected, perform the auto zero function for optimum performance.

Note
37 Hz coil drive frequency should not be used for sensor sizes larger than 20-inch.

See Auto zero.

8.5.2 Process density

LOI menu path	**Detailed Setup → More Params → Proc Density**

Use the process density value to convert from a volumetric flow rate to a mass flow rate using the following equation:

Qm = Qv x p

Where:

Qm is the mass flow rate

Qv is the volumetric flow rate, and

p is the fluid density

8.5.3 Reverse flow

LOI menu path	**Detailed Setup → Output Config → Reverse Flow**

Use reverse flow to enable or disable the transmitter's ability to read flow in the opposite direction of the flow direction arrow (see Flow direction). This may occur when the process has bi-directional flow, or when either the electrode wires or the coil wires are reversed (see Troubleshooting Remote wiring). This also enables the totalizer to count in the reverse direction.

8.5.4 Low flow cutoff

LOI menu path	**Detailed Setup → Sig Processing → Lo-Flow Cutoff**

Low flow cutoff allows the user to set a low flow limit to be specified. The analog output signal is driven to 4mA for flow rates below the set point. The low flow cutoff units are the same as the PV units and cannot be changed. The low flow cutoff value applies to both forward and reverse flows.

8.5.5 PV (flow) damping

LOI menu path	**Detailed Setup → Sig Processing → Damping**

Primary variable damping allows selection of a response time, in seconds, to a step change in flow rate. It is most often used to smooth fluctuations in output.

8.5.6 Signal processing

The transmitter contains several advanced functions that can be used to stabilize erratic outputs caused by process noise. The signal processing menu contains this functionality.

If the 37 Hz coil drive mode has been set, and the output is still unstable, the damping and signal processing function should be used. It is important to set the coil drive mode to 37 Hz first, so the loop response time is not increased.

The transmitter provides for a very easy and straightforward start-up, and also incorporates the capability to deal with difficult applications that have previously manifested themselves in a noisy output signal. In addition to selecting a higher coil drive frequency (37 Hz vs. 5 Hz) to isolate the flow signal from the process noise, the microprocessor can actually scrutinize each input based on three user-defined parameters to reject the noise specific to the application.

See Digital Signal Processing for the detailed description of how the signal processing works.

8.6 Configure special units

Special units are used when the application requires units that are not included in the flow units available from the device. Refer to Measurement units for a complete list of the available units.

8.6.1 Base volume unit

LOI menu path	**Basic Setup → Flow Units → Special Units → Base Vol Units**

Base volume unit is the unit from which the conversion is being made. Set this variable to the appropriate option.

8.6.2 Conversion factor

LOI menu path	**Basic Setup → Flow Units → Special Units → Conv Factor**

The special units conversion factor is used to convert base units to special units. For a straight conversion of units from one unit of measure to a different unit of measure, the conversion factor is the number of base units in the new unit.

Example: If you are converting from gallons to barrels and there are 31 gallons in a barrel, the conversion factor is 31.

8.6.3 Base time unit

LOI menu path	**Basic Setup → Flow Units → Special Units → Base Time Unit**

Base time unit provides the time unit from which to calculate the special units.For example, if your special units is a volume per minute, select minutes.

8.6.4 Special volume unit

LOI menu path	**Basic Setup → Flow Units → Special Units → Volume Unit**

Special volume unit enables you to display the volume unit format to which you have converted the base volume units.

Example: If the special units are abc/min, the special volume variable is abc. The volume units variable is also used in totalizing the special units flow.

8.6.5 Special flow rate unit

LOI menu path	**Basic Setup → Flow Units → Special Units → Rate Unit**

Flow rate unit is a format variable that provides a record of the units to which you are converting. The Handheld Communicator will display a special units designator as the units format for your primary variable. The actual special units setting you define will not appear. Four characters are available to store the new units designation. The LOI will display the four character designation as configured.

Example: To display flow in acre-feet per day, and acre-foot is equal to 43560 cubic feet, the procedure would be:

1. Set the volume unit to ACFT.
2. Set the base volume unit to ft3.
3. Set the conversion factor to 43560.
4. Set the time base unit to Day.
5. Set the flow rate unit to AF/D.

9 Advanced Diagnostics Configuration

9.1 Introduction

Rosemount magnetic flowmeters provide device diagnostics that detect and warn of abnormal situations throughout the life of the meter—from installation to maintenance and meter verification. With Rosemount magnetic flowmeter diagnostics enabled, plant availability and throughput can be improved, and costs through simplified installation, maintenance and troubleshooting can be reduced.

Table 9-1: Basic diagnostics availability

Diagnostic name	Diagnostic category	Product capability
Tunable Empty Pipe	Process	Standard
Electronics Temperature	Maintenance	Standard
Coil Fault	Maintenance	Standard
Transmitter Fault	Maintenance	Standard
Reverse Flow	Process	Standard
Electrode Saturation	Process	Standard
Coil Current	Maintenance	Standard
Coil Power	Maintenance	Standard
Grounding and Wiring Fault	Installation	Standard

Table 9-2: Advanced diagnostics availability

Diagnostic name	Diagnostic category	Product capability
High Process Noise	Process	Suite 1 (DA1)
Coated Electrode Detection	Process	Suite 1 (DA1)
Commanded Meter Verification	Meter Health	Suite 2 (DA2)
Continuous Meter Verification	Meter Health	Suite 2 (DA2)
4-20 mA Loop Verification	Installation	Suite 2 (DA2)

9.2 Licensing and enabling

All advanced diagnostics are licensed by ordering option code DA1, DA2, or both. In the event that a diagnostic option is not ordered, advanced diagnostics can be licensed in the field through the use of a license key. Each transmitter has a unique license key specific to the diagnostic option code. A trial license is also available to enable the advanced diagnostics. This temporary functionality will be automatically disabled after 30-days or when power to the transmitter is cycled, whichever occurs first. This trial code can be used a maximum of three times per transmitter. See the detailed procedures below for entering the license key and enabling the advanced diagnostics. To obtain a permanent or trial license key, contact an Emerson representative.

9.2.1 Licensing the diagnostics

Procedure

1. Power up the transmitter.
2. Verify the software version is 4.4 software or later.

LOI menu path	**Detailed Setup → Device Info → Revision Num → Software Num**

3. Determine the Device ID.

LOI menu path	**Detailed Setup → Device Info → Device ID**

4. Obtain a license key from an Emerson representative.
5. Enter license key.

LOI menu path	**Diagnostics → Advanced Diag → Licensing → License Key → License Key**

9.3 Tunable empty pipe detection

The tunable empty pipe detection provides a means of minimizing issues and false readings when the pipe is empty. This is most important in batching applications where the pipe may run empty with some regularity. If the pipe is empty, this diagnostic will activate, set the flow rate to 0, and deliver an alert.

Turning empty pipe on/off

LOI menu path	**Diagnostics → Diag Controls → Empty Pipe**

The tunable empty pipe detection diagnostic can be turned on or off as required by the application. The empty pipe diagnostic is shipped turned “On” by default.

9.3.1 Tunable empty pipe parameters

The tunable empty pipe diagnostic has one read-only parameter, and two parameters that can be custom configured to optimize the diagnostic performance.

Empty pipe (EP) value

LOI menu path	**Diagnostics → Variables → Empty Pipe**

This parameter shows the current empty pipe value. This is a read-only value. This number is a unit-less number and is calculated based on multiple installation and process variables such as sensor type, line size, process fluid properties, and wiring. If the empty pipe value exceeds the empty pipe trigger level for a specified number of updates, then the empty pipe diagnostic alert will activate.

Empty pipe (EP) trigger level

LOI menu path	**Diagnostics → Basic Diag → Empty Pipe → EP Trig Level**

Limits: 3 to 2000

Empty pipe trigger level is the threshold limit that the empty pipe value must exceed before the empty pipe diagnostic alert activates. The default setting from the factory is 100.

Empty pipe (EP) counts

LOI menu path	**Diagnostics → Basic Diag → Empty Pipe → EP Counts**

Limits: 2 to 50

Empty pipe counts is the number of consecutive updates that the transmitter must receive where the empty pipe value exceeds the empty pipe trigger level before the empty pipe diagnostic alert activates. The default setting from the factory is 5.

9.3.2 Optimizing tunable empty pipe

The tunable empty pipe diagnostic is set at the factory to properly diagnose most applications. If this diagnostic activates, the following procedure can be followed to optimize the empty pipe diagnostic for the application.

Procedure

1. Record the empty pipe value with a full pipe condition.

   Example

   Full reading = 0.2

2. Record the empty pipe value with an empty pipe condition.

   Example

   Empty reading = 80.0

3. Set the empty pipe trigger level to a value between the full and empty readings.

   For increased sensitivity to empty pipe conditions, set the trigger level to a value closer to the full pipe value.

   Example

   Set the trigger level to 25.0

4. Set the empty pipe counts to a value corresponding to the desired sensitivity level for the diagnostic.

   For applications with entrained air or potential air slugs, less sensitivity may be desired.

   Example

   Set the counts to 10

9.4 Electronics temperature

The transmitter continuously monitors the temperature of the internal electronics. If the measured electronics temperature exceeds the operating limits of –40 to 140 °F (–40 to 60 °C) the transmitter will go into alarm and generate an alert.

9.4.1 Turning electronics temperature on/off

LOI menu path	**Diagnostics → Diag Controls → Elect Temp**

The electronics temperature diagnostic can be turned on or off as required by the application.The electronics temperature diagnostic will be turned on by default.

9.4.2 Electronics temperature parameters

The electronics temperature diagnostic has one read-only parameter. It does not have any configurable parameters.

LOI menu path	**Diagnostics → Variables → Elect Temp**

This parameter shows the current temperature of the electronics. This is a read-only value.

9.5 Ground/wiring fault detection

The transmitter continuously monitors signal amplitudes over a wide range of frequencies. For the ground/wiring fault detection diagnostic, the transmitter specifically looks at the signal amplitude at frequencies of 50 Hz and 60 Hz which are the common AC cycle frequencies found throughout the world. If the amplitude of the signal at either of these frequencies exceeds 5 mV, that is an indication that there is a ground or wiring issue and that stray electrical signals are getting into the transmitter. The diagnostic alert will activate indicating that the ground and wiring of the installation should be carefully reviewed.

The ground/wiring fault detection diagnostic provides a means of verifying installations are done correctly. If the installation is not wired or grounded properly, this diagnostic will activate and deliver an alert. This diagnostic can also detect if the grounding is lost over-time due to corrosion or another root cause.

9.5.1 Turning ground/wiring fault on/off

LOI menu path	**Diagnostics → Diag Controls → Ground/Wiring**

The ground/wiring fault detection diagnostic can be turned on or off as required by the application. If the advanced diagnostics suite 1 (DA1 Option) was ordered, then the ground/wiring fault detection diagnostic will be turned on. If DA1 was not ordered or licensed, this diagnostic is not available.

9.5.2 Ground/wiring fault parameters

The ground/wiring fault detection diagnostic has one read-only parameter. It does not have any configurable parameters.

Line noise

LOI menu path	**Diagnostics → Variables → Line Noise**

The line noise parameter shows the amplitude of the line noise. This is a read-only value. This number is a measure of the signal strength at 50/60 Hz. If the line noise value exceeds 5 mV, then the ground/wiring fault diagnostic alert will activate.

9.6 High process noise detection

The high process noise diagnostic detects if there is a process condition causing an unstable or noisy reading that is not an actual flow variation. A common cause of high process noise is slurry flow, like pulp stock or mining slurries. Other conditions that cause this diagnostic to activate are high levels of chemical reaction or entrained gas in the liquid. If unusual noise or flow variation is seen, this diagnostic will activate and deliver an alert. If this situation exists and is left without remedy, it will add additional uncertainty and noise to the flow reading.

9.6.1 Turning high process noise on/off

LOI menu path	**Diagnostics → Diag Controls → Process Noise**

The high process noise diagnostic can be turned on or off as required by the application. If the advanced diagnostics suite 1 (DA1 Option) was ordered, then the high process noise diagnostic will be turned on. If DA1 was not ordered or licensed, this diagnostic is not available.

9.6.2 High process noise parameters

The high process noise diagnostic has two read-only parameters. It does not have any configurable parameters. This diagnostic requires that flow be present in the pipe and the velocity be greater than1 ft/s (0.3 m/s).

5 Hz signal to noise ratio (SNR)

LOI menu path	**Diagnostics → Variables → 5Hz SNR**

This parameter shows the value of the signal to noise ratio at the coil drive frequency of 5 Hz. This is a read-only value. This number is a measure of the signal strength at 5 Hz relative to the amount of process noise. If the transmitter is operating in 5 Hz mode, and the signal to noise ratio remains below 25 for one minute, then the high process noise diagnostic alert will activate.

37 Hz signal to noise ratio (SNR)

LOI menu path	**Diagnostics → Variables → 37Hz SNR**

This parameter shows the current value of the signal to noise ratio at the coil drive frequency of 37 Hz. This is a read-only value. This number is a measure of the signal strength at 37 Hz relative to the amount of process noise. If the transmitter is operating in 37 Hz mode, and the signal to noise ratio remains below 25 for one minute, then the high process noise diagnostic alert will activate.

9.7 Coated electrode detection

The coated electrode detection diagnostic provides a means of monitoring insulating coating buildup on the measurement electrodes. If coating is not detected, buildup over time can lead to a compromised flow measurement. This diagnostic can detect if the electrode is coated and if the amount of coating is affecting the flow measurement. There are two levels of electrode coating.

- Limit 1 indicates when coating is starting to occur, but has not compromised the flow measurement.
- Limit 2 indicates when coating is affecting the flow measurement and the meter should be serviced immediately.

9.7.1 Turning coated electrode detection on/off

LOI menu path	**Diagnostics → Diag Controls → Elec Coating**

The coated electrode detection diagnostic can be turned on or off as required by the application. If the advanced diagnostics suite 1 (DA1 option) was ordered, then the coated electrode detection diagnostic will be turned on. If DA1 was not ordered or licensed, this diagnostic is not available.

9.7.2 Coated electrode parameters

The coated electrode detection diagnostic has four parameters. Two are read-only and two are configurable parameters. The electrode coating parameters need to be initially monitored to accurately set the electrode coating limit levels for each application.

Electrode coating (EC) value

LOI menu path	**Diagnostics → Advanced Diag → Elec Coating → EC Current Val**

The electrode coating value reads the value of the coated electrode detection diagnostic.

Electrode coating (EC) level 1 limit

LOI menu path	**Diagnostics → Advanced Diag → Elec Coat → EC Limit 1**

Set the criteria for the electrode coating limit 1 which indicates when coating is starting to occur, but has not compromised the flow measurement. The default value for this parameter is 1000 k Ohm.

Electrode coating (EC) level 2 limit

LOI menu path	**Diagnostics → Advanced Diag → Elec Coat → EC Limit 2**

Set the criteria for the electrode coating limit 2 which indicates when coating is affecting the flow measurement and the meter should be serviced immediately. The default value for this parameter is 2000 k Ohm.

Maximum electrode coating (EC)

LOI menu path	**Diagnostics → Advanced Diag → Elec Coat → EC Max Value**

The maximum electrode coating value reads the maximum value of the coated electrode detection diagnostic since the last maximum value reset.

Clear maximum electrode value

LOI menu path	**Diagnostics → Advanced Diag → Elec Coat → Reset Max Val**

Use this method to reset the maximum electrode coating value.

9.8 4-20 mA loop verification

The 4-20 mA loop verification diagnostic provides a means of verifying the analog output loop is functioning properly. This is a manually initiated diagnostic test. This diagnostic checks the integrity of the analog loop and provides a health status of the circuit. If the verification does not pass, this will be highlighted in the results given at the end of the check.

The 4-20 mA loop verification diagnostic is useful for testing the analog output when errors are suspected. The diagnostic tests the analog loop at five different mA output levels:

- 4 mA
- 12 mA
- 20 mA
- Low alarm level
- High alarm level

9.8.1 Initiating 4-20 mA loop verification

LOI menu path	**Diagnostics → Advanced Diag → 4-20mA Verify → 4-20mA Verify**

The 4–20 mA loop verification diagnostic can be initiated as required by the application. If Smart Meter Verification Professional (DS1 Option) was ordered, then the 4–20 mA loop verification diagnostic will be available. If DA2 was not ordered or licensed, this diagnostic is not available.

9.8.2 4-20 mA loop verification parameters

The 4-20 mA loop verification diagnostic has five read-only parameters plus an overall test result. It does not have any configurable parameters.

4-20 mA loop verification test result

LOI menu path	**Diagnostics → Advanced Diag → 4-20mA Verify → View Results**

Shows the results of the 4-20 mA loop verification test as either passed or failed.

4 mA measurement

LOI menu path	N/A

Shows the measured value of the 4 mA loop verification test.

12 mA measurement

LOI menu path	N/A

Shows the measured value of the 12 mA loop verification test.

20 mA measurement

LOI menu path	N/A

Shows the measured value of the 20 mA loop verification test.

Low alarm measurement

LOI menu path	N/A

Shows the measured value of the low alarm verification test.

High alarm measurement

LOI menu path	N/A

Shows the measured value of the high alarm verification test.

9.9 Smart Meter Verification

The Smart Meter Verification diagnostic provides a means of verifying the flowmeter is within calibration without removing the sensor from the process. This diagnostic test provides a review of the transmitter and sensor's critical parameters as a means to document verification of calibration. The results of this diagnostic provide the deviation amount from expected values and a pass/fail summary against user-defined criteria for the application and conditions. The Smart Meter Verification diagnostic can be configured to run continuously in the background during normal operation, or it can be manually initiated as required by the application.

9.9.1 Sensor baseline parameters

The Smart Meter Verification diagnostic functions by taking a baseline sensor signature and then comparing measurements taken during the verification test to these baseline results.

The sensor signature describes the magnetic behavior of the sensor. Based on Faraday's law, the induced voltage measured on the electrodes is proportional to the magnetic field strength. Thus, any changes in the magnetic field will result in a calibration shift of the sensor. Having the transmitter take an initial sensor signature when first installed will provide the baseline for the verification tests that are done in the future. There are three specific measurements that are stored in the transmitter's non-volatile memory that are used when performing the calibration verification.

Coil circuit resistance

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Sensr Baseline → Values → Coil Resist**

The coil resistance is a measurement of the coil circuit health. This value is used as a baseline to determine if the coil circuit is still operating correctly.

Coil inductance (signature)

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Sensr Baseline → Values → Coil Inductnce**

The coil inductance is a measurement of the magnetic field strength. This value is used as a baseline to determine if a sensor calibration shift has occurred.

Electrode circuit resistance

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Sensr Baseline → Values → Electrode Res**

The electrode circuit resistance is a measurement of the electrode circuit health. This value is used as a baseline to determine if the electrode circuit is still operating correctly.

9.9.2 Establishing the sensor baseline

The first step in running the Smart Meter Verification test is establishing the reference baseline that the test will use as the baseline for comparison. This is accomplished by having the transmitter take a baseline of the sensor.

Reset baseline (re-signature meter)

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Sensr Baseline → Reset Baseline**

Having the transmitter take an initial sensor baseline when first installed will provide the comparison point for the verification tests that are done in the future. The sensor baseline should be taken during the start-up process when the transmitter is first connected to the sensor, with a full line, and ideally with no flow in the line. Running the sensor baseline procedure when there is flow in the line is permissible, but this may introduce some noise into the electrode circuit resistance measurement. If an empty pipe condition exists, then the sensor baseline should only be run for the coils.

Note
For high temperature applications, it is a best practice to take the sensor baseline when the process fluid and sensor have reached their normal operating temperature if that will be operating condition during test measurements.

Once the sensor baseline process is complete, the measurements taken during this procedure are stored in non-volatile memory to prevent loss in the event of a power interruption to the meter. This initial sensor signature is required for both manual and continuous Smart Meter Verification.

Recall values (recall last saved)

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Sensr Baseline → Recall Values**

In the event that the sensor baseline was reset accidentally or incorrectly, this function will restore the previously saved sensor baseline values.

9.9.3 Smart Meter Verification test criteria

The Smart Meter Verification diagnostic provides the ability to customize the test criteria to which the verification must be tested. The test criteria can be set for each of the flow conditions discussed above.

No flow limit

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Test Criteria → No Flow**

Set the test criteria for the no flow condition. The factory default for this value is set to five percent with limits configurable between one and ten percent. This parameter applies to manually initiated test only.

Flowing full limit

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Test Criteria → Flowing, Full**

Set the test criteria for the flowing, full condition. The factory default for this value is set to five percent with limits configurable between one and ten percent. This parameter applies to manually initiated tests only.

Empty pipe limit

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Test Criteria → Empty Pipe**

Set the test criteria for the empty pipe condition. The factory default for this value is set to five percent with limits configurable between one and ten percent. This parameter applies to manually initiated test only.

Continuous limit

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Test Criteria → Continual**

Set the test criteria for the continuous Smart Meter Verification diagnostic. The factory default for this value is set to five percent with limits configurable between two and ten percent. If the tolerance band is set too tightly, under empty pipe conditions or noisy flowing conditions, a false failure of the transmitter test may occur.

9.10 Run commanded Smart Meter Verification

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Run Meter Ver**

The Smart Meter Verification diagnostic will be available if the Smart Meter Verification Professional (DA2) was ordered. If DA2 was not ordered or licensed, this diagnostic will not be available. This method will initiate the commanded meter verification test.

9.10.1 Test conditions

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Run Meter Ver → Test Condition**

Smart Meter Verification can be initiated under three possible test conditions. This parameter is set at the time that the sensor baseline or Smart Meter Verification test is manually initiated.

No flow Run the Smart Meter Verification test with a full pipe and no flow in the line. Running the Smart Meter Verification test under this condition provides the most accurate results and the best indication of magnetic flowmeter health.

Flowing full Run the Smart Meter Verification test with a full pipe and flow in the line. Running the Smart Meter Verification test under this condition provides the ability to verify the magnetic flowmeter health without shutting down the process flow in applications when a shutdown is not possible. Running the diagnostic under flowing conditions can cause a false test failure if there is significant process noise present.

Empty pipe Run the Smart Meter Verification test with an empty pipe. Running the Smart Meter Verification test under this condition provides the ability to verify the magnetic flowmeter health with an empty pipe. Running the verification diagnostic under empty pipe conditions will not check the electrode circuit health.

9.10.2 Test scope

LOI menu path	**Diagnostics → Advanced Diag → Meter Verif → Run Meter Ver → Test Scope**

The commanded Smart Meter Verification test can be used to verify the entire flowmeter installation or individual parts such as the transmitter or sensor. This parameter is set at the time that the Smart Meter Verification test is manually initiated. There are three test scopes from which to choose.

All Run the Smart Meter Verification test and verify the entire flowmeter installation. This parameter results in the diagnostic performing the transmitter calibration verification, sensor calibration verification, coil health check, and electrode health check. Transmitter calibration and sensor calibration are verified to the percentage associated with the test condition selected when the test was initiated. This setting applies to manually initiated tests only.

Transmitter Run the Smart Meter Verification test on the transmitter only. This results in the verification test only checking the transmitter calibration to the limits of the test criteria selected when the verification test was initiated. This setting applies to manually initiated tests only.

Sensor (coils and electrodes) Run the Smart Meter Verification test on the sensor only. This results in the verification test checking the sensor calibration to the limits of the test criteria selected when the Smart Meter Verification test was initiated, verifying the coil circuit health, and the electrode circuit health. This setting applies to manually initiated tests only.

9.11 Continuous Smart Meter Verification

Continuous Smart Meter Verification can be used to monitor and verify the health of the flowmeter system. The continuous Smart Meter Verification will not report results until 30 minutes after powering up to ensure the system is stable and to avoid false failures.

9.11.1 Test scope

Continuous Smart Meter Verification can be configured to monitor the sensor coils, electrodes, analog output, and transmitter calibration, All of these parameters can be individually enabled or disabled. These parameters apply to continuous Smart Meter Verification only.

Coils

LOI menu path	**Diagnostics → Diag Controls → Cont Meter Ver → Coils**

Continuously monitor the sensor coil circuit by enabling this continuous Smart Meter Verification parameter.

Electrodes

LOI menu path	**Diagnostics → Diag Controls → Cont Meter Ver → Electrodes**

Continuously monitor the electrode resistance by enabling this continuous Smart Meter Verification parameter.

Transmitter

LOI menu path	**Diagnostics → Diag Controls → Cont Meter Ver → Transmitter**

Continuously monitor the transmitter calibration by enabling this continuous Smart Meter Verification parameter.

Analog output

LOI menu path	**Diagnostics → Diag Controls → Cont Meter Ver → Analog Output**

Continuously monitor the analog output signal by enabling this continuous Smart Meter Verification parameter.

9.12 Smart Meter Verification test results

If the Smart Meter Verification test is initiated by command, the transmitter will make several measurements to verify the transmitter calibration, sensor calibration, coil circuit health, and electrode circuits health. The results of these tests can be reviewed and recorded on the Table 9-3 form. Print the "Commanded Calibration Verification Results" form and enter the test results as you view them. The completed form can be used to validate that the meter is within the required calibration limits to comply with governmental regulatory agencies.

Depending on the method used to view the results, they will be displayed in either a menu structure, as a method, or in the report format. When using the LOI, the parameters are viewed as a method using the left arrow key to cycle through the results.

Table 9-3: Manual Smart Meter Verification Test Parameters

	Parameter	LOI menu path (Diagnostics → Variables → MV Results → Manual Results)
1	Test Condition	Test Condition
2	Test Criteria	Test Criteria
3	8714 Test Result	MV Results
4	Simulated Velocity	Sim Velocity
5	Actual Velocity	ActualVelocity
6	Velocity Deviation	Flow Sim Dev
7	Xmtr Cal Test Result	Xmtr Cal Verify
8	Sensor Cal Deviation	Sensor Cal Dev
9	Sensor Cal Test Result	Sensor Cal
10	Coil Circuit Test Result	Coil Circuit
11	Electrode Circuit Test Result	Electrode Ckt

Table 9-4: Continuous Smart Meter Verification Test Parameters

	Parameter	LOI menu path (Diagnostics → Variables → MV Results → Continual Res)
1	Continuous Limit	Test Criteria
2	Simulated Velocity	Sim Velocity
3	Actual Velocity	ActualVelocity
4	Velocity Deviation	Flow Sim Dev
5	Coil Signature	Coil Inductnce
6	Sensor Cal Deviation	Sensor Cal Dev
7	Coil Resistance	Coil Resist
8	Electrode Resistance	Electrode Res
9	mA Expected	4–20 mA Expect
10	mA Actual	4–20 mA Actual
11	mA Deviation	AO FB Dev

9.13 Smart Meter Verification measurements

The Smart Meter Verification test will make measurements of the coil resistance, coil inductance, and electrode resistance and compare these values to the values taken during the sensor baseline process to determine the sensor calibration deviation, the coil circuit health, and the electrode circuit health. In addition, the measurements taken by this test can provide additional information when troubleshooting the meter.

Coil circuit resistance

LOI menu path	Manual: **Diagnostics → Advanced Diag → Meter Verif → Measurements → Manual Measure → Coil Resist** Continuous: **Diagnostics → Advanced Diag → Meter Verif → Measurements → Continual Meas → Coil Resist**

The coil circuit resistance is a measurement of the coil circuit health. This value is compared to the coil circuit resistance signature measurement taken during the sensor baseline process to determine coil circuit health. This value can be continuously monitored using continuous Smart Meter Verification.

Coil inductance (signature)

LOI menu path	Manual: **Diagnostics → Advanced Diag → Meter Verif → Measurements → Manual Measure → Coil Inductance** Continuous: **Diagnostics → Advanced Diag → Meter Verif → Measurements → Continual Meas → Coil Inductance**

The coil inductance is a measurement of the magnetic field strength. This value is compared to the coil inductance signature measurement taken during the sensor baseline process to determine sensor calibration deviation. This value can be continuously monitored using continuous Smart Meter Verification.

Electrode circuit resistance

LOI menu path	Manual: **Diagnostics** → **Advanced Diag** → **Meter Verif** → **Measurements** → **Manual Measure** → **Electrode Res** Continuous: **Diagnostics** → **Advanced Diag** → **Meter Verif** → **Measurements** → **Continual Meas** → **Electrode Res**

The electrode circuit resistance is a measurement of the electrode circuit health. This value is compared to the electrode circuit resistance signature measurement taken during the sensor baseline process to determine electrode circuit health. This value can be continuously monitored using continuous Smart Meter Verification.

Actual velocity

LOI menu path	Manual: **Diagnostics** → **Advanced Diag** → **Meter Verif** → **Measurements** → **Manual Measure** → **ActualVelocity** Continuous: **Diagnostics** → **Advanced Diag** → **Meter Verif** → **Measurements** → **Continual Meas** → **ActualVelocity**

The actual velocity is a measurement of the simulated velocity signal. This value is compared to the simulated velocity to determine transmitter calibration deviation. This value can be continuously monitored using continuous Smart Meter Verification.

Flow simulation deviation

LOI menu path	Manual: → **Diagnostics** → **Variables** → **MV Results** → **Manual Results** → **Flow Sim Dev** Continuous: → **Diagnostics** → **Variables** → **MV Results** → **Continual Res** → **Flow Sim Dev**

The flow simulation deviation is a measurement of the percent difference between the simulated velocity and the actual measured velocity from the transmitter calibration verification test. This value can be continuously monitored using continuous Smart Meter Verification.

4-20 mA expected value

LOI menu path	Manual: **Diagnostics** → **Advanced Diag** → **4-20 mA Verify** → **View Results**
	Continuous: **Diagnostics** → **Advanced Diag** → **Meter Verif** → **Measurements** → **Continual Meas** → **4-20 mA Expect**

The 4-20 mA expected value is the simulated analog signal used for the 4-20 mA meter verification test. This value is compared to the actual analog signal to determine analog output deviation. This value can be continuously monitored using continuous Smart Meter Verification.

4-20 mA actual value

LOI menu path	Manual: **Diagnostics** → **Advanced Diag** → **4-20 mA Verify** → **View Results** Continuous: **Diagnostics** → **Advanced Diag** → **Meter Verif** → **Measurements** → **Continual Meas** → **4-20 mA Actual**

The 4-20 mA actual value is the measured analog signal used for the 4-20 mA meter verification test. This value is compared to the simulated analog signal to determine analog output deviation. This value can be continuously monitored using continuous Smart Meter Verification.

4-20 mA deviation

LOI menu path	Manual: **Diagnostics** → **Advanced Diag,** → **4-20 mA Verify** → **View Results** Continuous: **Diagnostics** → **Advanced Diag** → **Meter Verif** → **Measurements** → **Continual Meas** → **AO FB Dev**

The 4-20 mA deviation is a measurement of the percent difference between the simulated analog signal and the actual measured analog signal from the analog output verification test. This value can be continuously monitored using continuous Smart Meter Verification.

9.14 Optimizing the Smart Meter Verification

The Smart Meter Verification diagnostic can be optimized by setting the test criteria to the desired levels necessary to meet the compliance requirements of the application. The following examples below will provide some guidance on how to set these levels.

Example 1 An effluent meter must be certified annually to comply with environmental regulations. This example regulation requires that the meter be certified to five percent. Since this is an effluent meter, shutting down the process may not be viable. In this instance the Smart Meter Verification test will be performed under flowing conditions. Set the test criteria for flowing, full to five percent to meet the requirements of the governmental agencies.

Example 2 A pharmaceutical company requires bi-annual verification of meter calibration on a critical feed line for one of their products. This is an internal standard, and the plant requires a calibration record be kept on-hand. Meter calibration on this process must meet two percent. The process is a batch process so it is possible to perform the calibration verification with the line full and with no flow. Since the Smart Meter Verification test can be run under no flow conditions, set the test criteria for no flow to two percent to comply with the necessary plant standards.

Example 3 A food and beverage company requires an annual calibration of a meter on a product line. The plant standard calls for the accuracy to be three percent or better. They manufacture this product in batches, and the measurement cannot be interrupted when a batch is in process. When the batch is complete, the line goes empty. Since there is no means of performing the Smart Meter Verification test while there is product in the line, the test must be performed under empty pipe conditions. The test criteria for empty pipe should be set to three percent, and it should be noted that the electrode circuit health cannot be verified.

9.14.1 Optimizing continuous Smart Meter Verification

For continuous Smart Meter Verification, there is only one test criteria value to configure, and it will be used for all flow conditions. The factory default is set to five percent to minimize the potential for false failures under empty pipe conditions. For best results, set the criteria to match the maximum value of the three test criteria set during commanded meter verification (no flow, flowing full, and empty pipe).

For example, a plant might set the following commanded meter verification test criteria: two percent for no flow, three percent for flowing full, and four percent for empty pipe. In this case, the maximum test criterion is four percent, so the test criteria for continuous Smart Meter Verification should be set to four percent. If the tolerance band is set too tightly, under empty pipe conditions or noisy flowing conditions, a false failure of the transmitter test may occur.

Manual Calibration Verification Results

Report parameters	
User Name: _____	Calibration Conditions: ❑ Internal ❑ External
Tag #:_____	Test Conditions: ❑ Flowing ❑ No Flow, Full Pipe ❑ Empty Pipe
Flowmeter information and configuration	
Software Tag:	PV URV (20 mA scale):_____
Calibration Number:	PV LRV (4 mA scale):_____
Line Size:	PV Damping:_____
Transmitter calibration verification results	Sensor calibration verification results
Simulated Velocity:	Sensor Deviation %:_____
Actual Velocity:	Sensor Test: ❑ PASS / ❑ FAIL / ❑ NOT TESTED
Deviation %:	Coil Circuit Test: ❑ PASS / ❑ FAIL / ❑ NOT TESTED
Transmitter: ❑ PASS / ❑ FAIL / ❑ NOT TESTED	Electrode Circuit Test: ❑ PASS / ❑ FAIL / ❑ NOT TESTED
Summary of Calibration Verification results	
Verification Results: The result of the flowmeter verification test is: ❑ PASSED / ❑ FAILED	
Verification Criteria: This meter was verified to be functioning within _____ % of deviation from the original test parameters.	
Signature:_____	Date:_____

10 Digital Signal Processing

10.1 Introduction

Magmeters are used in applications that can create noisy flow readings. The transmitter has the capability to deal with difficult applications that have previously manifested themselves in a noisy output signal. In addition to selecting a higher coil drive frequency (37 Hz vs. 5 Hz) to isolate the flow signal from the process noise, the microprocessor has digital signal processing that is capable of rejecting the noise specific to the application. This section explains the different types of process noise, provides instructions for optimizing the flow reading in noisy applications, and provides a detailed description of the digital signal processing functionality.

10.2 Process noise profiles

1/f noise

This type of noise has higher amplitudes at lower frequencies, but generally degrades over increasing frequencies. Potential sources of 1/f noise include chemical mixing and slurry flow particles rubbing against the electrodes.

Spike noise

This type of noise generally results in a high amplitude signal at specific frequencies, which can vary depending on the source of the noise. Common sources of spike noise include chemical injections directly upstream of the flowmeter, hydraulic pumps, and slurry flows with low concentrations of particles in the stream. The particles bounce on the electrode generating a “spike” in the electrode signal. An example of this type of flow stream would be a recycle flow in a paper mill.

White noise

This type of noise results in a high amplitude signal that is relatively constant over the frequency range. Common sources of white noise include chemical reactions or mixing that occurs as the fluid passes through the flow meter and high concentration slurry flows where the particulates are constantly passing over the electrode head. An example of this type of flow stream would be a basis weight stream in a paper mill.

10.3 High process noise diagnostic

The transmitter continuously monitors signal amplitudes over a wide range of frequencies. For the high process noise diagnostic, the transmitter specifically looks at the noise amplitude adjacent to the Low and High coil drive frequencies. The noise values are used to calculate a signal-to-noise ratio for both drive frequencies. If the signal-to-noise ratio is less than 25 at the currently selected coil drive frequency, the high process noise diagnostic will trip, indicating that the flow signal may be compromised.

Related information

High process noise detection

10.4 Optimizing flow reading in noisy applications

If the flow reading is unstable, first check the wiring, grounding, and process reference associated with the magnetic flowmeter system. Ensure that the following conditions are met:

- Ground straps are attached to the adjacent flange or ground ring
- Grounding rings, lining protectors, or a process reference electrode are being used in lined or non-conductive piping

The causes of unstable transmitter output can usually be traced to extraneous voltages on the measuring electrodes. This “process noise” can arise from several causes including electrochemical reactions between the fluid and the electrode, chemical reactions in the process itself, free ion activity in the fluid, or some other disturbance of the fluid/electrode capacitive layer. In such noisy applications, an analysis of the frequency spectrum reveals process noise that typically becomes significant below 15 Hz.

In some cases, the effects of process noise may be sharply reduced by elevating the coil drive frequency above the 15 Hz region. Coil drive mode is selectable between the standard 5 Hz and the noise-reducing 37 Hz.

10.4.1 Coil drive frequency

LOI menu path	**Detailed Setup → Additional Params → Coil Drive Freq**

This parameter changes the pulse rate of the magnetic coils.

5 Hz

The standard coil drive frequency is 5 Hz, which is sufficient for nearly all applications.

37 Hz

If the process fluid causes a noisy or unstable flow reading, increase the coil drive frequency to 37 Hz. If the 37 Hz mode is selected, perform the auto zero function for optimum performance.

Note
37 Hz coil drive frequency mode should not be used for sensors larger than 20-inch.

10.4.2 Auto zero

LOI menu path	**Diagnostics → Trims → Auto Zero**

To ensure optimum accuracy when using 37 Hz coil drive mode, there is an auto zero function that should be initiated. When using 37 Hz coil drive mode it is important to zero the system for the specific application and installation.

The auto zero procedure should be performed only under the following conditions:

- With the transmitter and sensor installed in their final positions. This procedure is not applicable on the bench.
- With the transmitter in 37 Hz coil drive mode. Never attempt this procedure with the transmitter in 5 Hz coil drive mode.
- With the sensor full of process fluid at zero flow.

These conditions should cause an output equivalent to zero flow.

Set the loop to manual if necessary and begin the auto zero procedure. The transmitter completes the procedure automatically in about 90 seconds. A clock symbol will appear in the lower right-hand corner of the display to indicate that the procedure is running.

Note
Failure to complete an auto zero may result in a flow velocity error of 5 to10% at1 ft/s (0.3 m/s). While the output level will be offset by the error, the repeatability will not be affected.

10.4.3 Other signal processing tools

The transmitter contains several advanced functions that can be used to stabilize erratic outputs caused by process noise. The signal processing menu contains this functionality. If the 37 Hz coil drive frequency has been set, and the output is still unstable, the damping and signal processing function should be used. It is important to set the coil drive frequency to 37 Hz to increase the flow sampling rate. The transmitter provides an easy and straightforward start-up, and also incorporates the capability to deal with difficult applications that have previously manifested themselves in a noisy output signal. In addition to selecting a higher coil drive frequency (37 Hz vs. 5 Hz) to isolate the flow signal from the process noise, the microprocessor can scrutinize each input based on three user-defined parameters to reject the noise specific to the application.

Operating mode

LOI menu path	**Detailed Setup → Signal Processing → Operating Mode**

The operating mode should be used only when the signal is noisy and gives an unstable output. Filter mode automatically uses 37 Hz coil drive mode and activates signal processing at the factory set default values. When using filter mode, perform an auto zero with no flow and a full sensor. Either of the parameters, coil drive mode or signal processing, may still be changed individually. Turning signal processing off or changing the coil drive frequency to 5 Hz will automatically change the operating mode from filter mode to normal mode. This software technique, known as signal processing, “qualifies” individual flow signals based on historic flow information and three user-definable parameters, plus an on/off control. These parameters are described below.

Status

LOI menu path	**Detailed Setup → Signal Processing → Main Config DSP → Status**

Enable or disable the DSP capabilities. When ON is selected, the output is derived using a running average of the individual flow inputs. Signal processing is a software algorithm that examines the quality of the electrode signal against user-specified tolerances. The three parameters that make up signal processing (number of samples, maximum percent limit, and time limit) are described below.

Number of samples

LOI menu path	**Detailed Setup → Signal Processing → Main Config DSP → Samples**

The number of samples sets the amount of time that inputs are collected and used to calculate the average value. Each second is divided into tenths with the number of samples equaling the number of increments used to calculate the average. This parameter can be configured for an integer value between 1 and 125. The default value is 90 samples.

For example:

- A value of 1 averages the inputs over the past $^{1}/_{10}$ second

- A value of 10 averages the inputs over the past 1 second
- A value of 100 averages the inputs over the past 10 seconds
- A value of 125 averages the inputs over the past 12.5 seconds

Percent limit

LOI menu path	**Detailed Setup → Signal Processing → Main Config DSP → % Limit**

This parameter will set the tolerance band on either side of the running average, referring to percent deviation from the average. Values within the limit are accepted while value outside the limit are scrutinized to determine if they are a noise spike or an actual flow change. This parameter can be configured for an integer value between 0 and 100 percent. The default value is 2 percent.

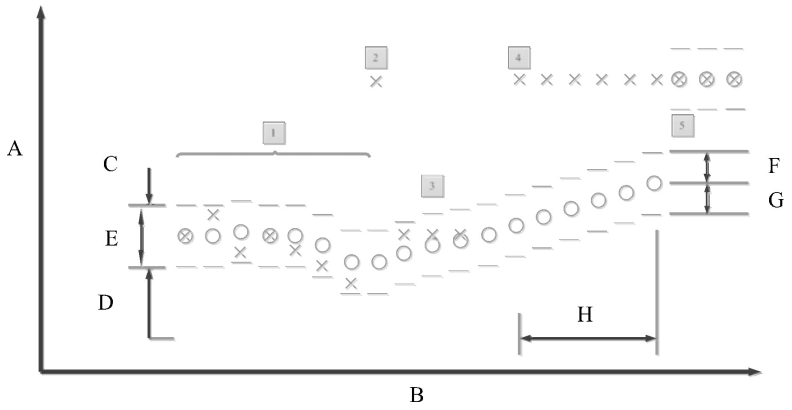
Time limit

LOI menu path	**Detailed Setup → Signal Processing → Main Config DSP → Time Limit**

The time limit parameter forces the output and running average values to the new value of an actual flow rate change that is outside the percent limit boundaries. It thereby limits response time to flow changes to the time limit value rather than the length of the running average. If the number of samples selected is 100, then the response time of the system is 10 seconds. In some cases this may be unacceptable. Setting the time limit forces the transmitter to clear the value of the running average and re-establish the output and average at the new flow rate once the time limit has elapsed. This parameter limits the response time added to the loop. A suggested time limit value of two seconds is a good starting point for most applicable process fluids. This parameter can be configured for a value between 0.6 and 256 seconds. The default value is 2 seconds.

10.5 Explanation of signal processing algorithm

An example plotting flow rate versus time is given below to help visualize the signal processing algorithm.



A. Flow rate
B. Time (10 samples = 1 second)
C. Upper value
D. Lower value
E. Tolerance band
F. Maximum percent limit
G. Minimum percent limit
H. Time limit

- X = Input flow signal from sensor
- O = Average flow signals and transmitter output, determined by the number of samples parameter
- Tolerance band, determined by the percent limit parameter
- Upper value = average flow + [(percent limit/100) average flow]
- Lower value = average flow - [(percent limit/100) average flow]

1. This scenario is that of a typical non-noisy flow. The input flow signal is within the percent limit tolerance band, therefore qualifying itself as a good input. In this case the new input is added directly into the running average and is passed on as a part of the average value to the output.
2. This signal is outside the tolerance band and therefore is held in memory until the next input can be evaluated. The running average is provided as the output.
3. The previous signal currently held in memory is simply rejected as a noise spike since the next flow input signal is back within the tolerance band. This results in complete rejection of noise spikes rather than allowing them to be “averaged” with the good signals as occurs in the typical damping circuits.
4. As in number 2 above, the input is outside the tolerance band. This first signal is held in memory and compared to the next signal. The next signal is also outside the tolerance band (in the same direction), so the stored value is added to the running average as the next input and the running average begins to slowly approach the new input level.
5. To avoid waiting for the slowly incrementing average value to catch up to the new level input, an algorithm is provided. This is the “time limit” parameter. The user

can set this parameter to eliminate the slow ramping of the output toward the new input level.

11 Maintenance

11.1 Introduction

This section covers basic transmitter maintenance. Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Read the following safety messages before performing any operation described in this section. Refer to these warnings when appropriate throughout this section.

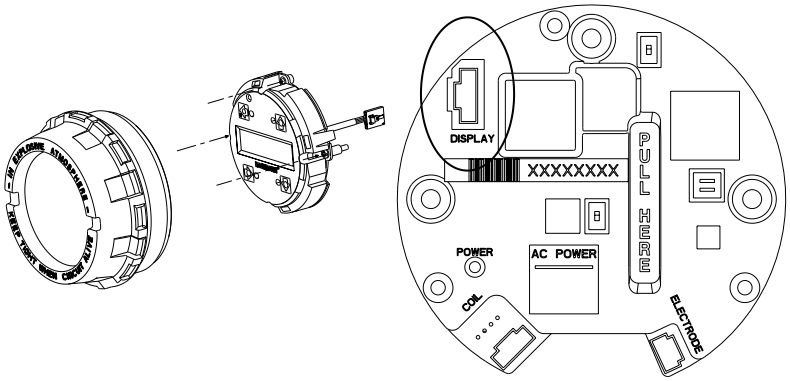
11.2 Safety information

⚠ WARNING

Failure to follow these maintenance guidelines could result in death or serious injury.

- Installation and servicing instructions should be performed by qualified personnel only.
- Do not perform any servicing other than that contained in the operating instructions.
- Verify the operating environment of the sensor and transmitter is consistent with the appropriate hazardous area approval.
- Do not connect the transmitter to a non-Rosemount sensor that is located in an explosive atmosphere.
- Mishandling products exposed to a hazardous substance may result in death or serious injury.
- If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDS) for each hazardous substance identified must be included with the returned goods.

11.3 Installing a LOI/Display



Procedure

1. If the transmitter is installed in a control loop, secure the loop.

2. Remove power from the transmitter.
3. Remove the cover on the electronics compartment of the transmitter housing. If the cover has a cover jam screw, loosen it before removing the cover.

   See Cover jam screw for details on the cover jam screw.

4. On the electronics stack, locate the serial connection labeled “DISPLAY”.

   See Figure 11-1.

5. Plug the serial connector from the back of the LOI/Display into the receptacle on the electronics stack.

   The LOI/Display can be rotated in 90 degree increments to provide the best viewing position. Rotate the LOI/Display to the desired orientation, taking care to not exceed 360 degrees of rotation. Exceeding 360 degrees of rotation could damage the LOI/Display cable and/or connector.

6. Once the serial connector is installed on the electronics stack, and the LOI/Display is oriented in the desired position, tighten the three mounting screws.
7. Install the extended cover with the glass viewing pane and tighten to metal-to-metal contact.

   If the cover has a cover jam screw, this must be tightened to comply with installation requirements. Return power to the transmitter and verify that it is functioning correctly and reporting the expected flow rate.

8. If installed in a control loop, return the loop to automatic control.

11.4 Replacing electronics stack

Prerequisites

Make sure that the existing electronics stack is the same as the replacement (Revision 4) electronics stack. There are two ways to make sure:

- Look at the complete transmitter model number. Current (Revision 4) electronics are only compatible with Models 8732E**M**. If your transmitter model number as shown on the model number tag is not 8732E**M**, you cannot use a Revision 4 board stack.
- Visually inspect the existing and new electronics stacks to ensure that they are physically alike. The current (Revision 4) version of the stack has its electrical connections in different locations from the older versions. Both are shown in Figure 11-2.

Note
You must open the housing and expose the electronics stack to inspect it (steps Step 1 through Step 5 below). Follow all applicable safety procedures and see Powering the transmitter for details on the covers.

Figure 11-2: Electronics Stack Identification



A. Current (Revision 4) electronics stack.
B. Old electronics stack.

Procedure

1. If the transmitter is installed in a control loop, secure the loop.
2. Remove power from the transmitter.
3. Remove the LOI/Display-side cover of the transmitter.

   Note
   See Powering the transmitter for details on the covers.

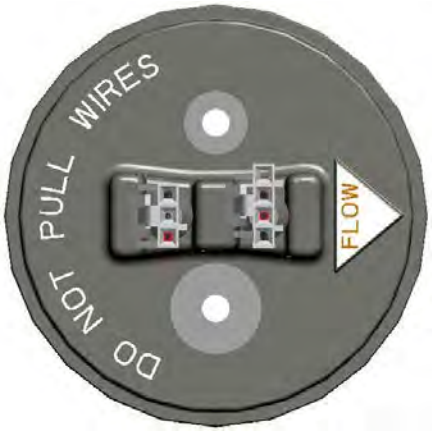
4. Remove the three screws that hold the LOI/Display to the electronics stack.
5. Carefully unplug the LOI/Display connector and remove and set aside the LOI/Display.
6. Carefully unplug the coil and electrode connectors.
7. Remove the three screws that secure the electronics stack into the housing.
8. Carefully pull out the electronics stack by the handle marked **PULL HERE**.
9. Remove the screws from the old electronics stack and insert them into the new electronics stack.
10. Hold the new electronics stack by the handle and carefully insert it into the housing, making certain that the screw holes and electrical connectors are in proper alignment to seat the stack.
11. Securely tighten the three electronics stack screws into the housing.
12. Plug in the coil and electrode connectors.
13. Replace the LOI/Display and refasten the three screws to secure it to the electronics stack.
14. Reinstall the LOI/Display-side cover of the transmitter and tighten it to ensure the housing is properly sealed to meet ingress protection requirements.
15. Return power to the transmitter and verify that it is functioning correctly and reporting the expected flow rate.
16. If installed in a control loop, return the loop to automatic control.

11.5 Replacing a socket module/terminal block

The socket module connects the sensor adapter to the transmitter. There are two versions of the socket module - one for integral mount transmitters and one for remote mount transmitters. The socket module is a replaceable component.

To remove the socket module, loosen the two mounting screws and pull up on the socket module from the base. When removing the socket module, do not pull on the wires. See Figure 11-3.

Figure 11-3: Socket Module Warning



11.5.1 Replacing an integral mount socket module

Prerequisites

The integral mount socket module is shown in Figure 11-4. To gain access to the socket module, the transmitter must be removed from the sensor adapter.

Figure 11-4: Socket Module—Integral Mount



Removing an integral mount socket module

Procedure

1. Disconnect power.
2. Remove electronics cover to gain access to the coil and electrode cables.
3. If the transmitter has a LOI/Display, it will need to be removed to gain access to the coil and electrode cables.
4. Disconnect the coil and electrode cables.
5. Remove the four transmitter mounting bolts.
6. Lift the transmitter off of the sensor adapter.
7. To remove the socket module, loosen the two mounting screws and pull up on the socket module from the base.
8. When removing the socket module, do not pull on the wires.

   See Figure 11-3.

Installing an integral mount socket module

Procedure

1. To insert a new integral mount socket module, press the base into its keyed position and tighten the two mounting screws.
2. The coil and electrode cables are fed through the bottom opening of the transmitter and plugged into the face of the electronics.
3. The coil and electrode cables are keyed so they will only fit into their dedicated location.
4. If the transmitter has a LOI/Display, it will need to be removed to access the coil and electrode ports.
5. Once the connections are made, the transmitter can be secured to the sensor adapter using the four mounting bolts.

11.5.2 Replacing a terminal block socket module

Prerequisites

Note
This section only applies to sensors with Kx approval codes.

The terminal block socket module is shown in Figure 11-5. To gain access to the socket module, remove the junction box from the sensor adapter.



A. Mounting screws:
- *2X—standard*
- *4X—with I.S. divider*

Removing a terminal block socket module

Procedure

1. Disconnect power to the transmitter and the remote cabling connected to the terminal block.
2. Remove the junction box cover to gain access to the remote cabling.
3. To disconnect the terminal block from the junction box housing, remove the two mounting screws and the two divider mounting screws (if applicable).
4. Pull up on the terminal block to expose the socket module base.
5. To remove the socket module, loosen the two mounting screws and pull up on the socket module from the base.
6. When removing the socket module, do not pull on the wires.

   See Figure 11-3.

Installing a terminal block socket module

Procedure

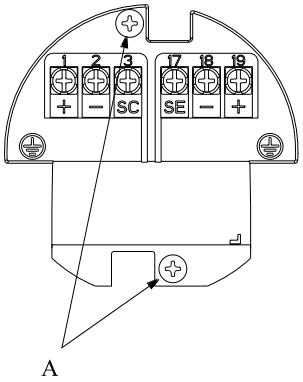
1. Insert the new terminal block socket module, press the base into its keyed position, and tighten the two mounting screws.
2. Connect the terminal block to the junction box housing by tightening the two mounting screws.

   Install the divider with the two mounting screws if applicable.
3. Reconnect remote cabling and power and replace junction box cover.

11.5.3 Replacing a terminal block with amp clips

Note
This section applies only to sensors with Nx approval codes or no hazardous area approval code for use in ordinary locations.





A. Mounting screws:
- *2X—standard*
- *4X—with I.S. divider*

Removing a terminal block

Procedure

1. Disconnect power to the transmitter.
2. Remove the junction box cover on the sensor to gain access to the remote cabling and disconnect the remote cabling connected to the terminal block.
3. To disconnect the terminal block from the junction box housing, remove the two mounting screws and the two divider mounting screws (if applicable).
4. Pull up on the terminal block to expose the connecting wires.
5. To remove the terminal block, unclip both wire connectors.

Installing a terminal block

Procedure

1. Clip the connecting wires to the back of the terminal block, the clips are different sizes and must be connected to their matching receptacle.
2. Connect the terminal block to the junction box housing by tightening the two mounting screws. Install the divider with the two mounting screws if applicable.
3. Reconnect remote cabling, replace the junction box cover on the sensor, and connect power.

11.6 Trims

LOI menu path	**Diagnostics → Trims**

Trims are used to calibrate the analog loop, calibrate the transmitter, re-zero the transmitter, and calibrate the transmitter with another manufacturer's sensor. Proceed with caution whenever performing a trim function.

11.6.1 D/A trim

LOI menu path	**Diagnostics → Trims → D/A Trim**

The D/A trim is used to calibrate the 4-20mA analog loop output from the transmitter. For maximum accuracy, the analog output should be trimmed for your system loop. Use the following steps to complete the output trim function.

Procedure

1. Set the loop to manual, if necessary.
2. Connect a precision ammeter in the 4-20mA loop.
3. Initiate the D/A trim function with the LOI.
4. Enter the 4mA meter value when prompted.
5. Enter the 20mA meter value when prompted.
6. Return the loop to automatic control, if necessary.

The 4-20mA trim is now complete. The D/A trim can be repeated to check the results. Alternatively, the analog output test can also be used to verify loop performance.

11.6.2 Scaled D/A trim

LOI menu path	**Diagnostics → Trims → Scaled D/A Trim**

A scaled D/A trim enables calibration of the flowmeter analog output using a different scale than the standard 4-20mA output scale. Non-scaled D/A trimming (described above), is typically performed using an ammeter where calibration values are entered in units of milliamperes. Scaled D/A trimming enables trimming of the flowmeter using a scale that may be more convenient based upon the method of measurement.

For example, it may be more convenient to make current measurements by direct voltage readings across the loop resistor. If the loop resistor is 500 ohms, and calibration of the meter will be done using voltage measurements across this resistor, the trim points can be rescaled from 4-20mA to 4-20mA x 500 ohm or 2-10VDC. Once the scaled trim points have been entered as 2 and 10, calibration of the flowmeter can be done by entering voltage measurements directly from the voltmeter.

11.6.3 Digital trim

LOI menu path	**Diagnostics → Trims → Digital Trim**

Digital trim is the function by which the factory calibrates the transmitter. This procedure is rarely needed by users. It is only necessary if the transmitter is suspected to be no longer accurate. A Rosemount 8714D Calibration Standard is required to complete a digital trim. Attempting a digital trim without a Rosemount 8714D Calibration Standard may result in

an inaccurate transmitter or an error message. The digital trim must be performed with the coil drive mode set to 5Hz and with a nominal sensor calibration number stored in the memory.

Note
Attempting a digital trim without a Rosemount 8714D Calibration Standard may result in an inaccurate transmitter, or a "DIGITAL TRIM FAILURE" message may appear. If this message occurs, no values were changed in the transmitter. Simply cycle power on the transmitter to clear the message.

To simulate a nominal sensor with the Rosemount 8714D Calibration Standard, change/verify the following parameters in the transmitter:

- Calibration Number-1000015010000000
- Units-ft/s
- PV URV-20mA = 30.00 ft/s
- PV LRV-4mA = 0 ft/s
- Coil Drive Frequency-5Hz

Before changing any of the configuration parameters, be sure to record the original values so that the transmitter can be returned to the original configuration prior to being placed back into operation. Failure to return the settings to the original configuration will result in incorrect flow and totalizer readings.

The instructions for changing the calibration number, units, PV URV, and PV LRV are located in Basic Setup. Instructions for changing the coil drive frequency can be found on Coil drive frequency.

Set the loop to manual (if necessary) and then complete the following steps:

Procedure

1. Power down the transmitter.
2. Connect the transmitter to a Rosemount 8714D Calibration Standard.
3. Power up the transmitter with the Rosemount 8714D connected and read the flow rate.

   The electronics need about a 5-minute warm-up time to stabilize.
4. Set the 8714D Calibration Standard to the 30 ft/s (9.1 m/s) setting.
5. The flow rate reading after warm-up should be between 29.97 (9.1 m/s) and 30.03 ft/s (9.2 m/s).
6. If the reading is within the range, return the transmitter to the original configuration parameters.
7. If the reading is not within this range, initiate a digital trim.

   The digital trim takes about 90 seconds to complete. No transmitter adjustments are required.

11.6.4 Universal trim

LOI menu path	**Diagnostics** → **Trims** → **Universal Trim**

The universal auto trim function enables the transmitter to calibrate sensors that were not calibrated at the factory. The function is activated as one step in a procedure known as in-process calibration. If a sensor has a 16-digit calibration number, in-process calibration is

not required. If it does not, or if the sensor is made by another manufacturer, complete the following steps for in-process calibration. Refer to Implementing a Universal Transmitter.

Procedure

1. Determine the flow rate of the process fluid in the sensor.

   Note
   The flow rate in the line can be determined by using another sensor in the line, by counting the revolutions of a centrifugal pump, or by performing a bucket test to determine how fast a given volume is filled by the process fluid.

2. Complete the universal auto trim function.

When the routine is completed, the sensor is ready for use.

11.7 Review

LOI menu path	**Device Setup** → **Review**

The transmitter includes a capability to review the configuration variable settings.

The flowmeter configuration parameters set at the factory should be reviewed to ensure accuracy and compatibility with the particular application of the flowmeter.

Note
If the LOI is used to review variables, each variable must be accessed as if changing its setting. The value displayed on the LOI screen is the configured value of the variable.

12 Troubleshooting

12.1 Introduction

This section covers basic transmitter and sensor troubleshooting. Problems in the magnetic flow meter system are usually indicated by incorrect output readings from the system, error messages, or failed tests. Consider all sources when identifying a problem in the system. If the problem persists, consult an Emerson Flow Representative to determine if the material should be returned to the factory. Emerson offers several diagnostics that aid in the troubleshooting process. Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Read the following safety messages before performing any operation described in this section. Refer to these warnings when appropriate throughout this section.

The transmitter performs self-diagnostics on the entire magnetic flow meter system: the transmitter, the sensor, and the interconnecting wiring. By sequentially troubleshooting each individual piece of the system, it becomes easier to identify the problem and make the appropriate adjustments.

If there are problems with a new installation, see Installation check and guide below for a quick guide to solve the most common problems. For existing installations, Table 12-7 lists the most common problems and corrective actions.

12.2 Safety information

⚠ WARNING

Failure to follow these troubleshotting guidelines could result in death or serious injury.

- Installation and servicing instructions should be performed by qualified personnel only.
- Do not perform any servicing other than that contained in the operating instructions.
- Verify that the operating environment of the sensor and transmitter is consistent with the appropriate hazardous area approval.
- Do not connect the transmitter to a non-Rosemount sensor that is located in an explosive atmosphere.
- Mishandling products exposed to a hazardous substance may result in death or serious injury.
- If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDS) for each hazardous substance identified must be included with the returned goods.

12.3 Installation check and guide

Use this guide to check new installations of Rosemount magnetic flowmeter systems that appear to malfunction.

12.3.1 Transmitter

Checking the transmitter before applying power

Prerequisites

Before applying power to the magnetic flowmeter system, make the following transmitter checks:

Procedure

1. Record the transmitter model number and serial number.
2. Visually inspect the transmitter for any damage including the terminal block.
3. Verify the proper wiring connections have been made for the power and outputs.

Checking the transmitter after applying power

Prerequisites

Apply power to the magnetic flowmeter system before making the following transmitter checks:

Procedure

1. Check for an active error message or status alert. Refer to Diagnostic messages.
2. Verify the correct sensor calibration number is entered in the transmitter.

   The calibration number is listed on the sensor nameplate.
3. Verify the correct sensor line size is entered in the transmitter.

   The line size value is listed on the sensor nameplate.
4. Verify the analog range of the transmitter matches the analog range in the control system.
5. Verify the forced analog output and forced pulse output of the transmitter produces the correct output at the control system.
6. If desired, use a Rosemount 8714D Calibration Standard to verify the transmitter calibration.

12.3.2 Sensor

Prerequisites

Be sure that power to magnetic flowmeter system is removed before beginning the following sensor checks:

Procedure

1. Record the sensor model number and serial number.
2. Visually inspect the sensor for any damage including inside the remote junction box, if applicable.
3. For horizontal flow installations, ensure that the electrodes remain covered by process fluid.

   For vertical or inclined installations, ensure that the process fluid is flowing up into the sensor to keep the electrodes covered by process fluid.
4. Verify the flow arrow is pointing in the same direction as forward flow.

5. Ensure the grounding straps on the sensor are connected to grounding rings, lining protectors, or the adjacent pipe flanges. Improper grounding will cause erratic operation of the system.

   Sensors with a ground electrode will not require the grounding straps to be connected.

12.3.3 Remote wiring

Procedure

1. The electrode signal and coil drive wires must be separate cables unless Rosemount specified combo cable is used.

   See Sensor to transmitter wiring.

2. The electrode signal wire and coil drive wire must be twisted shielded cable. Rosemount recommends 20 AWG twisted shielded cable for the electrode signal and 14 AWG twisted shielded cable for the coil drive.

   See Sensor to transmitter wiring.

3. See Product certifications regarding wiring installation requirements.
4. See Wiring Diagrams for component wiring.
5. Verify there is minimal exposed wiring and shielding.

   Less than 1 inch (25 mm) is recommended.

6. Verify that the single conduit that houses both the electrode signal and coil drive cables do not contain any other wires, including wires from other magmeters.

Note
For installations requiring intrinsically safe electrodes, the signal and coil drive cables must be run in Individual conduits.

12.3.4 Process fluid

Procedure

1. The process fluid should have a minimum conductivity of 5 microSiemens/cm (5 micro mhos/cm).
2. The process fluid must be free of air and gas.
3. The sensor must be full of process fluid.
4. The process fluid must be compatible with the wetted materials - liner, electrodes, ground rings, and lining protectors.

   Refer to the *Rosemount™ Magnetic Flowmeter Material Selection Guide (00816-0100-3033)* Technical Note for details.

5. If the process is electrolytic or has cathodic protection, refer to the *Installation and Grounding of Magmeters in Typical and Special Applications (00840-2400-4727)* Technical Note for special installation requirements.

12.4 Diagnostic messages

Problems in the magnetic flowmeter system are usually indicated by incorrect output readings from the system, error messages, or failed tests. Consider all sources in identifying a problem in the system.

Table 12-1: Basic Diagnostic Messages

Error message	Potential cause	Corrective action
Empty Pipe	Empty pipe	None - message will clear when pipe is full
	Wiring error	Check that wiring matches appropriate wiring diagrams
	Electrode error	Perform sensor tests - see Installed sensor tests
	Conductivity less than 5 microSiemens per cm	Increase conductivity to greater than or equal to 5 microSiemens per cm
	Intermittent diagnostic	Adjust tuning of empty pipe parameters - see Troubleshooting empty pipe
Coil Open Circuit	Improper wiring	Check coil drive wiring and sensor coils. Perform sensor tests - see Installed sensor tests
	Other manufacturer's sensor	Change coil current to 75 mA - set calibration numbers to 10000550100000030
		Perform a universal auto-trim to select the proper coil current
	Electronics board failure	Replace electronics stack
	Coil circuit open fuse	Replace the sensor
Auto Zero Failure	Flow is not set to zero	Force flow to zero, perform auto zero trim
	Unshielded cable in use	Change wire to shielded cable
	Moisture problems	See Installed sensor tests
Auto-Trim Failure	No flow in pipe while performing Universal Auto Trim	Establish a known flow rate, and perform universal auto-trim calibration
	Wiring error	Check that wiring matches appropriate wiring diagrams - see Implementing a Universal Transmitter
	Flow rate is changing in pipe while performing Universal Auto-Trim routine	Establish a constant flow rate, and perform universal auto-trim calibration
	Flow rate through sensor is significantly different than value entered during Universal Auto-Trim routine	Verify flow in sensor and perform universal auto-trim calibration
	Incorrect calibration number entered into transmitter for Universal Auto-Trim routine	Replace sensor calibration number with 1000005010000000
	Wrong sensor size selected	Correct sensor size setting - see Basic Setup
	Sensor failure	Perform sensor tests - see Installed sensor tests
Electronics Failure	Electronics self check failure	Cycle power to see if diagnostic message clears
		Replace Electronics stack

Table 12-1: Basic Diagnostic Messages *(continued)*

Error message	Potential cause	Corrective action
Electronics Temp Fail	Ambient temperature exceeded the electronics temperature limits	Move transmitter to a location with an ambient temperature range of -40 to 140 °F (-40 to 60 °C)
Reverse Flow	Electrode or coil wires reverse	Verify wiring between sensor and transmitter
	Flow is reverse	Turn ON Reverse Flow Enable to read flow
	Sensor installed backwards	Install sensor correctly, or switch either the electrode wires (18 and 19) or the coil wires (1 and 2)
PZR Activated (Positive Zero Return)	External voltage applied to terminals 5 and 6	Remove voltage to turn PZR off
Pulse Out of Range	The transmitter is trying to generate a frequency greater than allowed	Standard pulse - increase pulse scaling to prevent pulse output from exceeding 11,000 Hz
		Intrinsically safe pulse - Increase pulse scaling to prevent pulse output from exceeding 5,500 Hz
		Pulse output is in fixed pulse mode and is trying to generate a frequency greater than the pulse width can support - see Pulse output
		Verify the sensor calibration number and line size are correctly entered in the electronics
Analog Out of Range	Flow rate is greater than analog output range	Reduce flow, adjust URV and LRV values
		Verify the sensor calibration number and line sizes are correctly entered in the electronics
Flow rate > 43 ft/sec	Flow rate is greater than 43 ft/sec	Lower flow velocity, increase pipe diameter
	Improper wiring	Check coil drive wiring and sensor coils
		Perform sensor tests - see Installed sensor tests
Digital Trim Failure (Cycle power to clear messages, no changes were made)	The calibrator (8714B/C/D) is not connected properly	Review calibrator connections
	Incorrect calibration number entered into transmitter	Replace sensor calibration number with 1000015010000000
	Calibrator is not set to 30 FPS	Change calibrator setting to 30 FPS
	Bad calibrator or calibrator cable	Replace calibrator and/or calibrator cable
Coil Over Current	Improper wiring	Check coil drive wiring and sensor coilsPerform sensor tests - see Installed sensor tests
	Transmitter failure	Replace the electronics stack
Coil Power Limit	Improper wiring	Check coil drive wiring and sensor coils.
		Perform sensor tests - see Installed sensor tests
	Incorrect calibration number	Verify configured calibration number matches sensor tag
	Transmitter connected to other manufacturer's sensor	Change coil current to 75 mA - set calibration number to 10000550100000030
		Perform a universal auto-trim to select the proper coil current
	Coil drive frequency set to 37 Hz	Sensor may not be compatible with 37 Hz. Switch coil drive frequency to 5 Hz.
	Sensor failure	Perform sensor tests - see Installed sensor tests

Table 12-1: Basic Diagnostic Messages *(continued)*

Error message	Potential cause	Corrective action
	Improper wiring	Check the analog loop wiring - see Analog output
No AO Power	No external loop power	Verify the analog power switch position (internal/ external)
		For externally powered loop, verify power supply requirements - see Powering the transmitter
	No loop resistance (open loop)	Install resistance across the analog output terminals
		Disable message using LOI Error Mask parameter
	Transmitter failure	Replace the electronics stack
Electrode Saturation	Improper wiring	See Wiring
	Improper process reference	See Process reference connection
	Improper earth grounding	Verify earth ground connections - see Wiring
	Application requires special transmitter	Replace transmitter with transmitter that includes special option F0100
LOI Comm Error/LOI Lost Sync	Electrical noise	Verify earth ground connections - see Wiring
	Extreme vibration	Relocate transmitter
	Transmitter failure	Cycle power. If error returns, replace board stack.
LOI Key Stuck	Debris on the LOI glass	Clean LOI glass of any debris
	Holding LOI key for more than 60 seconds	Lock LOI to prevent unintentional configuration changes - see Display lock
	High levels of electrical noise	Move transmitter away from other electrical equipment or cables
	Faulty LOI	Replace LOI

Table 12-2: Advanced Process Diagnostic Messages

Error message	Potential cause	Corrective action
Grounding/Wiring Fault	Improper installation of wiring	See Wiring
	Coil/electrode shield not connected	See Wiring
	Improper process grounding	See Process reference connection
	Faulty ground connection	Check wiring for corrosion, moisture in the terminal block -see Process reference connection
	Sensor not full	Verify sensor is full
		Enable empty pipe detection
High Process Noise	Slurry flows - mining/pulp stock	Decrease the flow rate below 10 ft/s (3 m/s)
		Complete the possible solutions listed under Troubleshooting high process noise
	Chemical additives upstream of the sensor	Move injection point downstream of the sensor or move the sensor to a new location
		Complete the possible solutions listed under Troubleshooting high process noise

Table 12-2: Advanced Process Diagnostic Messages *(continued)*

Error message	Potential cause	Corrective action
	Electrode not compatible with the process fluid	Refer to the *Rosemount™ Magnetic Flowmeter Material Selection Guide (00816-0100-3033)*
	Gas/air in line	Move the sensor to another location in the process line to ensure that it is full under all conditions
	Electrode coating	Enable coated electrode etection diagnostic
		Use bullet-nose electrodes
		Downsize sensor to increase flowrate above 3 ft/s (1 m/s)
		Periodically clean sensor
	Styrofoam or other insulating particles	Complete the possible solutions listed under Troubleshooting high process noise
		Consult factory
	Low conductivity fluids (below 10 microsiemens/cm)	Trim electrode and coil wires - see Sensor Installation
		Use integral mount transmitter
		Set coil drive frequency to 37Hz
Electrode Coating Level 1	Coating is starting to buildup on electrode and interfering with measurement signal	Schedule maintenance to clean electrode
		Use bullet nose electrodes
		Downsize sensor to increase flow rate above 3ft/s (1ms)
	Process fluid conductivity has changed	Verify process fluid conductivity
Electrode Coating Level 2	Coating has built-up on electrode and is interfering with measurement signal	Schedule maintenance to clean electrode
		Use bullet nose electrodes
		Downsize sensor to increase flow rate above 3ft/s (1ms)
	Process fluid conductivity has changed	Verify process fluid conductivity

Table 12-3: Advanced Meter Verification Messages

Error message	Potential cause	Corrective action
Meter Ver Failed	Transmitter calibration verification test failed	Verify pass/fail criteria
		Rerun Smart™ Meter Verification under no flow conditions
		Verify calibration using 8714D Calibration Standard
		Perform digital trim
		Replace electronics board
	Sensor calibration test failed	Verify pass/fail criteria
		Rerun Smart Meter Verification
		Perform sensor tests - see Installed sensor tests
	Sensor coil circuit test failed	Verify pass/fail criteria
		Rerun Smart Meter Verification

Table 12-3: Advanced Meter Verification Messages *(continued)*

Error message	Potential cause	Corrective action
		Perform sensor tests - see Installed sensor tests
	Sensor electrode circuit test failed	Verify electrode resistance has a baseline (signature) value from a full pipe baseline
		Verify test condition was selected properly
		Verify pass/fail criteria
		Rerun Smart Meter Verification
		Perform sensor tests - see Installed sensor tests
4-20 mA loop verification failed	Analog loop not powered	Check 4-20 mA internal/external loop power switch - see Internal/external analog power (Output option code A)
		Check external supply voltage to the transmitter
		Check for parallel paths in the current loop
	Transmitter failure	Perform transmitter self test
		Perform manual analog loop test and D/A trim if necessary
		Replace the electronics board
Continuous Meter Verification Error	Transmitter calibration verification test failed	Verify pass/fail criteria
		Run manual Smart Meter Verification under no flow conditions
		Verify calibration using 8714D Calibration Standard
		Perform digital trim
		Replace electronics stack
	Sensor calibration test failed	Run manual Smart Meter Verification
		Perform sensor tests - see Installed sensor tests
	Sensor coil circuit test failed	Run manual Smart Meter Verification
		Perform sensor tests - see Installed sensor tests
	Sensor electrode circuit test failed	Run manual Smart Meter Verification
		Perform sensor tests - see Installed sensor tests
		Verify electrode resistance has a signature value from a full pipe baseline
Simulated Velocity Out of Spec	Unstable flow rate during the verification test or noisy process	Run manual transmitter verification test with no flow and a full pipe
	Transmitter drift or faulty electronics	Verify transmitter electronics with 8714D Calibration Standard. The dial on the 8714D should be set to 30 ft/s (9.14 m/s). The transmitter should be set up with the nominal calibration number (1000015010000000) and 5 Hz coil drive frequency.
		Perform an electronics trim using the 8714D
		If the electronics trim doesn't correct the issue, replace the electronics

Table 12-3: Advanced Meter Verification Messages *(continued)*

Error message	Potential cause	Corrective action
Coil Resistance Out of Spec	Moisture in the terminal block of the sensor or shorted coil	Perform sensor tests - see Installed sensor tests
		If the problem persists, replace the sensor
Coil Signature Out of Spec	Moisture in the terminal block of the sensor or shorted coil	Perform sensor tests - see Installed sensor tests
		If the problem persists, replace the sensor
	Calibration shift caused by heat cycling or vibration	Perform sensor tests - see Installed sensor tests
		If the problem persists, replace the sensor
Electrode Resistance Out of Spec	Moisture in the terminal block of the sensor	Perform sensor tests - see Installed sensor tests
		If the problem persists, replace the sensor
	Electrode coating	Enable coated electrode detection diagnostic
		Use bullet-nose electrodes
		Downsize sensor to increases flowrate above 3 ft/s (1 m/s)
		Periodically clean sensor
	Shorted electrodes	Perform sensor tests - see Installed sensor tests
		If the problem persists, replace the sensor
Analog Output Out of Spec	Unstable flow rate during the verification test or noisy process	Run manual transmitter verification test with no flow and a full pipe
	Analog output is no longer within accuracy specifications	Check the analog loop wiring. Excessive loop resistance can cause an invalid test

12.4.1 Troubleshooting empty pipe

The following actions can be taken if empty pipe detection is unexpected:

Procedure

1. Verify the sensor is full.
2. Verify the sensor has not been installed with a measurement electrode at the top of the pipe.
3. Decrease the sensitivity by setting the empty pipe trigger level to a value of at least 20 counts above the empty pipe value read with a full pipe.
4. Decrease the sensitivity by increasing the empty pipe counts to compensate for process noise. The empty pipe counts is the number of consecutive empty pipe value readings above the empty pipe trigger level required to set the empty pipe diagnostic. The count range is 2-50, factory default set at 5.
5. Increase process fluid conductivity above 5 microsiemens/cm.
6. Properly connect the wiring between the sensor and the transmitter.
7. Perform the sensor electrical resistance tests. For more detailed information, consult Installed sensor tests.

12.4.2 Troubleshooting ground/wiring fault

If transmitter detects high levels (greater than 5mV) 50/60 Hz noise caused by improper wiring or poor process grounding:

Procedure

1. Verify the transmitter is earth grounded.
2. Connect ground rings, grounding electrode, lining protector, or grounding straps. Grounding diagrams can be found in Process reference connection.
3. Verify the sensor is full.
4. Verify wiring between sensor and transmitter is prepared properly. Shielding should be stripped back less than 1 inch (25 mm).
5. Use separate shielded twisted pairs for wiring between sensor and transmitter.
6. Properly connect the wiring between the sensor and the transmitter. Corresponding terminal block numbers in the sensor and transmitter must be connected.

12.4.3 Troubleshooting high process noise

Note
In applications where very high levels of noise are a concern, it is recommended that a dual-calibrated Rosemount High-Signal 8707 sensor be used. These sensors can be calibrated to run at lower coil drive current supplied by the standard Rosemount transmitters, but can also be upgraded by changing to the 8712H High-Signal transmitter.

Note
For more information about process noise, see Process noise profiles.

1/f noise

This type of noise can be mitigated by switching to the 37 Hz coil drive setting.

Spike noise

The type of noise can be mitigated by switching to the 37 Hz coil drive setting.

White noise

This type of noise can be mitigated by switching to the 37 Hz coil drive setting.

Noise ratio less than 25 in 5 Hz coil drive frequency mode

The transmitter detected high levels of process noise. If the signal to noise ratio is less than 25 in 5 Hz coil drive frequency mode, proceed with the following steps:

Procedure

1. Increase transmitter coil drive frequency mode to 37 Hz (refer to Coil drive frequency and, if possible, perform auto zero function. See Auto zero).
2. Verify sensor is electrically connected to the process with process reference electrode, grounding rings with grounding straps, or lining protector with grounding straps.
3. If possible, redirect chemical additions downstream of the magmeter.
4. Verify process fluid conductivity is above 5 microSiemens/cm.

Noise ratio less than less than 25 in 37 Hz coil drive frequency mode

If the signal to noise ratio is less than 25 in 37 Hz coil drive frequency mode, see Digital Signal Processing.

12.4.4 Troubleshooting coated electrode detection

In the event that electrode coating is detected, use the following table to determine the appropriate course of action.

Table 12-4: Troubleshooting the Electrode Coating Diagnostic

Error message	Potential causes of error	Steps to correct
Electrode Coating Level 1	• Insulating coating is starting to build up on the electrode and may interfere with the flow measurement signal • Process fluid conductivity has decreased to a level close to operational limits of the meter	• Verify process fluid conductivity • Schedule maintenance to clean the electrodes • Use bullet nose electrodes • Replace the meter with a smaller diameter meter to increase the flow velocity to above 3 ft/s (1 m/s)
Electrode Coating Level 2	• Insulating coating has built up on the electrodes and is interfering with the flow measurement signal • Process fluid conductivity has decreased to a level below the operational limits of the meter	• Verify process fluid conductivity • Schedule maintenance to clean the electrodes • Use bullet nose electrodes • Replace the meter with a smaller diameter meter to increase the flow velocity to above 3 ft/s (1 m/s)

12.4.5 Troubleshooting 4-20 mA loop verification

In the event that the 4-20 mA Loop Verification fails, use the following table to determine the appropriate course of action.

Table 12-5: Troubleshooting the Analog Loop Verification Diagnostic

Test	Potential cause	Corrective action
4-20 mA Loop Verification Failure	Analog loop not powered	Check analog loop wiring
		Check loop resistance
		Check analog loop power switch – see Internal/external analog power (Output option code A)
		Check external supply voltage to the transmitter
		Check for parallel paths in the current loop
	Analog drift	Perform D/A trim
	Transmitter failure	Perform transmitter self-test
		Perform manual analog loop test
		Contact an Emerson Flow representative

12.4.6 Troubleshooting the Smart Meter Verification test

If the Smart Meter Verification test fails, use the following table to determine the appropriate course of action. Begin by reviewing the Smart Meter Verification results to determine the specific test that failed.

Table 12-6: Troubleshooting the Smart Meter Verification diagnostic

Test	Potential cause	Corrective action
Transmitter Verification Test	• Unstable flow reading during the test • Noise in the process • Transmitter drift • Faulty electronics	• Rerun Smart Meter Verification under No Flow conditions • Check the transmitter calibration with the 8714D Calibration Standard • Perform a digital trim • Contact an Emerson Flow representative
Sensor Calibration Verification	• Moisture in the sensor terminal block • Calibration shift caused by heat cycling or vibration	• Rerun Smart Meter Verification • Perform the sensor checks detailed in Sensor troubleshooting • Remove the sensor and send back for evaluation and / or recalibration • Retake sensor baseline at operating temperature
Coil Circuit Health	• Moisture in the sensor terminal block • Shorted Coil • High temperature application • Long remote cable length	
Electrode Circuit Health	• Electrode resistance baseline was not taken after installation • Test condition was not selected properly • Moisture in the sensor terminal block • Coated electrodes • Shorted electrodes	

12.5 Basic troubleshooting

When troubleshooting a magnetic flow meter, it is important to identify the issue. Table 12-7 provides common symptoms displayed by a magnetic flow meter that is not functioning properly. This table provides potential causes and suggested corrective actions for each symptom.

Table 12-7: Common magnetic flow meter Issues

Symptom	Potential cause	Corrective action
Output at 0 mA	No power to transmitter	Check power source and connections to the transmitter
	Analog output improperly configured	Check the analog power switch position
		Verify wiring and analog power
	Electronics failure	Verify transmitter operation with an 8714D Calibration Standard; If it fails, replace the electronics stack
	Blown fuse	Check the fuse and replace with an appropriately rated fuse, if necessary
Output at 4 mA	Transmitter in multidrop mode	Configure Poll Address to 0 to take transmitter out of multidrop mode
	Low Flow Cutoff set too high	Configure Low Flow Cutoff to a lower setting or increase flow to a value above the low flow cutoff
	PZR Activated	Open PZR switch at terminals 5 and 6 to deactivate the PZR
	Flow is in reverse direction	Enable Reverse Flow function
	Shorted coil	Coil check – perform sensor test
	Empty pipe	Fill pipe
	Electronics failure	Verify transmitter operation with an 8714D Calibration Standard; If it fails, replace the electronics stack
	Fixed Current Mode is turned ON	Turn Fixed Current Mode OFF
Output will not reach 20 mA	Loop resistance is greater than 600 ohms	Reduce loop resistance to less than 600 ohms
		Perform analog loop test
	Insufficient supply voltage to analog output	Verify analog output supply voltage
		Perform analog loop test
Output at 20.8 mA	Transmitter not ranged properly	Reset the transmitter range values – see Basic Setup
		Check tube size setting in transmitter and make sure it matches the actual tube size – see Basic Setup
Output at alarm level	Electronics failure	Cycle power; If alarm is still present, verify transmitter operation with an 8714D Calibration Standard; If it fails, replace the electronics stack
	Open coil circuit	Check coil drive circuit connections at the sensor and at the transmitter
	Analog output diagnostic alarm is active	See AO diagnostic alarm
	Coil power or coil current is over limit	Check coil drive circuit connections at the sensor and at the transmitter
		Cycle power; If alarm is still present, verify transmitter operation with an 8714D Calibration Standard; If it fails, replace the electronics stack
Output at alarm level while connected to non-Rosemount sensor	Connected to incompatible sensor	See Implementing a Universal Transmitter

Table 12-7: Common magnetic flow meter Issues *(continued)*

Symptom	Potential cause	Corrective action
Pulse output at zero, regardless of flow	Wiring error	Check pulse output wiring at terminals 3 and 4 ; Refer to wiring diagram for pulse counter and pulse output; See Connect pulse output
	PZR activated	Remove signal at terminals 5 and 6 to deactivate the PZR
	No power to transmitter	Check pulse output wiring at terminals 3 and 4; Refer to wiring diagram for pulse counter and pulse output
		Power the transmitter
	Reverse flow	Enable Reverse Flow function
	Electronics failure	Verify transmitter operation with an 8714D Calibration Standard; If it fails, replace the electronics stack
	Pulse output incorrectly configured	Review configuration and correct as necessary
Communication problems with the Handheld Communicator	4–20 mA output configuration	Check analog power switch (internal/external); The Handheld Communicator requires a 4–20 mA output to function
	Communication interface wiring problems	Incorrect load resistance (250 Ohm minimum, 600 Ohm maximum)Check appropriate wiring diagram
	Low batteries in the Handheld Communicator	Replace the batteries in the Handheld Communicator – see the communicator manual for instructions
	Old revision of software in the Handheld Communicator	Consult your local sales office about updating to the latest revision of software
Error Messages on LOI or Handheld Communicator	Many possible causes depending upon the message	See Diagnostic messages
Discrete input does not register	Input signal does not provide enough counts	Verify that the discrete input provided meets the requirements in Connect discrete input
		Perform a loop test to validate the analog control loop
		Perform a D/A trim; This allows the calibration of the analog output with an external reference at operating endpoints of the analog output

Table 12-7: Common magnetic flow meter Issues *(continued)*

Symptom	Potential cause	Corrective action
Reading does not appear to be within rated accuracy	Transmitter, control system, or other receiving device not configured properly	Check all configuration variables for the transmitter, sensor, communicator, and/or control system
		Check these other transmitter settings: • Sensor calibration number • Units • Line size
		Perform a loop test to check the integrity of the circuit
	Electrode Coating	Enable Coated Electrode Detection diagnostic
		Use bullet-nose electrodes
		Downsize sensor to increase flow rate above 3 ft/s
		Periodically clean sensor
	Gas/air in line	Move the sensor to another location in the process line to ensure it is full under all conditions
	Moisture problem	Perform the sensor tests - see Installed sensor tests
	Insufficient upstream/downstream pipe diameter	Move sensor to a new location with 5 pipe diameters upstream and 2 pipe diameters downstream if possible
	Cables for multiple magmeters run through same conduit	Use dedicated conduit run for each sensor and transmitter
	Improper wiring	If electrode shield and electrode signal wires are switched, flow indication will be about half of what is expected; Check wiring diagrams
	Flow rate is below 1 ft/s (specification issue)	See accuracy specification for specific transmitter and sensor
	Auto zero was not performed when the coil drive frequency was changed from 5 Hz to 37 Hz	Verify the sensor is full, verify there is no flow, and perform the auto zero function
	Sensor failure–shorted electrode	Perform the sensor tests - see Installed sensor tests
	Sensor failure–shorted or open coil	Perform the sensor tests - see Installed sensor tests
	Transmitter failure	Verify transmitter operation with an 8714D Calibration Standard; If it fails, replace the electronics stack

Table 12-7: Common magnetic flow meter Issues *(continued)*

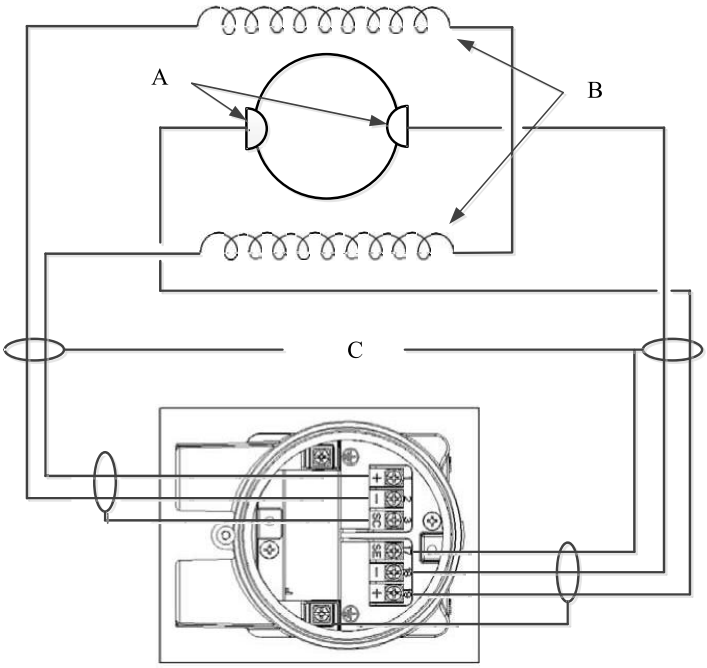
Symptom	Potential cause	Corrective action
Noisy Process	Chemical additives upstream of magnetic flowmeter	See Troubleshooting high process noise
		Move injection point downstream of magnetic flowmeter, or move magnetic flowmeter
		Set Coil Drive Frequency to High
	Sludge flows–mining/coal/sand/slurries (other slurries with hard particles)	Decrease flow rate below 10 ft/s
		Set Coil Drive Frequency to High
	Styrofoam or other insulating particles in process	See Troubleshooting high process noise
		Consult factory
		Set Coil Drive Frequency to High
	Electrode coating	Enable Coated Electrode Detection diagnostic
		Use a smaller sensor to increase flow rate above 3 ft/s
		Periodically clean sensor
	Gas/air in line	Move the sensor to another location in the process line to ensure it is full under all conditions
	Low conductivity fluids (below 5 microsiemens/cm)	Trim electrode and coil wires – see Sensor to transmitter wiring
		Keep flow rate below 3 FPS
		Use component cable - see Sensor to transmitter wiring
Noisy Process (cont.)	Low conductivity fluids (below 5 microsiemens/cm), (cont.)	Integral mount transmitter
Meter output is unstable	Low conductivity fluids (below 5 microsiemens/cm) combined with cable vibration or 60 Hz interference	Eliminate cable vibration
		Move cable to lower vibration run
		Tie down cable mechanically
		Trim electrode and coil wires - see Sensor to transmitter wiring
		Route cable line away from other equipment powered by 60 Hz
		Use component cable - see Sensor to transmitter wiring
	Electrode incompatibility	Check the Technical Data Sheet, Magnetic Flowmeter Material Selection Guide (document number 00816-0100-3033), for chemical compatibility with electrode material
	Improper grounding	Check ground wiring – see Process reference connection for wiring and grounding procedures
	High local magnetic or electric fields	Move magnetic flowmeter (20–25 ft away is usually acceptable)
	Control loop improperly tuned	Check control loop tuning
	Sticky valve (look for periodic oscillation of meter output)	Service valve

Table 12-7: Common magnetic flow meter Issues *(continued)*

Symptom	Potential cause	Corrective action
	Sensor failure	Perform the sensor tests (See Installed sensor tests)
	Analog output loop problem	Check that the 4–20 mA loop matches the digital value Perform analog output test
Meter output is unstable (cont.)	Low conductivity fluids (below 5 microsiemens/cm) combined with cable vibration or 60 Hz interference (cont.)	Use an integral mount

12.6 Sensor troubleshooting

This section describes manual tests that can be performed on the sensor to verify the health of individual components. The tests will require the use of a digital multimeter capable of measuring conductance in nanoSiemens and an LCR meter. A sensor circuit diagram is shown in Figure 12-1. The tests described below will check for continuity or isolation of the internal components of the sensor.



A. Electrodes
B. Coils
C. Sensor housing

12.6.1 Sensor adapter feed through pins

The sensor adapter is the part of the sensor that provides the internal connection feed-through wiring from the internal sensor components to the socket module connections. The top of the adapter has 10 pins - four pins for the coils, four pins for the electrodes,

and two pins for the process reference. Each connection point has two pins associated for redundant continuity. See Figure 12-2.

The best location for testing the sensor components is taking measurements directly on the feed-through pins. Direct measurement on the pins eliminates the possibility of an erroneous measurement caused by a bad socket module or remote wiring. The figure below shows the feed-through pin connections as they relate to the terminal connections described in the tests.





A. Electrode side
B. Coil side
C. Process reference
D. Orientation key

12.6.2 Socket module

The socket module connects the sensor adapter to the transmitter. There are two versions of the socket module—one for integral mount transmitters and one for remote mount transmitters. See Figure 12-3 and Figure 12-4. The socket module is a replaceable component. If test measurements taken through the socket module show a failure, remove the socket module and confirm measurements directly on the feed-through pins of the sensor adapter. To remove the socket module, refer to Maintenance.

Figure 12-3: Socket Module—Integral Mount



Figure 12-4: Remote Mount Socket Module



12.7 Installed sensor tests

If a problem with an installed sensor is identified, refer to Table 12-8 through Table 12-12 to assist in troubleshooting the sensor. Disconnect or turn off power to the transmitter before performing any of the sensor tests. Always check the operation of test equipment before each test.

If possible, take all readings from the preferred locations identified in Sensor adapter feed through pins, Sensor adapter direct lead pins, and Socket module. If the recommended locations in the sensor adapter are inaccessible, take measurements at the sensor terminal block or through remote cabling as close to the sensor as possible. Readings taken through remote cabling that is more than 100 feet (30 meters) in length may provide incorrect or inconclusive information and should be avoided.

The expected values in the test below assume the measurements have been taken directly at the pins.

Table 12-8: Test A. Sensor coil

Test conditions	Expected value	Potential cause	Corrective action
• Location: installed or uninstalled • Required equipment: multimeter • Measuring at connections: 1 and 2 = R	2Ω≤R≤18Ω	• Open or shorted coil	• Remove and replace sensor

Table 12-9: Test B: Shields to case

Test conditions	Expected value	Potential cause	Corrective action
• Location: installed or uninstalled • Required equipment: multimeter • Measuring at connections: — 17 and 3 — 3 and case ground — 17 and case ground	< 0.3Ω	• Moisture in terminal block • Leaky electrode • Process behind liner	• Clean terminal block • Remove sensor

Table 12-10: Test C. Coil to coil shield

Test conditions	Expected value	Potential cause	Corrective action
• Location: installed or uninstalled • Required equipment: multimeter • Measuring at connections: — 1 and 3 — 2 and 3	∞Ω (< 1nS)	• Process behind liner • Leaky electrode • Moisture in terminal block	• Remove sensor and dry • Clean terminal block • Confirm with sensor coil test

Table 12-11: Test D. Electrode to electrode shield

Test conditions	Expected value	Potential cause	Corrective action
• Location: installed • Required equipment: LCR (Set to Resistance and 120 Hz) • Measuring at connections: — 18 and 17 = R_1 — 19 and 17 = R_2	• R_1 and R_2 should be stable • $\lvert R_1 - R_2 \rvert \leq 300\Omega$	• Unstable R_1 or R_2 values confirm coated electrode • Shorted electrode • Electrode not in contact with process • Empty pipe • Low conductivity • Leaky electrode • Process reference ground not connected properly	• Remove coating from sensor wall • Use bullet-nose electrodes • Repeat measurement • Remove sensor and complete tests in Uninstalled sensor tests • Connect process reference ground per Process reference connection

Table 12-12: Test E. Electrode to Electrode

Test conditions	Expected value	Potential cause	Corrective action
• Location: installed • Required equipment: LCR (Set to Resistance and 120 Hz) • Measuring at connections: 18 and 19 — 18 and 17 = R_1 — 19 and 17 = R_2	Should be stable and same relative magnitude of R_1 and R_2 from Test D	• Unstable R_1 or R_2 values confirm coated electrode • Shorted electrode • Electrode not in contact with process • Empty pipe • Low conductivity • Leaky electrode • Process reference ground not connected properly	• Remove coating from sensor wall • Use bullet-nose electrodes • Repeat measurement • Remove sensor and complete tests in Uninstalled sensor tests • Connect process reference ground per Process reference connection

To test the sensor, a multimeter capable of measuring conductance in nanoSiemens is preferred. Conductance is the reciprocal of resistance.

Or:

$$1\ nanosiemens = \frac{1}{1\ gigaohm}$$

$$1\ nanosiemens = \frac{1}{1\ x\ 10^9\ ohm}$$

12.8 Uninstalled sensor tests

Sensor troubleshooting can also be performed on an uninstalled sensor. If test results from installed sensor tests are inconclusive, the next step is remove the sensor and perform the tests outlined in this section. Take measurements from the recommended terminal location, and directly on the electrode head inside the sensor. The measurement electrodes, 18 and 19, are on opposite sides in the inside diameter of the sensor.
If applicable, the third process reference electrode is between the two measurement electrodes.

The expected values in the test below assume the measurements have been taken directly at the pins.

Table 12-13: Test A. Terminal to front electrode

Test conditions	Expected value	Potential cause	Corrective action
• Location: uninstalled • Required equipment: Multimeter • 18 and electrode 18(1)	≤ 1 Ω	• Shorted electrode • Open electrode • Coated electrode	• Replace sensor • Remove coating from sensor wall

(1) When the connection head is in the vertical upright position and the flow arrow (see Flow direction) on the connection head flange points to the right, the front of the meter will be facing towards you. Electrode 18 is on the front of the meter. If you cannot determine the front of the meter, measure both electrodes. One electrode should result in an open reading, while the other electrode should be less than 0.3 ohm.

Table 12-14: Test B. Terminal to back electrode

Test conditions	Expected value	Potential cause	Corrective action
• Location: uninstalled • Required equipment: Multimeter • 19 and electrode 19(1)	≤ 1 Ω	• Shorted electrode • Open electrode • Coated electrode	• Replace sensor • Remove coating from sensor wall

(1) When the connection head is in the vertical upright position and the flow arrow (see Flow direction) on the connection head flange points to the right, the front of the meter will be facing towards you. Electrode 18 is on the front of the meter. If you cannot determine the front of the meter, measure both electrodes. One electrode should result in an open reading, while the other electrode should be less than 0.3 ohm.

Table 12-15: Test C. Terminal to reference electrode

Test conditions	Expected value	Potential cause	Corrective action
• Location: uninstalled • Required equipment: Multimeter • 17 and process reference electrode(1)	≤ 0.3 Ω	• Shorted electrode • Open electrode • Coated electrode	• Replace sensor • Remove coating from sensor wall

(1) Only valid if the sensor has a process reference electrode.

Table 12-16: Test D. Terminal to case ground

Test conditions	Expected value	Potential cause	Corrective action
• Location: uninstalled • Required equipment: Multimeter • 17 and safety ground	≤ 0.3 Ω	• Moisture in terminal block • Leaky electrode • Process behind liner	• Clean terminal block • Replace terminal block • Replace sensor

Table 12-17: Test E. Electrode to electrode shield

Test conditions	Expected value	Potential cause	Corrective action
• Location: uninstalled • Required equipment: Multimeter • 18 and 17 • 19 and 17	∞Ω (< 1 nS)	• Shorted electrode • Leaky electrode • Moisture in terminal block	• Replace sensor • Clean terminal block • Replace terminal block

Table 12-18: Test F. Electrode shield to coil

Test conditions	Expected value	Potential cause	Corrective action
• Location: uninstalled • Required equipment: Multimeter • 17 and 1	∞Ω (< 1 nS)	• Process in coil housing • Moisture in terminal block	• Replace sensor • Clean terminal block • Replace terminal block

12.9 Technical support and service

Email addresses:

Worldwide: flow.support@emerson.com

Asia-Pacific: APflow.support@emerson.com

Middle East and Africa: FlowTechnicalSupport@emerson.com

12.10 Service

To expedite the return process outside the United States, contact an Emerson representative.

A Product specifications

A.1 Rosemount 8700M Flowmeter Platform specifications

The tables below outline some of the basic performance, physical, and functional specifications of the Rosemount 8700M Magnetic Flowmeter Platform.

Table A-1: Rosemount 8732EM Transmitter Specifications

8732EM Transmitter		
	Model	8732EM
	Base accuracy(1)	0.25% Standard 0.15% High Accuracy Option
	Mounting	Integral or Remote
	Power supply	Global AC or DC
	User interface	LCD display with 4 Optical Switch LOI LCD display only No display
	Communication protocol	HART
	Diagnostics	Basic, DA1, DA2
	Sensor compatibility	All Rosemount plus other manufacturers
	Detailed specifications	Transmitter specifications
	Ordering information	Product Data Sheet

(1) For complete accuracy specifications, please refer to Transmitter functional specifications.

Table A-2: Rosemount Sensor Specifications

8705 Sensor		
	Style	Flanged
	Base accuracy(1)	0.25% Standard 0.15% High Accuracy Option
	Line sizes	½-in. to 36-in. (15 mm to 900 mm)
	Design features	Standard Process Design
	Detailed specifications	8705-M Flanged Sensor Specifications
	Ordering information	Product Data Sheet

Table A-2: Rosemount Sensor Specifications *(continued)*

8711 Sensor		
	Style	Wafer
	Base accuracy(1)	0.25% Standard 0.15% High Accuracy Option
	Line sizes	1½ -in. to 8-in. (40 mm to 200 mm)
	Design features	Compact, Light Weight
	Detailed specifications	8711-M/L Wafer Sensor Specifications
	Ordering information	Product Data Sheet
8721 Sensor		
	Style	Hygienic (sanitary)
	Base accuracy(1)	0.5% Standard 0.25% High Accuracy Option
	Line sizes	½-in. to 4-in. (15 mm to 100 mm)
	Design features	3-A CIP/SIP
	Detailed specifications	8721 Hygienic (Sanitary) Sensor Specifications
	Ordering information	Product Data Sheet

(1) For complete accuracy specifications, refer to the sensor's detailed specifications.

Table A-3: Lining Material Selection

Liner material	General characteristics
PFA, PFA+ 	Best chemical resistance
	Better abrasion resistance than PTFE
	Best high temperature capabilities
	Process temperature: -58 to 350 °F (-50 to 177 °C)
PTFE 	Highly chemical resistant
	Excellent high temperature capabilities
	Process temperature: -58 to 350 °F (-50 to 177 °C)
ETFE 	Excellent chemical resistance
	Better abrasion resistance than PTFE
	Process temperature: -58 to 300 °F (-50 to 149 °C)

Table A-3: Lining Material Selection *(continued)*

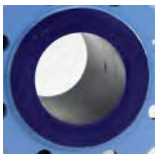
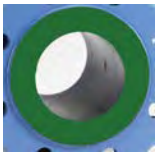
Liner material	General characteristics
Polyurethane 	Limited chemical resistance
	Excellent abrasion resistance for slurries with small and medium particles
	Process temperature: 0 to 140 °F (-18 to 60 °C)
	Typically applied in clean water
Neoprene 	Very good abrasion resistance for small and medium particles
	Better chemical resistance than polyurethane
	Typically applied in water with chemicals, and sea water
	Preferred liner for high pressure > ASME B16.5 Class 900
	Process temperature: 0 to 176 °F (-18 to 80 °C)
Linatex Rubber 	Limited chemical resistance especially in acids
	Very good abrasion resistance for large particles
	Softer material than polyurethane and neoprene
	Typically applied in mining slurries
	Process temperature: 0 to 158 °F (-18 to 70 °C)
Adiprene 	Ideal for applications with high salinity and/or hydrocarbon carryover
	Excellent abrasion resistance
	Typically used for Water Injection, Recovered Water, and Coal Gasification Slurries
	Preferred liner for high pressure > ASME B16.5 Class 900
	Process temperature: 0 to 200 °F (-18 to 93 °C)

Table A-4: Electrode Material

Electrode material	General characteristics
316L Stainless Steel	Good corrosion resistance
	Good abrasion resistance
	Not recommended for sulfuric or hydrochloric acids
Nickel Alloy 276 (UNS N10276)	Better corrosion resistance
	High strength
	Good in slurry applications
	Effective in oxidizing fluids
Tantalum	Excellent corrosion resistance
	Not recommended for hydrofluoric acid, fluorosilic acid, or sodium hydroxide
80% Platinum 20% Iridium	Best chemical resistance
	Expensive material
	Not recommended for aquaregia

Table A-4: Electrode Material *(continued)*

Electrode material	General characteristics
Titanium	Better chemical resistance
	Better abrasion resistance
	Good for sea water applications
	Not recommended for hydrofluoric or sulfuric acid
Tungsten Carbide coated	Limited chemical resistance
	Best abrasion resistance
	High concentration slurries
	Preferred electrode for oil and gas fracturing applications

Table A-5: Electrode Type

Electrode type	General characteristics
Standard Measurement	Lowest cost
	Good for most applications
Measurement + Reference Electrode (Also see Table A-6 and Table A-7 for grounding options and installation	Low cost grounding option especially for large line sizes
	If using a reference electrode, process fluid must have a minimum conductivity of 100 microSiemens/cm
	Not recommended for electrolytic or galvanic corrosion applications
Bulletnose	Extended head protrudes into the flow stream for self-cleaning
	Best option for coating processes
Flat Head	Low profile head
	Best option for abrasive slurries

Table A-6: Process Reference Options

Grounding options	General characteristics
No Grounding Options (grounding straps)	Acceptable for conductive unlined pipe
	Grounding straps provided at no cost
Reference Electrode	Same material as measurement electrodes
	Sufficient grounding option when process fluid conductivity is greater than 100 microSiemens/cm
	Not recommended in electrolysis applications, galvanic corrosion applications, applications where the electrodes may coat, or non-conductive pipe.

Table A-6: Process Reference Options *(continued)*

Grounding options	General characteristics
Grounding Rings	Low conductivity process fluids
	Cathodic or electrolysis applications that may have stray currents in or around the process
	Variety of materials for process fluid compatibility
Lining Protectors	Protect upstream edge of sensor from abrasive fluids
	Permanently installed on sensor
	Protect liner material from over torquing of flange bolts
	Provide ground path and eliminate need for grounding rings or reference electrode
	Required for applications where Flexitallic gaskets are used

Table A-7: Process Reference Installation

Type of pipe	Grounding straps	Grounding rings	Reference electrode	Lining protectors
Conductive unlined pipe	Acceptable	Not required	Not required	Not required
Conductive lined pipe	Not acceptable	Acceptable	Acceptable	Acceptable
Non-conductive pipe	Not acceptable	Acceptable	Not recommended	Acceptable

A.2 Transmitter specifications

A.2.1 Transmitter functional specifications

Sensor compatibility

Compatible with Rosemount 8705, 8711, and 8721 sensors. Compatible with AC and DC powered sensors of other manufacturers.

Transmitter coil drive current

500 mA

Flow rate range

Capable of processing signals from fluids with velocities between 0.04 and 39 ft/s (0.01 to 12 m/s) for both forward and reverse flow in all sensor sizes. Full scale continuously adjustable between –39 and 39 ft/s (–12 to 12 m/s).

Conductivity limits

Process liquid must have a conductivity of 5 microSiemens/cm (5 micromhos/cm) or greater.

Power supply

- 90 - 250 VAC @ 50/60 Hz

- 12 - 42 VDC
- 12 - 30 VDC

Line power fuses

- 90 - 250 VAC systems:
  - 2 amp quick acting
  - Bussman AGC2 or equivalent
- 12 - 42 VDC systems
  - 3 amp quick acting
  - Bussman AGC3 or equivalent
- 12 - 30 VDC systems
  - 3 amp quick acting
  - Bussman AGC3 or equivalent

Power consumption

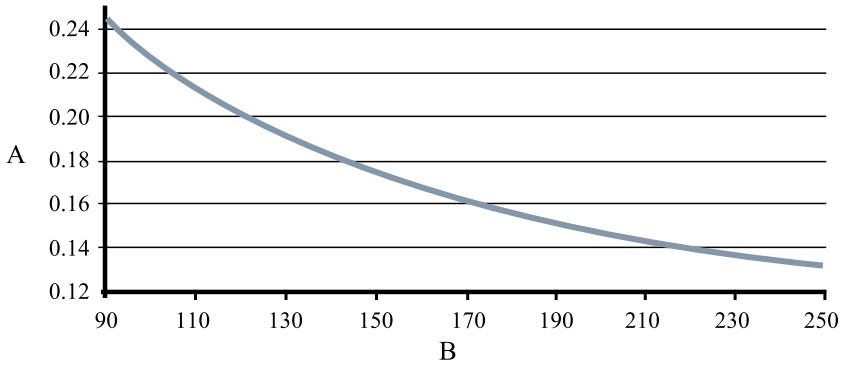
- 90 - 250 VAC: 40 VA maximum
- 12 - 42 VDC: 15 W maximum
- 12 - 30 VDC: 3 W maximum

Switch-on current

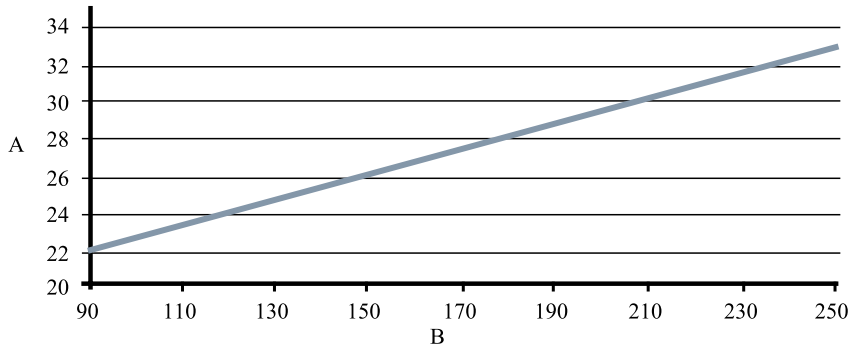
- At 250 VAC: Maximum 35.7 A (< 5 ms)
- At 42 VDC: Maximum 42 A (< 5 ms)
- At 30 VDC: Maximum 42 A (< 5 ms)

AC power supply requirements

Units powered by 90 - 250 VAC have the following power requirements. Peak inrush is 35.7 A at 250 VAC supply, lasting approximately 1 ms. Inrush for other supply voltages can be estimated with: Inrush (Amps) = Supply (Volts) / 7.0



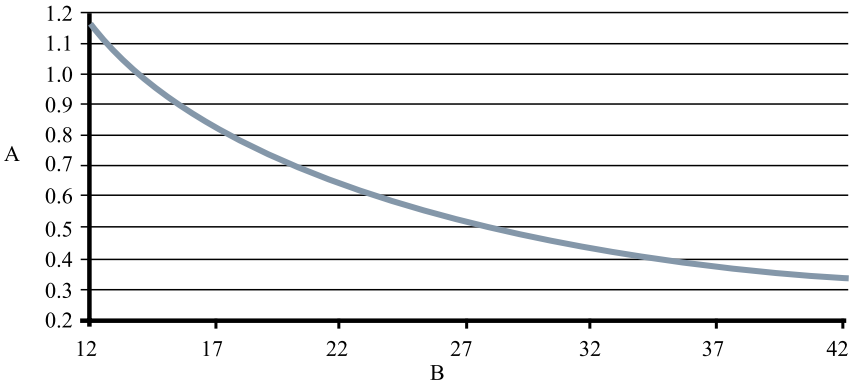
A. Supply current (amps)
B. Power supply (VAC)



A. Apparent power (VA)
B. Power supply (VAC)

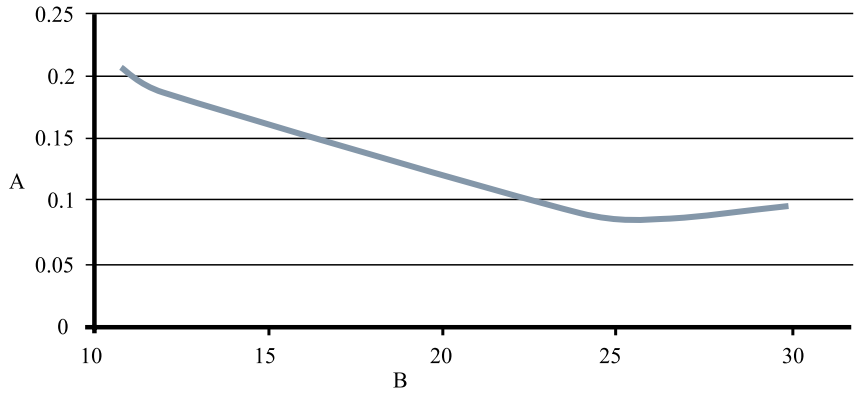
DC power supply requirements

Standard DC Units powered by 12 VDC power supply may draw up to 1.2 A of current steady state. Low power DC units may draw up to 0.25 A of current steady state. Peak inrush is 42 A at 42 VDC supply, lasting approximately 1 ms. Inrush for other supply voltages can be estimated with: Inrush (Amps) = Supply (Volts) / 1.0



A. Supply current (amps)
B. Power supply (VDC)

DC low power supply requirements



A. Supply current (amps)
B. Power supply (VDC)

Low power software option

This software option lowers the coil current from 500 mA to 75 mA in order to conserve power for applications in remote locations where power is scarce. The coils are still driven in a continuous manner optimizing measurement performance and providing access to all diagnostic capabilities. Because of the reduced coil current, flow measurement accuracy is reduced to 1% of rate for low power systems. Table A-8 shows the power consumption that can be expected for various configurations. Due to the reduced coil current, sensor size is limited to a maximum line size of 10-in. (250 mm).

The low power option is available for integral mount with DC power only (option code 3) and output code B (4-20 mA/HART/Pulse). To ensure the sensor will support the low power functionality, option code D3 for a low power calibration must appear in the sensor model number.

Sample model numbers for a low power system are:

`8732EMT3M1N6M4DA1DA2`

`8705DHA020D7M0N6B3D3`

Table A-8: Low power consumption

Output code	Power consumption	Flow accuracy	Measurement range
Output Code B Utilize Pulse Output Only	2 Watts Maximum	1% of Rate	0.04 fps to 39 fps 0.01 m/s to 12 m/s
Output Code B Utilize Pulse and Analog Output	3 Watts Maximum	1% of Rate	0.04 fps to 39 fps 0.01 m/s to 12 m/s
Output code M Utilizing Modbus RS-485 and Pulse Output	4 Watts Maximum	1% of Rate	0.04 fps to 39 fps 0.01 m/s to 12 m/s

Ambient temperature limits

- Operating:
  - –58 to 140 °F (–50 to 60 °C) without LOI/Display
  - –4 to 140 °F (–20 to 60 °C) with LOI/Display
  - The LOI/Display will not be visible at temperatures below –4 °F (–20 °C).
- Storage:
  - –58 to 185 °F (–50 to 85 °C) without LOI/Display
  - –22 to 176 °F (–30 to 80 °C) with LOI/Display

Humidity limits

0–95% RH to 140 °F (60 °C)

Altitude limits

AC Input Voltage: Maximum 250 VAC – Up to 2000 meters (6,500 feet)

AC Input Voltage: Maximum 150 VAC – Up to 4000 meters (13,000 feet)

DC Input Voltage: No altitude limit

Transient protection rating

Built in transient protection that conforms to:

- IEC 61000-4-4 for burst currents
- IEC 61000-4-5 for surge currents
- IEC 611185-2.2000, Class 3 up to 2 kV and up to 2 kA protection

Turn-on time

- 5 minutes to rated accuracy from power up
- 5 seconds from power interruption

Start-up time

50ms from zero flow

Low flow cut-off

Adjustable between 0.01 and 38.37 ft/s (0.003 and 11.7 m/s). Below selected value, output is driven to the zero flow rate signal level.

Overrange capability

Signal output will remain linear until 110% of upper range value or 44 ft/s (13 m/s). The signal output will remain constant above these values. Out of range message displayed on LOI/Display and the Field Communicator.

Damping

Adjustable between 0 and 256 seconds

A.2.2 Advanced diagnostics capabilities

Basic

- Self test
- Transmitter faults

- Analog output test
- Pulse output test
- Tunable empty pipe
- Reverse flow
- Ground/wiring fault
- Coil circuit fault
- Electronics temperature

Process diagnostics (DA1)

- High process noise
- Electrode coating diagnostic

Smart Meter Verification (DA2)

- Smart Meter Verification (continuous or commanded)
- 4-20 mA loop verification(1)

A.2.3 Output signals

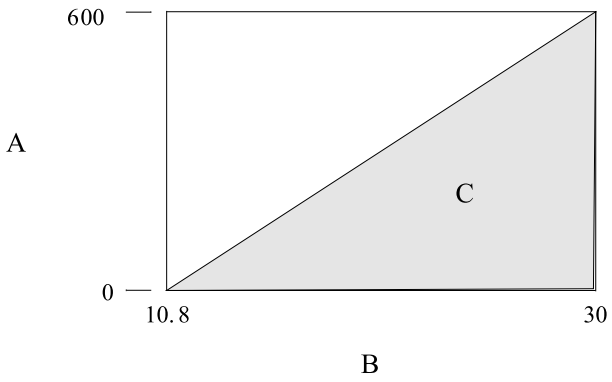
Analog output adjustment (2)

4–20 mA, switch-selectable as internally or externally powered.

Analog loop load limitations

- Internally powered 24 VDC max, 500 ohms max loop resistance
- Externally powered 10.8 - 30 VDC max.
- Loop resistance is determined by the voltage level of the external power supply at the transmitter terminals:

(1) Available with HART output only.
(2) For transmitters with intrinsically safe outputs (option code B), power must be supplied externally.



A. Load (ohms)
B. Power supply (volts)
C. Operating region

- R_{max} = 31.25 (V_{ps}–10.8)
- V_{ps} = power supply voltage (volts)
- Rmax = maximum loop resistance (ohms)

The analog output is automatically scaled to provide 4 mA at lower range value and 20 mA at upper range value. Full scale continuously adjustable between -39 and 39 ft/s (-12 to 12 m/sec), 1 ft/s (0.3 m/s) minimum span.

HART Communications is a digital flow signal. The digital signal is superimposed on the 4–20 mA signal and is available for the control system interface. A minimum of 250 ohms loop resistance is required for HART communications.

Analog alarm mode

High or low alarm signal is user-selectable via the Alarm switch on the front of the electronics. NAMUR-compliant alarm limits are software configurable and can be preset via CDS (C1). Individual diagnostic alarms are also software configurable. Alarms will drive the analog signal to the following mA values.

Low	3.75 mA	Requires CDS (C1)
High	22.60 mA	Factory default
NAMUR Low	3.5 mA	Requires CDS (C1)
NAMUR High	22.6 mA	Requires CDS (C1)

Scalable pulse frequency adjustment

- 0-10,000 Hz, switch-selectable as internally or externally powered [(3)]
- Pulse value can be set to equal desired volume in selected engineering units
- Pulse width adjustable from 0.1 to 650 ms
- Internally powered: Outputs up to 12 VDC[(4)]
- Externally powered: Input 5 - 28 VDC

Output testing

Analog output test [(4)]	Transmitter may be commanded to supply a specified current between 3.5 and 23 mA.
Pulse output test	Transmitter may be commanded to supply a specified frequency between 1 and 10,000 Hz.[(3)]

Optional discrete output function (AX option)

Externally powered at 5 - 28 VDC, 240 mA max, solid state switch closure to indicate either:

Reverse flow	Activates switch closure output when reverse flow is detected.
Zero flow	Activates switch closure output when flow goes to 0 ft/s or below low flow cutoff.
Empty pipe	Activates switch closure output when an empty pipe condition is detected.
Transmitter faults	Activates switch closure output when a transmitter fault is detected.
Flow limit 1, flow limit 2	Activates switch closure output when the transmitter measures a flow rate that meets the conditions established for this alert. There are two independent flow limit alerts that can be configured as discrete outputs.
Totalizer limit	Activates switch closure output when the transmitter measures a total flow that meets the conditions established for this alert.
Diagnostic status	Activates switch closure output when the transmitter detects a condition that meets the configured criteria of this output.

Optional discrete input function (AX option)

Externally powered at 5 - 28 VDC, 1.4 - 20 mA to activate switch closure to indicate either:

Reset Totalizer A (or B or C)	Resets Totalizer A (or B or C) value to zero.
Reset All Totals	Resets all totalizer values to zero.
Positive Zero Return (PZR)	Forces outputs of the transmitter to zero flow.

Security lockout

Security lockout switch on the electronics board can be set to deactivate all LOI and HART-based communicator functions to protect configuration variables from unwanted or accidental change.

(3) For transmitters with intrinsically safe outputs (option code B), frequency range is limited to 0-5000 Hz and must be powered externally.
(4) For transmitters with intrinsically safe outputs (option code B), power must be supplied externally.

LOI lockout

The display can be manually locked to prevent unintentional configuration changes. The display lock can be activated through a HART communication device, or by holding the UP arrow for 3 seconds and then following the on-screen instructions. When the display lock is activated, a lock symbol will appear in the lower right hand corner of the display. To deactivate the display lock, hold the UP arrow for 3 seconds and follow the on-screen instructions.

Display auto lock can be configured from the LOI with the following settings: OFF, 1 Minute, or 10 Minutes.

Sensor compensation

Rosemount sensors are calibrated in a flow lab at the factory and are assigned a calibration number. The calibration number must be entered into the transmitter, enabling interchangeability of sensors without calculations or a compromise in standard accuracy.

Transmitters and other manufacturers' sensors can be calibrated at known process conditions or at the Rosemount NIST-Traceable Flow Facility. Transmitters calibrated on site require a two-step procedure to match a known flow rate. This procedure can be found in the operations manual.

A.2.4 Performance specifications

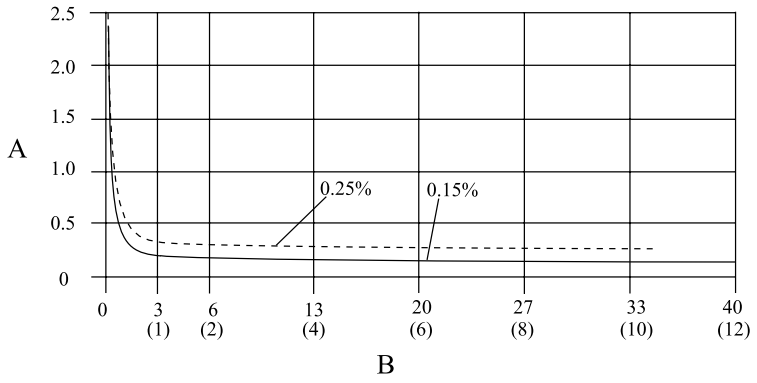
System specifications are given using the frequency output and with the unit at reference conditions.

Accuracy

Includes the combined effects of linearity, hysteresis, and repeatability.

Rosemount 8705-M Sensor

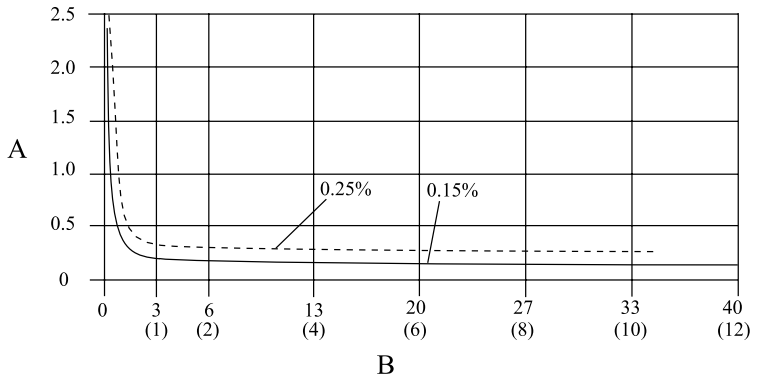
- Standard system accuracy:
  - ±0.25% of rate ±1.0 mm/sec from 0.04 to 6 ft/s (0.01 to 2 m/s)
  - ±0.25% of rate ±1.5 mm/sec above 6 ft/s (2 m/s)
- Optional high accuracy:[5]
  - ±0.15% of rate ±1.0 mm/sec from 0.04 to 13 ft/s (0.01 to 4 m/s)
  -



A. Percentage of rate
B. Velocity in ft/s (m/s)

Rosemount 8711-M/L Sensor

- Standard system accuracy:
  - ±0.25% of rate ±2.0 mm/sec from 0.04 to 39 ft/s (0.01 to 12 m/s)
- Optional high accuracy:
  - ±0.15% of rate ±1.0 mm/sec from 0.04 to 13 ft/s (0.01 to 4 m/s)
  -

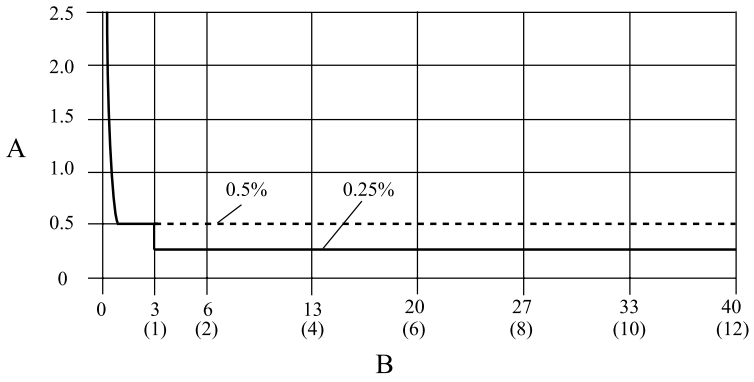


A. Percentage of rate
B. Velocity in ft/s (m/s)

(5) For sensor sizes greater than 12 in. (300 mm), the high accuracy is ±0.25% of rate from 3 to 39 ft/sec (1 to 12 m/sec).

Rosemount 8721 Sensor

- Standard system accuracy:
  - ±0.5% of rate ±1.5 mm/s from 0.04 to 1.0 ft/s (0.01 and 0.3 m/s)
  - ±0.5% of rate from 1 to 39 ft/s (0.3 to 12 m/s)
- Optional high accuracy:
  -



A. Percentage of rate
B. Velocity in ft/s (m/s)

Other manufacturers' sensors

- When calibrated in the Rosemount Flow Facility, system accuracies as good as 0.5% of rate can be attained.
- There is no accuracy specification for other manufacturers' sensors calibrated in the process line.

Analog output effects

Analog output has the same accuracy as frequency output plus an additional ±4 µ A at room temperature.

Repeatability	±0.1% of reading
Response time (analog output)	20 ms max response time to step change in input
Stability	±0.1% of rate over six months
Ambient temperature effect	±0.25% change over operating temperature range

A.2.5 8732 Field mount transmitter physical specifications

Materials of construction

Standard housing	Low copper aluminum Type 4X and IEC 60529 IP66/67/68/69[(1)]
Paint	Polyurethane coat (1.8 to 2.2 mils thick)

Cover gasket	Aluminum housing: Buna-N 316 SST housing: Silicone

(1) For applications where the transmitter may be submerged, even temporarily, contact Emerson Flow Technical Support for details.

Electrical connections

Conduit entries	Available in ½ inch NPT or M20. See ordering table footnotes for details.
Terminal block screws	6-32 (No. 6) suitable for up to 14 AWG wire
Safety grounding screws	External stainless assembly, M5; internal 8-32 (No. 8)

Vibration rating

Integral mount	2G per IEC 61298
Remote mount	5G per IEC 61298

Dimensions

See Product Data Sheet.

Weight

Field mount transmitter only	Aluminum	Approximately 7 lbs. (3.2 kg)

Add 1 pound (0.5 kg) for LOI/Display.

A.3 8705-M Flanged Sensor Specifications



A.3.1 Functional specifications

Service

Conductive liquids and slurries

Line sizes

½ inch to 36 inch (15 mm to 900 mm)

Sensor coil resistance

2 - 20 Ω

Interchangeability

Rosemount 8705-M sensors are interchangeable with 8712EM and 8732EM transmitters. System accuracy is maintained regardless of line size or optional features. Each sensor nameplate has a sixteen-digit calibration number that can be entered into a transmitter during configuration.

Upper range limit

39.37 ft/s (12 m/s)

Ambient temperature limits

- –20 to 140 °F (–29 to 60 °C) standard carbon steel housing design
- –58 to 140 °F (–50 to 60 °C) with "SH" all stainless housing design[6]

Pressure limits

See Process temperature limits.

Vacuum limits

PTFE lining	Full vacuum to +350 °F (+177 °C) through 4-in. (100 mm) line sizes. Consult an Emerson Flow representative for vacuum applications with line sizes of 6 inches (150 mm) or larger.
All other standard sensor lining materials	Full vacuum to maximum material temperature limits for all available line sizes.

Submergence protection IP68

The remote mount sensor is rated IP68 for continuous submergence. Tested to a depth of 33 ft (10 m) for a period of 48 hours. IP68 rating requires that the transmitter must be remote mount. Installer must use IP68 approved cable glands, conduit connections, and/or conduit plugs.

Conductivity limits

Process liquid must have a conductivity of 5 microSiemens/cm or greater. Consult an Emerson Flow representative for conductivity less than 5 microSiemens/cm.

Process temperature limits

PTFE lining	–58 to +350 °F (–50 to +177 °C)
ETFE lining	–58 to +300 °F (–50 to +149 °C)
PFA and PFA+ lining	–58 to +350 °F (–50 to +177 °C)
Polyurethane lining	0 to +140 °F (–18 to +60 °C)
Neoprene lining	0 to +176 °F (–18 to +80 °C)
Linatex lining	0 to +158 °F (–18 to +70 °C)
Adiprene lining	0 to +200 °F (–18 to +93 °C)

Notes

- Carbon steel flanges for PED have a minimum process temperature limit of 32 °F (0 °C).

(6) Not available for Class/Div approval codes N5, N6, K5, KU.

- Sensors ordered with hazardous location ratings may have different maximum process temperature limits. The sensors must be installed and used as directed by the installation drawing number noted on the serial nameplate.

Table A-9: Temperature vs. Pressure Limits for ASME B16.5 class flanges [1]

Sensor temperature vs. pressure limits for ASME B16.5 class flanges (up to 36 inch line sizes)[2]					
Flange material	**Flange rating**	**Pressure**			
		@ -20 to 100 °F (-29 to 38 °C)	**@ 200 °F (93 °C)**	**@ 300 °F (149 °C)**	**@ 350 °F (177 °C)**
Carbon Steel	Class 150	285 psi	260 psi	230 psi	215 psi
	Class 300	740 psi	680 psi	655 psi	645 psi
	Class 600[3]	1000 psi	800 psi	700 psi	650 psi
	Class 600[4]	1480 psi	1350 psi	1315 psi	1292 psi
	Class 900	2220 psi	2025 psi	1970 psi	1935 psi
	Class 1500	3705 psi	3375 psi	3280 psi	3225 psi
	Class 2500	6170 psi	5625 psi	5470 psi	5375 psi
304/304L Stainless Steel 316/316L Stainless Steel	Class 150	275 psi	235 psi	205 psi	190 psi
	Class 300	720 psi	620 psi	530 psi	500 psi
	Class 600[3]	1000 psi	800 psi	700 psi	650 psi
	Class 600[4]	1440 psi	1200 psi	1055 psi	997 psi
	Class 900	2160 psi	1800 psi	1585 psi	1497 psi
	Class 1500	3600 psi	3000 psi	2640 psi	2495 psi
	Class 2500	6000 psi	5000 psi	4400 psi	4160 psi

(1) Liner temperature limits must also be considered.
(2) 30-in. and 36-in. AWWA C207 Class D rated to 150 psi at atmospheric temperature.
(3) Flange rating Code 6.
(4) Flange rating Code 7.

Table A-10: Temperature vs. Pressure Limits for AS2129 Table D and E flanges [1]

Sensor temperature vs. pressure limits for AS2129 Table D and E flanges (4 inch to 24 inch line sizes)					
Flange Material	**Flange Rating**	**Pressure**			
		@ -29 to 50 °C (-20 to 122 °F)	**@ 100 °C (212 °F)**	**@ 150 °C (302 °F)**	**@ 200 °C (392 °F)**
Carbon Steel	D	101.6 psi	101.6 psi	101.6 psi	94.3 psi
	E	203.1 psi	203.1 psi	203.1 psi	188.6 psi

(1) Liner temperature limits must also be considered.

Table A-11: Temperature vs. Pressure Limits for EN 1092-1 flanges [1]

Sensor temperature vs. pressure limits for EN 1092-1 flanges (15 mm to 600 mm Line Sizes)					
Flange material	**Flange rating**	**Pressure**			
		@ -29 to 50 °C (-20 to 122 °F)	**@ 100 °C (212 °F)**	**@ 150 °C (302 °F)**	**@ 175 °C (347 °F)**
Carbon Steel	PN 10	10 bar	10 bar	9.7 bar	9.5 bar
	PN 16	16 bar	16 bar	15.6 bar	15.3 bar
	PN 25	25 bar	25 bar	24.4 bar	24.0 bar
	PN 40	40 bar	40 bar	39.1 bar	38.5 bar
304/304L Stainless Steel 316/316L Stainless Steel	PN 10	9.1 bar	7.5 bar	6.8 bar	6.5 bar
	PN 16	14.7 bar	12.1 bar	11.0 bar	10.6 bar
	PN 25	23 bar	18.9 bar	17.2 bar	16.6 bar
	PN 40	36.8 bar	30.3 bar	27.5 bar	26.5 bar

(1) Liner temperature limits must also be considered.

A.3.2 Physical specifications

Emerson Rosemount magnetic flow meters are designed to the standards defined in ASME B31.3. This standard is used as the basis for all of our other pressure vessel certifications such as CRN and PED.

Non-wetted materials

Sensor Pipe	Type 304/304L SST or Type 316/316L SST
Flanges[1]	Flat-Face (FF) and Raised-Face (RF)
Coil housing	Rolled carbon steel or 300 series stainless steel
Remote junction box	Painted aluminum
Paint	Polyurethane coat (2.6 mils or greater)
Optional coil housing	316/316L unpainted, option code SH
Optional remote junction box	316/316L, unpainted, option code SJ; included with option code SH

(1) Ambient temperature low limit for A105 carbon steel is –20 °F (–29 °C) per ANSI B16.5. For colder ambient environments, stainless steel flanges must be used.

Process-wetted materials

Flanges[1]	Ring Type Joint (RTJ)
Lining	PTFE, ETFE, PFA, Polyurethane, Neoprene, Linatex, Adiprene, PFA+
Electrodes	316L SST, Nickel Alloy 276 (UNS N10276), Tantalum, 80% Platinum-20% Iridium, Titanium

(1) Ambient temperature low limit for A105 carbon steel is –20 °F (–29 °C) per ANSI B16.5. For colder ambient environments, stainless steel flanges must be used.

Flat-faced flanges

Sensors ordered with flat-faced flanges and Neoprene or Linatex liners are manufactured with the liner extending to the outer dimension of the flange. All other liner selections extend to the diameter of raised face dimension and create a raised surface on the flange face.

Process connections

ASME B16.5	• Class 150 and Class 300: ½ inch to 24 inch (15 mm to 600 mm) • Class 600: ½ inch to 24 inch (15 mm to 600 mm)(1) • Class 900: 1 inch to 12 inch (25 mm to 300 mm)(2) • Class 1500: 1½ inch to 12 inch (40 mm to 300 mm)(2) • 1½ inch to 6 inch (40 mm to 150 mm)(2)
ASME B16.47	• Class 150: 30 inch to 36 inch (750 mm to 900 mm) • Class 300: 30 inch to 36 inch (750 mm to 900 mm)
AWWA C207	• Class D: 30 inch and 36 inch (750 mm and 900 mm)
MSS SP44	• Class 150: 30 inch to 36 inch (750 mm to 900 mm)
EN 1092-1	• PN10: 200 mm to 900 mm (8 inch to 36 inch) • PN16: 100 mm to 900 mm (4 inch to 36 inch) • PN25: 200 mm to 900 mm (8 inch to 36 inch) • PN40: 15 mm to 900 mm (½ inch to 36 inch)
AS2129	• Table D and Table E: 15 mm to 900 mm (½ inch to 36 inch)
AS4087	• PN16, PN21, PN35: 50 mm to 600 mm (2 inch to 24 inch)
JIS B2220	• 10K, 20K, 40K: 15 mm to 200 mm (½ inch to 8 inch)

(1) For PTFE, PFA, PFA+, and ETFE, maximum working pressure is derated to 1000 psig.
(2) For Class 900 and higher flange ratings, liner selection is limited to resilient liners.

Electrical connections

Conduit entries	Available with ½ inch NPT and M20
Terminal block screws	6-32 (No. 6) suitable for up to 14 AWG wire
Safety grounding screws	External stainless assembly, M5; internal 8-32 (No. 8)

Process reference electrode (optional)

A process reference electrode can be installed similarly to the measurement electrodes through the sensor lining. It will be made of the same material as the measurement electrodes.

Grounding rings (optional)

Grounding rings can be installed between the flange and the sensor face on both ends of the sensor. Single ground rings can be installed on either end of the sensor. They have an I.D. slightly larger than the sensor I.D. and an external tab to attach ground straps. Grounding rings are available in 316L SST, Nickel Alloy 276 (UNS N10276), titanium, and tantalum. See Product Data Sheet.

Lining protectors (optional)

Lining protectors can be installed between the flange and the sensor face on both ends of the sensor. The leading edge of lining material is protected by the lining protector; lining protectors cannot be removed once they are installed. Lining protectors are available in 316L SST, Nickel Alloy 276 (UNS N10276), and titanium. See Product Data Sheet.

Dimensions

See Product Data Sheet.

Weight

See Product Data Sheet.

A.4 8711-M/L Wafer Sensor Specifications



A.4.1 Functional specifications

Service

Conductive liquids and slurries

Line sizes

1.5-in. to 8-in. (40 mm to 200 mm)

Sensor coil resistance

10 - 18 Ω

Interchangeability

Rosemount 8711-M/L Sensors are interchangeable with 8712EM and 8732EM Transmitters. System accuracy is maintained regardless of line size or optional features. Each sensor nameplate has a sixteen-digit calibration number that can be entered into a transmitter during configuration.

Upper range limit

39.37 ft/s (12 m/s)

Process temperature limits

ETFE lining	-20 to 300 °F (–29 to 149 °C)
PTFE lining	-20 to 350 °F (-29 to 177 °C)

Ambient temperature limits

–20 to 140 °F (–29 to 60 °C)

Maximum safe working pressure at 100 °F (38 °C)

ETFE lining	Full vacuum to 740 psi (5.1 MPa)
PTFE lining	• Line sizes 1.5-in. (40 mm) through 4-in. (100 mm); Full vacuum to 740 psi (5.1 MPa) • Consult Technical Support for vacuum applications with line sizes of 6-in. (150 mm) or larger

Submergence protection IP68

The remote mount sensor is rated IP68 for continuous submergence. Tested to a depth of 33 ft (10 m) for a period of 48 hours. IP68 rating requires that the transmitter must be remote mount. Installer must use IP68 approved cable glands, conduit connections, and/or conduit plugs.

Conductivity limits

Process liquid must have a minimum conductivity of 5 microSiemens/cm (5 micromhos/cm) or greater for 8711.

A.4.2 Physical specifications

Non-wetted materials

Sensor body	• 303 SST • CF3M or CF8M • Type 304/304L
Coil housing	Rolled carbon steel
Remote junction box	Painted aluminum
Paint	Polyurethane coat (2.6 mils or greater)

Process-wetted materials

Lining	PTFE, ETFE
Electrodes	316L SST, Nickel Alloy 276 (UNS N10276), Tantalum, 80% Platinum—20% Iridium, Titanium

Electrical connections

Conduit entries	Available with 1/2 inch NPT and M20. See ordering table footnotes for details
Terminal block screws	6-32 (No. 6) suitable for up to 14 AWG wire
Safety grounding screws	External stainless assembly, M5; internal 8-32 (No. 8)

Process reference electrode (optional)

A process reference electrode can be installed similarly to the measurement electrodes through the sensor lining. It will be made of the same material as the measurement electrodes.

Grounding rings (optional)

Grounding rings can be installed between the flange and the sensor face on both ends of the sensor. They have an I.D. slightly smaller than the sensor I.D. and an external tab to attach ground wiring. Grounding rings are available in 316L SST, Nickel Alloy 276 (UNS N10276), titanium, and tantalum. See Product Data Sheet.

Dimensions

See Product Data Sheet.

Weight

See Product Data Sheet.

Process connections—Mounts between these flange configurations

ASME B16.5	Class 150, 300
EN 1092-1	PN10, PN16, PN25, PN40
JIS B2220	10K, 20K
AS4087	PN16, PN21, PN35

Studs, nuts, and washers—MK2-carbon steel

Component	ASME B16.5	EN1092-1
Studs, full thread	CS, ASTM A193, Grade B7	CS, ASTM A193, Grade B7
Hex nuts	ASTM A194 Grade 2H	ASTM A194 Grade 2H; DIN 934 H = D
Flat washers	CS, Type A, Series N, SAE per ANSI B18.2.1	CS, DIN 125
All items	Clear, chromate zinc-plated	Yellow zinc-plated

Studs, nuts, and washers—MK3-316 SST

Component	ASME B16.5	EN1092-1
Studs, full thread	ASTM A193, Grade B8M Class 1	ASTM A193, Grade B8M Class 1
Hex nuts	ASTM A194 Grade 8M	ASTM A194 Grade 8M; DIN 934 H = D
Flat washers	316 SST, Type A, Series N, SAE per ANSI B18.2.1	316 SST, DIN 125

A.5 8721 Hygienic (Sanitary) Sensor Specifications



A.5.1 Functional specifications

Service

Conductive liquids and slurries

Line sizes

1/2 -in. to 4-in. (15 mm to 100 mm)

Sensor coil resistance

5 -10 Ω

Interchangeability

Rosemount 8721 sensors are interchangeable with Rosemount 8712EM and 8732EM transmitters. System accuracy is maintained regardless of line size or optional features. Each sensor label has a 16 digit calibration number that can be entered into the transmitter during configuration.

Conductivity limits

Process liquid must have a minimum conductivity of 5 microSiemens/cm (5 micromhos/cm) or greater. Excludes the effect of interconnecting cable length in remote mount transmitter installations.

Flow rate range

Capable of processing signals from fluids that are traveling between 0.04 and 39 ft/s (0.01 to 12 m/s) for both forward and reverse flow in all sensor sizes. Full scale continuously adjustable between –39 and 39 ft/s (–12 to 12 m/s).

Sensor ambient temperature limits

14 to 140 °F (–15 to 60 °C)

Process temperature limits

PFA lining -20 to 350 °F (-29 to 177 °C)

Table A-12: Pressure limits

Line size	Max working pressure	CE mark max. working pressure
1/2 -in. (15 mm)	300 psi (20.7 bar)	300 psi (20.7 bar)
1-in. (25 mm)	300 psi (20.7 bar)	300 psi (20.7 bar)
1 1/2 -in. (40 mm)	300 psi (20.7 bar)	300 psi (20.7 bar)
2-in. (50 mm)	300 psi (20.7 bar)	300 psi (20.7 bar)
2 1/2 -in. (65 mm)	300 psi (20.7 bar)	240 psi (16.5 bar)
3 -in. (80 mm)	300 psi (20.7 bar)	198 psi (13.7 bar)
4-in. (100 mm)	210 psi (14.5 bar)	148 psi (10.2 bar)

Vacuum limits

Full vacuum at maximum lining material temperature; consult Technical Support.

Submergence protection IP68

The remote mount 8721 sensor is rated IP68 for submergence to a depth of 33 ft (10 m) for a period of 48 hours. IP68 rating requires that the transmitter must be remote mount. Installer must use IP68 approved cable glands, conduit connections, and/or conduit plugs.

A.5.2 Physical specifications

Mounting

Integrally mounted transmitters are factory-wired and do not require interconnecting cables. The transmitter can rotate in 90° increments. Remote-mounted transmitters require only a single conduit connection to the sensor.

Non-wetted materials

Sensor	304 Stainless Steel (wrapper), 304 Stainless Steel (pipe)
Terminal junction box	Low copper aluminumOptional: 304 Stainless Steel

Process wetted materials (sensor)

Liner	PFA with Ra < 32µ in. (0.81 µm)
Electrodes	• 316L SST with Ra < 15µ in. (0.38 µm) • Nickel Alloy 276 (UNS N10276) with Ra < 15µ in. (0.38 µm) • 80% Platinum-20% Iridium with Ra < 15µ in. (0.38 µm)

Process connections

The Rosemount 8721 Sanitary Sensor is designed using a standard IDF fitting as the basis for providing a flexible, hygienic interface for a variety of process connections. The Rosemount 8721 Sensor has the threaded or “male” end of the IDF fitting on the ends of the base sensor. The sensor can be directly connected with user supplied IDF fittings and gaskets. If other process connections are needed, the IDF fittings and gaskets can be provided and welded directly into the sanitary process tubing, or can be supplied with adapters to standard Tri Clamp process connections. All connections are PED compliant for group 2 fluids.

Tri Clamp sanitary coupling	• IDF Sanitary Coupling (screw type) • IDF specification per BS4825 part 4 • ANSI Weld Nipple • DIN 11850 Weld Nipple • DIN 11851 (Imperial and Metric) • DIN 11864-1 form A • DIN 11864-2 form A • SMS 1145 • Cherry-Burrell I-Line

Process connection material

- 316L Stainless Steel with Ra < 32µ in. (0.81µm)
- Optional Electropolished Surface Finish with Ra < 15µ in. (0.38µ m)

Process connection gasket material

- Silicone
- EPDM
- Viton

Electrical connections

Conduit entries	½ -in. NPT standard, M20 adapters
Terminal block screws	M3
Safety grounding screws	External stainless assembly, M5; internal 6-32 (No. 6)

Dimensions

See Product Data Sheet.

Weight

Table A-13: 8721 Sensor Weight

Line size	Sensor only	008721-0350 Tri Clamp fitting (Each)
1/2 -in. (15 mm)	4.84 lbs (2.20 kg)	0.58 lbs (0.263 kg)
1-in. (25 mm)	4.52 lbs (2.05 kg)	0.68 lbs (0.309 kg)
1 1/2 -in. (40 mm)	5.52 lbs (2.51 kg)	0.88 lbs (0.400 kg)
2-in. (50 mm)	6.78 lbs (3.08 kg)	1.30 lbs (0.591 kg)
2 1/2 -in. (65 mm)	8.79 lbs (4.00 kg)	1.66 lbs (0.727 kg)
3 -in. (80 mm)	13.26 lbs (6.03 kg)	2.22 lbs (1.01 kg)
4-in. (100 mm)	21.04 lbs (9.56 kg)	3.28 lbs (1.49 kg)

Aluminum remote junction box	• Approximately 1 lb. (0.45 kg) • Paint - Polyurethane (1.3 to 5 mils)
SST remote junction box	• Approximately 2.5 lbs. (1.13 kg) • Unpainted

B Product certifications

For detailed approval certification information and installation drawings, please see the appropriate document listed below:

- Document number 00825-MA00-0001: *Rosemount 8700M Approval Document - IECEx and ATEX*
- Document number 00825-MA00-0002: *Rosemount 8700M Approval Document – Class Division*
- Document number 00825-MA00-0003: *Rosemount 8700M Approval Document - North America Zone*
- Document number 00825-MA00-0007: *Rosemount 8700M Approval Document - NEPSI EN Zone 1 China*

NAMUR Compliance (8732E)

- NE21: Electromagnetic Compatibility of Equipment for Industrial Processes and Laboratory
- NE43: Standardisation of the Signal Level for the Failure Information of Digital Transmitters
- NE53: Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics
- NE70: Magnetic Inductive Flowmeters (MIF)
- NE95: Basic Principles of Homologation
- NE107: Self-Monitoring and Diagnosis of Field Devices

C Wiring Diagrams

C.1 Wiring sensor to transmitter

Figure C-1: Wiring 8732EM using component cable

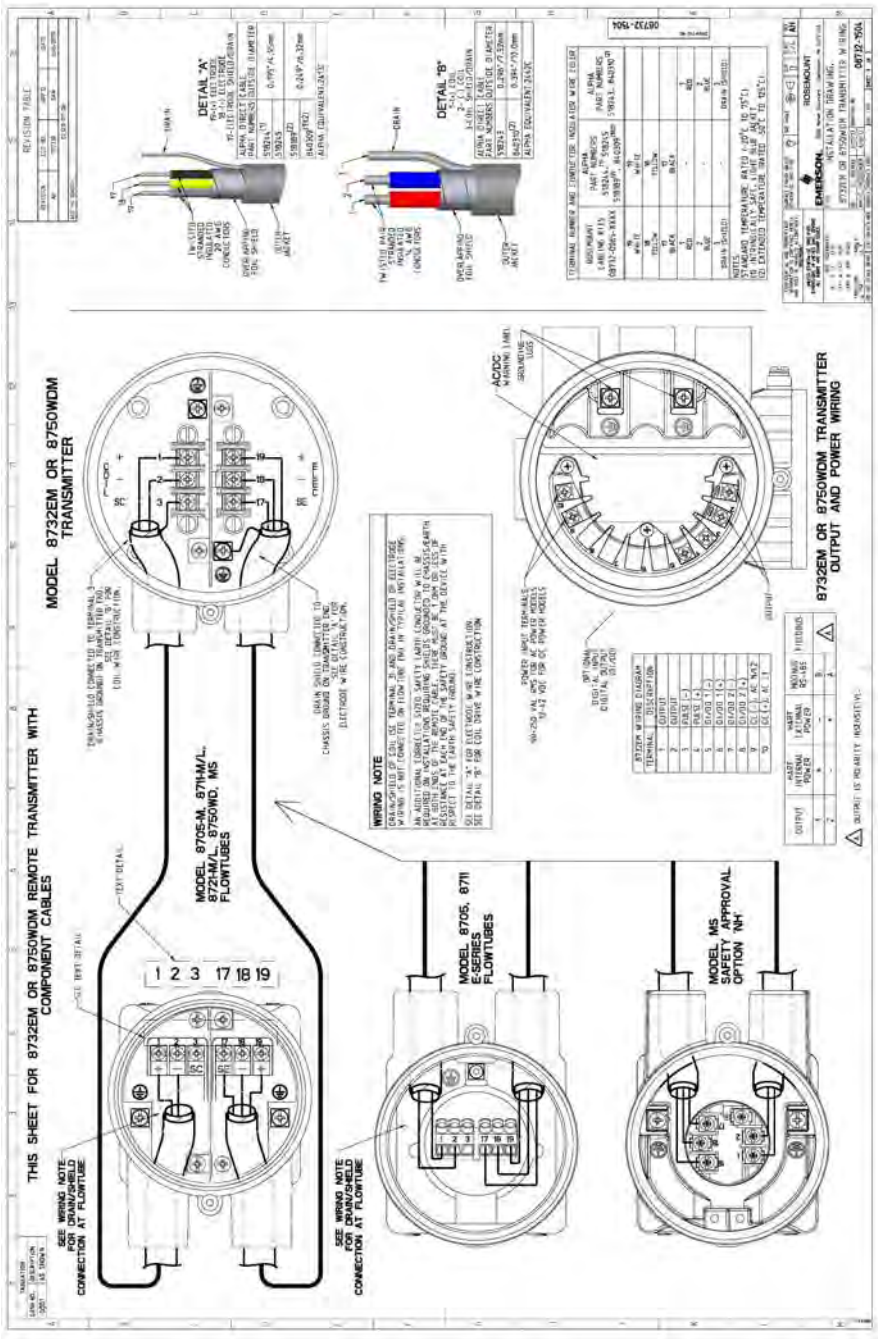
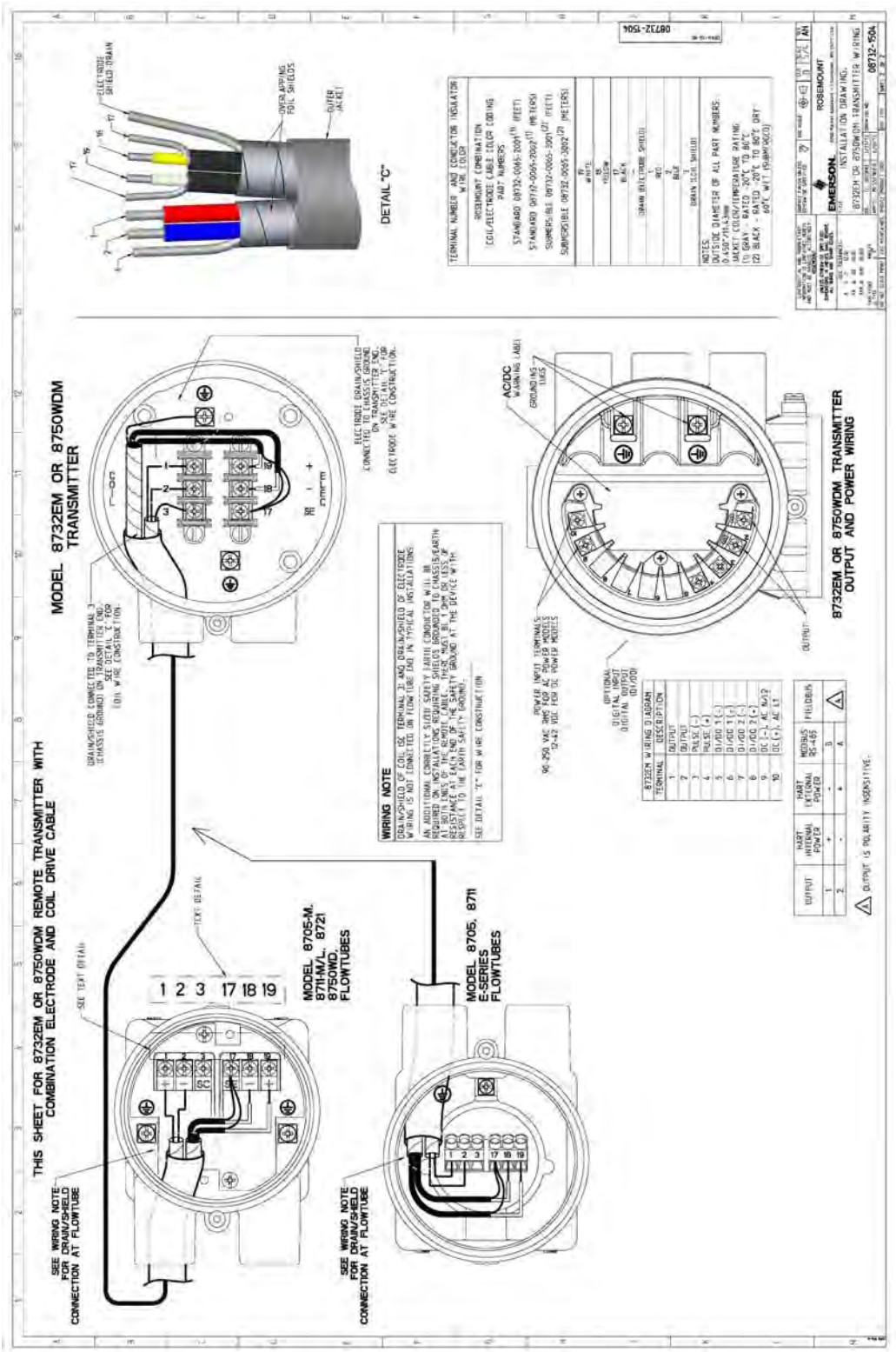


Figure C-2: Wiring 8732EM using combination cable



C.2 775 Smart Wireless THUM™ Adapter wiring diagrams

Figure C-3: Wiring diagram—775 Smart Wireless THUM Adapter with transmitter internal analog power

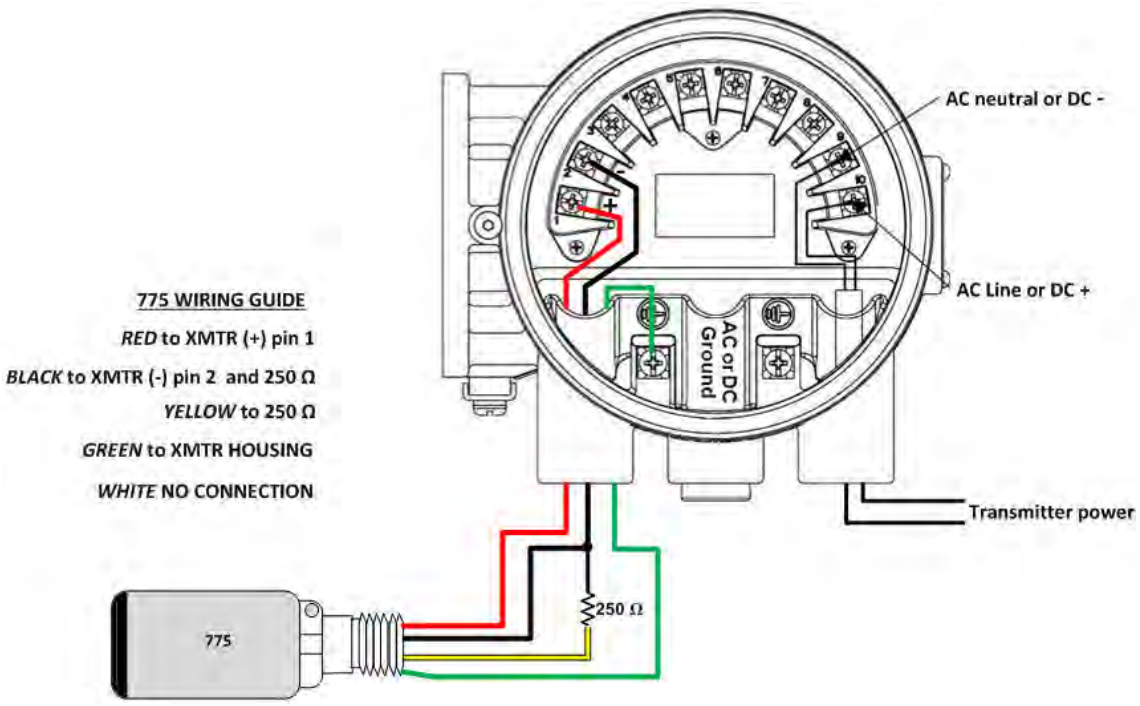
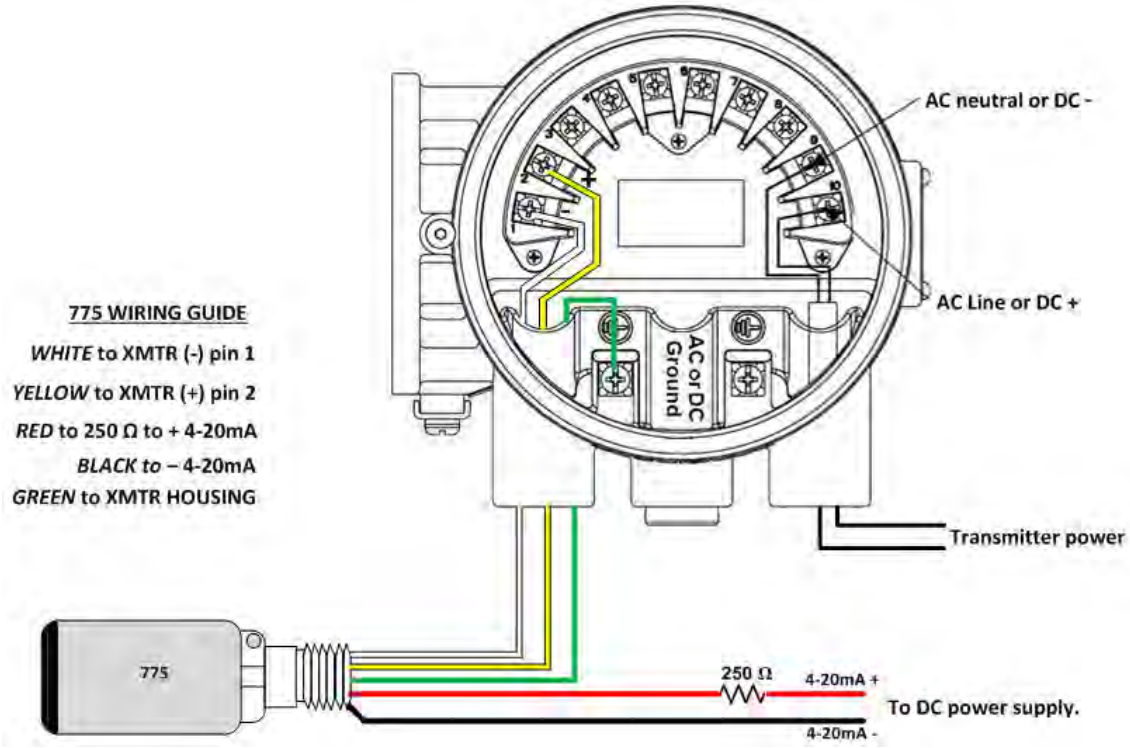


Figure C-4: Wiring diagram—775 Smart Wireless THUM Adapter with transmitter external analog power



C.3 475 Field Communicator wiring diagrams

Figure C-5: Wiring diagram—475 Field Communicator with transmitter internal analog power

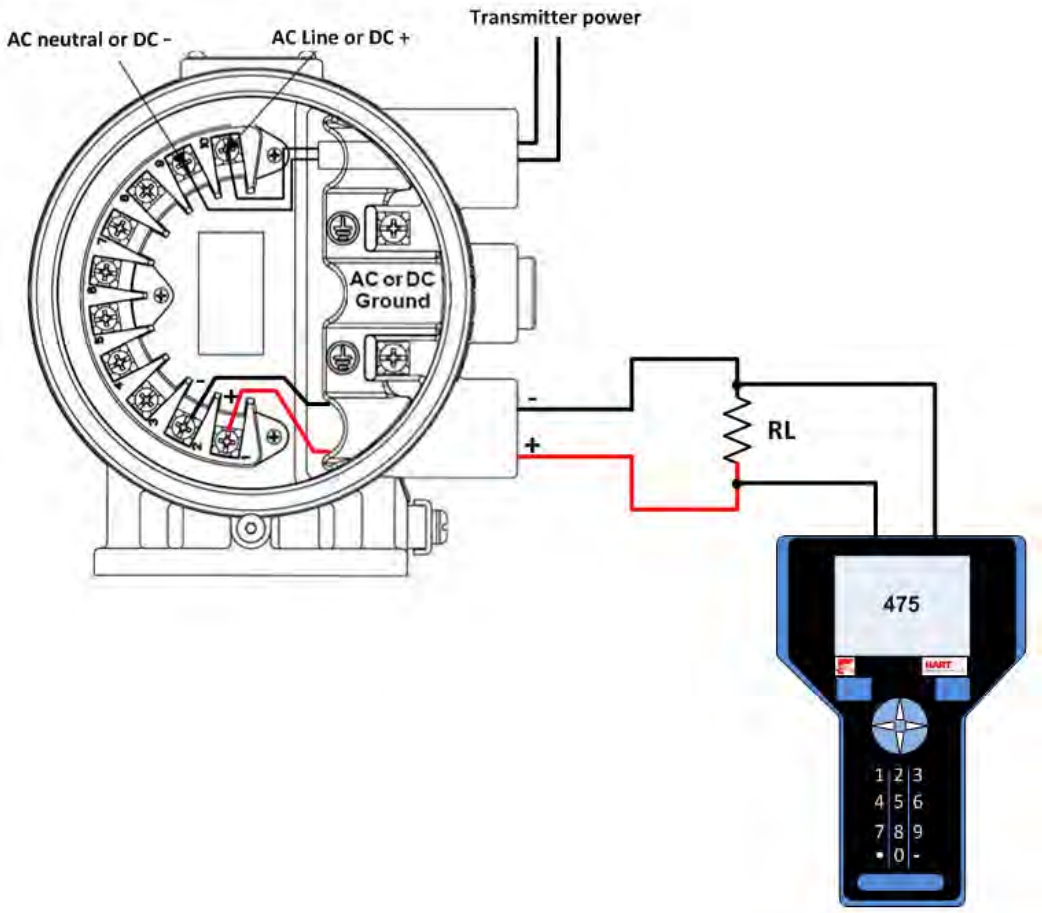
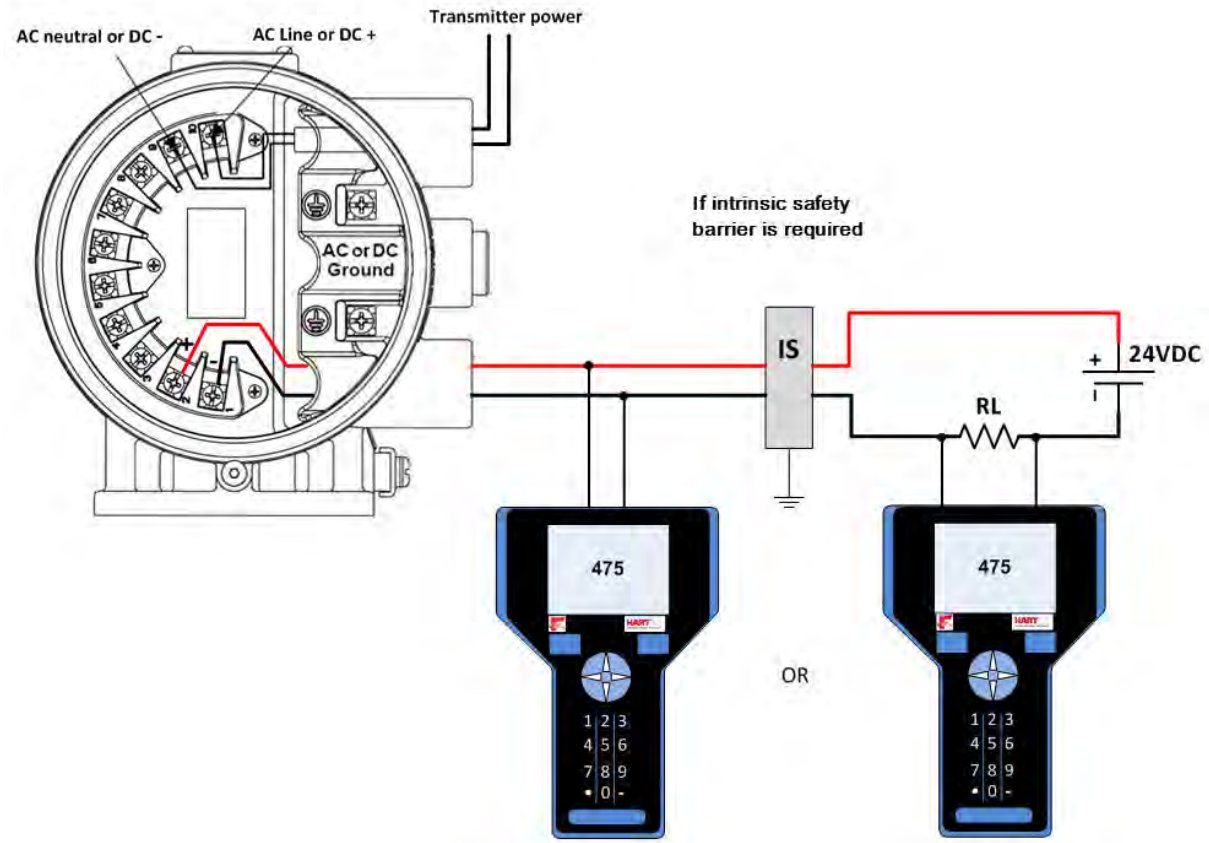


Figure C-6: Wiring diagram—475 Field Communicator with transmitter external analog power



D Implementing a Universal Transmitter

D.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Please read the following safety messages before performing any operation described in this section.

⚠ WARNING

The transmitter has not been evaluated for use with other manufacturers' magnetic flowmeter sensors in hazardous (Ex or Classified) areas. Special care should be taken by the end-user and installer that the transmitter meets the safety and performance requirements of the other manufacturer’s equipment.

D.2 Universal capability

The transmitter has the ability to drive other manufacturers' sensors. In addition to providing a flow measurement, all diagnostic functionality is available. This capability can provide additional information about the installation, the process, and the health of the sensor. Universal capabilities enable a common maintenance practice for all magnetic flowmeter installations and help reduce spares inventory of magnetic flowmeter transmitters.

This section provides wiring diagrams for connecting the transmitter to other manufacturers' sensors, and describes how to configure the universal capabilities.

D.3 Three step process

There are three steps to implementing a universal transmitter:

Procedure

1. Review the existing application. Verify that the existing sensor is in good working order, and that it is compatible with a universal transmitter.

   Locate the wiring diagram (in this Appendix) that applies to your sensor. While the Universal transmitter may be able to drive the existing sensor, if the sensor is not in good working order, the universal transmitter may not function correctly.

2. Connect the universal transmitter to the existing sensor using the appropriate wiring diagram from this appendix.

   If the sensor you are using is not listed in this appendix, contact Rosemount technical support for more details on the application of the universal capabilities.

3. Configure the transmitter following the guidelines in Operation and Advanced Configuration Functionality, setting up parameters as needed.

   One of the key configuration parameters is the sensor calibration number. There are several methods to determine the calibration number, but the most common method will be to use the universal trim capability. This functionality is detailed in

this appendix. Accuracy of the meter when the universal trim is used to determine the calibration number will be dependent on the accuracy of the known flow rate used in the trim process.

In addition to the universal trim, there are two other methodologies for determining a calibration number for the sensor:

Method 1: Have the sensor sent to a Rosemount service center for determination of a calibration number compatible with the universal transmitter. This is the most accurate method for determining the calibration number and will provide a ±0.5% of rate measurement accuracy from 3 to 40 fps (1-10 m/s).

Method 2: Involves the conversion of the existing sensor calibration number / meter factors to an equivalent Rosemount 16-digit calibration number. Accuracy of the meter using this methodology is estimated to be in the range of 2-3%. Contact the Rosemount technical support for more information on this method or to determine a calibration number for the existing sensor.

Once these steps are completed, the meter will begin measuring flow. Verify the measured flow rate is within the expected range and that the output correctly corresponds to the measured flow rate. Also verify the reading in the control system matches the reading at the transmitter. Once these items have been verified, the loop can be placed into automatic control as needed.

D.3.1 Universal trim

The universal auto trim function enables the transmitter to determine a calibration number for sensors that were not calibrated at the factory. See Universal trim.

D.4 Wiring the universal transmitter

The wiring diagrams in this section illustrate the proper connections between the transmitter and most sensors currently on the market. Specific diagrams are included for most models, and where information for a particular model of a manufacturer is not available, a generic drawing pertaining to that manufacturer's sensors is provided. If the manufacturer for the existing sensor is not included, see the drawing for generic connections.

Any trademarks used herein regarding sensors not manufactured by Rosemount are owned by the particular manufacturer of the sensor.

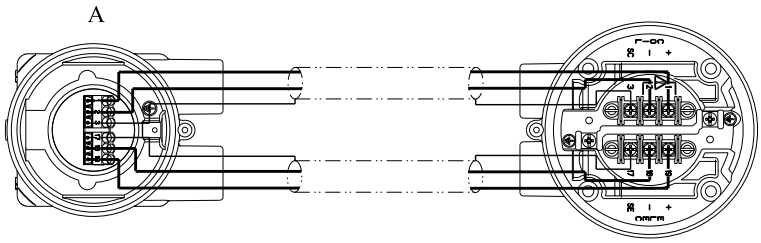
D.5 Rosemount sensors

D.5.1 8705/8707/8711/8721 Sensors to 8732 Transmitter

To connect a Rosemount 8705/8707/8711/8721 Sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-1.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Rosemount 8732 transmitter

Table D-1: Rosemount 8705/8707/8711/8721 Sensor Wiring Connections

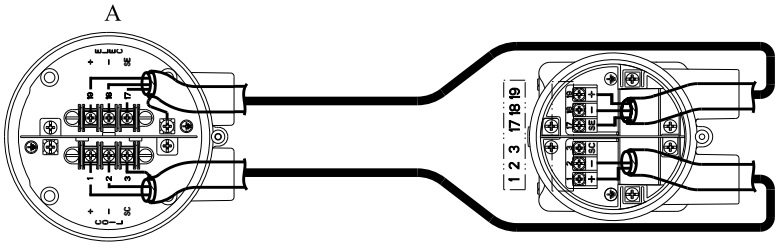
Rosemount 8732 Transmitters	Rosemount 8705/8707/8711/8721 Sensors
1	1
2	2
3	3
17	17
18	18
19	19

D.5.2 8705 M and 8711 M/L Sensors to 8732EM Transmitter

To connect a Rosemount 8705 M or 8711 M/L Sensor to a Rosemount 8732EM Transmitter, connect coil drive and electrode cables as shown in Figure D-2.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Rosemount 8732 transmitter

Table D-2: Rosemount 8705/8711 Sensor Wiring Connections

Rosemount 8732 Transmitters	Rosemount 8705/8711 Sensors
1	1 / +
2	2 / –
3	3 / SC
17	17 / SE
18	18 / –
19	19 / +

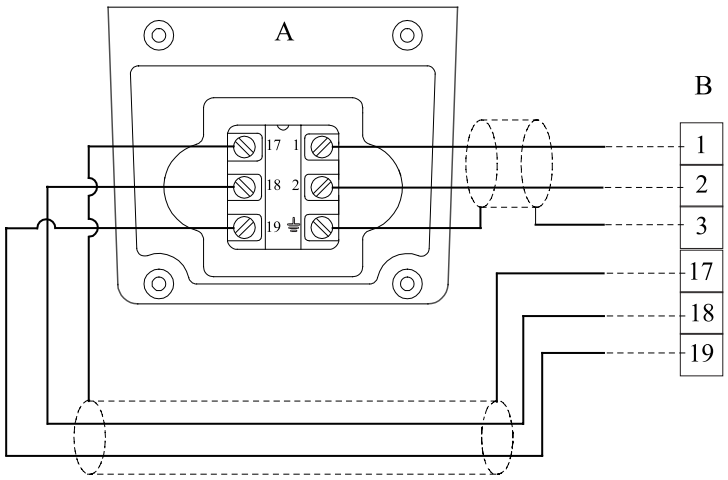
D.5.3 8701 sensor to 8732 transmitter

To connect a Rosemount 8701 sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-3 .

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.

Figure D-3: Wiring Diagram for Rosemount 8701 Sensor and Rosemount 8732



A. Rosemount 8701 sensor
B. Rosemount 8732 transmitter

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-3: Rosemount 8701 Sensor Wiring Connections

Rosemount 8732	Rosemount 8701 sensors
1	1
2	2

Table D-3: Rosemount 8701 Sensor Wiring Connections *(continued)*

Rosemount 8732	Rosemount 8701 sensors
3	3
17	17
18	18
19	19

D.5.4 Connecting sensors of other manufacturers

Prerequisites

Before connecting another manufacturer's sensor to the transmitter, it is necessary to perform the following functions.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.

Procedure

1. Turn off the AC power to the sensor and transmitter.

   ⚠ CAUTION

   Failure to do so could result in electrical shock or damage to the transmitter.

2. Verify the coil drive cables between the sensor and the transmitter are not connected to any other equipment.
3. Label the coil drive cables and electrode cables for connection to the transmitter.
4. Disconnect the wires from the existing transmitter.
5. Remove the existing transmitter and then mount the new transmitter.

   See Remote Transmitter Installation.

6. Verify the sensor coil is configured for series connection.

   Other manufacturers sensors may be wired in either a series or parallel circuit. All Rosemount magnetic sensors are wired in a series circuit. (Other manufacturers AC sensors (AC coils) wired for 220 V operation are typically wired in parallel and must be rewired in series.)

7. Use the manufacturer's recommended test procedure for verification of sensor condition to verify the sensor is in good working condition. Perform the basic checks:
   a) Check the coils for shorts or open circuits.
   b) Check the sensor liner for wear or damage.
   c) Check the electrodes for shorts, leaks, or damage.
8. Connect the sensor to the transmitter in accordance with reference wiring diagrams.

   See Wiring Diagrams for specific drawings.

9. Connect and verify all connections between the sensor and the transmitter, then apply power to the transmitter.
10. Perform the Universal Auto Trim function.

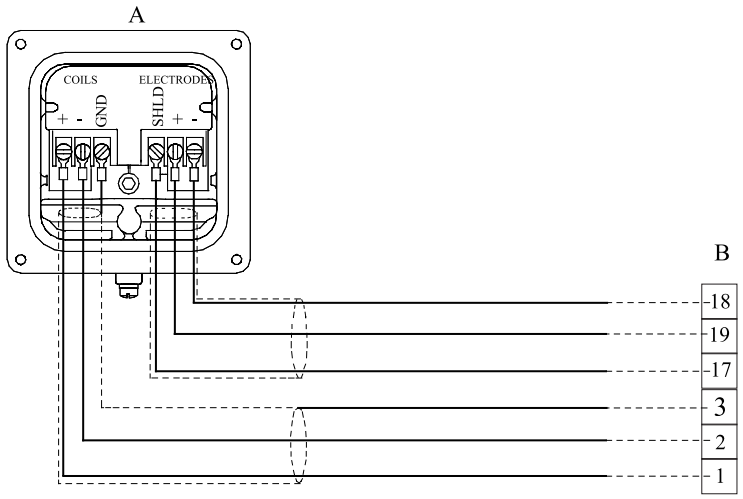
D.6 Brooks sensors

D.6.1 Model 5000 sensor to 8732 Transmitter

To connect a Model 5000 sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-4.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Brooks Model 5000
B. Rosemount 8732 transmitter

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-4: Brooks Model 5000 Sensor Wiring Connections

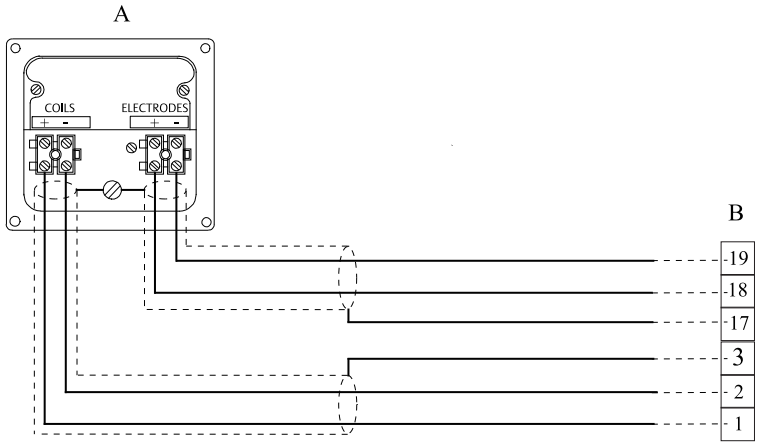
Rosemount 8732	Brooks sensors Model 5000
1	COILS (+)
2	COILS (-)
3	COILS (GND)
17	ELECTRODES (SHLD)
18	ELECTRODES (-)
19	ELECTRODES (+)

D.6.2 Model 7400 sensor to 8732 Transmitter

To connect a Model 7400 sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-5.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Brooks Model 7400
B. Rosemount 8732 transmitter

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-5: Brooks Model 7400 sensor Wiring Connections

Rosemount 8732	Brooks Sensors Model 7400
1	Coils +
2	Coils –
3	3
17	Shield
18	Electrode +
19	Electrode –

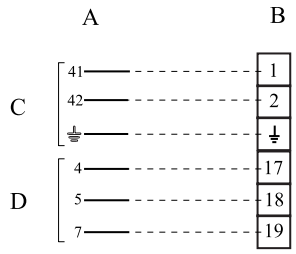
D.7 Endress and Hauser sensors

D.7.1 Endress and Hauser sensor to 8732 Transmitter

To connect an Endress and Hauser sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-6.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Endress and Hauser sensors
B. Rosemount 8732 transmitter
C. Coils
D. Electrodes

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-6: Endress and Hauser Sensor Wiring Connections

Rosemount 8732	Endress and Hauser sensors
1	41
2	42
3	14
17	4
18	5
19	7

D.8 Fischer and Porter sensors

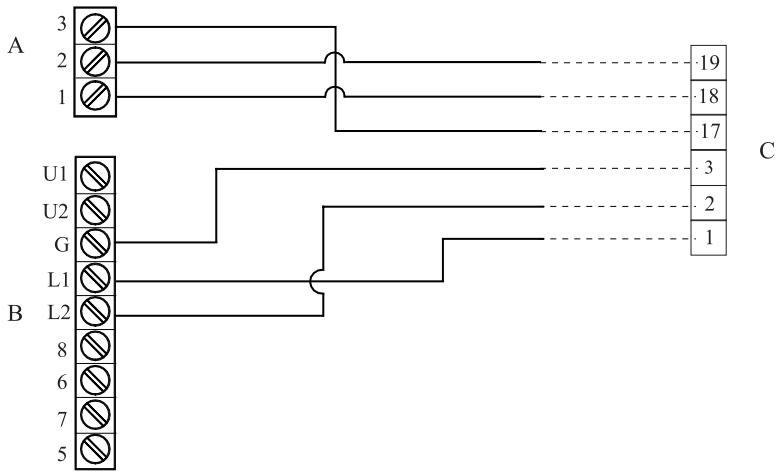
D.8.1 Model 10D1418 sensor to 8732 Transmitter

To connect a Model 10D1418 sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-7.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.

Figure D-7: Wiring Diagram for Fischer and Porter Sensor Model 10D1418 and



A. Electrode connections
B. Coil connections
C. Rosemount 8732 transmitter

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-7: Fischer and Porter Model 10D1418 Sensor Wiring Connections

Rosemount 8732	Fischer and Porter Model 10D1418 sensors
1	L1
2	L2
3	Chassis ground
17	3
18	1
19	2

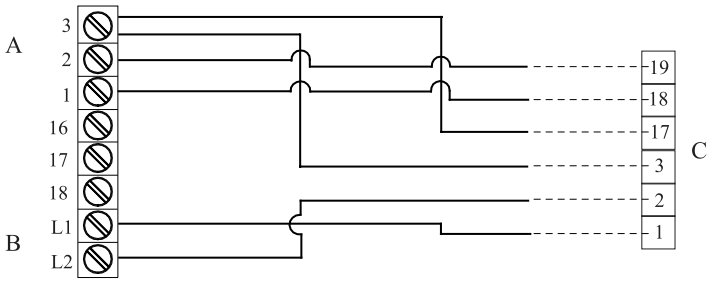
D.8.2 Model 10D1419 sensor to 8732 Transmitter

To connect a Model 10D1419 sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-8.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.

Figure D-8: Wiring Diagram for Fischer and Porter Sensor Model 10D1419 and



A. Electrode connections
B. Coil connections
C. Rosemount 8732 transmitter

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-8: Fischer and Porter Model 10D1419 Sensor Wiring Connections

Rosemount 8732	Fischer and Porter Model 10D1419 sensors
1	L1
2	L2
3	3
17	3
18	1
19	2

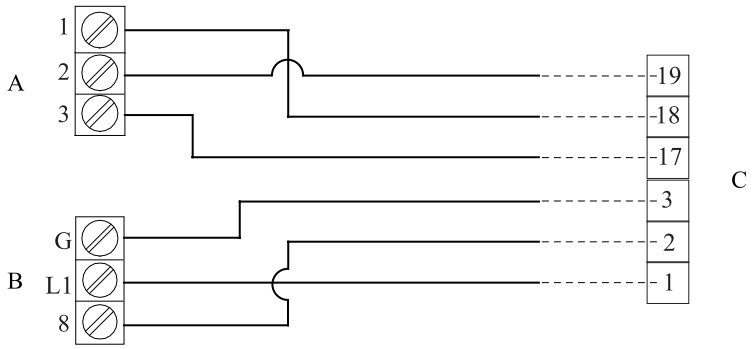
D.8.3 Model 10D1430 sensor (remote) to 8732 Transmitter

To connect a Model 10D1430 sensor (remote) to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-9.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.

Figure D-9: Wiring Diagram for Fischer and Porter Sensor Model 10D1430 (Remote)



A. Electrode connections
B. Coil connections
C. Rosemount 8732 transmitter

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-9: Fischer and Porter Model 10D1430 (Remote) Sensor Wiring Connections

Rosemount 8732	Fischer and Porter Model 10D1430 (Remote) sensors
1	L1
2	8
3	G
17	3
18	1
19	2

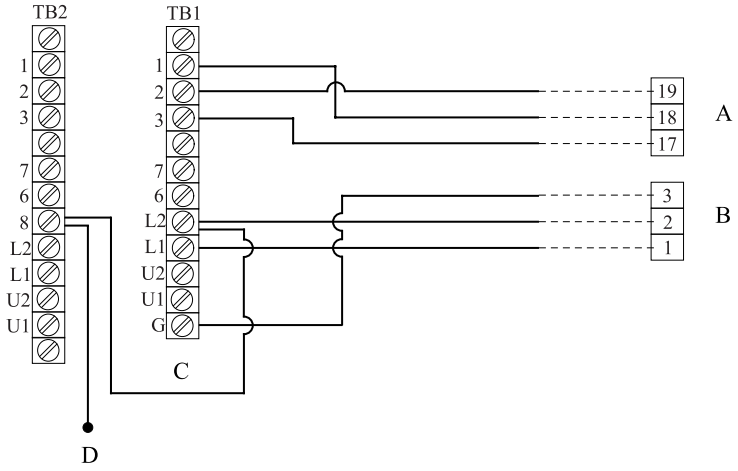
D.8.4 Model 10D1430 sensor (integral) to 8732 Transmitter

To connect a Model 10D1430 sensor (integral) to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-10.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.

Figure D-10: Wiring Diagram for Fischer and Porter Sensor Model 10D1430 (Integral)



A. Electrode connections
B. Coil connections
C. Blue
D. To calibration device

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-10: Fischer and Porter Model 10D1430 (integral) Sensor Wiring Connections

Rosemount 8732	Fischer and Porter Model 10D1430 (Integral) sensors
1	L1
2	L2
3	G
17	3
18	1
19	2

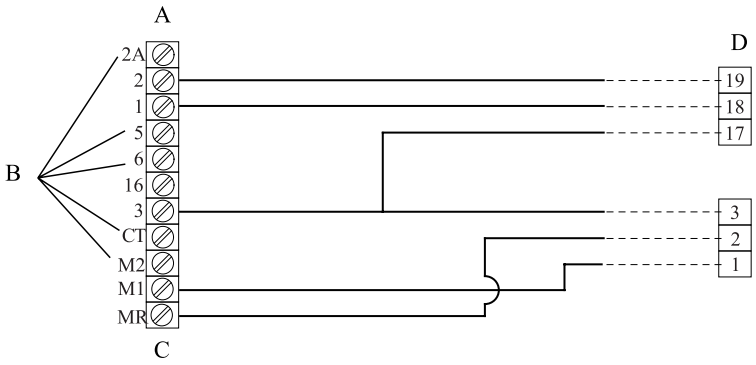
D.8.5 Model 10D1465/10D1475 sensors to 8732 Transmitter

To connect a Model 10D1465 or 10D1475 sensor (integral) to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-11.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.

Figure D-11: Wiring Diagram for Fischer and Porter Sensor Model 10D1465 and Model



A. Electrode connections
B. Disconnect
C. Coil connections
D. Rosemount 8732 transmitter

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-11: Fischer and Porter Model 10D1465 and 10D1475 Sensor Wiring Connections

Rosemount 8732	Fischer and Porter Model 10D1465 and 10D1475 sensors
1	M1
2	MR
3	3
17	3
18	1
19	2

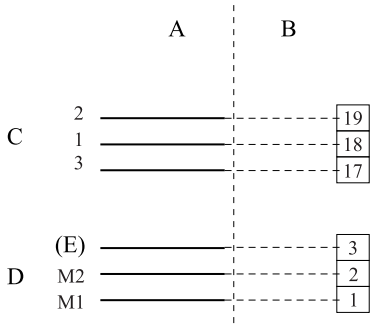
D.8.6 Fischer and Porter sensor to 8732 Transmitter

To connect a Fischer and Porter sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-12.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.

Figure D-12: Generic Wiring Diagram for Fischer and Porter Sensors and Rosemount



A. Fischer and Porter sensors
B. Rosemount 8732 transmitter
C. Electrode connections
D. Coil connections
E. Chassis

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-12: Fischer and Porter Generic Sensor Wiring Connections

Rosemount 8732	Fischer and Porter sensors
1	M1
2	M2
3	Chassis ground
17	3
18	1
19	2

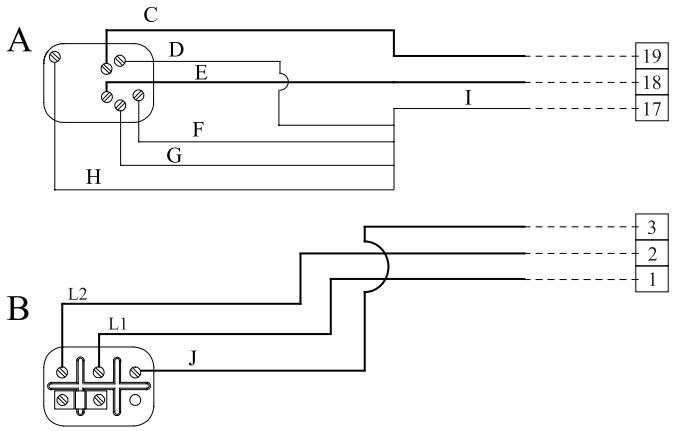
D.9 Foxboro sensors

D.9.1 Series 1800 sensor to 8732 Transmitter

To connect a Series 1800 sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-13.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Electrode connections
B. Coil connections
C. White lead
D. White shield
E. Black lead
F. Inner shield
G. Black shield
H. Outer shield
I. Any shield
J. Chassis ground

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-13: Foxboro Series1800 Sensor Wiring Connections

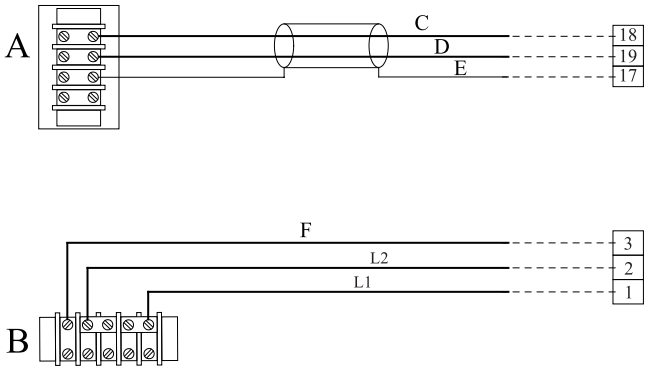
Rosemount 8732	Foxboro Series 1800 sensors
1	L1
2	L2
3	Chassis ground
17	Any shield
18	Black
19	White

D.9.2 Series 1800 (version 2) sensor to 8732 Transmitter

To connect a Series 1800 (version 2) sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-14.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Electrode connections
B. Coil connections
C. Blcak lead
D. White lead
E. Shield
F. Chassis ground

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-14: Foxboro Series 1800 (Version 2) Sensor Wiring Connections

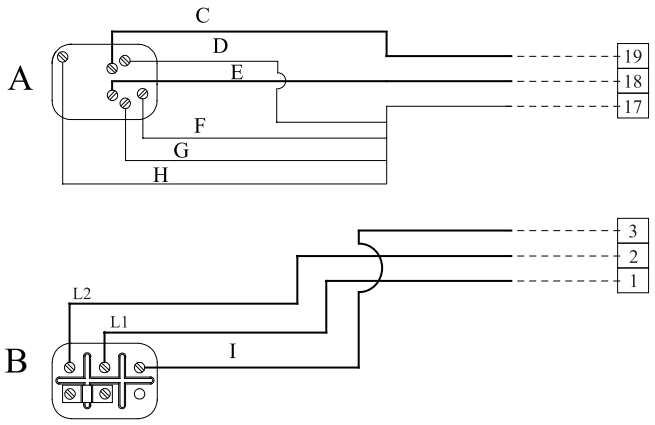
Rosemount 8732	Foxboro Series 1800 sensors
1	L1
2	L2
3	Chassis Ground
17	Any Shield
18	Black
19	White

D.9.3 Series 2800 Sensor to 8732 Transmitter

To connect a Series 2800 Sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-15.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Electrode connections
B. Coil connections
C. White lead
D. Black lead
E. Inner shield
F. Black shield
G. Outer shield
H. Chassis ground

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-15: Foxboro Series 2800 Sensor Wiring Connections

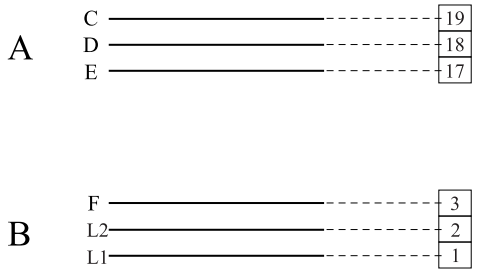
Rosemount 8732	Foxboro Series 2800 Sensors
1	L1
2	L2
3	Chassis Ground
17	Any Shield
18	Black
19	White

D.9.4 Foxboro Sensor to 8732 Transmitter

To connect a Foxboro Sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-16.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Electrode connections
B. Coil connections
C. White
D. Black
E. Any shield
F. Chassis ground

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-16: Foxboro Generic Sensor Wiring Connections

Rosemount 8732	Foxboro sensors
1	L1
2	L2
3	Chassis Ground
17	Any Shield
18	Black
19	White

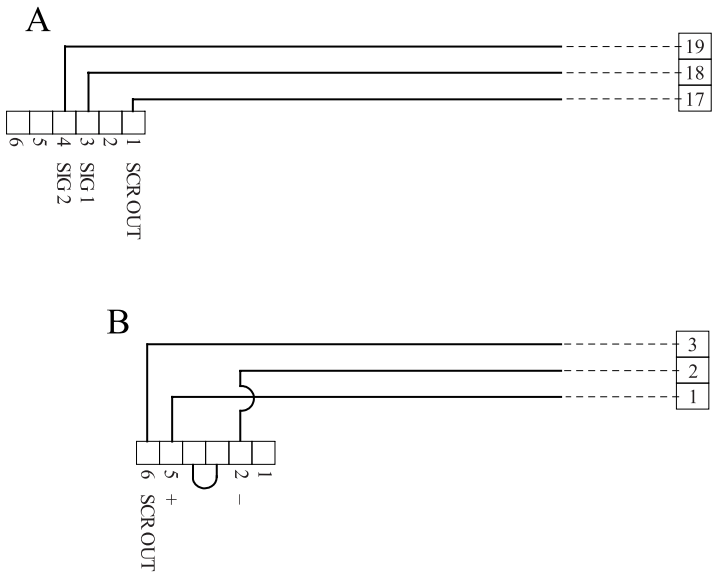
D.10 Kent Veriflux VTC sensor

D.10.1 Veriflux VTC sensor to 8732 Transmitter

To connect a Veriflux VTC sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-17.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Electrode connections
B. Coil connections

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-17: Kent Veriflux VTC Sensor Wiring Connections

Rosemount 8732	Kent Veriflux VTC sensors
1	2
2	1
3	SCR OUT
17	SCR OUT
18	SIG1
19	SIG2

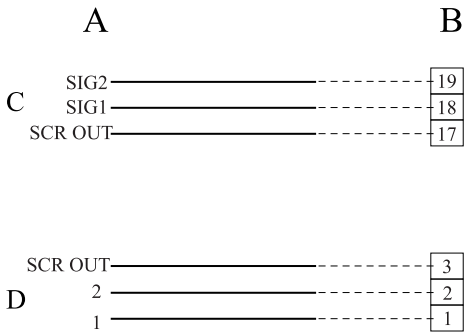
D.11 Kent sensors

D.11.1 Kent sensor to 8732 Transmitter

To connect a Kent sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-18.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Kent sensors
B. Rosemount 8732 transmitter
C. Electrode connections
D. Coil connections

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-18: Kent Sensor Wiring Connections

Rosemount 8732	Kent sensors
1	1
2	2
3	SCR OUT
17	SCR OUT
18	SIG1
19	SIG2

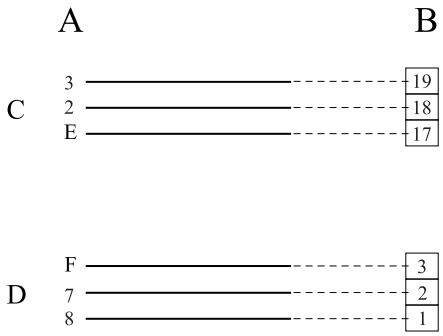
D.12 Krohne sensors

D.12.1 Krohne sensor to 8732 Transmitter

To connect a Krohne sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-19.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Kent sensors
B. Rosemount 8732 transmitter
C. Electrode connections
D. Coil connections
E. Electrode shield
F. Coil shield

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-19: Krohne Sensor Wiring Connections

Rosemount 8732	Krohne sensors
1	8
2	7
3	Coil Shield
17	Electrode Shield
18	2
19	3

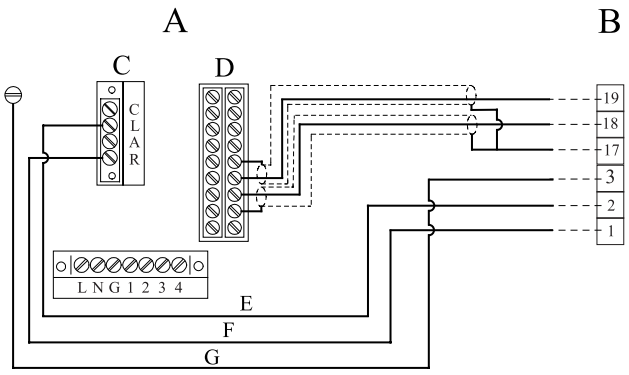
D.13 Taylor sensors

D.13.1 Series 1100 sensor to 8732 Transmitter

To connect a Series 1100 sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-20.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Taylor Series 1100 sensor
B. Rosemount 8732 transmitter
C. Coil connections
D. Electrode connections
E. White
F. Black
G. Green

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-20: Taylor Series 1100 Sensor Wiring Connections

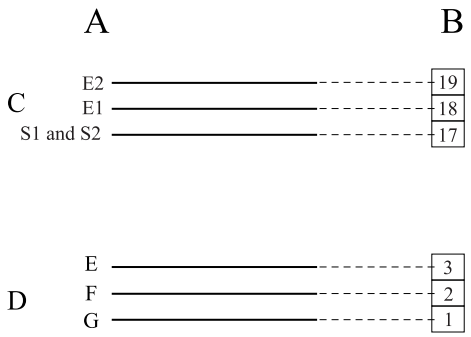
Rosemount 8732	Taylor Series 1100 sensors
1	Black
2	White
3	Green
17	S1 and S2
18	E1
19	E2

D.13.2 Taylor sensor to 8732 Transmitter

To connect a Taylor sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-21.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Taylor sensor
B. Rosemount 8732 transmitter
C. Electrode connections
D. Coil connections
E. Green
F. White
G. Black

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-21: Taylor Sensor Wiring Connections

Rosemount 8732	Taylor sensors
1	Black
2	White
3	Green
17	S1 and S2
18	E1
19	E2

D.14 Yamatake Honeywell sensors

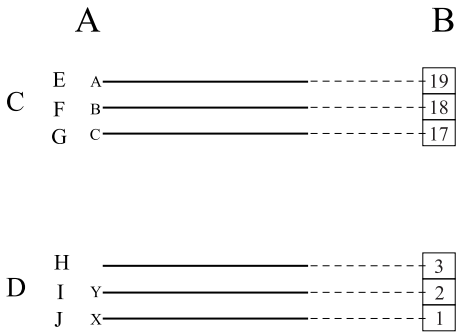
D.14.1 Yamatake Honeywell sensor to 8732 Transmitter

To connect a Yamatake Honeywell sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-22.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.

Figure D-22: Generic Wiring Diagram for Yamatake Honeywell Sensors and



A. Yamatake Honeywell sensors
B. Rosemount 8732 transmitter
C. Electrode connections
D. Coil connections
E. Terminal A
F. Terminal B
G. Terminal C
H. Chassis ground
I. Terminal Y
J. Terminal X

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-22: Yamatake Honeywell Sensor Wiring Connections

Rosemount 8732	Yamatake Honeywell sensors
1	X
2	Y
3	Chassis Ground
17	C
18	B
19	A

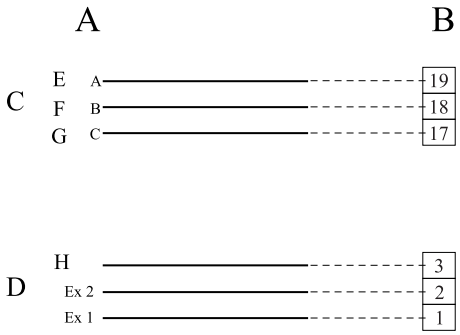
D.15 Yokogawa sensors

D.15.1 Yokogawa sensor to 8732 Transmitter

To connect a Yokogawa sensor to a Rosemount 8732 Transmitter, connect coil drive and electrode cables as shown in Figure D-23.

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.



A. Yokogawa sensors
B. Rosemount 8732 transmitter
C. Electrode connections
D. Terminal A
E. Terminal B
F. Terminal C
G. Chassis ground

Note
Refer to Figure D-1 for actual terminal block configuration drawing.

Table D-23: Yokogawa Sensor Wiring Connections

Rosemount 8732	Yokogawa sensors
1	EX1
2	EX2
3	Chassis Ground
17	C
18	B
19	A

D.16 Generic manufacturer sensor to 8732 Transmitter

D.16.1 Identify the terminals

Prerequisites

First check the sensor manufacturer's manual to identify the appropriate terminals. Otherwise, perform the following procedure.

Identify coil and electrode terminals

Procedure

1. Select a terminal and touch an ohmmeter probe to it.
2. Touch the second probe to each of the other terminals and record the results for each terminal.
3. Repeat the process and record the results for every terminal.

Coil terminals will have a resistance of approximately 3-300 ohms.

Electrode terminals will have an open circuit.

Identify a chassis ground

Procedure

1. Touch one probe of an ohmmeter to the sensor chassis.
2. Touch the other probe to the each sensor terminal and the record the results for each terminal.

The chassis ground will have a resistance value of one ohm or less.

D.16.2 Wiring connections

Procedure

⚠ CAUTION

Do not connect mains or line power to the magnetic flowtube sensor or to the transmitter coil excitation circuit.

1. Connect the electrode terminals to Rosemount 8732 terminals 18 and 19. The electrode shield should be connected to terminal 17.
2. Connect the coil terminals to Rosemount 8732 terminals 1, 2, and 3.
3. If the Rosemount 8732 Transmitter indicates a reverse flow condition, switch the coil wires connected to terminals 1 and 2.

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2024

For more information: **Emerson.com/global**

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ROSEMOUNT™

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7.14 IOM for Level Transmitters

Reference Manual
00809-0100-4530, Rev GE
September 2024

Rosemount™ 5300 Level Transmitter

Guided Wave Radar



HART COMMUNICATION PROTOCOL · IEC WirelessHART · FOUNDATION · Modbus

EMERSON™

NOTICE

Read this manual before working with the product. For personal and system safety and for optimum product performance, ensure that you thoroughly understand the contents before installing, using, or maintaining this product.

For technical assistance, contacts are listed below:

Customer Central

Technical support, quoting, and order-related questions.

- United States - 1-800-999-9307 (7:00 am to 7:00 pm CST)
- Asia Pacific- 65 777 8211

North American Response Center

Equipment service needs.

- 1-800-654-7768 (24 hours a day — includes Canada)
- Outside of these areas, contact your local Emerson representative.

⚠ WARNING

Failure to follow safe installation and servicing guidelines could result in death or serious injury.

Ensure the transmitter is installed by qualified personnel and in accordance with applicable code of practice.

Use the equipment only as specified in this manual. Failure to do so may impair the protection provided by the equipment.

Do not perform any services other than those contained in this manual unless you are qualified.

⚠ WARNING

Explosions could result in death or serious injury.

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.

Do not remove the gauge cover in explosive atmospheres when the circuit is alive.

To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

⚠ WARNING

Process leaks could result in death or serious injury.

Ensure that the transmitter is handled carefully. If the process seal is damaged, gas might escape from the tank if the transmitter head is removed from the probe.

⚠ WARNING

High voltage that may be present on leads could cause electrical shock.

Avoid contact with the leads and terminals.

Ensure the main power to the transmitter is off and the lines to any other external power source are disconnected or not powered while wiring the transmitter.

Probes covered with plastic and/or with plastic discs may generate an ignition-capable level of electrostatic charge under certain extreme conditions. Therefore, when the probe is used in a potentially explosive atmosphere, appropriate measures must be taken to prevent electrostatic discharge.

Eliminate the risk of Electrostatic Discharge (ESD) discharge prior to dismounting the transmitter head. Probes may generate an ignition-capable level of electrostatic charge under extreme conditions. During any type of installation or maintenance in a potentially explosive atmosphere, the responsible person should ensure that any ESD risks are eliminated before attempting to separate the probe from the transmitter head.

⚠ WARNING

Electrical shock could cause death or serious injury.

Use extreme caution when making contact with the leads and terminals.

⚠ WARNING

Any substitution of non-recognized parts may jeopardize safety. Repair (e.g. substitution of components) may also jeopardize safety and is not allowed under any circumstances.

Unauthorized changes to the product are strictly prohibited as they may unintentionally and unpredictably alter performance and jeopardize safety. Unauthorized changes that interfere with the integrity of the welds or flanges, such as making additional perforations, compromise product integrity and safety. Equipment ratings and certifications are no longer valid on any products that have been damaged or modified without the prior written permission of Emerson. Any continued use of product that has been damaged or modified without the written authorization is at the customer's sole risk and expense.

⚠ WARNING

Physical access

Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

Physical security is an important part of any security program and fundamental in protecting your system. Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

NOTICE

The products described in this document are NOT designed for nuclear-qualified applications. Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings. For information on Rosemount nuclear-qualified products, contact your local Emerson Sales Representative.

⚠ CAUTION

This product is designed to meet FCC and R&TTE requirements for a non-intentional radiator. It does not require any licensing whatsoever and has no tank restrictions associated with telecommunications issues.

⚠ CAUTION

This device complies with Part 15 of the Federal Communication Commission (FCC) Rules. Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

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1 Introduction

1.1 Using this manual

This manual provides installation, configuration, and maintenance information for the Rosemount™ 5300 Level Transmitter.

Transmitter overview contains an introduction to theory of operation and description of the transmitter. Information on applications, process and vessel characteristics, and a probe selection guide are also included.

Mechanical installation contains mounting considerations and mechanical installation instructions.

Electrical installation contains electrical installation instructions.

Configuration provides instructions on configuration of the transmitter using AMS Device Configurator/AMS Device Manager, a handheld communicator, DeltaV™, and Rosemount Radar Master software.

Operation contains operation techniques such as viewing measurement data and display functionality.

Service and troubleshooting provides troubleshooting techniques for the most common operating problems, as well as diagnostic and error messages, and service instructions.

Specifications and reference data supplies reference and specification data, as well as ordering information for spare parts and accessories.

Configuration parameters provides extended information about the configuration parameters.

Advanced configuration provides instructions on how to use the functions Dynamic Vapor Compensation, Signal Quality Metrics, and Probe End Projection.

Remote mounting contains mechanical installation instructions and configuration for remote housing.

FOUNDATION™ Fieldbus Block Information provides information regarding the function blocks.

HART® to Modbus® Converter (HMC) module describes the operation of the HART® to Modbus® Converter (HMC).

1.2 Product certifications

See the Rosemount 5300 Product Certifications document for detailed information on the existing approvals and certifications.

1.3 Product recycling/disposal

Consider recycling equipment and packaging.

Dispose of the product and packaging in accordance with local and national legislation.

Related information

Service support

2 Transmitter overview

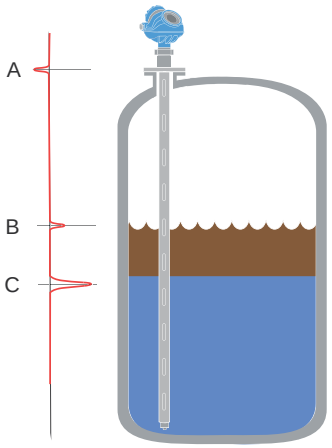
2.1 Measurement principle

Low power, nano-second microwave pulses are guided down a probe submerged in the process media. When a microwave pulse reaches a medium with a different dielectric constant, part of the energy is reflected back to the transmitter.

The transmitter uses the residual wave of the first reflection for measuring the interface level. Part of the wave, which was not reflected at the upper product surface, continues until it is reflected at the lower product surface. The speed of this wave depends fully on the dielectric constant of the upper product.

The time difference between the transmitted and the reflected pulse is converted into a distance, and the total level or interface level is then calculated. The reflection intensity depends on the dielectric constant of the product: the higher dielectric constant value, the stronger reflection.

Figure 2-1: Measurement Principle



A. Reference pulse
B. Level
C. Interface level

2.2 Application examples

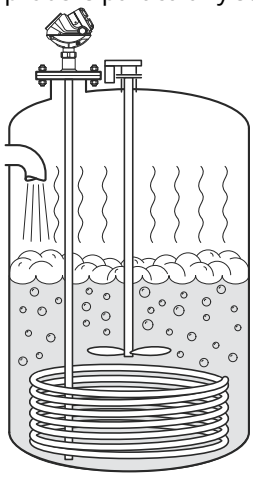
The Rosemount 5300 Level Transmitter is suited for aggregate (total) level measurements on most liquids, semi-liquids, solids, and liquid/liquid interfaces.

Guided microwave technology offers the highest reliability and precision to ensure measurements are virtually unaffected by temperature, pressure, vapor gas mixtures, density, turbulence, bubbling/boiling, low level, varying dielectric media, pH, and viscosity.

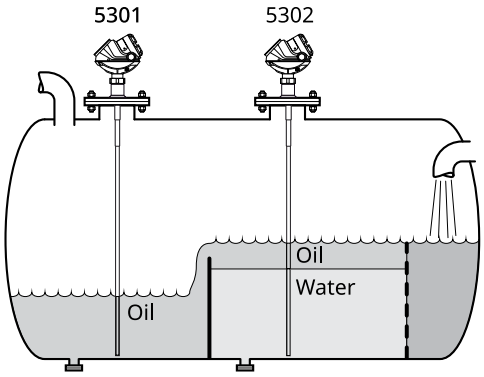
Guided wave radar technology in combination with advanced signal processing makes the Rosemount 5300 Level Transmitters suitable for a wide range of applications:

Boiling conditions with vapor and turbulence

The Rosemount 5300 Level Transmitter works well in boiling conditions with vapor and turbulence. If there are disturbing objects in the vicinity of the transmitter, the coaxial probe is particularly suitable.

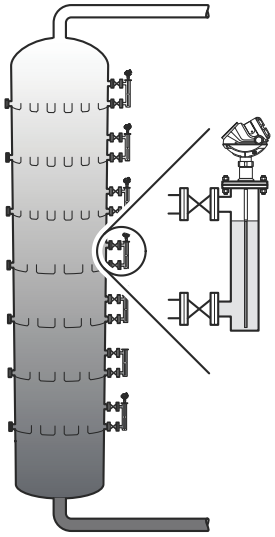


Separators, accumulators, and production tanks



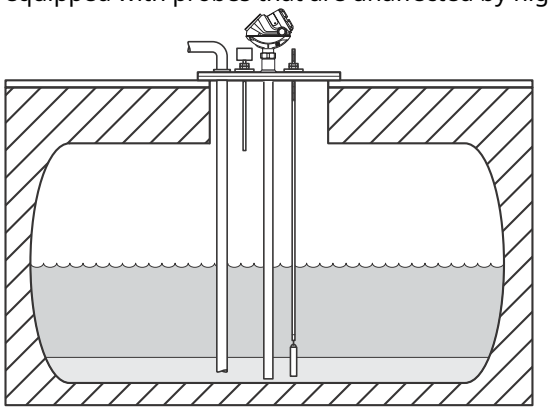
Chamber applications

The Rosemount 5300 Level Transmitter is well suited for chamber applications, such as distillation columns.



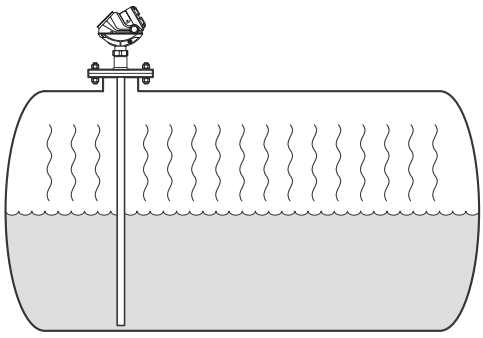
Waste tanks and sump pits

The Rosemount 5300 Level Transmitter is a good choice for underground tanks. It is installed on the top of the tank with the radar pulse concentrated near the probe. It can be equipped with probes that are unaffected by high and narrow openings or nearby objects.



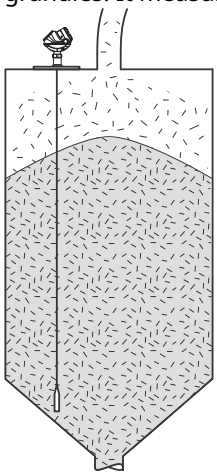
Ammonia, LNG and LPG tanks

Guided wave radar technology provides reliable measurements in ammonia, LNG, and LPG tanks.



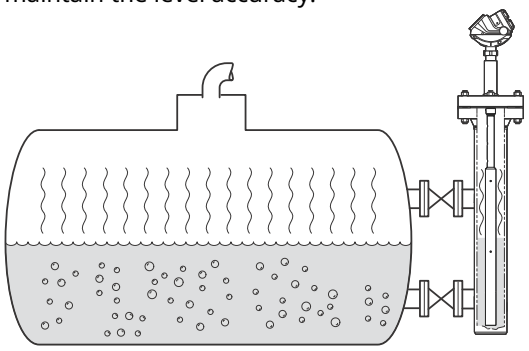
Solids measurement

Rosemount 5303, with a flexible single lead probe, is the solution for solids, powders, and granules. It measures independently of dust, angled surfaces, etc.



High-pressure saturated steam applications

The Rosemount 5300 Level Transmitter with Dynamic Vapor Compensation will automatically compensate for dielectric changes in high pressure steam applications and maintain the level accuracy.



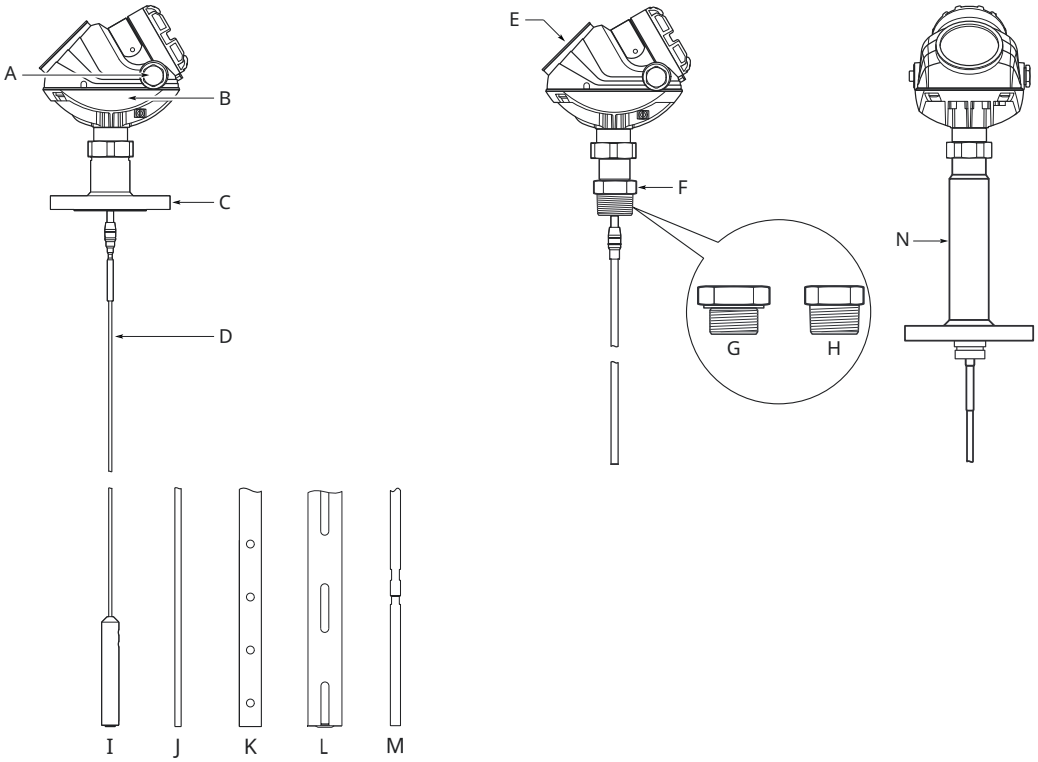
2.3 Components of the transmitter

The Rosemount 5300 Level Transmitter has an aluminum or stainless steel (SST) transmitter housing containing advanced electronics and software for signal processing. SST housing is preferred for harsh environment applications, such as off-shore platforms or other locations where the housing can be exposed to corrodents, such as salt solutions and caustics.

The radar electronics produces an electromagnetic pulse, which is guided by the probe. It comes with flange, threaded or Tri Clamp® process connection.

There are different probe types available for various applications: rigid single lead, segmented rigid single lead, flexible single lead, coaxial, and large coaxial.

Figure 2-2: Transmitter Components

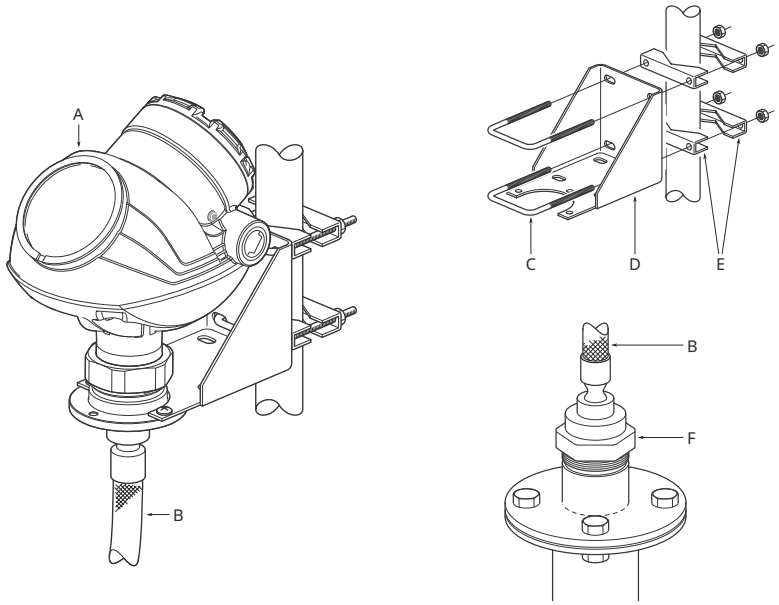


A. Cable entry: ½-in. NPT; Optional adapters: M20, eurofast®, minifast®
B. Radar electronics
C. Flanged process connections
D. Probe
E. Dual compartment housing
F. Threaded process connections
G. BSPP (G)
H. NPT
I. Flexible single lead with weight
J. Rigid single lead
K. Coaxial
L. Large coaxial
M. Segmented rigid single lead probe
N. HTHP version

2.3.1 Remote housing components

Remote housing allows for the transmitter head to be mounted separately from the probe.

Figure 2-3: Remote Housing Components



A. Dual compartment housing
B. Cable remote connection
C. U-bolt
D. Bracket
E. Clamping brackets
F. M50 nut

2.4 System integration

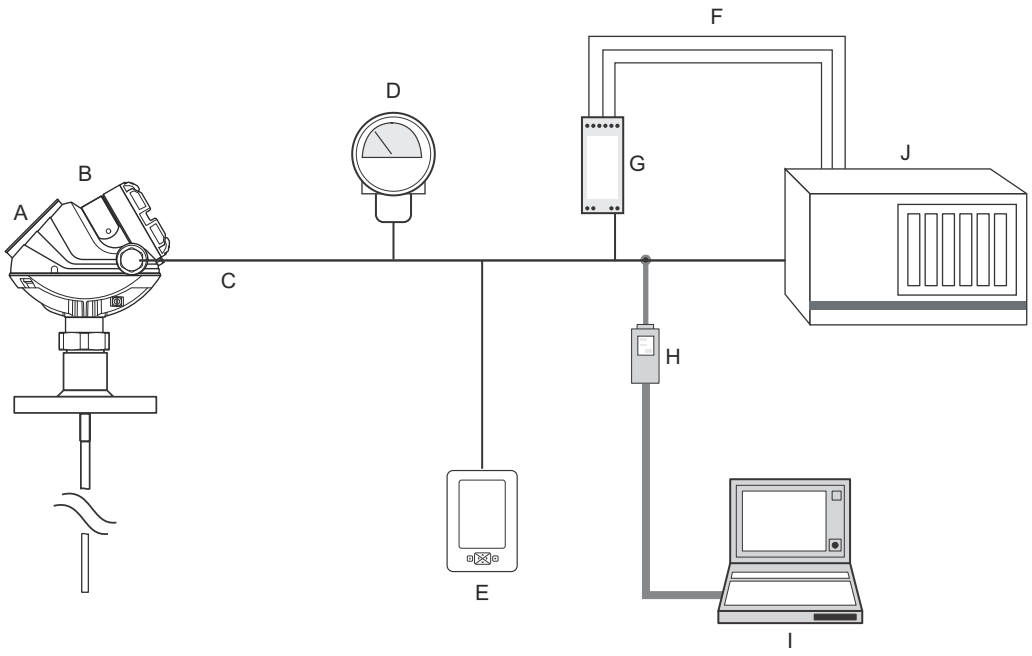
The Rosemount 5300 Level Transmitter is loop-powered, and it uses the same two wires for both power supply and output signal. The output is a 4-20 mA analog signal superimposed with a digital HART®, FOUNDATION™ Fieldbus, or Modbus® signal.

By using the optional Rosemount 333 HART Tri-Loop™, the digital HART signal can be converted into three additional 4-20 mA analog signals. With the HART protocol, multidrop configuration is possible. In this case, communication is restricted to digital, since current is fixed to the 4 mA minimum value.

The transmitter can be combined with the Emerson Wireless 775 THUM™ Adapter to wirelessly communicate HART data with IEC 62591 (*Wireless*HART®) technology.

In addition, the transmitter can be connected to a Rosemount 751 Field Signal Indicator for 4-20 mA / HART, a Rosemount 752 Remote Indicator for FOUNDATION Fieldbus, or it can be equipped with an integral display.

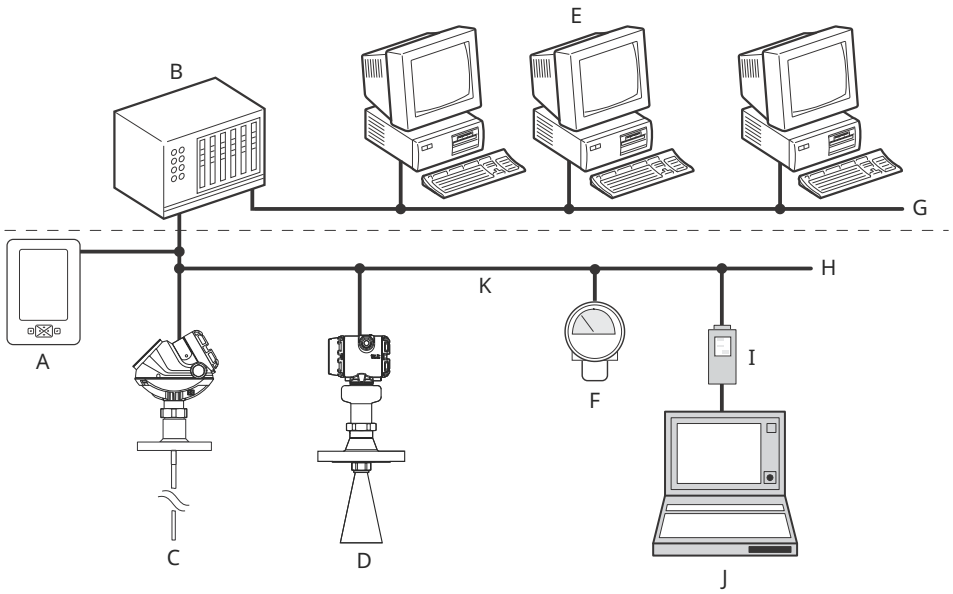
Figure 2-4: HART System Architecture



A. Integral display
B. Rosemount 5300 Level Transmitter
C. 4-20 mA/HART
D. Rosemount 751 Field Signal Indicator
E. Handheld communicator
F. 3 x 4-20 mA
G. Rosemount 333 HART Tri-Loop
H. HART modem
I. AMS Device Configurator/AMS Device Manager, or Rosemount Radar Master
J. DCS

Note
For HART communication, a minimum load resistance of 250 Ohm within the loop is required.

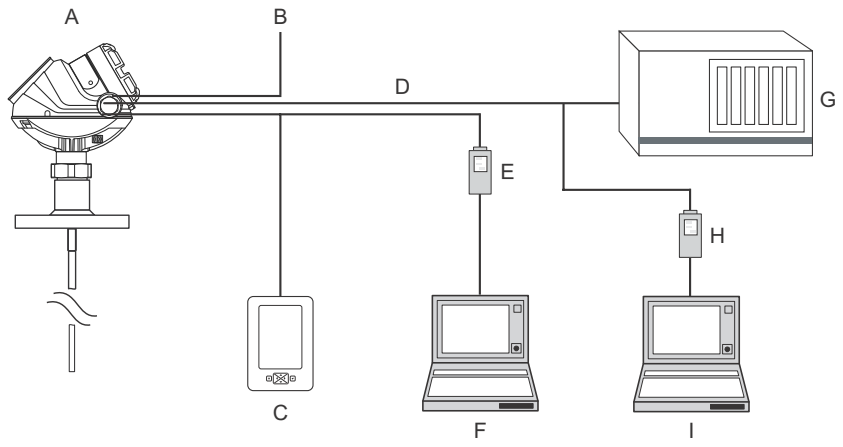
Figure 2-5: FOUNDATION Fieldbus System Architecture



A. Handheld communicator
B. Host/DCS system (e.g. DeltaV)
C. Rosemount 5300
D. Rosemount 5408
E. Maintenance
F. Display
G. H2 - High speed field bus
H. H1 - Low speed field bus
I. Fieldbus modem
J. PC with Rosemount Radar Master
K. Max cable length: 6200 ft. (1900 m)

Note
Intrinsically safe installations may allow fewer devices per I.S. barrier due to current limitations.

Figure 2-6: HART to Modbus System Architecture



A. Rosemount 5300
B. Power
C. Handheld communicator
D. Modbus, Levelmaster Emulation/RS-485
E. HART modem
F. PC 5300 Setup in Rosemount Radar Master
G. Control System
H. RS-232/RS-485 Converter
I. PC 5300 Setup in Rosemount Radar Master via Tunneling

2.5 Probe selection guide

The following guidelines should be used to choose the appropriate probe for the Rosemount 5300 Level Transmitter:

Table 2-1: Probe Selection Guide

G=Good, NR=Not Recommended, AD=Application Dependent (consult factory)

	Rigid single lead, segmented rigid single lead	Flexible single lead	Coaxial	Large coaxial
Measurements				
Level	G	G	G	G
Interface (liquid/liquid)	G	G	G	G
Process medium characteristics				
Changing density	G	G	G	G
Changing dielectric[1]	G	G	G	G
Wide pH variations	G	G	G	G
Pressure changes	G	G	G	G
Temperature changes	G	G	G	G
Condensing vapors	G	G	G	G
Bubbling/boiling surfaces	G	AD	G	G

Table 2-1: Probe Selection Guide *(continued)*

	Rigid single lead, segmented rigid single lead	Flexible single lead	Coaxial	Large coaxial
Foam (mechanical avoidance)	NR	NR	AD	AD
Foam (top of foam measurement)	AD	AD	NR	AD
Foam (foam and liquid measurement)	AD	AD	NR	AD
Clean liquids	G	G	G	G
Liquid with very low dielectric constants	G	G(2)	G	G
Coating/sticky liquids	AD(3)	AD	NR	AD
Viscous liquids	AD(3)	G	NR	AD
Crystallizing liquids	AD	AD	NR	AD
Solids, granules, powders	AD	G	NR	NR
Fibrous liquids	G	G	NR	AD
Tank environment considerations				
Probe is close (<12 in./30 cm) to tank wall / disturbing objects	AD	AD	G	G
Probe might touch tank wall, nozzle or disturbing objects	NR	NR	G	G
Turbulence	G	AD	G	G
Turbulent conditions causing breaking forces	NR	AD	NR	AD
Tall, narrow nozzles	AD	AD	G	G
Angled or slanted surface (viscous or solids materials)	G	G	NR	AD
Liquid or vapor spray might touch probe above surface	NR	NR	G	G
Disturbing Electromagnetic interference in tank	AD	AD	G	G
Cleanability of probe	G	G	NR	AD

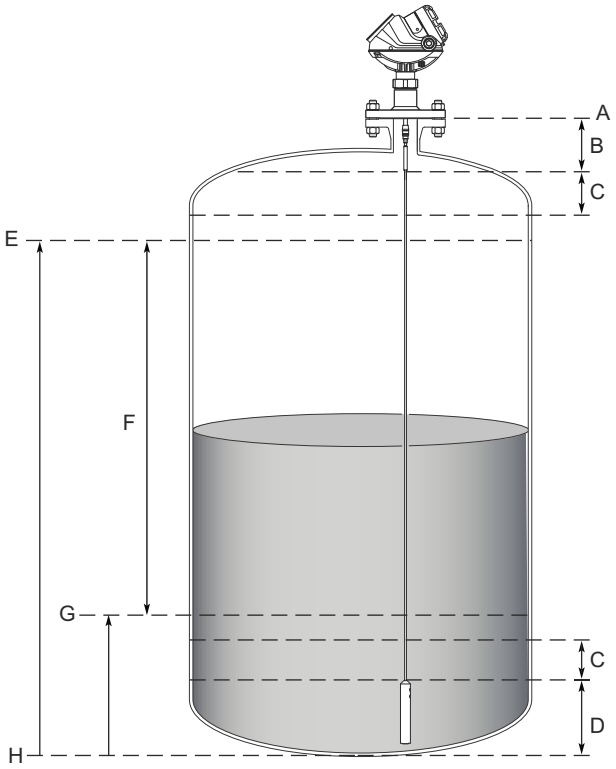
(1) For overall level applications, a changing dielectric has no effect on the measurement. For interface measurements, a changing dielectric for the top fluid will degrade the accuracy of the interface measurement.
(2) Limited measuring range.
(3) For viscous or sticky applications, it is not recommended to use centering discs mounted along the probe.

2.6 Measuring range

The measuring range depends on probe type, dielectric constant of the product, and installation environment, and is limited by the Blind Zones at the very top and bottom of the probe. In the Blind Zones, the accuracy exceeds ±1.18 in. (30 mm), and measurements may not be possible. Measurements close to the Blind Zones will have reduced accuracy.

Figure 2-7 illustrates how the measuring range is related to the Blind Zones and the areas with reduced accuracy.

Figure 2-7: Blind Zones and Areas with Reduced Accuracy



A. Upper Reference Point
B. Upper Blind Zone
C. Reduced accuracy
D. Lower Blind Zone
E. 20mA
F. Range 0 -100 %
G. 4mA
H. Zero Reference Point

Note
Measurements may not be possible in the Blind Zones, and measurements close to the Blind Zones will have reduced accuracy. Therefore, the 4-20 mA points should be configured outside these zones.

Related information

Accuracy over measuring range

2.7 Process characteristics

The Rosemount 5300 Level Transmitter has high sensitivity because of its advanced signal processing and high signal-to-noise ratio. This makes it able to handle various disturbances, however, the following circumstances should be considered before mounting the transmitter.

2.7.1 Contamination/product build-up

Heavy contamination or product build-up on the probe should be avoided since it may decrease the sensitivity of the transmitter and lead to measurement errors.

For viscous or sticky applications, it is important to choose a suitable probe. Periodic cleaning may also be required.

Maximum measurement error due to contamination is 1-10 percent depending on probe type, dielectric constant, contamination thickness and contamination height above product surface.

Signal Quality Metrics (SQM) diagnostic option can give an indication of how good the surface signal is compared to the noise, and when to clean the probe.

Related information

Contamination/product build-up

2.7.2 Bridging

Heavy product build-up results in bridging between the pipe and inner rod for coaxial probes, and may cause erroneous level readings, so it must be prevented. A single lead probe is recommended in these situations.

2.7.3 Foam

The Rosemount 5300 Level Transmitter measurement in foamy applications depends on the foam properties; light and airy or dense and heavy, high or low dielectrics, etc. If the foam is conductive and creamy, the transmitter may measure the surface of the foam. If the foam is less conductive, the microwaves may penetrate the foam and measure the liquid surface.

2.7.4 Vapor

In some applications, such as high pressure boiling water, there is a heavy vapor above the product surface that could influence the level measurement. The Rosemount 5300 Level Transmitter can be configured to compensate for the influence of vapor.

2.7.5 Boiling hydrocarbons

For products with very low dielectric constants, such as boiling hydrocarbons and solids, the threshold may need to be lowered, and/or the Probe End Projection (PEP) function activated.

Related information

Probe end projection

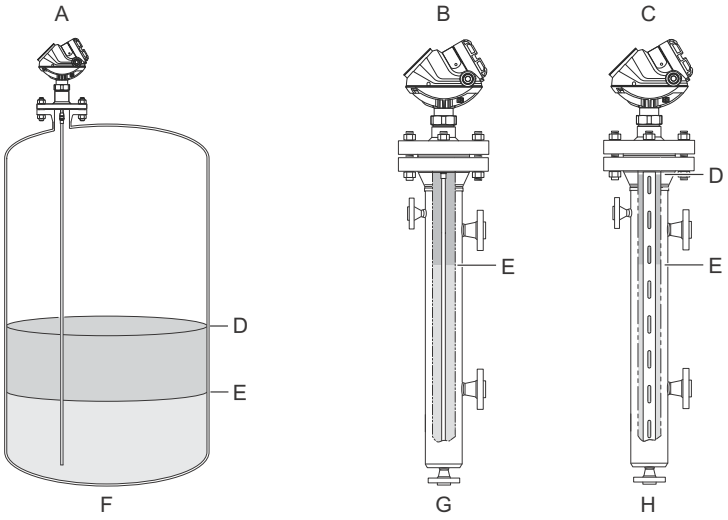
2.7.6 Interface measurements

The Rosemount 5302 is a good choice for measuring the interface of oil and water, or other liquids with significant dielectric differences.

It is also possible to measure interface with a Rosemount 5301 in applications where the probe is fully submerged in the liquid, using the submerged probe mode.

Rosemount 5302 with the large coaxial probe provides the ability to continuously keep track of both level and interface level in fully submerged applications. The product level and interface level mode must be selected.

Figure 2-8: Interface Level Measurement



A. Rosemount 5302
B. Rosemount 5301
C. Rosemount 5302 with large coaxial probe
D. Product level
E. Interface level
F. Product level and interface level
G. Interface level with submerged probe
H. Product level and interface level with submerged probe

2.8 Vessel characteristics

2.8.1 Heating coils, agitators

Because the radar signal is transmitted along a probe, the transmitter is generally not affected by objects in the tank. Avoid physical contact with metallic objects when single lead probes are used.

Avoid physical contact between probes and agitators, as well as applications with strong fluid movement, unless the probe is anchored. If the probe is able to move 1 ft. (30 cm) from any object, such as an agitator, during operation, the probe tie-down is recommended.

To stabilize the probe for side forces, a weight may be hung at the probe end (flexible probes only) or fix/guide the probe to the tank bottom.

2.8.2 Tank shape

The guided wave radar transmitter is insensitive to the tank shape. Since the radar signal travels along a probe, the shape of the tank bottom has no effect on the measurement performance. The transmitter handles flat or dish-bottom tanks equally well.

3 Mechanical installation

3.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises ⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Failure to follow safe installation and servicing guidelines could result in death or serious injury.

Ensure the transmitter is installed by qualified personnel and in accordance with applicable code of practice.

Use the equipment only as specified in this manual. Failure to do so may impair the protection provided by the equipment.

Do not perform any services other than those contained in this manual unless you are qualified.

⚠ WARNING

Process leaks could result in death or serious injury.

Ensure that the transmitter is handled carefully. If the process seal is damaged, gas might escape from the tank if the transmitter head is removed from the probe.

⚠ WARNING

High voltage that may be present on leads could cause electrical shock.

Probes covered with plastic and/or with plastic discs may generate an ignition-capable level of electrostatic charge under certain extreme conditions. Therefore, when the probe is used in a potentially explosive atmosphere, appropriate measures must be taken to prevent electrostatic discharge.

Eliminate the risk of Electrostatic Discharge (ESD) discharge prior to dismounting the transmitter head. Probes may generate an ignition-capable level of electrostatic charge under extreme conditions. During any type of installation or maintenance in a potentially explosive atmosphere, the responsible person should ensure that any ESD risks are eliminated before attempting to separate the probe from the transmitter head.

⚠ WARNING

Any substitution of non-authorized parts or repair, other than exchanging the complete transmitter head or probe assembly, may jeopardize safety and is prohibited.

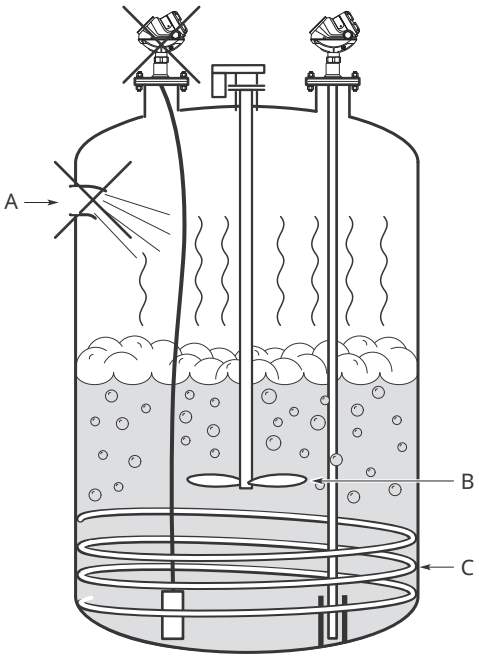
Unauthorized changes to the product are strictly prohibited as they may unintentionally and unpredictably alter performance and jeopardize safety. Unauthorized changes that interfere with the integrity of the welds or flanges, such as making additional perforations, compromise product integrity and safety. Equipment ratings and certifications are no longer valid on any products that have been damaged or modified without the prior written permission of Emerson. Any continued use of product that has been damaged or modified without the written authorization is at the customer's sole risk and expense.

3.2 Installation and mounting considerations

3.2.1 Recommended mounting position for liquids

When finding an appropriate mounting position for the transmitter, the conditions of the tank must be carefully considered. The transmitter should be mounted so that the influence of disturbing objects is reduced to a minimum. For easy access to the transmitter, ensure that it is mounted with sufficient service space.

Figure 3-1: Mounting Position



A. Inlet pipe
B. Agitator
C. Heating coils

The following guidelines should be considered when mounting the transmitter:

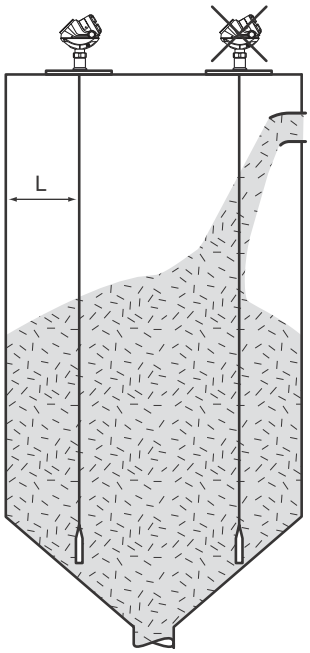
- Do not mount close to inlet pipes.

- Do not mount close to agitators. If the probe can move to within 12 in. (30 cm) away from an agitator, the probe should be anchored.
- If the probe tends to sway due to turbulent conditions in the tank, the probe should be anchored.
- Avoid mounting close to heating coils.
- Position the probe such that it is subject to a minimum of lateral force.
- The probe should not come into contact with the nozzle or other objects in the tank.

Note
Violent fluid movements causing high sideway forces may break rigid probes.

3.2.2 Recommended mounting for solids

Figure 3-2: Recommended Mounting for Solids



Consider the following guidelines when mounting the transmitter:

- Do not mount near inlet pipes in order to avoid product filling on the probe.
- Regularly check the probe for defects.
- It is recommended that the vessel be empty during installation.
- For concrete vessels, the distance (L) between the probe and the wall should be at least 20 in. (500 mm).
- Stabilize the probe for side forces, by attaching the probe to the tank bottom. For solids, use the 0.24 in. (6 mm) probe, because of the higher tensile strength. The probe should have a sag of ≥ 1 in./100 in. (10 mm/m) to prevent probe damage. See Anchor the probe for more information.
- Avoid anchoring in solids tanks over 98 ft. (30 m) in height since tensile loads are much stronger for anchored probes, see Considerations for solid applications.

- Product build-up on the silo walls near the probe may interfere with measurements. Choose a mounting position where the probe is not in contact with, or close to, the product build-up.

3.2.3 Considerations for solid applications

The flexible single lead probe is recommended for solids and is available in two versions to handle different loads and lengths:

Table 3-1: Tensile Strength and Collapse Load

Probe type	Tensile strength	Collapse load
0.16-in. (4 mm) diameter	Minimum 2698 lb (12 kN)	Maximum 3597 lb (16 kN)
0.24-in. (6 mm) diameter	Minimum 6519 lb (29 kN)	Maximum 7868 lb (35 kN)

Keep the following in mind when planning installation of the Rosemount 5300 in solid applications:

- There might be considerable down-pull forces on silo roofs caused by the media, so the silo roof must withstand the maximum probe tensile load.
- The tensile load depends on silo size, material density, and the friction coefficient. Forces increase with the buried length, the silo, and probe diameter.
- In critical cases, such as for products with a risk for build-up, use a 0.24 in. (6 mm) probe.
- Depending on position, forces on probes are two to ten times greater on probes with tie-down, than on probes with ballast weights(1).
- PTFE coated probes are not recommended for solid applications.

Guidelines for the tensile load from free-flowing solids acting on a suspended probe without any tie-down or weight in a smooth metallic wall silo as shown in Table 3-2 and Table 3-3. A safety factor of 2 is included for the figures. Consult your local Emerson representative for more information.

Table 3-2: Tensile Load for Unanchored 0.16 in. (4 mm) Flexible Single Lead Probe, lb (kN)

Material	Probe length 49 ft. (15 m)		Probe length 115 ft. (35 m)	
	Tank Ø= 10 ft. (3 m)	Tank Ø= 39 ft. (12 m)	Tank Ø= 10 ft. (3 m)	Tank Ø= 39 ft. (12 m)
Wheat	670 (3)	1120 (5)	1800 (8)	4500 (20) (1)
Polypropylene pellets	340 (1.5)	670 (3)	810 (3.6)	2360 (10.5)
Cement	900 (4)	2020 (9)	2470 (11)	7310 (32.5)(1)

(1) Exceeds tensile strength limit.

(1) The weight should not be fixed for probe 100 ft. (30 m) or longer.

Table 3-3: Tensile Load for Unanchored 0.24 in. (6 mm) Flexible Single Lead Probe, lb (kN)

Material	Probe length 49 ft. (15 m)		Probe length 115 ft. (35 m)	
	Tank Ø= 10 ft. (3 m)	Tank Ø= 39 ft. (12 m)	Tank Ø= 10 ft. (3 m)	Tank Ø= 39 ft. (12 m)
Wheat	900 (4)	1690 (7.5)	2810 (12.5)	6740 (30)(1)
Polypropylene pellets	450 (2)	920(4.1)	1190 (5.3)	3510 (15.6)
Cement	1350 (6)	2920 (13)	3600 (16)	10790 (48)(1)

(1) Exceeds tensile strength limit.

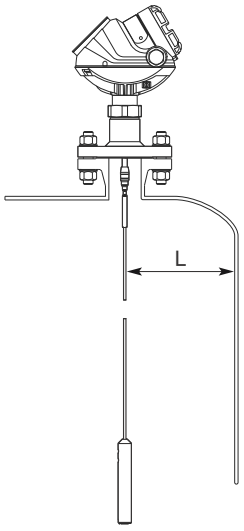
Note
For environments where electrostatic discharges are likely to occur, such as plastic pellets, it is recommended that the probe end is grounded.

3.2.4 Free space requirement

For easy access to the transmitter, ensure it is mounted with sufficient service space. For maximum measurement performance, the transmitter should not be mounted close to the tank wall or near other objects in the tank.

If the probe is mounted close to a wall, nozzle or other tank obstruction, noise might appear in the level signal. Therefore the following minimum clearance, according to Table 3-4, must be maintained.

Figure 3-3: Free Space Requirement



L. Clearance to tank wall

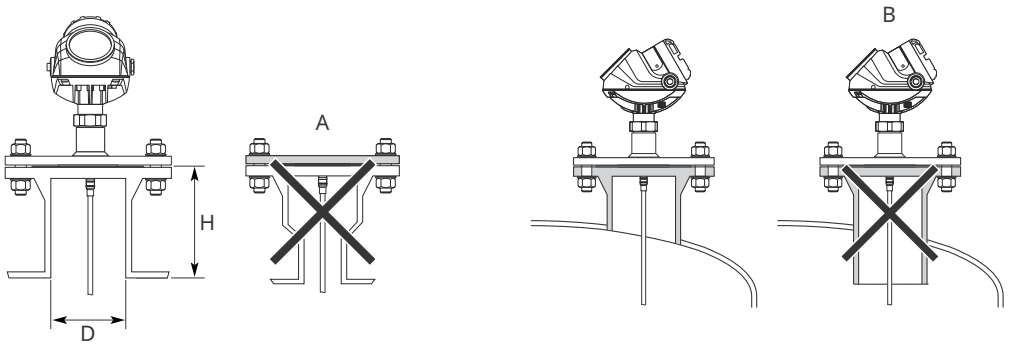
Table 3-4: Recommended Minimum Free Space for Optimal Performance

Probe type	Condition	Minimum clearance (L)
Rigid single lead/Segmented rigid single lead(1)	Smooth metal tank wall	4 in. (100 mm)
	Disturbing objects such as pipes and beams Plastic, concrete or rugged metal tank wall	16 in. (400 mm) 20 in. (500 mm)(2)
Flexible single	Smooth metal tank wall	4 in. (100 mm)
	Disturbing objects such as pipes and beams Plastic, concrete or rugged metal tank wall	20 in. (500 mm)
Coaxial/Large coaxial(1)	N/A	0 in. (0 mm)

(1) Minimum clearance from tank bottom for the coaxial, large coaxial and rigid single probes is 0.2 in. (5 mm).
(2) Applies to measurements with DC 1.4 or lower.

3.2.5 Flange connection on nozzles

Figure 3-4: Mounting in Nozzles



A. Avoid nozzles with reducer (unless using coaxial probe).
B. Confirm the nozzle does not extend into the tank.

The transmitter can be mounted in nozzles by using an appropriate flange. It is recommended that the nozzle size is within the dimensions given in Table 3-5.

Table 3-5: Nozzle Considerations for Optimal Performance

	Single (rigid/segmented/flexible)	Coaxial/Large coaxial
Recommended nozzle diameter (D)	6 in. (150 mm)	> probe diameter
Minimum nozzle diameter (D)(1)	2 in. (50 mm)	> probe diameter
Recommended nozzle height (H)(2)	4 in. (100 mm) + nozzle diameter(3)	N/A

(1) The Trim Near Zone (TNZ) function may be necessary or an Hold Off Distance/Upper Null Zone (UNZ) setup may be required to mask the nozzle.
(2) Longer nozzles may be used in certain applications. Consult your local Emerson representative for details.
(3) For nozzles taller than 4 in. (100 mm), the long stud version is recommended (option code LS) to prevent the flexible portion from touching the edge of the nozzle.

Note
The probe must not be in contact with the nozzle (except for the coaxial probe). If the nozzle diameter is less than recommended, the measuring range may be reduced.

Note
For single lead probes, avoid 10-in. (250 mm)/DN250 or larger diameter nozzles, especially in applications with low dielectric constant. An alternative is to install a smaller nozzle inside the nozzle.

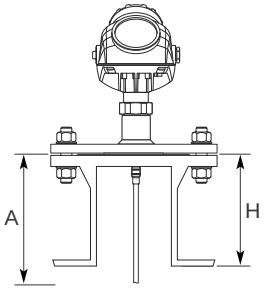
Related information

Change the hold off distance/upper null zone
Trim near zone function

Narrow nozzles

For narrow nozzles, it may be necessary to increase the Hold Off Distance/UNZ to reduce the measuring range in the upper part of the tank. Amplitude Threshold adjustments may also be needed in this case. A Trim Near Zone is recommended in most nozzle installations, for example, when there are disturbing obstacles in the near zone.

Figure 3-5: Hold Off Distance/UNZ for Narrow Nozzles

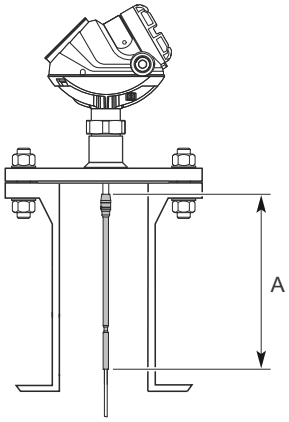


A. Hold Off Distance/UNZ

Long stud

A long stud is recommended for single flexible probes in a tall nozzle.

Figure 3-6: A Single Flexible Probe with a Long Stud



A. Long Stud (9.8 in./250 mm)

3.2.6 Installation in still pipe/chamber

General chamber considerations

Dimensioning the chamber/pipe correctly and selecting the appropriate probe is key to the success in these applications. When selecting a smaller chamber/pipe diameter, such as 2-in., a flexible probe is not suitable due to the chance of it coming into contact with the walls. Also, relatively large side inlets may interfere with the signal.

When gas lift and/or turbulence may occur (e.g. boiling hydrocarbons), a 3- or 4-in. chamber/pipe diameter is recommended for maximum measurement reliability. This is especially true in high pressure and high temperature installations.

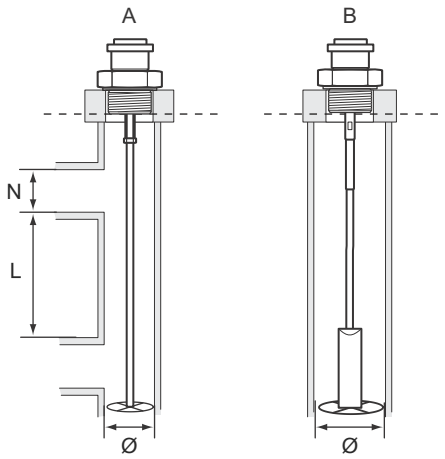
Table 3-6: Recommended and Minimum Chamber/Still Pipe Diameters for Different Probes

Probe type	Recommended diameter	Minimum diameter
Rigid single/segmented rigid single	3 or 4 in. (75 or 100 mm)	2 in. (50 mm)
Flexible single	4 in. (100 mm)	Consult your local Emerson representative
Coaxial	3 or 4 in. (75 or 100 mm)	1.5 in. (37.5 mm)
Large coaxial	3 or 4 in. (75 or 100 mm)	2 in. (50 mm)(1)

(1) Applicable to pipe schedule up to 40s,40. For higher pipe schedule consult your local Emerson representative.

Note
Metal pipes are preferred, especially in applications with low dielectric constant, to avoid disturbances from objects near the pipe.

Figure 3-7: Mounting Single Probe in Chamber/Still Pipe



A. Rigid single/segmented rigid single
B. Flexible single

Inlet pipe diameter N < Ø

Effective measuring range L ≥12 in. (300 mm).

Related information

Best Practices for Using Radar in Still Pipes and Chambers Technical Note
Dimensional drawings

Rosemount chamber

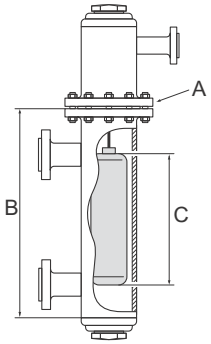
A Rosemount chamber allows external mounting of process level instrumentation. It supports a variety of process connections, and optional drain and vent connections. The standard Rosemount chambers are designed according to ASME B31.3. Rosemount chambers compliant with the Pressure Equipment Directive (PED) are available. Customer specific engineered solutions for Rosemount chambers are available upon request. Use option code XC to order together with the Rosemount 5300 Series Transmitters.

Use a centering disc the same diameter as the chamber if the probe length >3.3 ft. (1 m). See Table 3-9 for which disc to use.

Existing chamber

A Rosemount 5300 Level Transmitter is the perfect replacement in an existing displacer chamber. Proprietary flanges are offered, enabling use of existing chambers to make installation easy.

Figure 3-8: Existing Displacer Chamber



A. Replace chamber flange
B. Probe length
C. Displacer length

Considerations when changing to Rosemount 5300:

- The Rosemount 5300 Level Transmitter flange choice and probe length must be correctly matched to the chamber. Both standard ASME and EN (DIN), as well as proprietary chamber flanges, are available. See Proprietary flanges to identify the proprietary flanges.
- See Table 3-9 for guidelines on which disc size to use.
- See Table 3-7 for guidelines on the required probe length.

Table 3-7: Required Probe Length in Chambers

Chamber manufacturer	Probe length[1]
Major torque-tube manufacture (249B, 249C, 249K, 249N, 259B)	Displacer + 9 in. (229 mm)
Masoneilan™ (torque tube operated), proprietary flange	Displacer + 8 in. (203 mm)
Other - torque tube[2]	Displacer + 8 in. (203 mm)
Magnetrol® (spring operated)[3]	Displacer + between 7.8 in. (195 mm) to 15 in. (383 mm)
Others - spring operated[2]	Displacer + 19.7 in. (500 mm)

(1) If flushing ring is used, add the ring height to the probe length.
(2) For other manufacturers, there are small variations. This is an approximate value; actual length should be verified.
(3) Lengths vary depending on model, SG, and rating, and should be verified.

For additional information, see the Replacing Displacers with Guided Wave Radar Technical Note.

Probe type in chamber considerations

When installing a Rosemount 5300 in a chamber, a large coaxial or a single lead probe is recommended. The large coaxial probe should always be considered first whenever the application and dimensions of the chamber allow for it.

Large coaxial probes are the preferred choice for installation in chambers with limited space above and below the process connections. This type of probe has the best interface resolution and outstanding performance with low dielectric fluids. It is also unaffected by external disturbances such as protruding welds and side taps.

Single rigid probes are suitable for chamber installations. When used in a metal, small diameter pipe, single rigid probes offer a stronger return signal than when used in open applications. This makes them suitable for low dielectric and interface applications. In addition, for applications with highly viscous media where build up is likely to occur, single rigid probes is the best choice.

Single flexible probes may be used in longer bypass chambers, but care must be taken to ensure that the probe is suspended in a true vertical position and does not touch the pipe wall. If flexible probes are to be used, the bypass chambers should be 4 in. (100 mm) or larger in diameter to allow room for some flexing.

The probe must not touch the chamber wall, should extend the full height of the chamber, but not touch the bottom of the chamber. The probe length determines if a single rigid or single flexible probe should be used:

- Less than 19.7 ft. (6.0 m): Rigid single probe is recommended. Use a centering disc for probe > 3.3 ft. (1 m). When mounting space is limited, use a flexible single probe with a weight and centering disc.
- More than 19.7 ft. (6.0 m): Use flexible single probe with a weight and centering disc.[2]

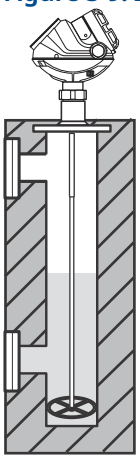
(2) The Blind Zones and the height of the weight limit the use of single flexible probes shorter than 3 ft. (1 m). If using the flexible probe, the short weight is recommended.

Insulation of the chamber

For hot applications, the chamber should always be insulated to prevent personal injuries and to reduce the amount of energy needed for heating. See Figure 3-9. It is often an advantage, and sometimes even required, for the radar measurement:

- In hot applications, insulation reduces the amount of condensation, since it prevents the upper part of the chamber from becoming a cold spot.
- Insulation prevents product solidification inside the chamber, and clogging of the inlet-pipes.

Figure 3-9: Insulated Chamber

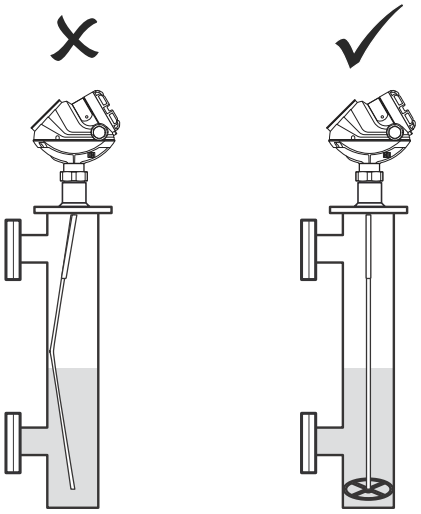


See Insulated tanks for more information.

Centering disc for pipe installations

To prevent the probe from contacting the chamber or pipe wall, centering discs are available for flexible single and rigid single probes. The disc is attached to the end of the probe. Discs are made of stainless steel, Alloy C-276, Alloy 400, Alloy 825, Duplex 2205, or PTFE. The centering disc in PTFE is not available for HTHP probes.

Figure 3-10: Prevent the Probe from Contacting the Wall



For the segmented rigid single lead probe, up to five PTFE centering discs can be mounted along the probe, but keep a minimum distance of two segments between the discs. Additionally, a disc in SST or PTFE (part number 03300-1655-xxxx) can be attached to the end of the probe.

When mounting a centering disc, it is important that it fits correctly in the chamber/pipe. See Figure 3-11 for Dimension D. Table 3-9 shows which centering disc diameter to choose for a particular pipe. Table 3-10 shows which centering disc diameter to choose for a Rosemount chamber.

Figure 3-11: Dimension D for Centering Discs

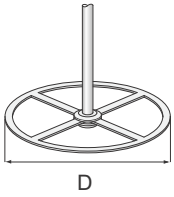


Table 3-8: Centering Disc Dimensions

Disc size	Actual disc diameter (D)
2-in.	1.8 in. (45 mm)
3-in.	2.7 in. (68 mm)
4-in.	3.6 in. (92 mm)
6-in.	5.55 in. (141 mm)
8-in.	7.40 in. (188 mm)

Table 3-9: Centering Disc Size Recommendation for Different Pipe Schedules

Pipe size	Pipe schedule			
	5s, 5 and 10s,10	40s, 40 and 80s, 80	120	160
2-in.	2-in.	2-in.	N/A(1)	N/A(2)
3-in.	3-in.	3-in.	N/A(1)	2-in.
4-in.	4-in.	4-in.	3-in.	3-in.
5-in.	4-in.	4-in.	4-in.	4-in.
6-in.	6-in.	6-in.	4-in.	4-in.
7-in.	N/A(1)	6-in.	N/A(1)	N/A(1)
8-in.	8-in.	8-in.	6-in.	6-in.

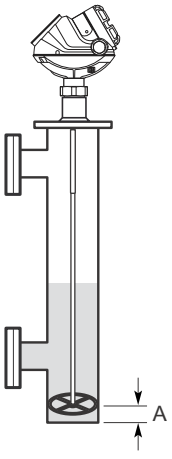
(1) Schedule is not available for pipe size.
(2) No centering disc is available.

Table 3-10: Centering Disc Size Recommendations for Rosemount Chambers

Chamber size	Chamber rating	Centering disc
3-in.	Up to Class 600/PN 100	3-in.
	Class 900, 1500/PN160, 250	2-in.
3-in. T-piece	Up to Class 600/PN 100	2-in.
4-in.	Up to Class 600/PN 100	4-in.
	Class 900, 1500/PN160, 250	3-in.

To avoid bending the probe (rigid probes), or twisting and coming into contact with the chamber wall (flexible probes), a small clearance distance between centering disc and chamber bottom is recommended. The clearance distance of 1 in. (25 mm) is selected with a dome shaped chamber bottom in mind, which may prevent the centering disc from reaching the bottom.

Figure 3-12: Clearance Distance between the Probe End and the Chamber Bottom

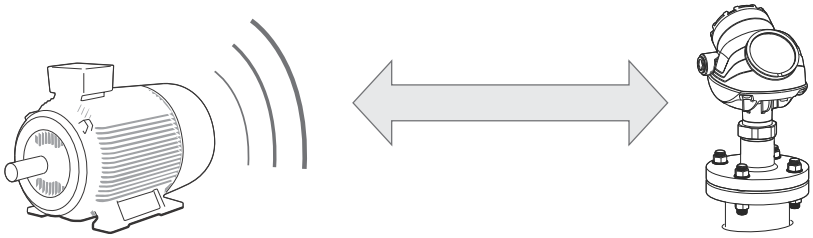


A. A clearance distance of 1 in. (25 mm) between the probe end and the chamber bottom is recommended.

3.2.7 Installation in non-metallic tanks and open-air applications

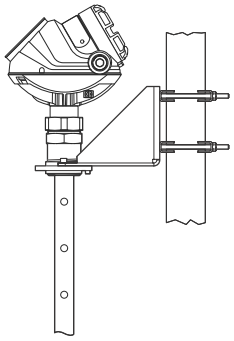
Avoid major sources of electrical disturbance in proximity of the installation (e.g. electrical motors, stirrers, servo mechanisms).

Figure 3-13: Avoid Electromagnetic Disturbances



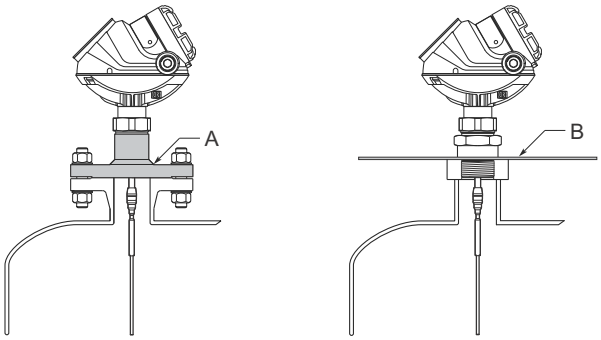
For clean liquids, use a coaxial probe to reduce effect of potential electrical disturbances.

Figure 3-14: Coaxial Probe in an Open-Air Application



For optimal single lead probe performance in non-metallic tanks, the probe must be mounted with a metal flange, or screwed in to a metal sheet (d > 14 in./350 mm) if a threaded version is used.

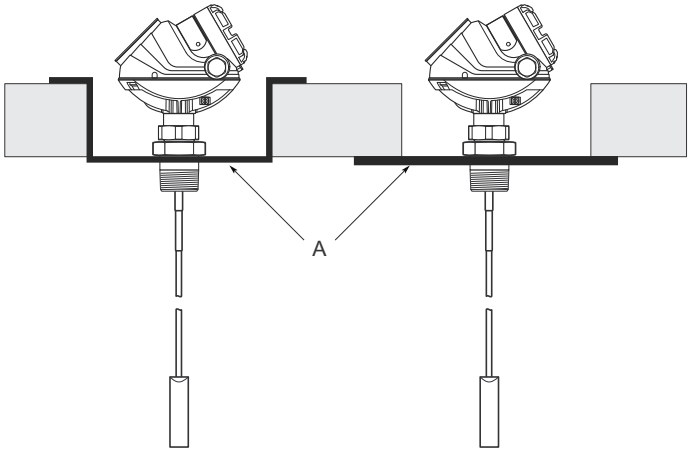
Figure 3-15: Mounting in Non-Metallic Tanks



A. Metal flange
B. Metal sheet (d > 14 in./350 mm)

3.2.8 Installation in concrete silos

Figure 3-16: Installation in Concrete Silos



A. Metal

3.2.9 Minimum distance between two single probes

When installing multiple Rosemount 5300 Level Transmitters with single probes in the same tank, ensure to place the devices at proper distance from each other to avoid the risk of interference caused by cross-talk. Table 3-11 provides recommended minimum distance between two probes. A coaxial probe or a probe installed in a still pipe will not cause any cross-talk.

Table 3-11: Minimum Distance between Single Probes

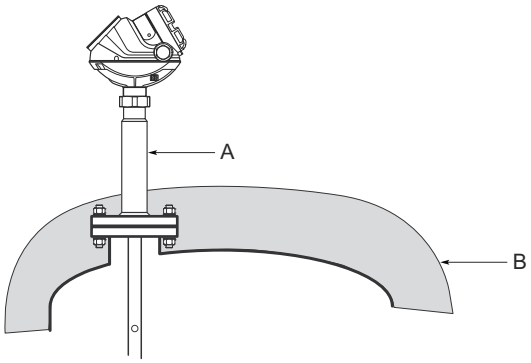
Product	Minimum distance between probes
Oil (DC = 2.1)	5.2 ft. (1.6 m)
Water (DC = 80)	3.3 ft. (1.0 m)

3.2.10 Insulated tanks

When the Rosemount 5300 is installed in high temperature applications, consider the maximum ambient temperature. See Temperature limits for details.

Tank insulation should not exceed 4 in. (100 mm) above the top of the process connection.

Figure 3-17: Tank Insulation



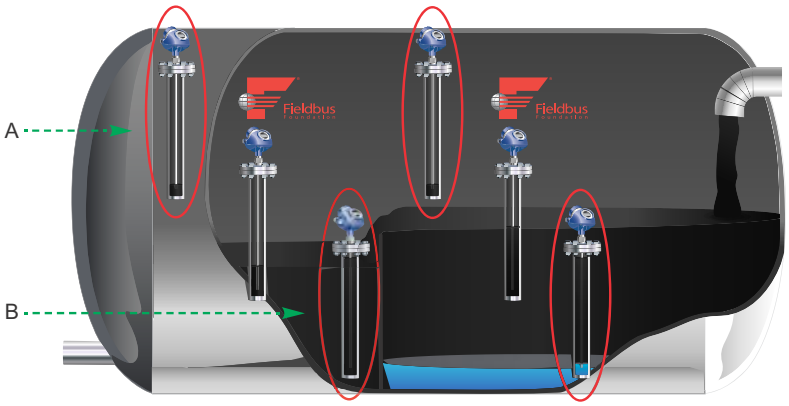
A. HTHP version
B. Tank insulation

3.2.11 Installation and configuration considerations for ESD systems

Figure 3-18 shows a common example of an Emergency Shutdown (ESD) system in a separator. High-high and low-low transmitters act as redundant safeguards. They will trigger emergency shutdowns or redirect flow of the application. In addition, there are one or several process control units that continuously measure and report the actual level in the tank to the host system and operators.

The high-high unit will always be empty during normal operation, and will indicate empty in the host system. The low-low unit will always be full during normal operation, and will indicate full in the host system as well.

Figure 3-18: ESD System in a Separator

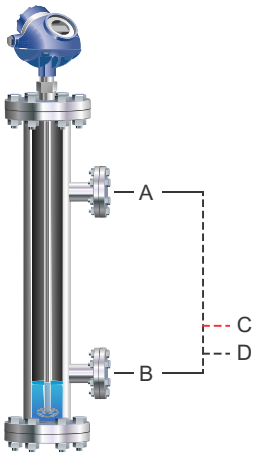


A. High-high unit
B. Low-low unit

High-high unit

The alarm levels must be located near the bottom inlet with considerable margin to the Blind Zones to ensure robust and accurate readings. See Set alarm limits for further information.

Figure 3-19: High-High Unit

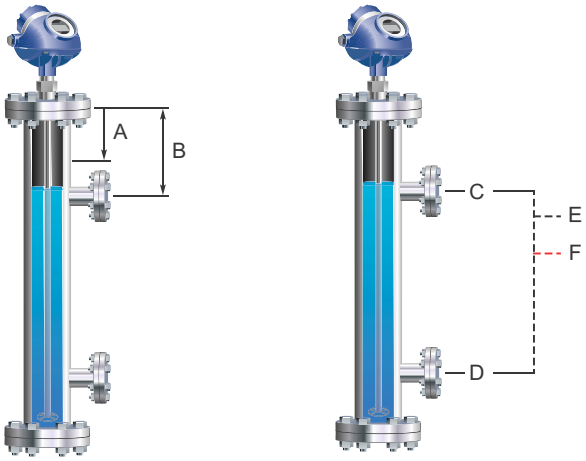


A. 20 mA
B. 4 mA
C. Shutdown
D. Warning

Low-low unit

The distance from flange to upper inlet must be at least 20 in. (500 mm). If this requirement is not met, a spool piece can be added. When the requirement of 20 in. (500 mm) is met, an Upper Null Zone (UNZ) of 14 in. (350 mm) must be configured, so that any disturbance in the near zone above the upper inlet is ignored.

Figure 3-20: Low-Low Unit



A. UNZ = 14 in. (350 mm)
B. Minimum 20 in. (500 mm)
C. 20 mA
D. 4 mA
E. Warning
F. Shutdown

3.2.12 Shipboard installations

Transmitters with aluminum housing are not approved for open deck installations.

For application conditions and limitations refer to the applicable shipboard approval.

3.3 Shorten the probe

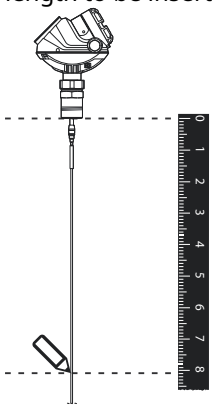
3.3.1 Shorten the flexible single lead probe

Prerequisites

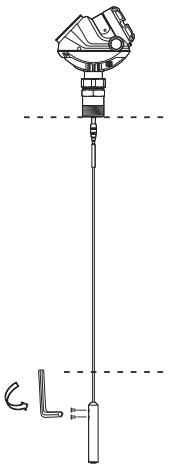
Note
The PTFE covered probes must not be cut in field.

Procedure

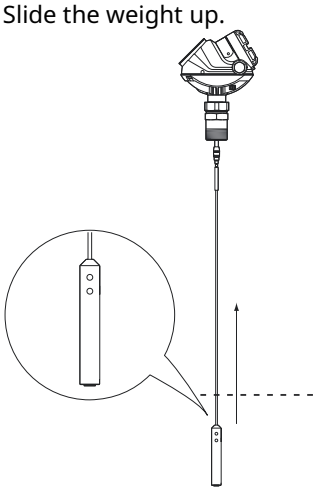
1. Mark where to cut the probe. Add at least 1.6 in. (40 mm) to the required probe length to be inserted into the weight.



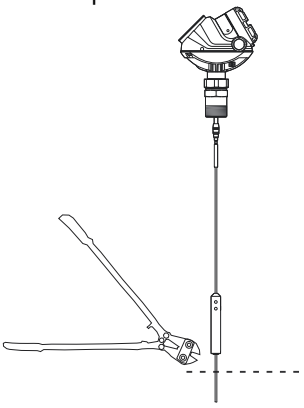
2. Loosen the weight.



3. Slide the weight up.



4. Cut the probe at the mark.



5. Fasten the weight.

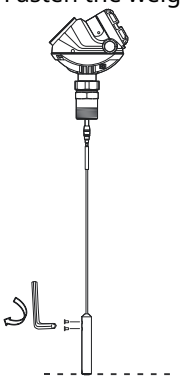


Table 3-12: Required Torque and Hex Key Dimensions

Flexible single lead probe	Required torque	Hex key dimension
4 mm wire, stainless steel	3.7 ft-lb (5 Nm)	4 mm
4 mm wire, Alloy C-276	1.8 ft-lb (2.5 Nm)	3 mm
4 mm wire, Alloy 400	1.8 ft-lb (2.5 Nm)	3 mm
4 mm wire, Duplex 2205	1.8 ft-lb (2.5 Nm)	3 mm
6 mm wire	7.4 ft-lb (10 Nm)	5 mm

Note
If the screws are not tightened according to the required torque, the weight may fall off. This is especially important for solid applications with high tensile loads on the probe.

Postrequisites

After shortening the probe be sure to update the transmitter configuration to the new probe length.

Related information

Probe length

3.3.2 Shorten the rigid single lead probe

Prerequisites

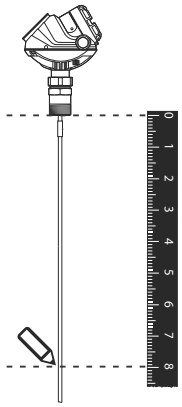
The minimum probe length is 15.7 in. (400 mm).

Note
The PTFE covered probes must not be cut in field.

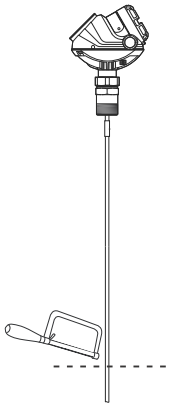
Note
Ensure the lead is fixed while cutting.

Procedure

1. Mark where to cut the probe.



2. Cut the probe at the mark.



Postrequisites

After shortening the probe be sure to update the transmitter configuration to the new probe length.

Related information

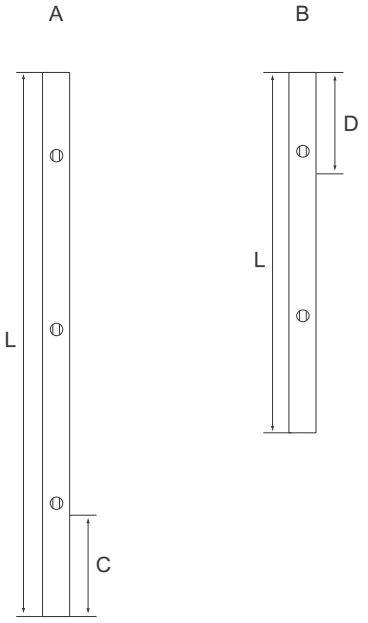
Probe length

3.3.3 Shorten the coaxial probe

Prerequisites

Note
The HTHP coaxial probe must not be cut in field.

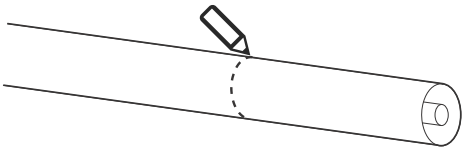
Figure 3-21: Maximum Shortening of Coaxial Probe



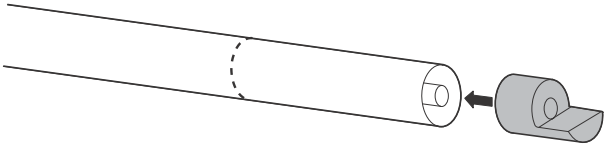
A. Ordered probe length (L) > 49 in. (1250 mm)
B. Ordered probe length (L) ≤ 49 in. (1250 mm)
C. Maximum shortening length: 23.6 in. (600 mm)
D. Minimum probe length: 15.7 in. (400 mm)

Procedure

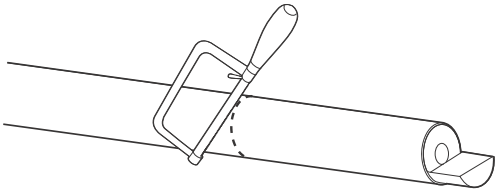
1. Mark where to cut the probe.
   - Pipes longer than 49 in. (1250 mm) can be shortened by as much as 23.6 in. (600 mm).
   - Pipes shorter than 49 in. (1250 mm) can be cut as long as the remaining length is not less than 15.7 in. (400 mm).



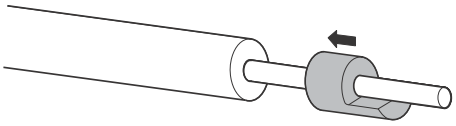
2. Insert the centering piece.
   The centering piece is delivered from factory and should be used to prevent the spacers centering the rod from coming loose.



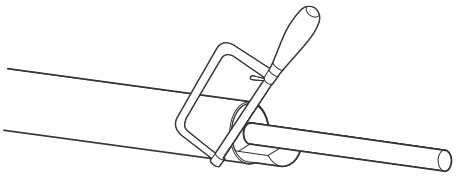
3. Cut the tube to the desired length.



4. Move the centering piece.



5. Cut the rod inside the tube. Ensure the rod is fixed with the centering piece while cutting.



Postrequisites

After shortening the probe be sure to update the transmitter configuration to the new probe length.

Related information

Probe length

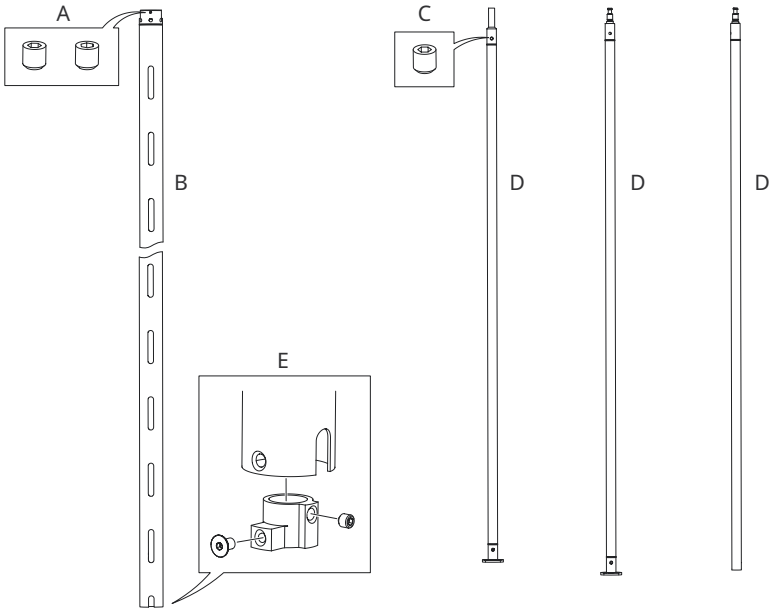
3.3.4 Shorten the large coaxial probe

Related information

Probe length

Large coaxial probe parts

Figure 3-22: Components



A. Set screw M4, 2 pcs
B. Outer pipe
C. Set screw M5
D. Inner probe (one to three pieces depending on probe length)
E. Probe end fixture

Verify possibility to shorten the large coaxial probe

The inner probe consists of one to three segements depending on probe length. The connection part between two inner probe segements must not be cut. Before shortening the large coaxial probe, verify that your desired probe length is permitted for cutting. Check your ordered probe length and desired probe length in table Table 3-13 or Table 3-14, and follow the action instruction.

Figure 3-23: Ordered Probe Length (L) vs Desired Probe Length (X)

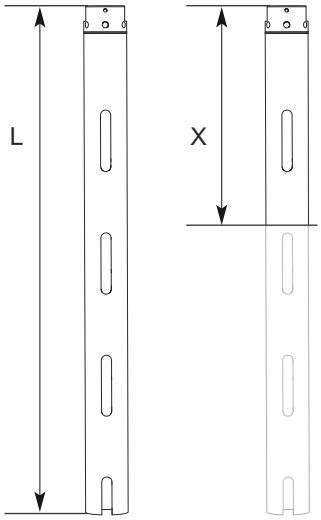


Table 3-13: Check Desired Cutting Probe Length (mm)

Ordered probe length (L)	Desired probe length (X)	Action
300 ≤ L ≤2100	300 ≤ X < 2100	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.
2100 < L ≤ 4100	300 ≤ X < 1960	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.
	1960 ≤ X ≤ 2055	A new inner probe segement must be ordered, contact your local Emerson representative.
	2055 < X < 4100	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.
4100 < L ≤ 6000	300 ≤ X < 1960	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.
	1960 ≤ X ≤ 2055	A new inner probe segement must be ordered, contact your local Emerson representative
	2055 < X < 3860	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.
	3860 ≤ X ≤ 3955	A new inner probe segement must be ordered, contact your local Emerson representative
	3955 < X < 6000	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.

Table 3-14: Check Desired Cutting Probe Length (in.)

Ordered probe length (L)	Desired probe length (X)	Action
11.8 ≤ L ≤ 82.7	11.8 ≤ X < 82.7	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.
82.7 < L ≤ 161.4	11.8 ≤ X < 77.2	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.
	77.2 ≤ X ≤ 80.9	A new inner probe segement must be ordered, contact your local Emerson representative
	80.9 < X < 161.4	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.
161.4 < L ≤ 236.2	11.8 ≤ X < 77.2	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.
	77.2 ≤ X ≤ 80.9	A new inner probe segement must be ordered, contact your local Emerson representative
	80.9 < X < 152.0	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.
	152.0 ≤ X ≤ 155.7	A new inner probe segement must be ordered, contact your local Emerson representative
	155.7 < L < 236.2	Cutting can be performed. Follow instruction, Shorten the large coaxial probe.

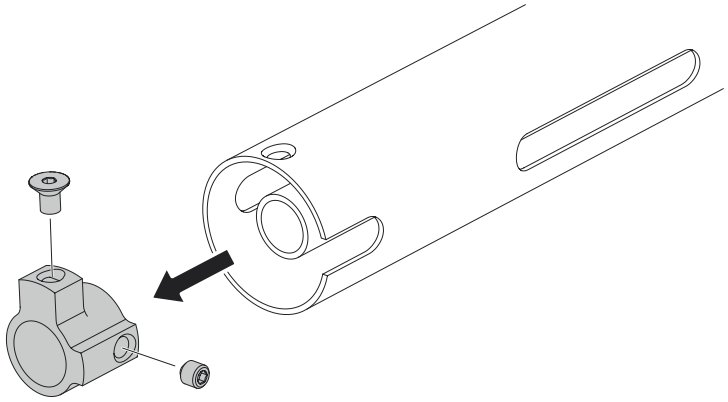
Shorten the large coaxial probe

Prerequisites

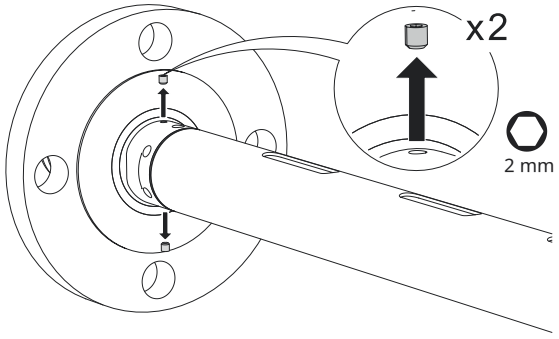
Verify your desired probe length is permitted for cutting, see Verify possibility to shorten the large coaxial probe.

Procedure

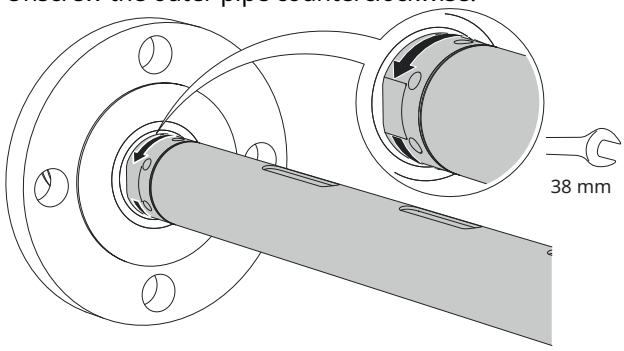
1. Remove the fixture at the end of the probe. Keep all parts safe for later use.



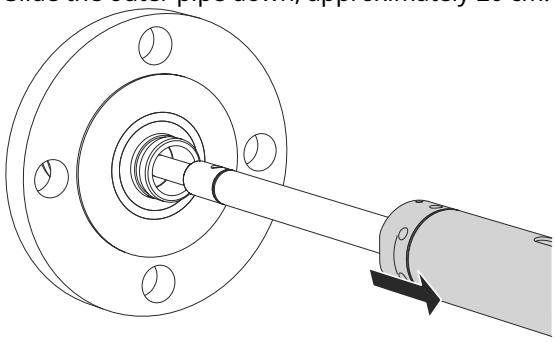
2. Loosen the outer pipe.
   a) Unscrew the two set screws.



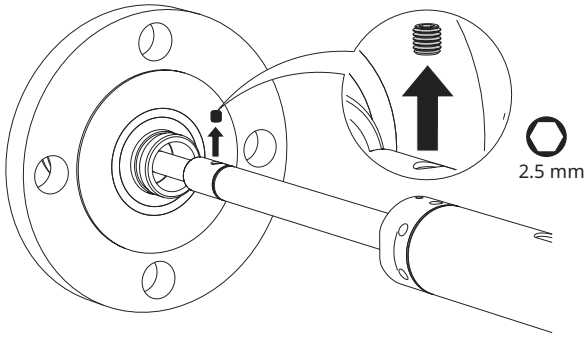
   b) Unscrew the outer pipe counterclockwise.



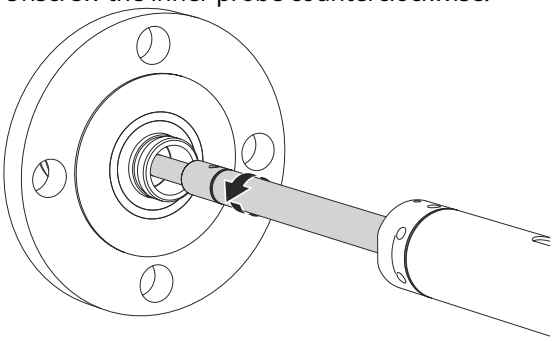
   c) Slide the outer pipe down, approximately 20 cm.



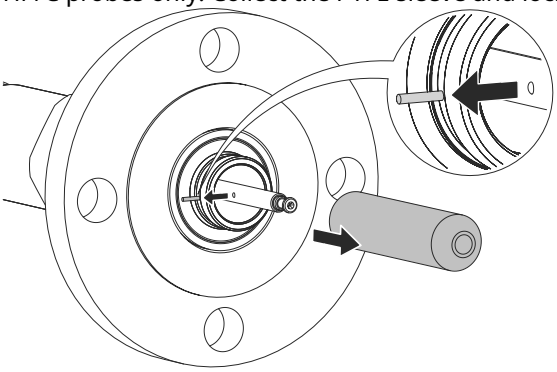
3. Loosen the inner probe.
   a) Unscrew the set screw.



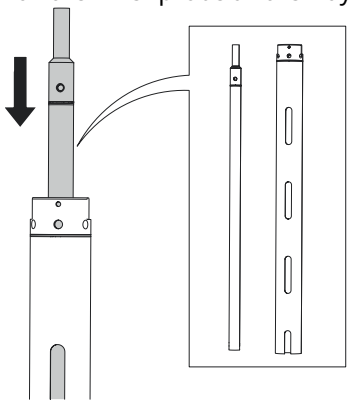
b) Unscrew the inner probe counterclockwise.



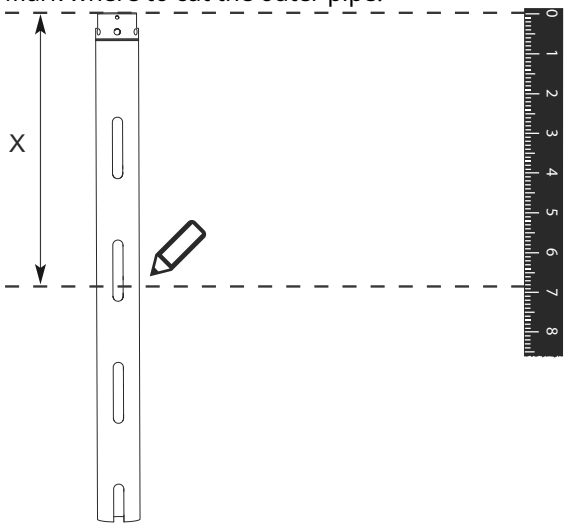
4. HP/C probes only: Collect the PTFE sleeve and locking pin for later use.



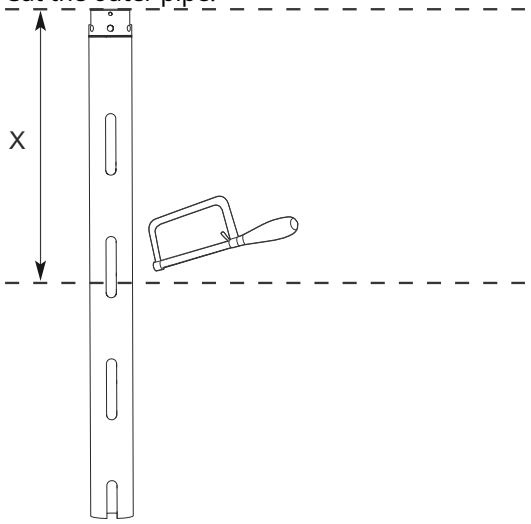
5. Pull the inner probe all the way through the outer pipe.



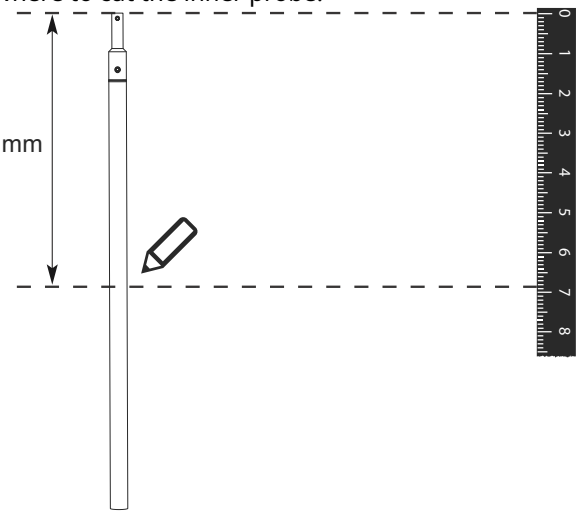
6. Mark where to cut the outer pipe.



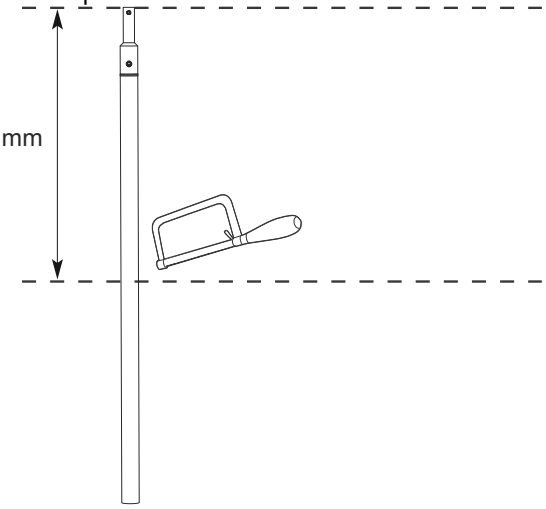
7. Cut the outer pipe.



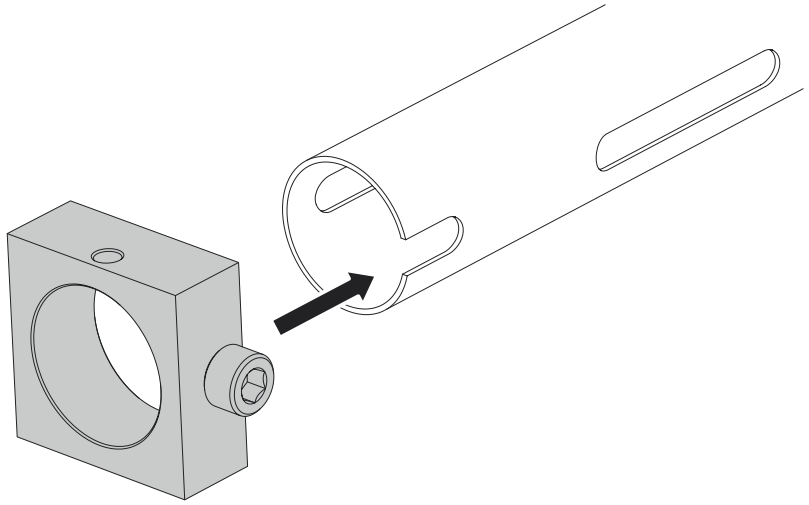
8. Mark where to cut the inner probe.



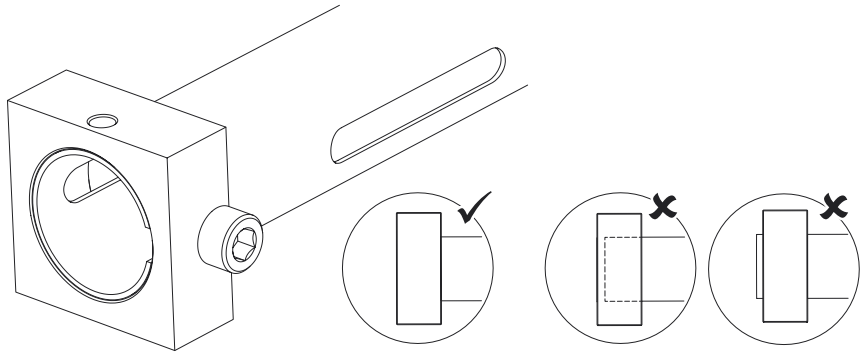
9. Cut the inner probe.



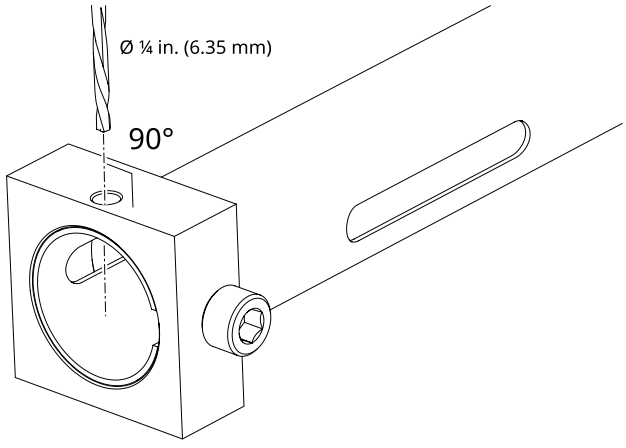
10. Drill a hole in the outer probe using the drilling fixture (included in your shipment).
    a) Place the drilling fixture at the end of the outer probe.



    b) Make sure the drilling fixture is aligned at the end of the outer probe.

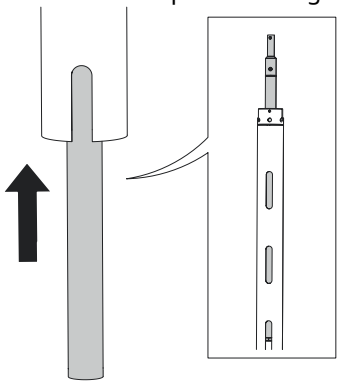


    c)

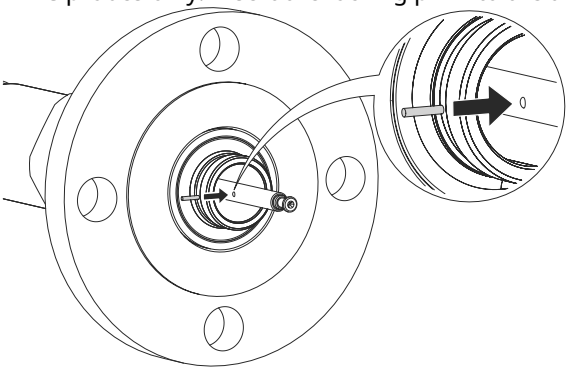


11. Threaded connections only: Countersink the drilled hole.
12. Remove sharp edges and burrs.

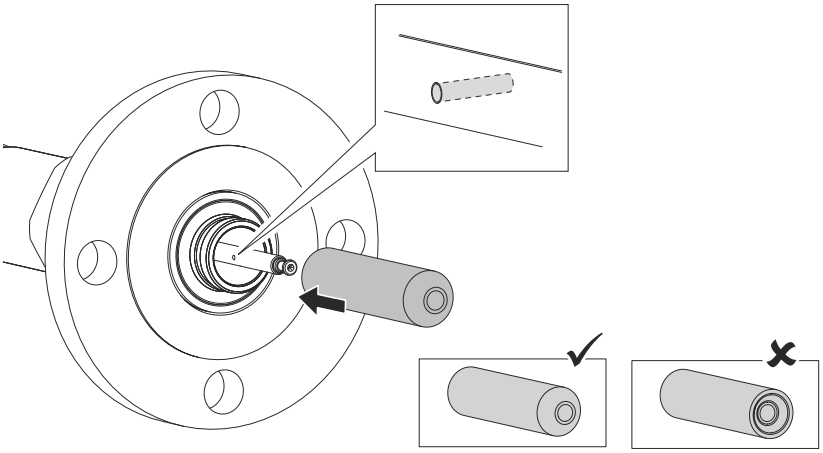
13. Inspect the inner probe. Verify that all centering discs are in good shape and the probe segments are tightened.
14. Slide the inner probe through the outer pipe.



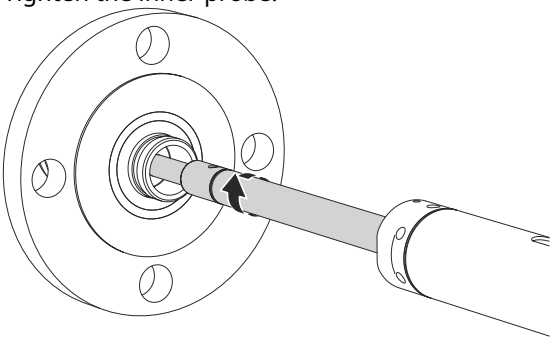
15. HP/C probes only: Insert the locking pin into the aligned holes.



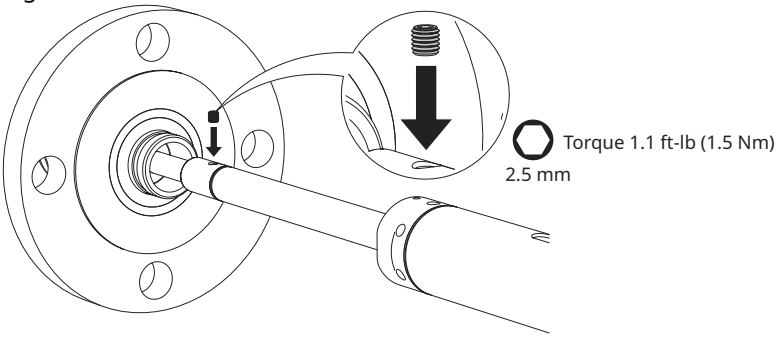
16. HP/C probes only: Mount the PTFE sleeve while keeping the locking pin in a horizontal position.



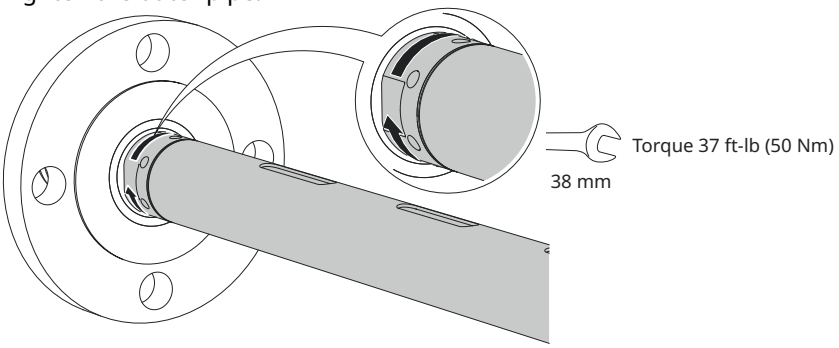
17. Tighten the inner probe.



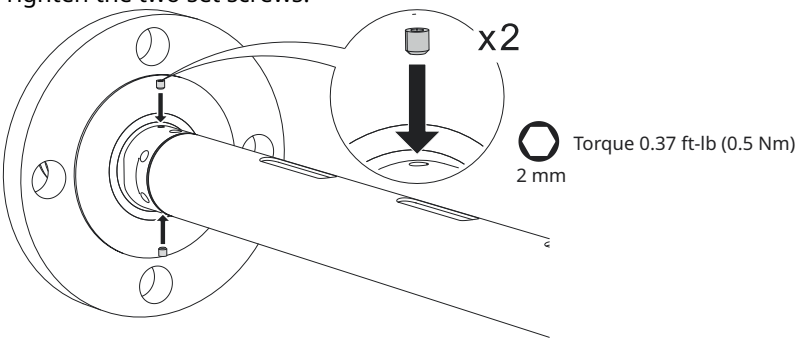
18. Tighten the set screw.



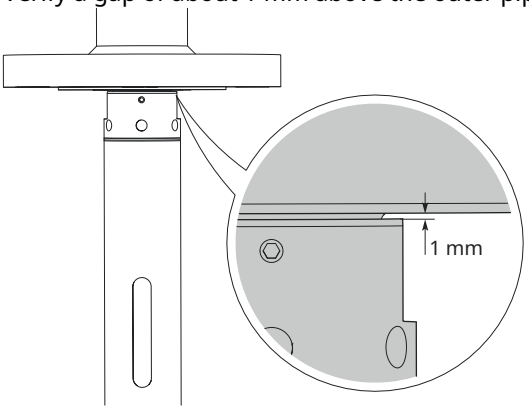
19. Tighten the outer pipe.



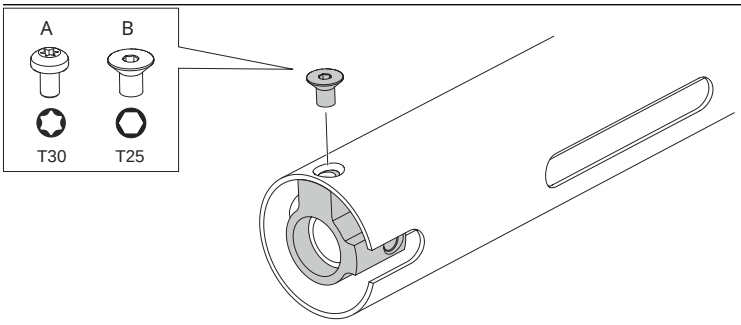
20. Tighten the two set screws.



21. Verify a gap of about 1 mm above the outer pipe.

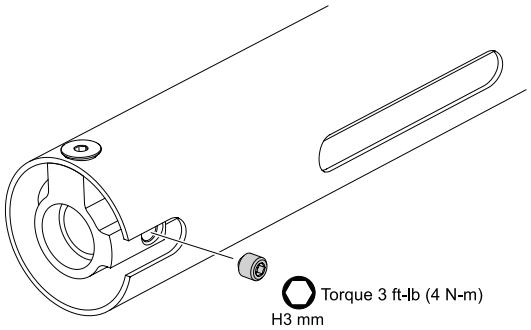


22. Mount the fixture at the end of the probe.



A. Flange connections: Torque 5 ft-lb (7 N-m)
B. Threaded connections: Torque 3 ft-lb (4 N-m)

23.



Postrequisites

After shortening the probe be sure to update the transmitter configuration to the new probe length.

3.4 Mount a centering disc

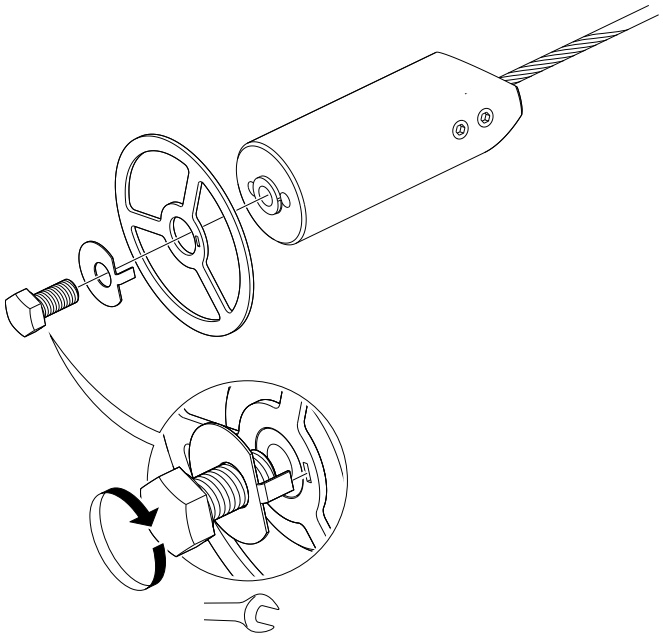
3.4.1 Mount a centering disc on flexible single lead probe

Prerequisites

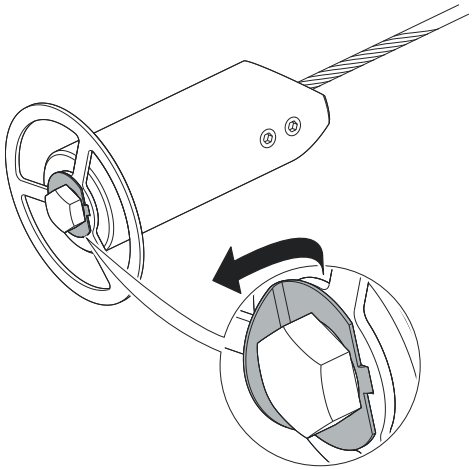
Note
When using centering discs made of PTFE, note that the maximum temperature is 482 °F (250 °C).

Procedure

1.



2. Secure the bolt by folding the tab washer.

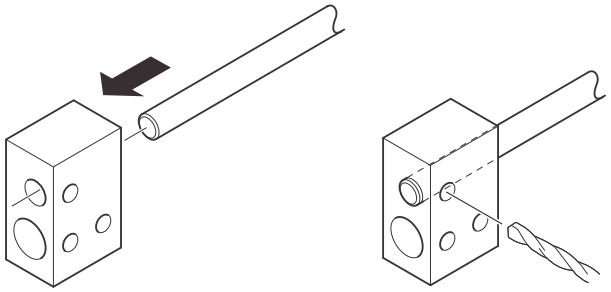


3.4.2 Mount a centering disc on rigid single lead probe (8 mm)

Note
Centering discs shall not be used with PTFE covered probes.

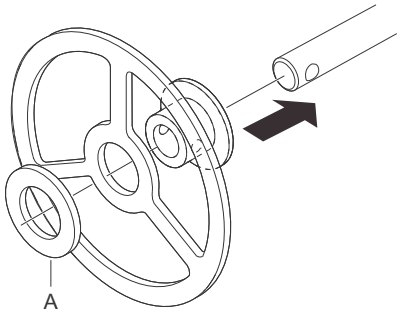
Procedure

1. Drill one hole using the drilling fixture (included in your shipment).

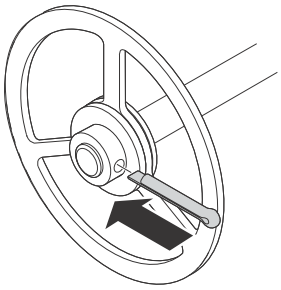


2. Mount the bushing, centering disc, and washer at the probe end.

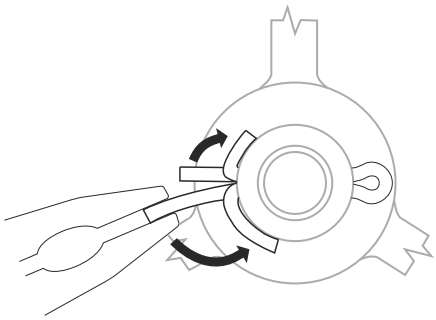
Note
Do not mount the washer (A) if the centering disc material is PTFE, Alloy C-276, Duplex 2205, or Alloy 400.



3. Insert the split pin through the bushing and the probe.



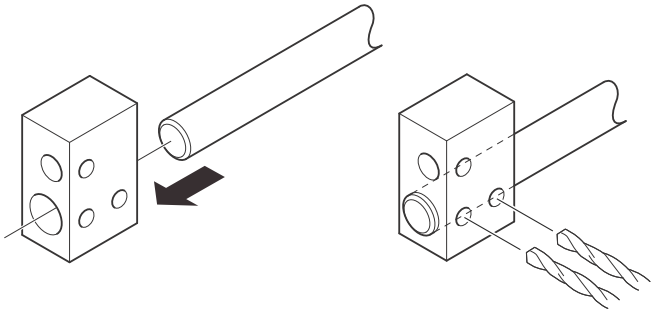
4. Secure the split pin.



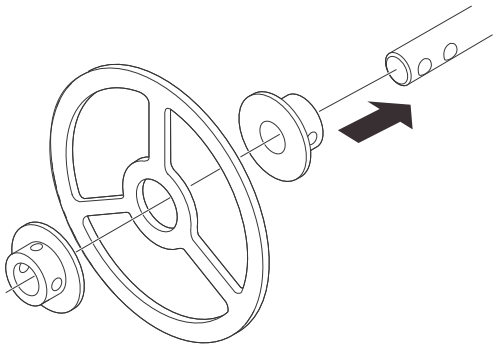
3.4.3 Mount a centering disc on rigid single lead probe (13 mm)

Procedure

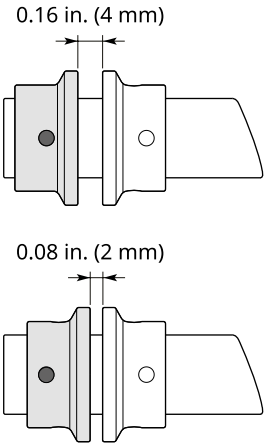
1. Drill two holes using the drilling fixture (included in your shipment).



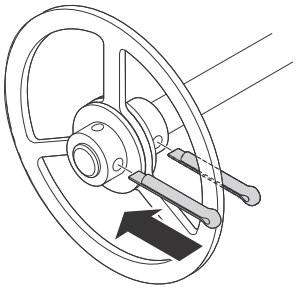
2. Mount the bushings and centering disc at the probe end.



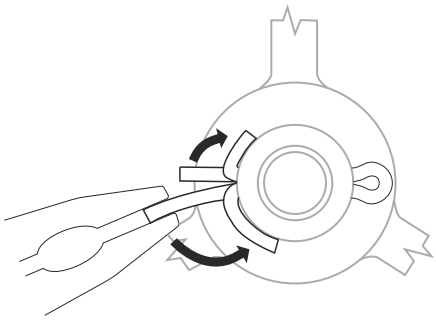
3.



4. Insert the split pins through the bushings and the probe.



5. Secure the split pins.



3.5 Mount device on tank

Mount the transmitter with flange on a nozzle on top of the tank. The transmitter can also be mounted on a threaded or Tri Clamp connection.

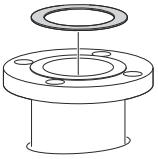
3.5.1 Tank connection with flange

Prerequisites

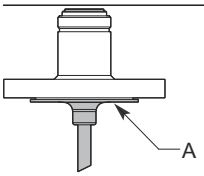
Note
PTFE covered probes must be handled carefully to prevent damage to the coating.

Procedure

1. Place a suitable gasket on top of the tank flange.

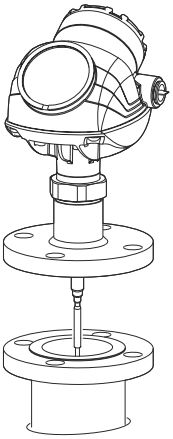


Note
Gasket should not be used for PTFE covered probe with protective plate.

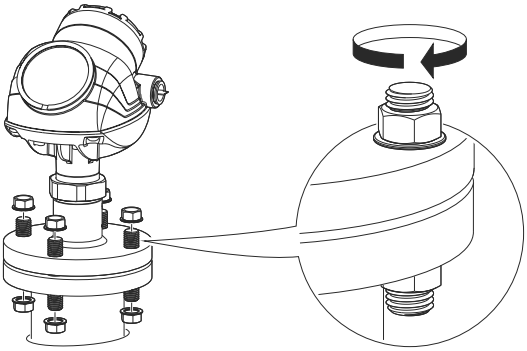


A. PTFE covered probe with protective plate

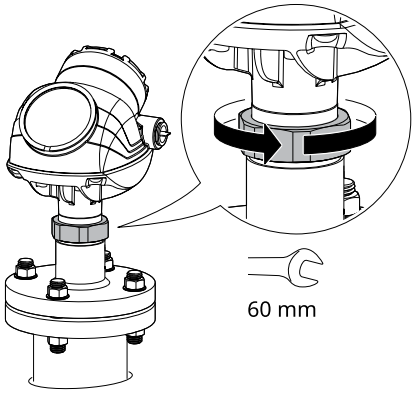
2. Lower the transmitter and probe with flange into the tank.



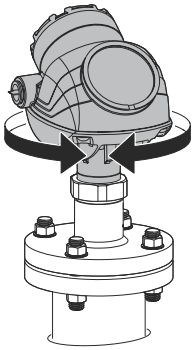
3. Tighten bolts and nuts with sufficient torque for the flange and gasket choice.



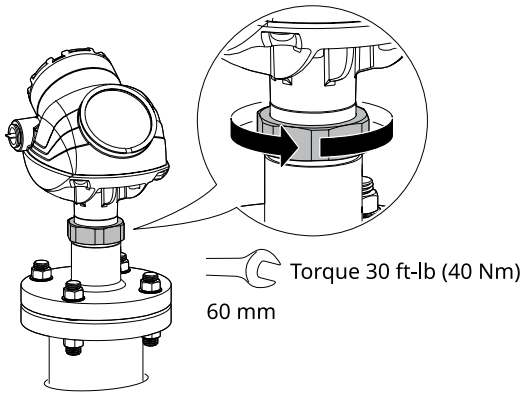
4.



5. Rotate the transmitter housing so the cable entries/display face the desired direction.



6.



3.5.2 Tank connection with loose flange (plate design)

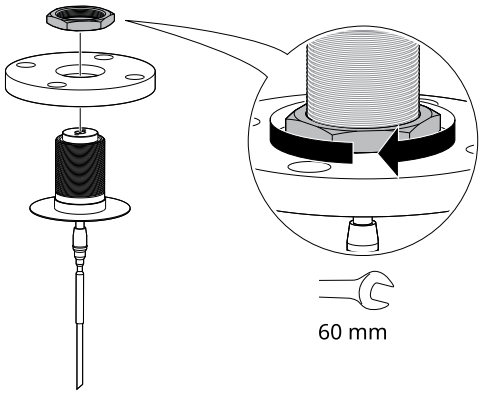
The transmitter is delivered with head, flange and probe assembled into one unit. If, for some reason, these parts have been disassembled, mount the transmitter as described below.

Prerequisites

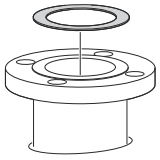
Note
PTFE covered probes must be handled carefully to prevent damage to the coating.

Procedure

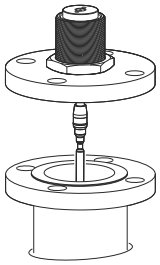
1.



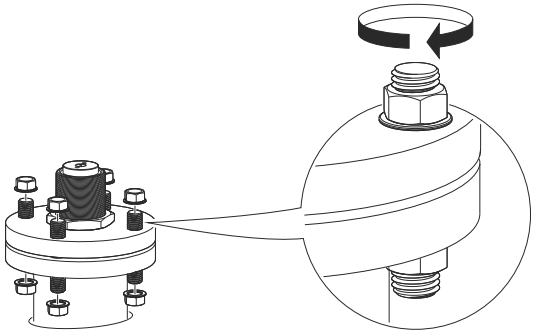
2. Place a suitable gasket on top of the tank flange.



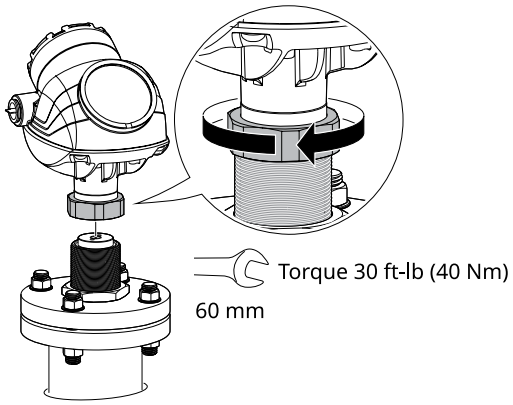
3. Lower the probe with flange into the tank.



4. Tighten bolts and nuts with sufficient torque for the flange and gasket choice.



5.



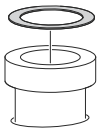
3.5.3 Threaded tank connection

Prerequisites

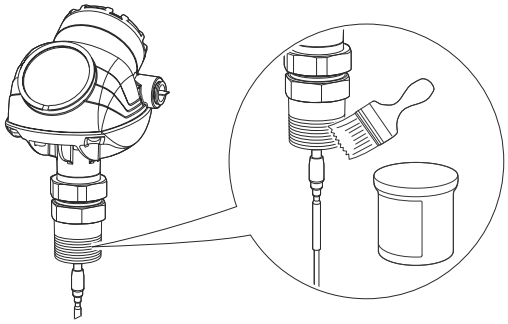
Note
PTFE covered probes must be handled carefully to prevent damage to the coating.

Procedure

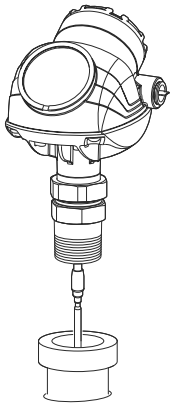
1. For adapters with BSPP (G) threads, place a suitable gasket on top of the tank flange.



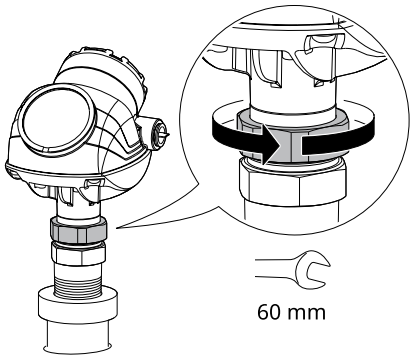
2. For adapters with NPT threads, use anti-seize paste or PTFE tape according to your site procedures.



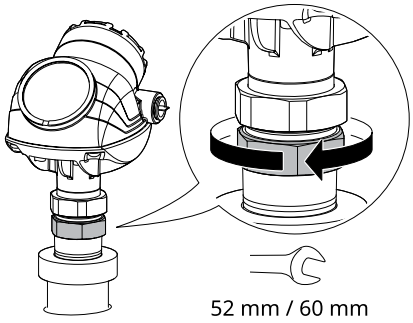
3. Lower the transmitter and probe into the tank.



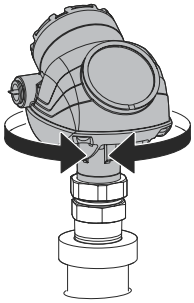
4.



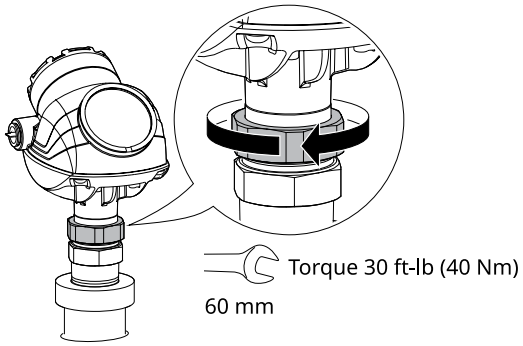
5.



6. Rotate the transmitter housing so the cable entries/display face the desired direction.



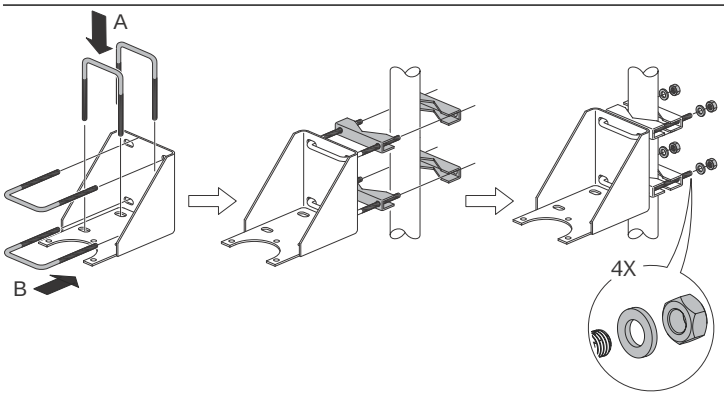
7.



3.5.4 Bracket mounting

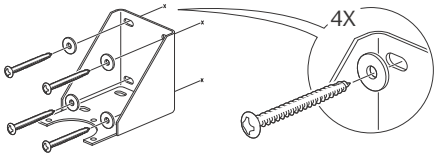
Procedure

1. Mount the bracket to the pipe/wall.
   On pipe:

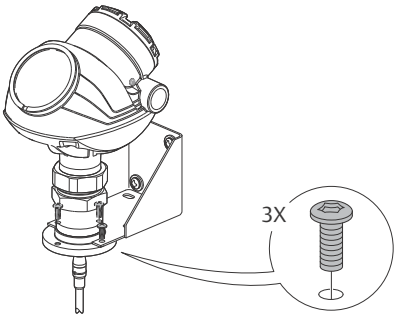


A. Horizontal pipe
B. Vertical pipe

   On wall:



2. Mount the transmitter with probe to the bracket.



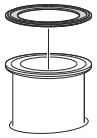
3.5.5 Tank connection with Tri Clamp

Prerequisites

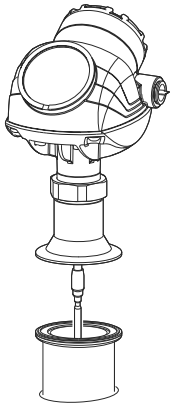
Note
PTFE covered probes must be handled carefully to prevent damage to the coating.

Procedure

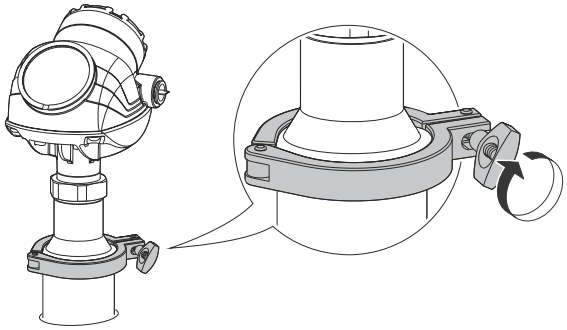
1. Place a suitable gasket on top of the tank flange.



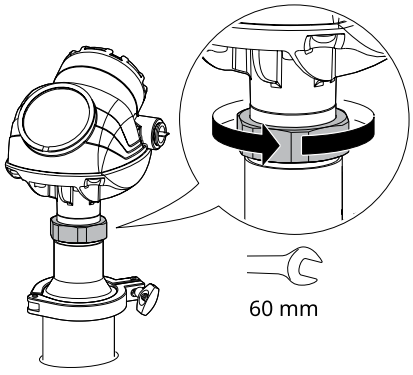
2. Lower the transmitter and probe into the tank.



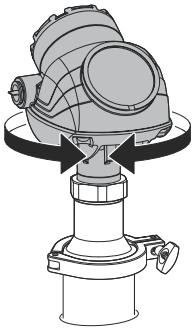
3. Tighten the clamp to the recommended torque (see the manufacturer's instruction manual).



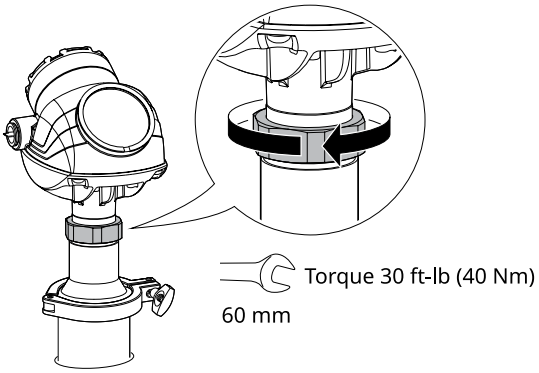
4.



5. Rotate the transmitter housing so the cable entries/display face the desired direction.

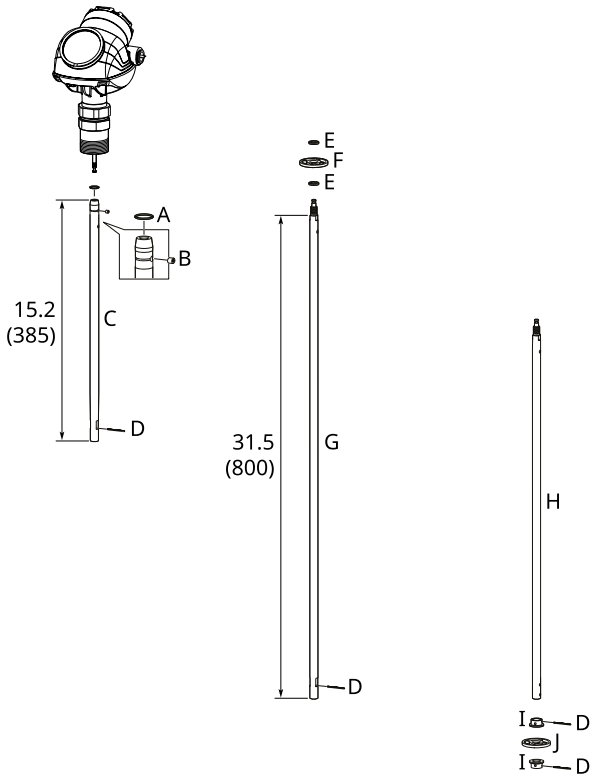


6.



3.5.6 Segmented probe

Segmented probe parts



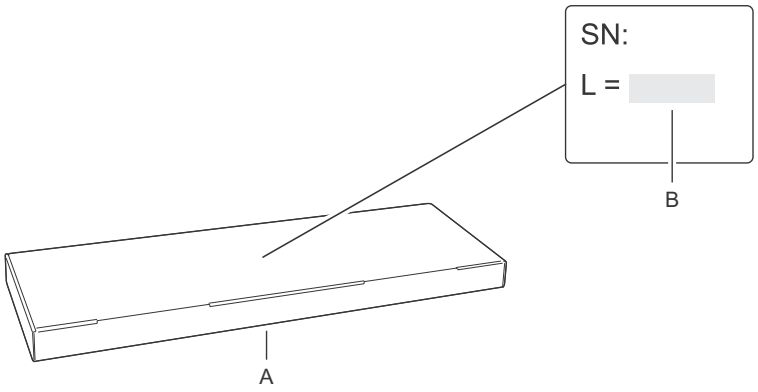
A. Safety ring
B. Screw
C. Top segment
D. Split pin
E. PTFE washer (optional)
F. Centering disc in PTFE (optional)
G. Middle segment
H. Bottom segment (length varies depending on total probe length)
I. Bushing (for the centering disc at the probe end)
J. Bottom centering disc in PTFE or stainless steel (optional)

Verifying probe length

Segmented probe ordered with model code 4S

Before installation, verify the probe length (L) on the label.

Figure 3-25: Label



A. Probe segments box
B. Probe length

Segmented probe ordered as spare part kit

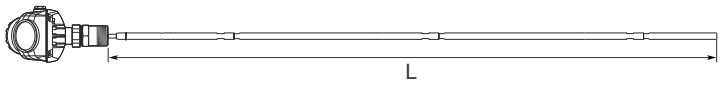
Before installation, the number of segments that add up to the desired probe length must be determined. Also, the bottom segment may need to be shortened.

Adjust the probe length

Procedure

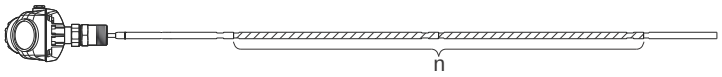
1. Determine L, the desired probe length.

L, desired probe length:

2. Determine n, the number of middle segments needed for the desired probe length. See Determination of probe segments.

n, number of middle segments:

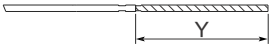
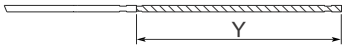
   

3. Calculate Y, the length of the bottom segment. See Determination of probe segments.

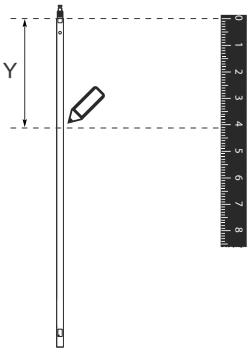
Y, length of bottom segment:

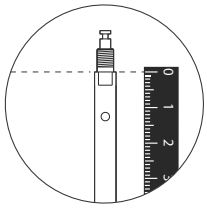
   

4. Continue as follows:

Length of bottom segment (Y)	Action
Y < 0.4 in. (10 mm) 	• Continue with Step 7. Do not use the bottom segment.
Y ≥ 0.4 in. (10 mm) 	• Continue with Step 5 and cut the bottom segment.
Y = 31.5 in. (800 mm) 	a. Add one extra middle segment to the calculated n. b. Continue with Step 7.

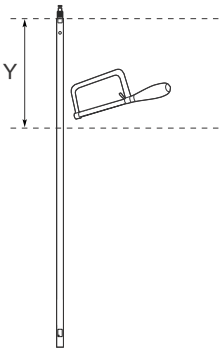
5. Mark where to cut the bottom segment.



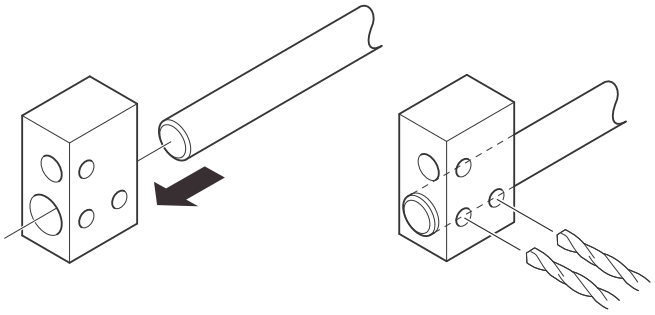


6. Cut the bottom segment at the mark.

Note
Ensure the bottom segment is fixed while cutting.



7. Optional: If a bottom centering disc is ordered, then drill two holes on the bottom segment using the drilling fixture.



Determination of probe segments

Table 3-15: Determination of Probe Segments for Standard Seal

Desired probe length (L)		Number of middle segments (n)	Length of bottom segment (Y)	
in.	mm		in.	mm
15.8 ≤ L ≤ 47.2	400 ≤ L ≤ 1200	0 pc	Y = L -15.8	Y = L - 400
47.2 < L ≤ 78.7	1200 < L ≤ 2000	1 pc	Y = L - 47.2	Y = L - 1200
78.7 < L ≤ 110.2	2000 < L ≤ 2800	2 pcs	Y = L - 78.7	Y = L - 2000
110.2 < L ≤ 141.7	2800 < L ≤ 3600	3 pcs	Y = L - 110.2	Y = L - 2800
141.7 < L ≤ 173.2	3600 < L ≤ 4400	4 pcs	Y = L - 141.7	Y = L - 3600
173.2 < L ≤ 204.7	4400 < L ≤ 5200	5 pcs	Y = L - 173.2	Y = L - 4400
204.7 < L ≤ 236.2	5200 < L ≤ 6000	6 pcs	Y = L - 204.7	Y = L - 5200
236.2 < L ≤ 267.7	6000 < L ≤ 6800	7 pcs	Y = L - 236.2	Y = L - 6000
267.7 < L ≤ 299.2	6800 < L ≤ 7600	8 pcs	Y = L - 267.7	Y = L - 6800
299.2 < L ≤ 330.7	7600 < L ≤ 8400	9 pcs	Y = L - 299.2	Y = L - 7600
330.7 < L ≤ 362.2	8400 < L ≤ 9200	10 pcs	Y = L - 330.7	Y = L - 8400
362.2 < L ≤ 393.7	9200 < L ≤ 10000	11 pcs	Y = L - 362.2	Y = L - 9200

Table 3-16: Determination of Probe Segments for HTHP/HP/C Seal

Desired probe length (L)		Number of middle segments (n)	Length of bottom segment (Y)	
in.	mm		in.	mm
17.3 ≤ L ≤ 48.8	440 ≤ L ≤ 1240	0 pc	Y = L -17.3	Y = L - 440
48.8 < L ≤ 80.3	1240 < L ≤ 2040	1 pc	Y = L - 48.8	Y = L - 1240
80.3 < L ≤ 111.8	2040 < L ≤ 2840	2 pcs	Y = L - 80.3	Y = L - 2040
111.8 < L ≤ 143.3	2840 < L ≤ 3640	3 pcs	Y = L - 111.8	Y = L - 2840
143.3 < L ≤ 174.8	3640 < L ≤ 4440	4 pcs	Y = L - 143.3	Y = L - 3640
174.8 < L ≤ 206.3	4440 < L ≤ 5240	5 pcs	Y = L - 174.8	Y = L - 4440
206.3 < L ≤ 237.8	5240 < L ≤ 6040	6 pcs	Y = L - 206.3	Y = L - 5240
237.8 < L ≤ 269.3	6040 < L ≤ 6840	7 pcs	Y = L - 237.8	Y = L - 6040
269.3 < L ≤ 300.8	6840 < L ≤ 7640	8 pcs	Y = L - 269.3	Y = L - 6840
300.8 < L ≤ 332.3	7640 < L ≤ 8440	9 pcs	Y = L - 300.8	Y = L - 7640
332.3 < L ≤ 363.8	8440 < L ≤ 9240	10 pcs	Y = L - 332.3	Y = L - 8440
363.8 < L ≤ 393.7	9240 < L ≤ 10000	11 pcs	Y = L - 363.8	Y = L - 9240

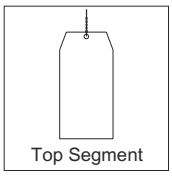
Assemble the segmented probe

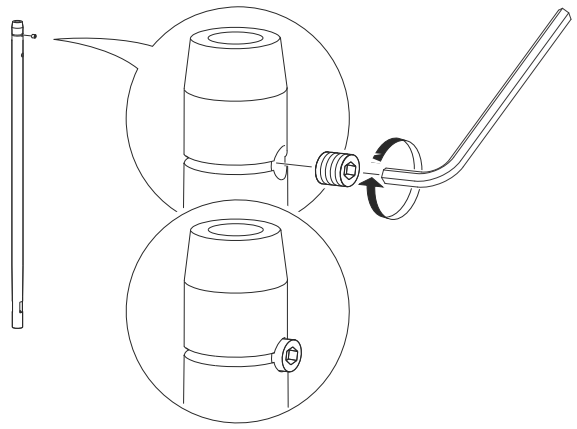
Prerequisites

Note
If there is enough space beside the tank, the probe can be assembled before inserting it into the tank.

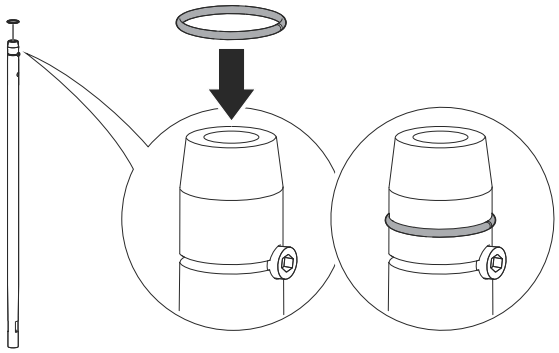
Procedure

1. Insert the stop screw to the top segment. Tighten approximately two turns.

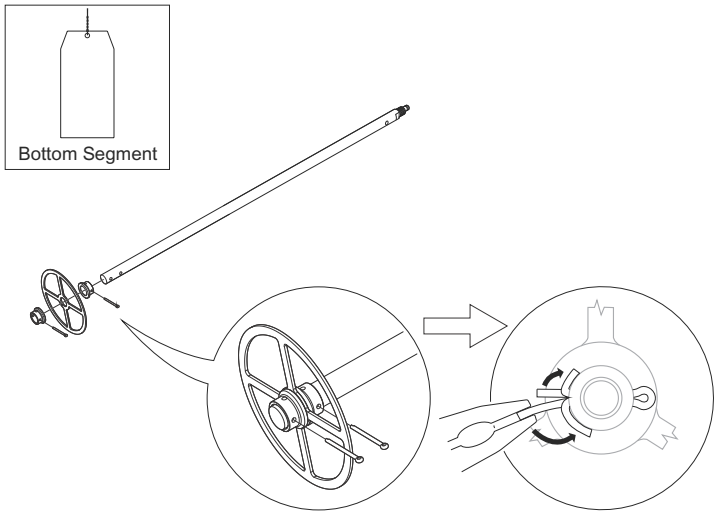




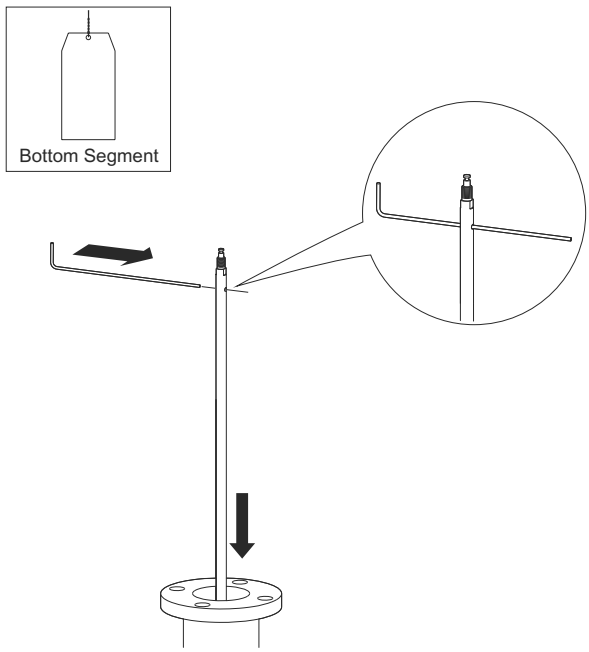
2. Pre-assemble the safety ring.



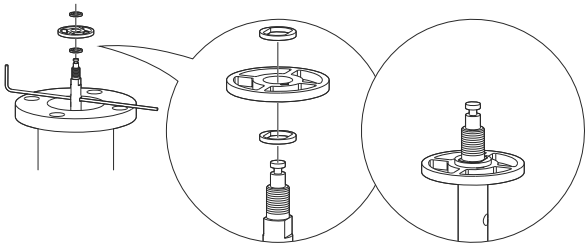
3. Optional: If ordered, mount the centering disc on the bottom segment of the probe.



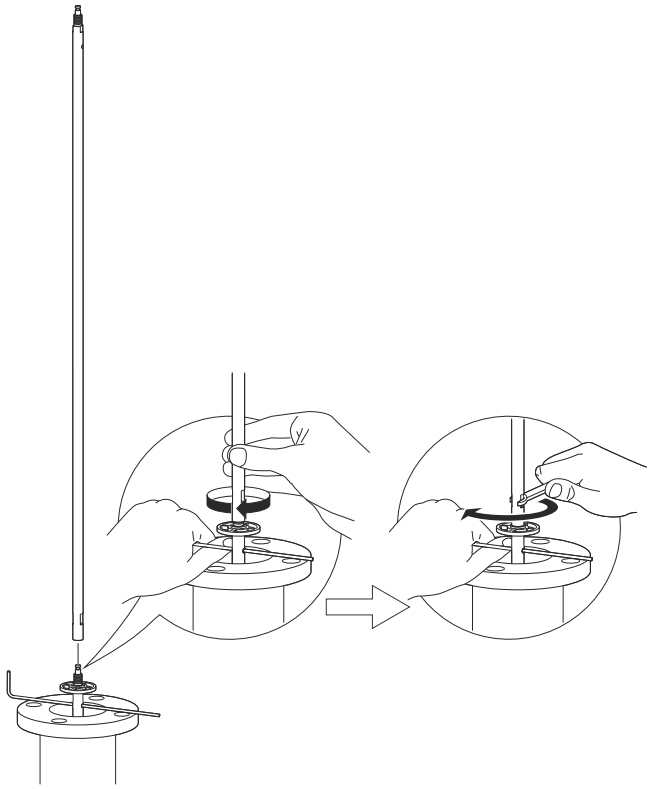
4. Insert the support tool.



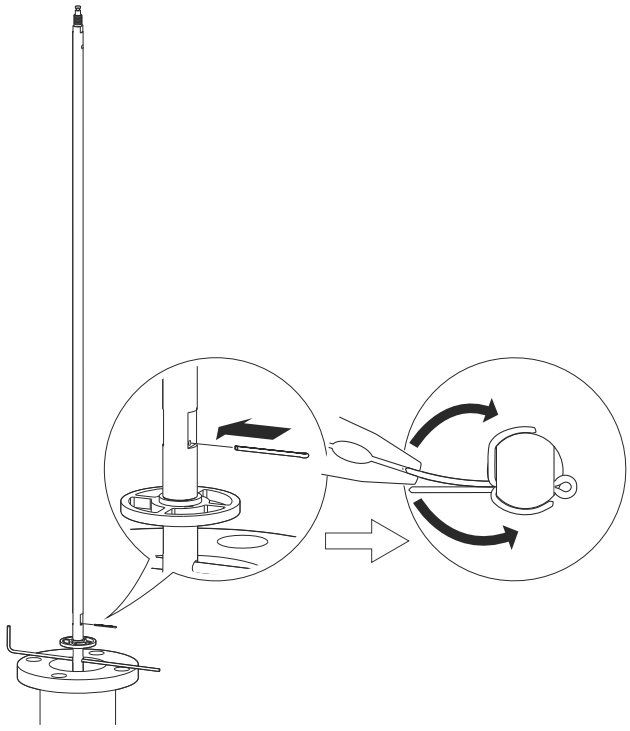
5. Optional: If ordered, mount the centering disc.
   - Maximum five pcs/probe
   - Minimum two segments between each centering disc



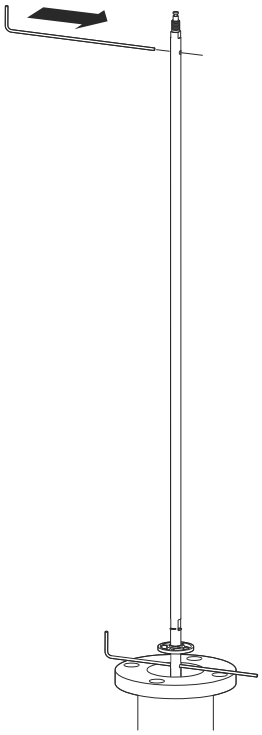
6. Mount a middle segment (hand tight).



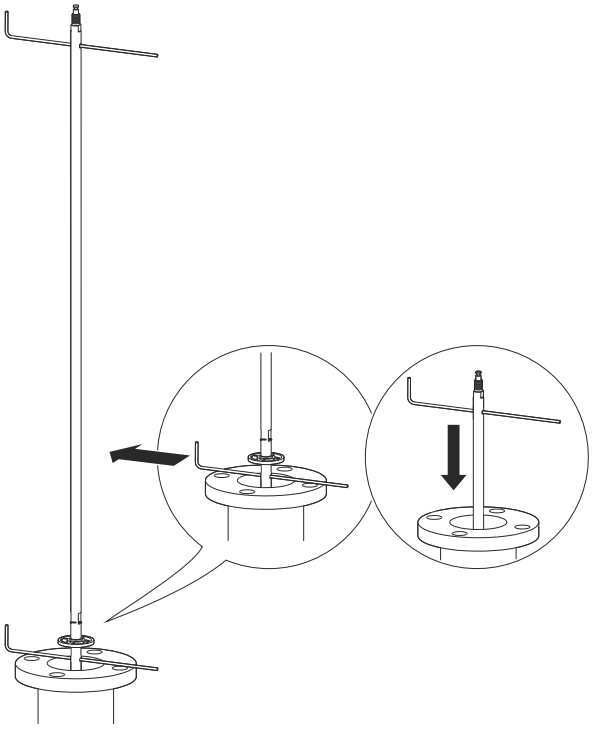
7. Secure the split pin.



8. Insert the second support tool.



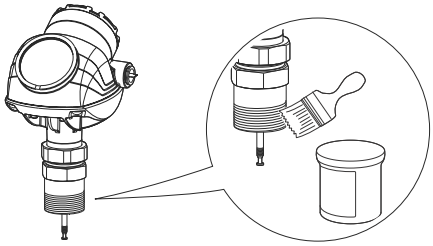
9. Remove the first support tool and lower the probe into the tank.



10. Repeat Step 5-Step 9 until all segments are mounted. Be sure to finish with the top segment of the probe.

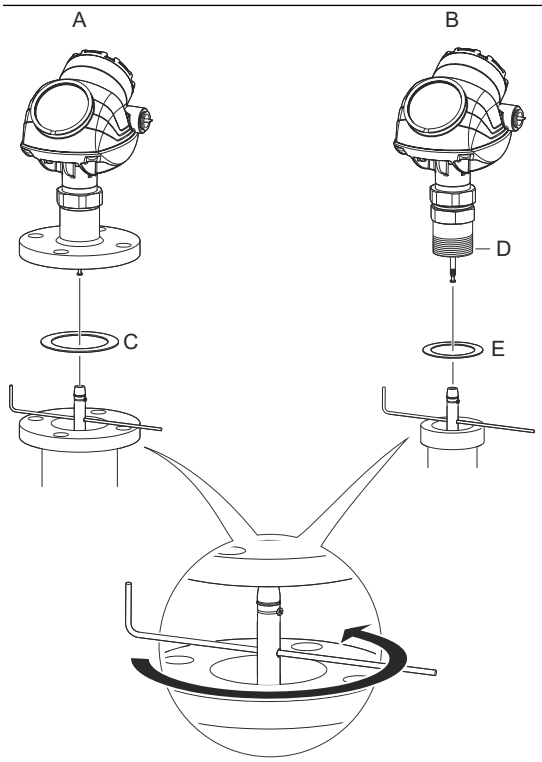
11. Seal and protect threads. Use anti-seize paste or PTFE tape according to your site

    ⚠ Only for NPT threaded tank connection.



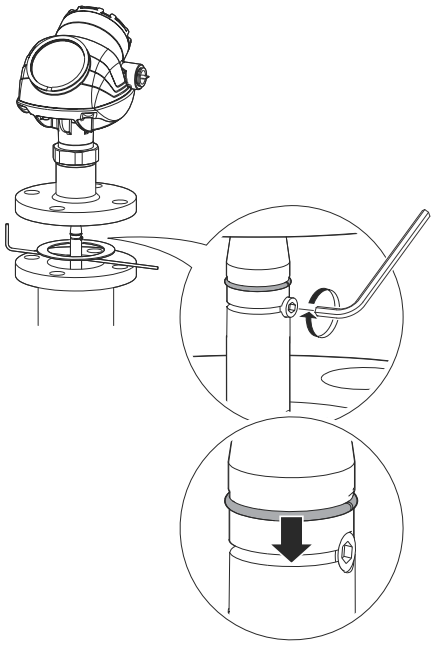
12. Attach the probe to the device.

Note
For safety reasons, at least two people are needed when mounting the device. Hold the device above the tank. High loads can break the support tool.

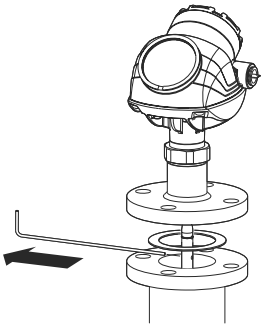


A. Flange/Tri Clamp
B. Threaded
C. Gasket
D. Sealant on threads (NPT)
E. Gasket (BSPP (G))

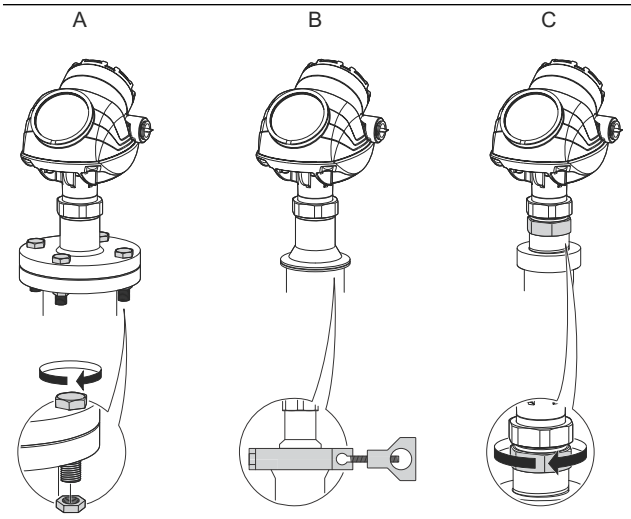
13. Tighten the stop screw and slide the safety ring into the groove.



14. Remove the support tool.

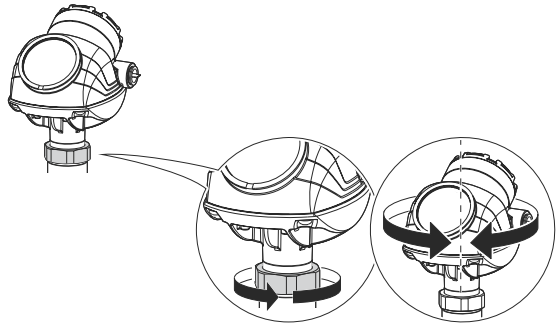


15. Mount the device on the tank.

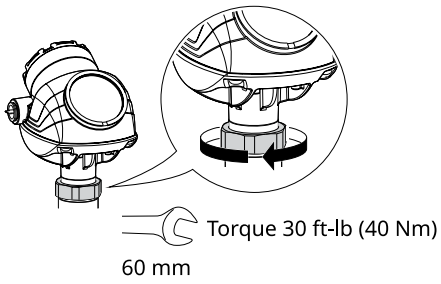


A. Flange
B. Tri Clamp
C. Threaded

16. Rotate the housing to the desired direction.



17.



3.6 Anchor the probe

In turbulent tanks it may be necessary to fix the probe. Depending on the probe type, different methods can be used to guide the probe to the tank bottom. This may be needed in order to prevent the probe from hitting the tank wall or other objects in the tank, as well as preventing a probe from breaking.

Flexible single lead probe

The flexible single lead probe itself can be used for anchoring. Pull the probe rope through a suitable anchoring point (e.g. a welded eye), and fasten it with a chuck.

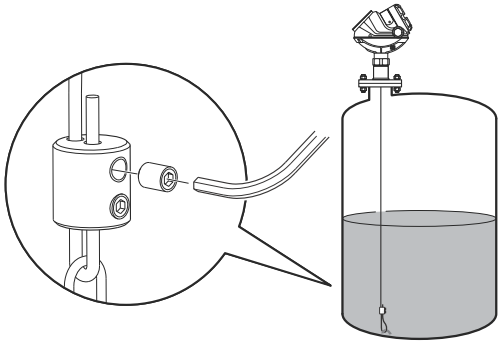
Table 3-17: Required Torque and Hex Key Dimensions

Flexible single lead probe	Required torque	Hex key dimension
4 mm wire, stainless steel	3.7 ft-lb (5 Nm)	4 mm
4 mm wire, Alloy C-276	1.8 ft-lb (2.5 Nm)	3 mm
4 mm wire, Alloy 400	1.8 ft-lb (2.5 Nm)	3 mm
4 mm wire, Duplex 2205	1.8 ft-lb (2.5 Nm)	3 mm
6 mm wire	7.4 ft-lb (10 Nm)	5 mm

The length of the loop will add to the Blind Zone. The location of the chuck will determine the beginning of the Blind Zone.

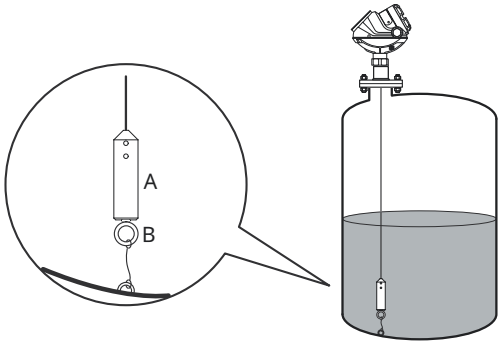
The Probe Length should be configured as the distance from the Upper Reference Point to the top of the chuck.

Figure 3-26: Flexible Single Lead Probe with Chuck



A ring (customer supplied) can be attached to the weight in a threaded (M8x14) hole at the end of the weight. Attach the ring to a suitable anchoring point.

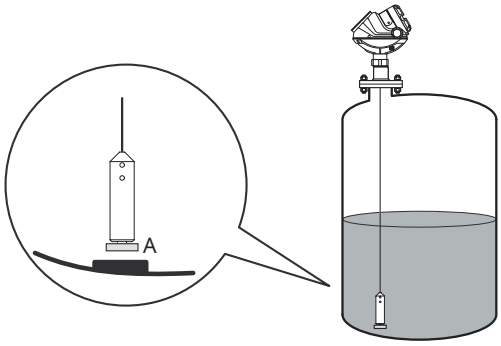
Figure 3-27: Flexible Single Lead Probe with Weight and Ring



A. Weight with internal threads M8x14
B. Ring

A magnet (customer supplied) can be fastened in a threaded (M8x14) hole at the end of the weight. The probe can then be guided by placing a suitable metal plate beneath the magnet.

Figure 3-28: Flexible Single Lead Probe with Weight and Magnet

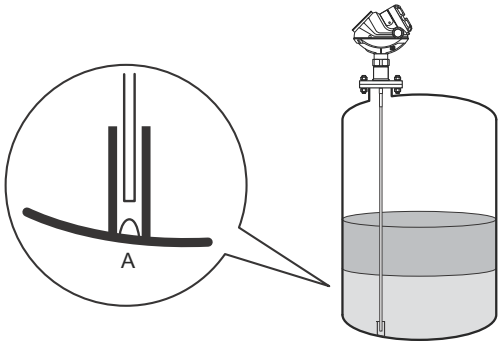


A. Magnet

Rigid single lead probe

The rigid single lead probe can be guided by a tube welded on the tank bottom. Tubes are customer supplied. Ensure that the probe can move freely in order to handle thermal expansion. The measurement accuracy will be reduced close to the tube opening.

Figure 3-29: Rigid Single Lead Probe with Tube

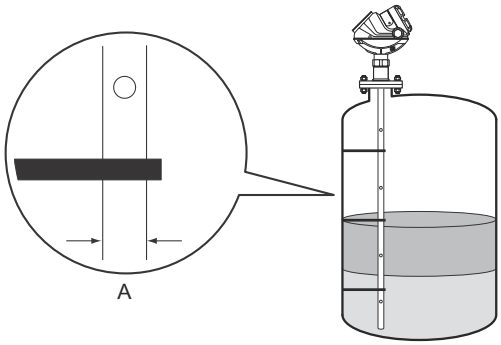


A. Drain

Coaxial probe

The coaxial probe can be secured to the tank wall by fixtures fastened to the tank wall. Fixtures are customer supplied. Ensure the probe can move freely due to thermal expansion without getting stuck in the fixture.

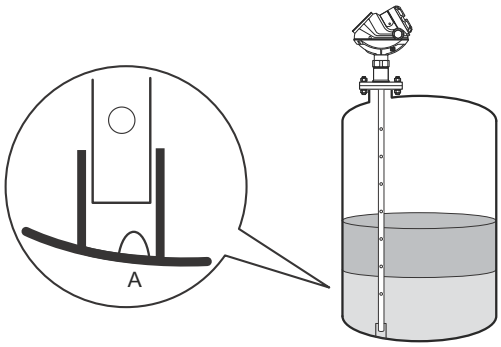
Figure 3-30: Coaxial Probe Secured to the Tank Wall



A. Coaxial: Ø 1.1 in. (28 mm), Large coaxial: Ø 1.7 in. (42 mm)

The coaxial probe can be guided by a tube welded on the tank bottom. Tubes are customer supplied. Ensure that the probe can move freely in order to handle thermal expansion. The measurement accuracy will be reduced close to the tube opening.

Figure 3-31: Coaxial Probe with Tube



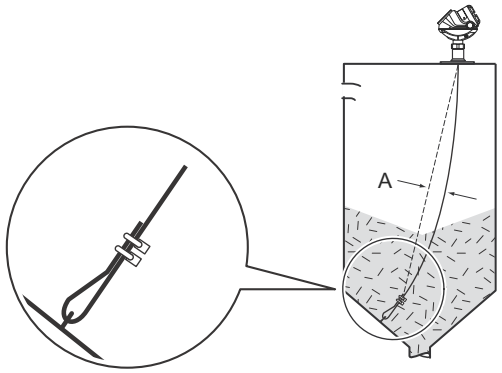
A. Drain

Solids applications

Pull the probe rope through a suitable anchoring point, e.g. a welded eye and fasten it with two clamps. It is recommended the probe is slack in order to prevent high tensile loads.

The sag should be at least 1.5 in./10 ft. (10 mm/m) of the probe length.

Figure 3-32: Flexible Single Lead Probe with Two Clamps



A. ≥ 10 mm/m

4 Electrical installation

4.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises ⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Failure to follow safe installation and servicing guidelines could result in death or serious injury.

Ensure the transmitter is installed by qualified personnel and in accordance with applicable code of practice.

Use the equipment only as specified in this manual. Failure to do so may impair the protection provided by the equipment.

Do not perform any services other than those contained in this manual unless you are qualified.

⚠ WARNING

Process leaks could result in death or serious injury.

Ensure that the transmitter is handled carefully. If the process seal is damaged, gas might escape from the tank if the transmitter head is removed from the probe.

⚠ WARNING

Explosions could result in death or serious injury.

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.

Do not remove the gauge cover in explosive atmospheres when the circuit is alive.

⚠ WARNING

High voltage that may be present on leads could cause electrical shock.

Avoid contact with the leads and terminals.

Ensure the mains power to the transmitter is off and the lines to any other external power source are disconnected or not powered while wiring the transmitter.

Probes covered with plastic and/or with plastic discs may generate an ignition-capable level of electrostatic charge under certain extreme conditions. Therefore, when the probe is used in a potentially explosive atmosphere, appropriate measures must be taken to prevent electrostatic discharge.

4.2 Cable/conduit entries

The electronics housing has two entries for ½ - 14 NPT. Optional M20×1.5, minifast® and eurofast® adapters are also available. The connections are made in accordance with local or plant electrical codes.

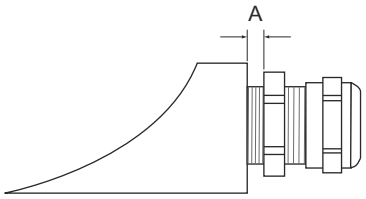
Make sure that unused ports are properly sealed to prevent moisture or other contamination from entering the terminal block compartment of the electronics housing.

Note
Use the enclosed metal plugs to seal unused ports. The plastic plugs mounted at delivery are not sufficient as seal!

Note
Thread sealing (PTFE) tape or paste on male threads of conduit is required to provide a water/dust tight conduit seal and to meet the required degree of ingress protection as well as to enable future removal of the plug/gland.

NPT is a standard for tapered threads. Engage the gland with 5 to 6 threads. Note that there will be a number of threads left outside the housing as illustrated in Figure 4-1.

Figure 4-1: Cable Entry with NPT Threaded Gland



A. The NPT threaded gland leaves a number of threads outside the housing

Ensure that glands for the cable entries meet requirements for IP class 66 and 67.

4.3 Grounding

Ensure grounding is done (including IS ground inside Terminal compartment) according to Hazardous Locations Certifications, national and local electrical codes.

Grounding is essential for Hazardous Location safety (even for Flameproof/Explosion Proof versions). A ground cable with a cross-sectional area of ≥ 4 mm^2 must be used.

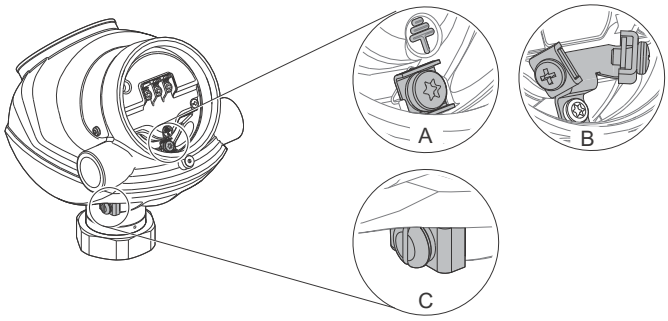
Note
Grounding the transmitter via threaded conduit connection may not provide sufficient ground.

Note
In the explosion-proof/flameproof version, the electronics is grounded via the transmitter housing. After installation and commissioning ensure that no ground currents exist due to high ground potential differences in the installation.

Transmitter housing grounding

The most effective transmitter housing grounding method is a direct connection to earth ground with minimal (< 1 Ω) impedance. There are two grounding screw connections provided (see Figure 4-2).

Figure 4-2: Ground Screws



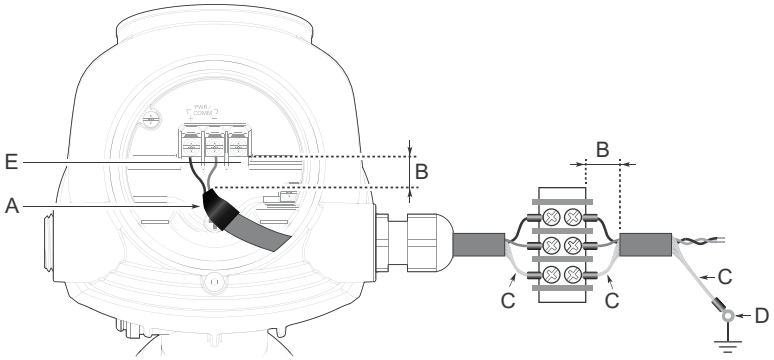
A. Internal ground screw, torque 28 in-lb (3.2 Nm)
B. Internal ground twin-screws for Hazardous locations certifications CSA/Canada, torque 10 in-lb (1.2 Nm)
C. External ground screw, torque 36 in-lb (4.1 Nm)

Signal cable shield grounding

Ensure the instrument cable shield is:

- Trimmed close and insulated from touching the transmitter housing.
- Continuously connected throughout the segment.
- Connected to a good earth ground at the power supply end.

Figure 4-3: Cable Shield and Signal Wire Insulation



A. Insulate shield
B. Minimize distance
C. Trim shield and insulate
D. Connect shield back to the power supply ground
E. Signal cable insulation must extend into the interior of each separate terminal

4.3.1 Grounding - FOUNDATION™ Fieldbus

⚠ Signal wiring of the fieldbus segment cannot be grounded. Grounding out one of the signal wires will shut down the entire fieldbus segment.

Shield wire ground

To protect the fieldbus segment from noise, grounding techniques for shield wire usually require a single grounding point for shield wire to avoid creating a ground loop. The ground point is typically at the power supply.

4.4 Cable selection

Use shielded twisted pair wiring for the Rosemount™ 5300 Level Transmitter to comply with EMC regulations. The cables must be suitable for the supply voltage and approved for use in hazardous areas, where applicable. For instance, in the U.S., explosion-proof conduits must be used in the vicinity of the vessel. For the ATEX and the IECEx flameproof versions of the Rosemount 5300 Level Transmitter, suitable conduits with sealing device or flameproof Ex d) cable glands must be used depending on local requirements.

Use 18 AWG to 12 AWG to minimize the voltage drop to the transmitter.

Note
Avoid running instrument cable next to power cables in cable trays or near heavy electrical equipment.

4.5 Hazardous areas

When the Rosemount 5300 Level Transmitter is installed in a hazardous area, local regulations and specifications in applicable certificates must be observed.

4.6 4-20 mA/HART® communication

4.6.1 Power requirements

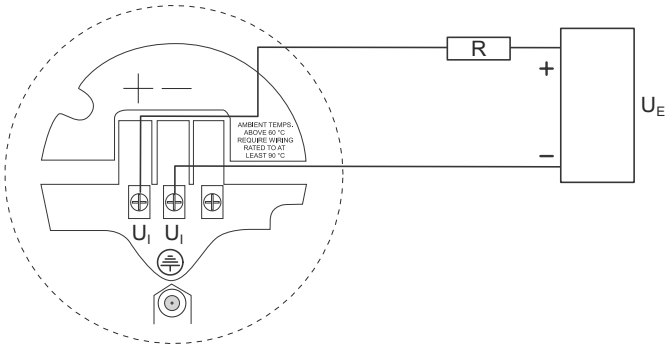
Terminals in the transmitter housing provide connections for signal cables. The Rosemount 5300 Level Transmitter is loop-powered and operates with the following power supplies:

Table 4-1: External Power Supply for HART

Approval type	Input voltage (U_i)(1)
None	16 - 42.4 Vdc
Non-sparking/Energy Limited	16 - 42.4 Vdc
Intrinsically Safe	16 - 30 Vdc
Explosion-proof/Flameproof	20 - 42.4 Vdc

(1) Reverse polarity protection.

Figure 4-4: External Power Supply for HART



R = Load Resistance (Ω)

U_E = External Power Supply Voltage (Vdc)

U_i = Input Voltage (Vdc)

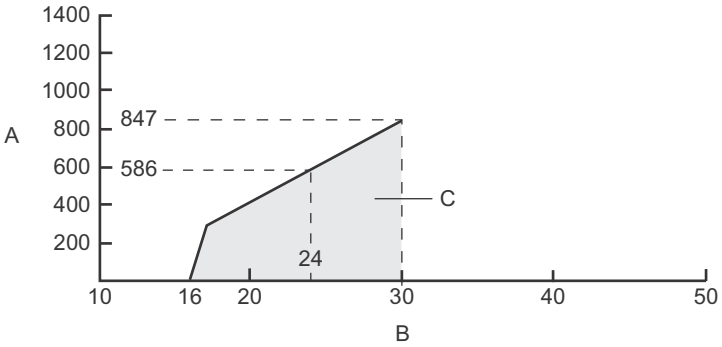
Table 4-2: Minimum Input Voltage (U_i) at Different Currents

Hazardous approval	Current	
	3.75 mA	21.75 mA
	Minimum input voltage (U_i)	
Non-hazardous installations, intrinsically safe installations and Non-sparking installations	16 Vdc	11 Vdc
Explosion-proof/flameproof installations	20 Vdc	15.5 Vdc

4.6.2 Load limitations

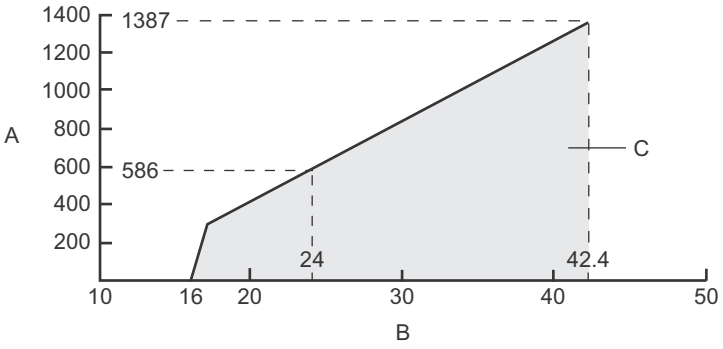
For HART® communication, a minimum loop resistance of 250 Ω is required. Maximum loop resistance is determined by the voltage level of the external power supply, as given by the following diagrams:

Figure 4-5: Intrinsically Safe Installations



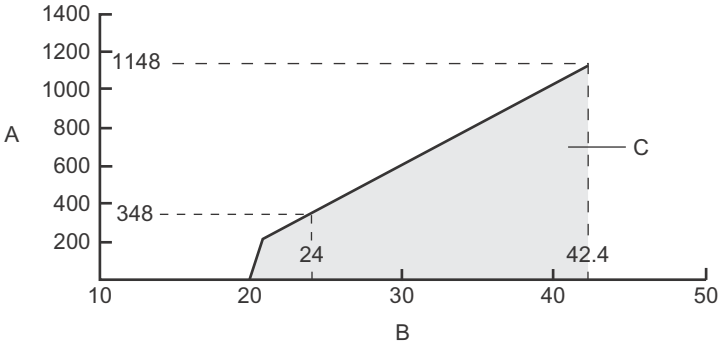
A. Loop Resistance (Ohms)
B. External Power Supply Voltage (Vdc)
C. Operating region

Figure 4-6: Non-Hazardous and Non-Sparking/Energy Limited Installations



A. Loop Resistance (Ohms)
B. External Power Supply Voltage (Vdc)
C. Operating region

Figure 4-7: Explosion-Proof/Flameproof (Ex d) Installations

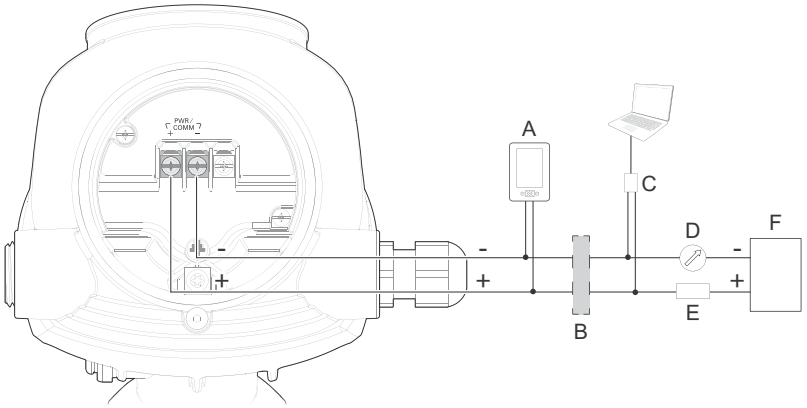


A. Loop Resistance (Ohms)
B. External Power Supply Voltage (Vdc)
C. Operating region

Note
For the Ex d case, the diagram is only valid if the load resistance is at the + side and if the - side is grounded, otherwise the maximum load resistance is limited to 435 Ω.

4.6.3 Wiring diagram

Figure 4-8: Wiring Diagram for 4-20 mA/HART®



A. Handheld communicator
B. Approved IS barrier (for Intrinsically Safe installations only)
C. HART modem
D. Current meter
E. Load resistance (≥250 Ω)
F. Power supply

Note
Rosemount 5300 Level Transmitters with flameproof/explosion-proof output have a built-in barrier; no external barrier needed.

For flameproof/explosion-proof applications the resistance between the negative terminal on the transmitter and the power supply must not exceed 435 Ω.

Note
For flameproof/explosion-proof installations, ensure the transmitter is grounded to the internal ground terminal inside the terminal compartment in accordance with national and local electrical codes.

Note
For intrinsically safe installations, ensure the instruments in the loop are installed in accordance with intrinsically safe field wiring practices and system control drawings when applicable.

4.7 HART® to Modbus® converter (HMC)

4.7.1 External power supply

The input voltage U_i for Modbus is 8-30 Vdc (max. rating).

4.7.2 Signal wiring

For the RS-485 bus, use shielded twisted pair wiring, preferably with an impedance of 120 Ω (typically 24 AWG) in order to comply with the EIA-485 standard and EMC regulations. The maximum cable length is 4000 ft./1200 m.

4.7.3 Power supply cabling

The power supply cables must be suitable for the supply voltage and ambient temperature, and approved for use in hazardous areas, where applicable.

4.7.4 Ground (common mode) voltage limit

± 7 V

4.7.5 Bus termination

Standard RS-485 bus termination per EIA-485

4.7.6 Connection terminals

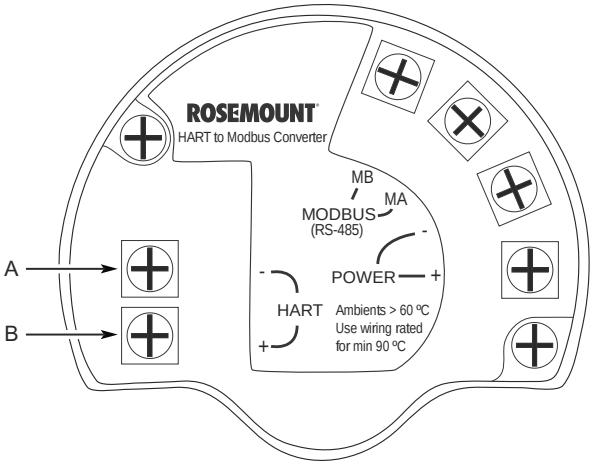
The connection terminals are described in Table 4-3.

Table 4-3: Connection Terminals

Connector label	Description	Comment
HART +	Positive HART connector	Connect to PC with Rosemount Radar Master software, handheld communicator, or other HART configurators.
HART -	Negative HART connector	
MA	Modbus RS-485 B connection (RX/TX+)(1)	Connect to RTU
MB	Modbus RS-485 A connection (RX/TX-)(1)	
POWER +	Positive power input terminal	Apply +8 Vdc to +30 Vdc (max. rating)
POWER -	Negative power input terminal	

(1) The designation of the connectors do not follow the EIA-485 standard, which states that RX/TX- should be referred to as 'A' and RX/TX+ as 'B'.

Figure 4-9: Connection Terminals for Rosemount 5300 with HART to Modbus Converter



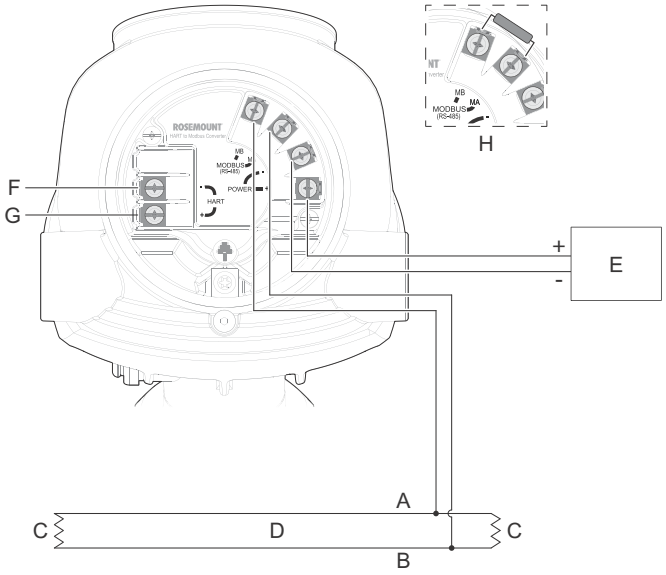
A. HART -
B. HART +

4.7.7 RS-485 bus

- The Rosemount 5300 Level Transmitter does not provide electrical isolation between the RS-485 bus and the transmitter power supply.
- Maintain a bus topology and minimize stub length.
- The RS-485 bus needs to be terminated once at each end, but should not be terminated elsewhere on the bus.

4.7.8 Wiring diagram

Figure 4-10: Wiring Diagram for RS-485 with Modbus®



A. "A" line
B. "B" line
C. 120 Ω
D. RS-485 Bus
E. Power supply
F. HART -
G. HART +
H. If it is the last transmitter on the bus, connect the 120 Ω termination resistor.

Note
Rosemount 5300 Level Transmitters with Flameproof/Explosion-proof output have a built-in barrier; no external barrier needed.(3)

4.7.9 Installation cases

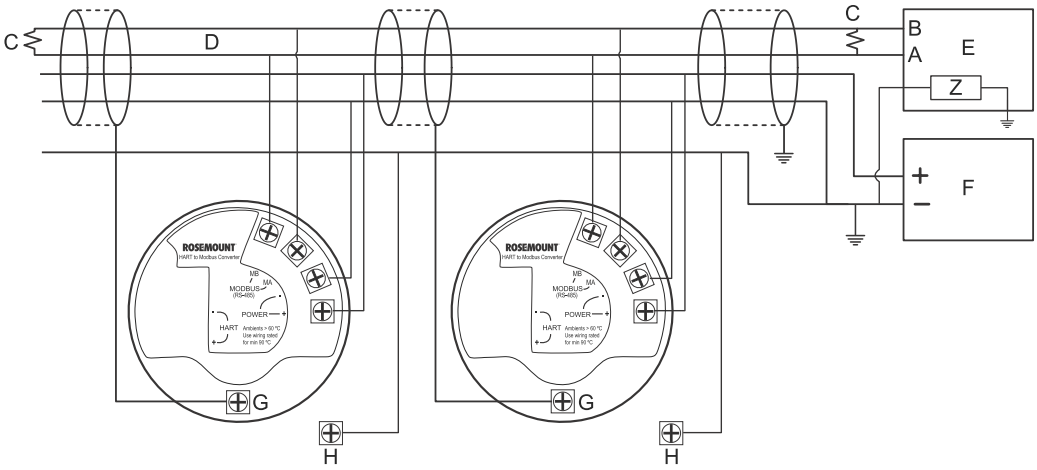
- Use common ground for Modbus Master and power supply.
- The power cables and RS-485 bus are in the same cable installation.
- A ground cable is installed and shall be used (cable size > 4 mm according to IEC60079-14, or size according to applicable national regulations and standards). A properly installed threaded conduit connection may provide sufficient ground.
- The cable shielding is grounded at master site (optional).

Note
⚠ The HART to Modbus Converter (HMC) equipped transmitter contains intrinsically safe circuits that require the housing to be grounded in accordance with national and local electrical codes. Failure to do so may impair the protection provided by the equipment.

(3) An external galvanic isolator is always recommended to be used for Flameproof/Explosion-proof installations.

Install the Rosemount 5300 Level Transmitter as shown in Figure 4-11. Up to 32 devices may be wired on one RS-485 bus using a multidrop wiring topology.

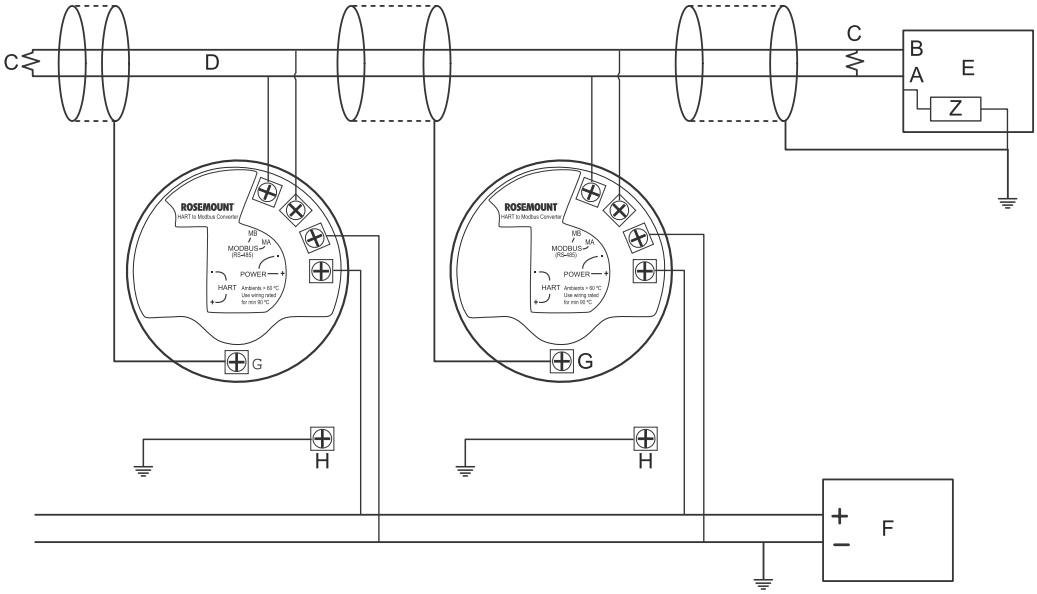
Figure 4-11: Multidrop Connection of Rosemount 5300 Level Transmitters



A. "A" line
B. "B" line
C. 120Ω
D. RS-485 bus
E. Modbus Master
F. Power supply
G. Internal ground screw
H. External ground screw

Alternatively, the Rosemount 5300 Level Transmitter can be installed as shown in Figure 4-12. If this wiring layout is used, there is an increased risk for communication disturbances due to differences in potential between grounding points. By using the same grounding point for Modbus Master and power supply, this risk is reduced.

Figure 4-12: Alternative Multidrop Connection of Rosemount 5300 Level Transmitters

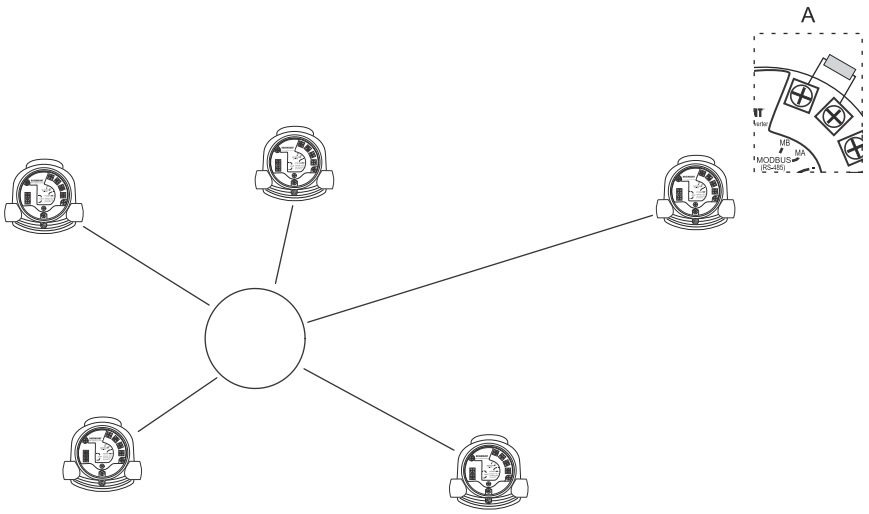


A. "A" line
B. "B" line
C. 120Ω
D. RS-485 bus
E. Modbus Master
F. Power supply
G. Internal ground screw
H. External ground screw

Star topology

For a star topology connection of the Rosemount 5300 Level Transmitter, the transmitter with the longest cable run needs to be fitted with a 120 Ω termination resistor.

Figure 4-13: Star Topology Connection of Rosemount 5300



A. 120 Ω termination resistor

4.7.10 External HART® devices (slaves)

The HART to Modbus® Converter (HMC) supports up to four external HART devices. The external devices are separated by using the HART address. The address must be different between the external devices and only addresses 1 to 5 are allowed for multiple slaves. Connect the devices one at a time and change the short address prior to connecting the next device by using a HART Configuration Tool such as Rosemount Radar Master, or a handheld communicator.

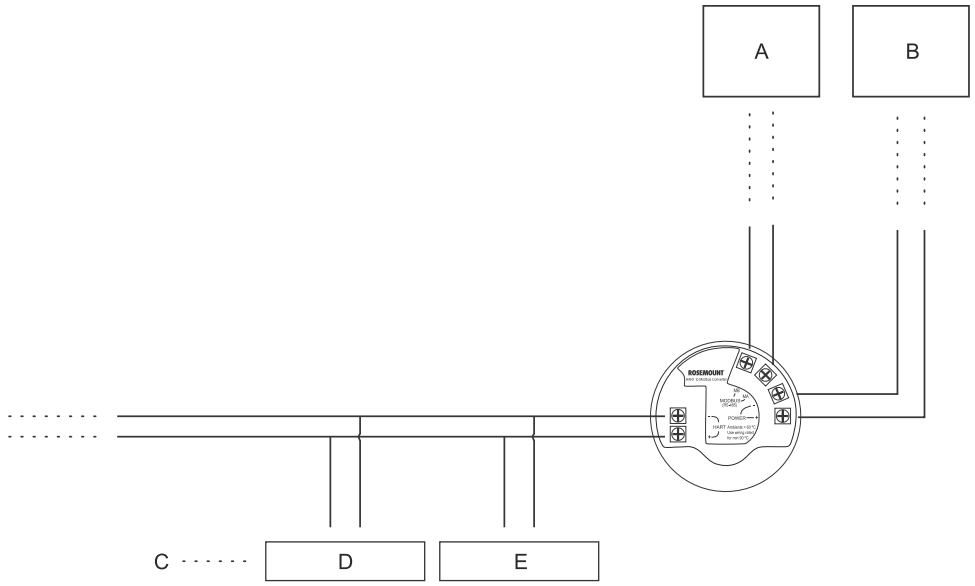
Note
The power supply from the HMC to external HART devices is not intrinsically safe. In a hazardous environment, any external HART device connected to the HMC must have Flameproof/Explosion-proof certification.

The HMC cyclically polls the HART devices for measurement values. The update rate depends on the number of connected devices and is shown in Table 4-4.

Table 4-4: Approximate Update Rates for Measurement Values

Number of devices (slaves)	Approximate update rate
1	2 seconds
2	3 seconds
3	4 seconds
4	5 seconds
5	5 seconds

Figure 4-14: The HMC Module Supports up to Four External Devices (Slaves)



A. RS-485 bus
B. Power supply
C. Up to four external devices
D. External HART device 2
E. External HART device 1

4.8 FOUNDATION™ Fieldbus

4.8.1 Power requirements

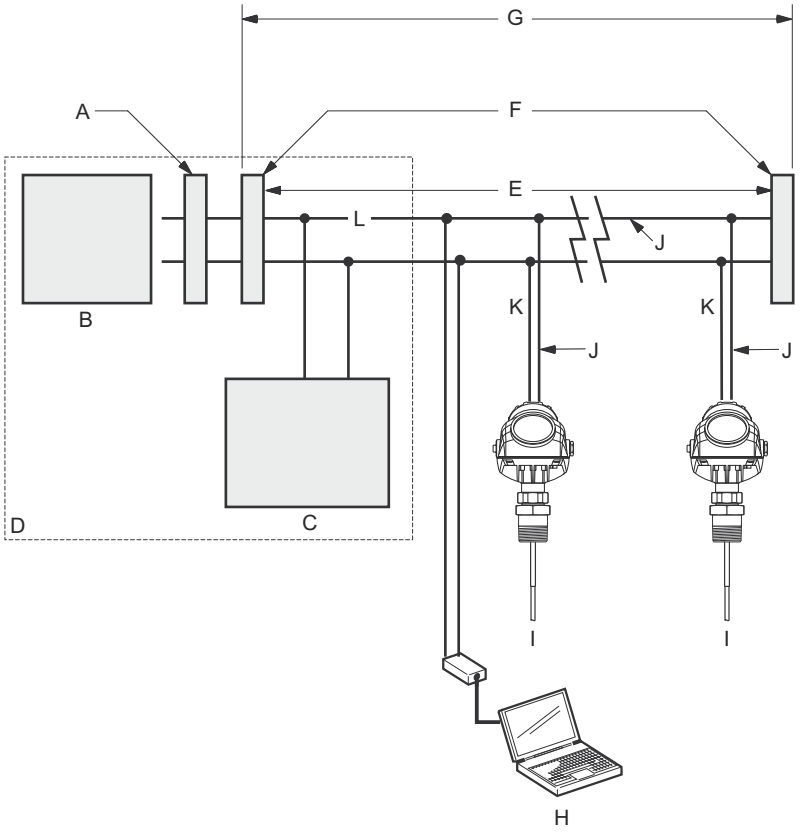
Terminals in the transmitter housing provide connections for signal cables. The Rosemount 5300 Level Transmitter is powered over FOUNDATION™ Fieldbus with standard fieldbus power supplies. The transmitter operates with the following power supplies:

Table 4-5: External Power Supply for FOUNDATION Fieldbus

Approval type	Power supply (Vdc)
None	9 - 32
Non-sparking/Energy limited	9 - 32
Intrinsically Safe	9 - 30
FISCO	9 - 17.5
Explosion-proof/flameproof	16 - 32

4.8.2 Connecting fieldbus devices

Figure 4-15: Rosemount 5300 Level Transmitter Field Wiring

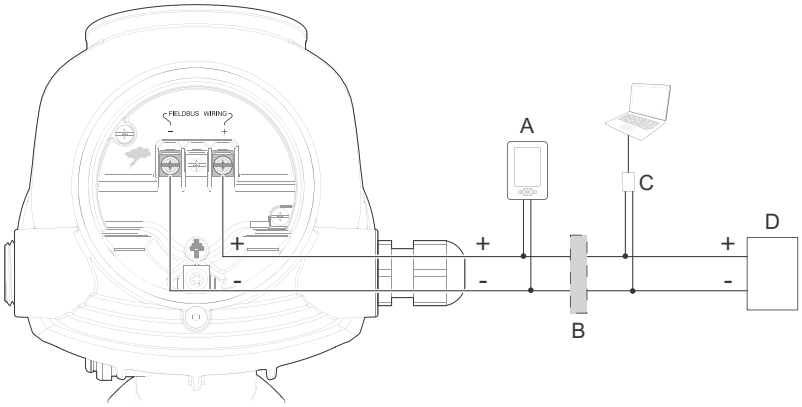


A. Integrated power conditioner and filter
B. Power supply
C. FOUNDATION™ Fieldbus configuration tool
D. (The power supply, filter, first terminator, and configuration tool are typically located in the control room.)
E. Fieldbus segment
F. Terminators
G. 6234 ft. (1900 m) maximum (depending upon cable characteristics)
H. Configuration with Rosemount Radar Master (in a fieldbus system hooked up on fieldbus segment)
I. Fieldbus devices on segment
J. Signal wiring
K. (Spur)
L. (Trunk)

* Intrinsically safe installations may allow fewer devices per I.S. barrier due to current limitations

4.8.3 Wiring diagram

Figure 4-16: Wiring Diagram for FOUNDATION Fieldbus



A. Handheld communicator
B. Approved IS barrier (for Intrinsically Safe installations only)
C. FOUNDATION Fieldbus modem
D. Power supply

Note
Rosemount 5300 Level Transmitters with flameproof/explosion-proof output have a built-in barrier; no external barrier needed.

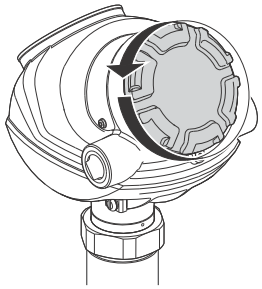
Note
For intrinsically safe installations, ensure the instruments in the loop are installed in accordance with intrinsically safe field wiring practices.

Note
For explosion-proof/flameproof installations, ensure the transmitter is grounded to the internal ground terminal inside the terminal compartment in accordance with national and local electrical codes.

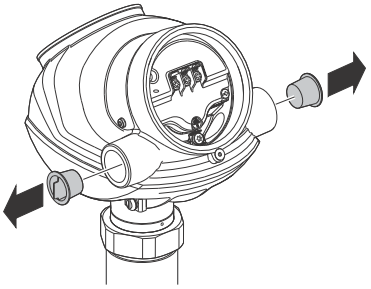
4.9 Connect wiring and power up

Procedure

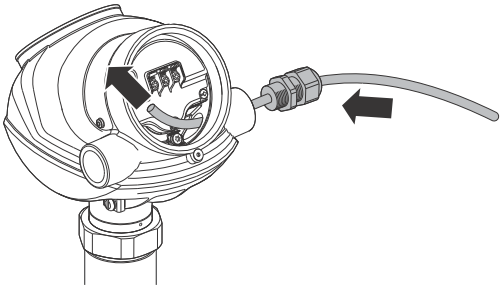
1. ⚠ Confirm the power supply is switched off.
2. Remove the terminal block cover.



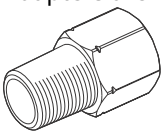
3. Remove the plastic plugs.



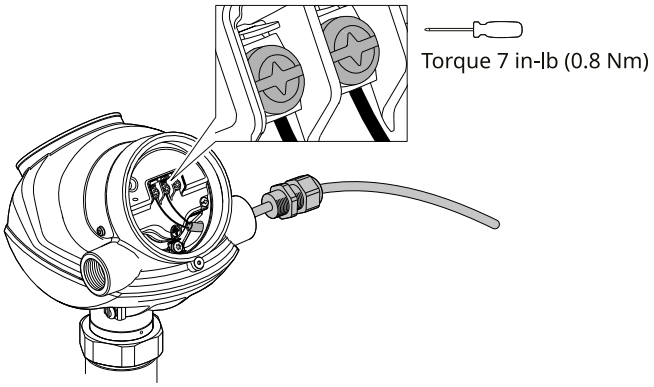
4. Pull the cable through the cable gland/conduit.



Adapters are required if M20 glands are used.



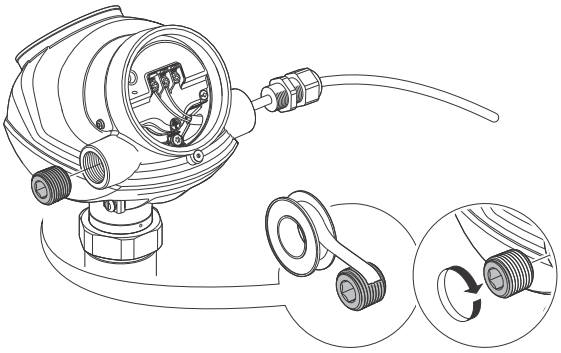
5. Connect the cable wires (see Figure 4-8, Figure 4-16, and Figure 4-10



6. Ensure proper grounding.

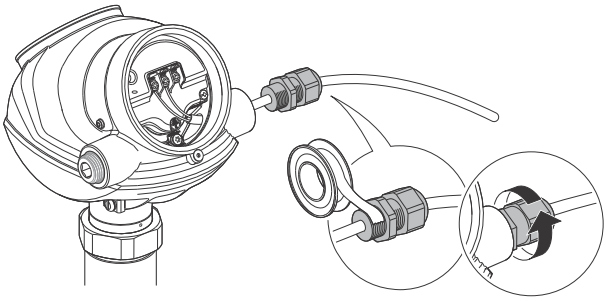
7. Use the enclosed metal plug to seal any unused port.

Note
Apply PTFE tape or other sealant to the threads.

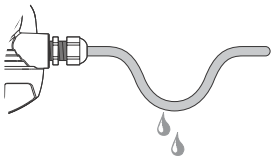


8. Tighten the cable gland.

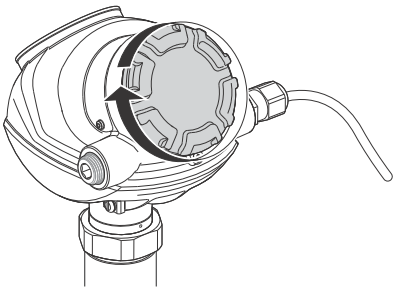
Note
Apply PTFE tape or other sealant to the threads.



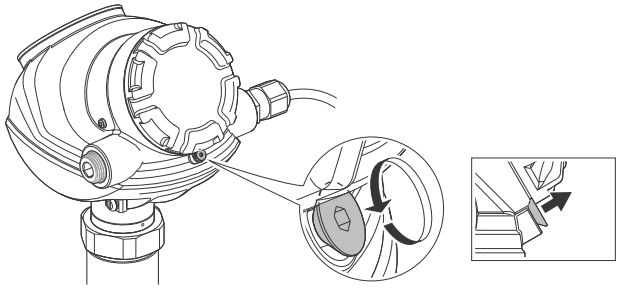
Note
Be sure to arrange the wiring with a drip loop.



9. ⚠ Mount the cover making sure the cover is secure to meet explosion-proof requirements.



10. Turn the jam screw counterclockwise until it contacts the cover.
    ⚠ Required for flameproof installations only.



11. Connect the power supply.

Related information

Cable/conduit entries
Grounding

4.10 Optional devices

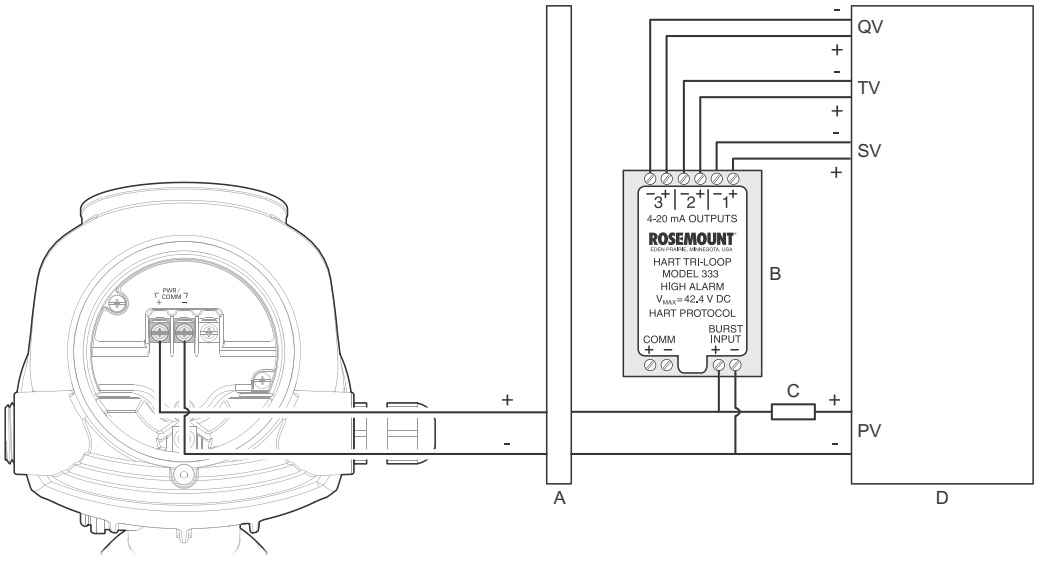
4.10.1 Rosemount 333 HART® Tri-Loop™

The Rosemount 5300 outputs a HART signal with four process variables. By using the Rosemount 333 HART Tri-Loop, up to three additional analog 4-20 mA outputs are provided.

Each Tri-Loop channel receives power from control room. Channel 1 must be powered for the Tri-Loop to operate.

The transmitter receives power from control room.

Figure 4-17: Example Installation of Rosemount 333 with Rosemount 5300



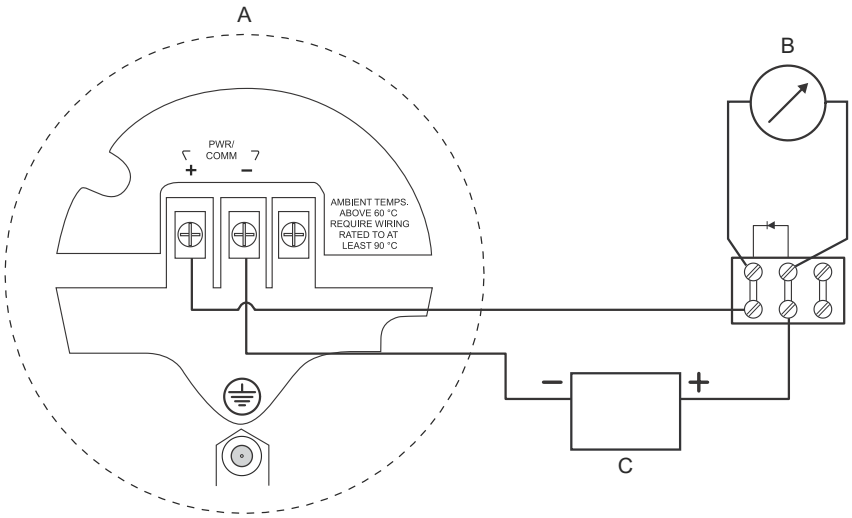
A. Approved IS barrier
B. DIN rail mounted Rosemount 333
C. Load resistance (≥250 Ω)
D. Control room

Related information

Rosemount 333 Reference Manual

4.10.2 Rosemount 751 Field Signal Indicator

Figure 4-18: Wiring Diagram for a Rosemount 5300 Transmitter with Rosemount 751 Field Signal Indicator



A. Rosemount 5300 Level Transmitter
B. Rosemount 751 Field Signal Indicator
C. Power supply

5 Configuration

5.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises ⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Failure to follow safe installation and servicing guidelines could result in death or serious injury.

Ensure the transmitter is installed by qualified personnel and in accordance with applicable code of practice.

Use the equipment only as specified in this manual. Failure to do so may impair the protection provided by the equipment.

Do not perform any services other than those contained in this manual unless you are qualified.

⚠ WARNING

Explosions could result in death or serious injury.

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.

Do not remove the gauge cover in explosive atmospheres when the circuit is alive.

5.2 Overview

The configuration of a Rosemount™ 5300 Level Transmitter is normally a simple and straightforward task. The complete configuration of a Rosemount 5300 Level Transmitter includes basic configuration, echo tuning, and advanced configuration. This section describes basic configuration.

If the transmitter is pre-configured at the factory according to the ordering specifications in the Configuration Data Sheet, no further basic configuration is required unless tank conditions have changed. The Rosemount 5300 Level Transmitter supports a set of advanced configuration options as well, which can be used to handle special tank conditions and applications.

It is highly recommended that prior to changing any parameters, save your current configuration as a backup file. If for any reason configuration data is lost or accidentally modified making the device inoperable, this backup file can be reloaded into the device.

5.2.1 Basic configuration

The basic configuration includes parameters for a standard configuration which is sufficient in most cases. The basic configuration comprises the following items:

- Measurement units
- Tank configuration - Tank geometry - Environment - Volume
- Analog output

5.2.2 Echo tuning

Amplitude thresholds can be adjusted in order to handle special situations when, for example, objects in the tank cause disturbing echoes that are stronger than the surface echo. A useful function is the Amplitude Threshold Curve (ATC) which lets you filter out single disturbing echoes. See Amplitude threshold curve for more information.

5.2.3 LCD configuration

It is possible to specify the variables to be presented on the display panel. See also Specify display panel variables.

5.2.4 Advanced configuration

For some applications, further device specific configuration is needed in addition to the basic configuration. This may be due to product properties or tank shape. See Advanced configuration for more information.

5.3 Configuration tools

- Field Device Integration (FDI) compliant systems
- Device Descriptor (DD) compliant systems
- Device Type Manager (DTM™) compliant systems
- Rosemount Radar Master

5.4 Host system integration

5.4.1 Confirm system readiness (HART® only)

Confirm HART® revision capability

If using HART based control or asset management systems, confirm the HART capability of those systems prior to transmitter installation. Not all systems are capable of communicating with HART Revision 7 protocol.

Transmitters with a firmware version 2F0 or later can be configured for either HART Revision 5 or 7.

Confirm correct device driver

Procedure

- Verify that the latest Device Driver (FDI/DD/DTM™) is loaded on your systems to ensure proper communication. See Table 5-1.
- Download the latest Device Driver from Emerson.com/MySoftware.

Table 5-1: Rosemount 5300 Device Revisions and Files

Firmware version(1)	Find Device Driver	
	HART® Universal Revision	Device Revision(2)
2F0 or later	7	4
	5	3
2A2 - 2E0	5	3

(1) Firmware version is printed on the transmitter head label (e.g. SW 2E0), or can be found here:

- *FDI/DD/DTM (select **Device Information** → **Revisions** → **Firmware Versions**).*
- *Rosemount Radar Master (select **Device** → **Properties**).*

(2) Device revision is printed on the transmitter head label (e.g. HART Dev Rev 4).

Download AMS Device Configurator

AMS Device Configurator is a software for configuration of Emerson field devices using FDI technology.

Procedure

Download the software at Emerson.com/AMSDeviceConfigurator.

Add the FDI Package to AMS Device Configurator

Procedure

1. Start **AMS Device Configurator**.
2. At the top left, click the menu icon and select **Add Device Package**.



3. Browse to the downloaded FDI Package and select **Open**.
4. Select **Add**.
5. Select **Back**.



Switch HART® revision mode

If the HART configuration tool is not capable of communicating with HART Revision 7, the device will load a generic menu with limited capability. To switch the HART revision mode from the generic menu:

Procedure

1. Locate the “Message” field.
2. In the Message field, enter **HART5** or **HART7**.

5.4.2 Set alarm limits

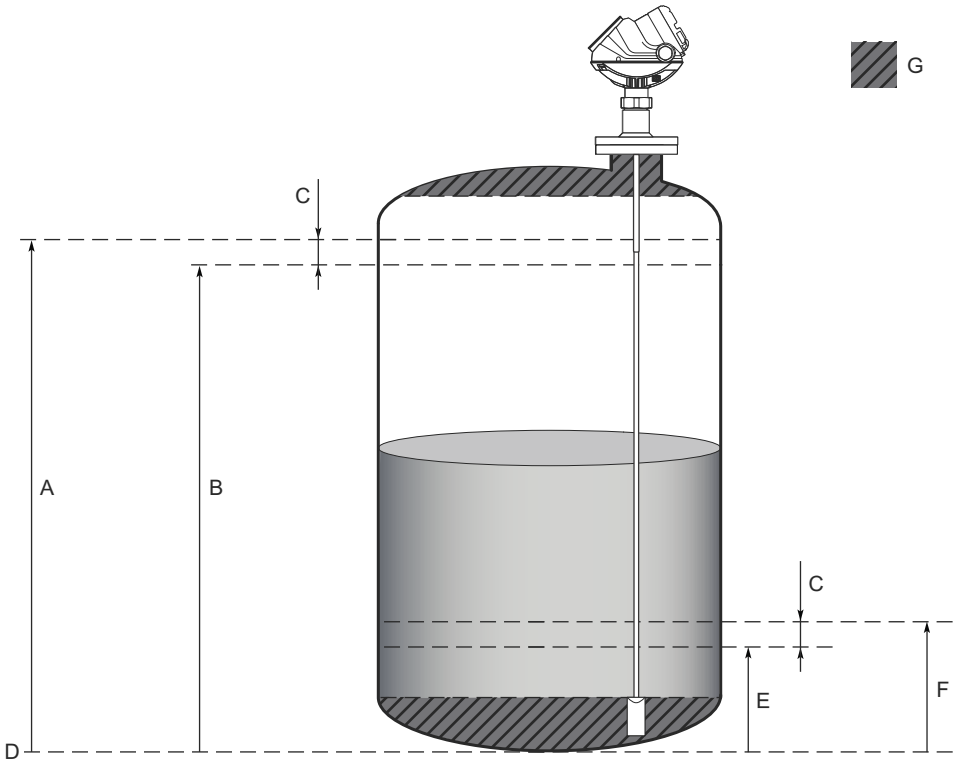
The alarm limits that are set in the host system need to be adjusted for the expected maximum product level rate and configured Damping Value.

When setting the high alarm limit, a safety margin (see Figure 5-1) should be subtracted from the desired high alarm limit. For the low alarm limit, the same safety margin should be added to the desired low alarm limit.

The safety margin ensures that the response time of the device is taken into account when specifying the alarm limits. See Table 5-2 or Table 5-3 (if Signal Quality Metrics is turned on) to determine the safety margin for your application.

Note
Alert limit values must be outside the Blind Zones and preferable outside areas with reduced accuracy.

Figure 5-1: Safety Margin for Alarm Limits



A. Desired high alarm limit
B. High alarm limit
C. Safety margin
D. Zero reference point
E. Desired low alarm limit
F. Low alarm limit
G. Blind Zones

Table 5-2: Safety Margin in Inches and Millimeters

Level rate in/min (mm/min)	Damping value			
	2 s (default)	10 s	20 s	50 s
Level Rate > 6.40 (160)	0.25 × Level Rate	0.60 × Level Rate	0.90 × Level Rate	1.90 × Level Rate
2.35 (60) < Level Rate < 6.40 (160)	0.50 × Level Rate	0.85 × Level Rate	1.15 × Level Rate	2.15 × Level Rate
1.05 (25) < Level Rate < 2.35 (60)	0.90 × Level Rate	1.25 × Level Rate	1.60 × Level Rate	2.60 × Level Rate
Level Rate < 1.05 (25)	1.75 × Level Rate	2.10 × Level Rate	2.40 × Level Rate	3.40 × Level Rate

Table 5-3: Safety Margin in Inches and Millimeters with Signal Quality Metrics Turned On

Level rate in/min (mm/min)	Damping value			
	2 s (default)	10 s	20 s	50 s
Level Rate > 6.40 (160)	0.40 × Level Rate	0.65 × Level Rate	1.00 × Level Rate	2.00 × Level Rate
2.35 (60) < Level Rate < 6.40 (160)	0.85 × Level Rate	1.10 × Level Rate	1.45 × Level Rate	2.45 × Level Rate
1.05 (25) < Level Rate < 2.35 (60)	1.55 × Level Rate	1.85 × Level Rate	2.15 × Level Rate	3.15 × Level Rate
Level Rate < 1.05 (25)	3.05 × Level Rate	3.30 × Level Rate	3.65 × Level Rate	4.65 × Level Rate

Procedure

1. Identify maximum product level rate for the application.
2. Note configured Damping Value.
   a) Rosemount Radar Master: Select **Setup** → **Advanced**.
   FDI/DD/DTM: Select **Service Tools** → **Echo Tuning**.
   b) Rosemount Radar Master: Select the **Echo Tracking** tab.
   FDI/DD/DTM: Select **Tracking Tab**.
3. Calculate where to position the high alarm limit in your host system.
   a) Determine desired high alarm limit.
   b) Subtract safety margin from the desired high alarm limit according to Table 5-2 (or Table 5-3 if Signal Quality Metrics is turned on).
4. Calculate where to position the low alarm limit in your host system.
   a) Determine desired low alarm limit.
   b) Add safety margin to the desired low alarm limit according to Table 5-2 (or Table 5-3 if Signal Quality Metrics is turned on).

Determine high alarm limit

Maximum product level rate = 100 mm/min Damping Value = 10 s

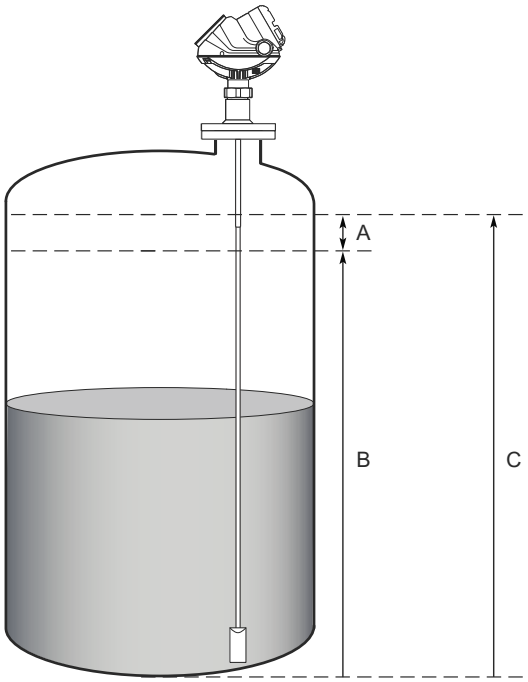
The Signal Quality Metrics is turned off in this example, so the safety margin is calculated using Table 5-2.

Safety margin = 0.85 × Level Rate = 0.85 × 100 = 85 mm

Desired high level alarm limit = 8500 mm

High alarm limit = Desired high alarm limit - Safety margin = 8500 - 85 = 8415 mm

Figure 5-2: Example - Determine High Alarm Limit



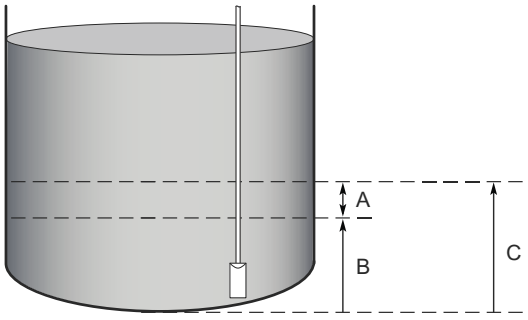
A. Safety margin = 85 mm
B. High alarm limit = 8500 - 85 = 8415 mm
C. Desired high alarm limit = 8500 mm

Determine low alarm limit

Desired low level alarm limit = 300 mm

Low alarm limit = Desired low alarm limit + Safety margin = 300 + 85 = 385 mm

Figure 5-3: Example - Determine Low Alarm Limit



A. Safety margin = 85 mm
B. Desired low alarm limit = 300 mm
C. Low alarm limit = 300 + 85 = 385 mm

5.5 Establish HART® communication for transmitter with HART to Modbus® Converter

Configuration is done by sending HART commands through the HART to Modbus Converter (HMC) to the 5300 Level Transmitter electronics. To establish HART communication, connect to the MA/MB terminals, or to the HART terminals.

5.5.1 Connect to the MA/MB terminals using RRM

The Rosemount 5300 Level Transmitter can be configured with Rosemount Radar Master using the MA, MB terminals.

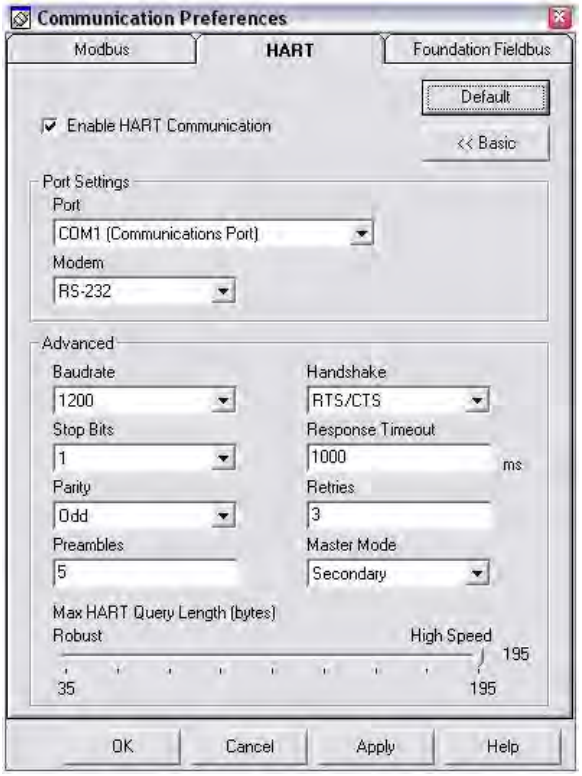
Prerequisites

An RS-485 Converter is required to connect to the transmitter.

Procedure

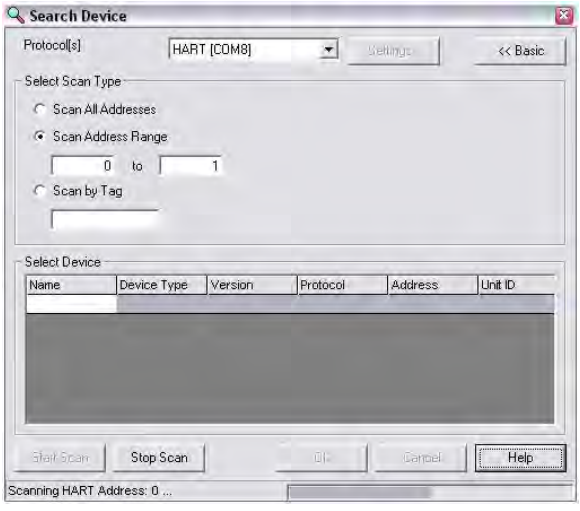
1. Connect the RS-485 Converter to the MA, MB connectors.
2. Start Rosemount Radar Master.
3. Enable HART communication and set communication preferences.
    a) Select **View** → **Communication Preferences**.
    b) Select the **HART** tab.
    c) Select the **Enable HART Communication** checkbox.
    d) In the ***Port*** list, select the COM port number that the RS-485 Converter is connected to.

e) Select **Advanced** and use the following settings:



f) Select **OK**.

4. Connect the power wires (or cycle power) to the transmitter.
5. Wait 20 seconds, and then search for and connect to device.
   a) Select **Device** → **Search**.
   b) Ensure HART address 1 is being scanned.



   c) Select **Start Scan**.
   After a while the ***Search Device*** window presents a list of found transmitters.

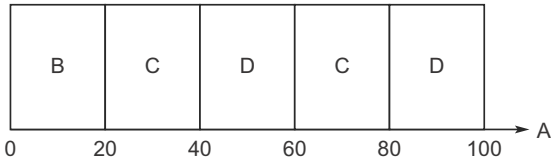
d) Select the device from the list and select **OK** to connect.

6. After completing the configuration, disconnect the RS-485 Converter, connect the Modbus communication wires and cycle power to the transmitter.
7. Verify communication between the transmitter and the RTU is established (can take up to 60 seconds from startup).

RS-485 communication after startup

The transmitter will try to establish communication using different protocols during 20 second time-slots from time of startup.

Figure 5-4: RS-485 Communication after Startup



A. Time (s)
B. Modbus RTU
C. HART
D. Configured protocol (Modbus RTU, Levelmaster, or Modbus ASCII)

The transmitter will continue to use a communication protocol once communication has been established.

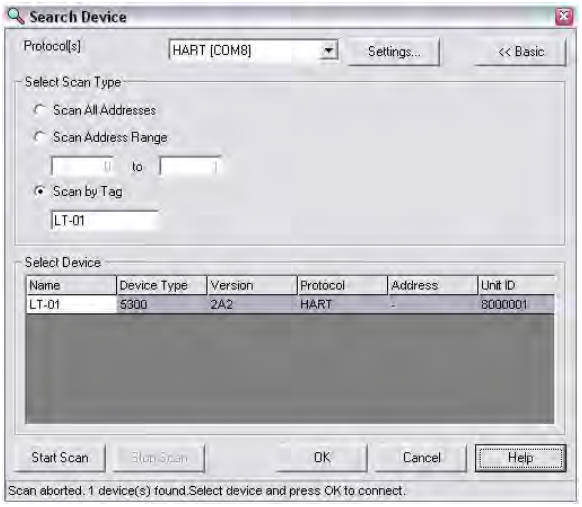
Establish communication when multiple 5300/5400 Modbus units are on the bus using RRM

By default, the transmitters have HART address 1. It will not be possible to establish communication on HART address 1 if several transmitters have the same address. In this case, there are alternative solutions to establish communication:

Procedure

1. Select **Device** → **Search**.
2. In the *Search Device* window, select **Scan by Tag**.

3. Enter the HART Device Tag of the transmitter. Communication can now be established with an individual transmitter even if several devices have the same HART address.



4. Ensure the Rosemount 5300 is alone on bus. Disconnect or turn off power from any other devices.

5.5.2 Connect to the HART terminals

To configure the Rosemount 5300 Level Transmitter, connect the communicator or PC to the HART terminals using a HART modem. Both the configuration tool and the RS-485 bus can be connected simultaneously. Configuration data is sent with HART commands through the HART to Modbus Converter (HMC) to the Rosemount 5300 Level Transmitter electronics. Note that the power supply must be connected during configuration.

Note
Measurement data is not updated to the Modbus Master when a configuration tool is connected.

Related information

Connection terminals

5.6 Change Modbus communication parameters

5.6.1 Change Modbus communication parameters using FDI/DTM

To change the Modbus address and communication parameters:

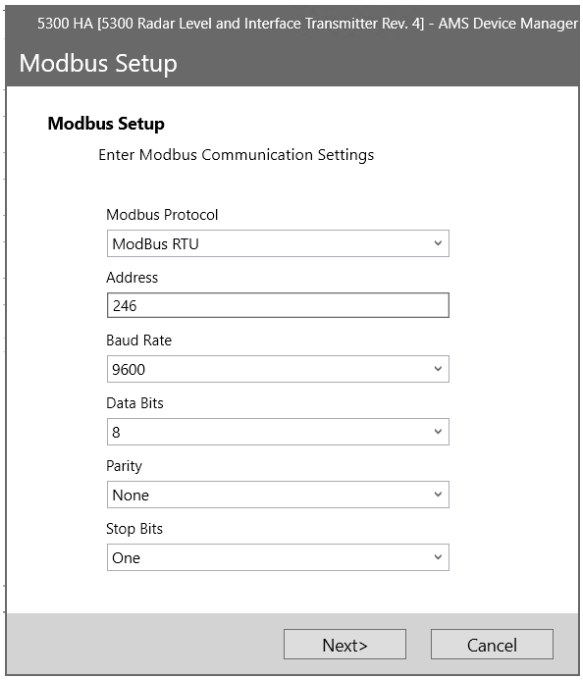
Prerequisites

To change Modbus communication parameters, the Rosemount 5300 Level Transmitter must use HART address 1, the default address.

Procedure

1. Select **Configure** → **Manual Setup** → **Device Setup**.

2. Select the **HART** tab.
3. Select **Modbus Setup**.
4. In the ***Modbus Setup*** window, select Modbus protocol and type the desired Modbus address.



5. Enter the baud rate, parity, and stop bits, then select **Next**.

Postrequisites

After changing communication parameters, disconnect the HART modem and wait at least 60 seconds for the change to take effect. In case the MA/MB terminals are used for connection to the HART to Modbus Converter (HMC), disconnect the RS-485 Converter, cycle power to the transmitter and wait up to 60 seconds for the change to take effect.

5.6.2 Change Modbus communication parameters using a handheld communicator

The Modbus communication parameters can be changed by entering a text string in the HART Message parameter.

Prerequisites

To change Modbus communication parameters, the Rosemount 5300 must use HART address 1, the default address.

Procedure

1. Select: **Overview** → **Device Information** → **Identification**.
2. Enter desired string into the **Message** area.

Postrequisites

After changing communication parameters, disconnect the handheld communicator and wait up to 60 seconds for the change to take effect.

5.6.3 Change Modbus communication parameters using RRM

To change the Modbus address and communication parameters in Rosemount Radar Master:

Prerequisites

To change Modbus communication parameters, the Rosemount 5300 Level Transmitter must use HART address 1, the default address.

Procedure

1. Start Rosemount Radar Master and connect to the transmitter.
2. Select **Setup** → **General**.
3. Select the **Communication** tab.
4. Select **Modbus Setup**.
5. In the ***Modbus Setup*** window, select **Enter Modbus communication settings**.
   It is also possible to enter a user-defined Modbus message in the ***Modbus String*** area.
6. Select Modbus protocol and type the desired Modbus address.
7. Enter the baud rate, parity, and stop bits, then select **OK**.

Postrequisites

After changing communication parameters, disconnect the HART modem and wait at least 60 seconds for the change to take effect. In case the MA/MB terminals are used for connection to the HART to Modbus Converter (HMC), disconnect the RS-485 Converter, cycle power to the transmitter and wait up to 60 seconds for the change to take effect.

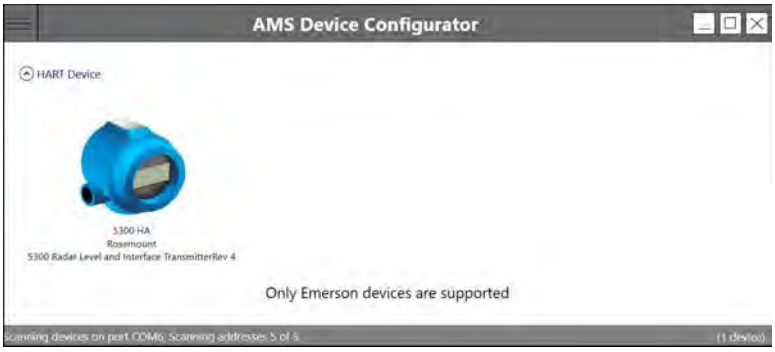
5.7 Basic configuration using FDI/DD/DTM

See Basic configuration parameters for information on the various configuration parameters.

5.7.1 Connect to device using AMS Device Configurator

Procedure

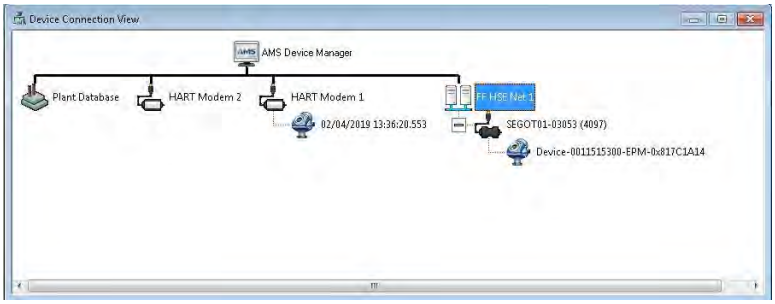
1. Start AMS Device Configurator.
2. Double-click the device icon.



5.7.2 Connect to device using AMS Device Manager

Procedure

1. Start AMS Device Manager.
2. Select **View** → **Device Connection View**.
3. In the *Device Connection View*, double-click the modem icon.
4. Double-click the device icon.



5.7.3 Connect to device using a handheld communicator

Procedure

Turn on the handheld communicator and connect to the device.

5.7.4 Configure device

Configure HART® devices

Procedure

1. Select **Configure** → **Guided Setup**.
2. Select **Level Measurement Setup** and follow the instructions.
3. Select **Device Specific Setup**.
4. Run **Verify Level** to check your level measurement.
5. (Optional) Select **Volume Setup**.
6. (Optional) Select **Display Setup**.

Configure FOUNDATION™ Fieldbus devices

Procedure

1. Select **Configure** → **Guided Setup**.
2. Select **Level Measurement Setup** and follow the instructions.
3. (Optional) Select **Volume Calculation Setup**.
4. (Optional) Select **Device Specific Setup**.
5. (Recommended) Select **Restart Measurement**.

5.8 Basic configuration using DeltaV

The Rosemount 5300 Level Transmitter supports DD Methods for DeltaV™ to facilitate transmitter configuration. The following description shows how to use DeltaV with AMS Device Manager to configure the Rosemount 5300 Level Transmitter. The corresponding FOUNDATION™ Fieldbus commands are also shown.

Procedure

1. From the **Start** menu, select **DeltaV** → **Engineering** → **DeltaV Explorer**.
2. Navigate through the file structure to find the Rosemount 5300 Level Transmitter.
3. Right-click the Rosemount 5300 Level Transmitter icon and select **Properties**.



The *Fieldbus Device Properties* window lets you enter device tag and description. This information is not required for the operation of the transmitter and can be left out if desired.

4. Check that the general information complies with the ordering information. General information such as device type (Rosemount 5300), manufacturer, device ID are presented.

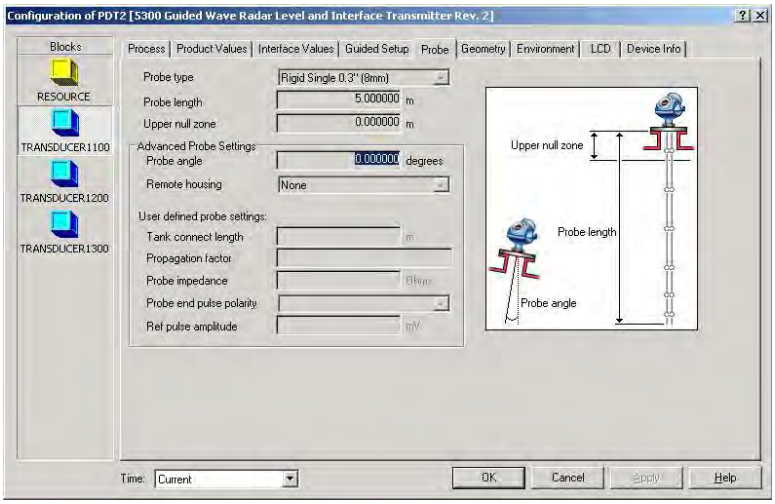
   The Rosemount 5300 Level Transmitter device ID consists of the following components: Manufacturer ID-Model-Serial Number.

   ### Example

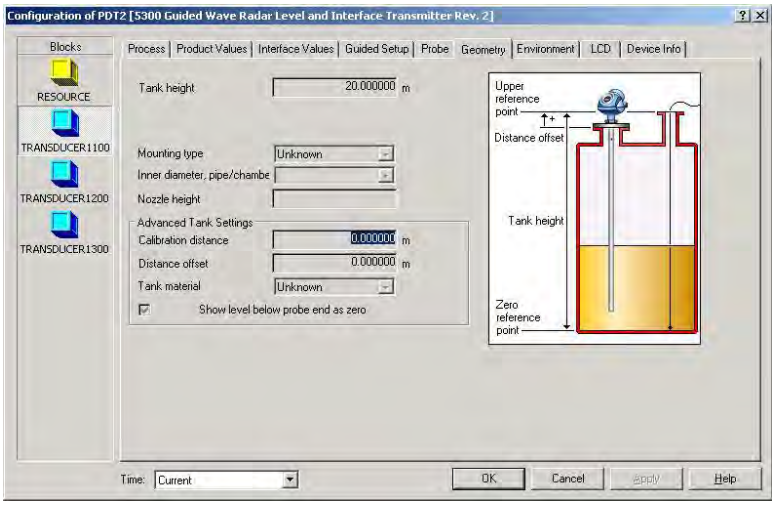
   0011515300 Radar T2-0x81413425

5. In the *DeltaV Explorer*, select the desired transmitter and choose the **Configure** option.

6. Select the **TRANSDUCER1100** block, and then select the **Probe** tab.

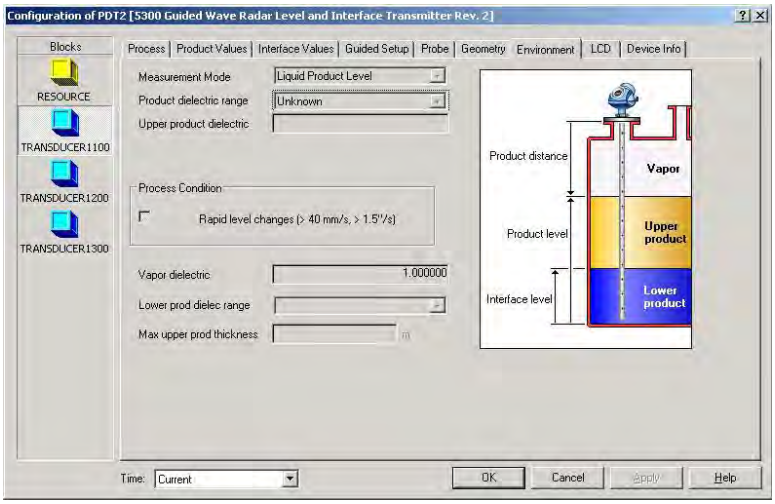


7. Check configuration of Probe Type.
   The transmitter automatically makes some initial calibrations based on the selected Probe Type. Normally, the Probe Type is pre-configured at the factory.
8. Check the entered Probe Length.
9. Select the **TRANSDUCER1100** block, and then select the **Geometry** tab.

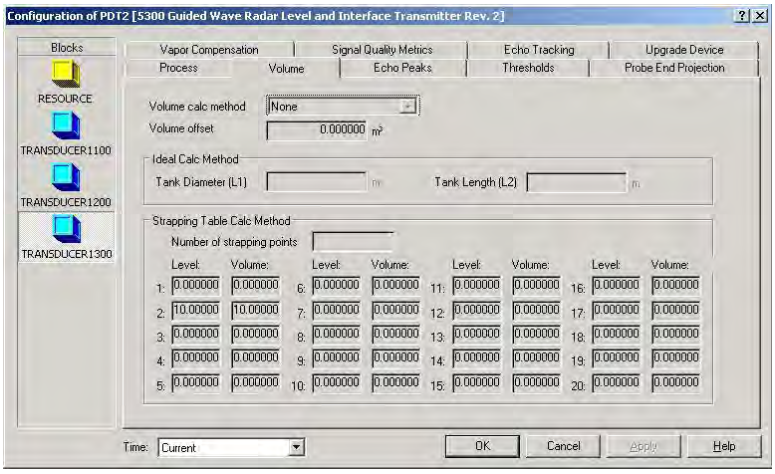


10. Enter the **Tank Height**.
11. Select the **Mounting Type**.
12. If using pipe, chamber or nozzle, then select the **Inner Diameter**.
13. If using nozzle, then enter the **Nozzle Height**.

14. Select the **Environment** tab.



15. Select the **Measurement Mode**.
16. Enter the **Product Dielectric Range**/**Upper Product Dielectric**.
17. Select the **Rapid level changes** check-box only if the surface is moving quickly up or down at rates over 1.5 in./s (40 mm/s).
18. To configure volume calculation, select the **TRANSDUCER1300** block, and then select the **Volume** tab.



19. In the *Volume Calc method* list, select the **Volume Calculation Method**.
20. If an ideal tank shape is selected, then enter the **Tank Diameter** and **Tank Length** (not for spherical tanks).
21. If **Strapping Table** is selected, starting at the bottom of the tank, for each new point, enter the total volume up to the specified level value.
22. (Optional) Enter the **Volume Offset** value.

5.9 Basic configuration using RRM

To configure the Rosemount 5300 Level Transmitter using Rosemount Radar Master (RRM), choose either of the following methods:

- Guided Setup if you are unfamiliar with the Rosemount 5300 Level Transmitter (see Guided setup).
- Setup functions if you are already familiar with the configuration process or for changes to the current settings (Using the setup functions).

5.9.1 System requirements

Hardware

	Minimum	Recommended
Processor	Pentium 200 MHz	Pentium 1 GHz
Memory	64 MB RAM	128 MB RAM
Graphical card	Screen resolution of 800 x 600	Screen resolution of 1024 x 768
COM Port	1 serial COM port or 1 USB port	
Hard drive space	100 MB	

Software

Operating systems supported:

- Microsoft® Windows 11
- Microsoft Windows 10
- Microsoft Windows 2000 - Service pack 3
- Microsoft Windows XP - Service pack 2 and Service pack 3
- Microsoft Windows 7 - 32-bit and 64-bit versions

5.9.2 Help in RRM

To open the Help window:

Procedure

Select **Help** → **Contents**.

Help is also available from a Help button in most windows.

5.9.3 Download Rosemount Radar Master

Rosemount Radar Master is a software for configuration of radar devices.

Procedure

Download the software at Emerson.com/RosemountRadarMaster.

5.9.4 Installing the RRM software for HART® communication

To install the Rosemount Radar Master:

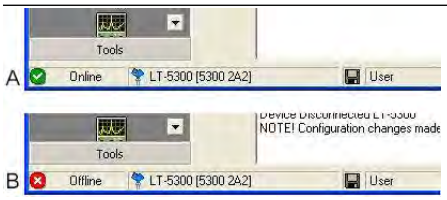
Procedure

1. Insert the installation CD into your CD-ROM drive.
2. If the installation program is not automatically started, choose **Run** from the Windows Start bar.
3. Type `D:\RRM\Setup.exe`, where D is the CD-ROM drive.
4. Follow the instructions on the screen.
5. Confirm that HART is chosen as default protocol.
6. For Windows 2000/XP/7, set COM port buffers to 1, see Set the COM port buffers.

Getting started

Procedure

1. Click the **Start** button, and then select **All Programs** → **Rosemount** → **Rosemount Radar Master** or click the RRM icon in the Windows workspace.
2. If the *Search Device* window did not appear automatically, then select **Device** → **Search**.
3. In the *Search Device* window, choose communication protocol HART.
4. If you want to specify start and stop address, then select **Advanced**.
5. Click the **Start Scan** button. Now RRM searches for the transmitter.
   After a while the *Search Device* window presents a list of found transmitters.
6. Select the desired transmitter and select **OK** to connect.
7. If communication does not work, check that the correct COM port is connected to the computer and that the COM port is properly configured, see Specify the COM port. You may also check in the *Communication Preferences* window that HART communication is enabled.
8. In the RRM Status Bar, verify that RRM communicates with the transmitter.



A. RRM communicates with the transmitter
B. No communication with the transmitter

5.9.5 Specify the COM port

If communication is not established, open the *Communication Preferences* window and check that the correct COM Port is selected:

Procedure

1. In RRM, select **View** → **Communication Preferences**.
2. Select the **HART** tab.

3. Select the **Enable HART Communication** checkbox.
4. Check which COM port the modem is connected to.
5. Choose the COM port option that matches the actual COM port on the PC that the transmitter is connected to.

5.9.6 Set the COM port buffers

For Windows 2000/XP/7 the COM port Receive Buffer and Transmit Buffer need to be set to 1. To set the COM port buffers:

Procedure

1. In the MS Windows Control Panel, open the **System** option.
2. Select the **Hardware** tab, and then select **Device Manager**.
3. Expand the **Ports** node in the tree view.
4. Righ-click the selected COM port and select **Properties**.
5. Select the **Port Settings** tab, and then select **Advanced**.
6. Drag the **Receive Buffer** slider to 1.
7. Drag the **Transmit Buffer** slider to 1.
8. Select **OK**.
9. Restart the computer.

5.9.7 Installing the RRM software for FOUNDATION™ Fieldbus

To install the Rosemount Radar Master for FOUNDATION Fieldbus communication:

Procedure

1. Start by installing the *National Instruments Communication Manager* software.

   See National Instruments manual (Getting started with your PCMCIA-FBUS and the NI-FBUS® software) for more information.
2. Insert the RRM installation CD into your CD-ROM drive.
3. If the installation program is not automatically started, choose **Run** from the Windows Start bar.
4. Type `D:\RRM\Setup.exe` where D is the CD-ROM drive.
5. Follow the instructions on the screen.
6. Confirm that FOUNDATION Fieldbus is chosen as default protocol.

Getting started

Procedure

1. Before starting RRM ensure that appropriate settings are made with the *National Instruments Interface Configuration Utility*:



   If only Rosemount Radar Master is connected to the bus:

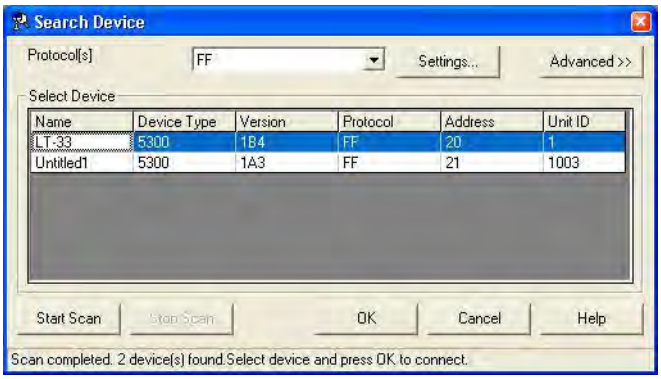
   - Device address = Fixed
   - Device Type = Link Master Device
   - Usage = NI-FBUS

   If other host systems are connected to the bus:

   - Device address = Visitor
   - Device Type = Basic Device
   - Usage = NI-FBUS

2. Click the **Start** button, and then select **All Programs** → **Rosemount** → **Rosemount Radar Master** or click the RRM icon in the Windows workspace.
3. If the National Instruments Communication Manager server is not running, select **Yes** when RRM displays a request for starting the server.
4. If the *Search Device* window did not appear automatically, then select **Device** → **Search**.
5. In the *Search Device* window, choose communication protocol FOUNDATION Fieldbus (if not already selected).
6. If you want to specify start and stop address, then select **Advanced**.

7. Select **Start Scan**. Now RRM searches for the transmitter.
   After a while RRM shows the transmitters found on the bus.



8. Select the desired transmitter and select **OK** to connect.
9. In the RRM Status Bar, verify that RRM communicates with the transmitter.



A. RRM communicates with the transmitter
B. No communication with the transmitter

5.9.8 Specifying measurement units

Measurement units for data presentation in RRM can be specified when the RRM program is installed. Units can also be changed as follows:

Procedure

1. Select **View** → **Application Preferences**.
2. Select the **Measurement Units** tab.
3. Choose the desired units for length, level rate, volume, and temperature.

5.9.9 Using the setup functions

Use the setup function if you are already familiar with the configuration process for the Rosemount 5300 Series Transmitter or for changes to the current settings:

Procedure

1. Start the RRM software.

2. In the RRM workspace choose the appropriate icon for the configuration of transmitter parameters.

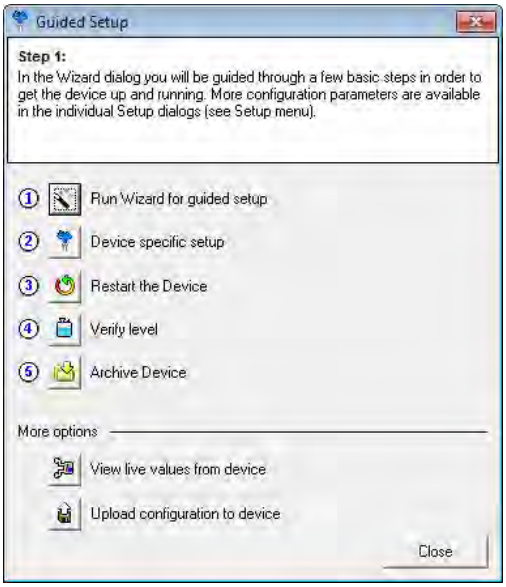
Icon	Description
Wizard	The Wizard is a tool that guides you through the basic configuration procedure of a Rosemount 5300 Level Transmitter.
General	Configuration of general settings such as communication parameters, device tag, and measurement units. This window also lets you configure which LCD variables to be displayed.
Tank	Configuration of probe, tank geometry, tank environment, and volume
Output	Configuration of analog and digital output
Echo Curve	Disturbance echo handling
Advanced	Advanced configuration

5.9.10 Guided setup

The following description shows how to use the Guided Setup in Rosemount Radar Master. The Guided Setup is useful if you are unfamiliar with the Rosemount 5300 Level Transmitter.

Procedure

1. Start the Guided Setup.
   a) Start Rosemount Radar Master. It automatically presents a list of available transmitters.
   b) Select the desired transmitter. Now the transmitter is connected and the *Guided Setup* window appears automatically:



2. In the *Guided Setup* window, select **Run Wizard for guided setup** and follow the instructions. Now you will be guided through a short transmitter installation procedure.

   Note
   The *Guided Setup* is an extended installation guide that includes more than just the configuration Wizard. It can be disabled by unchecking the **Open Guided Setup dialog after Connect** check box in the *Application Preferences* window (select **View** → **Application Preferences**, and then select the **View Options** tab).

3. In the *Device Properties* window, check that the information complies with the ordering information.

   The *Device Properties* window presents general information stored in the transmitter database such as device model, serial number, communication protocol and device address.

4. (Optional) In the *Device Tag* window, enter tag, message, descriptor, and date. The information is not required for the operation of the transmitter and can be left out if desired.
5. In the *Digital Units* window, select the digital units of measurement for the device.
6. In the *Probe* window, check configuration of Probe Type.

   The transmitter automatically makes some initial calibrations based on the selected Probe Type. Normally, the Probe Type is pre-configured at the factory.

7. Check the entered Probe Length.
8. In the *Geometry* window, set the tank geometry parameters.
   a) Enter the **Tank Height**.
   b) Select the **Mounting Type**.
   c) If using pipe, chamber or nozzle, then select the **Pipe/Chamber/Nozzle Inner Diameter**.
   d) If using nozzle, then enter the **Nozzle Height**.
9. In the *Environment* window, specify tank environment.
   a) Select the **Measurement Mode**.
   b) Enter the **Product Dielectric Range**/**Upper Product Dielectric Constant**.
10. In the *Volume* window, select the **Volume Calculation Method**.
11. If an ideal tank shape is selected, then enter the **Diameter** and **Length** (not for spherical tanks).
12. If **Strapping Table** is selected, starting at the bottom of the tank, for each new point, enter the total volume up to the specified level value.
13. (Optional) Enter the **Volume Offset** value.
14. (HART only) In the *Analog Out 1* window, configure the analog output.
    a) In the *Output Source (PV)* list, select the desired transmitter variable to use for the analog output.
    b) Specify the analog output range by setting the **Lower Range Value (4 mA)** and the **Upper Range Value (20 mA)** to the desired values.
    c) In the *Alarm Mode AOut 1* list, select the **Alarm Mode** you want to use for your analog out channel.

15. In the *Finish Configuration Wizard* window, select **Finish** and continue with the next step in the guided setup.

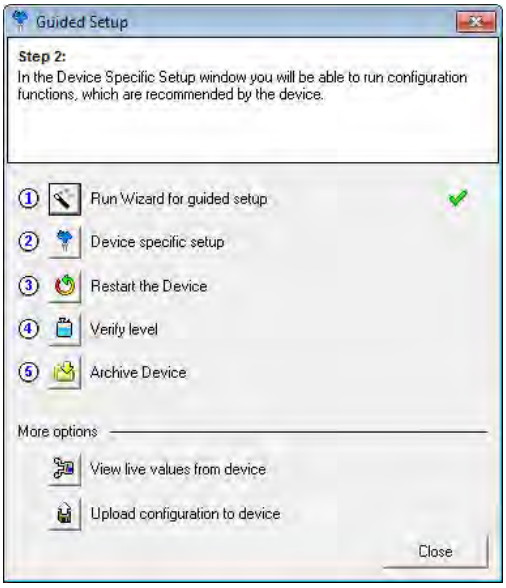
    This is the last window in the Configuration Wizard concluding the basic configuration. The current configuration can be changed at any time using the setup windows (General, Tank, Output etc., see Using the setup functions). The setup windows contain further options not available in the Configuration Wizard.

Device specific setup

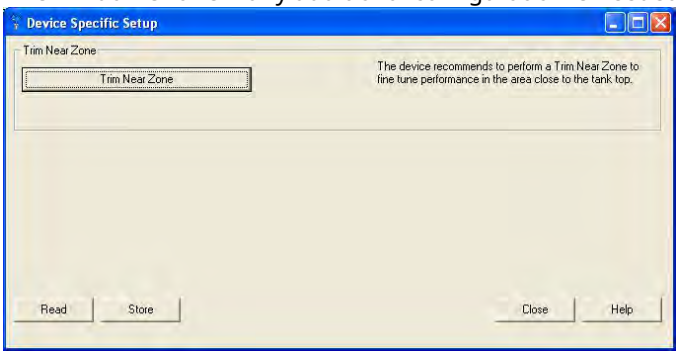
The Device Specific Setup provides additional configuration functions, as recommended by the device.

Procedure

1. In the *Guided Setup* window, select **Device specific setup** and follow the on-screen instructions.



This window shows if any additional configuration is needed.



2. Choose the tank material if recommended.
3. Proceed to Restart the device if no configuration is needed.

Related information

Trim near zone function
Probe end projection

Dielectric constant settings

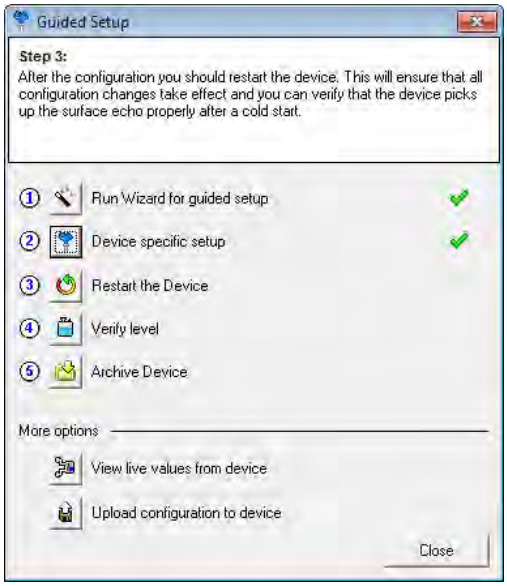
Restart the device

When the transmitter is configured, it should be restarted to ensure that all configuration changes are properly activated and the transmitter performs as expected.

Procedure

In the *Guided Setup* window, select **Restart the Device**.

It may take up to 60 seconds until measurement values are updated.



Run verify level

The Verify Level tool matches the product level reported by the device to a reference measurement (for example hand-dipping with a measurement tape).

If any difference, the Calibration Distance parameter will be adjusted. A minor adjustment using Calibration Distance is normal. There may, for example be a deviation between the actual tank height and the configured value.

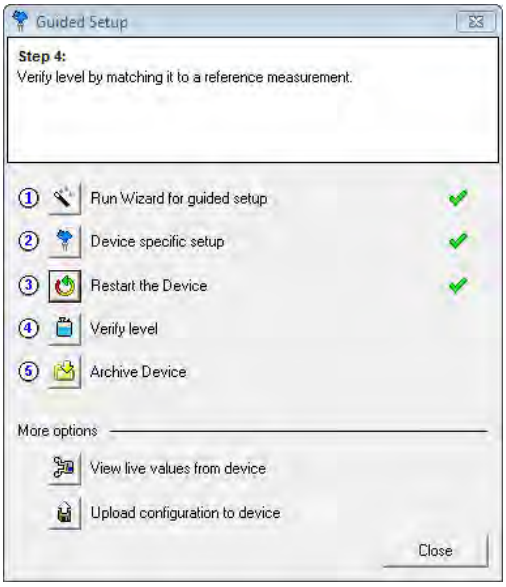
Prerequisites

Ensure that:

- The product surface is calm.
- The tank is not being filled or emptied
- The actual level is well above the probe end.

Procedure

1. In the *Guided Setup* window, select **Verify level** to check your level measurement.



2. Follow the on-screen instructions.

Note
The offset (Calibration Distance parameter) is automatically set after completing the Verify Level method. An offset greater than 4 in. (100 mm) indicates a problem with the level measurement. Re-check configuration parameters. If these are correct, then view an echo plot and evaluate thresholds.

Related information

Calibration distance

Archive device

When configuration is finished, it is recommended that the configuration is saved to a backup file.

The backup file may be useful to:

- Install another Rosemount 5300 Level Transmitter in a similar tank since the file can be directly uploaded to a new device.
- Restore the configuration, if for any reason, configuration data is lost or accidentally modified making the device inoperable.

Procedure

In the *Guided Setup* window, select **Archive Device**.



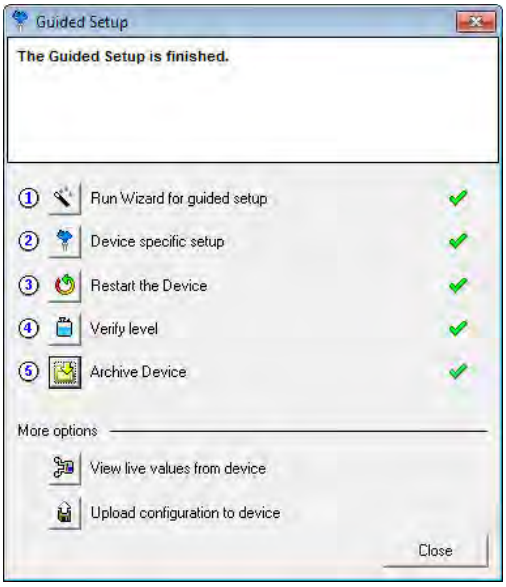
The Archive Device function will create an information package for support purposes. The package includes a complete backup of the device, several logs, and echo curves.

View live values from device

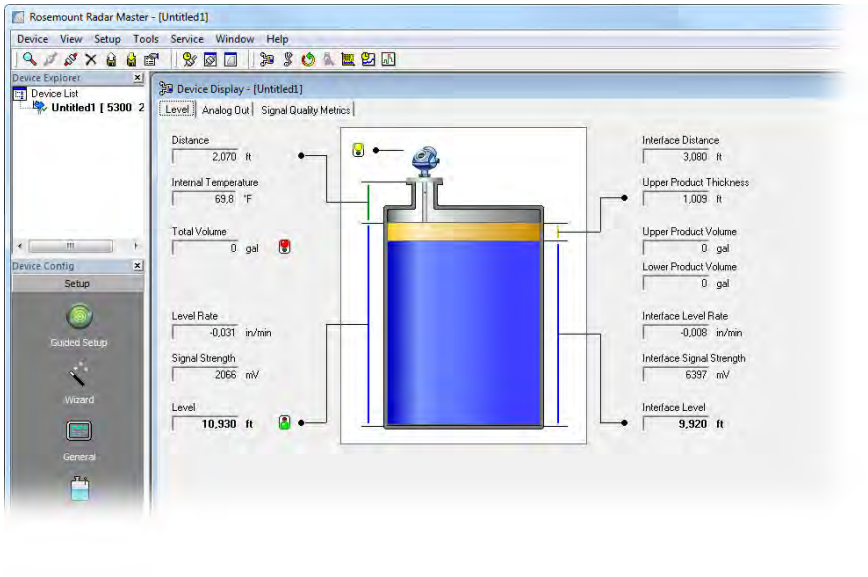
View live values from device to verify that the transmitter works correctly.

Procedure

1. In the *Guided Setup* window, select **View live values from device**.



2. Verify the transmitter works correctly. If the measured values seem incorrect, configuration settings may need to be adjusted.



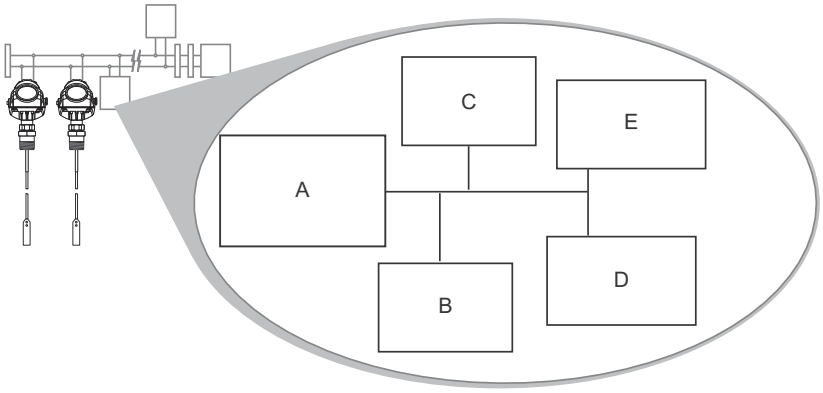
5.10 FOUNDATION™ Fieldbus overview

This section provides a brief overview of FOUNDATION Fieldbus block operation with the Rosemount 5300 Level Transmitter.

For detailed information about FOUNDATION Fieldbus technology and function blocks, refer to the Rosemount 5300 FOUNDATION Fieldbus Block Reference Manual.

Figure 5-5 illustrates how the signals are channeled through the transmitter.

Figure 5-5: Function Block Diagram for the Rosemount 5300 with FOUNDATION Fieldbus



A. FOUNDATION Fieldbus compliant communications stack
B. Register transducer block
C. Level transducer block
D. Resource block physical device information
E. Advanced configuration block

Note
It is highly recommended that you limit the number of periodic writes to all static or non-volatile parameters such as HI_HI_LIM, LOW_CUT, SP, TRACK_IN_D, OUT, IO_OPTS, BIAS, STATUS_OPTS, SP_HI_LIM, and so on. Static parameter writes increment the static revision counter, ST_REV, and are written to the device's non-volatile memory. Fieldbus devices have a non-volatile memory write limit. If a static or non-volatile parameter is configured to be written periodically, the device can stop its normal operation after it reaches its limit or fail to accept new values.

5.10.1 Assigning device tag and node address

A Rosemount 5300 Level Transmitter is shipped with a blank tag and a temporary address (unless specifically ordered with both) to allow a host to automatically assign an address and a tag. If the tag or address need to be changed, use the features of the configuration tool. The tool basically does the following:

Procedure

1. Changes the address to a temporary address (248-251).
2. Changes the tag to a new value.
3. Changes the address to a new address.

   When the transmitter is at a temporary address, only the tag and address can be changed or written to. The resource, transducer, and function blocks are all disabled.

5.10.2 FOUNDATION™ Fieldbus block operation

Function blocks within the fieldbus device perform the various functions required for process control. Function blocks perform process control functions, such as Analog Input (AI) functions, as well as Proportional-Integral Derivative (PID) functions.

The standard function blocks provide a common structure for defining function block inputs, outputs, control parameters, events, alarms, and modes, and combining them into a process that can be implemented within a single device or over the fieldbus network. This simplifies the identification of characteristics that are common to function blocks.

In addition to function blocks, fieldbus devices contain two other block types to support the function blocks. These are the resource block and the transducer block.

Resource blocks contain the hardware specific characteristics associated with a device; they have no input or output parameters. The algorithm within a resource block monitors and controls the general operation of the physical device hardware. There is only one resource block defined for a device.

Transducer blocks connect function blocks to local input/output functions. They read sensor hardware and write to effector (actuator) hardware.

Resource block

The resource block contains diagnostic, hardware, electronics, and mode handling information. There are no linkable inputs or outputs to the resource block.

Related information

Resource Transducer Block

Register transducer block

The register transducer block allows a service engineer to access all database registers in the device.

Related information

Register Transducer Block

Advanced configuration transducer block

The advanced configuration transducer block contains functions such as amplitude threshold settings for filtering of disturbing echoes and noise, simulation of measurement values, and strapping table for volume measurements.

Related information

Advanced Configuration Transducer Block

Level transducer block

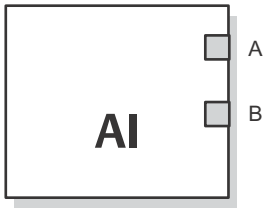
The level transducer block contains transmitter information including diagnostics and the ability to configure, set to factory defaults and restarting the transmitter.

Related information

Level Transducer Block

Analog Input block

Figure 5-6: Analog Input Block



A. OUT_D = Discrete output that signals a selected alarm condition
B. OUT = The block output value and status

The Analog Input (AI) function block processes field device measurements and makes them available to other function blocks. The output value from the AI block is in engineering units and contains a status indicating the quality of the measurement. The measuring device may have several measurements or derived values available in different channels. Use the channel number to define the variable that the AI block processes and passes on to linked blocks.

Related information

Analog-Input Block

Function block summary

The following function blocks are available for the Rosemount 5300 Level Transmitter:

- Analog Input (AI)
- Proportional/Integral/Derivative (PID)
- Signal Characterizer (SGCR)

- Arithmetic (ARTH)
- Input Selector (ISEL)
- Output Splitter (OS)

For detailed information about FOUNDATION Fieldbus technology and function blocks used in the Rosemount 5300 Level Transmitter, refer to the FOUNDATION Fieldbus Blocks Reference Manual .

5.11 Configure the alarm output for the Modbus® transmitter

The output from the Modbus transmitter in case of an error (such as a field device malfunction) can be configured.

Use the Modbus string to configure the alarm output. The values for Modbus registers corresponding to PV, SV, TV, and QV will be changed accordingly (applicable registers in area 1300, 2000, 2100, and 2200).

Prerequisites

If the Modbus communication setup has been changed, but the transmitter has not yet started to use the new configuration, then you need to disconnect the HART modem and wait up to 60 seconds for the change to take effect.

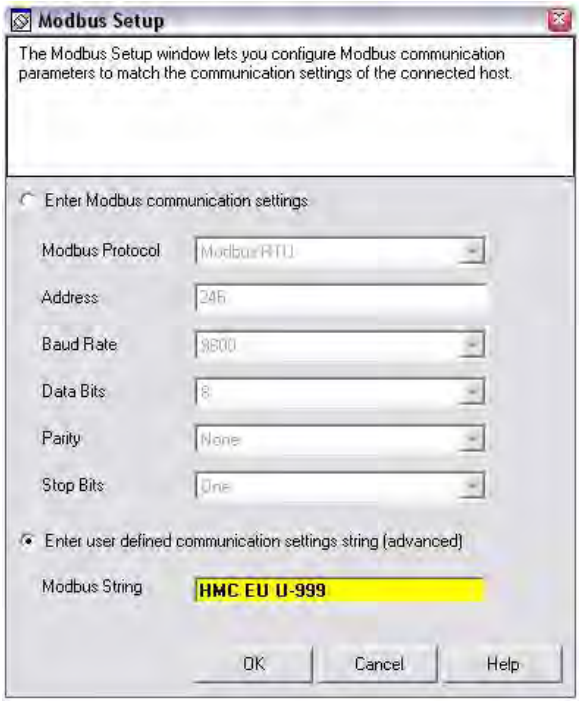
In case the MA/MB terminals are used for connection to the HART to Modbus Converter (HMC), disconnect the RS-485 Converter, cycle power to the transmitter and wait up to 60 seconds for the change to take effect.

The Modbus communication settings will otherwise be lost if you write a new message to the transmitter.

Procedure

1. Start Rosemount Radar Master and connect to the transmitter.
2. Select **Setup** → **General**.
3. Select the **Communication** tab.
4. Select **Modbus Setup**.
5. Select **Enter user defined communication settings string (advanced)**.

6. Enter the Modbus string, and select **OK**.



Postrequisites

After changing the Alarm Output configuration, disconnect the HART modem and wait up to 60 seconds for the change to take effect. In case the MA/MB terminals are used for connection to the HMC, disconnect the RS-485 Converter, cycle power to the transmitter, and wait up to 60 seconds for the change to take effect.

5.11.1 Modbus alarm output strings

Table 5-4: Available Alarm Output Text Strings

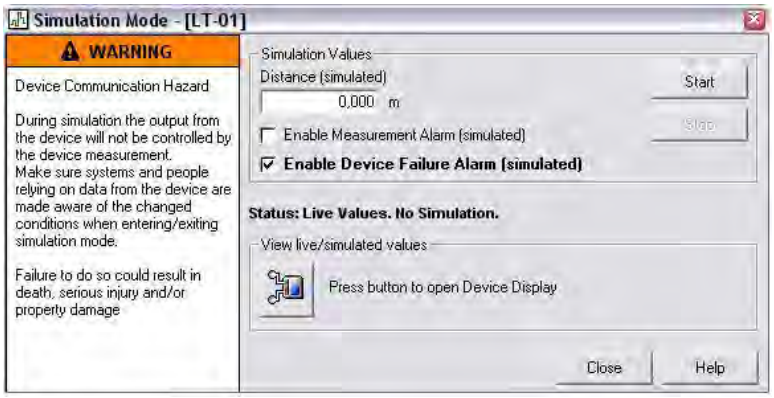
Protocol	String	Alarm output
Modbus RTU	HMC EN	Not a number (NaN), default
	HMC EF	Freeze, hold last value
	HMC EU U-0.1	User defined value, -0.1 in this example
Levelmaster	HMC M2 EH	High value, 999.99, default
	HMC M2 EL	Low value, -99.99
	HMC M2 EF	Freeze, hold last value
	HMC M2 EU U0	User defined value (range -99.99 to 999.99), 0 in this example
Modbus ASCII	HMC M1 EN	Not a number (NaN), default
	HMC M1 EF	Freeze, hold last value
	HMC M1 EU U-0.1	User defined value (range -99.99 to 999.99), -0.1 in this example

5.11.2 Verify alarm output

To verify the alarm output, use Rosemount Radar Master to simulate a device failure:

Procedure

1. Establish HART communication with the transmitter through Rosemount Radar Master.
2. Select **Tools** → **Simulation Mode**.



3. Select **Enable Device Failure Alarm (simulated)**.
4. Select **Start**.
5. Disconnect HART modem.
6. Verify that the configured alarm output is available in the Modbus host.
7. Use Rosemount Radar Master to turn off simulation mode.

5.11.3 Use status information to evaluate measurement validity

The transmitter updates status information about the current measurement, and this status information is available as a bitfield register through Modbus communication.

By monitoring the status information it is possible to determine if the current measurement output value is valid.

Related information

Common Modbus host configuration

5.11.4 Use Heartbeat to detect errors

By reading and evaluating the Heartbeat value from the device, it is possible to verify that the communication link between the transmitter, HMC, RTU and even the control system communicating with the RTU is working.

Assign Heartbeat to one of the transmitter variables (SV, TV, or QV). Heartbeat is increased by one for each measurement cycle in the device (until it eventually starts over at zero again).

In case this value is not updated, it means that the communication link is broken.

5.12 Tri-Loop™ HART®-to-Analog converter

The Rosemount 333 HART® Tri-Loop™ HART-to-Analog signal converter is capable of converting a digital HART Burst signal into three additional 4-20 mA analog signals.

Related information

Rosemount 333 Reference Manual

5.12.1 Set the level transmitter up for HART Tri-Loop using FDI/DD/DTM

To set the Rosemount 5300 Level Transmitter up for the HART Tri-Loop:

Procedure

1. Make sure the transmitter is properly configured.
2. If desired, change the measurement units.
   a) Select **Configure** → **Manual Setup** → **Device Setup** → **Units**.
3. Set the desired device variable to use for Primary Variable (PV), Secondary Variable (SV), Third Variable (TV), and Fourth Variable (QV). Select **Configure** → **Manual Setup** → **Device Setup** → **HART**.
   a) Select **Configure** → **Manual Setup** → **Device Setup** → **HART**.
   b) Under ***Variable Mapping***, select variables for PV, SV, TV, and QV.
4. Set the Rosemount Rosemount 5300 to Burst Mode.
   a) Select **View/Configure Message 1**.
   b) Under ***Burst Message 1 Mode***, select **On**.
   c) Under ***Burst Message 1 Command***, select **Cmd 3: Read Dynamic Variables/ Current**, and then select **Next**.
   d) Under ***Burst Message 1 Trigger Mode***, select **Continuous**.
   e) Set the Burst Message 1 Update Rate, and then select **Finish**.
5. Prior to exiting the configuration, note the selected variables for SV, TV, and QV, and the units set for each of the variables. The same configuration must be used for the Rosemount 333.

5.12.2 Set the level transmitter up for HART Tri-Loop using RRM

To set the Rosemount 5300 Level Transmitter up for the HART Tri-Loop:

Procedure

1. Make sure the Rosemount 5300 Level Transmitter is properly configured.
2. Assign transmitter variables Primary Variable, Secondary Variable etc. Select**Setup** → **Output/General**.
3. Configure variable units: length, level rate, volume and temperature. Select: **Setup** → **General/Units**.
4. Set the Rosemount 5300 to Burst Mode. Select **Setup** → **General/Communication**.

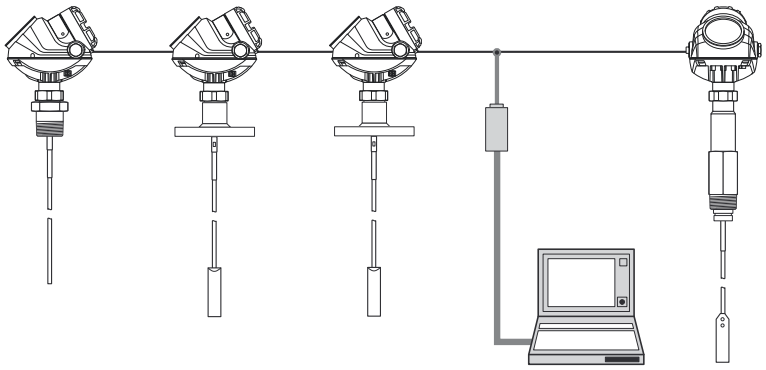
Note
Using a HART revision 7 device, the Rosemount 5300 Level Transmitter supports up to 3 Burst messages. It can burst Cmd 1, 2, 3, 9, 33, 48. For command aggregation, Cmd78 is used. Supported burst trigger modes in HART 7: Continuous, Windowed, Falling, and Rising.

5. Select burst option 3 = process variables and current (process vars/crnt).
6. Prior to exiting the configuration, note the selected variables for SV, TV, and QV, and the units set for each of the variables. The same configuration must be used for the Rosemount 333.

5.13 HART® multi-drop configuration

The Rosemount 5300 Level Transmitter can be run in multidrop mode. In the multidrop mode each transmitter has a unique HART address.

Figure 5-7: Multidrop Connection



5.13.1 Change the poll address using FDI/DD/DTM

To set the desired address for multidrop operation:

Procedure

1. Select **Manual Setup** → **Device Setup**.
2. Select **HART** → **Change Address**.
3. Set the desired address for multidrop operation.
   - HART 5: addresses between 1 and 15
   - HART 7: addresses between 1 and 63
4. Select **Next** to save the new address.

5.13.2 Change the poll address using a handheld communicator

To set the desired address for multidrop operation:

Procedure

1. Select **Configure** → **Manual Setup** → **Device Setup** → **HART** → **Comm Settings**.
2. Set **Poll addr** to the desired address for multidrop operation.
   - HART 5: addresses between 1 and 15

- HART 7: addresses between 1 and 63

3. Select **Send** to save the new address.

5.13.3 Change the poll address using RRM

To set the desired address for multidrop operation:

Procedure

1. Select **Setup** → **General**.
2. Select the **Communication** tab.
3. Set the desired address for multidrop operation.
   - HART 5: addresses between 1 and 15
   - HART 7: addresses between 1 and 63
4. Click the **Store** button to save the new address.

6 Operation

6.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises ⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Failure to follow safe installation and servicing guidelines could result in death or serious injury.

Ensure the transmitter is installed by qualified personnel and in accordance with applicable code of practice.

Use the equipment only as specified in this manual. Failure to do so may impair the protection provided by the equipment.

⚠ WARNING

Explosions could result in death or serious injury.

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.

⚠ WARNING

Electrical shock could cause death or serious injury.

Use extreme caution when making contact with the leads and terminals.

⚠ WARNING

High voltage that may be present on leads could cause electrical shock.

Probes covered with plastic and/or with plastic discs may generate an ignition-capable level of electrostatic charge under certain extreme conditions. Therefore, when the probe is used in a potentially explosive atmosphere, appropriate measures must be taken to prevent electrostatic discharge.

⚠ WARNING

Any substitution of non-authorized parts or repair, other than exchanging the complete transmitter head or probe assembly, may jeopardize safety and is prohibited.

Unauthorized changes to the product are strictly prohibited as they may unintentionally and unpredictably alter performance and jeopardize safety. Unauthorized changes that interfere with the integrity of the welds or flanges, such as making additional perforations, compromise product integrity and safety. Equipment ratings and certifications are no longer valid on any products that have been damaged or modified without the prior written permission of Emerson. Any continued use of product that has been damaged or modified without the written authorization is at the customer's sole risk and expense.

6.2 Using the display panel

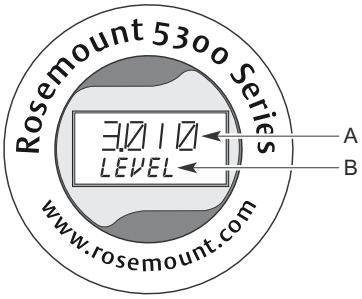
The Rosemount™ 5300 Level Transmitter uses an optional display panel for presentation of measurement data. When the transmitter is switched on, the display panel presents information such as transmitter model, measurement frequency, software version, communication type (HART®, FF), serial number, HART identification tag, setting of write protection switch, and Analog Output settings.

When the transmitter is up and running, the display panel presents level, signal amplitude, volume, and other measurement data depending on the display panel configuration (see Specify display panel variables). The available LCD parameters are listed in Table 6-1.

The display has two rows, the upper row shows the measurement value and the lower row shows the parameter name and measurement unit. It toggles between the different measurement values every two seconds. The lower row toggles between parameter name and measurement unit each second.

Variables to be presented are configurable by using a handheld communicator, AMS Device Configurator, AMS Device Manager, DeltaV™, the Rosemount Radar Master software or any FDI/DD/DTM compliant host.

Figure 6-1: The Rosemount 5300 Level Transmitter Display Panel



A. Measurement value
B. Toggling between measurement parameter and measurement unit

Error messages are listed in LCD error messages.

Table 6-1: LCD Parameters and Presentation on Display

Parameter	Presentation on display	Description
Level	LEVEL	Product level
Distance	DIST	Distance from the upper reference point to the product surface
Level rate	LRATE	The speed of level movement up or down
Signal strength	AMPL	The signal amplitude of the surface echo
Volume	VOUME	Total product volume
Internal temperature	INTEMP	Temperature inside the transmitter housing
Analog output current	ANOUT	4 -20 mA current
Percent range	%RANGE	Level value in percent of total measurement range
Interface level	IFLVL	Level of the lower product
Interface distance	IFDIST	Distance between the upper reference point and the interface between the upper and lower product
Interface level rate	IFRATE	The speed of interface level movement up or down
Interface signal strength	IFAMPL	The signal amplitude of the interface echo
Volume lower	VOL LO	Product volume of lower product
Volume upper	VOL UP	Product volume of upper product
Upper product thickness	UPTKNS	Thickness of the upper product
Signal quality	SIG Q	The signal quality
Surface/noise margin	SNM	The relationship between the surface peak amplitude and the strongest noise peak amplitude
Vapor DC	VAP DC	The vapor dielectric constant

6.3 Specify display panel variables

6.3.1 Specify display panel variables using FDI/DD/DTM

Specify variables and corresponding measurement units to be presented on the display panel (LCD) screen:

Procedure

1. HART®: Select **Configure** → **Manual Setup** → **Device Setup**.
   FOUNDATION™ Fieldbus: Select **Configure** → **Manual Setup**
2. Select the **Display** tab.

3. Select the desired variables and measurement units to be displayed on the LCD display.



4. Select **Save** to save the configuration and close the window.

6.3.2 Specify display panel variables using a handheld communicator

Specify variables and corresponding measurement units to be presented on the display panel (LCD) screen:

Procedure

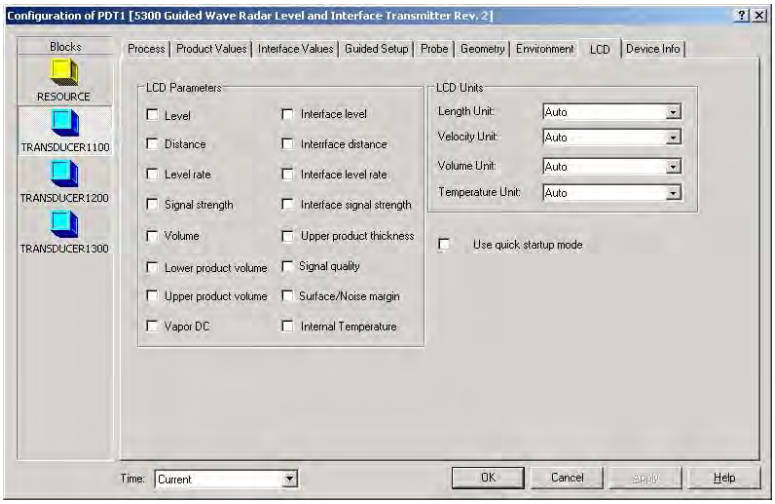
1. Specify LCD parameters:
   a) HART®: Select **Configure** → **Manual Setup** → **Device Setup**.
   FOUNDATION™ Fieldbus: Select **Configure** → **Manual Setup**
   b) Select **Display**.
   c) Select **LCD Parameters**.
   d) Select the desired variables to be displayed on the LCD display.
   e) Select **Send**, and follow the instructions.
2. Specify measurment units:
   a) HART: Select **Configure** → **Manual Setup** → **Device Setup**.
   FOUNDATION Fieldbus: Select **Configure** → **Manual Setup**.
   b) HART: Select **Units**.
   FOUNDATION Fieldbus: Select **LCD Units**.
   c) Specify desired measurement units.
   d) Select **Send**, and follow the instructions.

6.3.3 Specify display panel variables using DeltaV

To specify which variables to view on the display panel (LCD) screen and the corresponding measurement units:

Procedure

1. Right-click the transmitter icon and choose the **Properties** option.
2. Select the **Transducer1100** block.
3. Select the **LCD** tab.



4. Select the variables to be shown on the display panel.
5. Select the desired LCD measurement units.

   You can specify the same measurement units as selected in the **Product Values** tab and in the **Interface Values** tab by choosing the **Auto** option for the LCD Unit.
6. Select **OK** to save the LCD settings in the transmitter database.

6.3.4 Specify display panel variables using RRM

Specify variables and corresponding measurement units to be presented on the display panel (LCD) screen:

Procedure

1. Select **Setup** → **General**, or select the **General** icon in the *Device Config* window.
2. Select the **LCD** tab.
3. Select the variables to be shown on the display panel.
   a) Select the **Store** button to save the LCD settings in the transmitter database.
4. Select the **Units** tab.
5. Select the desired measurement units.
   a) Select the **Store** button to save the LCD settings in the transmitter database.

6.4 View measurement data

6.4.1 View measurement data in FDI/DD/DTM

Current measurement data of the primary variables are presented on the **Overview** screen. To view all current measurement values, do the following:

Procedure

1. Select **Service Tools** → **Variables**.
2. HART®: Select **Mapped Variable**, **Process**, **Device**, or **Signal Quality**.
   FOUNDATION™ Fieldbus: Select **Product Variables**, **Interface Variables** or **Signal Quality Metrics**.

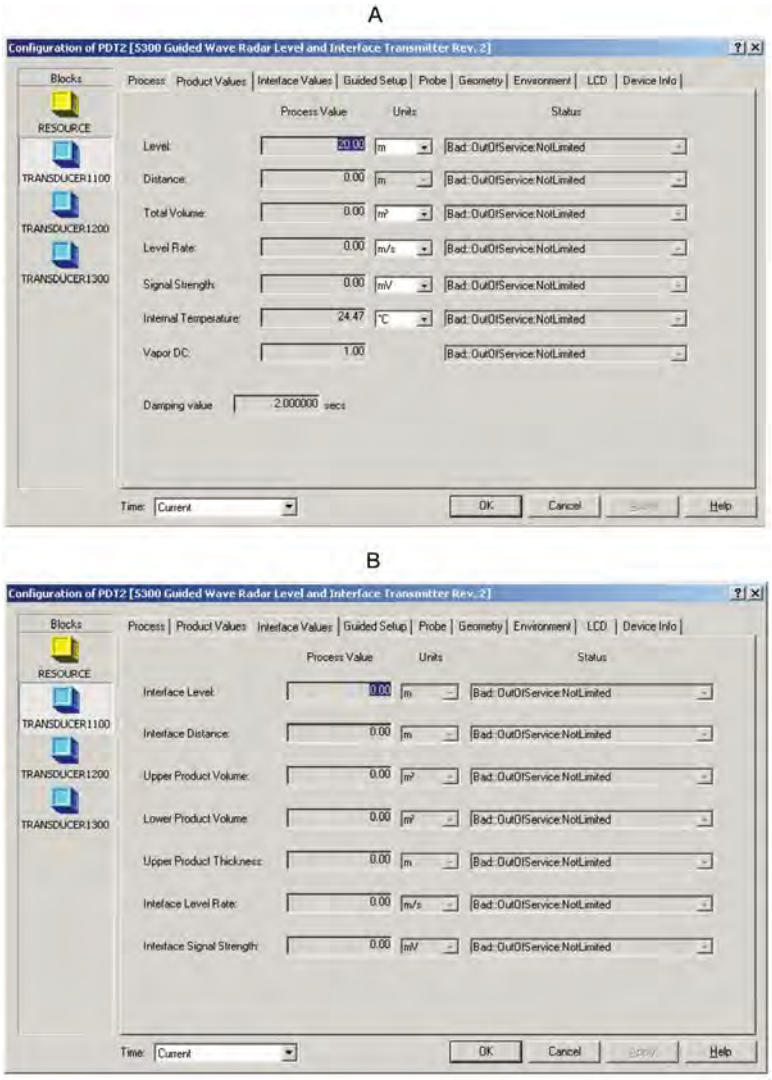
6.4.2 View measurement data in DeltaV

Procedure

1. Right-click the transmitter icon and choose the **Properties** option.
2. Select the **Transducer1100** block.

3. Select the desired group of measurement values to view.
   - To view level values such as Level and Distance, select the **Product Values** tab.
   - To view interface measurement values, select the **Interface Values** tab.

Figure 6-2: Presentation of Measurement Data in DeltaV for Rosemount 5300



A. Level values
B. Interface level values

6.4.3 View measurement data in RRM

To view measurement data in Rosemount Radar Master:

Procedure

1. Select **Tools** → **Device Display**.

2. Select the desired group of measurement values to view.
   - To view measurement data such as level, signal strength, etc., select the **Level** tab.
   - To view the analog output signal, select the **Analog Out** tab.
   - To view signal quality and surface/noise margin, select the **Signal Quality Metrics** tab.

7 Service and troubleshooting

7.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises ⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Failure to follow safe installation and servicing guidelines could result in death or serious injury.

Ensure the transmitter is installed by qualified personnel and in accordance with applicable code of practice.

Use the equipment only as specified in this manual. Failure to do so may impair the protection provided by the equipment.

Do not perform any services other than those contained in this manual unless you are qualified.

⚠ WARNING

Process leaks could result in death or serious injury.

Ensure that the transmitter is handled carefully. If the process seal is damaged, gas might escape from the tank if the transmitter head is removed from the probe.

⚠ WARNING

Explosions could result in death or serious injury.

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.

Do not remove the gauge cover in explosive atmospheres when the circuit is alive.

⚠ WARNING

High voltage that may be present on leads could cause electrical shock.

Avoid contact with the leads and terminals.

Ensure the mains power to the transmitter is off and the lines to any other external power source are disconnected or not powered while wiring the transmitter.

Probes covered with plastic and/or with plastic discs may generate an ignition-capable level of electrostatic charge under certain extreme conditions. Therefore, when the probe is used in a potentially explosive atmosphere, appropriate measures must be taken to prevent electrostatic discharge.

⚠ WARNING

Any substitution of non-authorized parts or repair, other than exchanging the complete transmitter head or probe assembly, may jeopardize safety and is prohibited.

Unauthorized changes to the product are strictly prohibited as they may unintentionally and unpredictably alter performance and jeopardize safety. Unauthorized changes that interfere with the integrity of the welds or flanges, such as making additional perforations, compromise product integrity and safety. Equipment ratings and certifications are no longer valid on any products that have been damaged or modified without the prior written permission of Emerson. Any continued use of product that has been damaged or modified without the written authorization is at the customer's sole risk and expense.

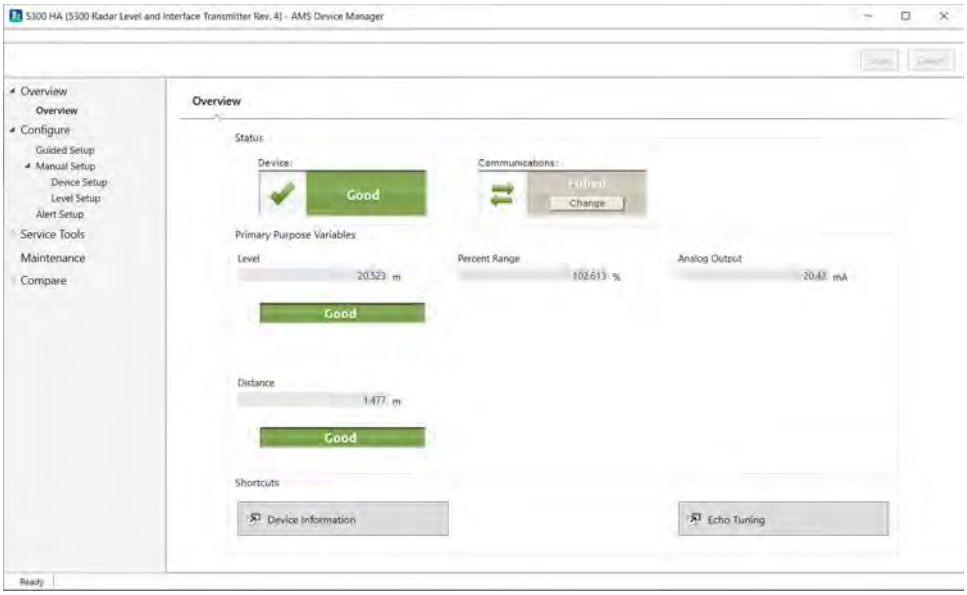
7.2 View diagnostics

7.2.1 View device status in AMS Configurator/AMS Device Manager

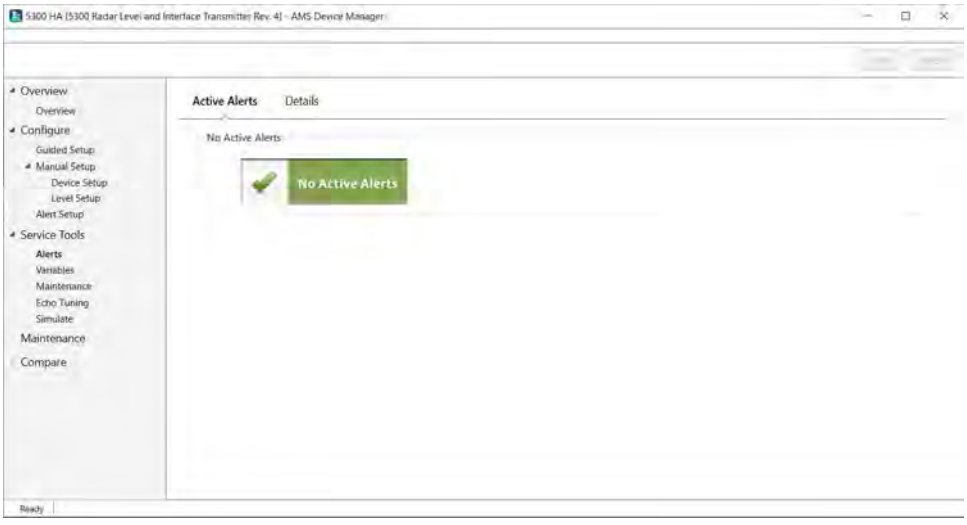
To view the device status and active alerts in AMS Device Configurator/AMS Device Manager:

Procedure

1. To view device status select **Overview**.



2. To view active alerts select **Service Tools** → **Alerts**.



Related information

Diagnostic messages per NAMUR NE 107 (HART)
Diagnostic messages per NAMUR NE 107 (FOUNDATION Fieldbus)

7.2.2 View device status using a handheld communicator

To view the device status and active alerts usinga a handheld commnicator:

Procedure

1. To view device status select **Overview**.
2. To view active alerts select **Service Tools** → **Alerts**.

Related information

Diagnostic messages per NAMUR NE 107 (HART)
Diagnostic messages per NAMUR NE 107 (FOUNDATION Fieldbus)

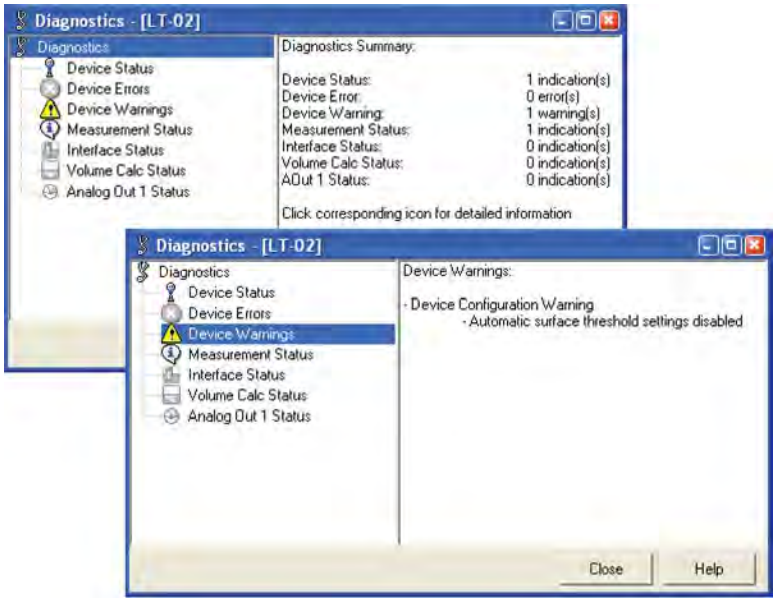
7.2.3 View diagnostics in RRM

To view the *Diagnostics* window in Rosemount Radar Master:

Procedure

Select **Tools** → **Diagnostics**.

Figure 7-1: The Diagnostics Window in Rosemount Radar Master



Related information

Device status
Errors
Warnings
Measurement status
Interface status
Volume calculation status
Analog output status

7.3 Diagnostic messages

7.3.1 Diagnostic messages per NAMUR NE 107 (HART®)

Diagnostic messages per NAMUR NE 107 are listed in Table 7-1 and Table 7-2.

Table 7-1: Status - Failure

Message	Description	Recommended actions
Volume measurment failure - Invalid Volume	Reasons may be multiple: • Incorrect volume configuration • Level measurement invalid	1. If **Level Measurement Failure** is active, clear that alert first. 2. Check volume configuration. 3. Load default database to the device and reconfigure it. 4. If error persists it might indicate a hardware error, replace the transmitter head.
Level/Interface Measurement Failure	No valid level reading. Reasons may be multiple: • No valid surface echo peak in the measuring range. • Incorrect transmitter configuration.	1. Analyze echo curve for reason and check device configuration. 2. Check device physical installation (for instance probe contamination). 3. Load default database to the device and reconfigure it. 4. If error persists it might indicate a hardware error, replace the transmitter head.
Probe Missing	The transmitter cannot detect the probe.	1. Check that the probe is properly connected.
Sensor Database (HREG) error	The device has found an error in the configuration database.	1. Load default database to the device to clear the error. 2. Reconfigure the device. 3. If the alert persists, replace the transmitter head.
Electronics Failure (RAM Error)	The device has detected a fault with an electrical component on the main board electronics module assembly.	1. Replace transmitter head.
Electronics Failure (FPROM Error)		
Electronics Failure (Microwave Module Error)		
Electronics Failure (Analog Output Error)		
Electronics Failure (Modem Error)		
Electronics Failure (Hardware Error)		
Electronics Failure (Other Memory Error)		

Table 7-1: Status - Failure *(continued)*

Message	Description	Recommended actions
Software Error	The device software has encountered an error. Reasons may be multiple, including too low supplied voltage, or an error being simulated.	1. Make sure that enough voltage is supplied to the device. 2. Restart the device. 3. Turn off simulation of device failure. 4. If the alert persists, replace the transmitter head.
Internal Temperature Critical	The internal temperature of the device has reached critical levels and the integrity of the device electronics has been compromised. Ambient temperature should not exceed device specifications (-40 °C to +80 °C).	1. Replace the transmitter head.
Proof Test Reflector Alarm	The product in the tank is at a critically high level.	1. Remove product from the tank.

Table 7-2: Status - Maintenance Request

Message	Description	Recommended actions
Loop Current Fixed	The analog output channel has been set to a fixed output.	1. Put the analog output channel back to variable output.
Device Simulation Active	The measurement output from the device is currently being simulated.	1. Use the **Simulation Mode** method to enable or disable simulation.
Internal temperature out of limits	Internal temperature is outside its limits (-40 °C to +80 °C).	1. Check ambient temperature at installation site.
Configuration Warning - Unsupported Combination of Functions	Please consult the reference manual for details.	1. Check device configuration.
Configuration Warning - Function not Supported	Support for the configured functions has not been purchased.	1. Upgrade the device. 2. Set measurement mode to **Level**. 3. Turn off Signal Quality Metrics. 4. Turn off Vapor Compensation.
Configuration Error - Vapor Compensation not Calibrated	The vapor compensation function need to be calibrated to work properly.	1. Run the **Calibrate Vapor Compensation** function.
Measurement Error - Vapor Compensation Reflector Not Found	The device cannot find the reference reflector echo.	1. Check that the correct reference reflector is configured. 2. Check that the correct probe is attached. 3. Check if the probe needs to be cleaned. 4. Recalibrate vapor compensation.

Table 7-2: Status - Maintenance Request *(continued)*

Message	Description	Recommended actions
Configuration Error - Invalid Volume Strapping Table	The volume calculation strapping table is incorrectly configured.	1. Check that the values in the strapping table are entered in increasing order. 2. Check that the number of strapping points to use is correct.
Configuration Error	Configuration Error	1. Load the default database to the device. 2. Restart measurement. 3. Reconfigure the device. 4. Contact Rosemount customer support.
Loop Current Saturated	The analog output channel is saturated because the level measurement is outside the configured analog output limits.	1. Check the analog output configuration.
Volume measurement warning - Level is out of Range	The level measurement is outside the configured volume range.	1. Check volume configuration.
Measurement Warning - Probe End Projection DC Estimation Limited	Probe End Projection DC estimation is outside the configured limit.	1. Check **Probe End Projection** configuration.
Measurement Warning - Vapor DC Estimation Limited	Vapor DC estimation is outside the configured limit.	1. Check **Vapor DC** configuration.
Measurement Warning - Interface Close To Maximum Range	The interface is close to the maximum the device can handle. If the interface thickness increases, the device may lose the interface echo.	1. Decrease the interface thickness in the tank.
Low Signal Quality Margin	Signal Quality is below the configured alarm level.	1. Clean any product buildup from the probe. 2. If the probe is corroded, consider replacing it.
Low Surface/Noise Margin	Surface/Noise Margin is below the configured alarm level.	1. Clean any product buildup from the probe. 2. If the probe is corroded, consider replacing it.
Level Supervision Test Mode Active - Test Mode Active	The device is in test mode and is not reporting actual information. Measurement output currently corresponds to position of verification reflector.	1. Use the **Start/Stop Test Mode** method for Level Supervision to start or stop test mode.

7.3.2 Diagnostic messages per NAMUR NE 107 (FOUNDATION™ Fieldbus)

Diagnostic messages per NAMUR NE 107 are listed in Table 7-3 to Table 7-5.

Table 7-3: Status - Failed

Message	Description	Recommended actions
Electronics Failure – Main Board	The device has detected a fault with an electrical component on the main board electronics module assembly.	1. Replace the transmitter head.
Electronics Failure – Output board	The device has detected a fault with an electrical component on the output board electronics module assembly.	1. Replace the transmitter head.
Internal Communication Failure	The communication between the main board and the output board has been lost.	1. Replace the transmitter head.
Memory Failure – Output Board	Configuration data has been corrupted or pending configuration changes have been lost due to loss of power before storage could complete.	1. Restart the device. 2. Reconfigure the device. 3. If error persists, it may indicate a faulty memory chip. Replace the transmitter head.
Internal Temperature Critical	The internal temperature of the device has reached critical levels and the integrity of the device electronics may be compromised. Environmental temperature should not exceed device specifications.	1. Verify that ambient temperature is within the specified range. 2. Remote mount the transmitter head away from the process and environmental conditions. 3. Restart the device. 4. If the condition persists, replace the device.
Software Failure	The device software has encountered an error. Reasons may be multiple, including too low supplied voltage, or an error being simulated.	1. Make sure that enough voltage is supplied to the device. 2. Restart the device. 3. Turn off simulation of device failure. 4. If the alert persists, replace the transmitter head.
Software Incompatibility Error	Fieldbus software and main firmware versions are incompatible.	1. Replace the transmitter head.
Probe Missing	The transmitter cannot detect the probe.	1. Check that the probe is properly connected.
Sensor Database Error	The device has found an error in the configuration database.	1. Load default database to the device to clear the error and restart device. 2. Reconfigure the device. 3. If the alert persists, replace the transmitter head.

Table 7-4: Status - Function Check

Message	Description	Recommended actions
Check function	One or more Transducer Blocks are in Out of Service mode.	1. Return Transducer Block to **Auto** mode.

Table 7-5: Status - Maintenance Required

Message	Description	Recommended actions
Level/Interface Measurement Failure	There is no valid level reading. Reasons may be multiple: • No valid surface echo peak in the measuring range • Incorrect transmitter configuration	1. Analyze echo curve for reason and check device configuration. 2. Check device installation (for instance probe contamination). 3. Load default database to the device and reconfigure it. 4. If error persists it might indicate a hardware error. Replace the transmitter head.
Volume Measurement Failure	Reasons may be multiple: • Incorrect volume configuration • Level measurement invalid	1. If **Level Measurement Failure** is active, clear that alert first. 2. Check volume configuration 3. Load default database to the device and reconfigure it. 4. If error persists it might indicate a hardware error, replace the transmitter head.
Volume Measurement Warning	The level measurement is outside the configured volume range.	1. Check volume configuration.
Internal Temperature Out of Limit	The temperature of the electronics board has exceeded the transmitter's operating range.	1. Verify that ambient temperature is within the operating range. 2. Restart the device. 3. Remote mount the transmitter head away from the process and environmental conditions. 4. If the condition persists, replace the device.
Measurement Error	The device cannot find the reference reflector echo.	1. Check that the correct reference reflector is configured. 2. Check that the correct probe is attached. 3. Check if probe needs to be cleaned. 4. Recalibrate **Vapor Compensation**.
Measurement Warning	The interface is close to the maximum the device can handle. If the interface thickness increases, the device may lose the interface echo.	1. If **Interface Thickness Close to Max** is checked, decrease the thickness interface in the tank
	Probe End Projection Dielectric Constant estimation is outside the configured limit.	1. If **Probe End Projection DC Estimation Limited** is checked, check **Probe End Projection** configuration.
	Vapor Dielectric Constant estimation is outside the configured limit	1. If **Vapor DC Estimation Limited** is checked, check **Vapor Dielectric Constant** configuration.

Table 7-5: Status - Maintenance Required *(continued)*

Message	Description	Recommended actions
Configuration Error	Start Code and Measurement Mode Mismatch.	If **Start code and Measurement Mode Mismatched** is checked: 1. Upgrade the device. 2. Set measurement mode to **Level**.
	The volume calculation strapping table is incorrectly configured.	If **Invalid Strapping Table** is checked: 1. Check that the values in the strapping table are entered in increasing order. 2. Check that the number of strapping points to use is correct.
	The vapor compensation function needs to be calibrated to work properly.	If **Vapor Compensation Not Calibrated** is checked: 1. Run the **Calibrate Vapor Compensation** function.
	Other Configuration Error.	If **Configuration Error** is checked: 1. Load the default database to the device. 2. Restart measurement. 3. Reconfigure the device. 4. Contact Rosemount customer support.
Configuration Warning	Unsupported combination of functions.	1. if **Unsupported Combination of Functions** is checked, check device configuration.
	Support for the configured functions has not been purchased.	If **Signal Quality Not Supported** or **Vapor Compensation not supported** is checked: 1. Upgrade the device. 2. Turn off Signal Quality Metrics. 3. Turn off Vapor Compensation.
	Process Seal and Probe Type Mismatch.	1. If **Process Seal and Probe Type Mismatch** is checked, check configuration of Probe Type and Process Seal using Rosemount Radar Master.
	Unsupported Probe Type.	1. If **Unsupported Probe Type** is checked, check Probe Type configuration.
Device Simulation Active	The measurement output from the device is currently being simulated.	1. Use **Start/Stop Device Simulation** to enable or disable simulation.

Table 7-5: Status - Maintenance Required *(continued)*

Message	Description	Recommended actions
Signal Quality Low	The Signal Quality is below the defined alert limit.	1. Take action based on your intended use of this alert. 2. Clean the probe. 3. If no actions are necessary, consider to change the limit.
Surface/Noise Margin Low	The Surface/Noise Margin is below the defined alert limit.	1. Take action based on your intended use of this alert. 2. Clean the probe. 3. If no actions are necessary, consider changing the limit.

7.3.3 Status messages in Rosemount Radar Master

Device status

Device status messages that may appear on the display or in Rosemount Radar Master are shown in Table 7-6:

Table 7-6: Device status

Message	Description	Action
Running Boot Software	The application software could not be started.	Contact Emerson Service Department.
Device Warning	A device warning is active.	See Warning Messages for details.
Device Error	A device error is active.	See Error Messages for details.
Sim Mode 0 Active	The simulation mode is active.	Turn off the simulation mode in Rosemount Radar Master, select Tools, Simulation Mode, and click the Stop button.
Advanced Simulation Mode Active	The advanced simulation mode is active.	To turn off the Advanced Simulation mode, set Holding Register 3600=0 (see View/edit holding registers using RRM).
Interface Invalid	The interface measurement is invalid.	Check the Error Messages, Warning Messages, and the Interface Status for details.
Invalid Measurement	The level measurement is invalid.	Check Error Messages, Warning Messages, and Measurement Status for details.
User Register Area Write Protected	The configuration registers are write protected.	Use the Lock/Unlock function to turn off the write protection (see Write protection).
Write Protected Jumper Set	Write protection jumper on the display is enabled.	Remove the write protection jumper.
Factory Settings Used	The factory default configuration is used.	The transmitter has lost its calibration. Contact Emerson Service Department.
Probe missing	Probe is not detected.	Check that the probe is correctly mounted. Check the connection between probe and transmitter head.

Errors

Error messages that may be displayed on the display or in Rosemount Radar Master are shown in Table 7-7. Errors normally result in Analog Output alarm.

Errors are indicated in Rosemount Radar Master in the *Diagnostics* window.

Table 7-7: Error Messages

Message	Description	Action
RAM error	An error in the gauge data memory (RAM) has been detected during the startup tests. **Note** This automatically resets the gauge.	Contact Emerson service department.
FPROM error	An error in the gauge program memory (FPROM) has been detected during the startup tests. **Note** This automatically resets the gauge.	Contact Emerson service department.
Database (Hreg) error	An error in the transmitter configuration memory (EEPROM) has been detected. The error is either a checksum error that can be solved by loading the default database or a hardware error. **Note** The default values are used until the problem is solved.	Load default database and restart the transmitter. Contact Emerson service department if the problem persists.
Microwave Module error	An error in the microwave module.	Contact Emerson service department.
LCD error	An error in the LCD is detected.	Contact Emerson service department.
Modem error	An error in the modem used for digital communication has been detected.	Contact Emerson service department.
Analog out error	An error in the Analog Out Module.	Contact Emerson service department.
Internal temperature error	An error in the internal temperature measurement. -40 °C<Internal Temperature<85 °C.	Contact Emerson service department.
Other hardware error	An unspecified hardware error has been detected.	Contact Emerson service department.
Measurement error	A serious measurement error has been detected.	Contact Emerson service department.
Configuration error	At least one configuration parameter is outside allowed range. **Note** The default values are used until the problem is solved.	• Load the default database and restart the transmitter (see Reset to factory settings) • Configure the transmitter or upload a backup configuration file (see Download configuration from file to device using RRM) • Contact Emerson service department if the problem persists
Software error	An error has been detected in the transmitter software.	Contact Emerson service department.

Warnings

Table 7-8 shows a list of diagnostic messages that may be displayed on the display or in Rosemount Radar Master. Warnings are less serious than errors and in most cases do not result in Analog Output alarms.

In Rosemount Radar Master, warnings are indicated in the *Diagnostics* window.

Table 7-8: Warning Messages

Message	Description	Action
RAM warning	See Diagnostics (Rosemount Radar Master: **Tools** → **Diagnostics**) for further information on a warning message. Also see View diagnostics in RRM.	
FPROM warning		
Hreg warning		
MWM warning		
LCD warning		
Modem warning		
Analog out warning		
Internal temperature warning		
Other hardware warning		
Measurement warning		
Config warning		
SW warning		

Measurement status

Measurement Status messages that may appear on the display or in Rosemount Radar Master are shown in Table 7-9:

Table 7-9: Measurement Status

Message	Description	Action
Full tank	The level measurement is in Full Tank state. The transmitter waits for the surface echo to be detected at the top of the tank.	No action needed.
Empty tank	The level measurement is in Empty Tank state. The transmitter waits for the surface echo to be detected at the bottom of the tank.	No action needed.
Probe missing	Probe is not detected.	Check that the probe is correctly mounted. Check the connection between probe and transmitter head.
Seal contaminated	Suspected contamination of the seal has been detected.	Check if the seal connection with the probe is contaminated.
Reference pulse calculated	The position of the reference pulse is calculated from the internal reference pulse.	No action needed.
Reference pulse invalid	An error in the reference pulse in the last sampled tank signal.	Check Warning messages. If MicroWave Module (MWM) Warning is active, this might indicate a transmitter error. Contact Emerson Service Department.

Table 7-9: Measurement Status *(continued)*

Message	Description	Action
DeltaF not at setpoint	The DeltaF is not correctly regulated.	Check Warning Messages. If MicroWave Module (MWM) Warning is active, this might indicate a transmitter error. Contact Emerson Service Department.
Tank signal clip warning	The last Tank Signal was clipped.	Check Warning Messages. If MWM Warning is active, this might indicate a transmitter error. Contact Emerson Service Department.
No surface echo found	The Surface Echo Pulse cannot be detected. Possible cause: • Wrong surface threshold • Liquid level in Blind Zone or below probe end	Check if the configuration can be changed so that the surface echo can be tracked in this current region. View the Echo Curve plot and check surface threshold.
Predicted level	The presented level is predicted. The surface echo could not be detected.	Check if the configuration can be changed so that the surface echo can be tracked in this current region. View the Echo Curve plot and check surface threshold.
No reference echo	The Reference Echo Pulse cannot be detected. Possible cause: • The tank is full. • The transmitter is configured with wrong probe type. • Reference Amplitude Threshold is incorrect.	• Check the product level. • Check that correct probe type is configured. • Check Reference Amplitude Threshold.
Reduced reference echo	The reference echo has been found with reduced amplitude.	No action needed.
In full tank state	The level measurement is in the full tank state, waiting for a surface echo detection at the top of the tank.	No action needed.
Sampling failed	The sampling of the last tank signal failed.	Check Warning Messages.
Invalid volume value	The given volume value is invalid. The given measurements are simulated.	Check Volume Status for details.
Sim mode 0 active	The simulation mode is active. The given measurements are simulated.	Turn off the simulation mode.
Advanced Simulation Mode active	The advanced simulation mode is active.	To turn off the Advanced Simulation mode, set Holding Register 3600=0 (see View/edit holding registers using RRM).
Invalid Lower Volume Value	The given lower volume value is invalid.	Check Lower Volume Status for details.
Invalid Upper Volume Value	The given upper volume value is invalid.	Check Upper Volume Status for details.
Using probe end projection measurement	The probe end projection is active in the transmitter software.	No action needed.
Reference echo present	An echo has been detected in the reference zone.	No action needed.

Table 7-9: Measurement Status *(continued)*

Message	Description	Action
Sudden level jump detected	This may result from various measurement problems, such as: • Rapid level changes • Surface level within Blind Zone • Disturbing echo	Check the tank to find out what causes problem to track the surface. • Set the Rapid Level Changes parameter, see Rapid level changes. • In the Blind Zones, the level may jump to Full Tank/End of Probe • See Disturbance echo handling.
Nearzone echo present	An echo has been detected in the nearzone.	No action needed.
Nonlinear gain used	The nonlinear gain is enabled.	No action needed.
Nearzone measurement	The current sweep can be used as a measurement of the nearzone.	No action needed.

Interface status

Interface status messages that may appear on the display or in Rosemount Radar Master are shown in Table 7-10:

Table 7-10: Interface Status

Message	Description	Action
Interface not OK	The interface measurement is not OK.	Check other interface status messages for reason.
Interface not found	No interface available	No action needed.
	Interface threshold to high	Adjust Interface threshold, see Example 2: Interface peak not found.
Can't measure interface on horizontal probe	Interface cannot be measured when the probe is horizontally mounted.	Change the probe mounting or turn off interface measurement by changing the measurement mode.
Can't handle max possible interface thickness	With the current configuration, the maximum measurement range is too short to guarantee that the interface echo can always be found.	Accept the limitation or change the tank environment and device configuration.
Interface thickness close to max range	The interface is close to the limit where it will be lost due to the limited maximum measurement range.	No action needed but the interface echo may be lost if the upper product thickness increases.
Interface set to max thickness	No interface echo found. The upper product thickness is set the maximum value of the current level measurement.	No action needed.
Interface thickness greater than probe length	The interface was found below the probe end.	The Upper Product Dielectric Constant is probably incorrect.

Volume calculation status

Volume calculation status messages that may appear on the display or in Rosemount Radar Master are shown in Table 7-11:

Table 7-11: Volume Status

Message	Description	Action
Level is below lowest strapping point.	The measured level is below the lowest point in the given strapping table.	For a correct volume calculation in this region, change the strapping table.
Level is above highest strapping point.	The measured level is above the highest point in the given strapping table.	For a correct volume calculation in this region, change the strapping table.
Level out of range.	The measured level is outside the given tank shape.	Check if the correct tank type is chosen and check the configured Tank Height.
Strap table length not valid.	The configured strap table length is too small or too large.	Change the strapping table size to a valid number of strapping points. A maximum number of 20 strapping points can be entered.
Strap table not valid.	The strapping table is not correctly configured.	Check that both level and volume values in the strapping table are increasing with strapping table index.
Level not valid.	The measured level is not valid. No volume value can be calculated.	Check Measurement Status, Warning and Error Messages.
Volume configuration missing.	No volume calculation method is chosen.	Do a volume configuration.
Volume not valid.	The calculated volume is not valid.	Check the other volume status messages for the reason.

Analog output status

Analog output status messages that may appear on the display or in Rosemount Radar Master are shown in Table 7-12.

Note
Analog output status messages may not appear on the integral display while the Rosemount 5300 Level Transmitter runs in HART 7 multidrop mode.

Table 7-12: Analog Output Status

Message	Description	Action
Not connected	Analog output hardware is not connected.	
Alarm Mode	The analog output is in Alarm Mode.	Check Error and Warning Messages to find the reason for the Alarm.
Saturated	The analog output signal value is saturated, i.e. equal to the saturation value.	No action needed.
Multidrop	The transmitter is in Multidrop Mode. The analog output is fixed at 4 mA.	This is the normal setting when a device is used in Multidrop configuration.
Fixed Current mode	The analog output is in fixed current mode.	This mode is used when calibrating the Analog Output channel.
PV out of Limits	The Primary variable is out of range.	Check the Upper and Lower Range Value
Span Too Small	The configured span is too small.	Check the Upper and Lower Range Value.
Invalid Limits	The given Upper and Lower Sensor Limits are invalid.	Check that the difference between the Upper and Lower Sensor Limits is greater than the Minimum Span.

7.4 LCD error messages

Figure 7-2: The Rosemount 5300 Display Panel Displaying an Error Message



Table 7-13: Error Messages Displayed on the Rosemount 5300 Display Panel

Error message	Description
RAM FAIL	An error in the gauge data memory (RAM) has been detected during the startup tests. **Note** This resets the gauge automatically.
FPROM FAIL	An error in the gauge program memory (FPROM) has been detected during the startup tests. **Note** This resets the gauge automatically.
HREG FAIL	An error in the transmitter configuration memory (EEPROM) has been detected. The error is either a checksum error that can be solved by loading the default database, or a hardware error. **Note** The default values are used until the problem is solved.
OMEM FAIL	Other memory failure.
MWM FAIL	An error in the microwave module.
DPLY FAIL	An error in the LCD.
MODEM FAIL	Modem hardware failure.
AOUT FAIL	An error in the Analog Out Module.
OHW FAIL	An unspecified hardware error has been detected.
ITEMP FAIL	An error in the internal temperature measurement.
MEAS FAIL	A serious measurement error has been detected.
CONFIG FAIL	At least one configuration parameter is outside the allowed range. **Note** The default values are used until the problem is solved.
SW FAIL	An error has been detected in the transmitter software.

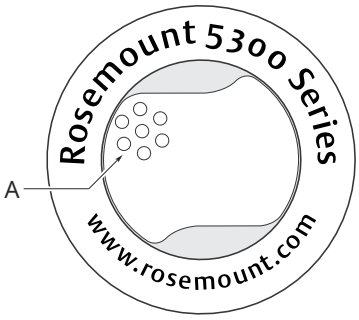
Related information

Errors

7.5 LED error messages

For Rosemount 5300 Level Transmitters without display, a flashing Light Emitting Diode (LED) is used for presentation of error messages.

Figure 7-3: Rosemount 5300 Level Transmitter with LED



A. Flashing LED

In normal operation, the LED flashes once every other second. When an error occurs, the LED flashes a sequence that corresponds to the Code number followed by a five second pause. This sequence is continuously repeated. The following errors can be displayed:

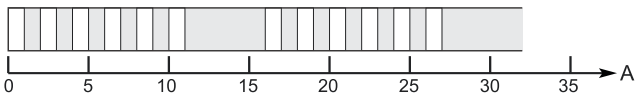
Table 7-14: LED Error Codes

Code	Error
0	Ram Failure
1	FPROM
2	HREG
4	Microwave Module
5	Display
6	Modem
7	Analog Out
8	Internal Temperature
11	Hardware
12	Measurement
14	Configuration
15	Software

Example

Modem error (code 6) is displayed as the following flash sequence:

Figure 7-4: Flash Sequence Example



A. Seconds

7.6 FOUNDATION™ Fieldbus error messages

7.6.1 Resource block

This section describes error conditions found in the Resource block. Read Table 7-15 through Table 7-17 to determine the appropriate corrective action.

Block errors

Table 7-15 lists conditions reported in the BLOCK_ERR parameter.

Table 7-15: Resource Block Block_Err Messages

Condition name and description
Other
Simulate Active: This indicates that the simulation switch is in place. This is not an indication that the I/O blocks are using simulated data
Device Fault State Set
Device Needs Maintenance Soon
Memory Failure: A memory failure has occurred in FLASH, RAM, or EEPROM memory
Lost Static Data: Static data that is stored in non-volatile memory has been lost
Lost NV Data: Non-volatile data that is stored in non-volatile memory has been lost
Device Needs Maintenance Now
Out of Service: The actual mode is out of service

Table 7-16: Resource Block Summary_Status Messages

Condition name
Uninitialized
No repair needed
Repairable
Call Service Center

Table 7-17: Resource Block DETAILED_STATUS with Recommended Action Messages

Condition name	RECOMMENDED action
LOI Transducer block error	• Restart processor • Check display connection • Call service center
Sensor Transducer block error	• Restart processor • Check Rosemount 5300 cable • Call service center
Mfg. Block integrity error	• Restart processor • Call service center

Table 7-17: Resource Block DETAILED_STATUS with Recommended Action Messages *(continued)*

Condition name	RECOMMENDED action
Non-Volatile memory integrity error	• Restart processor • Call service center
ROM integrity error	• Restart processor • Call service center

7.6.2 Transducer Block

This section describes error conditions found in the Sensor Transducer Block.

Table 7-18: Transducer Block Block_Err Messages

Condition name and description
Other
Out of Service: The actual mode is out of service

Table 7-19: Transducer Block XD_ERR Messages

Condition name and description
Electronics Failure: An electrical component failed
I/O Failure: An I/O failure occurred
Data Integrity Error: Data stored in the device is no longer valid due to a non-volatile memory checksum failure, a data verify after write failure, etc.
Algorithm Error: The algorithm used in the transducer block produced an error due to overflow, data reasonableness failure, etc.

7.6.3 Analog Input (AI) function block errors

Table 7-20 describes error conditions that are supported by the AI Block. Read Table 7-21 to determine the appropriate corrective action.

Table 7-20: AI BLOCK_ERR Conditions

Condition number	Condition name	Description
1	Block Configuration Error	The selected channel carries a measurement that is incompatible with the engineering units selected in XD_SCALE, the L_TYPE parameter is not configured, or CHANNEL = zero.
3	Simulate Active	Simulation is enabled and the block is using a simulated value in its execution.
7	Input Failure/Process Variable has Bad Status	The hardware is bad, or a bad status is being simulated.
15	Out of Service	The actual mode is out of service.

Table 7-21: Troubleshooting the AI Block

Symptom	Possible causes	Recommended actions
Bad or no level readings (Read the AI "BLOCK_ERR" parameter)	BLOCK_ERR reads OUT OF SERVICE (OOS)	• AI Block target mode set to OOS. • Resource Block OUT OF SERVICE.
	BLOCK_ERR reads CONFIGURATION ERROR	• Check CHANNEL parameter (see CHANNEL). • Check L_TYPE parameter (see L_TYPE). • Check XD_SCALE engineering units. (see XD_SCALE and OUT_SCALE).
	BLOCK_ERR reads POWERUP	Download Schedule into block. Refer to host for downloading procedure.
	BLOCK_ERR reads BAD INPUT	• Sensor Transducer Block Out Of Service (OOS). • Resource Block Out of Service (OOS).
	No BLOCK_ERR but readings are not correct. If using Indirect mode, scaling could be wrong	• Check XD_SCALE parameter. • Check OUT_SCALE parameter. (see XD_SCALE and OUT_SCALE).
OUT parameter status reads UNCERTAIN and substatus reads EngUnitRangViolation	Out_ScaleEU_0 and EU_100 settings are incorrect.	See XD_SCALE and OUT_SCALE.
Mode will not leave OOS	Target mode not set	Set target mode to something other than OOS.
	Configuration error	BLOCK_ERR will show the configuration error bit set. The following are parameters that must be set before the block is allowed out of OOS: CHANNEL must be set to a valid value and cannot be left at the initial value of 0. XD_SCALE.UNITS_INDX must match the units in the transducer block channel value. L_TYPE must be set to Direct, Indirect, or Indirect Square Root and cannot be left at the initial value of 0.
	Resource block	The actual mode of the Resource block is OOS. See Resource Block Diagnostics for corrective action.
	Schedule	Block is not scheduled and therefore cannot execute to go to Target Mode. Schedule the block to execute.
Process and/or block alarms will not work	Features	FEATURES_SEL does not have Alerts enabled. Enable the Alerts bit.
	Notification	LIM_NOTIFY is not high enough. Set equal to MAX_NOTIFY.
	Status Options	STATUS_OPTS has Propagate Fault Forward bit set. This should be cleared to cause an alarm to occur.

Table 7-21: Troubleshooting the AI Block *(continued)*

Symptom	Possible causes	Recommended actions
Value of output does not make sense	Linearization Type	L_TYPE must be set to Direct, Indirect, or Indirect Square Root and cannot be left at the initial value of 0.
	Scaling	Scaling parameters are set incorrectly: XD_SCALE.EU0 and EU100 should match that of the transducer block channel value. OUT_SCALE.EU0 and EU100 are not set properly.
Cannot set HI_LIMIT, HI_HI_LIMIT, LO_LIMIT, or LO_LO_LIMIT Values	Scaling	Limit values are outside the OUT_SCALE.EU0 and OUT_SCALE.EU100 values. Change OUT_SCALE or set values within range.

7.7 Troubleshooting guide

If there is a malfunction despite the absence of diagnostic messages, see Table 7-22 for information on possible causes.

Table 7-22: Troubleshooting Chart

Symptom	Possible cause	Action
No level reading	• Power disconnected • Data communication cables disconnected • Probe is not connected	• Check the power supply • Check the cables for serial data communication • View the Diagnostic window, see View diagnostics in order to check active status messages • Check if “Probe Missing” is active. If it is, check the probe connection
No HART communication.	• COM Port configuration does not match the connected COM Port • Cables may be disconnected • Wrong HART address is used • Hardware failure • HART resistor	• Check that correct COM Port is selected in the HART server (see Specify the COM port) • Check wiring diagram • Verify that the 250 Ω resistor is in the loop. • Check cables • Ensure that correct HART short address is used. Try address=0 • Check Analog Output current value to verify that transmitter hardware works • Check that the correct settings are used in Rosemount Radar Master. Select Device, Search from the menu. Click Settings and HART tab. Ensure the values are properly chosen. The standard values are shown in Specify the COM port.

Table 7-22: Troubleshooting Chart *(continued)*

Symptom	Possible cause	Action
Analog Out is set in Alarm.	Measurement or transmitter failure.	View the Diagnostic window, see View diagnostics to check active error and status messages.
Both Surface pulse and Interface Pulse are detected, but Interface Level is reported as unknown in the Echo Curve plot.	Measurement Mode is set to “Level Only”.	Set Measurement Mode to “Level and Interface” (see Measurement mode).
Both Surface pulse and Interface pulse are detected, but Interface Level is reported as unknown in the Echo Curve plot.	Interface pulse is identified as a double bounce	No action required.
	Surface pulse and Interface pulse are very close	Use the Echo Curve plot to verify that the surface and interface are close, see Analyzing the measurement signal.
Surface pulse is detected, but Level is incorrectly reported as Full or Empty.	• Wrong Probe Type set • Bad Reference Threshold value	View the Diagnostics window, see View diagnostics, to check active messages and check if the warning “Full Tank/Empty Tank” is active. If this is the case, check that: • the transmitter is configured with correct probe type • the reference pulse is below the reference amplitude threshold. If not, adjust reference threshold to an appropriate value
The reference pulse is not detected.	• The tank is full • The transmitter is configured with wrong probe type • Reference Amplitude Threshold is incorrect	• Check the product level • Check that correct probe type is configured • Check Reference Amplitude Threshold
	Large coaxial probe is used	No action
Incorrect Interface Level reading.	• Interface threshold incorrect • Upper Product Dielectric constant incorrect	• Adjust Interface threshold, see Example 2: Interface peak not found • Check the Upper Product Dielectric constant, see Upper product dielectric constant
Incorrect level reading.	• Configuration error • Disturbing objects in the tank	• Check the Tank Height parameter • Check status information and diagnostic information • Check that the transmitter has not locked on an interfering object, see Disturbance echo handling • Adjust the Surface amplitude threshold, see Example 1: Product surface peak not found

Table 7-22: Troubleshooting Chart *(continued)*

Symptom	Possible cause	Action
Both Surface pulse and Interface pulse are detected, but no interface is present in the tank.	Double bounce handling does not work properly.	Verify that the following parameters are correctly configured: • Nozzle Height • Upper Product Dielectric Constant • Lower Product Dielectric Constant
Integral display does not work.		• Check the display configuration • Check loop power • Check Display connection • Contact Emerson Service Department (1)
FOUNDATION Fieldbus Card to Transmitter Communication Fault		• Verify Device Mode setting, should be FOUNDATION Fieldbus (Parameter: ENV_DEVICE_MODE) • Restart method from Resource Block • Reboot gauge (Cycle Power)
Level Measurement Failure		• Check Power Supply • Check the gauge configuration (Transducer Block) • Check that the mechanical installation is correct
Temperature Measurement Failure		• Check ambient temperature (2) • Restart gauge • Contact Emerson Service Department
Volume Measurement Failure		• Restart gauge • Check gauge configuration using PC Based configuration tool
No surface echo		• Check signal strength • Restart transmitter • See Example 1: Product surface peak not found
DB Error/ Microwave Unit Error/ Configuration Error/ Other Error		• Restart transmitter • Set database to default; load default Database • Download Application Software • Call Service Center
SW Error/ Display Error/ Analog Out Error		• Restart transmitter • Call Service Center

(1) A malfunctioning display panel may only be replaced by service personnel at the Emerson service department. A display must not be replaced when the transmitter is in operation.

(2) If the Rosemount 5300 Level Transmitter has been exposed to temperatures outside the specified limits, the device may stop its normal operation.

7.7.1 Troubleshooting the HART® to Modbus® Converter

No communication on RS-485 bus (MA, MB)

Recommended actions

1. Check that the cables are connected.
2. Check that PWR+ is connected to + and PWR- is connected to - on the power supply.
3. Ensure the Rosemount 5300 Level Transmitter is supplied with 8-30 Vdc (max. rating).
4. Try alternating MA/MB if you are unsure of the polarity.
5. If an RS-485 converter is used, make sure it is properly installed and configured.
6. The last Rosemount 5300 Level Transmitter may need a terminating 120Ω resistor connected between MA and MB.

No communication in RRM using HART+, HART-

Recommended actions

1. Verify the HART modem is properly connected.
2. Check if device is at an alternate HART address (default 1).

No communication in RRM using MA, MB

Recommended actions

1. Check if device is at an alternate HART address (default 1).
2. Cycle the power and wait 20 seconds before polling.

Related information

No communication on RS-485 bus (MA, MB)

No communication with Modbus RTU protocol

Recommended actions

1. Make sure the Modbus communication protocol configuration is done properly.
2. Make sure the Modbus RTU address is unique on the bus.
3. Cycle the power and try to connect.
4. Check the RTU communication settings.

Related information

No communication on RS-485 bus (MA, MB)
Modbus communication protocol configuration

No communication with Modbus ASCII protocol

Recommended actions

1. Make sure the Modbus communication protocol configuration is done properly.

2. Make sure the Modbus ASCII address is unique on the bus.
3. Cycle the power, waiting 40 seconds before communication begins.
4. Check the RTU communication settings.

Related information

No communication on RS-485 bus (MA, MB)
Modbus communication protocol configuration

No communication with Levelmaster protocol

Recommended actions

1. Make sure the Modbus communication protocol configuration is done properly.
2. Make sure the Levelmaster address is unique on the bus.
3. Cycle the power, waiting 40 seconds before communication begins.
4. Check the RTU communication settings.

Related information

No communication on RS-485 bus (MA, MB)
Modbus communication protocol configuration

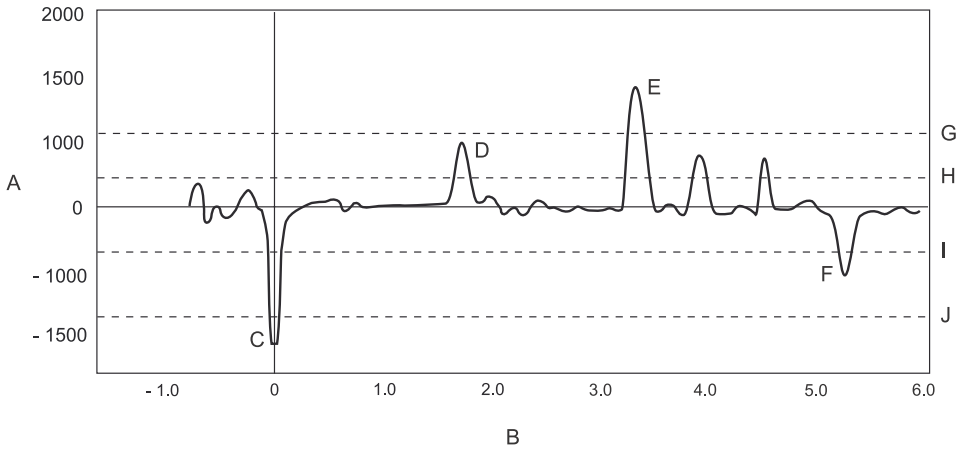
7.8 Service and troubleshooting tools

7.8.1 Analyzing the measurement signal

Using the Echo Curve plot function, an instant view of the tank signal is shown. Measurement problems can be solved by studying the position and amplitude of the different pulses.

Note
Figure 7-5 illustrates the key elements of a theoretical echo curve. In an actual echo curve, the probe end pulse and the probe end echo threshold line are not visible in an interface application, they are shown for illustration purposes only.

Figure 7-5: The Echo Curve Function Presents All Visible Echoes



A. Amplitude, mV
B. Distance, m
C. Reference
D. P1 Surface
E. P2 Interface
F. Probe End
G. Interface Threshold
H. Surface Threshold (ATC)
I. Probe End Threshold
J. Reference Threshold

Echo peaks

In a typical measurement situation, the following peaks appear in the echo curve plot:

Reference peak

This peak is caused by the transition between transmitter and the tank vapor space or air. It is used by the transmitter as a starting reference point for distance to the level surface. The echo peak amplitude depends on the probe type and installation geometry.

Note
No reference peak will be included in the echo curve of a large coaxial probe. An internal reference point is used for the large coaxial probe.

Product surface peak

This peak indicates the product level and is caused by a reflection from the product surface.

The signal strength of the reflection depends on the dielectric constant of the product. Product with a high dielectric constant (for example water) gives better reflection (a strong signal amplitude) than product with a low dielectric constant (for example oil).

Interface peak

This peak indicates the interface level. The peak is caused by reflection from the interface between an upper product and a bottom product with a relatively high dielectric constant. This peak is identified when the measurement mode is set to Product Level and Interface Level or Interface Level with Submerged Probe.

Probe end peak

It is caused by reflection from the probe end. If the probe is grounded, the peak will be positive. If the probe end is submerged in a high dielectric media, such as water, it will not be visible.

7.8.2 Use the echo curve analyzer in AMS Device Configurator

The echo curve analyzer shows the measurement signal amplitude from the top to the bottom of the tank. It includes functions for viewing and recording the echo curve, and configuration of amplitude thresholds. To read the echo curve in AMS Device Configurator:

Procedure

1. Select **Service Tools** → **Echo Tuning**.
2. Select the **Echo Curve** tab.
   AMS Device Configurator reads one echo curve and then stops.

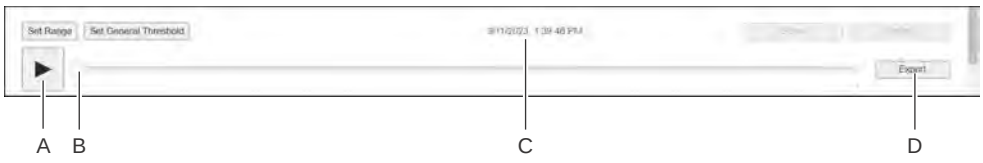


3. To continuously update the echo curve, select the **Play** icon.

Timeline

Use the timeline to navigate through the read echo curves.

Figure 7-6: Timeline



A. Play or pause, when the play button is selected, the tank spectrum is continuously updated.
B. Timeline slider, drag the slider to move the timeline forward or backward.
C. Date and time of echo curve readout.
D. Export echo curves.

Export echo curves

Echo curves plotted since the play button was selected are available for export, maximum 24 hours.

Procedure

1. Select **Service Tools** → **Echo Curve**.
2. Select **Export**.
3. Type your desired file name.
4. Browse to the desired directory, and then select **Save**.

Set surface threshold to a fixed value

Procedure

1. Select **Service Tools** → **Echo Curve**.
2. Select the **Set General Threshold** button. To set the surface threshold do one of the following:
3. Type the desired value, and select **Set** to set the ATC to a fixed value (a horizontal line).

Set surface threshold points to individual values

Procedure

1. Select **Service Tools** → **Echo Curve**.
2. Click and drag one point at the time in the ATC in order to raise or lower the threshold at a certain position in the tank.
3. Select the **Store** button to save your threshold settings.

Set interface threshold

Procedure

1. Select **Service Tools** → **Echo Curve**.
2. Select and drag the interface threshold line to a desired fixed value.
3. Select the **Store** button to save your threshold settings.

Zoom in and out the echo curve

You can zoom in to a specific area of the echo curve.

Procedure

- To zoom in or out, use either of the following options:
  - Mouse scroll wheel.
  - Touchpad to pinch zoom.
- To reset the zoom level, in the upper right corner of the echo curve, select **Reset Zoom**.

7.8.3 Use the echo curve analyzer with a handheld communicator

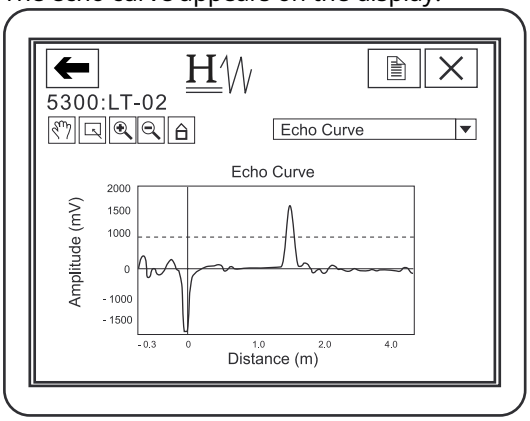
Using a handheld communicator that supports the Electronic Device Description Language (EDDL) with enhancements allows you to view the Echo Curve, create an Amplitude Threshold Curve (ATC) and specify amplitude thresholds such as the Surface Threshold, Interface Threshold, and Reference Threshold.

View the echo curve

To view the echo curve:

Procedure

1. Select **Service Tools** → **Echo Tuning** → **Echo Curve**.
   The echo curve appears on the display:



2. Use the Hand and Zoom tools to view specific parts of the Echo Curve.
   The drop down list allows you to choose items, such as the different amplitude thresholds, to be displayed in the plot.
   The echo curve plot also shows an ATC if available. See Adjust thresholds using a handheld communicator for further threshold options.

7.8.4 Use the echo curve analyzer in RRM

The Echo Curve Analyzer in Rosemount Radar Master shows the measurement signal amplitude from the top to the bottom of the tank. It includes functions for viewing and recording the Echo Curve, and advanced functions for configuration of amplitude thresholds. To plot the measurement signal:

Procedure

1. Start Rosemount Radar Master.
2. Open **Device Config/Tools** (or **Device Config/Setup**).
3. Select the **Echo Curve** icon.
   The *Echo Curve Analyzer* window appears with the **View/Record Mode** tab (or the **Configuration Mode** tab) selected.

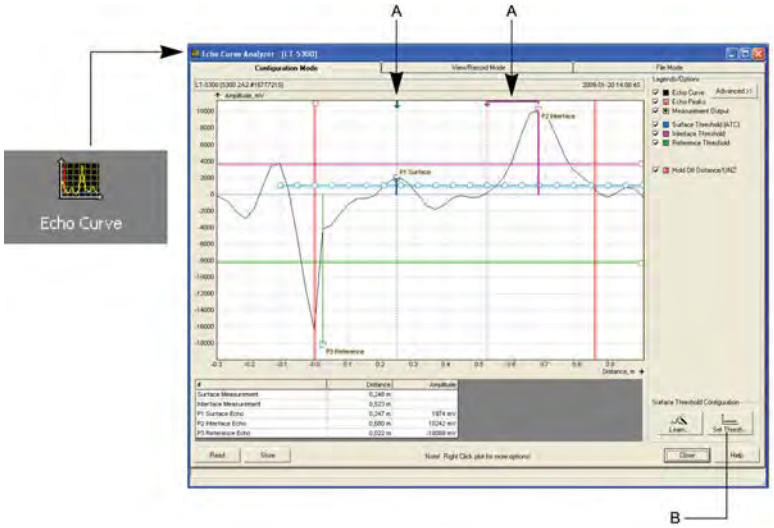
The configuration mode tab

The Configuration Mode tab lets you adjust the different amplitude thresholds. When clicking the **Echo Curve** icon under *Device Config/Setup*, the *Echo Curve Analyzer* window appears with the **Configuration Mode** tab selected.

See the Rosemount Radar Master online-help for descriptions of the various display options in the *Echo Curve Analyzer* window.

Note
By manually changing the amplitude thresholds in the Echo Curve plot, the Automatic mode is disabled for the corresponding threshold (see Amplitude thresholds for more information on how to adjust the amplitude thresholds).

Figure 7-7: Echo Curve Analyzer Plot in Configuration Mode



A. Measurement Output
B. Set Threshold

The current level Measurement Output from the device is presented with an arrow at the top of the plot.

Normally, the measurement output points directly at the surface echo peak, but if, for instance, the tank is empty, and there is no surface echo peak detected, the Measurement Output is still presented indicating the distance to the tank bottom.

In Figure 7-7, the interface output peak is pointing to the linear distance based on corrections for the dielectric of the material. The actual interface peak is at the electrical distance.

Modify ATC

The ATC can also be manually edited if further fine tuning is needed.

Procedure

Click and drag one circle at the time in the ATC in order to raise or lower the threshold at a certain position in the tank. You may zoom in (left click and drag) for higher resolution when modifying ATC points.

Set surface threshold to a fixed value

Procedure

Select the **Set Threshold** button to set the ATC to a fixed value (a horizontal line).

Set interface threshold

Procedure

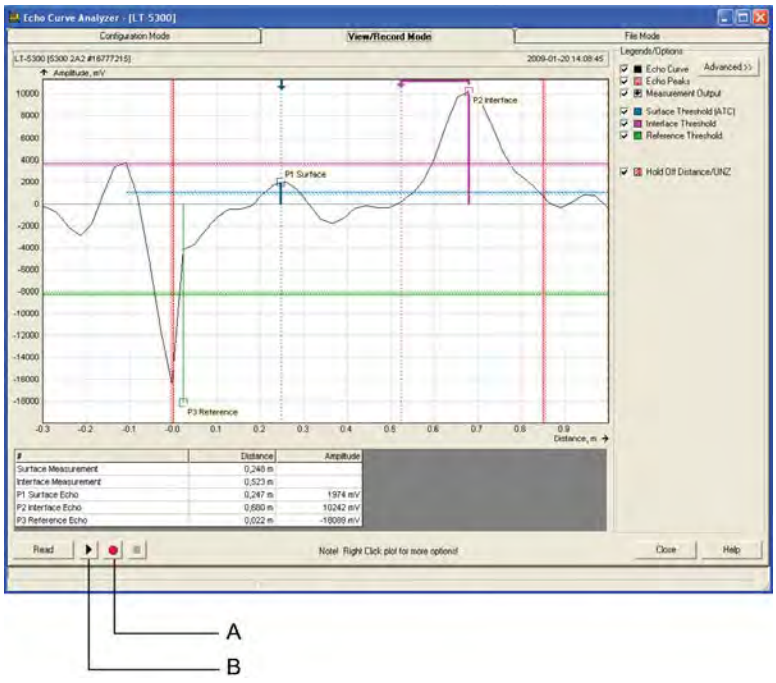
Drag the circle on the right hand side to modify the threshold or right click the circle and select **Properties** to enter a value.

The view/record mode tab

The View/Record Mode tab presents a plot of the current tank conditions. Each radar echo is displayed as a peak in the signal plot.

When clicking the **Echo Curve** icon under **Device Config/Tools**, the *Echo Curve Analyzer window* appears with the **View/Record Mode** tab selected:

Figure 7-8: An Echo Curve Plot in View/Record Mode



A. Record tank spectra
B. Play (continuously updates the spectrum)

Advanced

The Advanced button opens a list below the Echo Curve plot with information about all echoes in the tank such as signal amplitude and position in the tank.

Play

When the Play button is clicked, the tank spectrum is continuously updated without being stored.

Record tank spectra

This function allows you to record tank spectra over time. This can be a useful function if, for example, you want to study the tank signal when filling or emptying the tank.

The file mode tab

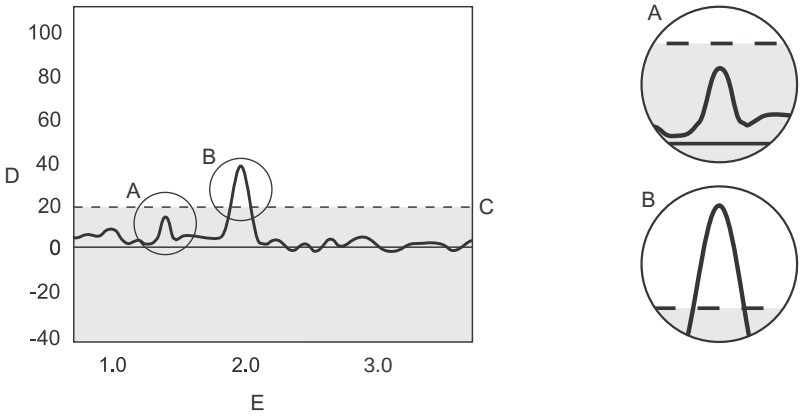
The **File Mode** tab lets you open files with saved snapshots/movies to be presented in the spectrum plot. A movie file can be played to view the amplitude plot at the desired update rate.

7.8.5 Amplitude thresholds

Measurement with the Rosemount 5300 is based on the fact that the radar signal pulses are reflected by the product surface and the interface between two liquids. Signal amplitude thresholds are used to separate the measurement signal from disturbing echoes and noise.

The transmitter uses certain criteria to decide which type of pulse that is detected. For example, counting from the top of the tank, the first echo found above the Surface Threshold is considered as the product surface, as illustrated in Figure 7-9. Other pulses further away from the top, although above the Surface Threshold, are ignored. When the surface echo is found, the next pulse below the product surface and with a signal strength above the Interface Threshold, is considered as the Interface.

Figure 7-9: Threshold Principle



A. The echo peak is below the threshold (dotted line) and is suppressed by the device.
B. This echo peak is interpreted as the product surface, since it is the first peak closest to device that is above the surface threshold.
C. Threshold
D. Amplitude
E. Distance

By default, the device automatically calculates threshold values depending on the measurement mode, various dielectric constant values and process conditions that you have configured. The configured Upper Product Dielectric Constant is used for setting the automatically calculated amplitude thresholds. Normally no other threshold adjustment is needed. But if the transmitter still does not track for example the product surface, it may be necessary to manually adjust the thresholds.

Reference threshold

Threshold to filter out noise in the echo curve for detection of the Reference peak. The reference peak is a strong negative echo very close to the device.(4)

Surface threshold

Threshold to filter out noise in the echo curve for detection of the Surface. Noise below the threshold is suppressed. The first echo peak closest to the device that crosses and is above the Surface Threshold is the surface echo.

The surface threshold is designed as a number of individually adjustable amplitude threshold points, the Amplitude Threshold Curve (ATC), see Amplitude threshold curve.

Interface threshold

Threshold to filter out noise in the echo curve for detection of the Interface. The first echo peak after the surface echo that crosses and is above the Interface Threshold is the interface echo.

Full tank threshold

Note
By default, the Full Tank Threshold Offset value is 0 (function is not used). Do not use this function unless you are qualified.

The Full Tank threshold is related to the Reference Threshold, and can be used for detecting that the tank is full.(5) The given offset value determines the gap between the Reference threshold and the Full Tank threshold. The transmitter considers the tank full when the amplitude of the Reference Peak has dropped to a value between the two threshold values.

If the amplitude of the Reference peak is below the Full Tank Threshold (negative amplitude of the Reference peak), the tank is not considered full.

By default, this value is 0 (function is not used). This is because highly contaminated or condensed tank-seals, and turbulent or boiling surfaces, which can cause splashing, may cause function to be triggered.

Probe end threshold

Threshold to filter out noise in the echo curve for detection of the Probe End peak. The probe end peak is a fairly strong positive or negative echo (depending on probe type) that is present at the probe end when tank is empty.

Guidelines for setting the amplitude thresholds

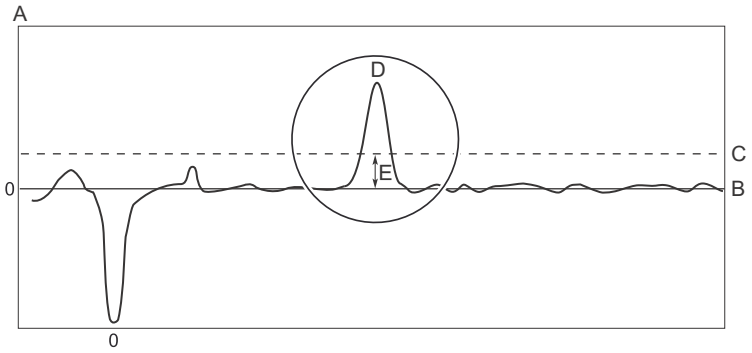
Normally, the amplitude thresholds are automatically set by the transmitter, and no manual settings are needed. However, due to the properties of the product, it may in rare cases be necessary to adjust the amplitude thresholds for optimum measurement performance.

Guidelines for setting the surface threshold

Before changing the Surface Threshold, ensure the product level is at least 20 in. (0.5 m) from the lower side of the device flange.

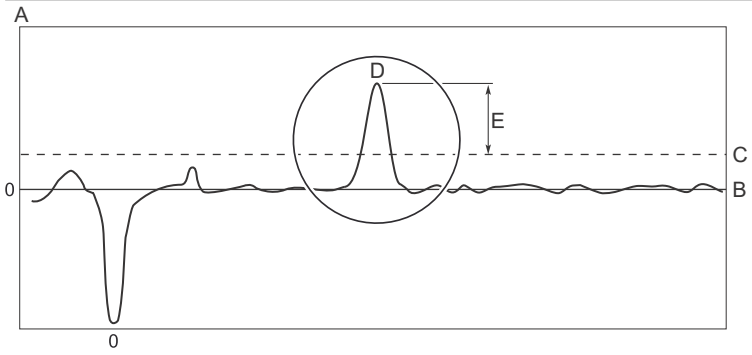
(4) The reference threshold has no impact on the large coaxial probes since an internal reference point is used for those probes.
(5) The full tank threshold has no impact on the large coaxial probes since an internal reference point is used for those probes.

- Surface Thresholds should never be set to values less than:
  - 700 mV at distance 0-20 ft. (0-6 m) from the upper reference point.
  - 500 mV at distance more than 20 ft. (6 m) from the upper reference point.
- Set the Surface Threshold to about ⅓ of the weakest surface echo amplitude in the measuring range.



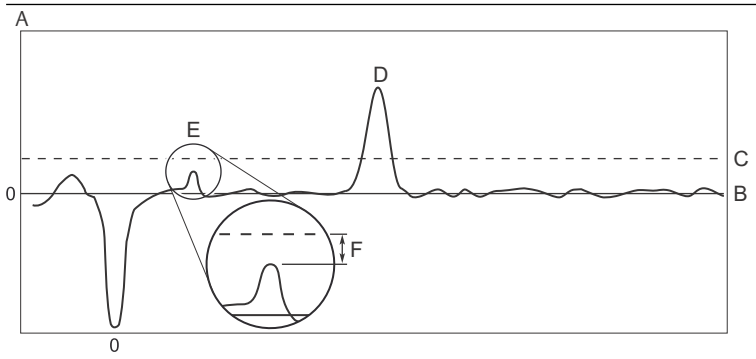
A. Amplitude (mV)
B. Distance
C. Surface Threshold
D. Surface echo
E. About ⅓ of surface echo amplitude

- Ensure to include a 500 mV margin between the Surface Threshold and the surface echo amplitude over the entire measuring range. For best performance, verify margin by lowering the product surface, or if not possible by using Figure 7-10 to #unique_291/unique_291_Connect_42_RFIXfe92916.



A. Amplitude (mV)
B. Distance
C. Surface Threshold
D. Surface echo
E. At least 500 mV margin

- Surface Threshold should be at least 500 mV greater than the amplitude of disturbances.



A. Amplitude (mV)
B. Distance
C. Surface Threshold
D. Surface echo
E. Disturbance
F. At least 500 mV margin

Contact your local Emerson representative if the transmitter is still having difficulties to track the product surface after applying the guidelines.

Guidelines for setting the interface threshold

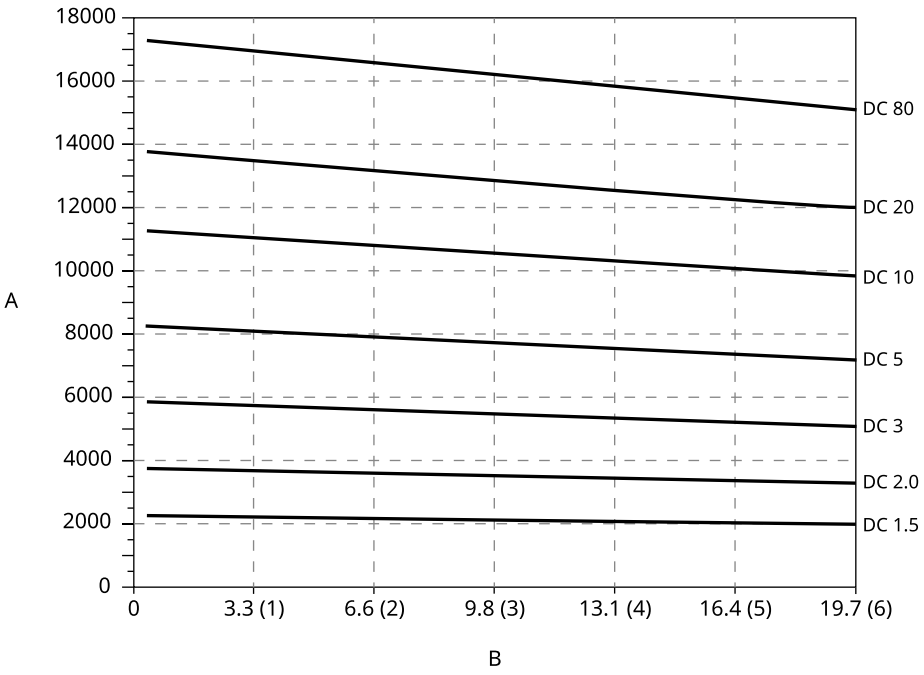
- The Interface Threshold should be approximately 50 percent of the interface signal amplitude.
- If possible, Interface Threshold should be higher than Surface Threshold.

Typical surface echo amplitudes and thresholds

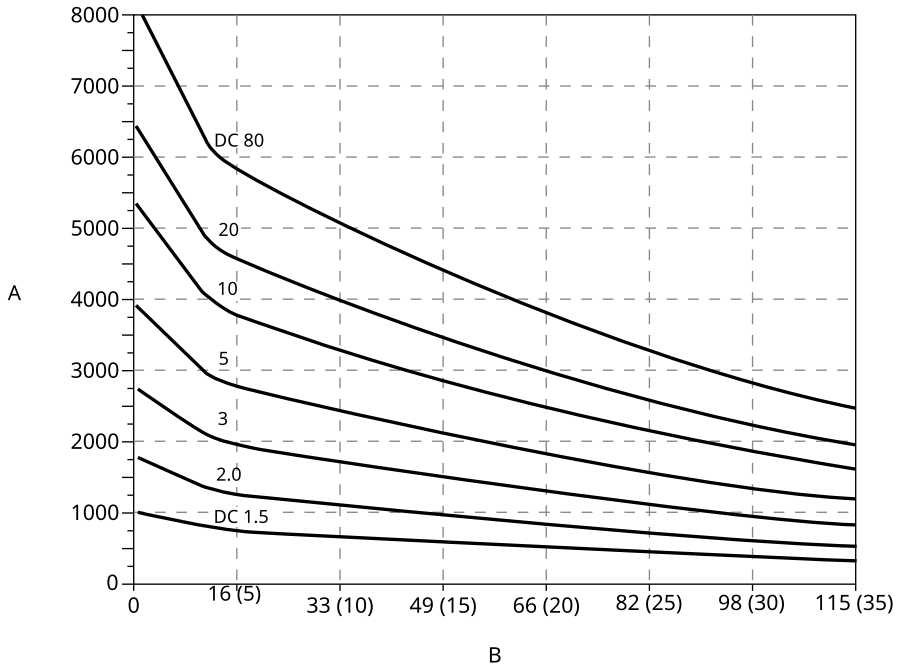
Figure 7-10 and Figure 7-11 shows typical signal amplitude of the surface echo (signal strength) at different distances to the surface. The signal amplitude of the surface echo depends on the dielectric constant of the product. Product with a high dielectric constant (for example water) gives better reflection (a strong signal amplitude) than product with a low dielectric constant (for example oil).

Note
The amplitude of the surface echo is also depended on the distance to the product surface. Since the signal is attenuated along the probe, the surface echo will be strongest close to the tank top, and then weaker further away from the tank top. In addition, the signal amplitude of the surface echo can vary because of product, foam, turbulence, ambient temperature and so on.

The values in Figure 7-10 and Figure 7-11 are estimations. Significantly different Surface Threshold values may have to be used to handle special tank conditions and applications.

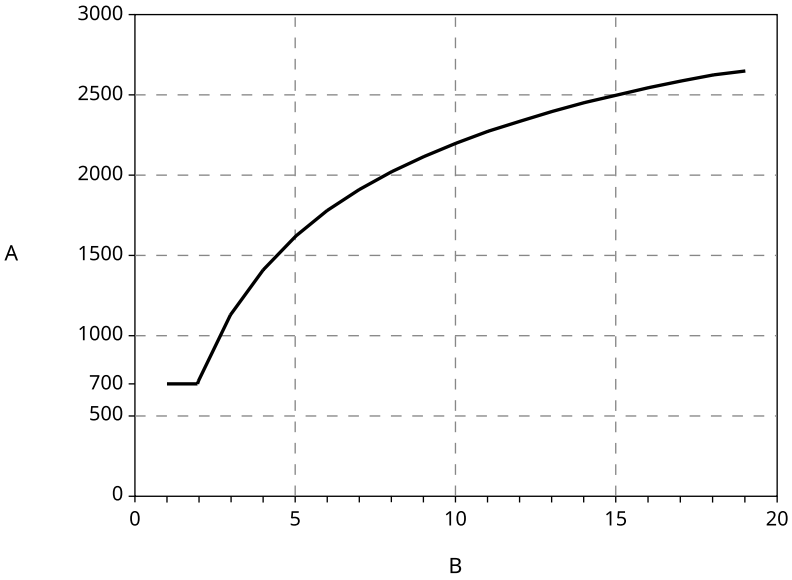


A. Amplitude (mV)
B. Distance, ft. (m)



A. Amplitude (mV)
B. Distance, ft. (m)

Figure 7-12 shows typical surface thresholds for different values of the upper product dielectric constant.



A. Amplitude (mV)
B. Dielectric constant of upper product

Adjust thresholds using FDI/DD/DTM

Normally, the amplitude thresholds are automatically set by the Rosemount 5300 Transmitter, and no manual settings are needed. However, due to the properties of the product, it may in rare cases be necessary to adjust the amplitude thresholds for optimum measurement performance.

Prerequisites

Note
Before changing the amplitude thresholds, check that the Upper Product Dielectric Constant parameter is set as accurately as possible. The Upper Product Dielectric Constant is used for setting the automatically calculated amplitude thresholds.

Procedure

1. Select **Service Tools** → **Echo Tuning**.
2. In the **Thresholds** tab, specify desired threshold settings: Interface, Reference, Probe End and Full Tank thresholds.
3. Select **Save**.

Adjust thresholds using a handheld communicator

To adjust the amplitude thresholds:

Prerequisites

Note
Before changing the amplitude thresholds, check that the Upper Product Dielectric Constant parameter is set as accurately as possible. The Upper Product Dielectric Constant is used for setting the automatically calculated amplitude thresholds.

Procedure

1. HART: Select HART **Service Tools** → **Echo Tuning** → **Thresholds**.
   FOUNDATION Fieldbus: Select HART **Service Tools** → **Echo Tuning** → **Echo Tuning**.
   The different threshold options appear on the display.
2. Open the desired option. For example, to specify a constant Surface Threshold:
   HART: Select **Surface** → **Set Threshold**.
   FOUNDATION Fieldbus: Select option **Surface Threshold** → **Set Threshold**.
   See also Analyzing the measurement signal and Amplitude thresholds for more information on how to use the amplitude thresholds.
3. Select **Save** and follow the instructions.

Adjust thresholds using RRM

Normally, the amplitude thresholds are automatically set by the Rosemount 5300 Transmitter, and no manual settings are needed. However, due to the properties of the product, it may in rare cases be necessary to adjust the amplitude thresholds for optimum measurement performance.

Prerequisites

Note
Before changing the amplitude thresholds, check that the Upper Product Dielectric Constant parameter is set as accurately as possible. The Upper Product Dielectric Constant is used for setting the automatically calculated amplitude thresholds.

Procedure

1. Select **Setup** → **Advanced**.
2. In the **Thresholds** tab, specify desired threshold settings: Interface, Reference, Probe End and Full Tank thresholds.
3. Select **Store**.

Automatic surface threshold

When this option is selected, the transmitter automatically sets the Surface threshold to a constant value based on the configured Dielectric Constant of the product.

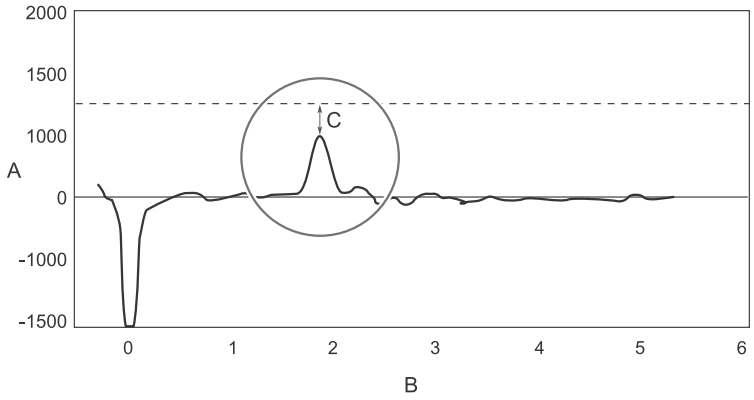
Note that by enabling the Automatic Surface threshold setting, the Amplitude Threshold Curve (ATC) is replaced by a constant threshold value.

The Surface threshold can also be manually set by using the Set Threshold function (see The configuration mode tab).

Example 1: Product surface peak not found

If the transmitter does not track the product surface correctly, it may be necessary to adjust the threshold values. In Figure 7-13, the Surface Threshold is too high and as a result the product level will not be detected. In a situation like this, the Surface Threshold has to be lowered so that the surface peak is not filtered out.

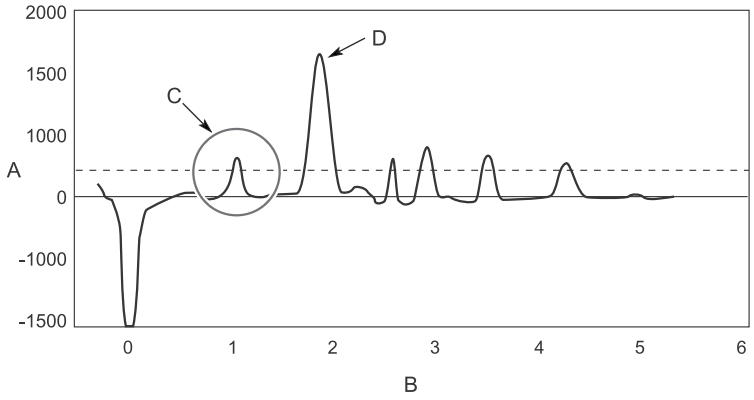
Figure 7-13: Surface Threshold Is Too High



A. Amplitude
B. Distance
C. Surface Threshold is above the Product Surface peak. Surface Threshold= Amplitude Threshold Curve (ATC)

If there are disturbing objects in the tank, the Surface Threshold must be carefully set to avoid locking on the wrong amplitude peak. In Figure 7-14, the Surface Threshold is too low, and as a result the transmitter has locked on a peak above the actual product surface. A disturbance was interpreted as the product surface, since this was the first amplitude peak closest to device that went above Surface Threshold. The actual product surface was interpreted as the interface or the probe end.

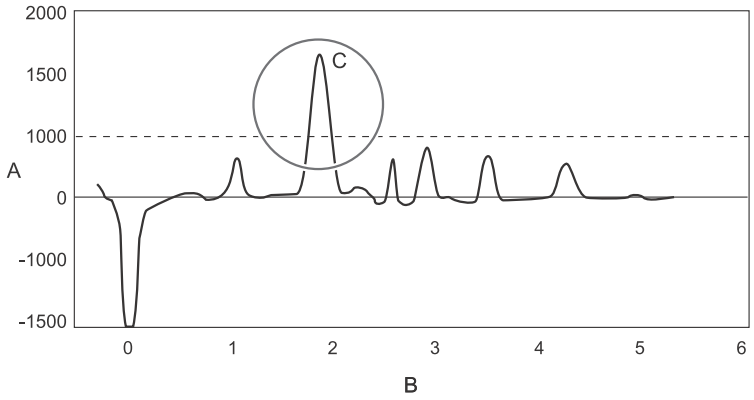
Figure 7-14: Surface Threshold Is Too Low



A. Amplitude
B. Distance
C. Disturbing echo misinterpreted as product surface
D. Actual product surface

By adjusting the Surface Threshold the product surface is properly detected as illustrated in Figure 7-15.

Figure 7-15: Echo Curve Plot after Surface Threshold Was Adjusted



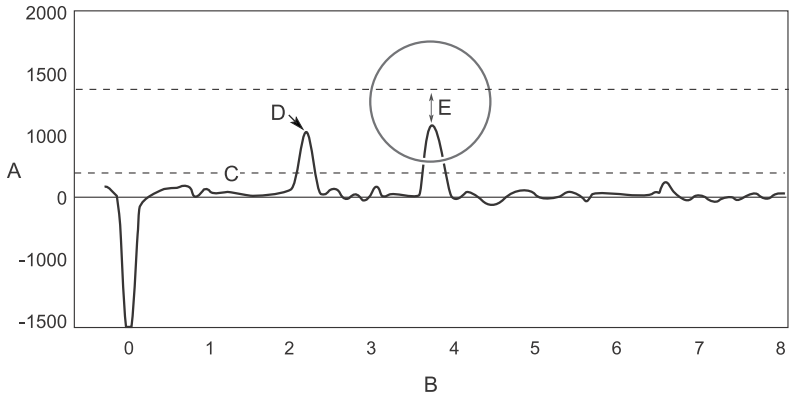
A. Amplitude
B. Distance
C. After Surface Threshold is adjusted the product surface is correctly detected.

Example 2: Interface peak not found

In interface applications where the bottom product has a relatively low dielectric constant (<40), or if the signal is attenuated in the upper product, the amplitude of the reflected signal from the interface is relatively low and difficult for the transmitter to detect. In such a case it may be possible to detect the reflected signal from the interface if the Interface Threshold is adjusted.

Figure 7-16 illustrates a situation where the Interface Threshold is too high. The signal amplitude peak at the interface between the upper and lower products is not detected in this case.

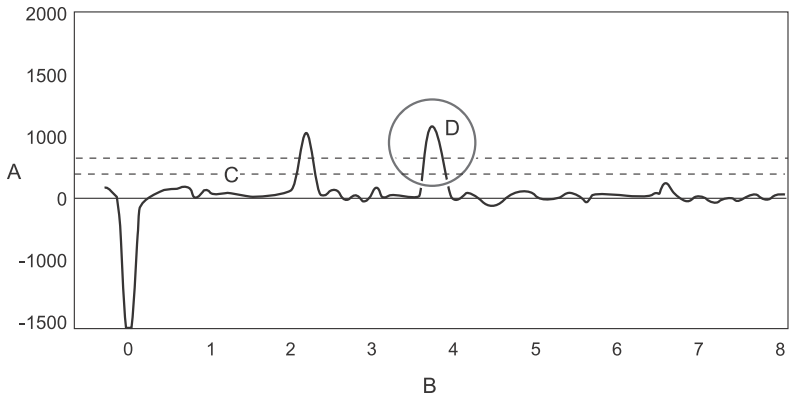
Figure 7-16: Echo Curve Plot Indicating that the Interface Threshold for the Interface Peak Is Too High



A. Amplitude
B. Distance
C. Surface Threshold
D. Product Surface Peak
E. The Interface Threshold is above the Interface Peak.

By adjusting Interface Threshold, the peak at the interface between the upper and lower products is detected as illustrated in Figure 7-17.

Figure 7-17: After Changing the Interface Threshold the Transmitter Detects the Interface



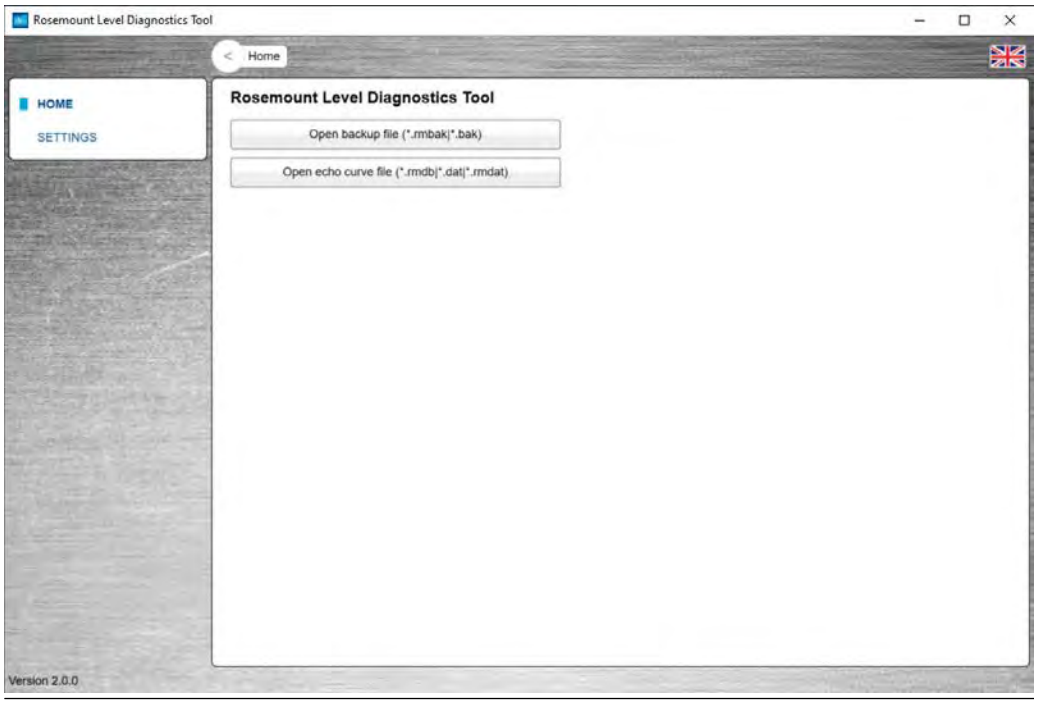
A. Amplitude
B. Distance
C. Surface Threshold
D. After Interface Threshold is adjusted the interface is correctly detected.

If the Lower Product Dielectric Constant is known, the corresponding configuration parameter can be changed as an alternative to adjusting the amplitude thresholds.

7.8.6 Using the Rosemount Level Diagnostics Tool

You can view backup and echo curve files with the Rosemount Level Diagnostics Tool.

Figure 7-18: Rosemount Level Diagnostics Tool



Download Rosemount Level Diagnostics Tool

Procedure

Download the software at Emerson.com/RosemountLevelDiagnosticsTool.

View a backup file of the device configuration

You can view backup files with the Rosemount Level Diagnostics Tool.

Procedure

1. Start **Rosemount Level Diagnostics Tool**.
2. Select **Open backup file**.
3. Browse to the saved backup file (.rmbak or .bak), and then select **Open**.

View a saved echo curve file

You can view echo curve files with the Rosemount Level Diagnostics Tool.

Procedure

1. Start **Rosemount Level Diagnostics Tool**.
2. Select **Open echo curve file**.
3. Browse to the saved echo curve file (.rmdb, .dat, or .rmdat), and then select **Open**.

Change measurement units

Procedure

1. Select **Settings**.
2. In the **Length presentation unit** list, select the desired unit.
3. In the **Volume presentation unit** list, select the desired unit.
4. In the **Temperature presentation unit** list, select the desired unit.
5. In the **Velocity presentation unit** list, select the desired unit.

7.8.7 Calibrate analog output

Calibrate analog output using FDI/DD/DTM

Use this function to calibrate the analog output by comparing the actual output current with the nominal 4 mA and 20 mA currents. Calibration is done at factory and the analog output does not normally need to be recalibrated.

Procedure

1. Select **Configure** → **Manual Setup** → **Device Setup**.
2. Select the **Analog Output** tab.
3. Select **D/A Trim**.
4. Follow the on-screen instructions to calibrate the 4 mA and the 20 mA outputs.

Calibrate analog output using RRM

Use this function to calibrate the analog output by comparing the actual output current with the nominal 4 mA and 20 mA currents. Calibration is done at factory and the analog output does not normally need to be recalibrated.

Procedure

1. Start Rosemount Radar Master and connect to device.
2. Select **Setup** → **Output**.
3. Select the **Analog Out 1** tab.
4. Select the **Calibrate DAC** button.
   If the **Calibrate DAC** button is hidden, then select **Advanced** for more options.
5. Follow the on-screen instructions to calibrate the 4 mA and the 20 mA outputs.

7.8.8 Logging measurement data

By using the Log Device Registers function in the Rosemount Radar Master software, you can log Input and Holding registers over time. It is possible to choose from different pre-defined sets of registers. This function is useful for verifying that the transmitter works properly.

Prerequisites

This function is only available in Rosemount Radar Master.

Procedure

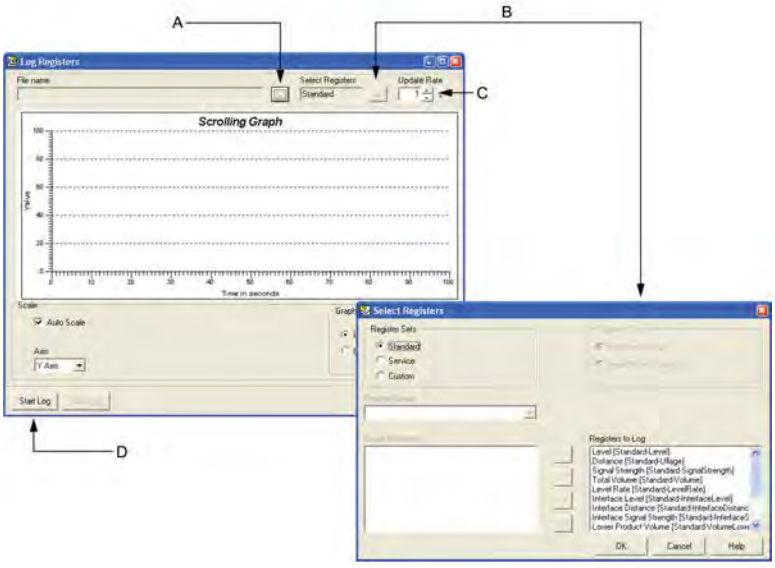
1. In Rosemount Radar Master, select **Tools** → **Log Device Registers.**
2. In the *Log Registers* window, select the **Browse** button.

3. Type your desired file name.
4. Browse to the desired directory, and then select **Save**.
5. Select the **Select Register** button.
6. Select the desired registers to be logged. There are three options available:

Option	Description
Standard	Logs the most common registers and are often sufficient.
Service	If you experience problems with your device you may be asked to send a Service Log to our service department.
Custom	Define your own set of parameters to log.

7. If **Custom** is selected, then:
   a) Select **Read only (Input)** or **Read/Write (Holding)**.
   b) In the *Register Group* list, select select the desired register group.
   c) Under *Group Registers*, select one of the parameters, and then select the right arrow button (>), or select the double arrow button (>>) to add the whole group.
8. Enter the update rate. An update rate of for example 10 seconds means that the plot will be updated every 10 seconds.
9. Select the **Start Log** button. The logging will proceed until stopped by clicking the **Stop Log** button.

Figure 7-19: The Log Registers Function



A. Browse
B. Select register
C. Update rate
D. Start log

7.8.9 Save a backup file of the device configuration

Save a backup file of the device configuration using FDI/DTM

When configuration is finished, it is recommended to store the device configuration in a backup file for future reference.

The backup file may be useful to:

- Restore the configuration of the transmitter.
- Install another transmitter in a similar tank.
- Troubleshoot the transmitter.

Procedure

1. Select **Service Tools** → **Maintenance** → **Backup**.
2. Select **Save/Restore Configuration**.
3. Select **Save Configuration**.
4. Type your desired file name.
5. Browse to the desired folder within the available directory, and then select **Save**.

Save a backup file of the device configuration using RRM

Use this Rosemount Radar Master option to make a backup copy of the configuration parameters in the transmitter database. The backup file can be used to restore the transmitter configuration. It can also be used for configuration of a transmitter in a similar application. Parameters in the saved file can be uploaded directly to the new device.

Procedure

1. In Rosemount Radar Master, select **Device** → **Backup Config to File**.
2. Browse to the desired directory.
3. Type a name of the backup file, and then select **Save**.
   Now the transmitter configuration is stored.

7.8.10 Download configuration from file to device

Download configuration from file to device using FDI/DTM

Procedure

1. Select **Service Tools** → **Maintenance** → **Backup**.
2. Select **Restore Configuration**.
3. Browse to the backup file and select **Open**.

Download configuration from file to device using RRM

To upload a backup configuration using Rosemount Radar Master:

Procedure

Select **Device** → **Upload Config to Device**.

7.8.11 View backup files using RRM

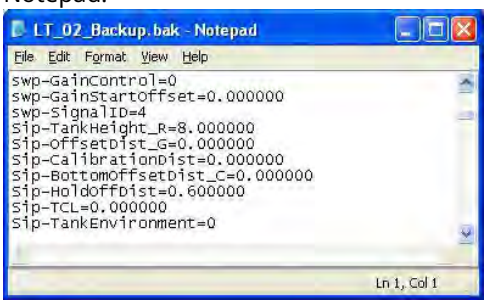
The backup file can be viewed by using the Backup File Reader which is installed with the Rosemount Radar Master software.

Procedure

Click the **Start** button, and then select **All Programs** → **Rosemount** → **Radar Master Tools** → **Backup File Reader**.



The backup file can also be viewed as a text file in a word processing program such as the Notepad.



See also Open the configuration report using RRM for further information on viewing backup files.

7.8.12 Open the configuration report using RRM

The configuration report shows what configuration changes have been done to the transmitter compared to the factory configuration. The report compares a specified backup file with the default transmitter configuration.

Procedure

1. In Rosemount Radar Master, select **Tools** → **Configuration Report**.
2. Browse to desired backup file to generate the configuration report from, and then select **Open**.

   Information on probe type, software versions, software and hardware configuration, and unit code is presented.

7.8.13 Save a configuration report to file using FDI/DTM

The configuration report shows what configuration changes have been done to the transmitter compared to the factory configuration. The report compares a specified backup file with the default transmitter configuration.

Procedure

1. Select **Service Tools** → **Maintenance** → **Backup**.
2. Select **Save/Restore Configuration**.
3. Select **Create Report**.
4. Type your desired file name.
5. Browse to the desired folder within the available directory, and then select **Save**.

7.8.14 Reset to factory settings

Reset to factory settings using FDI/DD/DTM

This function resets all or a specific part of the holding registers to factory settings.

Prerequisites

Note
It is recommended that a backup of the configuration is done before the factory reset. Then the old transmitter configuration can be loaded if necessary.

Procedure

1. Select option **Service Tools** → **Maintenance** → **Reset/Restore**.
2. HART: Select the **Restore Default Settings** button and follow the instructions.
   FOUNDATION Fieldbus: Select the **Reset to Factory Default** button and follow the instructions.

Reset to factory settings using DeltaV

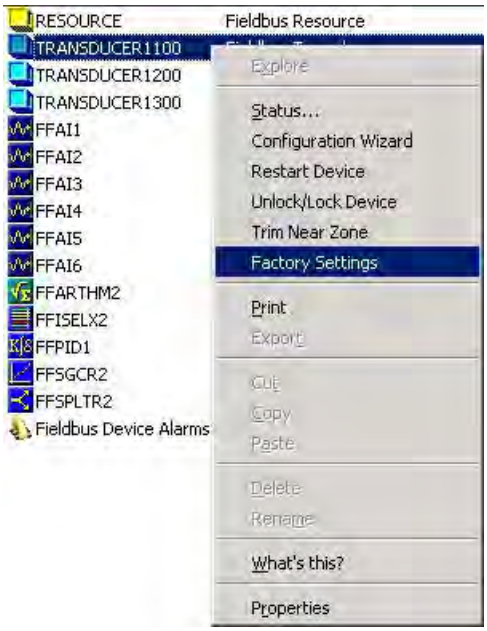
This function resets all or a specific part of the holding registers to factory settings.

Prerequisites

Note
It is recommended that a backup of the configuration is done before the factory reset. Then the old transmitter configuration can be loaded if necessary.

Procedure

1. In the *DeltaV™ Explorer*, select the desired transmitter icon, and then right-click the **TRANSDUCER1100** block icon.
2. Select **Factory Settings**.



Reset to factory settings using RRM

This function resets all or a specific part of the holding registers to factory settings.

Prerequisites

Note
It is recommended that a backup of the configuration is done before the factory reset. Then the old transmitter configuration can be loaded if necessary.

Procedure

Select **Tools** → **Factory Settings** and follow the instructions.

7.8.15 Use the simulation mode

Use the simulation mode with FDI/DD/DTM

This function can be used to simulate measurements and alarms.

Procedure

1. HART: Select **Service Tools** → **Simulate** → **Simulate**.
   FOUNDATION Fieldbus: **Service Tools** → **Simulate** → **Measurement**.
2. Select the **Start/Stop Device Simulation** button and follow the instructions.

Use the simulation mode with DeltaV

This function can be used to simulate measurements and alarms.

Procedure

1. In the *DeltaV™ Explorer*, select the desired transmitter icon, and then right-click the **TRANSDUCER1300** block icon.

2. Select **Simulation Mode**.



Use the simulation mode with RRM

This function can be used to simulate measurements and alarms.

Procedure

1. Select **Tools** → **Simulation Mode**.
2. In the *Distance (simulated)* box, type the desired value.
3. To simulate a measurement alarm, select the **Enable Measurement Alarm (simulated)** checkbox.
4. To simulate a failure alarm (e.g. an internal hardware failure), select the **Enable Device Failure Alarm (simulated)** checkbox.
5. Select **Start**.

7.8.16 Enter service mode in Rosemount Radar Master

Service functions for advanced users are available in Rosemount Radar Master. All options in the Service menu are enabled when entering the service mode.

Procedure

1. Select **Service** → **Enter Service Mode**.
2. Type the password and select **Submit**.

   The default password is "admin".

7.8.17 Change password for the service mode

To change the password for enabling all options in the Service menu:

Procedure

1. Select **Service** → **Change Password**.
2. Type your current password.
3. Type a new password.

7.8.18 View input registers

View input registers using FDI/DTM

Measured data is continuously stored in the input registers. By viewing the contents of the input registers, expert users can check that the transmitter works properly.

Procedure

1. Select **Configure** → **Manual Setup** → **Level Setup**.
2. Select **Advanced** → **Expert Options** → **Input Registers**.
3. Type the desired register number to start reading from.
   Registers can also be viewed by selecting a group from the **Block** list.
4. Select **Refresh**.

View input registers using RRM

Measured data is continuously stored in the input registers. By viewing the contents of the input registers, expert users can check that the transmitter works properly.

Procedure

1. In Rosemount Radar Master, enter the service mode.
   a) Select **Service** → **Enter Service Mode**.
   b) Type the password and select **Submit**.
      The default password is "admin".
2. Select **Service** → **View Input Registers**.
3. Select the **Dec** or **Hex** checkbox as desired.

Option	Description
Dec	Display values in decimal format.
Hex	Display values in hexadecimal (Hex) format.

4. In the *View Input Registers* window, do one of the following:
   - To search for registers by name, select the **Names** checkbox, and then in the list, select the desired register group.
   - To search for registers by entering the register number, select the **Numbers** checkbox, and then type the desired register number and the number of registers to read.
5. Select **Read**.

7.8.19 View holding registers

View holding registers using FDI/DTM

Procedure

1. Select **Configure** → **Manual Setup** → **Level Setup**.
2. Select **Advanced** → **Expert Options** → **Holding Registers**.
3. Type the desired register number to start reading from.
   Registers can also be viewed by selecting a group from the **Block** list.
4. Select **Refresh**.

7.8.20 Edit holding registers

Edit holding registers using FDI/DTM

The holding registers store various transmitter parameters, such as configuration data, used to control the measurement performance.

Prerequisites

Note
Do not use holding registers to configure the transmitter unless you are qualified. This dialog is mainly used for service purposes and for advanced configuration.

Procedure

1. Select **Configure** → **Manual Setup** → **Level Setup**.
2. Select **Advanced** → **Expert Options** → **Holding Registers**.
3. Type the desired register number to start reading from.
   Registers can also be viewed by selecting a group from the **Block** list.
4. Select **Refresh**.
5. To change a holding register value, type a new value in the corresponding value field, or select a new value from the corresponding list.
6. Select **Save** to store the new value.

View/edit holding registers using RRM

The holding registers store various transmitter parameters, such as configuration data, used to control the measurement performance.

Prerequisites

Note
Do not use holding registers to configure the transmitter unless you are qualified. This dialog is mainly used for service purposes and for advanced configuration.

Procedure

1. In Rosemount Radar Master, enter the service mode.
   a) Select **Service** → **Enter Service Mode**.
   b) Type the password and select **Submit**.
      The default password is "admin".

2. Select **Service** → **View Holding Registers**.
3. Select the **Dec** or **Hex** checkbox as desired.

Option	Description
Dec	Display values in decimal format.
Hex	Display values in hexadecimal (Hex) format.

4. In the *View Holding Registers* window, do one of the following:
   - To search for registers by name, select the **Names** checkbox, and then in the list, select the desired register group.
   - To search for registers by entering the register number, select the **Numbers** checkbox, and then type the desired register number and the number of registers to read.
5. Select **Read**.
6. To change a holding register value, type a new value in the corresponding value field.

   Some holding registers can be edited in a separate window. In this case, you can change individual data bits.
7. Select **Store** to store the new value.

7.8.21 Write protection

Write protect a transmitter using FDI/DD/DTM

The transmitter can be protected from unintentional configuration changes by a password protected function. The default password is 12345. It is recommended that this password is not changed to facilitate service and maintenance of the transmitter.

Procedure

1. HART®: Select **Overview** → **Device Information** → **Alarm and Security** → **Security**.

   FOUNDATION Fieldbus: Select **Overview** → **Device Information** → **Security**.
2. HART: Select **Write Protect** and follow the instructions.

   FOUNDATION Fieldbus: Select **Write Protect Level** or **Write Protect All**, and follow the instructions.

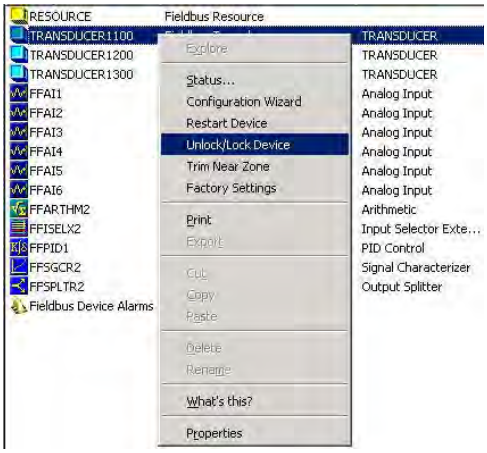
Write protect a transmitter using DeltaV

The transmitter can be protected from unintentional configuration changes by a password protected function. The default password is 12345. It is recommended that this password is not changed to facilitate service and maintenance of the transmitter.

Procedure

1. In the *DeltaV™ Explorer*, select the transmitter icon, and right-click the **TRANSDUCER1100** block icon.

2. Select **Unlock/Lock Device**.



Write protect a transmitter using RRM

The transmitter can be protected from unintentional configuration changes by a password protected function. The default password is 12345. It is recommended that this password is not changed to facilitate service and maintenance of the transmitter.

Procedure

1. Select **Tools** → **Lock/Unlock Configuration Area**.
2. Type the password to lock/unlock, and then select **OK**.

7.8.22 Upgrade the HART® to Modbus® Converter firmware

The HMC's firmware is upgraded using Rosemount Radar Master.

Prerequisites

Note
All settings in the HART to Modbus converter (HMC) will be lost after upgrading the transmitter. Reconfiguration of Modbus communication setup and alarm handling is required after completing the upgrade.

Note
During firmware upgrade, the HMC Modbus RTU address must be 246, the default address. Ensure to disconnect other Modbus RTU devices that are connected and have address 246.

Note
Do not interrupt communication between the PC and the Rosemount 5300 Level Transmitter during the firmware upload.

Procedure

1. Start Rosemount Radar Master.
2. Enable Modbus communication and set communication preferences.
   a) Select **View** → **Communication Preferences**.
   b) Select the **Modbus** tab.
   c) Select the **Enable Modbus Communication** checkbox.

d) In the ***Port*** list, select the COM port number that the RS-485 Converter is connected to.

e) Select **Advanced** and use the following settings:

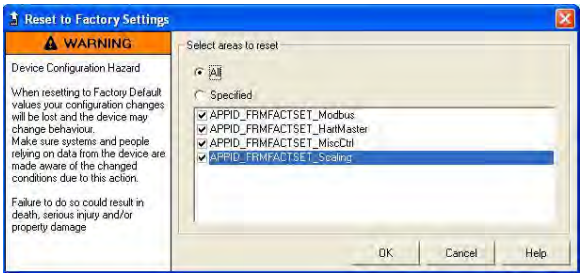
- Modem: RS-485
- Baudrate: According to configuration in HMC (default 9600)
- Stop Bits: According to configuration in HMC (default 1)
- Parity: According to configuration in HMC (default None)
- Handshake: RTS/CTS
- Response Timeout: 1000 ms
- Retries: 3

f) Select **OK**.

3. Search for and connect to device.
   a) Select **Device** → **Search** to open the ***Search Device*** window.
      If the HMC is configured for Modbus ASCII or Levelmaster communication, cycle the power to the transmitter and then open the ***Search Device*** window. The HMC will then communicate using Modbus RTU for 20 seconds and under that time it is possible to connect with Rosemount Radar Master.
   b) In the ***Protocols(s)*** list, verify that Modbus is selected.
   c) Select **Scan Address Range**, and type a start and end address.
      The default HMC Modbus address is 246.
   d) Select **Start Scan**.
   e) Select **OK** to connect when the device is found.
4. Ensure the HMC Modbus address is set to 246 (the default address).
   a) Select **Setup** → **General**.
   b) In the ***Device Address*** box, type 246 and select **Store**.
5. Enter service mode.
   a) Select **Service** → **Enter Service Mode**.
   b) Type the password and select **Submit**.
      The default password is "admin".
6. Upload HMC firmware to device.
   a) Select **Service** → **Upload Firmware**.
   b) Select **Browse** and navigate to the folder containing the HMC firmware file.
   c) Select the ".cry" file, and select **Open**.
   d) In the ***Upload Firmware*** window, select **Upload** to start the firmware upgrade.
7. When upload is finished, select **Tools** → **Diagnostics**.
8. Select **Device Errors** and check for “Checksum”.
9. If “Checksum” is on the list, then do the following:

a) Select **Tools** → **Factory Settings**.

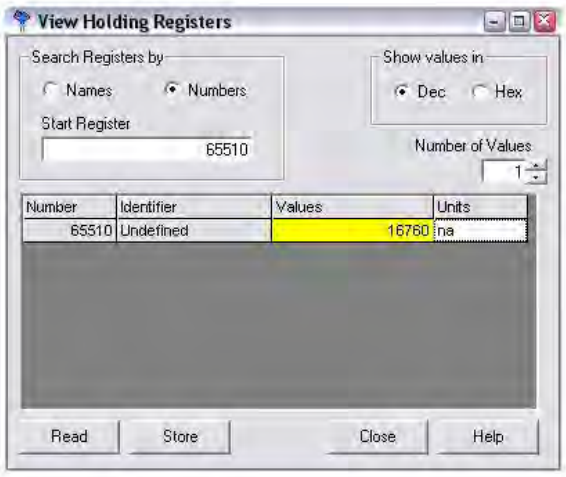
b) Select **All** and then select **OK**.



c) Select **Yes**.

Note
An error message might be displayed when performing the Reset to Factory Settings operation. The operation has been successful if the checksum error has been cleared.

10. Select **Tools** → **Restart Device**.
11. Select **Tools** → **Diagnostics**, and then select **Device Errors** to verify that the "Checksum" error is no longer present.
12. If the "Checksum" error is still present, then do the following:
    a) Select **Service** → **View Holding Registers**.
    b) Select **Numbers**.
    c) In the ***Start Register*** box, type `65510`, and then select **Read**.
    d) Type the value `16760` for register `65510` and select **Store**.



13. Select **Tools** → **Restart Device**.

14. If the HMC is configured for Modbus ASCII or Levelmaster communication, then proceed with the following:
    a) Close Rosemount Radar Master and disconnect the RS-485 converter from the HMC.
    b) Cycle the power to the HMC to exit the Modbus RTU communication mode.

7.9 Application challenges

7.9.1 Handling disturbances at top of tank

In addition to using the ATC, the Rosemount 5300 Level Transmitter supports alternative methods to filter out disturbances at the top of the tank, such as the Trim Near Zone and the Hold Off Distance/Upper Null Zone functions, which can be used to handle disturbances from narrow nozzles or nozzles with rough edges.

Trim near zone function

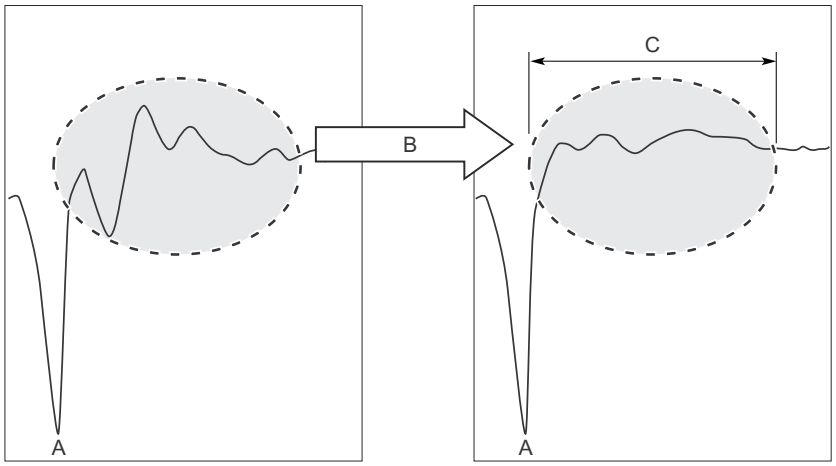
The Trim Near Zone function is used to fine tune performance in the area close to the tank top (Near Zone). The Near Zone stretches about 3.3 ft (1 m) into the tank from the lower side of the device flange.

The device will learn how the echo curve in the Near Zone looks like and use this for enhancing accuracy when the surface echo is within the Near Zone. When leaving factory, the near zone measurement has been fine tuned. The factory setting is normally sufficient and does not need to be repeated after installation.

However, since the setting is optimized depending on actual installation, further trimming may be necessary in the case of unfavorable conditions (for instance if there are disturbance echoes caused by the tank nozzle, or if you have exchanged the probe). Trimming means that the measurement performance in the Near Zone is maintained even under these conditions and prevents false echo indication.

Figure 7-20 describes the Trim Near Zone function and its effect on the echo curve. This effect is only visible if measurement conditions so require.

Figure 7-20: Echo Curve Before and After Trim Near Zone



A. Reference Peak
B. Trim Near Zone
C. 0-3.3 ft (0-1 m)

Perform trim near zone using FDI/DD/DTM

The Trim Near Zone function is used to fine tune performance in the area close to the tank top (Near Zone).

Prerequisites

Before performing the Trim Near Zone, ensure that:

- There is product in the tank.
- The product level is below the Near Zone region (0-3.3 ft (0-1 m) below the Upper Reference Point).
- The ambient temperature is within 72 °F (40 °C) of the expected ambient operating temperature.

Note
The Trim Near Zone function should only be used for reducing impact from stationary disturbances. It is not suitable for occasional disturbances.

Note
For firmware version 2.A2 or later the Trim Near Zone is not possible in combination with narrow nozzles, as defined below:

- 50 mm < Nozzle height < 300 mm
- Nozzle diameter < 2 in. for all single probes (except 13 mm single rigid)
- Nozzle diameter < 3 in. for 13 mm single rigid

Note
Trim Near Zone is not available for large coaxial probes.

Note
For devices with option code BR5, refer to the Rosemount 5300 Single Probes with Cold Temperature Option Code BR5 Manual Supplement.

Procedure

1. HART®: Select **Overview** → **Echo Tuning**.
   FOUNDATION™ Fieldbus: **Configure** → **Manual Setup** → **Avanced**.
2. Select **Near Zone** → **Trim Near Zone** and follow the instructions.
3. When near zone trimming is complete, restart the device.
   a) HART: Select **Service Tools** → **Maintenance**.
      FOUNDATION Fieldbus: Select **Service Tools** → **Maintenance** → **Reset/Restart**.
   b) Select **Restart Device**.

Perform trim near zone using RRM

The Trim Near Zone function is used to fine tune performance in the area close to the tank top (Near Zone).

Prerequisites

Before performing the Trim Near Zone, ensure that:

- There is product in the tank.
- The product level is below the Near Zone region (0-3.3 ft (0-1 m) below the Upper Reference Point).
- The ambient temperature is within 72 °F (40 °C) of the expected ambient operating temperature.

Note
The Trim Near Zone function should only be used for reducing impact from stationary disturbances. It is not suitable for occasional disturbances.

Note
For firmware version 2.A2 or later the Trim Near Zone is not possible in combination with narrow nozzles, as defined below:

- 50 mm < Nozzle height < 300 mm
- Nozzle diameter < 2 in. for all single probes (except 13 mm single rigid)
- Nozzle diameter < 3 in. for 13 mm single rigid

Note
Trim Near Zone is not available for large coaxial probes.

Note
For devices with option code BR5, refer to the Rosemount 5300 Single Probes with Cold Temperature Option Code BR5 Manual Supplement.

Procedure

1. Select **Setup** → **Advanced**.
2. Select the **Near Zone** tab.
3. Select **Trim Near Zone** and follow the on-screen instructions.
4. When near zone trimming is complete, restart the device.
   a) Select **Tools** → **Restart Device**.

Reset trim near zone using FDI/DD/DTM

To reset the Trim Near Zone function to factory settings:

Procedure

1. HART®: Select **Overview** → **Echo Tuning**.
   FOUNDATION™ Fieldbus: **Configure** → **Manual Setup** → **Advanced**.
2. Select **Near Zone** → **Reset near zone trimming to factory settings** and follow the instructions.

Reset trim near zone using RRM

To reset the Trim Near Zone function to factory settings:

Procedure

1. Select **Setup** → **Advanced**.
2. Select the **Near Zone** tab.
3. Select **Trim Near Zone**.
4. Select **Reset near zone trimming to factory settings**, and then select **OK**.

Change the hold off distance/upper null zone

Change the hold off distance/upper null zone using FDI/DD/DTM

The Hold Off Distance/Upper Null Zone (UNZ) defines a zone close to the transmitter where echoes are ignored. This zone can be extended to block out disturbing echoes at the top of the tank.

Prerequisites

Note
By adjusting the Hold Off Distance/UNZ, the measuring range is reduced.

Note
Before changing the Hold Off Distance/UNZ, check entered value for the high alarm limit. The high alarm limit must be outside the Hold Off Distance/UNZ.

Procedure

1. Use the Echo Curve plot to verify if there are disturbances in the upper part of the tank.
2. Set the Hold Off Distance/UNZ to the desired value.
   a) HART®: Select **Configure** → **Manual Setup** → **Level Setup** → **Probe**.
      FOUNDATION™ Fieldbus: Select **Configure** → **Manual Setup** → **Probe**.
   b) Set **Upper Null Zone** to the desired value.
   c) Select **Send**.

Related information

Use the echo curve analyzer with a handheld communicator
Hold off distance/upper null zone (UNZ)

Change the hold off distance/upper null zone using RRM

The Hold Off Distance/Upper Null Zone (UNZ) defines a zone close to the transmitter where echoes are ignored. This zone can be extended to block out disturbing echoes at the top of the tank.

Prerequisites

Note
By adjusting the Hold Off Distance/UNZ, the measuring range is reduced.

Note
Before changing the Hold Off Distance/UNZ, check entered value for the high alarm limit. The high alarm limit must be outside the Hold Off Distance/UNZ.

Procedure

1. Use the Echo Curve plot to verify if there are disturbances in the upper part of the tank.
2. Set the Hold Off Distance/UNZ to the desired value.
    a) Select **Setup** → **Tank**.
    a) Select the **Probe** tab.
    b) In the ***Hold Off Distance/UNZ*** box, type the desired value.
    c) Select **Store**.

Related information

Use the echo curve analyzer in RRM
Hold off distance/upper null zone (UNZ)

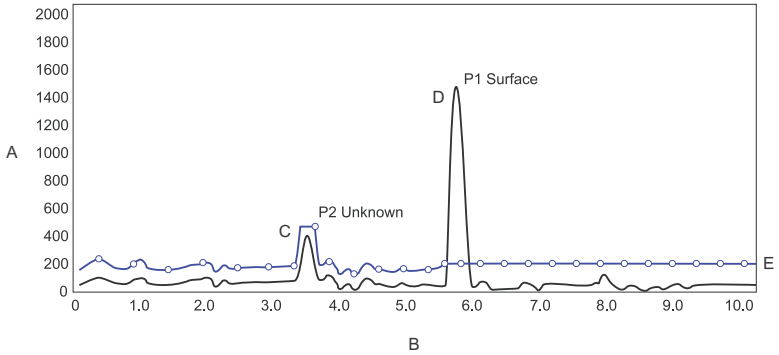
7.9.2 Disturbance echo handling

When the Basic Configuration is done, the transmitter may need a fine-tuning to handle disturbing objects in the tank. The Amplitude Threshold Curve (ATC) function can be used for disturbance echo handling with the Rosemount 5300 Level Transmitter.

Amplitude threshold curve

As shown in Figure 7-21, the ATC can be designed to filter out single disturbing echoes by adapting the curve around the corresponding amplitude peak. It is important in this case that the disturbance is fixed at a certain tank level. Disturbing echoes which may appear different from time to time can be filtered out by raising the whole ATC.

Figure 7-21: Disturbing Echoes Can Be Filtered out by Creating an Amplitude Threshold



A. Amplitude, mV
B. Distance, m
C. Disturbing object
D. Measurement signal
E. Amplitude Threshold Curve

Signal quality metrics

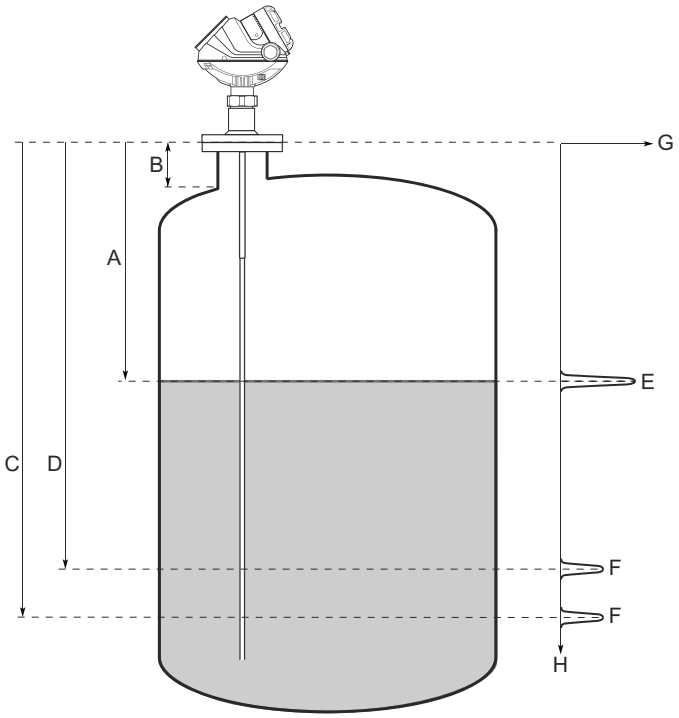
Build up on the probe and different surface conditions are factors that can affect signal and noise levels. Signal Quality Metrics can give an indication of how good the surface signal is compared to the noise. For more information, see Signal Quality Metrics.

7.9.3 Double bounce handling

A double bounce echo occurs when a radar signal bounces back and forth between the product surface and the tank roof before it is detected by the transmitter. Double bounces are most likely to appear in metal water tanks. When using interface measurement to detect a potential oil layer on top of the water, an unidentified double bounce echo peak could cause problems being interpreted as an interface echo peak.

Normally, these echo peaks are identified and discarded as double bounce peaks by the Rosemount 5300. Both the echo peak amplitude and position are used to identify a double bounce.

Figure 7-22: Double Bounce Echo Peak Position



A. Surface distance
B. Nozzle height
C. Distance to potential double bounce = Surface distance × 2
D. Distance to potential double bounce = (Surface distance × 2) - Nozzle height
E. Surface echo peak
F. Double bounce echo peaks
G. Signal amplitude
H. Distance

Required settings for effective double bounce identification

- The position of a potential double bouce echo peak is related to the nozzle hight. A properly configured nozzle height is therefor essential to achieve an efficient double bounce handling.
- The configured dielectic constants are included in the evaluation of the echo peak amplitude and should therefore also be set correctly.

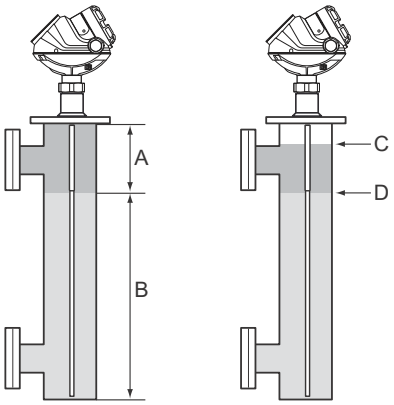
Related information

Upper product dielectric constant

7.9.4 Interface level with submerged probe

The measurement mode Interface Level with Submerged Probe is used to handle interface measurements when the product level is not visible, for example in a full chamber pipe as illustrated in Figure 7-23. In this case the probe is fully submerged into the upper product, and only the interface level is detected by the transmitter.

Figure 7-23: Interface Level Measurements in a Full Chamber



A. Interface distance
B. Interface level
C. Product level is ignored
D. Interface level is measured

Even if the upper product level drops, it is ignored by the transmitter which continues to measure only the interface level. If the product level drops, the air filled region in the upper part of the pipe will slightly reduce the measurement accuracy of the interface level. To achieve high accuracy in this measurement mode, the probe must be fully submerged, or a Rosemount 5302 for Level and Interface measurements should be used.

Set the measurement mode using FDI/DD/DTM

To set the measurement mode to Interface Level with Submerged Probe:

Prerequisites

Note
Do not set measurement mode to Interface Level with Submerged Probe for applications where both product level and interface level should be measured.

Procedure

1. Select **Configure** → **Level Setup**.
2. Select the **Environment** tab.
3. Under *Measurement Mode*, select the **Interface Level with submerged probe** checkbox.

4. Select **Send**.

Note
Adjust Interface Threshold if the interface level pulse is not detected. Note that in submerged mode the interface is picked up by the surface threshold.

Set the measurement mode using RRM

To set the measurement mode to Interface Level with Submerged Probe:

Prerequisites

Note
Do not set measurement mode to Interface Level with Submerged Probe for applications where both product level and interface level should be measured.

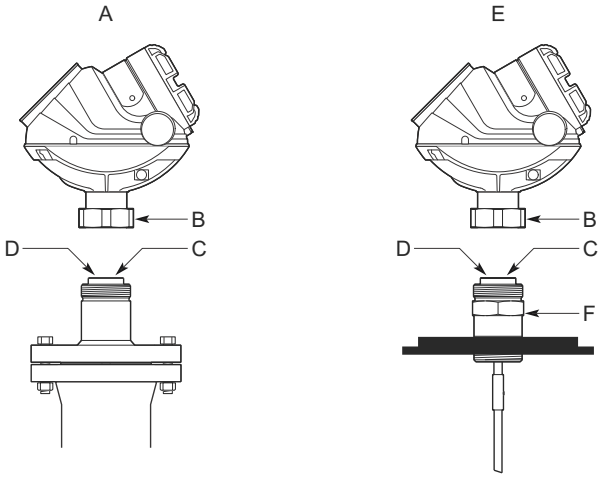
Procedure

1. Select **Setup** → **Tank**.
2. Select the **Environment** tab.
3. Under *Measurement Mode*, select the **Interface Level with submerged probe** checkbox.
4. Select **Store**.

Note
Adjust Interface Threshold if the interface level pulse is not detected. Note that in submerged mode the interface is picked up by the surface threshold.

7.10 Replace the transmitter head

Figure 7-24: Transmitter Head Replacement



A. Flanged version
B. Nut
C. Process seal
D. Put the protection plug here
E. Threaded version
F. Adapter

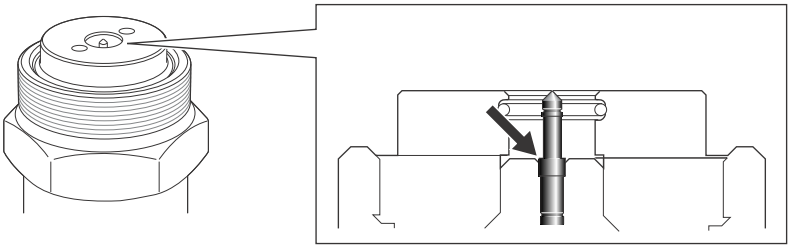
Prerequisites

Note
If the transmitter head must be removed from the probe, ensure that the process seal is carefully protected from dust and water.

Procedure

1. Loosen the nut that connects the transmitter head to the process seal.
2. ⚠ Carefully lift the transmitter head.
3. On the probe, ensure that the upper surface of the process seal is clean and free from dust and water. Wipe it clean with a dry and lint-free cloth.
4. Verify the spring-loaded pin at the center of the process seal is properly inserted. When inserted properly, only the plunger is seen above the edge inside the seal hole.

   Note
   Do not remove the process seal from the adapter.



5. If the transmitter head is not mounted directly, attach the protection plug to the process seal to protect the exposed parts from dust and water. If a protection plug is not available, then cover the process seal with a plastic bag.
6. Rotate the new transmitter head so the device display faces the desired direction.
7. Tighten the nut. Max torque is 30 ft-lb (40 Nm).

Postrequisites

Configure the transmitter.

Related information

Configuration

7.11 Changing a probe

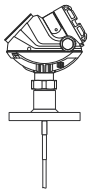
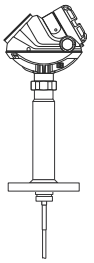
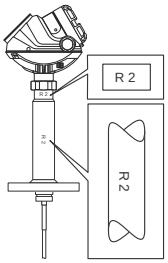
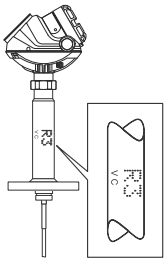
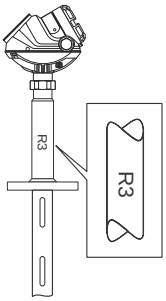
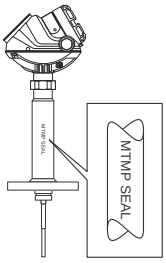
7.11.1 Probe and firmware compatibility

Transmitter heads with a firmware version earlier than 1.A4 (manufacturing date before 2008-06-18) are not compatible with HP/HTHP/C probes marked with R2.

Transmitter heads with a firmware version 1.A4 or later are compatible with HP/HTHP probes without the R2 marking when the Trim Near Zone function is performed, as illustrated below.

Only probes with both R3 and VC marking are compatible with the Dynamic Vapor Compensation function. See Check if Dynamic Vapor Compensation function is supported using RRM to determine if the Dynamic Vapor Compensation function is supported by the transmitter head.

Table 7-23: Compatibility between Firmware Version and Probe Type

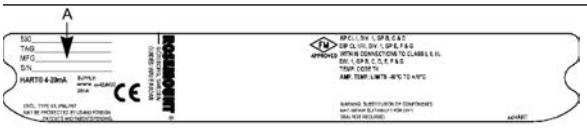
Firmware version	Probe type					
	Standard	HP/HTHP without R2 marking	HP/HTHP/C with R2 marking only(1)	HTHP with both R3 and VC marking	Large coaxial HP/C	MTMP
						
Earlier than 1.A4	Yes	Yes	No	No	No	No
1.A4	Yes	Yes(2)	Yes	No	No	No
2.A2 - 2.F0	Yes	Yes(2)	Yes(3)	No	No	No
2.H0 -2.J0	Yes	Yes (2)	Yes (3)	Yes(4)	No	No
2.L3 or later	Yes	Yes (2)	Yes (3)	Yes(4)	Yes	Yes

(1) The R2 marking is on the housing seal or the adapter as seen in the figure.
(2) Trim Near Zone function is required.
(3) When Dynamic Vapor Compensation is not used.
(4) The probe requires that Dynamic Vapor Compensation is activated in the device for full functionality.

7.11.2 Check firmware and probe version

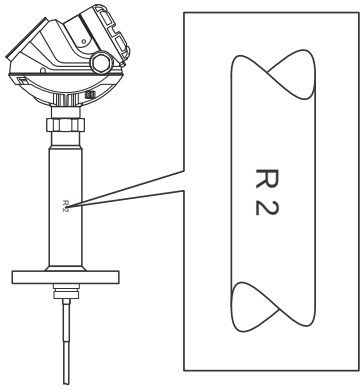
Procedure

1. Check the manufacturing date on the transmitter head label.



A. Manufacturing Date Before 080618 (YYMMDD)

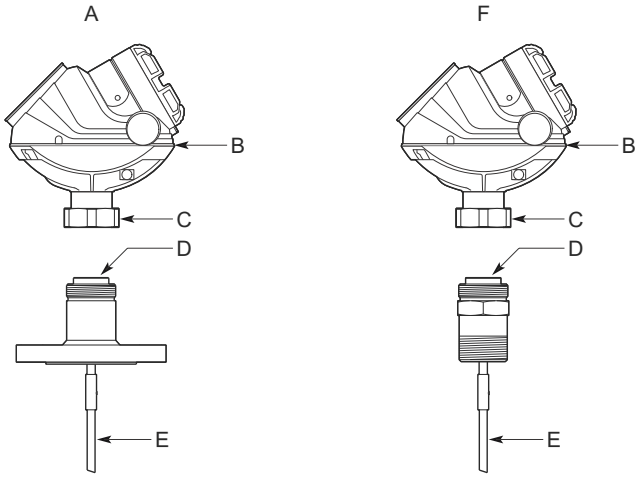
2. Check the marking on the probe.



3. Check the software revision number (firmware version).
   a) FDI/DD/DTM: Select **Device Information** → **Revisions** → **Firmware revision**.
      Rosemount Radar Master: Select **Device** → **Properties**.

7.11.3 Replace the probe

Figure 7-25: Probe Replacement



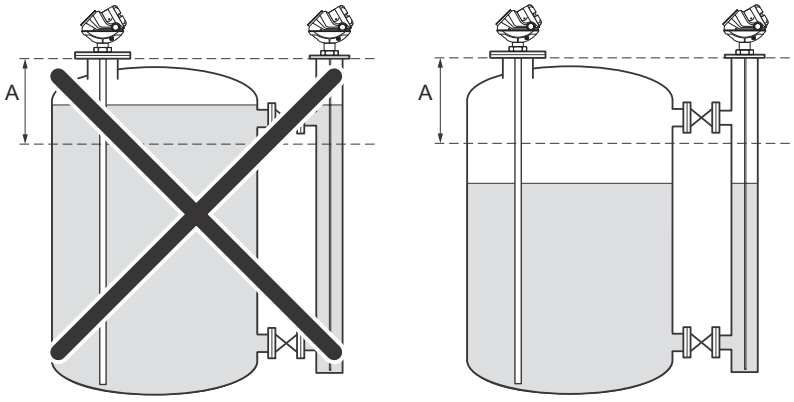
A. Flange version
B. Transmitter head
C. Nut
D. Process seal
E. Probe
F. Threaded version

Procedure

1. Loosen the nut.
2. ⚠ Remove the transmitter head from the old probe. Be sure to protect the transmitter head bottom from dust and water.

3. On the new probe, ensure that the protection plug is removed and the upper surface of the process seal is clean. Also verify that the spring-loaded pin at the center of the process seal is properly inserted.
4. Mount the transmitter head on the new probe.
5. Tighten the nut. Max torque is 30 ft-lb (40 Nm).
6. If the new probe is not of the same type as the old one, update the transmitter configuration by setting the Probe Type parameter to the appropriate value.
    a) FDI/DD/DTM: Select **Configure** → **Manual Setup** → **Level Setup**.
    Rosemount Radar Master: Select **Setup** → **Tank**.
    b) Select the **Probe** tab.
    c) In the **Probe Type** list, select desired probe type.
7. Measure the Probe Length and enter the measured value.
    a) FDI/DD/DTM: Select **Configure** → **Manual Setup** → **Level Setup**.
    Rosemount Radar Master: Select **Setup** → **Tank**.
    b) Select the **Probe** tab.
    c) In the **Probe Length** box, enter the measured Probe Length value.
8. In certain cases, a fine tune by using the Trim Near Zone function is necessary.
    When using the Trim Near Zone function, product level in the vessel must be lowered beneath the Near Zone to get precise measurement data (see Figure 7-26).

Figure 7-26: Product Level Lowered beneath the Near Zone



A. Near Zone, 40 in. (1 m)

9. Run Verify Level to check your level measurement.

Related information

Probe length
Run verify level

7.12 Service support

To expedite the return process, refer to Emerson.com and contact the nearest Emerson representative.

⚠ CAUTION

Individuals who handle products exposed to a hazardous substance can avoid injury if they are informed of and understand the hazard. Returned products must include a copy of the required Safety Data Sheet (SDS) for each substance.

Emerson representatives will explain the additional information and procedures necessary to return goods exposed to hazardous substances.

A Specifications and reference data

A.1 Performance specifications

A.1.1 General

Reference conditions

Single Standard probe, 77 °F (25 °C) in water (DC=80) and ambient pressure in a 4-in. pipe using Trim Near Zone function.

Reference accuracy

± 0.12 in. (3 mm) or 0.03% of measured distance, whichever is greatest

For probes with spacers, the accuracy may deviate close to the spacers. Accuracy may be affected by remote housing.

Repeatability

± 0.04 in. (1 mm)[6]

Ambient temperature effect

± 0.008 in. (0.2 mm) /°K or ± 30 ppm/°K of measured value, whichever is greatest[7]

Electromagnetic interference effect

- Shielded cable: ± 0.2 in. (5 mm)[8]
- Unshielded cable: ± 2 in. (50 mm)[8]

For FOUNDATION™ Fieldbus units it may be required to ground the signal cable shield at the power supply and transmitter to achieve optimum performance.

Thresholds may need to be adjusted, see Guidelines for setting the amplitude thresholds for general guidelines on manual threshold settings.

Update interval

Minimum 1 update per second

A.1.2 Environment

Vibration resistance

- Aluminum housing: Level 1 IEC 60770-1/IEC 61298-3 ed 1 chapter 7, IACS E10
- Stainless Steel housing: IACS E10

(6) In accordance with IEC 60770-1. See the IEC 60770-1 standard for a definition of radar specific performance parameters and if applicable corresponding test procedures.
(7) For the BR5 option code with ambient temperatures between -67 °F (-55 °C) and -40 °F (-40 °C), the ambient temperature effect is ± 0.012 in. (0.3 mm) /°K or ± 45 ppm/°K of measured value, whichever is greatest.
(8) Deviation through electromagnetic interference according to EN 61326.

Electromagnetic compatibility

Emission and Immunity: EMC directive 2014/30/EU, EN 61326-1:2013, and EN61326-3-1:2006.

NAMUR recommendations: NE21[9]

CE-mark

Complies with applicable directives (EMC, ATEX).

Built-in lightning protection

EN 61326, IEC 61000-4-5, level 2kV (6kV with T1 terminal block)

Contamination/product build-up

- Single lead probes are preferred when there is a risk of contamination (because build-up can result in the product bridging between the inner lead and outer pipe for the coaxial versions).
- For viscous or sticky applications, PTFE probes are recommended. Periodic cleaning may also be required.
- For viscous or sticky applications, it is not recommended to use centering discs mounted along the single lead probe.
- Signal Quality Metrics (option code D01, or DA1) can be used to determine when to clean the probe. Transmitters equipped with the Diagnostics Suite option can calculate Signal Quality Metrics.

Table A-1: Maximum Recommended Viscosity and Contamination/Build-up

Probe type	Maximum viscosity	Contamination/build-up
Single lead	8000 cP[1][2]	Build-up allowed
Large coaxial	1500 cP	Thin build-up allowed, but no bridging
Coaxial	500 cP	Not recommended

(1) Consult your local Emerson representative in the case of agitation/turbulence and high viscous products.

(2) Be cautious in HTHP viscous or crystallizing media applications where temperature at instrument connection is significantly lower than process temperature with risk of coating in the upper part of probe that may reduce the measurement signal. Consider using M, HP, or STD probes in such applications.

A.1.3 Measuring range

See Table A-2 and Table A-3 for each probe's measuring range and minimum dielectric constant. Due to the measuring range depending on the application and factors described below, the values are a guideline for clean liquids. For more information, ask your local Emerson representative.

Note
For Remote Housing, see Table A-4 and Table A-5 for the maximum recommended measuring range for different remote housing lengths, installation types, dielectric constants, and probe types.

(9) Namur NE21 not available with option code QT.

Different parameters (factors) affect the echo and therefore the maximum measuring range differs depending on application according to:

- Disturbing objects close to the probe.
- Media with higher dielectric constant (ε_r) gives better reflection and allows a longer measuring range.
- Surface foam and particles in the tank atmosphere may affect measuring performance.
- Heavy product build-up or contamination on the probe should be avoided since it can reduce measuring range and might cause erroneous level readings.

Table A-2: Maximum Measuring Range

Probe type	Maximum measuring range
Rigid single lead/segmented rigid single lead	9 ft. 10 in. (3 m) for 8 mm probes (code 4A) 19 ft. 8 in. (6 m) for 13 mm probes (code 4B) 32 ft. 9 in. (10 m) for 13 mm probes (code 4S)
Flexible single lead	164 ft. (50 m)(1)(2)
Coaxial	19 ft. 8 in. (6 m)
Large coaxial	19 ft. 8 in. (6 m)

(1) Maximum measuring range for Duplex 2205 probes type 5A and 5B is 105 ft. (32 m).
(2) Maximum measuring range for PTFE covered probes type 5A is 98 ft (30 m).

Table A-3: Minimum Dielectric Constant

Probe type	Minimum dielectric constant			
	Std	**MTMP/HP**	**HTHP**	**C**
Rigid single lead/ segmented rigid single lead	1.4(1)(2) (1.25 if installed in a metallic bypass or stilling well)	1.6(1)(2) (1.4 if installed in a metallic bypass or stilling well)		
Flexible single lead	1.4, up to 49 ft. (15 m)(1) 1.8, up to 82 ft. (25 m)(1) 2.0, up to 115 ft. (35 m)(1)(3) 3, up to 138 ft. (42 m) 4, up to 151 ft. (46 m) 6, up to 164 ft. (50 m)	1.6, up to 49 ft. (15 m)(1) 1.8, up to 82 ft. (25 m)(1) 2.0, up to 115 ft. (35 m)(1)(3) 3, up to 138 ft. (42 m) 4, up to 151 ft. (46 m) 6, up to 164 ft. (50 m)		
Coaxial	1.2	1.4	2.0	1.4
Large coaxial	1.2	1.4	N/A	1.4

(1) Probe end projection software function will improve the minimum measurable dielectric constant. Consult the factory for details.
(2) May be lower depending on installation.
(3) Up to 49 ft. (15 m) for Duplex 2205 probes type 5A and 5B.

Table A-4: Remote Housing Measuring Range for Tank Installations, ft. (m)

Probe type[1]	1 m remote housing			2 m remote housing			3 m remote housing		
	DC 1.4	DC 2	DC 80	DC 1.4	DC 2	DC 80	DC 1.4	DC 2	DC 80
Rigid single 8 mm	4 (1.25)	4 (1.25)	10 (3)[2]	9 (2.75)	9 (2.75)	10 (3)[2]	10 (3)	10 (3)	10 (3)
Rigid single 13 mm	4 (1.25)	4 (1.25)	19 (6)[2]	9 (2.75)	9 (2.75)	19 (6)[2]	14 (4.25)	14 (4.25)	19 (6)[2]
Segmented rigid single	4 (1.25)	4 (1.25)	33 (10)[2]	9 (2.75)	9 (2.75)	33 (10)[2]	14 (4.25)	14 (4.25)	33 (10)[2]
Flexible single	4 (1.25)	4 (1.25)	159 (48.5)[2]	9 (2.75)	9 (2.75)	154 (47)[2]	14 (4.25)	14 (4.25)	149 (45.5)[2]
Coaxial/Large coaxial	19 (6)	19 (6)	19 (6)	19 (6)	19 (6)	19 (6)	19 (6)	19 (6)	19 (6)

(1) Validated for ambient temperature range -40 °F to 185 °F (-40 °C to 85 °C).
(2) Accuracy may be affected up to ± 1.2 in. (30 mm).

Table A-5: Remote Housing Measuring Range for Chamber/Pipe Installations < 4 in. (100 mm), ft. (m)

Probe type[1]	1 m remote housing			2 m remote housing			3 m remote housing		
	DC 1.4	DC 2	DC 80	DC 1.4	DC 2	DC 80	DC 1.4	DC 2	DC 80
Rigid single 8 mm	4 (1.25)	10 (3)[2]	10 (3)[2]	9 (2.75)	10 (3)[2]	10 (3)[2]	10 (3)	10 (3)	10 (3)
Rigid single 13 mm	19 (6)[2]	19 (6)[2]	19 (6)[2]	19 (6)[2]	19 (6)[2]	19 (6)[2]	19 (6)	19 (6)	19 (6)
Segmented rigid single	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]
Flexible single[3]	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]	33 (10)[2]
Coaxial/Large coaxial	19 (6)	19 (6)	19 (6)	19 (6)	19 (6)	19 (6)	19 (6)	19 (6)	19 (6)

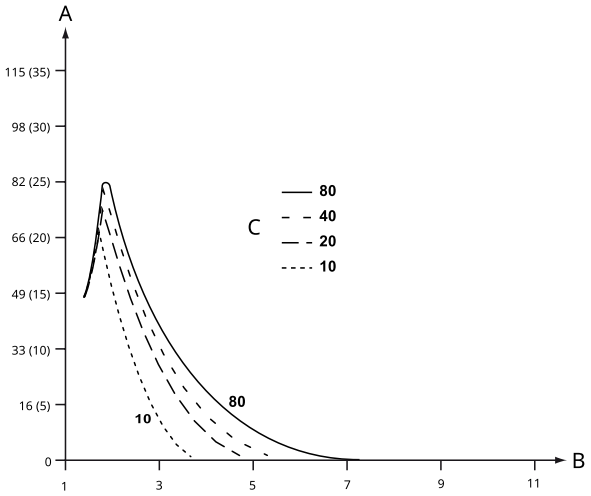
(1) Validated for ambient temperature range -40 °F to 185 °F (-40 °C to 85 °C).
(2) Accuracy may be affected up to ± 1.2 in. (30 mm).
(3) Required chamber/pipe size is 3 or 4 in. (75 -100 mm).

Interface measuring range

The maximum allowable upper product thickness/measuring range is primarily determined by the dielectric constants of the two liquids.

Typical applications include interfaces between oil/oil-like and water/water-like liquids, with a low (<3) dielectric constant for the upper product and a high (>20) dielectric constant for the lower product. For such applications, the maximum measuring range is limited by the length of the coaxial, large coaxial, and rigid single lead probes.

For flexible probes, the maximum measuring range is reduced by the maximum upper product thickness, according to the diagram below. However, characteristics may vary between the different applications. Maximum distance to the interface is 164 ft. (50 m) minus the maximum upper product thickness.



A. Maximum upper product thickness, ft. (m)
B. Upper product dielectric constant
C. Lower product dielectric constant

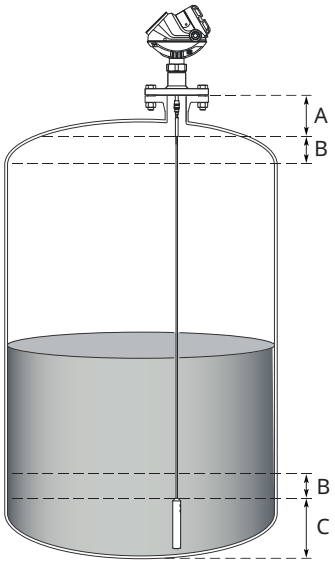
A.1.4 Accuracy over measuring range

The measuring range depends on probe type, dielectric constant of the product and installation environment, and is limited by the Blind Zones at the very top and bottom of the probe. In the Blind Zones, the accuracy exceeds ±1.18 in. (30 mm), and measurements may not be possible. Measurements close to the Blind Zones will have reduced accuracy.

The following conditions will impact the Blind Zones:

- If the single lead probes are installed in a nozzle, the nozzle height shall be added to the specified Upper Blind Zone.
- The measuring range for the PTFE covered flexible single lead probe includes the weight when measuring on a high dielectric media.
- When using a metallic centering disc, the Lower Blind Zone is 8 in. (20 cm), including weight if applicable. When using a PTFE centering disc, the Lower Blind Zone is not affected.

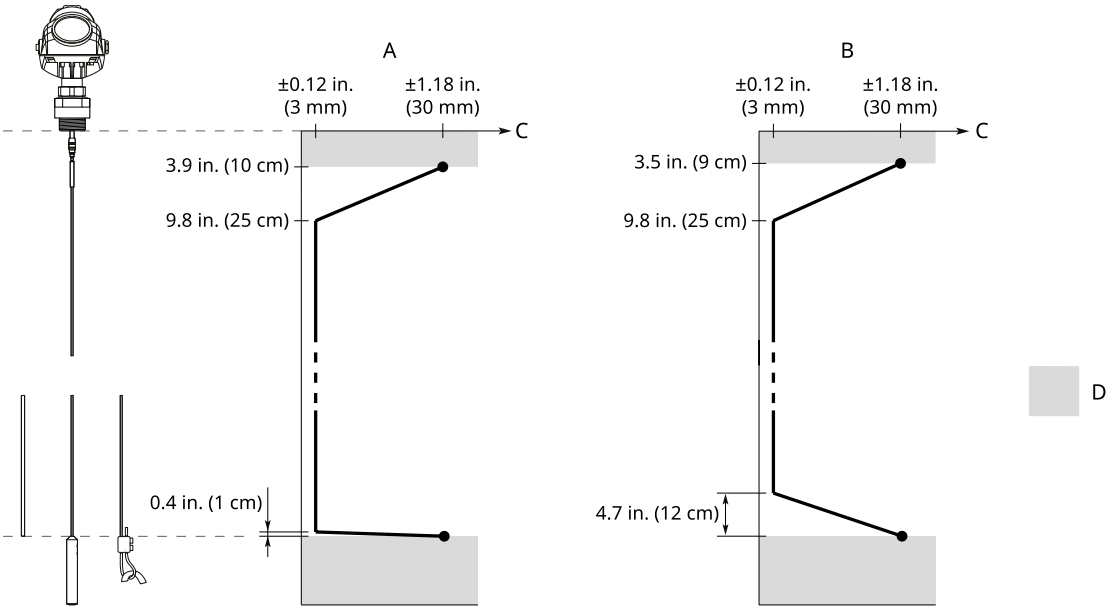
Figure A-2: Blind Zones



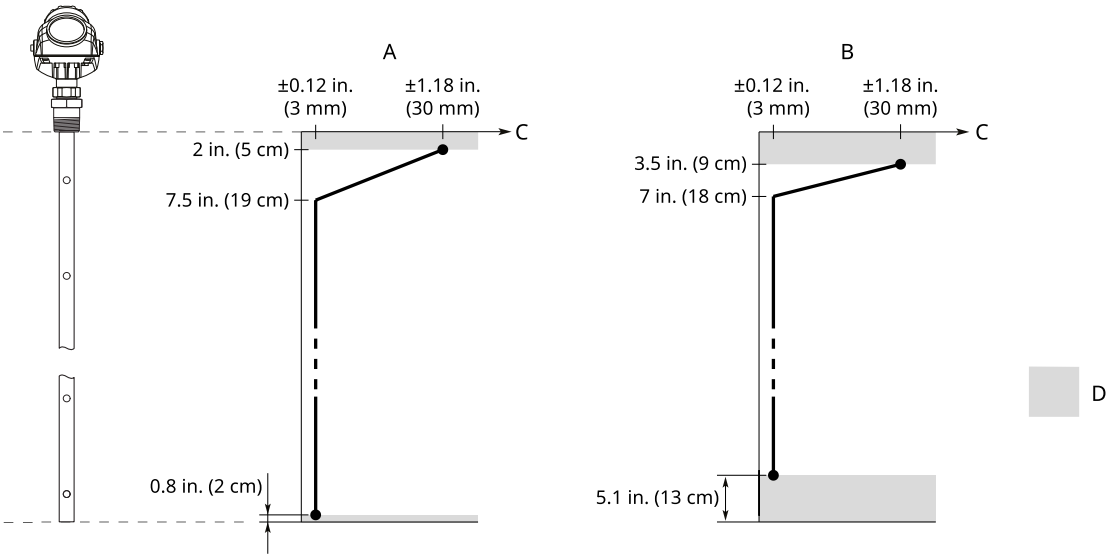
A. Upper Blind Zone
B. Reduced accuracy
C. Lower Blind Zone

Note
Measurements may not be possible in the Blind Zones, and measurements close to the Blind Zones will have reduced accuracy. Therefore, the 4-20 mA points should be configured outside these zones.

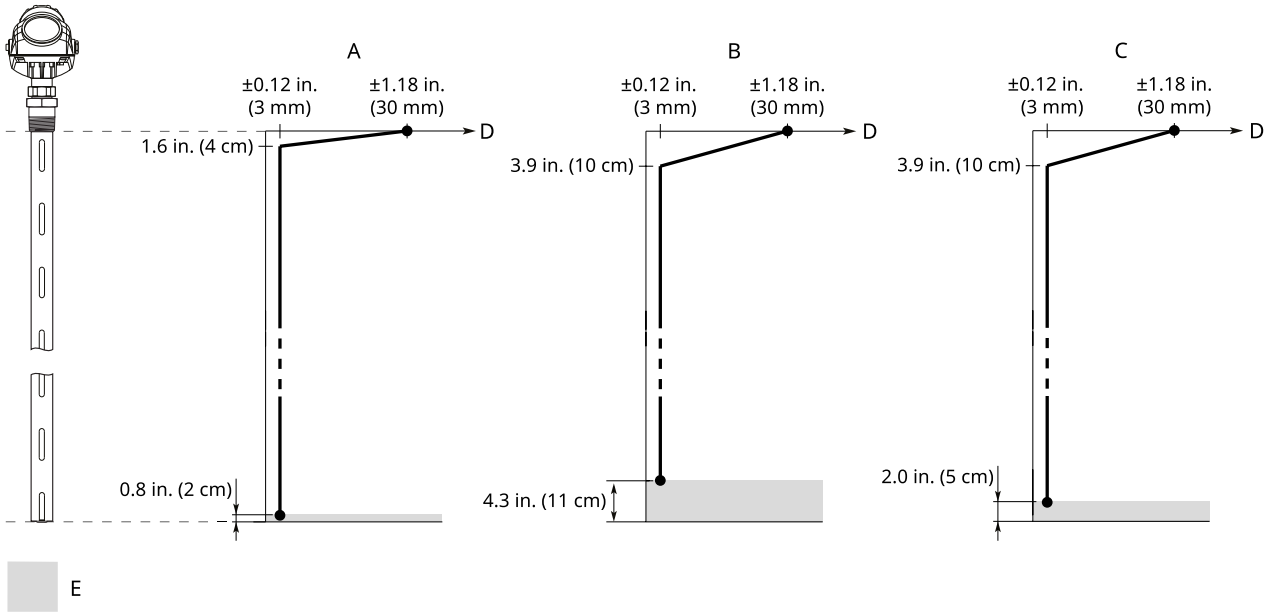
Figure A-3, Figure A-4, and Figure A-5 illustrate the accuracy over measuring range at reference condition with alternating probe types and varying dielectric constant of the product.



A. Water (DC = 80)
B. Oil (DC = 2)
C. Accuracy
D. Blind Zone



A. Water (DC = 80)
B. Oil (DC = 2)
C. Accuracy
D. Blind Zone



A. Water (DC = 80)
B. Oil (DC = 2), Liquid product level measurement mode
C. Oil (DC = 2), Liquid product level and interface level measurement mode
D. Accuracy
E. Blind Zone

A.2 Functional specifications

A.2.1 General

Field of application

Liquids and semi-liquids level and/or liquid/liquid interfaces or solids level

- Model 5301, for liquid level or submerged interface measurements
- Model 5302, for liquid level, liquid level and interface, or solid level measurements
- Model 5303, for solid level measurements

Measurement principle

Time Domain Reflectometry (TDR)

Related information

Measurement principle

Microwave output power

Nominal 300 µW, Max. 45 mW

EMC

FCC part 15 subpart B and EMC Directive (2014/30/EU). Considered to be an unintentional radiator under the Part 15 rules.

Humidity

0 to 100% relative humidity

Safety response time

< 8 s at damping value 2 s

The safety response time will be a function of the configured damping value.

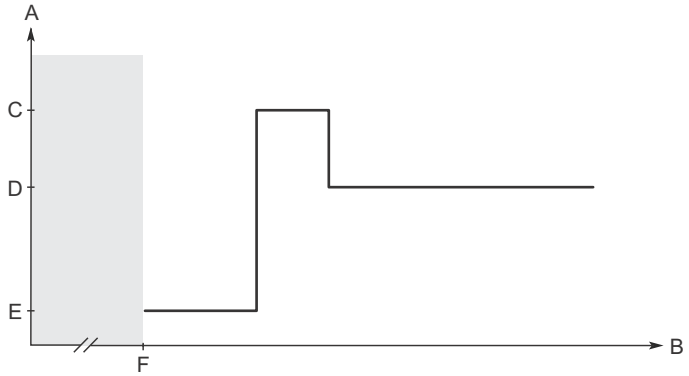
Start-up time

< 40 s[10]

A.2.2 Start-up sequence

For the Rosemount™ 5300, the radar will first go to Low Alarm current for nine seconds during boot-up followed by nine seconds of High Alarm or Low Alarm current depending on alarm mode. After that measurement is re-established and the 4-20mA output settles at the actual level value.[11] Refer to Figure A-6 and Figure A-7. If a different start-up behavior is preferred, contact your local Emerson representatives.

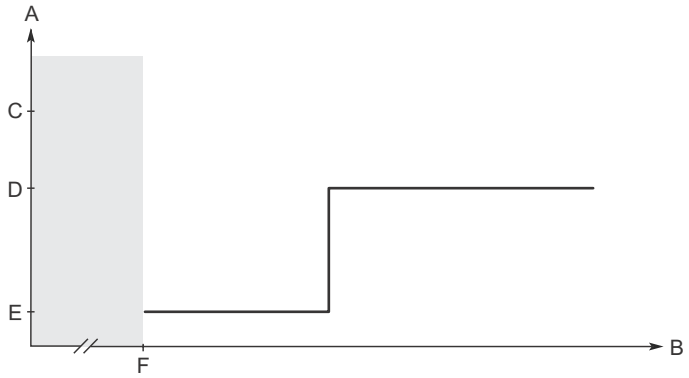
Figure A-6: Start-Up Sequence, Alarm Mode High



A. Current, mA
B. Time, s
C. High Alarm current (Rosemount or Namur value, according to configuration)
D. Actual level value
E. Low Alarm current (Rosemount or Namur value, according to configuration)
F. For option code BR5 at temperatures below -40 °F (-40 °C): Five minutes delay with an undefined current value

(10) The start-up time is extended with five additional minutes for option code BR5 at temperatures below -40 °F (-40 °C). Refer to Start-up sequence.
(11) For devices with option code BR5 at temperatures below -40 °F (-40 °C), the start-up sequence is delayed for five minutes with an undefined current value.

Figure A-7: Start-Up Sequence, Alarm Mode Low



A. Current, mA
B. Time, s
C. High Alarm current (Rosemount or Namur value, according to configuration)
D. Actual level value
E. Low Alarm current (Rosemount or Namur value, according to configuration)
F. For option code BR5 at temperatures below -40 °F (-40 °C): Five minutes delay with an undefined current value

A.2.3 4-20 mA HART®

Output

Two-wire, 4-20 mA. Digital process variable is superimposed on 4-20 mA signal, and available to any host that conforms to the HART® protocol. The digital HART signal can be used in multidrop mode.

HART revision

The default output is HART Revision 7. To order HART Revision 5 factory configured, add option code HR5. The device can also be field configured to HART Revision 5 if needed.

Signal wiring

Recommended output cabling is twisted shielded pairs, 24-12 AWG.

Power requirements

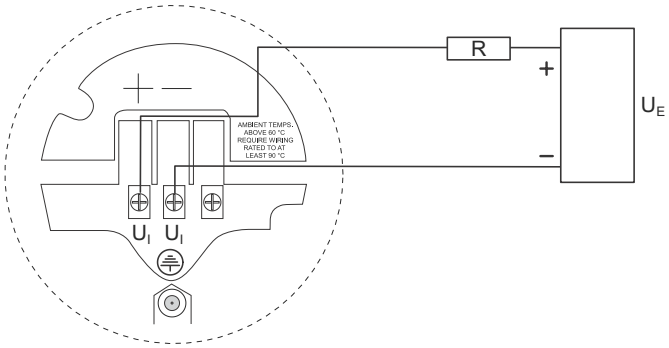
Terminals in the transmitter housing provide connections for signal cables. The Rosemount 5300 Level Transmitter is loop-powered and operates with the following power supplies:

Table A-6: External Power Supply for HART

Approval type	Input voltage (U_i)(1)
None	16 - 42.4 Vdc
Non-sparking/Energy Limited	16 - 42.4 Vdc
Intrinsically Safe	16 - 30 Vdc
Explosion-proof/Flameproof	20 - 42.4 Vdc

(1) Reverse polarity protection.

Figure A-8: External Power Supply for HART



R = Load Resistance (Ω)

U_E = External Power Supply Voltage (Vdc)

U_i = Input Voltage (Vdc)

Table A-7: Minimum Input Voltage (U_i) at Different Currents

Hazardous approval	Current	
	3.75 mA	21.75 mA
	Minimum input voltage (U_i)	
Non-hazardous installations, intrinsically safe installations and Non-sparking installations	16 Vdc	11 Vdc
Explosion-proof/flameproof installations	20 Vdc	15.5 Vdc

Signal on alarm

	High	Low
Standard	21.75 mA	3.75 mA
Namur NE43	22.50 mA	3.60 mA

Saturation levels

	High	Low
Standard	20.8 mA	3.9 mA
Namur NE43	20.5 mA	3.8 mA

A.2.4 FOUNDATION™ Fieldbus

Power requirements

Terminals in the transmitter housing provide connections for signal cables. The Rosemount 5300 Level Transmitter is powered over FOUNDATION™ Fieldbus with standard fieldbus power supplies. The transmitter operates with the following power supplies:

Table A-8: External Power Supply for FOUNDATION Fieldbus

Approval type	Power supply (Vdc)
None	9 - 32
Non-sparking/Energy limited	9 - 32
Intrinsically Safe	9 - 30
FISCO	9 - 17.5
Explosion-proof/flameproof	16 - 32

Quiescent current draw

22 mA

Blocks and execution time

Block	Execution time
1 Resource	N/A
3 Transducer	N/A
6 Analog Input (AI)	10 ms
1 Proportional/Integrate/Derivate (PID)	15 ms
1 Signal Characterizer (SGCR)	10 ms
1 Integrator (INT)	10 ms
1 Arithmetic (ARTH)	10 ms
1 Input Selector (ISEL)	10 ms
1 Control Selector (CS)	10 ms
1 Output Splitter (OS)	10 ms

FOUNDATION Fieldbus class (basic or Link Master)

Link Master (LAS)

Number of available VCRs

Maximum 20, including one fixed

FOUNDATION Fieldbus instantiation

Yes

Conforming FOUNDATION™ Fieldbus

ITK 6.0.1

FOUNDATION Fieldbus alerts

- Field diagnostics alerts
- Plantweb™ Insight alerts

A.2.5 Modbus®

Output

The RS-485 Modbus version communicates by Modbus RTU, Modbus ASCII, and Levelmaster protocols.

8 data bits, 1 start bit, 1 stop bit, and software selectable parity.

Baud Rate	1200, 2400, 4800, 9600 (default), and 19200 bits/s
Address Range	1 to 255 (default device address is 246)

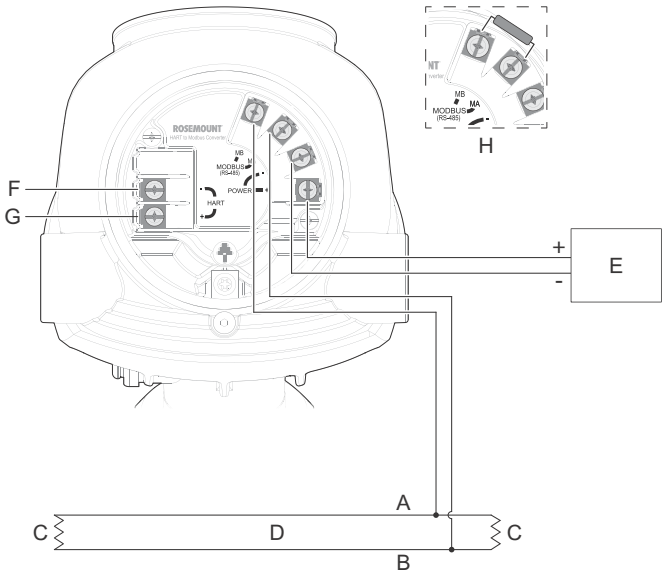
HART communication is used for configuration via the HART terminals or tunneling via the RS-485.

External power supply

The input voltage U_i for Modbus is 8-30 Vdc (max. rating).

Wiring diagram

Figure A-9: Wiring Diagram for RS-485 with Modbus®



A. "A" line
B. "B" line
C. 120 Ω
D. RS-485 Bus
E. Power supply
F. HART -
G. HART +
H. If it is the last transmitter on the bus, connect the 120 Ω termination resistor.

Note
Rosemount 5300 Level Transmitters with Flameproof/Explosion-proof output have a built-in barrier; no external barrier needed.(12)

Power consumption

- < 0.5 W (with HART address=1)
- < 1.2 W (incl. four HART slaves)

Note
The Rosemount 5300 Level Transmitter with Modbus protocol is configured to HART address 1 at factory. This reduces power consumption by locking the analog output at 4 mA.

A.2.6 Display and configuration

Integral display

The integral digital display can toggle between: level, distance, volume, internal temperature, interface distance, interface level, peak amplitudes, interface thickness, percentage of range, analog current out.

Note
The display cannot be used for configuration purposes.

Configuration tools

- Field Device Integration (FDI) compliant systems
- Device Descriptor (DD) compliant systems
- Device Type Manager (DTM™) compliant systems
- Rosemount Radar Master

Output units

- Level, Interface and Distance: ft., in., m, cm, or mm
- Level Rate: ft./s, m/s, in./min, m/h
- Volume: $ft.^3$, $in.^3$, US gals, Imp gals, barrels, yd^3, m^3, or liters
- Temperature: °F and °C

(12) An external galvanic isolator is always recommended to be used for Flameproof/Explosion-proof installations.

Output variables

Table A-9: Output Variables

Variable	5301	5302	5303	PV, SV, TV, QV
Level	✓	✓	✓	✓
Distance to Level (Ullage)	✓	✓	✓	✓
Level Rate	✓	✓	✓	✓
Signal Strength	✓	✓	✓	✓
Volume	✓	✓	✓	✓
Internal Temperature	✓	✓	✓	✓
Interface Level	(✓)(1)	✓	N/A	✓
Interface Distance	(✓)(1)	✓	N/A	✓
Interface Level Rate	(✓)(1)	✓	N/A	✓
Interface Signal Strength	(✓)(1)	✓	N/A	✓
Upper Layer Thickness	(✓)(1)	✓	N/A	✓
Lower Volume	(✓)(1)	✓	N/A	✓
Upper Volume	(✓)(1)	✓	N/A	✓
Signal Quality	✓	✓	✓	(✓)(2)
Surface/Noise Margin	✓	✓	✓	(✓)(2)
Vapor DC	✓	N/A	N/A	(✓)(2)
Analog Output Current(3)(4)	✓	✓	✓	N/A
% of Range(4)	✓	✓	✓	N/A

(1) Interface measurement only for fully submerged probe.
(2) Not available as primary variable.
(3) Not available for FOUNDATION™ Fieldbus, Modbus® Signal Output, or for HART® units in fixed current mode.
(4) LCD display variable only.

Damping

0-60 s (2 s, default value)

A.2.7 Diagnostics

General

Transmitter diagnostics with alerts include hardware and software errors, electronics temperature, probe missing, and invalid measurement and configuration error diagnostics. In addition to this, echo curve and variable logging including signal strength facilitate easy on-line troubleshooting.

Alerts

The transmitter is compliant with NAMUR NE 107 Field Diagnostics for standardized device diagnostic information (only available for FOUNDATION™ Fieldbus or HART®).

Diagnostics Suite

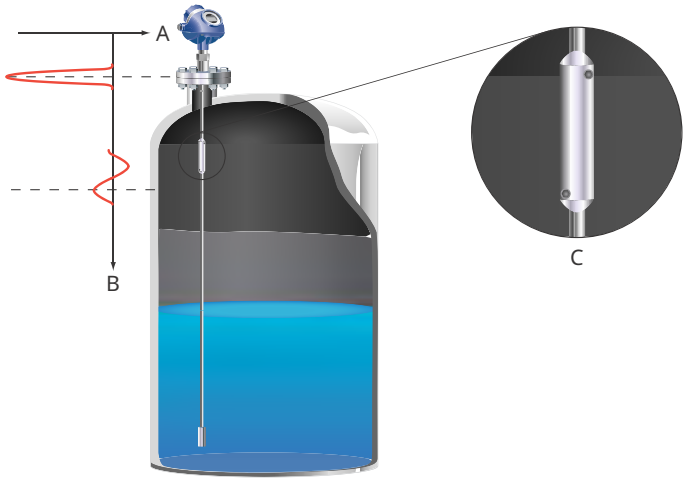
Signal Quality Metrics

Diagnostics package that monitors the relations between surface, noise and threshold. The function can be used to detect abnormal conditions in the process such as probe contamination or sudden loss of signal strength. Signal Quality Metrics parameters are available as Output Variables in Rosemount Radar Master, and can be sent to Distributed Control System (DCS) to trigger an alarm.

Proof Test Reflector

The reflector, which is available with single lead flexible probes, is used to test and continuously verify that the transmitter is functioning properly in both tank and chamber/pipe installations. Compared to traditional diagnostics that only monitor the transmitter electronics, the reflector can also be used to diagnose the upper parts of the probe inside the tank for e.g. build-up, corrosion monitoring and other process related conditions.

Figure A-10: Proof Test Reflector



A. Amplitude
B. Distance
C. Reflector

The primary use-cases for the reflector are:

- Verification of transmitter and probe (i.e. proof-testing)
- Continuous monitoring of high level condition

Verification

During commissioning, the location and amplitude characteristics of the reflector are stored in the transmitter. When the test procedure is later initiated, the stored reflector data is compared to the current measurement to verify the integrity of the measurement electronics and upper part of the probe.

During the test, the transmitter will output a level corresponding to the reflector position, which can be used to verify the integrity of the transmitter output.

Continuous monitoring of high level condition

Additionally, the reflector's unique echo characteristics aid the transmitter to locate a liquid surface above the reflector, thereby offering increased reliability to detect high level conditions at a user selectable limit.

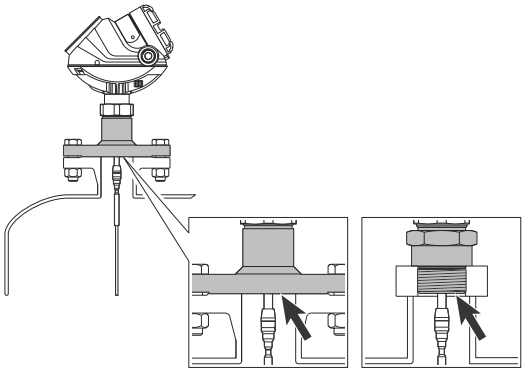
The transmitter continuously monitors the status of the reflector and abnormal conditions generate alarms and alerts as appropriate.

Reflector limitations

Application	Not to be used in fully submerged applications
Minimum dielectric constant	2.4 (for option code HL1) 2.0 (for option codes HL2 and HL3)

A.2.8 Process temperature and pressure rating

Process Temperature and Pressure - Max Rating gives the maximum process temperature (measured at the lower part of the flange or threaded connection) and pressure rating for the different tank connections.



For standard tank connection, final rating may be lower depending on flange, material of construction, and O-ring selection. Table A-10 gives the temperature ranges for standard tank seals with different O-ring materials.

Table A-10: Temperature and Pressure Ranges for Standard Tank Seals with Different O-ring Material

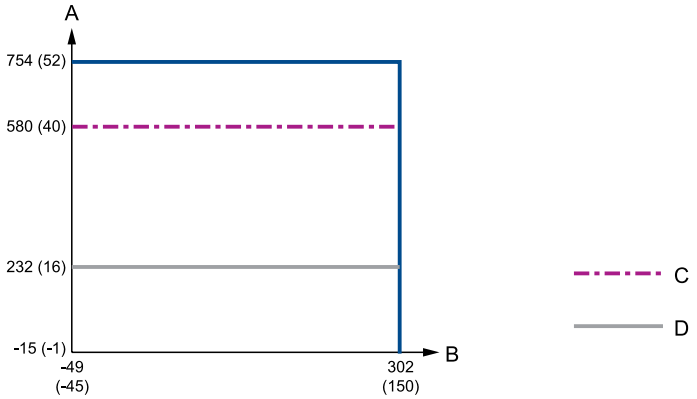
O-ring material	Temperature °F (°C) in air		Pressure psig (bar)
	Minimum(1)	Maximum	Maximum
Fluoroelastomer (FKM)	-22 (-30)	302 (150)	754 (52)
Ethylene Propylene (EPDM)	-40 (-40)	266 (130)	754 (52)
Kalrez® Perfluoroelastomer (FFKM)	14 (-10)	302 (150)	754 (52)
Nitrile Butadiene (NBR)	-31 (-35)	230 (110)	580 (40)
Fluorosilicone (FVMQ)	-49 (-45)	302 (150)	754 (52)

(1) The O-ring can be stored at lower temperatures (refer to Table A-11).

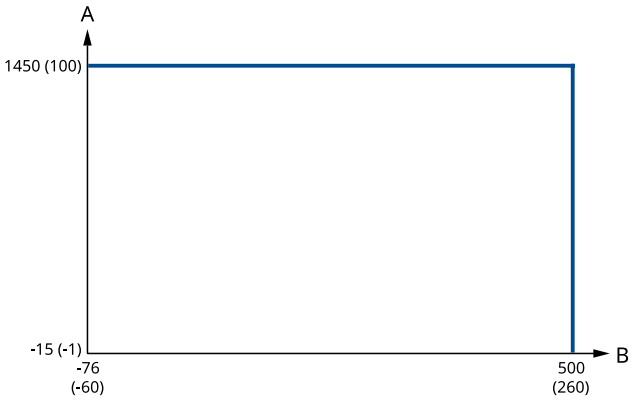
Note
Always check the chemical compatibility of the O-ring material with your application. If the O-ring material is not compatible with its chemical environment, the O-ring may eventually malfunction.

No wetted O-rings are used in the MTMP, HTHP, HP, and C versions. Final rating may be lower depending on flange and material of construction selection.

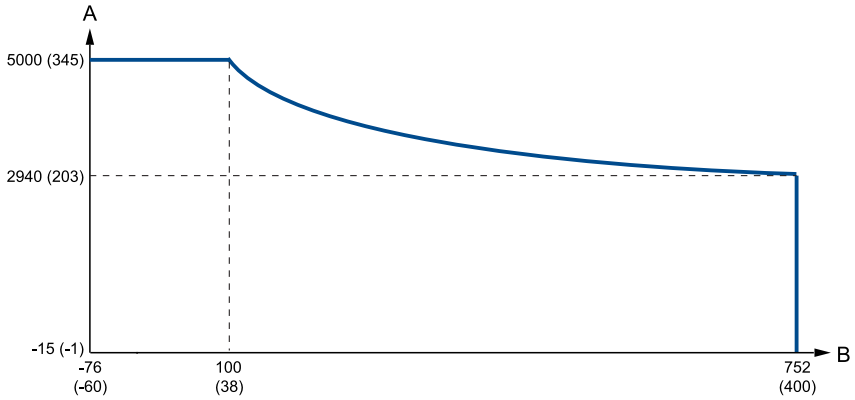
Process Temperature and Pressure - Max Rating



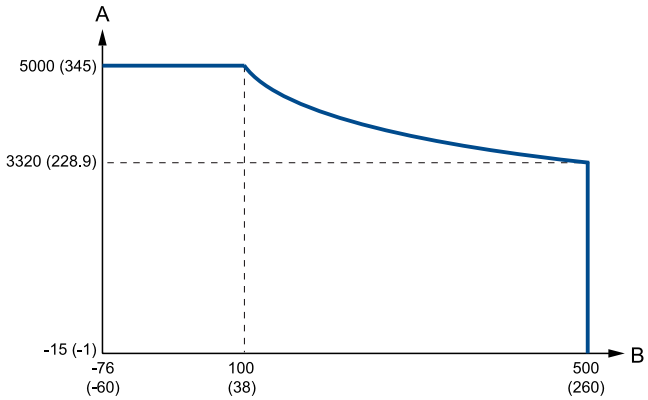
A. Pressure psig (bar)
B. Temperature °F (°C)
C. O-ring material code B (Nitrile Butadiene)
Overfill prevention code U1 (Overfill prevention according to WHG/TUV)
Protective plate: Alloy C-276 (Material of construction code 2) or Alloy 400 (Material of construction code 3)
D. Protective plate: PTFE (Material of construction code 7)



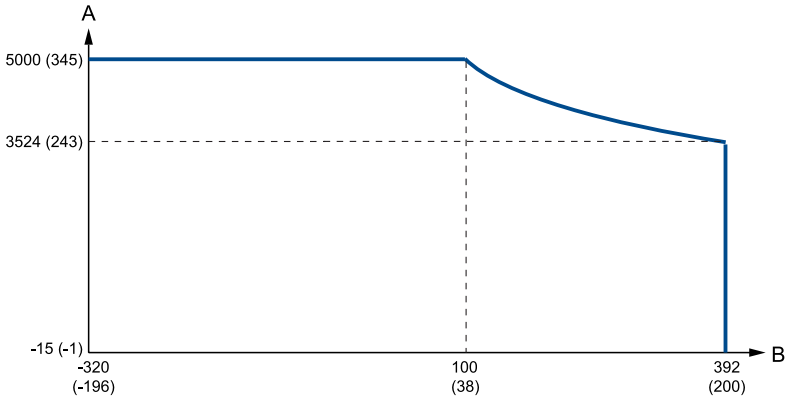
A. Pressure psig (bar)
B. Temperature °F (°C)



A. Pressure psig (bar)
B. Temperature °F (°C)



A. Pressure psig (bar)
B. Temperature °F (°C)

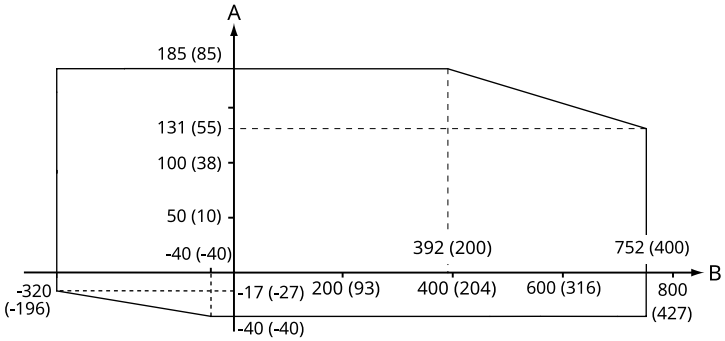


A. Pressure psig (bar)
B. Temperature °F (°C)

A.2.9 Temperature limits

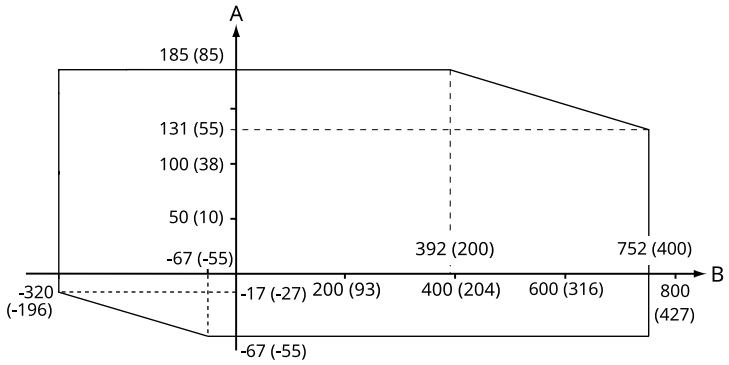
The maximum and minimum ambient temperature for the electronics depends on the process temperature (as described by Figure A-16 and Figure A-17) and on the approval (see Product certifications).

Figure A-16: Ambient Temperature vs. Process Temperature



A. Ambient temperature °F (°C)
B. Process temperature °F (°C)

For additional information, refer to Table A-11.



A. Ambient temperature °F (°C)
B. Process temperature °F (°C)

Note
Nozzle insulation for the HTHP version (Operating Temperature and Pressure code H) should not exceed 4 in. (10 cm) of height above the flange.

Note
In applications where the ambient temperature exceeds the limits of the electronics, a Remote Mounting connection can be used. The maximum temperature for the Remote Mounting connection at the vessel connection point is 302 °F (150 °C).

The heat sink installation option is mandatory for flanges Class 2500/PN250 or higher in Dynamic Vapor Compensation applications. For flanges Class 1500/PN160 the heat sink option is highly recommended.

Table A-11: Ambient Temperature Limits

Description	Operating limit	Storage limit
Without integral display	-40 °F to 185 °F (-40 °C to 85 °C)	-58 °F to 194 °F (-50 °C to 90 °C)
With integral display	-40 °F to 158 °F (-40 °C to 70 °C)(1)	-40 °F to 185 °F (-40 °C to 85 °C)
Option code BR5 without integral display	-67 °F to 185 °F (-55 °C to 85 °C)	-76 °F to 194 °F (-60 °C to 90 °C)
Option code BR5 with integral display	-67 °F to 158 °F (-55 °C to 70 °C)(1)	-76 °F to 185 °F (-60 °C to 85 °C)

(1) Integral display may not be readable and device display updates will be slower at temperatures below -4 °F (-20 °C).

A.2.10 Flange rating

ASME flange rating

316 up to Class 1500 flanges according to ASME B16.5 Table 2-2.2 and 316L for Class 2500 flanges according to ASME B16.5 Table 2-2.3:

- Standard: Maximum 302 °F/754 psig (150 °C/52 Bar)
- MTMP: Maximum 500 °F/1450 psig (260 °C/100 Bar)
- HP: Class 2500 up to maximum 500 °F (260 °C)
- C: Class 2500 up to maximum 392 °F (200 °C)

- HTHP: Class 2500 up to maximum 752 °F (400 °C)

Alloy C-276 (UNS N10276) according to ASME B16.5 Table 2-3.8:

- Standard: Maximum 302 °F/754 psig (150 °C/52 Bar)
- HP: Class 1500 up to maximum 500 °F (260 °C)
- HTHP: Class 1500 up to maximum 752 °F (400 °C)

Alloy 825 (UNS N08825) according to ASME B16.5 Table 2-3.8:

- Standard: Maximum 302 °F/754 psig (150 °C/52 Bar)
- HP: Class 1500 up to maximum 500 °F (260 °C)
- HTHP: Class 1500 up to maximum 752 °F (400 °C)

Duplex 2205 (UNS S31803) according to ASME B16.5 Table 2-2.8:

- Standard: Maximum 302 °F/754 psig (150 °C/52 Bar)
- HP: Class 1500, -51 °F (-46 °C) up to maximum 500 °F (260 °C)
- HTHP: Class 1500, -51 °F (-46 °C) up to maximum 599 °F (315 °C)

EN flange rating

EN 1.4404 according to EN 1092-1 material group 13E0:

- Standard: Maximum 302 °F/754 psig (150 °C/52 Bar)
- MTMP: Maximum 500 °F/1450 psig (260 °C/100 Bar)
- HP: PN 320 up to maximum 500 °F (260 °C)
- C: PN 320 up to maximum 392 °F (200 °C)
- HTHP: PN 320 up to maximum 752 °F (400 °C)

Alloy C-276 (UNS N10276) according to EN 1092-1 material group 12E0:

- Standard: Maximum 302 °F/754 psig (150 °C/52 Bar)
- HP: PN 320 up to maximum 500 °F (260 °C)
- HTHP: PN 320 up to maximum 752 °F (400 °C)

Duplex 2205 (EN 1.4462) according to EN 1092-1 material group 16E0:

- Standard: Maximum 754 psig (52 Bar), -22 °F (-30 °C) up to maximum 302 °F (150 °C)[13]
- HP: PN 320, -22 °F (-30 °C) up to maximum 482 °F (250 °C)[13]
- HTHP: PN 320, -22 °F (-30 °C) up to maximum 482 °F (250 °C)[13]

JIS flange rating

316 according to JIS B2220 material group 2.2:

- Standard: Maximum 302 °F/754 psig (150 °C/52 Bar)
- MTMP: Maximum 500 °F/1450 psig (260 °C/100 Bar)
- HP: Maximum temperature 260 °C. Final rating depends on flange.
- C: Maximum temperature 200 °C. Final rating depends on flange.
- HTHP: Maximum temperature 400 °C. Final rating depends on flange.

(13) Minimum and maximum temperature limit due to EN13445-2.

Fisher and Masoneilan flange rating

316 according to ASME B16.5 Table 2-2.2:

- Standard: Maximum 302 °F/754 psig (150 °C/52 Bar)
- MTMP: Maximum 500 °F/1450 psig (260 °C/100 Bar)
- HP: Class 600 up to maximum 260 °C
- C: Class 600 up to maximum 200 °C
- HTHP: Class 600 up to maximum 400 °C

A.2.11 Tri Clamp rating

Tri Clamp is available for the standard temperature and pressure seal.

Table A-12: Tri Clamp Rating

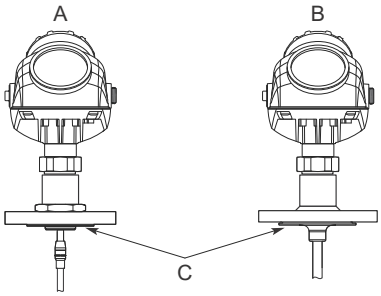
Size	Maximum pressure(1)
1½-in. (37.5 mm)	232 psig (16 bar)
2-in. (50 mm)	232 psig (16 bar)
3-in. (75 mm)	145 psig (10 bar)
4-in. (100 mm)	145 psig (10 bar)

(1) The final rating depends on the clamp and gasket.

A.2.12 Plate design

Certain models of flanged alloy and PTFE covered probes have a tank connection design with a protective flange plate that prevents the backing flange from being exposed to the tank atmosphere. The protective flange plate is manufactured in the same material as the probe. The backing flange is made of 316L/EN 1.4404 for alloy probes, and 316/1.4404 for PTFE covered probes.

Figure A-18: Protective Plate



A. Alloy probe and protective plate
B. PTFE covered probe and protective plate
C. Protective plate

PTFE protective plate

Flange rating according to SST backing flange ASME B16.5 Table 2-2.2, EN 1092-1 material group 13E0, and JIS B2220 material group 2.3.

- Standard: Maximum 302 °F/232 psig (150 °C/16 Bar)

Alloy C-276 protective plate

Flange rating according to SST backing flange ASME B16.5 Table 2-2.3, EN 1092-1 material group 13E0, and JIS B2220 material group 2.3.

- Standard: Maximum 302 °F/580 psig (150 °C/40 Bar). Flange plate design is available up to Class 300/PN 40
- HP: Maximum temperature 260 °C. Flange plate design is available up to Class 600/PN 63
- HTHP: Maximum temperature 400 °C. Flange plate design is available up to Class 600/PN 63

Alloy 400 protective plate

Flange rating according to SST backing flange ASME B16.5 Table 2-2.3, EN 1092-1 material group 13E0, and JIS B2220 material group 2.3.

- Standard: Maximum 302 °F/580 psig (150 °C/40 Bar). Flange plate design is available up to Class 300/PN 40

A.2.13 Conditions used for flange strength calculations

See Table A-13 to Table A-17 for the conditions used for flange strength calculations.

Table A-13: 316/316L Flanges

Standard	Bolting material	Gasket		Flange material	Hub material
		Standard/ MTMP/HP/ HTHP/C	MTMP/HP/ HTHP/C		
ASME	Stainless steel SA193 B8M Cl.2	Soft (1a) with min. thickness 1.6 mm	Spiral wound gasket with nonmetallic filler (1b)	Stainless steel A182 Gr. F316	Stainless steel SA479M 316
EN, JIS	EN 1515-1/-2 group 13E0, A4-70	Soft (EN 1514-1) with min. thickness 1.6 mm	Spiral wound gasket with nonmetallic filler (EN 1514-2)	Stainless steel A182 Gr. F316 and EN 10222-5-1.4404	Stainless steel SA479M 316, and EN 10272-1.4404

Table A-14: Process Connection with Plate Design

Standard	Bolting material	Gasket		Flange material	Hub material
		Standard/HP/ HTHP/C	HP/HTHP/C		
ASME	Stainless steel SA193 B8M Cl.2	Soft (1a) with min. thickness 1.6 mm	Spiral wound gasket with nonmetallic filler (1b)	Stainless steel A182 Gr. F316L/ F316	SB574 Gr. N10276 or SB164 Gr. N04400
EN, JIS	EN 1515-1/-2 group 13E0, A4-70	Soft (EN 1514-1) with min. thickness 1.6 mm	Spiral wound gasket with nonmetallic filler (EN 1514-2)	Stainless steel A182 Gr. F316L/ F316 and EN 10222-5-1.4404	

Table A-15: Alloy C-276 Flanges

Standard	Bolting material	Gasket		Flange material	Hub material
		Standard/HP/ HTHP	HP/HTHP		
ASME	UNS N10276	Soft (1a) with min. thickness 1.6 mm	Spiral wound gasket with nonmetallic filler (1b)	SB462 Gr. N10276 (solution annealed condition) or SB575 Gr. N10276 (solution annealed condition)	SB574 Gr. N10276
EN		Soft (EN 1514-1) with min. thickness 1.6 mm	Spiral wound gasket with nonmetallic filler (EN 1514-2)		

Table A-16: Alloy 825 Flanges

Standard	Bolting material	Gasket		Flange material	Hub material
		Standard/HP/ HTHP	HP/HTHP		
ASME	A193 B7 or A320 L7	Soft (1a) with min. thickness 1.6 mm	Spiral wound gasket with nonmetallic filler (1b)	SB564 Gr. N08825 (solution annealed condition)	SB425 Gr. N08825 (solution annealed condition)

Table A-17: Duplex 2205 Flanges

Standard	Bolting material	Gasket		Flange material	Hub material
		Standard/HTHP	HP/HTHP		
ASME	A193 B7 or A320 L7	Soft (1a) with min. thickness 1.6 mm	Spiral wound gasket with nonmetallic filler (1b)	Duplex stainless steel SA/A182 F51 and EN10222-5-1.4462	Stainless steel SA479M S31803 and EN 10272-1.4462
EN	Bumax® 88	Soft (EN 1514-1) with min. thickness 1.6 mm	Spiral wound gasket with nonmetallic filler (EN 1514-2)		

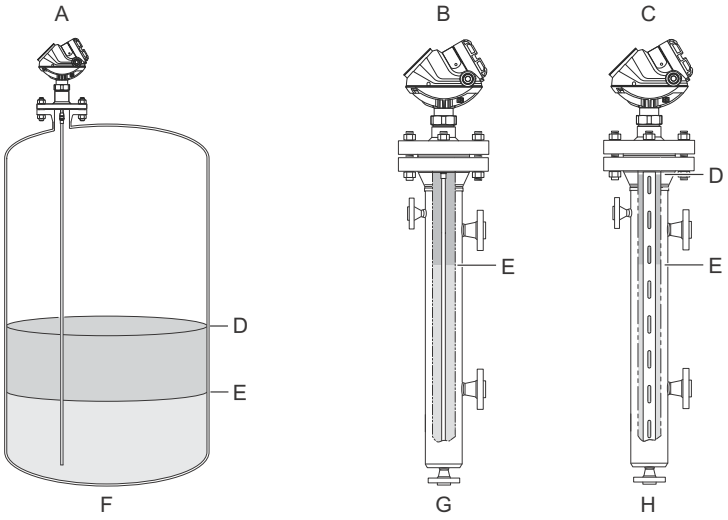
A.2.14 Interface measurements

The Rosemount 5302 is a good choice for measuring the interface of oil and water, or other liquids with significant dielectric differences.

It is also possible to measure interface with a Rosemount 5301 in applications where the probe is fully submerged in the liquid, using the submerged probe mode.

Rosemount 5302 with the large coaxial probe provides the ability to continuously keep track of both level and interface level in fully submerged applications. The product level and interface level mode must be selected.

Figure A-19: Interface Level Measurement



A. Rosemount 5302
B. Rosemount 5301
C. Rosemount 5302 with large coaxial probe
D. Product level
E. Interface level
F. Product level and interface level
G. Interface level with submerged probe
H. Product level and interface level with submerged probe

Interface measurement considerations

If interface is to be measured, follow these criteria:

- The dielectric constant of the upper product should be known and should not vary. The Rosemount Radar Master software has a built-in dielectric constant calculator to help the user estimate the upper product dielectric constant.
- The dielectric constant of the upper product must have a lower dielectric constant than the lower product to have a distinct reflection.
- The difference between the dielectric constants for the two products must be larger than 6.
- The maximum dielectric constant for the upper product is 7 for the single lead probes and 10 for the coaxial probes.

Table A-18: Minimum Detectable Upper Product Thickness

Probe type	Minimum Detectable Upper Product Thickness
Large coaxial	1 in. (2.5 cm)(1)
Single lead	2.4 in. (6 cm)
Coaxial (standard/MTMP/HP/C)	2.8 in. (7 cm)
Coaxial (HTHP)	8 in. (20 cm)

(1) Depending on application characteristics such as the upper product dielectric constant.

Related information

Interface measuring range

Emulsion layers

Sometimes there is an emulsion layer (mix of the products) between the two products which can affect interface measurements. For guidelines on emulsion situations, consult your local Emerson representative.

A.2.15 High pressure steam applications

Considerations

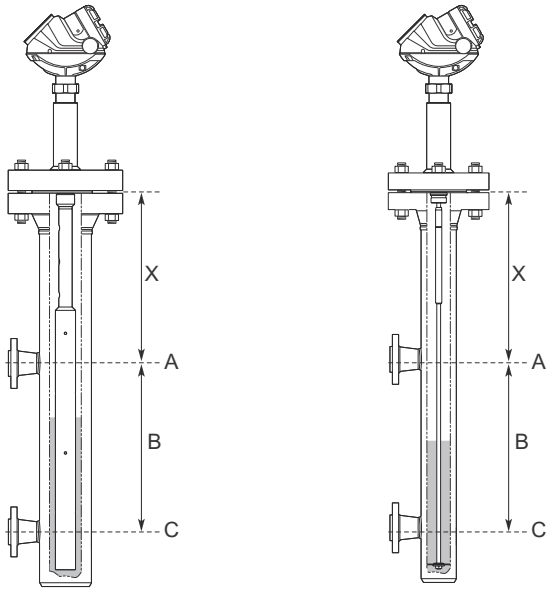
Saturated steam under high pressure can influence radar level transmitter measurements. Rosemount 5301 with Dynamic Vapor Compensation will automatically compensate for this and maintain the level accuracy.

- Probe type 3V (for 3- to 4-in. chambers) or 4U (for 2-in. chambers) must be used.
- Mount in a 2-, 3-, or 4-in. bypass chamber with flanges appropriately sized for the pressure and temperature of the application.
- Dynamic Vapor Compensation requires a minimum distance X from the flange to the surface level in order to measure the change in the vapor dielectric constant. If the level rises within this area, the unit switches over to static compensation, using the last known vapor dielectric constant.

Table A-19: Minimum Distance X

Reference reflector type		Minimum distance X
Length	**Option code**	
Short, 14 in. (350 mm)	R1	22 in. (560 mm)
Long, 20 in. (500 mm)	R2	28 in. (710 mm)

Figure A-20: Minimum Distance X and Minimum Measuring Span



A. Level: 100%
B. Minimum measuring span: 12 in. (300 mm)
C. Level: 0%

- Always ensure there are no disturbances from inlets etc. close to the reference reflector end when using probe type 4U.

Select reference reflector

- The long reflector, 20 in. (500 mm), has the best accuracy and is recommended for all chambers where the dimensions of the chamber allow for it.
- If the distance from the flange to the upper inlet is less than 28 in. (710 mm), the short reflector should be chosen. This distance is a minimum when dynamic compensation is required within the whole measuring range from the lower to the upper inlet. If this is not required, the long reflector can be used and dynamic compensation is possible up to 28 in. (710 mm) from the flange.

A.3 Physical specifications

A.3.1 Material selection

Emerson provides a variety of Rosemount products with various product options and configurations, including materials of construction that can be expected to perform well in a wide range of applications. The Rosemount product information presented is intended as a guide for the purchaser to make an appropriate selection for the application. It is the purchaser's sole responsibility to make a careful analysis of all process parameters (such as all chemical components, temperature, pressure, flow rate, abrasives, contaminants, etc.), when specifying product, materials, options, and components for the particular application. Emerson is not in a position to evaluate or guarantee the compatibility of the process fluid or other process parameters with the product, options, configuration, or materials of construction selected.

A.3.2 Engineered solutions

When standard model codes are not sufficient to fulfill requirements, please consult the factory to explore possible Engineered Solutions. This is typically, but not exclusively, related to the choice of wetted materials or the design of a process connection. These Engineered Solutions are part of the expanded offerings and may be subject to additional delivery lead time. For ordering, factory will supply a special R-labeled numeric option code that should be added at the end of the standard model string.

A.3.3 Housing and enclosure

Type

- Dual compartment (terminal compartment and the electronics are completely separated).
- Two entries for conduit or cable connections.
- The transmitter housing is separable from probe assembly.
- The transmitter housing can be rotated in any direction.

Electrical connection

½ - 14 NPT for cable glands or conduit entries.

Optional: M20 x 1.5 conduit / cable adapter, M12 4-pin male eurofast® connector or A size Mini 4-pin male minifast® connector.

Recommended output cabling is twisted shielded pairs, 24-12 AWG.

Housing material

Polyurethane-covered Aluminum (Aluminum alloy A360, maximum 0.6 percent Cu), or Stainless Steel Grade CF8M (ASTM A743)

Ingress protection

NEMA® 4X, IP 66, IP67

Factory sealed

Yes

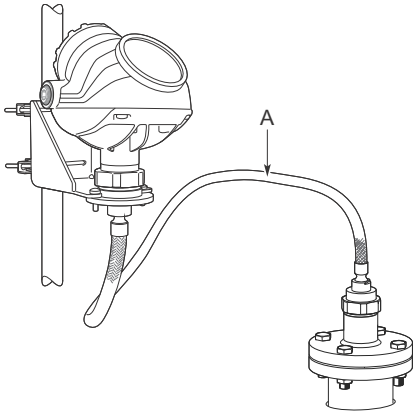
Weight

- Aluminum transmitter head: 4.4 lb (2 kg)
- SST transmitter head: 10.8 lb (4.9 kg)

A.3.4 Remote housing mounting

Kit that includes a flexible armored extension cable and a bracket for wall or pipe mounting.

Figure A-21: Remote Housing Mounting

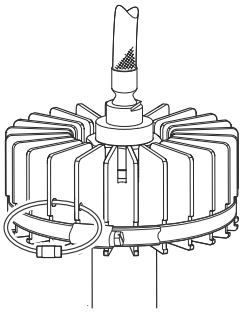


A. Remote Housing Mounting Cable: 3, 6, or 9 ft (1, 2, or 3 m)

A.3.5 Heat sink

The heat sink is used for remote housing mounting to keep the temperature at the vessel connection point at a maximum of 302 °F (150 °C). The heat sink installation option is available for Rosemount 5300 with Dynamic Vapor Compensation (DVC). Heat sink is mandatory for DVC probes with flanges Class 2500/PN250 or higher and highly recommended for Class 1500/PN160.

Figure A-22: Heat Sink



A.3.6 Tank connection

The tank connection consists of a tank seal, a flange, Tri Clamp, or NPT or BSPP (G) threads.

A.3.7 Flange dimensions

Follows ASME B16.5, JIS B2220, and EN 1092-1 standards for blind flanges.

Related information

Standard flanges

Proprietary flanges

A.3.8 Vented flanges

Available with Masoneilan and Fisher vented flanges. Vented flanges must be ordered as accessories with a 1½-in. NPT threaded process connection (code RA). As an alternative to a vented flange, it is possible to use a flushing connection ring on top of the standard nozzle.

A.3.9 Tri Clamp connection

Follows ISO 2852 standard.

A.3.10 Pressure Equipment Directive (PED)

Complies with 2014/68/EU article 4.3

A.3.11 Probes

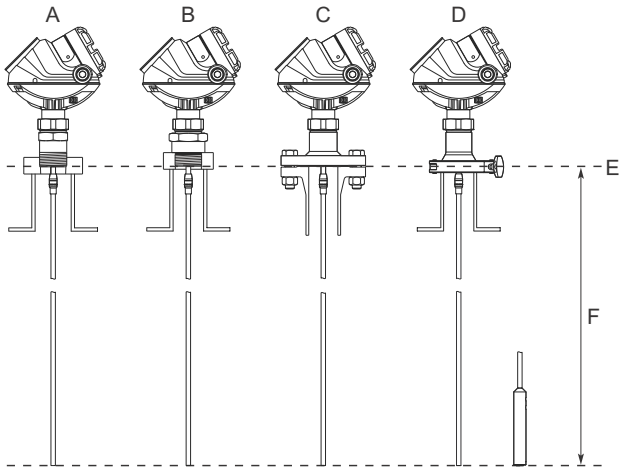
Probe versions

Coaxial, large coaxial, rigid single lead, segmented rigid single lead, and flexible single lead. Probes can be ordered in different materials and options for extreme temperatures and pressure.

Total probe length

This is defined from the Upper Reference Point to the end of the probe (weight included, if applicable).

Figure A-23: Total Probe Length



A. NPT
B. BSPP (G)
C. Flange
D. Tri Clamp
E. Upper reference point
F. Total probe length

Select the probe length according to the required measuring range (the probe must be hung and fully extended through the entire distance where level readings are desired).

Cut-to-fit probes

All probes can be cut in field, except for the HTHP coaxial probe and the PTFE covered probe.

However, there are some restrictions for the standard and MTMP/HP/C coaxial probes: Probes over 4.1 ft. (1.25 m) can be cut up to 2 ft. (0.6 m). Shorter probes can be cut to the minimum length of 1.3 ft. (0.4 m).

Flexible single lead probes can be cut to the minimum length of 3.3 ft. (1.0 m).

Minimum and maximum probe length

Probe type	Probe length
Flexible single lead	3.3 to 164 ft. (1 to 50 m)
Rigid single lead (0.3 in./8 mm)	1.3 to 9.8 ft. (0.4 to 3 m)
Rigid single lead (0.5 in./13 mm)	1.3 to 19.7 ft. (0.4 to 6 m)
Segmented rigid single lead	1.3 to 32.8 ft. (0.4 to 10 m)
Coaxial	1.3 to 19.7 ft. (0.4 to 6 m)
Large coaxial	1.0 to 19.7 ft. (0.3 to 6 m)

Probe angle

0 to 90 degrees from vertical axis

Note
Models with QT option code should not be installed in angled probe installations.

Tensile strength

- 0.16 in. (4 mm) Flexible single lead SST: 2698 lb (12 kN)
- 0.16 in. (4 mm) Flexible single lead Alloy C-276: 1574 lb (7 kN)
- 0.16 in. (4 mm) Flexible single lead Alloy 825: 1574 lb (7 kN)
- 0.16 in. (4 mm) Flexible single lead Alloy 400: 1124 lb (5 kN)
- 0.16 in. (4 mm) Flexible single lead Duplex 2205: 1349 lb (6 kN)
- 0.24 in. (6 mm) Flexible single lead SST: 6519 lb (29 kN)

Collapse load

- 0.16 in. (4 mm) Flexible single lead SST: 3597 lb (16 kN)
- 0.16 in. (4 mm) Flexible single lead Alloy C-276: 1798 lb (8 kN)
- 0.16 in. (4 mm) Flexible single lead Alloy 825: 1798 lb (8 kN)
- 0.16 in. (4 mm) Flexible single lead Alloy 400: 1349 lb (6 kN)
- 0.16 in. (4 mm) Flexible single lead Duplex 2205: 1574 lb (7 kN)
- 0.24 in. (6 mm) Flexible single lead SST: 7868 lb (35 kN)

Sideway capacity

- Rigid single lead/Segmented rigid single lead: 4.4 ft. lbf, 0.44 lb at 9.8 ft. (6 Nm, 0.2 kg at 3 m)
- Coaxial/Large coaxial: 73.7 ft. lbf, 3.7 lb at 19.7 ft. (100 Nm, 1.67 kg at 6 m)

A.3.12 Material exposed to tank atmosphere

Table A-20: Standard Probe (Operating Temperature and Pressure Code S)

Material of construction code	Material exposed to tank atmosphere
1 (probe types 6A and 6B)	316L/316 (EN 1.4404)(1), Duplex 2507 (UNS S32750/EN 1.4410), PTFE, PFA, silicone grease, and O-ring materials
1 (all other probe types)	316L/316 (EN 1.4404)(1), PTFE, PFA, silicone grease, and O-ring materials
2 and H	Alloy C-276 (UNS N10276), PTFE, PFA, silicone grease, and O-ring materials
3	Alloy 400 (UNS N04400), Alloy K500 (UNS N05500), PTFE, PFA, silicone grease, and O-ring materials
7	PTFE (1 mm PTFE cover)
8	316L/316 (EN 1.4404), PTFE, silicone grease, and O-ring materials
D	Duplex 2205 (UNS S31803/EN 1.4462), Duplex 2507 (UNS S32750/EN 1.4410), PTFE, PFA, silicone grease, and O-ring materials

Table A-20: Standard Probe (Operating Temperature and Pressure Code S) *(continued)*

Material of construction code	Material exposed to tank atmosphere
E	Alloy 825 (UNS N08825), PTFE, PFA, silicone grease, and O-ring materials

(1) For flexible single lead probes only.

Table A-21: MTMP Probe (Operating Temperature and Pressure Code M)

Material of construction code	Material exposed to tank atmosphere
1	316L/316 (EN 1.4404)(1), Ceramic (Al_2O_3), Graphite, PFA, PTFE, Alloy C-276 (UNS N10276), and Alloy 718 (UNS N07718)

(1) For flexible single lead probes only.

Table A-22: HTHP Probe (Operating Temperature and Pressure Code H)

Material of construction code	Material exposed to tank atmosphere
1 (probe types 3V and 4U)	316L/316 (EN 1.4404), Ceramic (Al_2O_3), Graphite, and Alloy C-276 (UNS N10276)
1 (all other probe types)	316L/316 (EN 1.4404)(1), Ceramic (Al_2O_3), Graphite, Alloy C-276 (UNS N10276), and Alloy 718 (UNS N07718)
2 and H	Alloy C-276 (UNS N10276), Ceramic (Al_2O_3), Graphite, and Alloy 718 (UNS N07718)
D	Duplex 2205 (UNS S31803/EN 1.4462), Ceramic (Al_2O_3), Graphite, Alloy C-276 (UNS N10276), and Alloy 718 (UNS N07718)
E	Alloy 825 (UNS N08825), Ceramic (Al_2O_3), Graphite, Alloy C-276 (UNS N10276), and Alloy 718 (UNS N07718)

(1) For flexible single lead probes only.

Table A-23: HP Probe (Operating Temperature and Pressure code P)

Material of construction code	Material exposed to tank atmosphere
1 (probe type 3C)	316L/316 (EN 1.4404), Ceramic (Al_2O_3), Graphite, PTFE, and Alloy C-276 (UNS N10276)
1 (all other probe types)	316L/316 (EN 1.4404)(1), Ceramic (Al_2O_3), Graphite, PFA, PTFE, Alloy C-276 (UNS N10276), and Alloy 718 (UNS N07718)
2 and H	Alloy C-276 (UNS N10276), Ceramic (Al_2O_3), Graphite, PFA, PTFE, and Alloy 718 (UNS N07718)
D	Duplex 2205 (UNS S31803/EN 1.4462), Ceramic (Al_2O_3), Graphite, PFA, PTFE, Alloy C-276 (UNS N10276), and Alloy 718 (UNS N07718)
E	Alloy 825 (UNS N08825), Ceramic (Al_2O_3), Graphite, PFA, PTFE, Alloy C-276 (UNS N10276), and Alloy 718 (UNS N07718)

(1) For flexible single lead probes only.

Table A-24: Cryogenic Probe (Operating Temperature and Pressure code C)

Material of construction code	Material exposed to tank atmosphere
1 (probe type 3C)	316L/316 (EN 1.4404), Ceramic (Al_2O_3), Graphite, PTFE, and Alloy C-276 (UNS N10276)
1 (all other probe types)	316L/316 (EN 1.4404)(1), Ceramic (Al_2O_3), Graphite, PFA, PTFE, Alloy C-276 (UNS N10276), and Alloy 718 (UNS N07718)

(1) For flexible single lead probes only.

A.3.13 Weight

Table A-25: Flange and Probes

Item	Weight
Flange	Depends on flange size
Flexible single lead probe	0.05 lb/ft. (0.08 kg/m)
Rigid single lead probe (0.3-in./8 mm)	0.27 lb/ft. (0.4 kg/m)
Rigid single lead probe (0.5-in./13 mm)	0.71 lb/ft. (1.06 kg/m)
Segmented rigid single lead probe	0.71 lb/ft. (1.06 kg/m)
Coaxial probe	0.67 lb/ft. (1 kg/m)
Large coaxial probe	1.48 lb/ft. (2.2 kg/m)

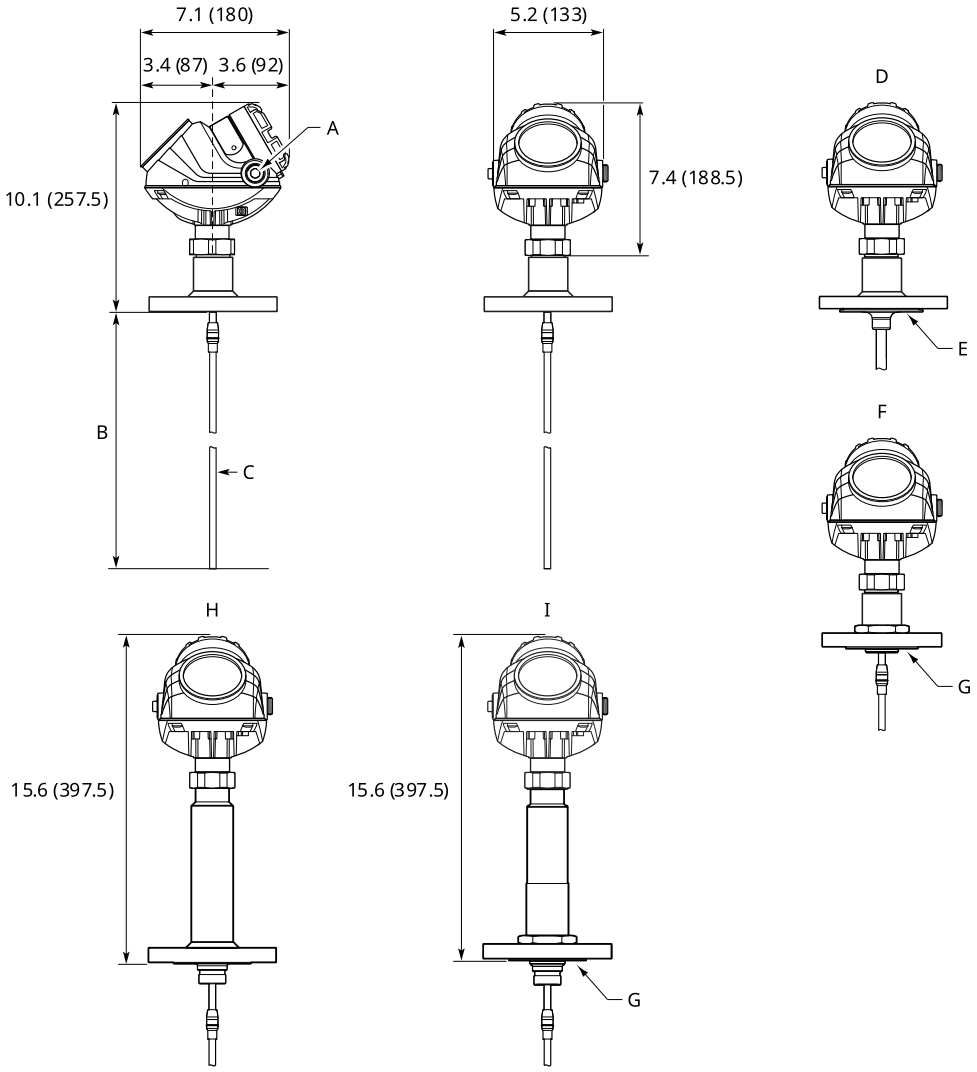
Table A-26: End Weight

Item	Weight
Standard weight for flexible single lead probe (0.16-in./4 mm)	0.88 lb (0.40 kg)
Short weight (W2) for flexible single lead probe (0.16-in./4 mm)	0.88 lb (0.40 kg)
Heavy weight (W3) for flexible single lead probe (0.16-in./4 mm)	2.43 lb (1.10 kg)
Weight for flexible single lead probe (0.24-in./6 mm)	1.2 lb (0.55 kg)
Weight for PTFE covered flexible single lead	2.2 lb (1 kg)

A.3.14 End weight options

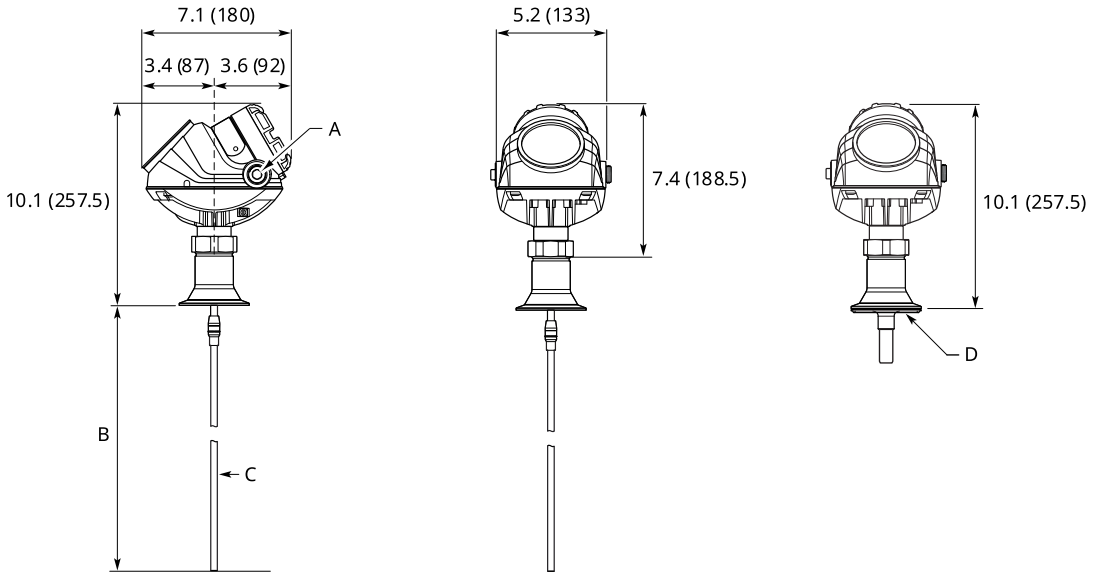
A short weight is available for the single flexible probe. It is used for measuring close to the probe end and shall be used where the measuring range must be maximized. The height is 2 in. (50 mm) and the diameter is 1.5 in. (37.5 mm). The option code is W2.

A.4 Dimensional drawings



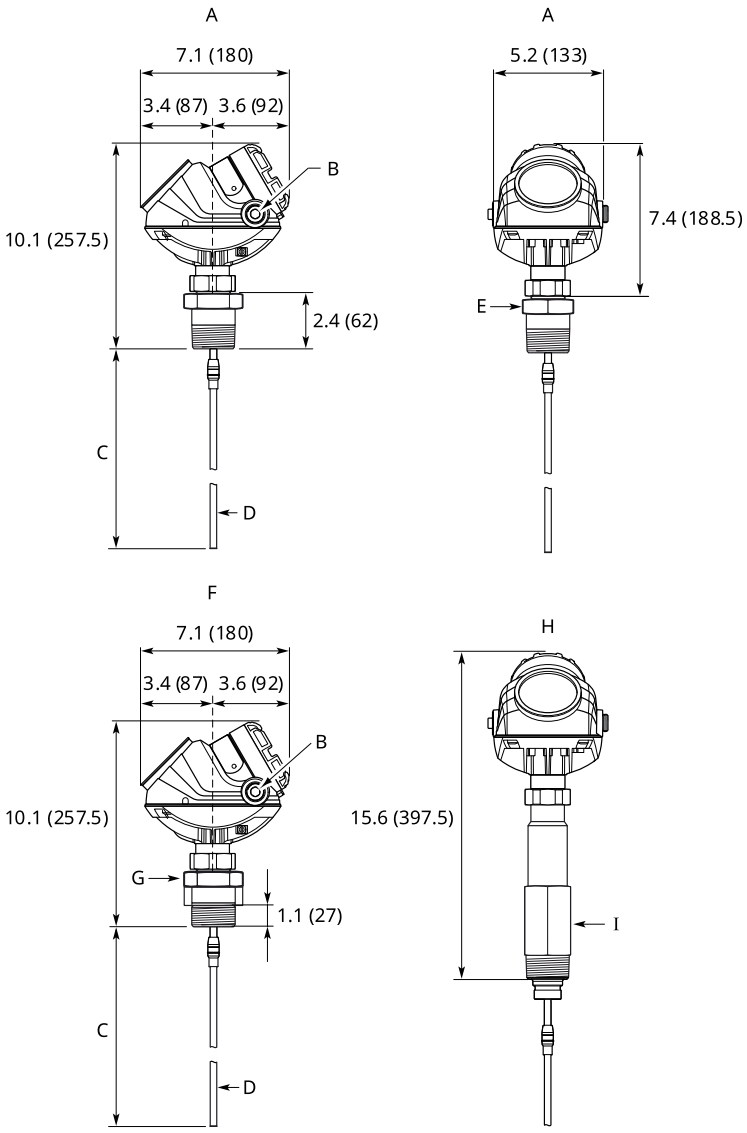
A. ½ - 14 NPT; optional adapters: M20x1.5, eurofast® and minifast®
B. L ≤ 10 ft. (3 m) for Ø 0.31 (8); L ≤ 20 ft. (6 m) for Ø 0.51 (13)
C. Ø 0.31 (8); Ø 0.51 (13); Ø 0.47 (12) for PTFE covered probe
D. PTFE covered probe and protective plate
E. Protective plate design (Material of construction code 7)
F. Alloy probe and protective plate
G. Protective plate design (Material of construction code 2 or 3)
H. MTMP/HTHP/HP/C version
I. HTHP/HP Plate Design (Option for Alloy versions)

Dimensions are in inches (millimeters).



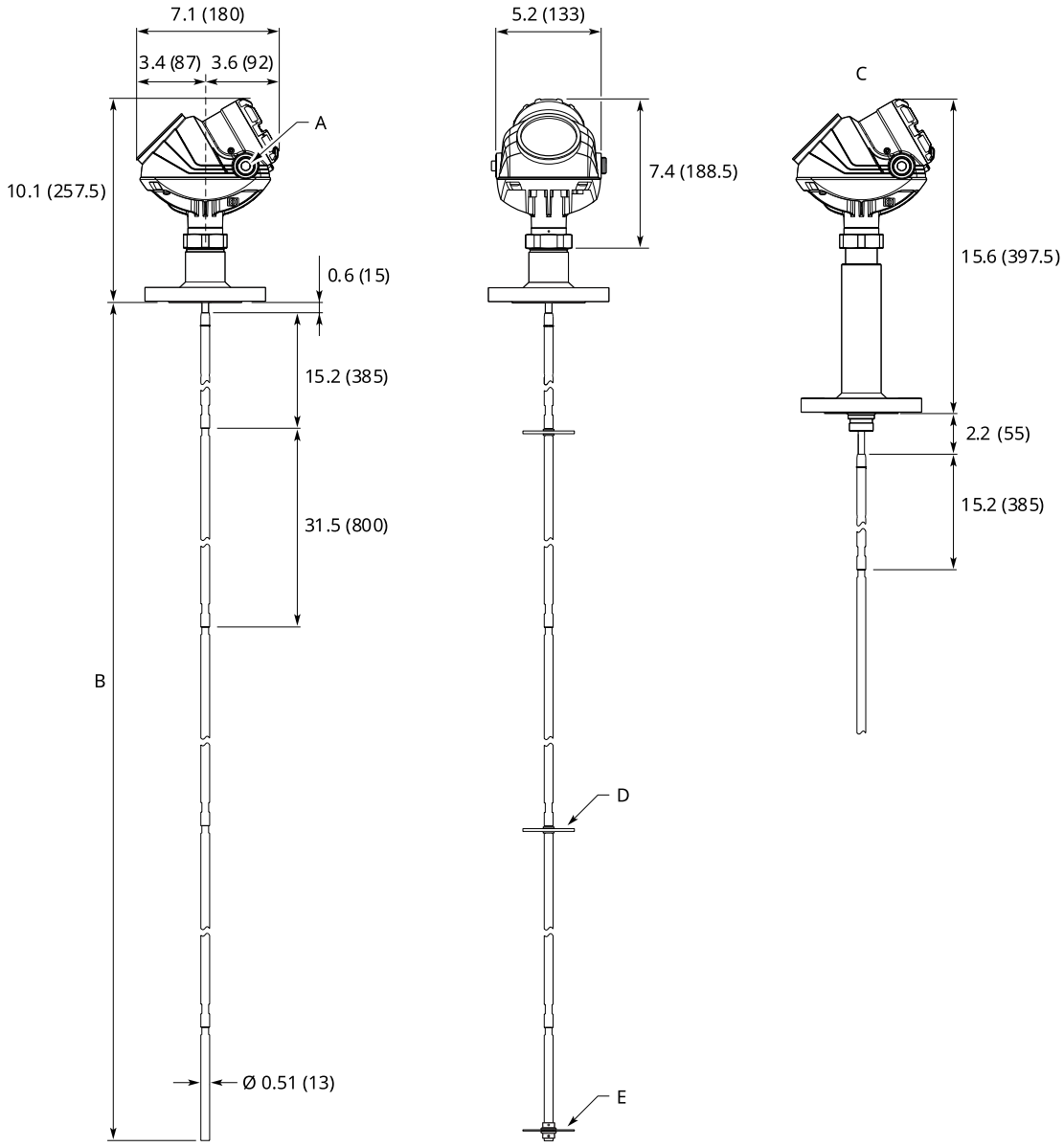
A. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
B. L ≤ 10 ft. (3 m) for Ø 0.31 (8); L ≤ 20 ft. (6 m) for Ø 0.51 (13)
C. Ø 0.31 (8); Ø 0.51 (13); Ø 0.47 (12) for PTFE covered probe
D. The PTFE covered probe is designed with a protective plate
Protective plate design (Material of construction code 7)

Dimensions are in inches (millimeters).



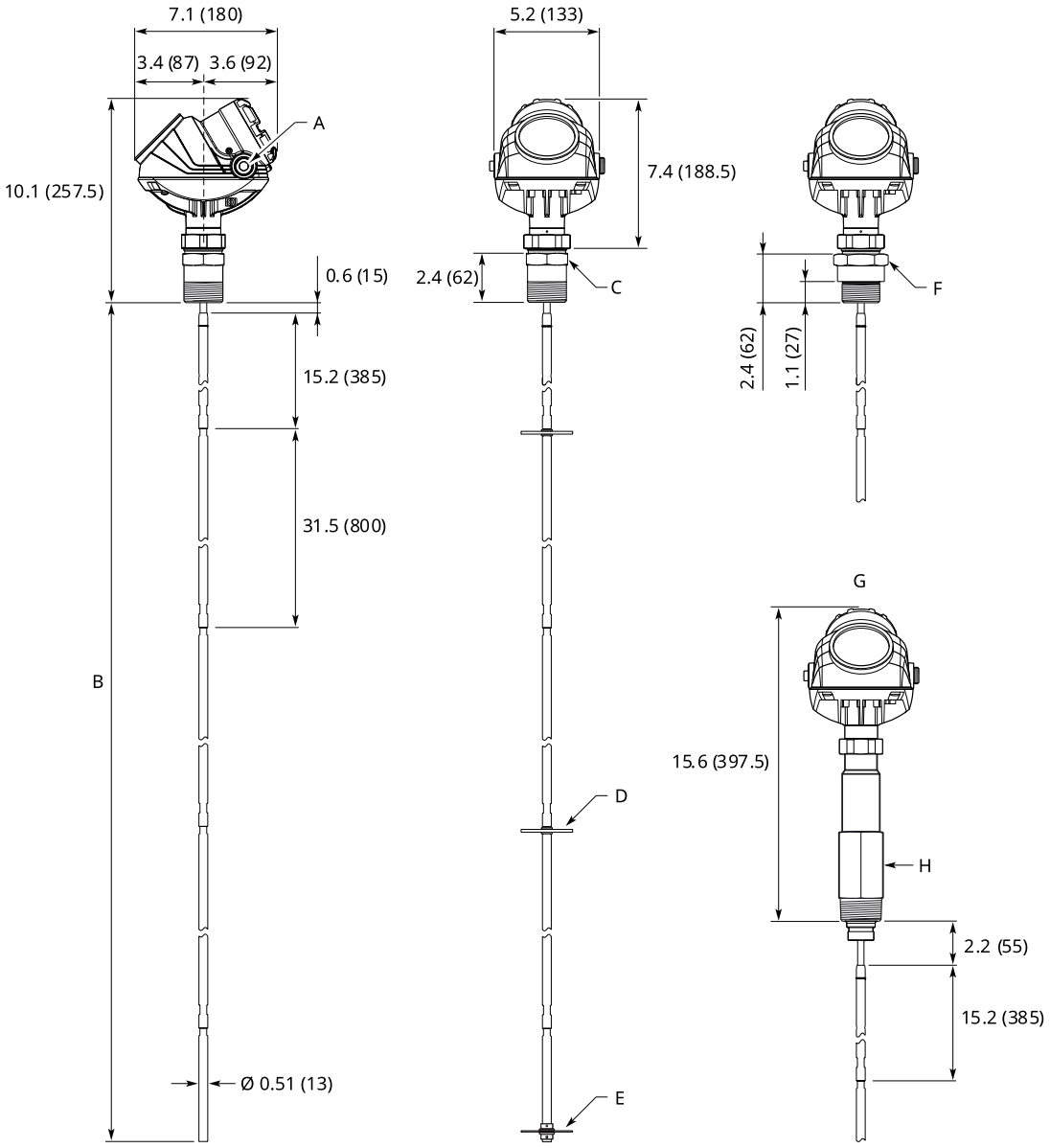
A. NPT 1/1½/2 in.
B. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
C. L ≤ 10 ft. (3 m) for Ø 0.31 (8); L ≤ 20 ft. (6 m) for Ø 0.51 (13)
D. Ø 0.31 (8); Ø 0.51 (13); Ø 0.47 (12) for PTFE covered probe
E. 1 in. / 1½ in.: s52; 2 in.: s60
F. G 1/1½ in.
G. 1 in.: s52; 1½ in.: s60
H. NPT 1½, G 1½ in. (MTMP/HTHP/HP/C version)
I. NPT: s50; G: s60

Dimensions are in inches (millimeters).



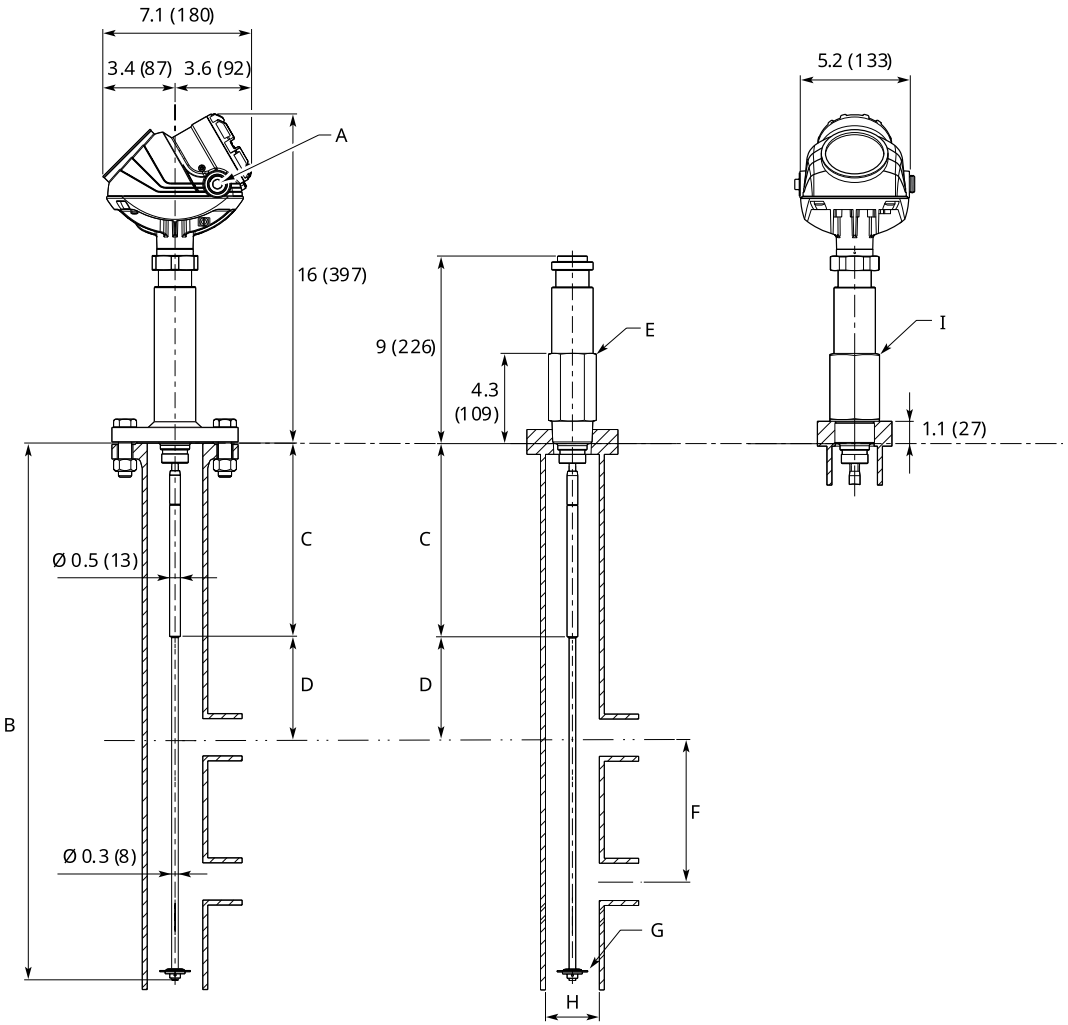
A. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
B. L ≤ 33 ft. (10 m)
C. MTMP/HTHP/HP/C version
D. Optional: PTFE centering disc
E. Optional: Bottom centering disc (SST or PTFE)

Dimensions are in inches (millimeters).



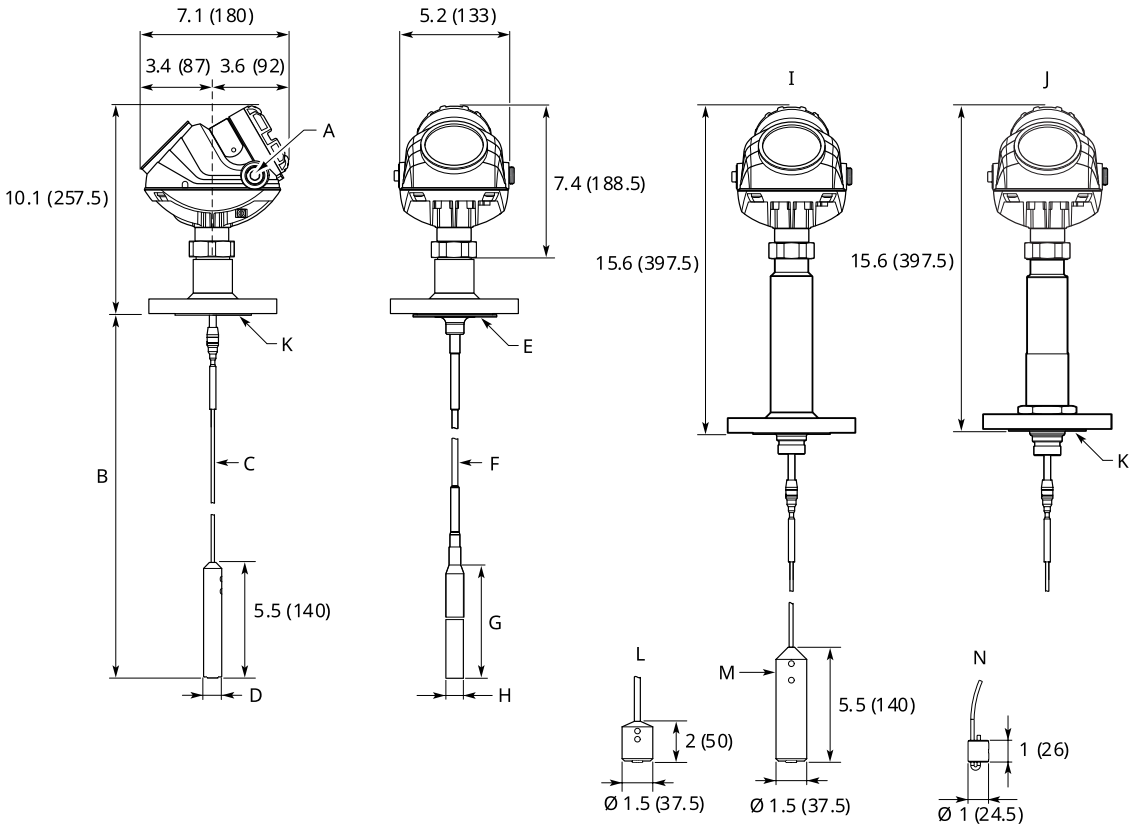
A. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
B. L ≤ 33 ft. (10 m)
C. NPT 1 in., s52; NPT 1½ in., s52; NPT 2 in., s60
D. Optional: PTFE centering disc
E. Optional: Bottom centering disc (SST or PTFE)
F. BSP-G 1 in., s52; BSP-G 1½ in., s60
G. MTMP/HTHP/HP/C version
H. NPT 1½ in., s50; BSP-G 1½ in., s60

Dimensions are in inches (millimeters).



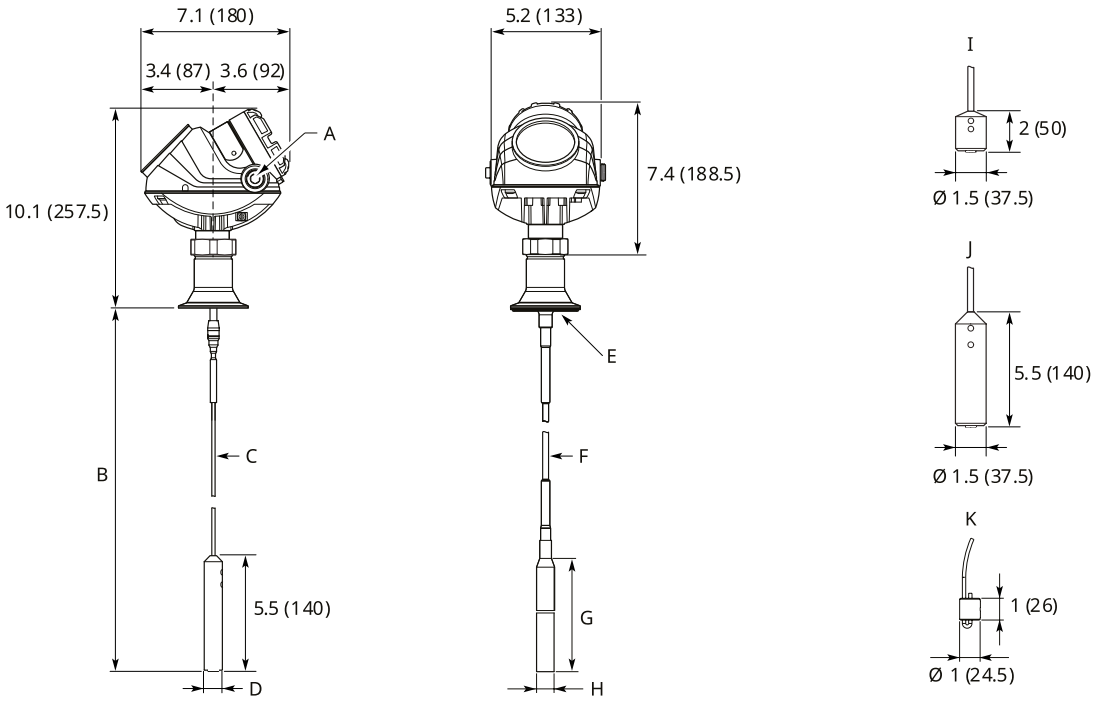
A. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
B. L ≤ 10 ft. (3 m)
C. Short reflector: 13.8 (350); Long reflector: 19.7 (500)
D. Minimum 8.3 in. (210 mm) distance between water surface and reflector end
E. NPT 1½ in., s50
F. Min. 12 in. (300 mm)
G. 1½-in. centering disc, Ø 1.46 (37)
H. Pipe inner diameter: Ø 1.5 (38) - Ø 2.05 (52)
I. BSP-G 1½ in., s60

Dimensions are in inches (millimeters).



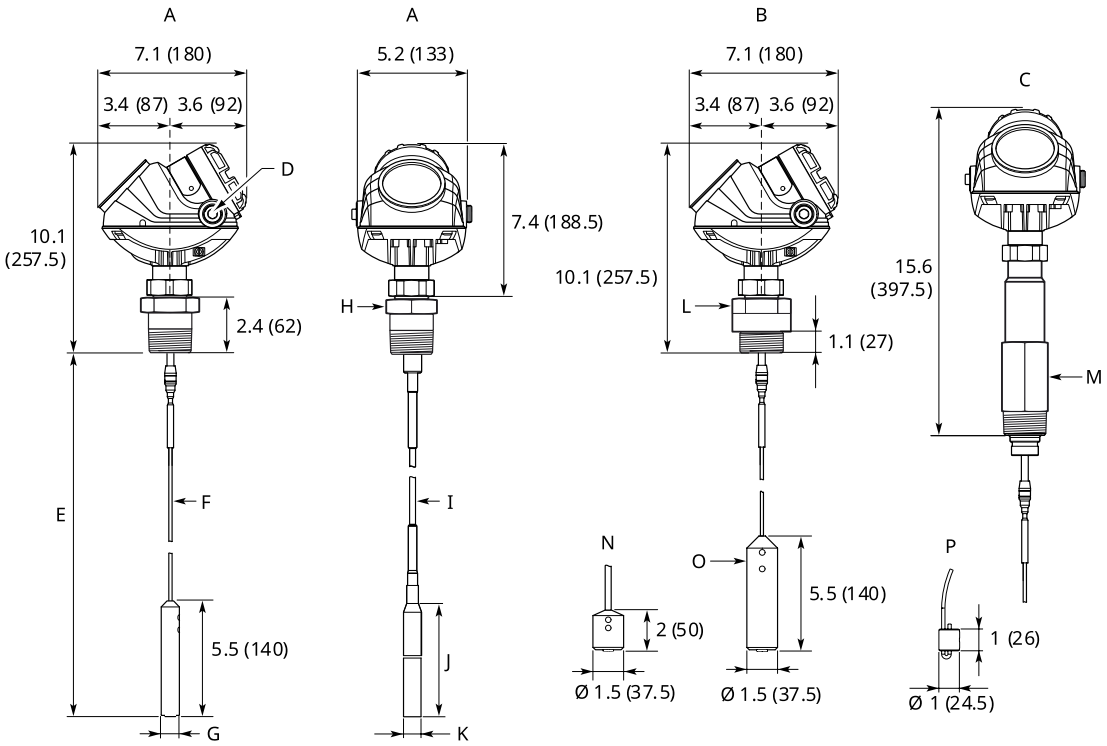
A. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
B. L ≤ 164 ft. (50 m)
C. Ø 0.16 (4); Ø 0.24 (6)
D. 4 mm probe: Ø 0.86 (22); 6 mm probe: Ø 1.10 (28)
E. The PTFE covered probe is designed with a protective plate
Protective plate design (Material of construction code 7)
F. Ø 0.28 (7) for PTFE covered probe
G. 17.1 (434) for PTFE covered probe
H. Ø 0.88 (22.5) for PTFE covered probe
I. MTMP/HTHP/HP/C version
J. HTHP/HP/C Plate Design (Option for Alloy versions)
K. Protective plate design (Material of construction code 2 or 3)
L. Short weight (option W2)
M. Heavy weight (option W3)
N. Chuck

Dimensions are in inches (millimeters).



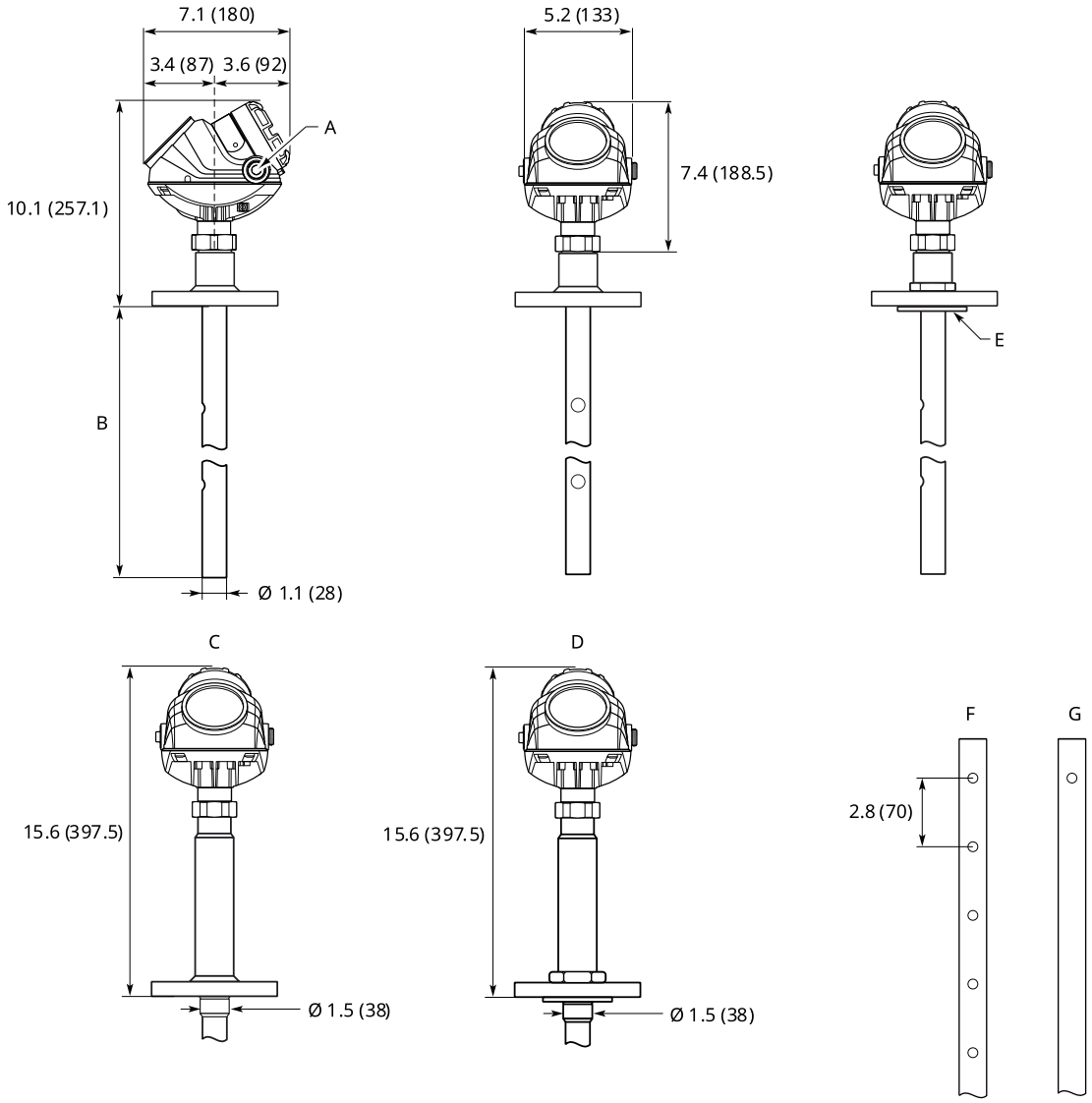
A. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
B. L ≤ 164 ft. (50 m)
C. Ø 0.16 (4); Ø 0.24 (6)
D. 4 mm probe: Ø 0.86 (22); 6 mm probe: Ø 1.10 (28)
E. The PTFE covered probe is designed with a protective plate
Protective plate design (Material of construction code 7)
F. Ø 0.28 (7) for PTFE covered probe
G. 17.1 (434) for PTFE covered probe
H. Ø 0.88 (22.5) for PTFE covered probe
I. Short weight (option W2)
J. Heavy weight (option W3)
K. Chuck

Dimensions are in inches (millimeters).



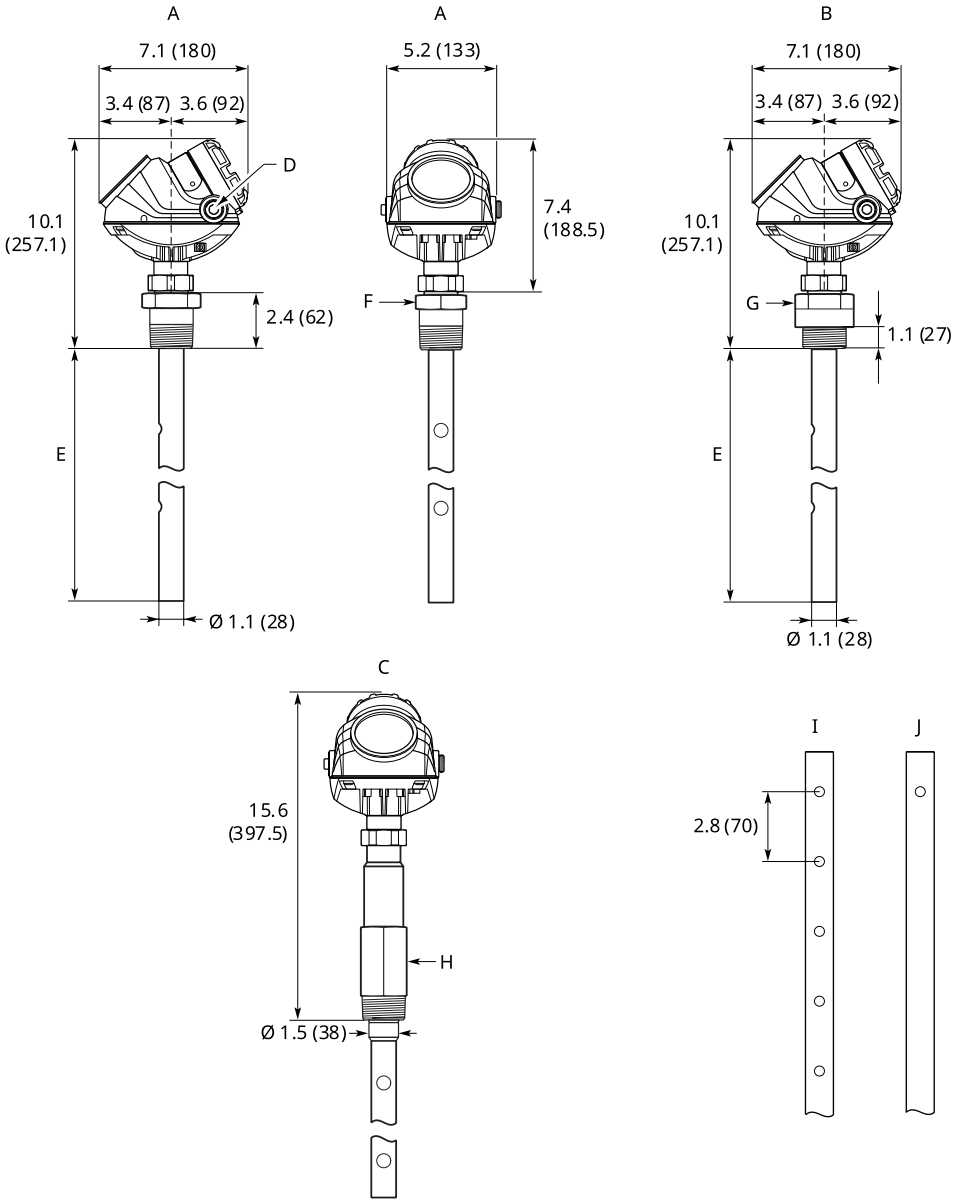
A. NPT 1/1½/2 in.
B. G 1/1½ in.
C. NPT 1½, G 1½ in. (MTMP/HTHP/HP/C version)
D. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
E. L ≤ 164 ft. (50 m)
F. Ø 0.16 (4); Ø 0.24 (6)
G. 4 mm probe: Ø 0.86 (22); 6 mm probe: Ø 1.10 (28)
H. 1 in. / 1½ in.: s52; 2 in.: s60
I. Ø 0.28 (7) for PTFE covered probe
J. 17.1 (434) for PTFE covered probe
K. Ø 0.88 (22.5) for PTFE covered probe
L. 1 in.: s52; 1½ in.: s60
M. NPT: s50; G: s60
N. Short weight (option W2)
O. Heavy weight (option W3)
P. Chuck

Dimensions are in inches (millimeters).



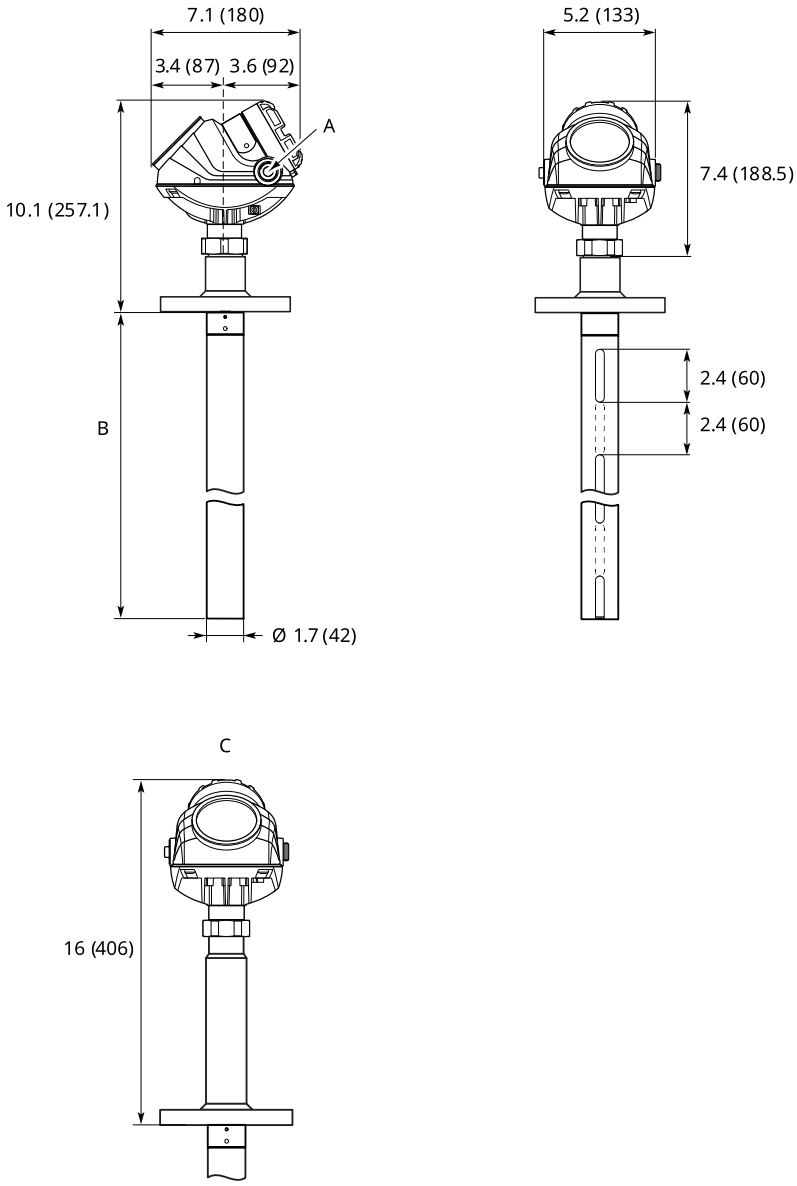
A. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
B. L ≤ 20 ft. (6 m)
C. MTMP/HTHP/HP/C version
D. HTHP/HP Plate Design (Option for Alloy versions)
E. Protective plate design (Material of construction code 2 or 3)
F. Probe type: Coaxial, perforated (code 3B)
G. Probe type: Coaxial (code 3A)

Dimensions are in inches (millimeters).



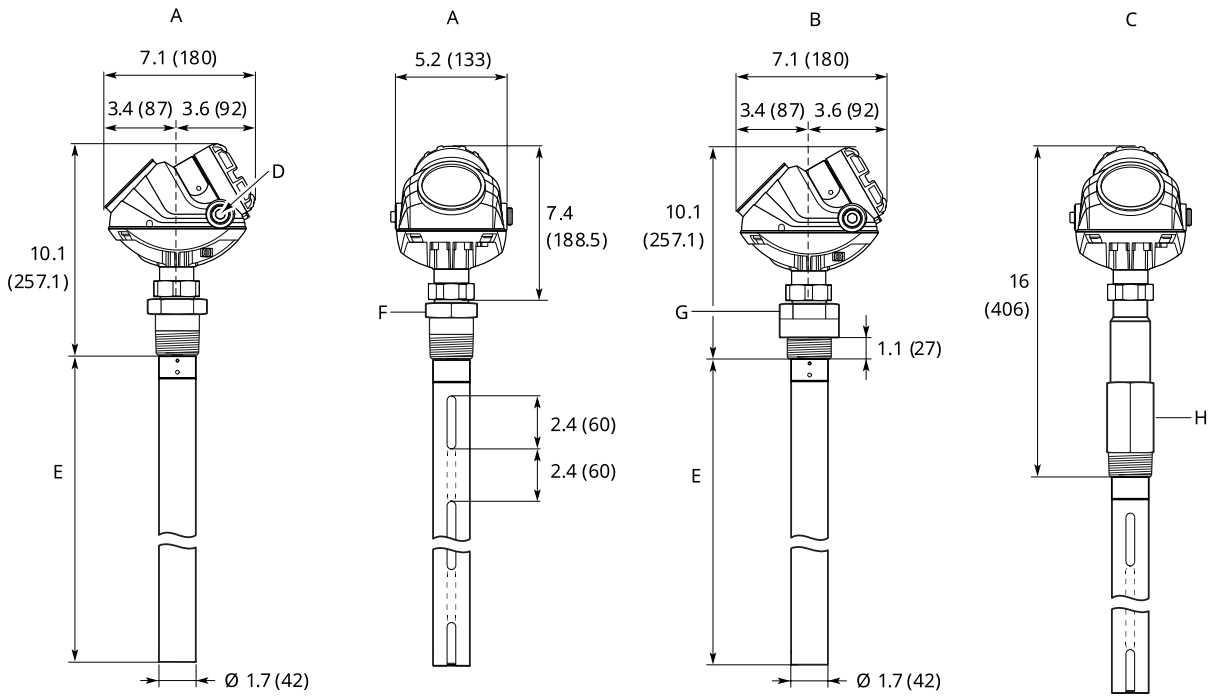
A. NPT 1/1½/2 in.
B. G 1/1½ in.
C. NPT 1½, G 1½ inch (MTMP/HTHP/HP/C version)
D. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
E. L ≤ 20 ft (6 m)
F. 1 in., 1½ in.: s52; 2 in.: s60
G. 1 in.: s52; 1½ in.: s60
H. NPT: s50; G: s60
I. Probe type: Coaxial, perforated (code 3B)
J. Probe type: Coaxial (code 3A)

Dimensions are in inches (millimeters).



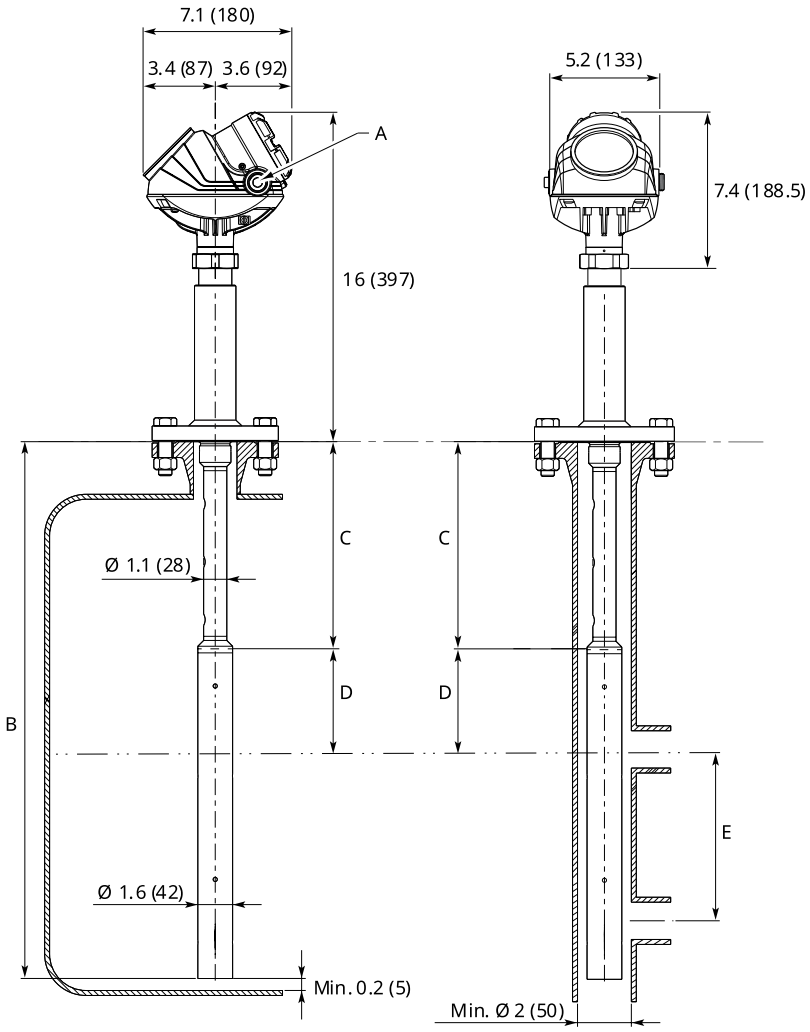
A. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
B. L ≤ 20 ft. (6 m)
C. HP/C version

Dimensions are in inches (millimeters).



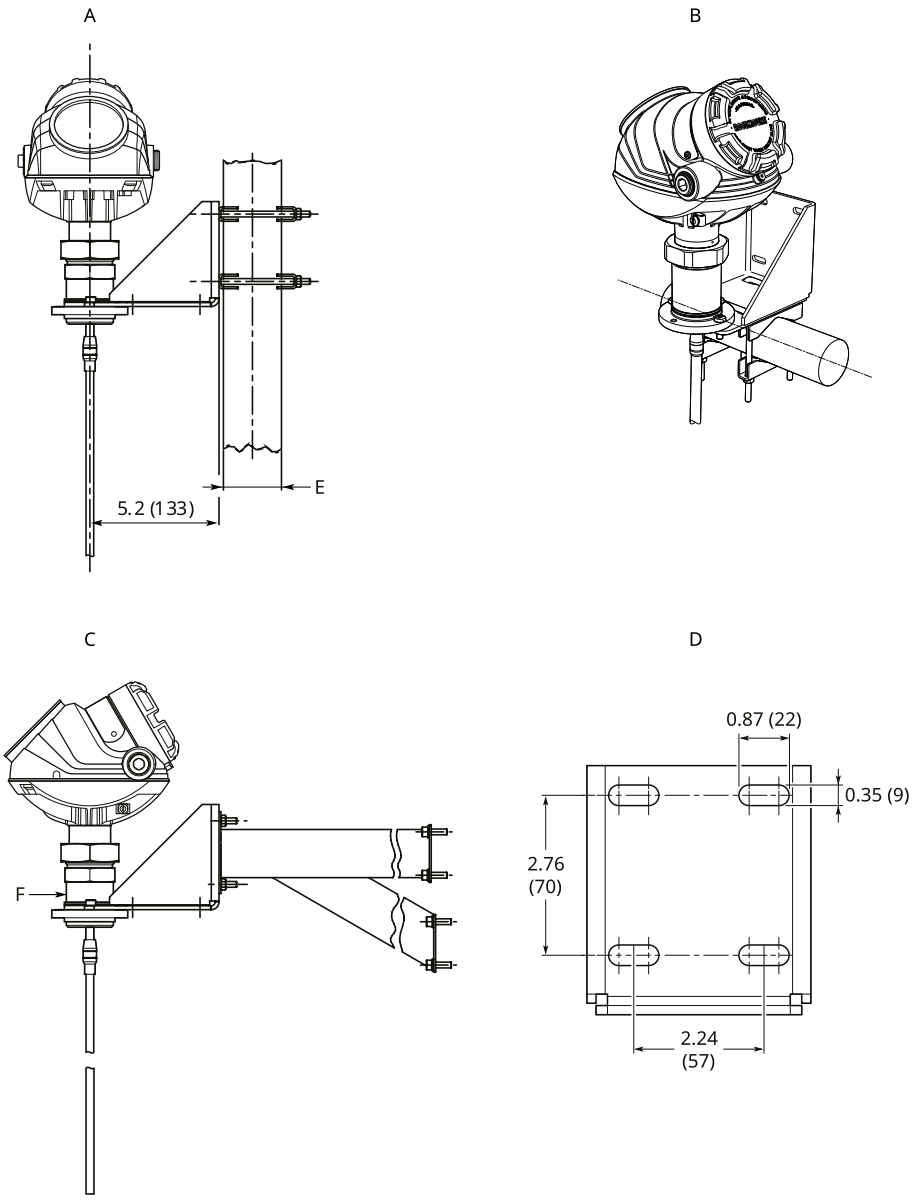
A. NPT 1½/2 in.
B. G 1½ in.
C. NPT 1½, G 1½ in. (HP/C version)
D. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
E. L ≤ 20 ft. (6 m)
F. 1½ in.: s52; 2 in.: s60
G. 1½ in.: s60
H. NPT: s50; G: s60

Dimensions are in inches (millimeters).



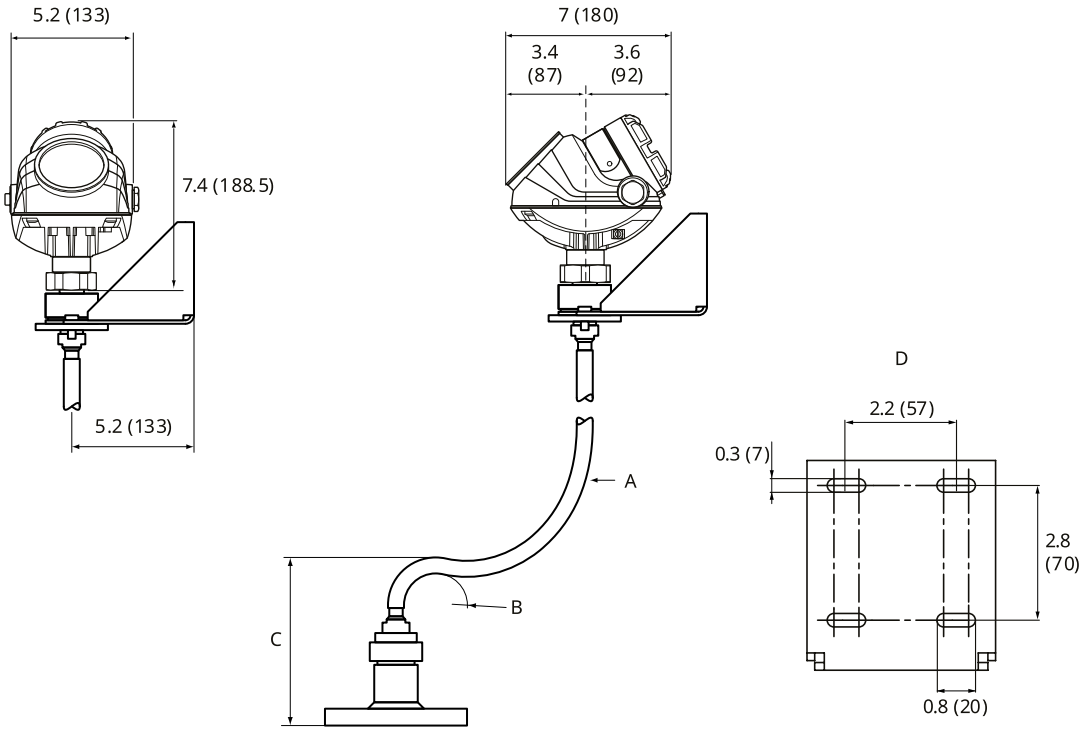
A. ½ - 14 NPT; optional adapters: M20x1.5, eurofast and minifast
B. L ≤ 13 ft. 1 in. (4 m)
C. Short reflector: 13.8 (350); Long reflector: 19.7 (500)
D. Minimum 8.3 in. (210 mm) distance between water surface and reflector end
E. Minimum 12 in. (300 mm)

Dimensions are in inches (millimeters).



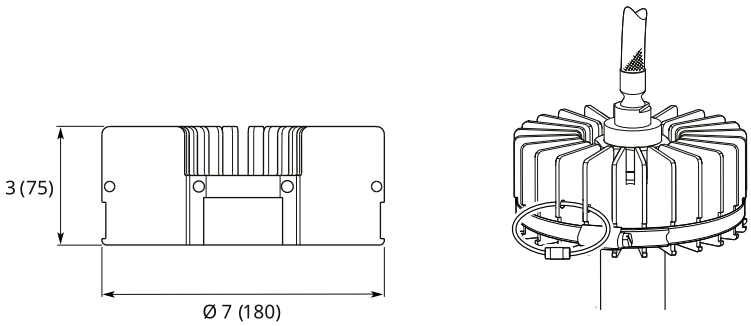
A. Pipe mounting (vertical pipe)
B. Pipe mounting (horizontal pipe)
C. Wall mounting
D. Hole pattern for wall mounting
E. Pipe diameter: max 2.5 in. (64 mm)
F. NPT 1½-in.

Dimensions are in inches (millimeters).



A. 3, 6, 9 ft. (1, 2, or 3 m)
B. R_{min}: 1.4 (35)
C. H_{min}: 7.3 (185) for Standard variant; 12.8 (325) for HTHP/HP/C variant
D. Hole pattern for remote housing wall mounting

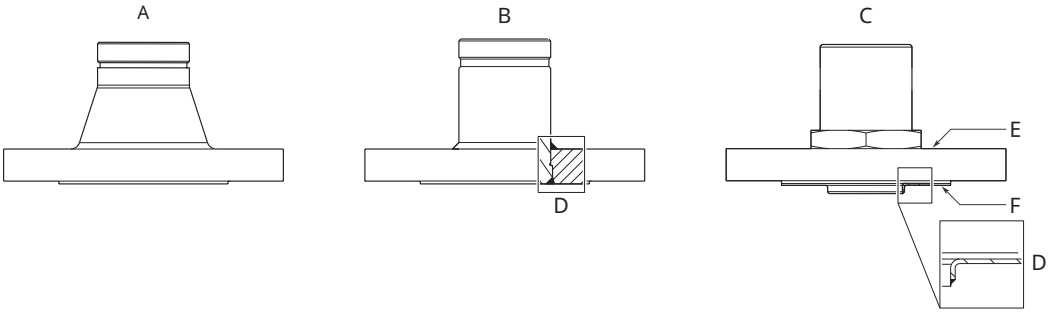
Dimensions are in inches (millimeters).



Dimensions are in inches (millimeters).

A.5 Standard flanges

Figure A-41: Flange Connection



A. Forged one-piece
B. Welded construction
C. Protective plate design
D. Weld
E. Backing flange
F. Protective plate

Table A-27: Standard Flanges

Standard	Face type(1)	Plate surface finish, R_a
ASME B16.5	Raised face	125-250 µin
	Ring type joint	< 63 µin
EN 1092-1	Type A flat face	3.2-12.5 µm
	Type B2 raised face	0.8-3.2 µm
	Type C tongue face	0.8-3.2 µm
	Type E spigot face	3.2-12.5 µm
JIS B2220	Raised face	3.2-6.3 µm

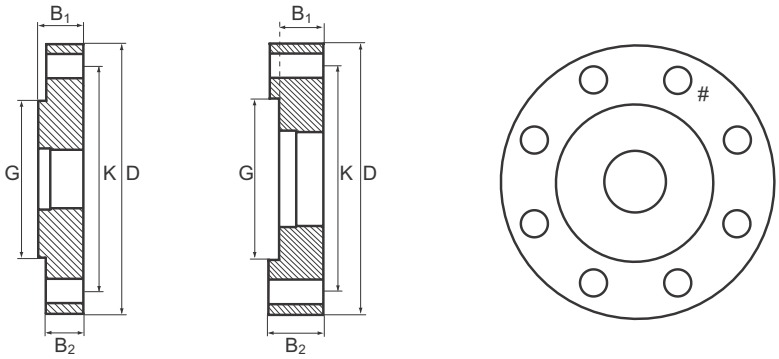
(1) Face gasket surface is serrated per mating standard.

Table A-28: Standard Flanges, Protective Plate

Standard	Face type including protective plate	Plate surface finish, R_a
ASME B16.5	Raised face	3.2-6.3 µm
EN 1092-1	Raised face	3.2-6.3 µm
JIS B2220	Raised face	3.2-6.3 µm

A.6 Proprietary flanges

Figure A-42: Proprietary Flanges



D: Outside diameter

B_1: Flange thickness with gasket surface

B_2: Flange thickness without gasket surface

$F=B_1-B_2$: Gasket surface thickness

G: Gasket surface diameter

Bolts: Number of bolts

K: Bolt hole circle diameter

Dimensions are in inches (millimeters).

Note
Dimensions may be used to aid in the identification of installed flanges. It is not intended for manufacturing use.

Table A-29: Dimensions of Proprietary Flanges

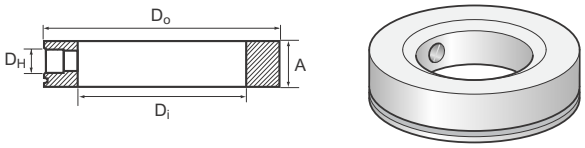
Special flanges(1)	D	B_1	B_2	F	G	# Bolts	K
Fisher™ 249B/259B(2)	9.00 (228.6)	1.50 (38.2)	1.25 (31.8)	0.25 (6.4)	5.23 (132.8)	8	7.25 (184.2)
Fisher 249C(3)	5.69 (144.5)	0.94 (23.8)	1.13 (28.6)	-0.19 (-4.8)	3.37 (85.7)	8	4.75 (120.65)
Masoneilan™(2)	7.51(191.0)	1.54 (39.0)	1.30 (33.0)	0.24 (6.0)	4.02 (102.0)	8	5.87 (149.0)

(1) These flanges are also available in a vented version. Vented flanges must be ordered with a 1½-in. NPT threaded process connection (code RA).
(2) Flange with raised face.
(3) Flange with recessed face.

For information about flange temperature and pressure ratings, see Fisher and Masoneilan flange rating.

A.7 Flushing connection rings

Figure A-43: Flushing Connection Rings



A. Height: 0.97 in. (24.6 mm)

Table A-30: Dimensions of Flushing Connection Rings

Flushing connection rings	D_i	D_o	D_H
2-in. ANSI(1)	2.12 (53.8)	3.62 (91.9)	¼-in. NPT
3-in. ANSI(1)	3.60 (91.4)	5.00 (127.0)	¼-in. NPT
4-in. ANSI(1)/DN100	3.60 (91.4)	6.20 (157.5)	¼-in. NPT
DN50	2.40 (61.0)	4.00 (102.0)	¼-in. NPT
DN80	3.60 (91.4)	5.43 (138.0)	¼-in. NPT

(1) Up to Class 2500.

A.8 Spare parts list - transmitter head

A.8.1 Required model components

Model

Code	Description	
5301	Guided Wave Radar Liquid Level or Interface Transmitter (interface available for fully submerged probe)	★
5302	Guided Wave Radar Liquid Level and Interface Transmitter	★
5303	Guided Wave Solids Level Transmitter	★

Signal output

Code	Description	
H	4-20 mA with HART communication (default output from factory is HART 7, add option code HR5 for HART 5)	★
F	FOUNDATION Fieldbus	★
M	RS-485 with Modbus communication	★
U	Rosemount 2410 Tank Hub connectivity	

Related information

4-20 mA HART
FOUNDATION Fieldbus
Modbus

Housing material

Code	Description	
A	Polyurethane-covered Aluminum (Aluminum alloy A360, maximum 0.6 percent Cu)	★
S	Stainless Steel, Grade CF8M (ASTM A743)	

Conduit / cable threads

Code	Description		
1	½ - 14 NPT	1 plug included	★
2	M20 x 1.5 adapter	1 adapter and 1 plug included	★
4	2 pcs M20 x 1.5 adapter	2 adapters and 1 plug included	★
G(1)(2)	Metal cable gland (½ - 14 NPT)	2 glands and 1 plug included	★
E(3)	M12, 4-pin, male connector (eurofast®)	1 plug included	★
M(3)	A size Mini, 4-pin, male connector (minifast®)	1 plug included	★

(1) Not available with explosion-proof or flameproof approvals.
(2) Minimum temperature is -20 °C (-4 °F).
(3) Not available with explosion-proof, flameproof, or increased safety approvals.

Operating temperature and pressure

Code	Description	
N	Not Applicable	★

Material of construction: Process connection / probe

Code	Description	
0	Not Applicable	★

Sealing O-ring material

Code	Description	
N	Not Applicable	★

Probe type

Code	Description	
0N	None	★

Probe length units

Code	Description	
N	Not Applicable	★

Total probe length (feet/m)

Code	Description	
000	Not Applicable	★

Total probe length (in./cm)

Code	Description	
00	Not Applicable	★

Process Connection - size / type

Code	Description
NA	Not Applicable

Hazardous locations certifications

Code	Description	
NA	No Hazardous Locations Certifications	★
E1[(1)]	ATEX Flameproof	★
E3[(1)]	China Flameproof	★
E5[(1)]	USA Explosion-proof	★
E6[(1)]	Canadian Explosion-proof	★
E7[(1)]	IECEx Flameproof	★
I1	ATEX Intrinsic Safety	★
IA[(2)]	ATEX FISCO Intrinsic Safety	★
I3	China Intrinsic Safety	★
IC[(2)]	China FISCO Intrinsic Safety	★
I5	USA Intrinsic Safety and Non-Incendive	★
IE[(2)]	USA FISCO Intrinsic Safety	★
I6	Canadian Intrinsic Safety	★
IF[(2)]	Canadian FISCO Intrinsic Safety	★
I7	IECEx Intrinsic Safety	★
IG[(2)]	IECEx FISCO Intrinsic Safety	★
E2[(1)]	INMETRO Flameproof	
EM[(1)]	Technical Regulations Customs Union (EAC) Flameproof	
I2	INMETRO Intrinsic Safety	
IB[(2)]	INMETRO FISCO Intrinsic Safety	
IM	Technical Regulations Customs Union (EAC) Intrinsic Safety	
IN[(2)]	Technical Regulations Customs Union (EAC) FISCO Intrinsic Safety	
EW	India PESO Flameproof	
IW	India PESO Intrinsic Safety	

Code	Description	
E4[1]	Japan Flameproof	
EP[1][3]	Republic of Korea Flameproof	
KA[1]	ATEX, USA, Canadian Flameproof/Explosion-proof	
KB[1]	ATEX, USA, IECEx Flameproof/Explosion-proof	
KC[1]	ATEX, Canadian, IECEx Flameproof/Explosion-proof	
KD[1]	USA, Canadian, IECEx Flameproof/Explosion-proof	
KE	ATEX, USA, Canadian Intrinsic Safety	
KF	ATEX, USA, IECEx Intrinsic Safety	
KG	ATEX, Canadian, IECEx Intrinsic Safety	
KH	USA, Canadian, IECEx Intrinsic Safety	
KI[2]	FISCO - ATEX, USA, Canadian Intrinsic Safety	
KJ[2]	FISCO - ATEX, USA, IECEX Intrinsic Safety	
KK[2]	FISCO - ATEX, Canadian, IECEX Intrinsic Safety	
KL[2]	FISCO - USA, Canadian, IECEX Intrinsic Safety	
N1	ATEX Increased Safety	
N7	IECEx Increased Safety	

(1) Probes are intrinsically safe.
(2) Requires FOUNDATION Fieldbus signal output (U_i parameter listed in Product Certifications).
(3) The EP (Republic of Korea Flameproof) certificate is based on the E7 (IECEx Flameproof) certificate, therefore model code E7 is stated in the certificate instead of EP.

Related information

Product certifications

A.8.2 Additional options

Display

Code	Description	
M1	Integral digital display	★

Communication

Code	Description	
HR5	4–20 mA with digital signal based on HART 5 protocol (default output from factory is HART 7, add option code HR5 for HART 5)	★

Factory configuration

Code	Description	
C1	Factory configuration per Configuration Data Sheet	★

Alarm limits

Code	Description	
C4	NAMUR alarm and saturation levels, high alarm	★
C5	NAMUR alarm and saturation levels, low alarm	★
C8[(1)]	Standard Rosemount alarm and saturation levels, low alarm	★

(1) The standard alarm setting is high.

Special quality assurance

Code	Description	
Q4	Calibration data certificate	★

Safety certifications

Only available with HART 4-20 mA output (output code H).

Code	Description	
QS	Prior-use certificate of FMEDA Data	★
QT	Safety-certified to IEC 61508 with certificate of FMEDA data	★

Related information

Rosemount 5300 Safety Manual

Marine / shipboard approvals

Transmitters with aluminum housing are not approved for open deck installations.

Code	Description	
SBS	American Bureau of Shipping Type Approval	★
SDN	Det Norske Veritas (DNV) Type Approval	★
SLL	Lloyd's Register Type Approval	★
SKR	Korean Register Type Approval	★
SBV	Bureau Veritas Type Approval	★
SNK	Nippon Kaiji Kyokai Type Approval	★

Transient protection

Code	Description	
T1	Transient Protection Terminal Block. Selectable with HART 4-20 mA output (output code H). Already included in all FOUNDATION Fieldbus variations.	★

Diagnostic functionality

Code	Description	
D01	FOUNDATION Fieldbus Diagnostics Suite (includes Signal Quality Metrics diagnostics(1))	★
DA1	HART Diagnostics Suite (includes Signal Quality Metrics diagnostics(1))	★

(1) Signal Quality Metrics diagnostics is not compatible with interface measurement where the probe is fully submerged.

Cold temperature

Code	Description	
BR5(1)(2)(3)(4)	-67 °F (-55 °C) cold temperature	

(1) Only available for end-destination countries within the EAC Economic Union (Russia, Belarus, Kazakhstan, Armenia, and Kyrgyzstan).
(2) Consider any temperature limitations dependent on Material of construction, Hazardous locations certifications, and/or O-ring selection.
(3) Not available with option code QS or U1.
(4) For ambient temperatures between -67 °F (-55 °C) and -40 °F (-40 °C), the ambient temperature effect is ± 0.012 in. (0.3 mm) /°K or ± 45 ppm/°K of measured value, whichever is greatest. Other performance specifications apply to ambient temperatures between –40 °F (–40 °C) and 185 °F (85 °C).

Overfill prevention

Code	Description	
U1	Overfill prevention according to WHG/TUV	★

Extended product warranty

Code	Description	
WR3	3-year limited warranty	★
WR5	5-year limited warranty	★

Remote housing

Not available with Marine/shipboard approvals.

Code	Description	
B1	1 m/3.2 ft. Remote housing mounting cable and 316L bracket	
B2	2 m/6.5 ft. Remote housing mounting cable and 316L bracket	
B3	3 m/9.8 ft. Remote housing mounting cable and 316L bracket	

Related information

Dimensional drawings

Specials

Code	Description	
RXXXX	Custom engineered solutions beyond standard model codes. Consult factory for details.	

Related information

Engineered solutions

A.9 Spare parts list - probe

A.9.1 Required model components

Model

Code	Description
5309	Spare probe

Signal output

Code	Description	
N	Not Applicable	★

Housing material

Code	Description
N	Not Applicable

Conduit / cable threads

Code	Description
0	Not Applicable

Operating temperature and pressure

Process seal rating. Final rating depends on Material of construction, Flange, and O-ring selection.

Code	Description		Probe type	
Standard (Std)				
S	Design and operating temperature: -40 to 302 °F (-40 to 150 °C)	Design and operating pressure: -15 to 754 psig (-1 to 52 bar)[1]	3A, 3B, 3C, 4A, 4B, 4S, 5A, and 5B	★
Medium Temperature and Medium Pressure (MTMP)				
M[2]	Design and operating temperature: -76 to 500 °F (-60 to 260 °C)	Design and operating pressure: -15 to 1450 psig (-1 to 100 bar)	3A, 3B, 4A, 4B, 4S, 5A, and 5B	★

Code	Description		Probe type	
High Pressure (HP)				
P[3]	Design temperature: -76 to 752 °F (-60 to 400 °C)[4] Operating temperature: -76 to 500 °F (-60 to 260 °C)[5]	Design and operating pressure: -15 to 5000 psig (-1 to 345 bar)	3A, 3B, 3C, 4A, 4B, 4S, 5A, and 5B	★
High Temperature / High Pressure (HTHP)				
H[3][6]	Design and operating temperature: -76 to 752 °F (-60 to 400 °C)	Design and operating pressure: -15 to 5000 psig (-1 to 345 bar)	3A, 3B, 3V, 4A, 4B, 4S, 4U, 5A, and 5B	★
Cryogenic Temperature (C)				
C[3]	Design and operating temperature: -320 to 392 °F (-196 to 200 °C)	Design and operating pressure: -15 to 5000 psig (-1 to 345 bar)	3A, 3B, 3C, 4A, 4B, 4S, 5A, 5B (Only SST)	

(1) Maximum pressure is 580 psig (40 bar) for O-ring material code B (Nitrile Butadiene), Overfill prevention code U1, and Material of construction code 2 or 3.
(2) Available with ATEX, IECEx approvals, or without hazardous locations approvals.
(3) Requires option None for sealing (no O-ring).
(4) Pressure retaining parts are designed for up to 752 °F (400 °C), maximum operating temperature is 500 °F (260 °C).
(5) Maximum operating temperature is 482 °F (250 °C) for option code U1.
(6) For applications where operating temperature cycles exclusively below 500 °F / 260 °C, and other applications where a large amount of contamination is present, the High Pressure (HP), Medium Temperature and Medium Pressure (MTMP), or Standard (Std) seal should be used, if process conditions allow.

Related information

Process temperature and pressure rating
Flange rating
Plate design
Tri Clamp rating

Material of construction: Process connection / probe

For other materials, consult the factory.

Code	Description	Probe type	Valid operation temperature and pressure	
1(1)	316/316L/EN 1.4404	All	S, M, H, P, C	★
2	Alloy C-276 (UNS N10276). With plate design if flanged version. Up to class 600/PN 63 for HTHP/HP process seals.	3A, 3B, 4A, 4B, 5A, 5B	S, H, P	
3	Alloy 400 (UNS N04400). With plate design if flanged version.	3A, 3B, 4A, 4B, 5A, 5B	S	
7	PTFE covered probe and flange. With plate design.	4A and 5A	S	
8	PTFE covered probe	4A and 5A	S	
H	Alloy C-276 (UNS N10276) process connection, flange, and probe	3A, 3B, 4A, 4B, 5A, 5B	S, H, P	
D	Duplex 2205 (EN 1.4462/UNS S31803) process connection, flange, and probe	4B, 5A, 5B	S, H, P	
E	Alloy 825 (UNS N08825) process connection, flange, and probe	4B, 5A, 5B	S, H, P	

(1) ASME flanges dual certified 316/316L.

Sealing O-ring material

For other materials, consult the factory.

Code	Description	
N(1)	None	★
V	Fluoroelastomer (FKM)	★
E	Ethylene Propylene (EPDM)	★
K	Kalrez® Perfluoroelastomer (FFKM)	★
B	Nitrile Butadiene (NBR)	★
F	Fluorsilicone (FVMQ)	★

(1) Requires Operating Temperature and Pressure code M, H, P, or C.

Probe type

Code	Description	Process connections	Probe lengths	
3B	Coaxial, perforated. For level and interface measurement.	Flange / 1-in.(1), 1½-in., 2- in.(1) Thread	Min: 1 ft. 4 in. (0.4 m) Max: 19 ft. 8 in. (6 m)	★
3C(2)	Large coaxial, perforated. For level and interface measurement.	Flange / 1½-in., 2- in.(1) Thread	Min: 1 ft. (0.3 m) Max: 19 ft. 8 in. (6 m)	★
3V(3)(4)(5)	Integrated Still Pipe Vapor Probe. For 3-in. chambers and above. Refer to "Options" to specify reference reflector length.	Flange	Min: 2 ft. 11 in. (0.9 m) for the short reflector (R1 option) Min: 3 ft. 7 in. (1.1 m) for the long reflector (R2 option) Max: 13 ft. 1 in. (4 m)	★
4A	Rigid Single Lead (8 mm)	Flange / 1- in.(1), 1½-in., 2- in.(1) Thread / Tri Clamp	Min: 1 ft. 4 in. (0.4 m) Max: 9 ft. 10 in. (3 m)	★
4B	Rigid Single Lead (13mm)	Flange / 1-in., 1½-in., 2-in. Thread / Tri Clamp	Min: 1 ft. 4 in. (0.4 m) Max: 19 ft. 8 in. (6 m)	★
4U(3)(4)(5)	Single Rigid Vapor Probe (equip with a 1½-in. centering disc). For 2-in. chambers. Refer to "Options" to specify reference reflector length.	Flange / 1½-in. Thread	Min: 2 ft. 11 in. (0.9 m) for the short reflector (R1 option) Min: 3 ft. 7 in. (1.1 m) for the long reflector (R2 option) Max: 9 ft. 10 in. (3 m)	★
5A(6)	Flexible Single Lead with weight	Flange / 1-in.(1), 1½-in., 2-in.(1) Thread / Tri Clamp	Min: 3 ft. 4 in. (1 m) Max: 164 ft. (50 m)(7)(8)	★
5B(9)	Flexible Single Lead with chuck	Flange / 1-in.(1), 1½-in., 2-in.(1) Thread / Tri Clamp	Min: 3 ft. 4 in. (1 m) Max: 164 ft. (50 m)(7)	★
3A(10)	Coaxial (for level measurement)	Flange / 1-in.(1), 1½-in., 2-in.(1) Thread	Min: 1 ft. 4 in. (0.4 m) Max: 19 ft. 8 in. (6 m)	
4S	Segmented Rigid Single Lead (13mm)	Flange / 1-in., 1½-in., 2-in.Thread / Tri Clamp	Min: 1 ft. 4 in. (0.4 m) Max: 32 ft. 9 in. (10 m)	
6A(11)	Flexible Single Lead with weight, 6 mm	Flange / 1-in., 1½-in., 2-in.Thread	Min: 3 ft. 4 in. (1 m) Max: 164 ft. (50 m)	★
6B(11)	Flexible Single Lead with chuck, 6 mm	Flange / 1-in., 1½-in., 2-in.Thread	Min: 3 ft. 4 in. (1 m) Max: 164 ft. (50 m)	★

(1) Only available with Operating Temperature and Pressure code S.
(2) Requires firmware version 2.L3 or later.
(3) Only available with Operating Temperature and Pressure code H.
(4) Not available with Remote housing code B1 or B2.
(5) Probe type 3V or 4U together with flanges Class 2500/PN250 or higher requires installation option code HS (Heat sink).
(6) 0.79 lb (0.36 kg) standard weight for flexible single lead probe. L=5.5 in. (140 mm). For PTFE covered probes: 2.2 lb (1 kg) standard weight for flexible single lead probe. L=17.1 in. (434 mm).
(7) Maximum probe length for Duplex 2205 probes is 105 ft (32 m).
(8) Maximum probe length for PTFE covered probes is 98 ft (30 m).
(9) Extra length for fastening is added in factory.
(10) Requires model 5301.
(11) 1.2 lb (0.56 kg) standard weight for flexible single lead probe. L=5.5 in. (140 mm).

Probe length units

Code	Description	
E	English (feet, inches)	★
M	Metric (meters, centimeters)	★

Total probe length (feet/m)

Probe weight included if applicable. Give the total probe length in feet and inches or meters and centimeters, depending on selected probe length unit. If tank height is unknown, please round up to an even length when ordering. Probes can be cut to exact length in field. Maximum allowable length is determined by process conditions.

Code	Description	
XXX	0-164 ft. or 0-50 m	★

Related information

Total probe length

Total probe length (inch/cm)

Probe weight included if applicable. Give the total probe length in feet and inches or meters and centimeters, depending on selected probe length unit. If tank height is unknown, please round up to an even length when ordering. Probes can be cut to exact length in field. Maximum allowable length is determined by process conditions.

Code	Description	
XX	0 - 11 in. or 0-99 cm	★

Related information

Total probe length

Process connection - size / type

For other process connections, consult the factory.

Code	Description			
ASME flanges[1]		Material of construction	Operating temperature and pressure	
AA[2]	2-in. Class 150, RF (Raised Face Type)	1, 2, 3, 7, 8, H, D, E	S, M, H, P, C	★
AB[2]	2-in. Class 300, RF (Raised Face Type)	1, 2, 3, 7, 8, H, D, E	S, M, H, P, C	★
AC	2-in. Class 600, RF (Raised Face Type)	1, 2, H, D, E	M, H, P, C	★
AD	2-in. Class 900, RF (Raised Face Type)	1, H, D, E	M, H, P, C	★
BA[2]	3-in. Class 150, RF (Raised Face Type)	1, 2, 3, 7, 8, H, D, E	S, M, H, P, C	★
BB[2]	3-in. Class 300, RF (Raised Face Type)	1, 2, 3, 7, 8, H, D, E	S, M, H, P, C	★
BC	3-in. Class 600, RF (Raised Face Type)	1, 2, H, D, E	M, H, P, C	★
BD	3-in. Class 900, RF (Raised Face Type)	1, H, D, E	M, H, P, C	★
CA[2]	4-in. Class 150, RF (Raised Face Type)	1, 2, 3, 7, 8, H, D, E	S, M, H, P, C	★
CB[2]	4-in. Class 300, RF (Raised Face Type)	1, 2, 3, 7, 8, H, D, E	S, M, H, P, C	★

Code	Description			
CC	4-in. Class 600, RF (Raised Face Type)	1, 2, H, D, E	M, H, P, C	★
CD	4-in. Class 900, RF (Raised Face Type)	1, H, D, E	M, H, P, C	★
AE	2-in. Class 1500, RF (Raised Face Type)	1, H, D, E	M, H, P, C	
AF	2-in. Class 2500, RF (Raised Face Type)	1	M, H, P, C	
AI	2-in. Class 600, RTJ (Ring Type Joint)	1, H, D, E	M, H, P, C	
AJ	2-in. Class 900, RTJ (Ring Type Joint)	1, H, D, E	M, H, P, C	
AK	2-in. Class 1500, RTJ (Ring Type Joint)	1, H, D, E	M, H, P, C	
BE	3-in. Class 1500, RF (Raised Face Type)	1, H, D, E	M, H, P, C	
BF	3-in. Class 2500, RF (Raised Face Type)	1	M, H, P, C	
BI	3-in. Class 600, RTJ (Ring Type Joint)	1, H, D, E	M, H, P, C	
BJ	3-in. Class 900, RTJ (Ring Type Joint)	1, H, D, E	M, H, P, C	
BK	3-in. Class 1500, RTJ (Ring Type Joint)	1, H, D, E	M, H, P, C	
CE	4-in. Class 1500, RF (Raised Face Type)	1, H, D, E	M, H, P, C	
CI	4-in. Class 600, RTJ (Ring Type Joint)	1, H, D, E	M, H, P, C	
CJ	4-in. Class 900, RTJ (Ring Type Joint)	1, H, D, E	M, H, P, C	
CK	4-in. Class 1500, RTJ (Ring Type Joint)	1, H, D, E	M, H, P, C	
DA	6-in. Class 150, RF (Raised Face Type)	1, 2, 3, 7, 8, H	S, M, H, P, C	
DB	6-in. Class 300, RF (Raised Face Type)	1, 2, 3, 7, 8, H	S, M, H, P, C	
EN 1092-1 flanges		Material of construction	Operating temperature and pressure	
HB	DN50, PN40, Type A flat face	1, 2, 3, 7, 8	S, M, H, P, C	★
HC	DN50, PN63, Type A flat face	1, 2, 3	M, H, P, C	★
HD	DN50, PN100, Type A flat face	1	M, H, P, C	★
IA	DN80, PN16, Type A flat face	1, 2, 3, 7, 8	S, M, H, P, C	★
IB	DN80, PN40, Type A flat face	1, 2, 3, 7, 8	S, M, H, P, C	★
IC	DN80, PN63, Type A flat face	1, 2, 3	M, H, P, C	★
ID	DN80, PN100, Type A flat face	1	M, H, P, C	★
JA	DN100, PN16, Type A flat face	1, 2, 3, 7, 8	S, M, H, P, C	★
JB	DN100, PN40, Type A flat face	1, 2, 3, 7, 8	S, M, H, P, C	★
JC	DN100, PN63, Type A flat face	1, 2, 3	M, H, P, C	★
HI	DN50, PN40, Type E spigot face	1, 8	S, M, H, P, C	
HP	DN50, PN16, Type C tongue face	1, 8	S, M, H, P, C	
HQ	DN50, PN40, Type C tongue face	1, 8	S, M, H, P, C	
IE	DN80, PN160, Type B2 raised face	1	M, H, P, C	
IH	DN80, PN16, Type E spigot face	1, 8	S, M, H, P, C	
II	DN80, PN40, Type E spigot face	1, 8	S, M, H, P, C	
JE	DN100, PN160, Type B2 raised face	1	M, H, P, C	

Code	Description			
JH	DN100, PN16, Type E spigot face	1, 8	S, M, H, P, C	
JI	DN100, PN40, Type E spigot face	1, 8	S, M, H, P, C	
JQ	DN100, PN40, Type C tongue face	1, 8	S, M, H, P, C	
KA	DN150, PN16, Type A flat face	1, 2, 3, 7, 8	S, M, H, P, C	
KB	DN150, PN40, Type A flat face	1, 2, 3, 7, 8	S, M, H, P, C	
KH	DN150, PN16, Type E spigot face	1, 8	S, M, H, P, C	
NI	DN65, PN40, Type E spigot face	1, 8	S, M, H, P, C	
JIS flanges		Material of construction	Operating temperature and pressure	
UA	50A, 10K, RF (Raised Face Type)	1, 2, 3, 7, 8	S, M, H, P, C	★
VA	80A, 10K, RF (Raised Face Type)	1, 2, 3, 7, 8	S, M, H, P, C	★
XA	100A, 10K, RF (Raised Face Type)	1, 2, 3, 7, 8	S, M, H, P, C	★
Threaded connections		Material of construction	Probe type	
RA	1½-in. NPT thread	Std: 1, 2, 3, 8, H, D MTMP/HTHP: 1	3A, 3B, 3C, 4A, 4B, 4S, 4U, 5A, 5B	★
RC	2-in. NPT thread	1, 8	3A, 3B, 3C, 4A, 4B, 4S, 5A, 5B, standard temperature and pressure	★
RB	1-in. NPT thread	1, 8	3A, 3B, 4A, 4B, 4S, 5A, 5B, standard temperature and pressure	
SA	1½-in. BSP (G 1½-in.) thread	Std: 1, 2, 3, 8, H, D MTMP/HTHP: 1	3A, 3B, 3C, 4A, 4B, 4S, 4U, 5A, 5B	
SB	1-in. BSP (G 1-in.) thread	1, 8	3A, 3B, 4A, 4B, 4S, 5A, 5B, standard temperature and pressure	
Tri Clamp fittings[3]		Material of construction	Probe type	
FT	1½-in. Tri Clamp	1, 7, 8	4A, 5A, 5B standard temperature and pressure	
AT	2-in. Tri Clamp	1, 7, 8	4A, 4B, 5A, 5B, 4S standard temperature and pressure	
BT	3-in. Tri Clamp	1, 7, 8	4A, 4B, 5A, 5B, 4S standard temperature and pressure	
CT	4-in. Tri Clamp	1, 7, 8	4A, 4B, 5A, 5B, 4S standard temperature and pressure	
Proprietary flanges		Material of construction	Operating temperature and pressure	
TF	Fisher - proprietary 316/316L (for 249B, 259B chambers) Torque Tube Flange	1, 7, 8	S, M, H, P, C	★
TT	Fisher - proprietary 316/316L (for 249C chambers) Torque Tube Flange	1, 7, 8	S, M, H, P, C	★
TM	Masoneilan - proprietary 316/316L Torque Tube Flange	1, 7, 8	S, M, H, P, C	★

Code	Description	
Special process connection		
XX	Special Process Connection	

(1) Design according to ASME B31.3. No code stamp or ASME certificate available.
(2) Forged one-piece flange provided for Standard (Std) seal together with Material of construction code 1, 7 or 8, and Probe type code 3A, 3B, 3V, 4A, 4B, 4U, 4S, 5A, or 5B. Welded construction provided for other combinations.
(3) Follows ISO 2852 standard.

Hazardous locations certifications

Code	Description	
NA	Not Applicable	★

A.9.2 Additional options

Hydrostatic testing

Available for tank connection with flange.

Code	Description	
P1	Hydrostatic testing, including certificate	★

Welding procedure qualification record documentation

Only applies to flanged process connections with welded construction or protective plate design.

Weldings in accordance with EN/ISO standards.

Code	Description	
Q66	Welding Procedure Qualification Record (WPQR)	★
Q67	Welder Performance Qualification (WPQ)	★
Q68	Welding Procedure Specification (WPS)	★

Material traceability certification

Certificate includes all pressure retaining wetted parts.

Code	Description	
Q8	Material traceability certification consistent with ISO10474-3.1:2013 / EN10204-3.1:2004	★

Positive material identification certificate

Code	Description	
Q76	Positive material identification certificate of conformance	★

Country certification

Code	Description	
J1	Canadian Registration Number (CRN)	★
J2[1]	ASME B31.1	★

(1) Design and manufacturing according to ASME B31.1. No code stamp or ASME certificate available. Welding in accordance with ASME IX.

Dye penetration test certificate

Only applies to flanged process connections with welded construction or protective plate design.

Code	Description	
Q73	Certificate of liquid penetrant inspection	★

Materials certification

Available for probe type 3A, 3B, 3C, 4A, 4B, 4S, and PTFE-coated 5A.

Code	Description	
N2	NACE® material recommendation per NACE MR0175/ISO 15156 and NACE MR0103/ISO 17945	★

Installation options

Code	Description	
LS[1]	Long stud 9.8 in (250 mm) for flexible single lead probe to prevent contact with wall/nozzle. Standard stud length is 3.9 in (100 mm) for probes 5A and 5B.Standard stud length is 5.9 in (150 mm) for probes 6A and 6B.	★
BR	316L Mounting Bracket for 1½-in. NPT Process Connection (RA)	
HS[2]	Heat sink	

(1) Not available with PTFE covered probes.
(2) Requires Remote housing code B3, and Probe type code 3V or 4U.

Related information

Dimensional drawings

Weight and anchoring options for flexible single probes

Code	Description	
W3	Heavy Weight (for most applications)	★
W2	Short Weight (when measuring close to the probe end)	

Related information

Dimensional drawings

Weight assembly options for flexible single probes

Code	Description	
WU	Weight or chuck not mounted on the probe	★

Proof Test Reflector

Only available with HART 4-20 mA output (code H), standard operating temperature and pressure (code S), material of construction (code 1), and flexible single lead probes (probe type 5A or 5B).

Code	Description	
HL1	Verification reflector for 3- to 6-in. pipe/chamber	
HL2	Verification reflector for 8-in. pipe/chamber	
HL3	Verification reflector for tanks and 10-in. or wider pipe/chamber	

Related information

Proof Test Reflector

Extended product warranty

Code	Description	
WR3	3-year limited warranty	★
WR5	5-year limited warranty	★

Centering discs

Code	Description	Outer diameter	
S2(1)	2-in. Centering disc	1.8 in. (45 mm)	★
S3(1)	3-in. Centering disc	2.7 in. (68 mm)	★
S4(1)	4-in. Centering disc	3.6 in. (92 mm)	★
P2(2)	2-in. Centering disc PTFE	1.8 in. (45 mm)	★
P3(2)	3-in. Centering disc PTFE	2.7 in. (68 mm)	★
P4(2)	4-in. Centering disc PTFE	3.6 in. (92 mm)	★
S6(1)	6-in. Centering disc	5.55 in. (141 mm)	
S8(1)	8-in. Centering disc	7.40 in. (188 mm)	
P6(2)	6-in. Centering disc PTFE	5.55 in. (141 mm)	
P8(2)	8-in. Centering disc PTFE	7.40 in. (188 mm)	

(1) Available for SST, Alloy C-276, Alloy 400, Alloy 825, and Duplex 2205 probes, type 4A, 4B, 4S, and 5A. Same disc material as probe material.

(2) Available for probe types 4A, 4B, 4S, and 5A. Not available with Operating Temperature and Pressure code H or Material of Construction codes 7 and 8.

Related information

Centering disc for pipe installations

Reference reflectors for dynamic vapor compensation probes

Required for probe type 3V and 4U.

Code	Description	
R1	Short reflector. Length=14 in. (350 mm)	

Code	Description	
R2	Long reflector. Length=20 in. (500 mm)	

Related information

Select reference reflector

Assemble/consolidate to chamber

Selecting the XC option code on the Rosemount 5300 and a Rosemount chamber will result in matching, consolidating, configuring, and shipping of the two products in one crate. Note that the flange bolts are only hand-tightened. Long rigid single lead probes (>8 ft./2.5 m) are ship separately in order to reduce transportation risk damage.

Code	Description	
XC	Consolidate to Chamber	★

Related information

Rosemount chamber

Specials

Code	Description	
RXXXX	Custom engineered solutions beyond standard model codes. Consult factory for details.	

Related information

Engineered solutions

A.10 Accessories

A.10.1 Weight kit

Item number	Description	
03300-7001-0003	Weight kit flexible 4 mm single lead	
03300-7001-0004	Weight kit flexible 6 mm single lead	

A.10.2 Centering discs for rigid single lead probe (d=0.3 in./8 mm)

If a centering disc is required for a flanged probe, the centering disc can be ordered with options Sx or Px in the model code. If a centering disc is required for a threaded connection, or as a spare part, it should be ordered using the item numbers listed in this table.

For other materials, consult the factory.

Item number	Description	Outer diameter	
03300-1655-0001	Kit, 2-in. Centering disc, SST	1.8 in. (45 mm)	★
03300-1655-0006	Kit, 2-in. Centering disc, PTFE	1.8 in. (45 mm)	★
03300-1655-0002	Kit, 3-in. Centering disc, SST	2.7 in. (68 mm)	★
03300-1655-0007	Kit, 3-in. Centering disc, PTFE	2.7 in. (68 mm)	★
03300-1655-0003	Kit, 4-in. Centering disc, SST	3.6 in. (92 mm)	★
03300-1655-0008	Kit, 4-in. Centering disc, PTFE	3.6 in. (92 mm)	★
03300-1655-0004	Kit, 6-in. Centering disc, SST	5.55 in. (141 mm)	
03300-1655-0009	Kit, 6-in. Centering disc, PTFE	5.55 in. (141 mm)	
03300-1655-0005	Kit, 8-in. Centering disc, SST	7.40 in. (188 mm)	
03300-1655-0010	Kit, 8-in. Centering disc, PTFE	7.40 in. (188 mm)	

Related information

Centering disc for pipe installations

A.10.3 Centering discs for rigid single lead probe (d=0.5 in./13 mm)

If a centering disc is required for a flanged probe, the centering disc can be ordered with options Sx or Px in the model code. If a centering disc is required for a threaded connection, or as a spare part, it should be ordered using the item numbers listed in this table.

For other materials, consult the factory.

Item number	Description	Outer diameter	
03300-1655-0301	Kit, 2-in. Centering disc, SST	1.8 in. (45 mm)	★
03300-1655-0306	Kit, 2-in. Centering disc, PTFE	1.8 in. (45 mm)	★
03300-1655-0302	Kit, 3-in. Centering disc, SST	2.7 in. (68 mm)	★

Item number	Description	Outer diameter	
03300-1655-0307	Kit, 3-in. Centering disc, PTFE	2.7 in. (68 mm)	★
03300-1655-0303	Kit, 4-in. Centering disc, SST	3.6 in. (92 mm)	★
03300-1655-0308	Kit, 4-in. Centering disc, PTFE	3.6 in. (92 mm)	★
03300-1655-0304	Kit, 6-in. Centering disc, SST	5.55 in. (141 mm)	
03300-1655-0309	Kit, 6-in. Centering disc, PTFE	5.55 in. (141 mm)	
03300-1655-0305	Kit, 8-in. Centering disc, SST	7.40 in. (188 mm)	
03300-1655-0310	Kit, 8-in. Centering disc, PTFE	7.40 in. (188 mm)	

Related information

Centering disc for pipe installations

A.10.4 Snap-on centering discs for flexible single lead probes

Maximum temperature for the snap-on centering discs is 392 °F (200 °C).

Item number	Description	
03300-1658-0001	Kit, 2- to 4-in. snap-on centering disc, PEEK, 1 pc	
03300-1658-0002	Kit, 2- to 4-in. snap-on centering disc, PEEK, 3 pcs	
03300-1658-0003	Kit, 2- to 4-in. snap-on centering disc, PEEK, 5 pcs	

A.10.5 Centering discs for flexible single lead probes

If a centering disc is required for a flanged probe, the centering disc can be ordered with options Sx or Px in the model code. If a centering disc is required for a threaded connection, or as a spare part, it should be ordered using the item numbers listed in this table.

For other materials, consult the factory.

Item number	Description	Outer diameter	
03300-1655-1001	Kit, 2-in. Centering disc, SST	1.8 in. (45 mm)	★
03300-1655-1006	Kit, 2-in. Centering disc, PTFE	1.8 in. (45 mm)	★
03300-1655-1002	Kit, 3-in. Centering disc, SST	2.7 in. (68 mm)	★
03300-1655-1007	Kit, 3-in. Centering disc, PTFE	2.7 in. (68 mm)	★
03300-1655-1003	Kit, 4-in. Centering disc, SST	3.6 in. (92 mm)	★
03300-1655-1008	Kit, 4-in. Centering disc, PTFE	3.6 in. (92 mm)	★
03300-1655-1004	Kit, 6-in. Centering disc, SST	5.55 in. (141 mm)	
03300-1655-1009	Kit, 6-in. Centering disc, PTFE	5.55 in. (141 mm)	
03300-1655-1005	Kit, 8-in. Centering disc, SST,	7.40 in. (188 mm)	
03300-1655-1010	Kit, 8-in. Centering disc, PTFE	7.40 in. (188 mm)	

Related information

Centering disc for pipe installations

A.10.6 Centering discs for mounting between segments (probe type 4S only)

Item number	Description	Outer diameter	
03300-1656-1002	2-in. Centering disc (1 pc), PTFE, Segmented rigid single lead	1.8 in. (45 mm)	
03300-1656-1003	3-in. Centering disc (1 pc), PTFE, Segmented rigid single lead	2.7 in. (68 mm)	
03300-1656-1004	4-in. Centering disc (1 pc), PTFE, Segmented rigid single lead	3.6 in. (92 mm)	
03300-1656-1006	6-in. Centering disc (1 pc), PTFE, Segmented rigid single lead	5.55 in. (141 mm)	
03300-1656-1008	8-in. Centering disc (1 pc), PTFE, Segmented rigid single lead	7.40 in. (188 mm)	
03300-1656-3002	2-in. Centering disc (3 pcs), PTFE, Segmented rigid single lead	1.8 in. (45 mm)	
03300-1656-3003	3-in. Centering disc (3 pcs), PTFE, Segmented rigid single lead	2.7 in. (68 mm)	
03300-1656-3004	4-in. Centering disc (3 pcs), PTFE, Segmented rigid single lead	3.6 in. (92 mm)	
03300-1656-3006	6-in. Centering disc (3 pcs), PTFE, Segmented rigid single lead	5.55 in. (141 mm)	
03300-1656-3008	8-in. Centering disc (3 pcs), PTFE, Segmented rigid single lead	7.40 in. (188 mm)	
03300-1656-5002	2-in. Centering disc (5 pcs), PTFE, Segmented rigid single lead	1.8 in. (45 mm)	
03300-1656-5003	3-in. Centering disc (5 pcs), PTFE, Segmented rigid single lead	2.7 in. (68 mm)	
03300-1656-5004	4-in. Centering disc (5 pcs), PTFE, Segmented rigid single lead	3.6 in. (92 mm)	
03300-1656-5006	6-in. Centering disc (5 pcs), PTFE, Segmented rigid single lead	5.55 in. (141 mm)	
03300-1656-5008	8-in. Centering disc (5 pcs), PTFE, Segmented rigid single lead	7.40 in. (188 mm)	

A.10.7 Segmented rigid single lead probe spare part kit

Item number	Description	
03300-0050-0001	15.2 in. / 385 mm Segment for Top connection (1 pc)	
03300-0050-0002	31.5 in. / 800 mm Segment (1 pc)	
03300-0050-0003	31.5 in. / 800 mm Segment (3 pcs)	
03300-0050-0004	31.5 in. / 800 mm Segment (5 pcs)	
03300-0050-0005	31.5 in. / 800 mm Segment (12 pcs)	

A.10.8 Vented flanges

1-½ in. NPT threaded connection (RA) is required.

Not available with Country certification option code J1 or J2.

Not available for Probe type code 3C.

Item number	Description	
03300-1812-0092	Fisher™ (249B, 259B), one ¼-in. NPT connection, 316/316L	
03300-1812-0093	Fisher (249C), one ¼-in. NPT connection, 316/316L	
03300-1812-0091	Masoneilan™, one ¼-in. NPT connection, 316/316L	

A.10.9 Flushing connection rings

Not available with Country certification option code J1 or J2.

Item number	Description	
DP0002-2111-S6	2-in. ANSI, one ¼-in. NPT connection, 316L	
DP0002-3111-S6	3-in. ANSI, one ¼-in. NPT connection, 316L	
DP0002-4111-S6	4-in. ANSI/DN100, one ¼-in. NPT connection, 316L	
DP0002-5111-S6	DN50, one ¼-in. NPT connection, 316L	
DP0002-8111-S6	DN80, one ¼-in. NPT connection, 316L	

A.10.10 HART modem and cables

Item number	Description	
03300-7004-0002	MACTek® VIATOR® HART Modem and cables (USB connection)	★
03300-7004-0001	MACTek VIATOR HART Modem and cables (RS232 connection)	★

A.10.11 Remote housing mounting spare part kit

Item number	Description	
03300-7006-0001	1 m / 3.2 ft. Remote Housing Mounting Cable and 316L Bracket	
03300-7006-0002	2 m / 6.5 ft. Remote Housing Mounting Cable and 316L Bracket	
03300-7006-0003	3 m / 9.8 ft. Remote Housing Mounting Cable and 316L Bracket	

A.10.12 Heat sink

Item number	Description	
05300-7001-0001	Heat sink	

A.10.13 Proof Test Reflector spare part kit

Requires Rosemount 5300 firmware version 2.H0 or later.

Item number	Description	
05300-7200-0001	For 3- to 8-in. pipe/chamber (inner diameter)	
05300-7200-0002	For tanks or 10-in. pipe/chamber (inner diameter) or wider	

B Configuration parameters

B.1 Menu tree

This section provides the menu tree structure with various configuration parameters for AMS Device Manager and handheld communicator:

Figure B-1: Menu Tree for Field Communicator – HART 5 (DD 0303)

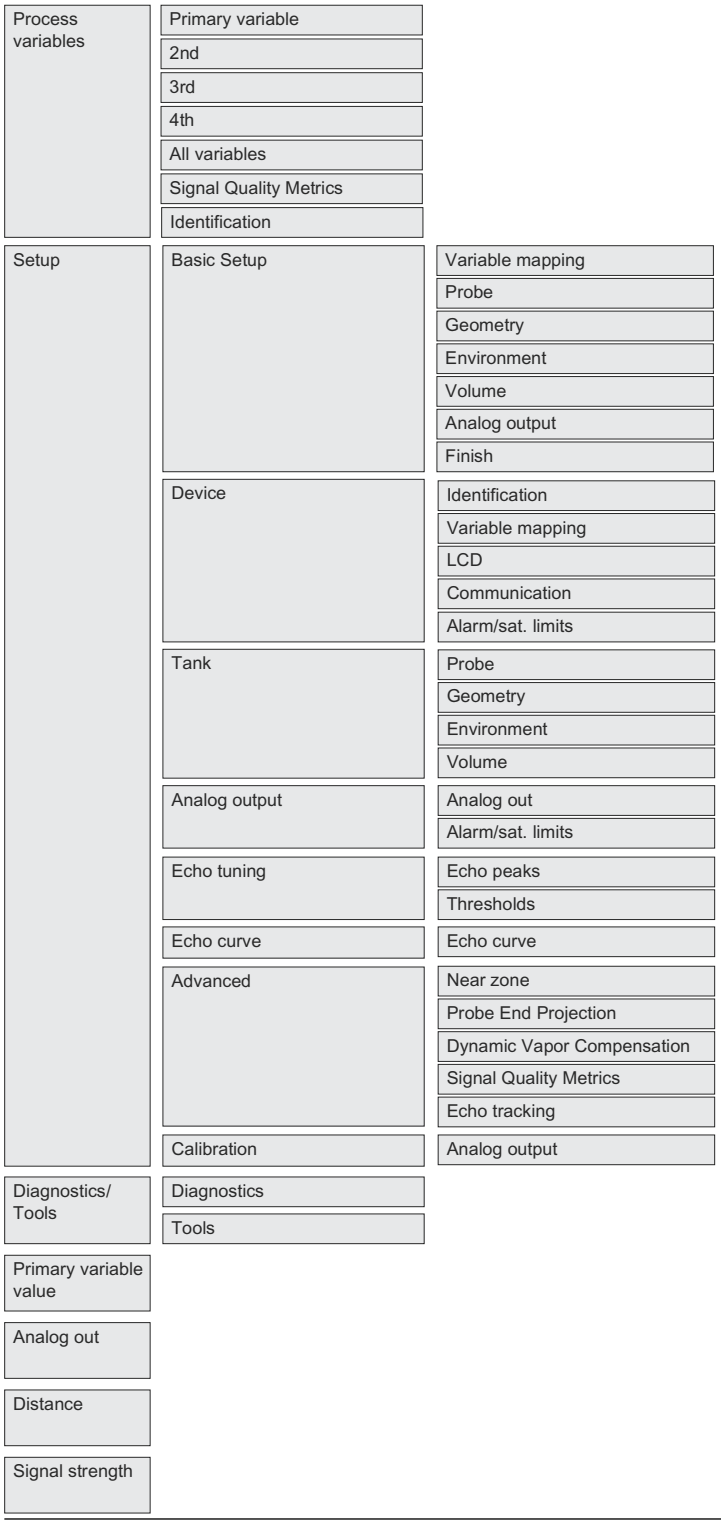
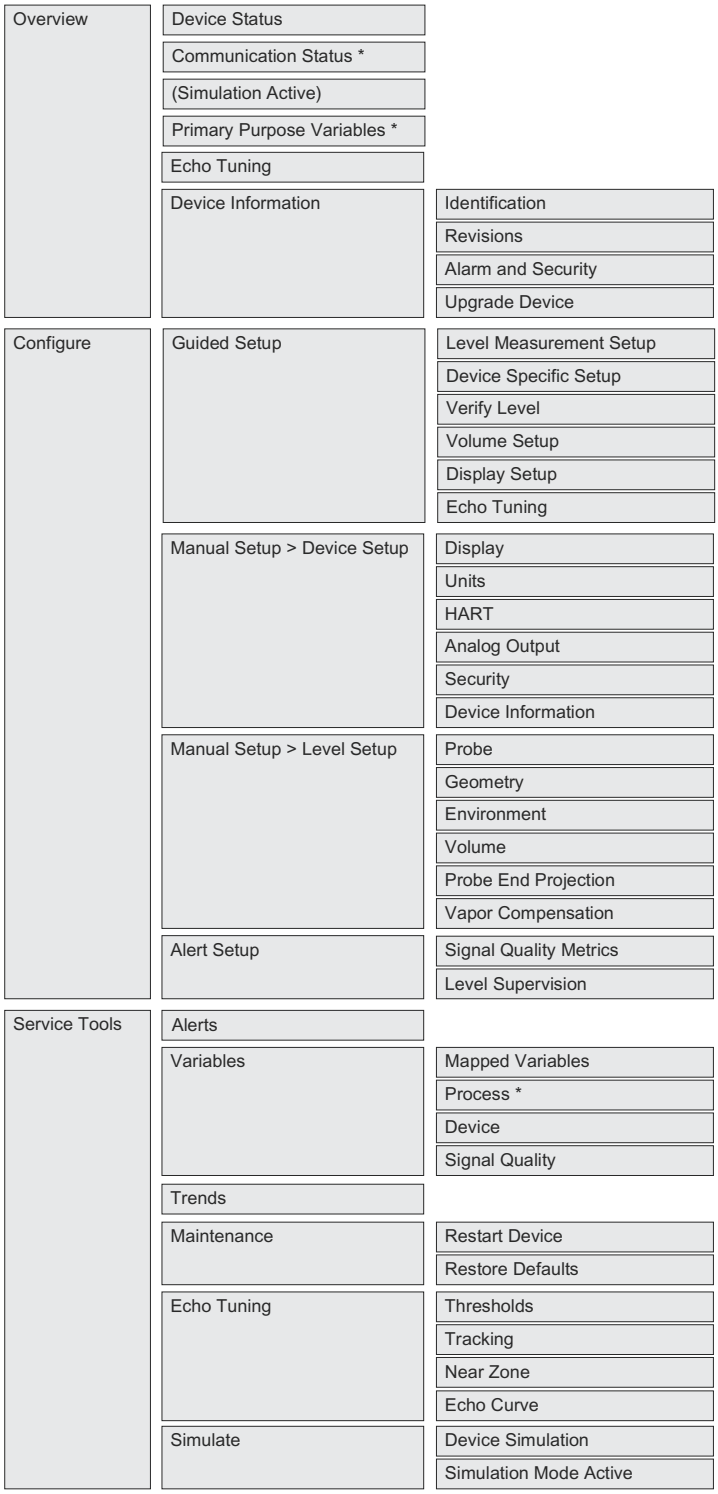
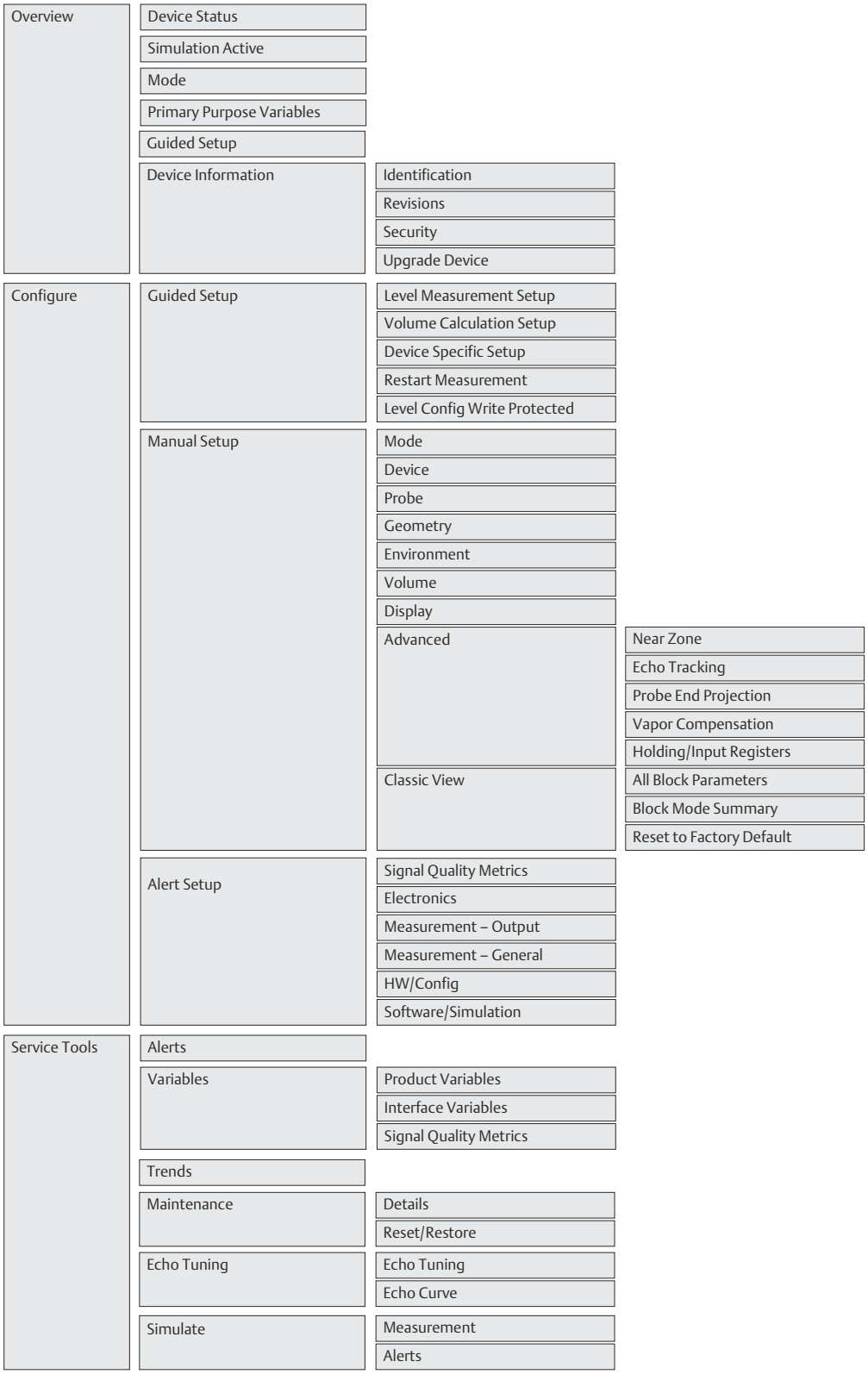


Figure B-2: Menu Tree for AMS Device Manager and Handheld Communicator – HART 5 (DD 0305) and HART 7 (DD 0404)



* HART7 only.

Figure B-3: Menu Tree for AMS Device Manager and Handheld Communicator – FOUNDATION™ Fieldbus (DD 0404)



B.2 Basic configuration parameters

This section describes basic configuration parameters for a Rosemount™ 5300 Level Transmitter. Basic configuration is only needed for the Rosemount 5300 Level Transmitters which are not pre-configured at the factory. Factory configuration is normally specified in the Configuration Data Sheet.

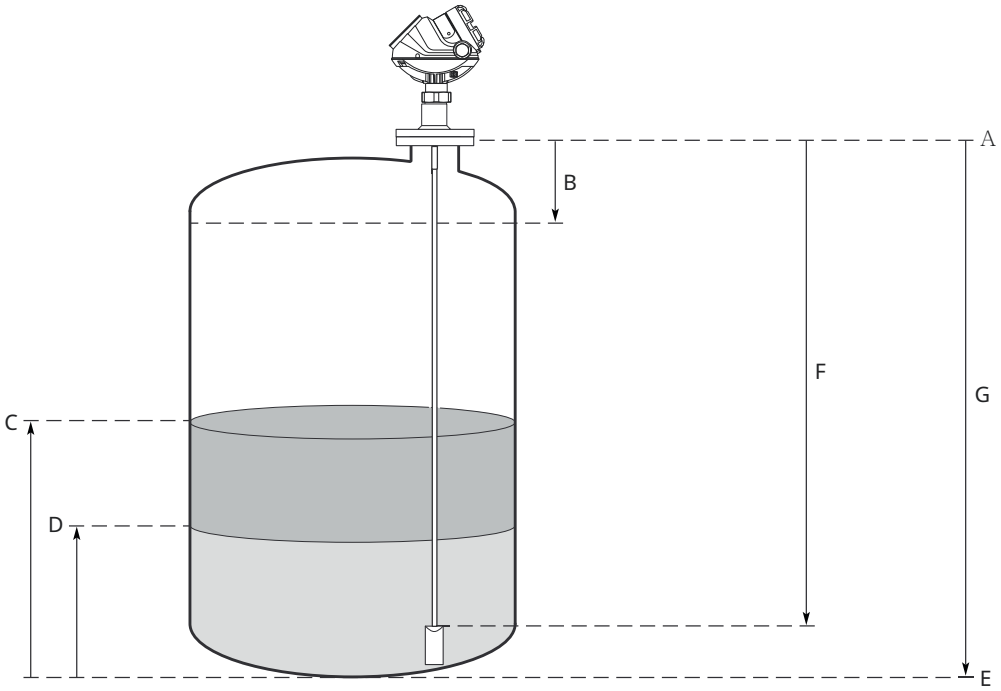
B.2.1 Measurement units

Measurement units can be specified for presentation of level/interface level, level rate, volume, and temperature values.

B.2.2 Tank and probe geometry

The basic transmitter configuration includes setting the tank geometry parameters.

Figure B-4: Tank Geometry

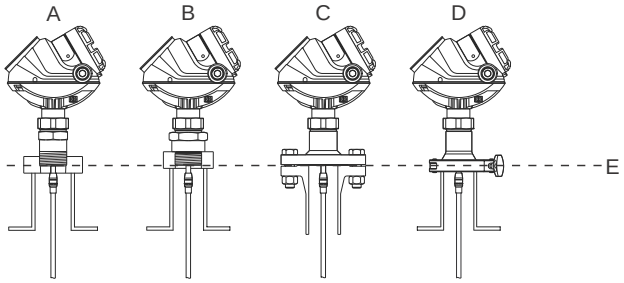


A. Upper reference point
B. Hold Off Distance/Upper Null Zone (UNZ)
C. Product level
D. Interface level
E. Zero reference point
F. Probe length
G. Tank height

Upper Reference Point

The Upper Reference Point is located at the underside of the threaded adapter, transmitter flange, or Tri Clamp®, as illustrated in Figure B-5.

Figure B-5: Upper Reference Point



A. NPT
B. BSPP (G)
C. Flange
D. Tri Clamp
E. Upper Reference Point

Tank height

The Tank Height is the distance from the Upper Reference Point to the bottom of the tank (Zero Reference Point). The transmitter measures the distance to the product surface and subtracts this value from the Tank Height to determine the level.

Ensure the Tank Height is as accurate as possible, since a Tank Height error results in a corresponding level value offset error.

When setting the Tank Height, keep in mind that this value is used for all level measurements performed by transmitter. The Tank Height must be set in linear (level) units, such as feet or meters, regardless of primary variable assignment.

Mounting type

Enter the type of mounting for the device. This configuration optimizes the device for the respective mounting type.

Table B-1: Mounting Types

Option	Description
Unknown	Default factory setting for mounting type, and can also be used if the mounting type is unknown.
Pipe/chamber	Select this option if the device is mounted on a chamber/ bridle or in a pipe. When selecting this alternative, enter the corresponding Inner Diameter as well.
Nozzle	Select this if the device is installed on a nozzle. When selecting this alternative, configure the Inner Diameter and the Nozzle Height as well.
Direct/bracket	When the device is mounted directly on the tank roof with no traditional nozzle, this is the alternative to use. With this selection, no inner diameter or height is required, thus those selections are disabled.

Inner diameter

Used with pipe, chamber, and nozzle installations.

Nozzle height

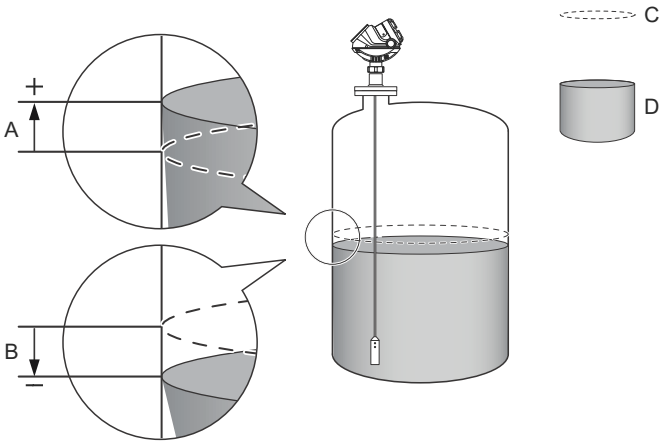
For nozzle installations

Calibration distance

Difference between surface distance measured by transmitter and the same distance measured by, for example, hand-dipping with a measurement tape. A positive Calibration Distance value will increase the presented level value.

It is recommended to run the Verify Level tool to match the product level reported by the transmitter to a reference measurement.

Figure B-6: Calibration Distance



A. Positive Calibration Distance value
B. Negative Calibration Distance value
C. Reported level
D. Actual level

Non-metallic (e.g. plastic) vessels and installation geometry may introduce an offset for the zero reference point. This offset may be up to ± 1 in. (25 mm). The offset can be compensated for by using Calibration Distance.

Related information

Run verify level

Probe length

The probe length is the distance between the Upper Reference Point and the end of the probe. If a weight is used at the end of the probe, it should not be included.

For flexible single lead probes anchored with chuck, the Probe Length should be configured as the distance from the Upper Reference Point to the top of the chuck.

For flexible single lead probes anchored with clamps, the Probe Length should be configured as the distance from the Upper Reference Point to the upper clamp.

This parameter is pre-configured at factory. The probe length must be changed if the probe is shortened, or if you have ordered a spare transmitter head.

Related information

Upper Reference Point

Anchor the probe

Probe type

The transmitter is designed to optimize measurement performance for each probe type. The transmitter automatically makes an initial calibration based on the type of probe that is used.

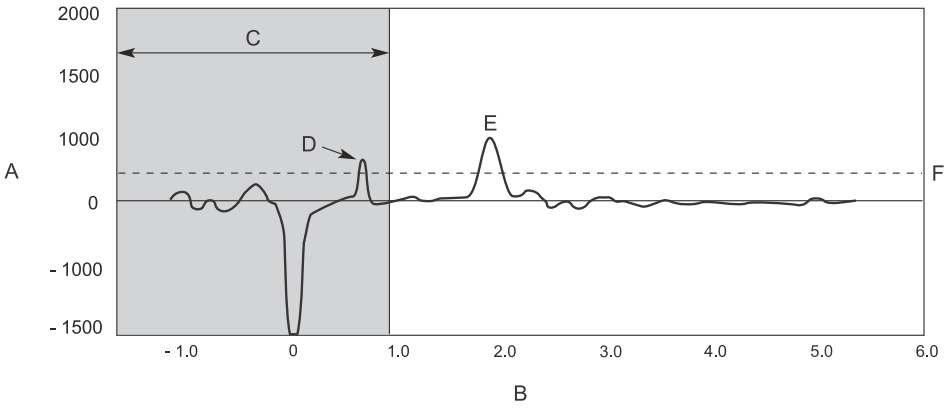
This parameter is pre-configured at factory and only needs to be set if the probe is changed to another type, or if you have installed a spare transmitter.

Select the type of probe that is mounted to the transmitter. Select User Defined probe if your probe can not be found in the list or if you have done modifications to a standard probe.

Hold off distance/upper null zone (UNZ)

The Hold Off Distance/UNZ defines how close to the device's Upper Reference Point a level value is accepted. You can extend Upper Null Zone to block out disturbing echoes close to the tank top, caused by for example a narrow nozzle with rough walls, obstacles close to the probe, or a nozzle that protrudes into the tank.

Figure B-7: Identifying the Hold Off Distance/UNZ in the Echo Curve Plot



A. Amplitude, mV
B. Distance, m
C. Hold Off Distance/UNZ
D. Disturbance
E. Surface peak
F. Surface Threshold

By adjusting the Hold Off Distance/UNZ, the measuring range is reduced. The Hold Off Distance/UNZ is equal to zero in the default configuration.

Related information

Change the hold off distance/upper null zone

B.2.3 Tank environment

Measurement mode

Normally, the measurement mode does not need to be changed. The transmitter is pre-configured according to the specified model:

Table B-2: List of Measurement Modes for Different Rosemount 5300 Models

Model	Measurement mode
Rosemount 5301	• Liquid product level (1) • Interface level with submerged probe
Rosemount 5302	• Liquid product level • Product level and interface level(1) • Interface level with submerged probe • Solid product level
Rosemount 5303	• Solid product level(1)

(1) Default setting.

The measurement mode Interface level with submerged probe is used for applications where the probe is fully submerged in liquid. In this mode, the transmitter ignores the upper product level. See Interface level with submerged probe for more information.

Note
Only use Interface level with submerged probe for applications where the interface is measured with a fully submerged probe.

Rapid level changes

Optimize the transmitter for measurement conditions where the level changes quickly due to filling and emptying of the tank. As a default standard, a Rosemount 5300 Level Transmitter is able to track level changes of up to 1.5 in./s (40 mm/s). When the Rapid Level Changes check-box is marked, the transmitter can track level changes of up to 8 in./s (200 mm/s).

The Rapid Level Changes check-box should not be used in normal conditions when the product surface moves slowly.

Product dielectric range

Note
Applicable to “Liquid Product Level” and “Solid Product Level” measurement modes.

Enter the range of the dielectric constant (DC) for the product in the tank. The selected range of dielectric constant is used for setting the automatically calculated amplitude thresholds.

Upper product dielectric constant

Note
Applicable to “Interface Level with submerged” and “Product Level and Interface Level” measurement modes.

The Upper Product Dielectric Constant (DC) should be entered as accurately as possible. The dielectric constant of the upper product is essential for calculating the interface level and the upper product thickness. In addition, this value is used for setting the automatically calculated amplitude thresholds.

If the dielectric constant of the lower product is significantly smaller than the dielectric constant of water, you may need to make special adjustments. The dielectric constant of water is 80.

Related information

Interface measurements
Example 2: Interface peak not found

Use the dielectric constant chart in Rosemount Radar Master

The Dielectric Constant Chart lists the dielectric constant of a large number of products.

Procedure

1. Select **Setup** → **Tank**.
2. Select the **Environment** tab.
3. Select the **Dielectric Constant Chart** button.



Use the upper product dielectric constant calculator in Rosemount Radar Master

The Upper Product Dielectric Constant Calculator lets you calculate the dielectric constant of the upper product based on the following input:

- Actual upper product thickness
- The dielectric constant value stored in the transmitter
- The upper product thickness presented by the transmitter

Procedure

1. Select **Setup** → **Tank**.
2. Select the **Environment** tab.
3. Select the **Upper Product Dielectric Constant Calculator** button.



B.2.4 Volume

Volume calculation method

Select if the volume measurement should be calculated from the configured tank dimensions or a strapping table.

Tank type

You can choose one of the following options:

- Strap table
- Vertical cylinder
- Horizontal cylinder
- Vertical bullet
- Horizontal bullet
- Sphere
- None

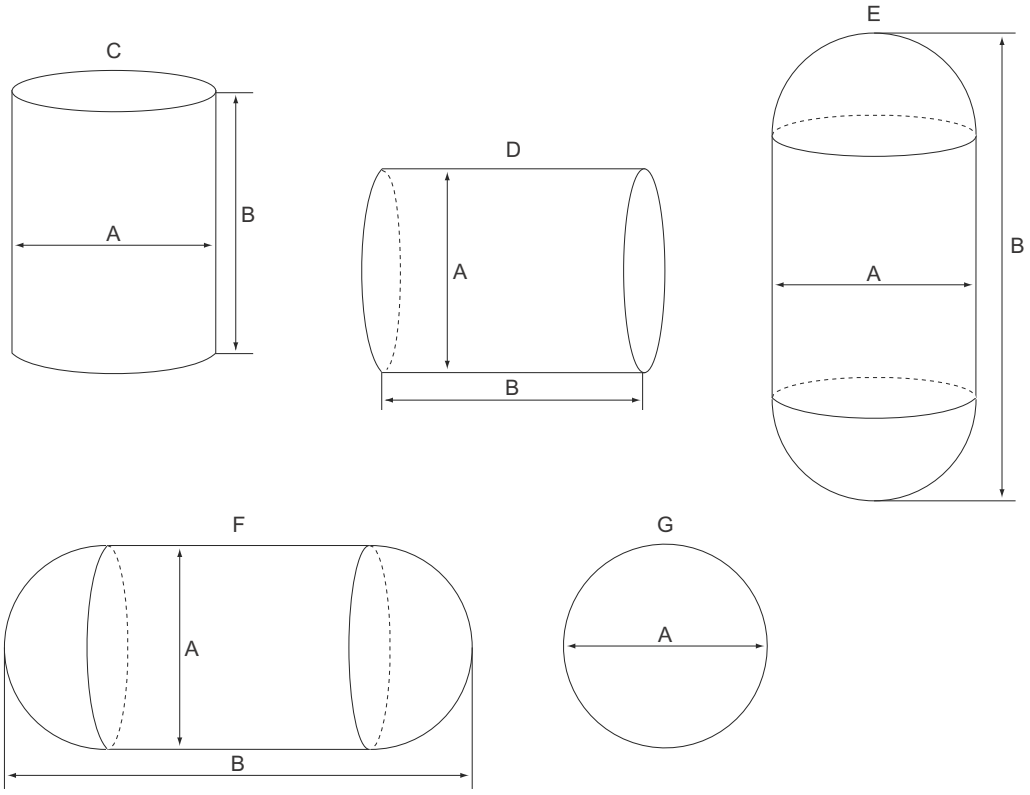
Strapping table

Strapping tables can be used for irregularly shaped tanks, to eliminate errors due to bulging when product is added to a tank, or if a pre-defined tank type does not provide sufficient accuracy.

Strapping table requires entering level-volume pairs in a table (maximum 20 points). Use most of the strapping points in regions where the tank shape is non-linear. Starting at the bottom of the tank, for each new point, enter the total volume up to the specified level value.

Standard tank shapes

Figure B-8: Standard Tank Shapes



A. Diameter
B. Height
C. Vertical cylinder
D. Horizontal cylinder
E. Vertical bullet
F. Horizontal bullet
G. Sphere

Vertical cylinder

Vertical cylinder tanks are specified by diameter, height, and volume offset.

Horizontal cylinder

Horizontal cylinders are specified by diameter, height, and volume offset.

Vertical bullet

Vertical bullet tanks are specified by diameter, height, and volume offset. The volume calculation model for this tank type assumes that the radius of the bullet end is equal to the diameter/2.

Horizontal bullet

Horizontal bullets are specified by diameter, height, and volume offset. The volume calculation model for this tank type assumes that the radius of the bullet end is equal to the diameter/2.

Sphere

Spherical tanks are specified by diameter and volume offset.

Volume offset

Use this parameter to add a volume to each calculated volume value, for example a sump volume below the Zero Level in the tank.

B.2.5 Analog output (HART®)

The output source (Primary Value), range values, and alarm mode are specified for the analog output.

Output source/primary variable

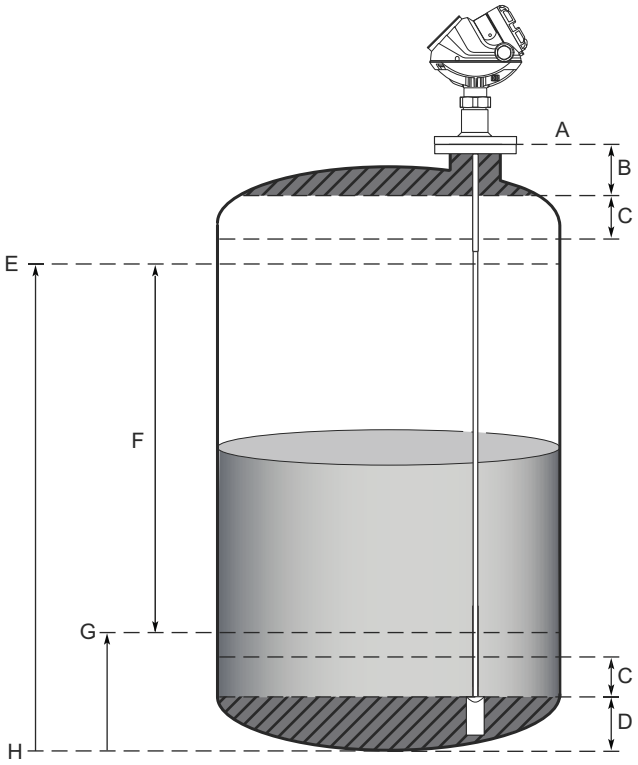
Specify the source to control the analog output. Typically, the Primary Value is configured to be the product level.

For Rosemount 5300 with Modbus protocol, ensure the measurement unit of the Primary Variable (PV) , matches the configuration of the Modbus Host since the transmitter output value does not include any information on associated measurement units.

Upper/lower range value

Enter the range values that correspond to the analog output values 4 and 20 mA. If a measured value goes beyond the measurement range, the transmitter enters saturation mode (limit alarm is disabled) or alarm mode depending on the current configuration.

Figure B-9: Example of Range Value Settings



A. Upper Reference Point
B. Upper Blind Zone
C. Reduced accuracy
D. Lower Blind Zone
E. 20 mA, Upper Range Value = 100%
F. Range 0 -100 %
G. 4 mA, Lower Range Value = 0%
H. Zero Reference Point (Level=0)

Note
Measurements may not be possible in the Blind Zones, and measurements close to the Blind Zones will have reduced accuracy. Therefore, the 4-20 mA points should be configured outside these zones.

Also ensure the 20 mA value is below the Hold Off Distance/Upper Null Zone (UNZ).

Alarm mode

The alarm mode specifies the analog output state when there is a failure or a measurement error:

Table B-3: Alarm Modes

Option	Description
High	The output current is set to the high alarm limit.
Low	The output current is set to the low alarm limit

Table B-3: Alarm Modes *(continued)*

Option	Description
Freeze current	The output current is set to the last valid value at the time when the error occurs.

Default settings for alarm mode:

- Measurement errors: output current = high
- Measured value out of range: transmitter enters saturation mode (if limit alarm is disabled).

Table B-4: Analog Output: Standard Alarm Values vs. Saturation Values

Level	4–20 mA saturation values	4–20 mA alarm value
Low	3.9 mA	3.75 mA
High	20.8 mA	21.75 mA

Table B-5: Analog Output: NAMUR-Compliant Alarm Values vs. Saturation Values

Level	4–20 mA saturation values	4–20 mA alarm value
Low	3.8 mA	3.6 mA
High	20.5 mA	22.5 mA

C Advanced configuration

C.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises ⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Failure to follow safe installation and servicing guidelines could result in death or serious injury.

Ensure the transmitter is installed by qualified personnel and in accordance with applicable code of practice.

Use the equipment only as specified in this manual. Failure to do so may impair the protection provided by the equipment.

Do not perform any services other than those contained in this manual unless you are qualified.

⚠ WARNING

Explosions could result in death or serious injury.

Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

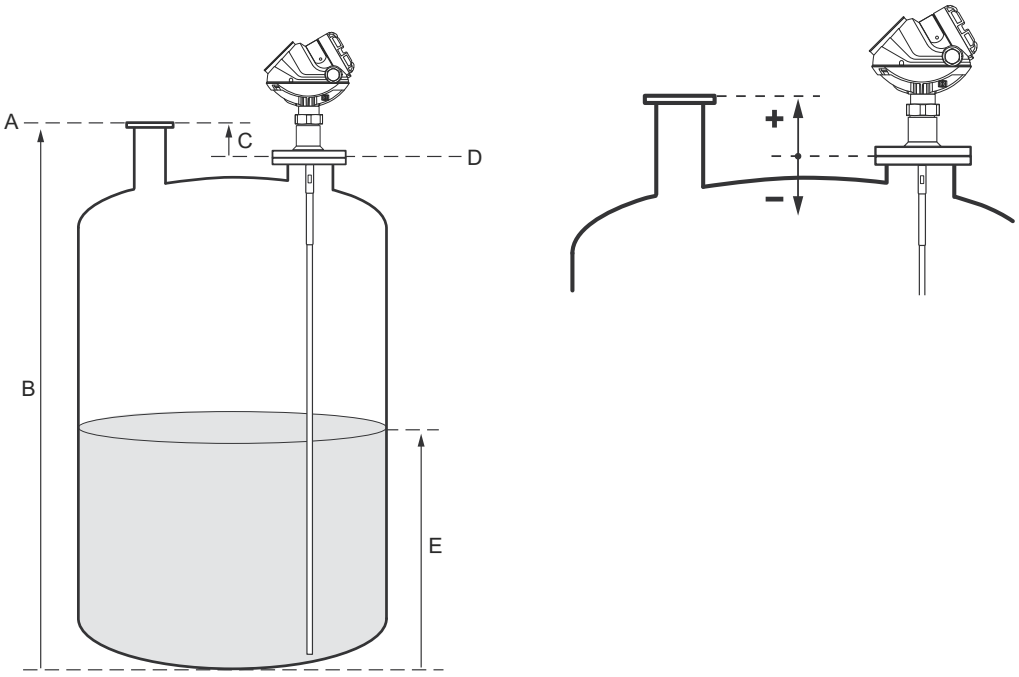
Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.

Do not remove the gauge cover in explosive atmospheres when the circuit is alive.

C.2 Set user defined upper reference point

An Upper Reference Point other than the standard Transmitter Reference Point can be specified by setting the Distance Offset parameter as illustrated in Figure C-1.

Figure C-1: Specify Upper Reference Point Using Distance Offset Parameter



A. Upper Reference Point
B. Tank Height
C. Distance Offset
D. Transmitter Reference Point
E. Product Level

Procedure

1. Adjust the Tank Height to the distance from the tank bottom to the desired Upper Reference Point.
2. Add the distance between the Upper Reference Point and the Transmitter Reference Point to the Distance Offset value that is stored in the transmitter database.
   a) FDI/DD/DTM: Select **Configure** → **Manual Setup** → **Level Setup**.
   Rosemount Radar Master: Select **Setup** → **Tank**.
   b) FDI/DD/DTM: Select the **Geometry** tab.
   Rosemount Radar Master: Select the **Geometry** tab, and click the **Advanced** button.
   c) In the ***Distance Offset*** (G) box, type the desired value.

C.3 Probe end projection

Probe End Projection is used for two purposes:

- Use the probe end echo as reference, in case the surface echo is lost, to calculate the surface echo position.

- Use the probe end echo as reference when the surface echo is close to the probe end to enhance accuracy of the surface echo position.

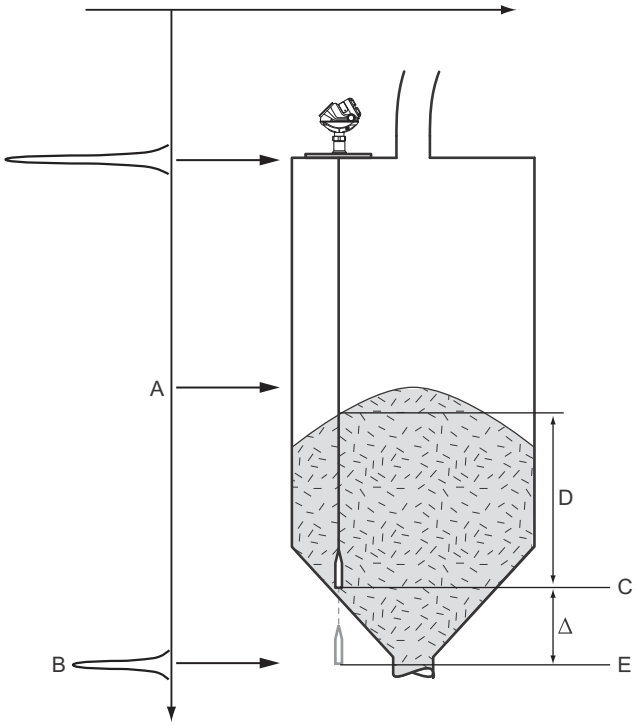
By using the Probe End Projection function, the device is capable of measuring the product level even if the surface echo is lost. The Probe End Projection is suited for challenging applications with very poor reflectivity (low dielectric constant). Due to the poor reflectivity of the product, situations may occur where the surface pulse is invisible to the transmitter at long measuring ranges.

If the surface becomes invisible, the device will revert to use the probe end, and the most recently estimated value of the dielectric constant to calculate the surface. Once the surface reappears, the device will immediately use direct measurement on the surface again. The calculated surface value is less accurate than the value with direct measurement.

When the microwaves emitted by the Rosemount 5300 Transmitter propagate through the product in the tank, the probe end echo appears to be located below the actual probe end. The apparent displacement of the probe end echo peak is a consequence of the reduced propagation speed of the measurement signal through the product compared to the speed through air. The displacement of the probe end pulse can be observed by using the Echo Curve Analyzer in the Rosemount Radar Master (see Use the echo curve analyzer in RRM).

For products with very low dielectric constants the product surface level can be determined by comparing the actual probe end position as given by the Probe Length value, with the apparent position of the probe end echo peak. The difference is related to the properties of the product, i.e. the Dielectric Constant, and the distance D travelled by the measurement signal through the product, see Figure C-2.

Figure C-2: The Probe End Projection Function



The product Level is given by the relation between Probe End displacement Δ, the Dielectric Constant of the product, and distance D.

A. Surface pulse is missing due to low product reflectivity
B. Probe End pulse
C. Actual Probe End position
D. Distance
E. Apparent Probe End position

Note
It is important that the Probe Length and product Dielectric Constant are given with high accuracy.

C.3.1 Setup the probe end projection

Prerequisites

Note
Assure that the Mounting Type, Probe Type, and Probe Length have been assigned correct values before configuring the Probe End Projection.

Note
This function is only available for liquid/solid product level measurement modes (i.e. not available for interface or fully submerged interface measurement modes) and a well defined probe end echo (i.e. ensure that the probe end/centering disc/weight is either always in contact with the tank wall or never in contact with the tank wall).

Probe End Projection can be configured using a guide. When the tank is empty, the guided setup will be able to accurately calibrate probe end offset and probe end pulse polarity.

You will be asked to insert an initial value for the Product DC. This is the value for the product dielectric constant that the device uses as a start point for estimation. This value must be as accurate to the actual value of the dielectric constant as possible.

When the tank is filled, the guided setup will be able to estimate the Product DC. This value is used as an initial value for future estimation of the Product DC.

For best performance, complete the guided setup with an empty tank and then a second time with a filled tank, but do not overwrite the empty tank calibration.

Procedure

1. FDI/DD/DTM: **Configure** → **Manual Setup** → **Level Setup**.
   Rosemount Radar Master: Select **Setup** → **Advanced**.
2. Select the **Probe End Projection** tab.
3. Select **Guided Probe End Projection Setup** and follow the on-screen instructions.

Optional configurations

DC estimation limit

This is a limit for the product dielectric constant estimation. The limit is a percentage, saying how much the estimated product DC is allowed to differ from the initial product DC value. If the estimation goes outside this limit, a warning will be generated.

Used product DC

This is the estimated product dielectric constant that the device will use for Probe End Projection.

Reset DC estimation

Resets DC estimation to the configured initial value, forcing the device to start over estimating the product DC.

Use static product DC

Check this setting if you do not want the device to estimate the product DC. This will force the device to use the configured initial product DC.

C.4 Adjust the echo tracking settings

Measurement with the Rosemount 5300 is based on the fact that the radar signal pulses are reflected by the product surface. Different parameters are used to track the measurement signal to achieve a reliable and stable measurement. Normally, the echo tracking parameters are automatically set by the transmitter, and no manual settings are needed. However, due to the properties of the product, in rare cases it may be necessary to adjust the echo tracking settings for optimum measurement performance.

Procedure

1. FDI/DD/DTM: Select **Service Tools** → **Echo Tuning**.
   Rosemount Radar Master: Select **Setup** → **Advanced**.
2. FDI/DD/DTM: Select the **Tracking** tab.
   Rosemount Radar Master: Select the **Echo Tracking** tab.
3. To adjust the echo tracking settings, clear the **Use automatic echo tracking settings** checkbox.
4. Set **Echo Timeout** and **Close Distance** to the desired values.

5. FDI/DD/DTM: Select **Send**.
   Rosemount Radar Master: Select **Store**.

C.4.1 Use automatic echo tracking settings

When this check-box is selected, the transmitter automatically sets the echo tracking parameters to a constant value based on the configured tank environment and measurement mode.

C.4.2 Echo time out

This parameter defines the time in seconds before the device should start to search for a surface echo outside the Close Distance window after it was lost. After an echo was lost, the device does not start searching (or set Invalid Level) until the specified time has elapsed. In some applications, especially with solid products or applications with foam, the surface echo may disappear for periods of time. This value can be increased to prevent the device from entering alarm mode too early after the surface is lost.

C.4.3 Close distance

The Close Distance defines a window centered at the current surface position where new surface echo candidates can be selected. The size of the window is ±Close Distance. Echoes outside this window will not be considered as surface echoes. The device will without delay jump to the strongest echo within this window. This value can be increased if there are rapid level changes in the tank. If the value is too large the device might select an invalid echo as the surface echo.

C.4.4 Damping value

This parameter defines how fast the transmitter reacts to a change of the level value (step response). The default value is 2 seconds.

A high value makes the level reading steady, while a low value allows the transmitter to respond to rapid level changes (but the presented level value may be less steady).

C.5 Dielectric constant settings

C.5.1 Vapor dielectric constant

In some applications, there is heavy vapor above the product surface having a significant influence on the level measurement. In such cases the vapor dielectric can be entered to compensate for this effect.

The default value is equal to 1, which corresponds to the dielectric constant of vacuum. Normally this value does not need to be changed since the effect on measurement performance is very small for most vapors.

For applications with a varying pressure and/or temperature, certain models of the Rosemount 5300 Level Transmitter have a built-in function that automatically compensates for varying vapor dielectric constants.

C.5.3 Adjust the vapor dielectric constant using FDI/DD/DTM

Procedure

1. Select **Configure** → **Manual Setup** → **Level Setup**.
2. Select the **Environment** tab.
3. Select the **Advanced Environment Options** button.
4. In the *Vapor Dielectric Constant* box, enter the desired value.

C.5.4 Adjust the vapor dielectric constant using RRM

Procedure

1. Select **Setup** → **Tank**.
2. Select the **Environment** tab.
3. Select the **Advanced** button for more options.
4. In the *Vapor Dielectric Constant* box, the desired value. You may also use the Vapor Dielectric Calculator or the Vapor Dielectric Chart to find the correct value.

C.5.5 Adjust the lower product dielectric range using FDI/DD/DTM

If the dielectric constant of the lower product is significantly smaller than the dielectric constant of water, you may need to adjust the Lower Product Dielectric Range.

Prerequisites

Special adjustments can also be made by trimming the appropriate amplitude thresholds. See Example 2: Interface peak not found for further information.

Procedure

1. Select **Configure** → **Manual Setup** → **Level Setup**.
2. Select the **Environment** tab.
3. Select the **Advanced Environment Options** button.
4. In the *Lower Product Dielectric Range* list, select the desired range.

C.5.6 Adjust the lower product dielectric range using RRM

If the dielectric constant of the lower product is significantly smaller than the dielectric constant of water, you may need to adjust the Lower Product Dielectric Range.

Prerequisites

Special adjustments can also be made by trimming the appropriate amplitude thresholds. See Example 2: Interface peak not found for further information.

Procedure

1. Select **Setup** → **Tank**.
2. Select the **Environment** tab.
3. Select the **Advanced** button for more options.
4. In the *Lower Product Dielectric Range* list, select the desired range.

C.6 Dynamic Vapor Compensation

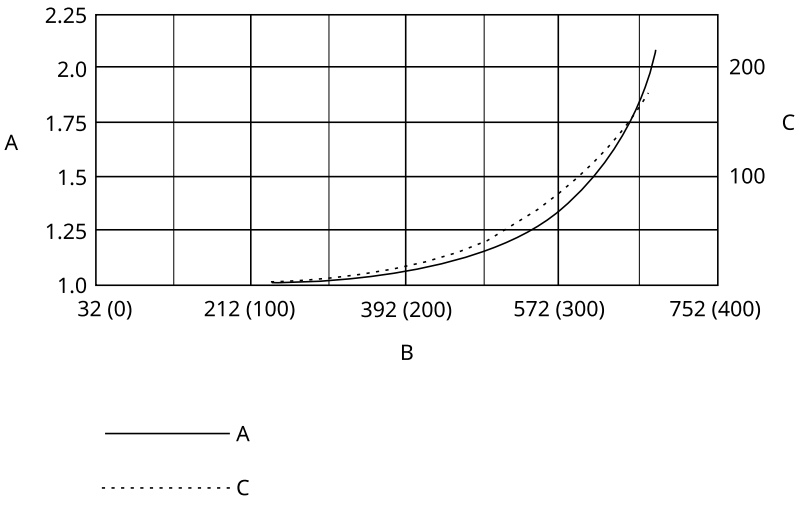
Rosemount 5300 Level Transmitter is based on the Time Domain Reflectometry (TDR) technology where low power nanosecond microwave pulses are guided down a probe submerged in the process media. When a radar pulse reaches a media with a different dielectric constant, part of the energy is reflected to the transmitter. The time difference between the transmitted pulse and the reflected pulse is converted into a distance from which the total level or interface level is calculated.

For radar level gauging, the actual measured quantity is the propagation time through the empty space between the radar level transmitter and the liquid surface. For typical radar level transmitter accuracy, the propagation speed of the radar signal should be close to the velocity of light in vacuum. However, in some important cases, the deviation is not negligible and must be taken into account for accuracy. High tank pressure in combination with certain gases is an example.

High pressure water steam can influence radar level transmitter measurements. This is due to the high pressure as well as the polar structure of water molecules. In such cases, the Rosemount 5300 Level Transmitter can be configured for compensation for this effect.

Water has high critical temperature and pressure (705 °F / 374 °C and 3205 psi / 221 bar, respectively). However, Dynamic Vapor Compensation has a maximum temperature and pressure of 676 °F / 358 °C and 2610 psi / 180 bar. Above these limits, level measurement may not be possible since the separation between gas and liquid becomes indistinct.

In a closed vessel containing water liquid and water vapor, existing databases (referred to as a Mollier diagram) have been used to calculate pressure and vapor density, and deduce the dielectric constant of the vapor from this. The dielectric constant changes as given in Figure C-3.



A. Dielectric constant
B. Temperature (°F/°C)
C. Pressure (bar)

The standard version of a Rosemount 5300 Level Transmitter can be configured for static compensation of vapor by manually entering the dielectric constant of vapor. For applications with a varying pressure and/or temperature, certain models of the

Rosemount 5300 have a built-in function (Dynamic Vapor Compensation) that automatically compensates for varying vapor dielectric constants.

The Rosemount 5300 uses a reference reflector mounted on the probe at a certain distance to estimate the dielectric constant of the vapor. The transmitter knows where the reference reflector pulse should have been if there were no vapor present. However, since there is vapor in the tank, the reference reflector pulse will appear beyond the actual reflector point. The distance between the actual reflector point and the apparent reflector point will be used to calculate the vapor dielectric constant. The calculated dielectric constant is then dynamically used to compensate for changes in vapor dielectric constant, resulting in a final accuracy down to ± 2% of measured distance (ullage). The accuracy may be reduced to ± 6% in certain conditions, such as rapid changes in temperature, pressure, and dielectric constant.

C.6.1 Check if Dynamic Vapor Compensation function is supported in model code

To check if the Dynamic Vapor Compensation function is supported:

Procedure

Check that 3V or 4U is mentioned in the model code on the transmitter head.

Model Code: 530xxxxxxx3Vxxxxxxxxx or 530xxxxxxx4Uxxxxxxxxx

C.6.2 Check if Dynamic Vapor Compensation function is supported using FDI/DD/DTM

Prerequisites

Note
Vapor compensation is supported for Product Level measurement mode only.

Procedure

1. Select **Overview** → **Device Information**.
2. Select the **Upgrade Device** tab.
3. Check that the **Diagnostics Suite** check box is selected in the *Available Hardware/ Software Options* list.

C.6.3 Check if Dynamic Vapor Compensation function is supported using RRM

Prerequisites

Note
Vapor compensation is supported for Product Level measurement mode only.

Procedure

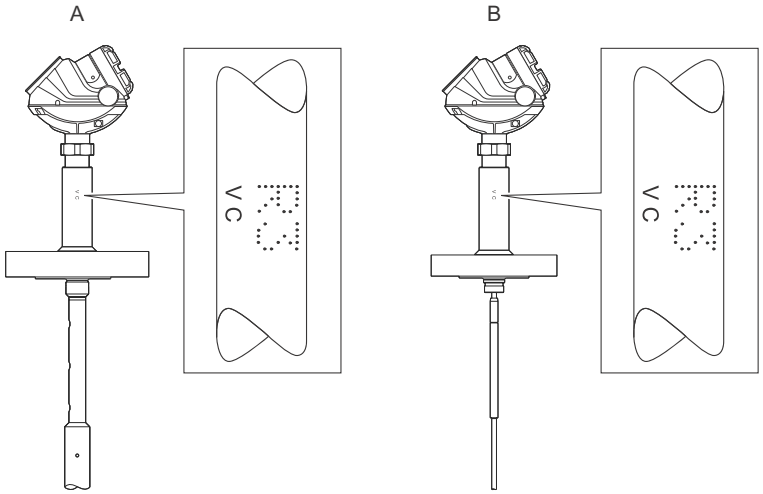
1. Start Rosemount Radar Master and connect to device.
2. Right-click on the device and select **Properties**.
3. Check that “Vapor Compensation” is mentioned in the *Device Software Configuration 2* list.

C.6.4 Review installation guidelines

The following installation guidelines should be considered when mounting the transmitter:

- Only probe type 3V or 4U must be used. Check the “VC” and “R3” marking on the seal.

Figure C-4: “VC” and “R3” Marking



A. Probe type 3V (coaxial) for 3-4 in. chambers
B. Probe type 4U (rigid single) for 2 in. chambers

- The maximum probe length is 13 ft. 1 in. (4 m) for probe type 3V and 9 ft. 10 in. (3 m) for probe type 4U.
- Pipe/Chamber is the only supported mounting type. See below for supported pipe inner diameters:

Probe type	Chamber size	Supported pipe inner diameter
3V	3 to 4 in.	Minimum 2 in. (50 mm)
4U	2 in.	1.5 to 2.05 in. (38 to 52 mm)

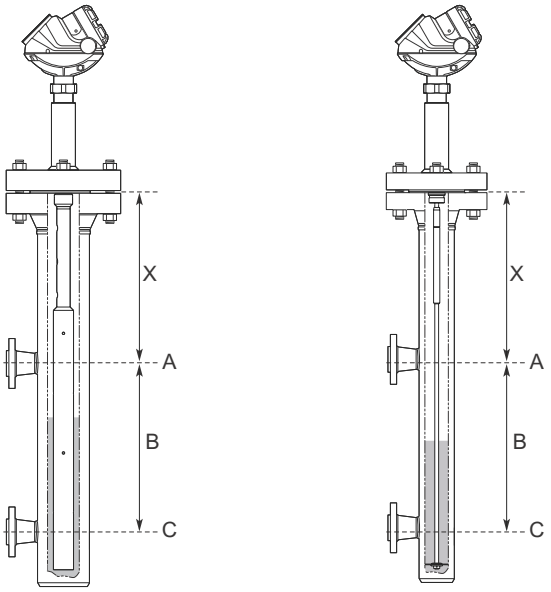
- Probe End Projection is disabled when Vapor Compensation is enabled.
- Trim Near Zone shall not be used when Dynamic Vapor Compensation is used.
- Dynamic Vapor Compensation requires a minimum distance X from the flange to the surface level to measure the change in the vapor dielectric constant. If the level rises within this area, the unit switches over to static compensation, using the last known vapor dielectric constant.

Table C-1: Minimum Distance X

Reference reflector type		Minimum distance X
Length	**Option code (1)**	
Short, 14 in. (350 mm)	R1	22 in. (560 mm)
Long, 20 in. (500 mm)	R2	28 in. (710 mm)

(1) Check model code on the transmitter label.

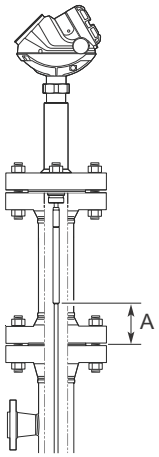
Figure C-5: Minimum Distance X and Minimum Measuring Span



A. Level: 100%
B. Minimum measuring span: 12 in. (300 mm)
C. Level: 0%

- The minimum measuring span for the Dynamic Vapor Compensation functionality is 12 in. (300 mm).
- The long reflector, 20 in. (500 mm), has the best accuracy and is recommended for all chambers where the dimensions of the chamber allow for it.
- If the distance from the flange to the upper inlet is less than 28 in. (710 mm), the short reflector should be chosen. This distance is a minimum when dynamic compensation is required within the whole measuring range from the lower to the upper inlet. If this is not required, the long reflector can be used and dynamic compensation is possible up to 28 in. (710 mm) from the flange.
- If a Rosemount 5300 GWR transmitter is ordered from Rosemount together with a Rosemount 9901 Chamber, these space requirements are met by using the option code G1 or G2 for the chamber. G1 is used with the short reference reflector and G2 is used with the long reference reflector.
  If an existing chamber is used, which does not meet these space requirements, a spool piece can be added. For the 4U probe, the spool piece needs to be at least 2 in. (50 mm) longer or shorter than the reference reflector, to ensure that there are no disturbances from welds close to the reference reflector end. For a spool piece with the 3V probe, this is not a requirement.

Figure C-6: Spool Piece Requirement for the 4U Probe



A. For the 4U probe, the spool piece needs to be at least 2 in. (50 mm) longer or shorter than the reference reflector.

C.6.5 Calibrate Dynamic Vapor Compensation function

Check if calibration is needed on-site

Type	Action
Probe type 3V (coaxial) with/without remote housing	The Dynamic Vapor Compensation function of this Rosemount 5300 Level Transmitter has been calibrated at factory. Calibration is only needed if: • The transmitter is reset to factory settings. Reset removes pre-calibration of the Dynamic Vapor Compensation function. • A spare or replacement Rosemount 5300 Transmitter head is mounted on the supplied Dynamic Vapor Compensation probe.
Probe type 4U (rigid single)	Calibration is always needed on-site during the commission phase.

Note
When installing a device with Dynamic Vapor Compensation, do not upload a backup file from another device.

Perform calibration using FDI/DD/DTM

Prerequisites

- The surface level must be at least 20 in. (0.5 m) below the end of the reference reflector. (It is recommended to empty the chamber.)
- Perform the calibration at ambient pressure and temperature conditions (i.e. when the vapor dielectric constant is close to one).
- When using remote housing, confirm it is fully assembled before calibrating the Vapor Compensation function.

Procedure

1. Verify the basic configuration for device has been performed.
2. Ensure the correct probe type is selected.
   a) HART®: Select **Configure** → **Manual Setup** → **Level Setup**.
   FOUNDATION™ Fieldbus: Select **Configure** → **Manual Setup**.
   b) Select the **Probe** tab.
   c) In the *Probe type* list, select **Coaxial HTHP** for probe type 3V or **Rigid Single HTHP 0.3″ (8mm)** for probe type 4U.
   d) Select **Send**.
3. Check that Mounting Type is set to Pipe/Chamber and select inner diameter.
   a) HART: Select **Configure** → **Manual Setup** → **Level Setup**.
   FOUNDATION Fieldbus: Select **Configure** → **Manual Setup**.
   b) Select the **Geometry** tab.
   c) In the *Mounting Type* list, select **Pipe/Chamber**.
   d) In the *Inner Diameter, Pipe/Chamber/Nozzle* list, select the corresponding inner diameter.
   e) Select **Send**.
4. HART: Select **Configure** → **Manual Setup** → **Level Setup**.
   FOUNDATION Fieldbus: Select **Configure** → **Manual Setup** → **Advanced**.
5. HART: Select the **Vapor Compensation** tab.
   FOUNDATION Fieldbus: Select the **Vapor Compensation Setup** button.
6. In the *Reference Reflector Type* list, select reference reflector as appropriate, and then select **Next**.

Option	Description
Coax, l=350 mm (RR B3 in old DD versions)	Use this option for probe type 3V with short reflector
Coax, l=500 mm (RR B4 in old DD versions)	Use this option for probe type 3V with long reflector
d=13 mm, l=350 mm (RR A6 in old DD versions)	Use this option for probe type 4U with short reflector
d=13 mm, l=500 mm (RR B2 in old DD versions)	Use this option for probe type 4U with long reflector

7. HART: Select the **Use Vapor Compensation** checkbox, and then select **Send**.
   FOUNDATION Fieldbus: In the *Use Vapor Compensation* list, select **Yes**, and then select **Next**.

8. Select the **Calibrate Vapor Compensation** button and follow the on-screen instructions.

   Note
   When the Dynamic Vapor Compensation function has been calibrated, ensure the Probe Type, Mounting Type, Inner Diameter, Reference Reflector Type, and remote connection (if used) remain set as they were during calibration.

   If changing the configuration of these parameters, the Dynamic Vapor Compensation function will be deactivated, and the device error "Vapor Compensation Not Factory Calibrated" appears. Correct the parameter that has been changed, and restart the device.

9. When the calibration is finished, restart the device.
   a) Select **Service Tools** → **Maintenance**.
   b) (FOUNDATION Fieldbus only) Select the **Reset/Restore**.
   c) Select **Restart Device**.

Postrequisites

Verify the echo peak from the reference reflector is marked in the echo curve plot.

Related information

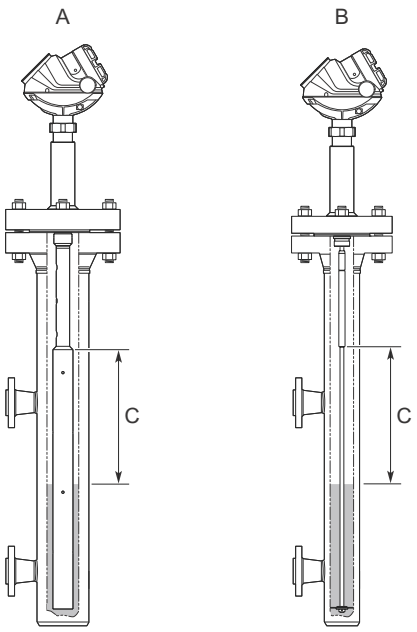
Verify the echo peak from the reference reflector using RRM

Perform calibration using RRM

Prerequisites

- The surface level must be at least 20 in. (0.5 m) below the end of the reference reflector. (It is recommended to empty the chamber.)

Figure C-7: Surface Level



A. Probe type 3V for 3- to 4-in. chambers
B. Probe type 4U for 2-in. chambers
C. Minimum 20 in. (0.5 m)

- Perform the calibration at ambient pressure and temperature conditions (i.e. when the vapor dielectric constant is close to one).
- When using remote housing, confirm it is fully assembled before calibrating the Vapor Compensation function.

Procedure

1. Verify the basic configuration for device has been performed.
2. Ensure the correct probe type is selected.
   a) Select **Setup** → **Tank**.
   b) Select the **Probe** tab.
   c) In the *Probe type* list, select **Coaxial HTHP** for probe type 3V or **Rigid Single HTHP 0.3″ (8mm)** for probe type 4U.
   d) Select **Store**.
3. Check that Mounting Type is set to Pipe/Chamber and select inner diameter.
   a) Select **Setup** → **Tank**.
   b) Select the **Geometry** tab.
   c) In the *Mounting Type* list, select **Pipe/Chamber**.
   d) In the *Inner Diameter, Pipe/Chamber/Nozzle* list, select the corresponding inner diameter.
   e) Select **Store**.
4. Select **Setup** → **Advanced**.

5. Select the **Vapor Compensation** tab.
6. In the *Reference Reflector Type* list, select reference reflector as appropriate, and then select **Store**.

Option	Description
Coax, l=350 mm	Use this option for probe type 3V with short reflector
Coax, l=500 mm	Use this option for probe type 3V with long reflector
d=13 mm, l=350 mm	Use this option for probe type 4U with short reflector
d=13 mm, l=500 mm	Use this option for probe type 4U with long reflector

7. Select the **Use Vapor Compensation** checkbox, and then select **Store**.
8. Select **Calibrate Vapor Compensation** and follow the on-screen instructions.

Note
When the Dynamic Vapor Compensation function has been calibrated, ensure the Probe Type, Mounting Type, Inner Diameter, Reference Reflector Type, and remote connection (if used) remain set as they were during calibration.

If changing the configuration of these parameters, the Dynamic Vapor Compensation function will be deactivated, and the device error "Vapor Compensation Not Factory Calibrated" appears. Correct the parameter that has been changed, and restart the device.

9. When the calibration is finished, restart the device.
   a) Select **Tools** → **Restart Device**.

Postrequisites

Verify the echo peak from the reference reflector is marked in the echo curve plot.

Related information

Verify the echo peak from the reference reflector using RRM

Verify the echo peak from the reference reflector in AMS Device Configurator

Verify that the echo peak from the reference reflector is marked "Reference Reflector" in the echo curve plot.

Procedure

1. Select **Service Tools** → **Echo Tuning**.
2. Select the **Echo Curve** tab.
   AMS Device Configurator reads one echo curve and then stops.
3. Verify that the echo peak from the reference reflector is marked "Reference Reflector" in the echo curve plot.
   Probes will have the reflector end either at 1.1 ft. (0.35 m) or at 1.6 ft. (0.5 m), depending on if the probe has a short or a long reflector.

Verify the echo peak from the reference reflector using RRM

Verify that the echo peak from the reference reflector is marked “P2 Reference Reflector” in the echo curve plot.

Procedure

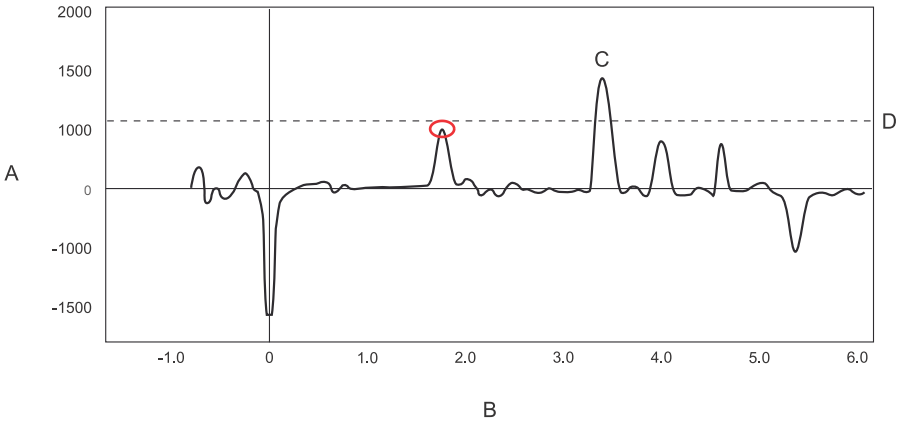
1. In Rosemount Radar Master, select **Setup** → **Echo Curve**.
2. If the echo curve is not read automatically, select **Read**.
3. Verify that the echo peak from the reference reflector is marked “P2 Reference Reflector” in the echo curve plot.

   Probes will have the reflector end either at 1.1 ft. (0.35 m) or at 1.6 ft. (0.5 m), depending on if the probe has a short or a long reflector.

C.7 Signal Quality Metrics

Signal Quality Metrics indicates the surface signal integrity compared to the noise. It can be used to schedule maintenance to clean the probe or detect and monitor turbulence, boiling, foam and emulsions.

Figure C-8: Echo Curve Showing Surface Peak Amplitude, Noise Peak Amplitude, and Surface Threshold



A. Amplitude, mV
B. Distance, m
C. Surface peak amplitude (P1)
D. Surface Threshold=Amplitude Threshold Curve (ATC)

Signal quality

Signal Quality is a measurement of the surface peak amplitude (P1) compared to the surface threshold (ATC) and the smallest marginal between the noise and the ATC above the surface (indicated with a circle) compared to the ATC. The Signal Quality spans from 0 to 10, where 0 indicates a low margin, and 10 indicates a high margin. It indicates how much margin there is until the noise peak is indicated as the surface level.

Note
The signal amplitude and the noise margin depend on probe type and application conditions, as well as the condition of the probe. Even if the probe is clean, the Signal Quality may not be a 10.

Surface/noise margin

Surface/Noise Margin is the relationship between surface peak amplitude and the amplitude of the strongest noise peak above the surface. The Surface/Noise Margin spans from 0 to 10, where 0 indicates a low margin, and 10 indicates a high margin. It indicates how much disturbance the device can handle in the tank.

Note
The signal amplitude and the noise margin depend on probe type and application conditions, as well as the condition of the probe. Even if the probe is clean, the Surface/Noise Margin may not be a 10.

C.7.1 Check if Signal Quality Metrics is supported model code

To check if Signal Quality Metrics is supported:

Procedure

Check that DA1 or D01 is mentioned in the model code on the transmitter head.

C.7.2 Check if Signal Quality Metrics is supported using FDI/DD/DTM

To check if Signal Quality Metrics is supported:

Procedure

1. Select **Overview** → **Device Information**.
2. Select the **Upgrade Device** tab.
3. Check that the **Diagnostics Suite** check box is selected in the *Available Hardware/Software Options* list.

C.7.3 Check if Signal Quality Metrics is supported using RRM

To check if Signal Quality Metrics is supported, do one of the following:

Procedure

1. Start Rosemount Radar Master and connect to device.
2. Right-click on the device and select **Properties**.
3. Check that “Diagnostics Suite” is mentioned in the *Device Software Configuration 2* list.

C.7.4 View Signal Quality Metrics using FDI/DD/DTM

Procedure

1. Select **Service Tools** → **Variables**.
2. Select the **Signal Quality** tab to view signal quality metrics.

C.7.5 View Signal Quality Metrics using RRM

Procedure

1. Select **Tools** → **Device Display**.
2. Select the **Signal Quality Metrics** tab to view signal quality metrics.

C.7.6 Configure transmitter variables for Signal Quality Metrics using Rosemount Radar Master

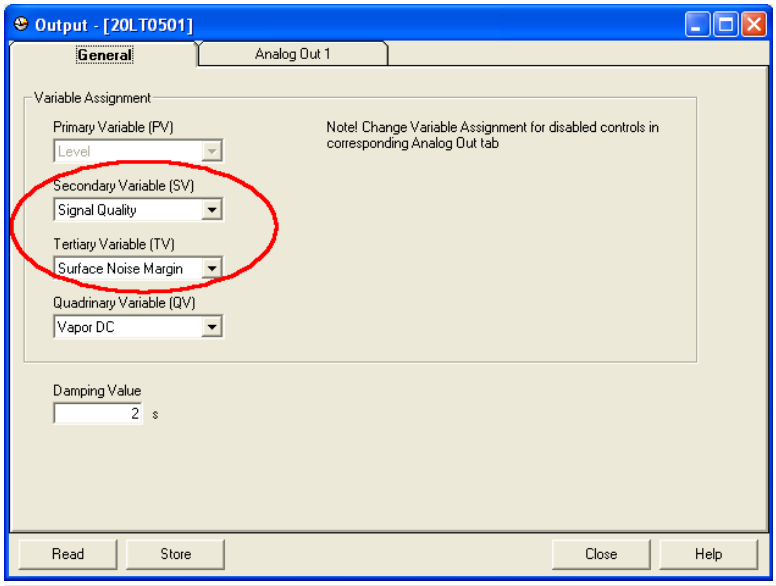
Signal Quality Metrics can be assigned to Transmitter Variables (SV, TV, or QV).

Variables can be sent to Distributed Control System (DCS) to trigger an alarm. Suitable trigger levels vary from application to application. Guidelines for appropriate values can be determined by logging Signal Quality Metrics over time and viewing minimum/maximum values. The Signal Quality alarm trigger value should be at least 1, but a better guideline is 2-3.

Procedure

Select **Setup** → **Output**.

Figure C-9: Configure Transmitter Variables for Signal Quality Metrics



C.8 Switch alarm limits (HART® only)

C.8.1 Switch alarm limits using FDI/DD/DTM

The alarm limits can be set to either Rosemount or NAMUR NE43 values.

Prerequisites

Requires firmware version 2.L3 or later.

Procedure

1. Select **Configure** → **Manual Setup** → **Device Setup**.
2. Select the **Analog Output** tab.
   The *Alarm Output Level* drop-down list displays the current alarm limit option.
3. Click the **Configure Alarm and Saturation Limits** button.
4. Select the desired alarm limit option, and then select **Next**.

5. Select **Finish** when the *Method Complete* message appears.

C.8.2 Switch alarm limits using handheld communicator

The alarm limits can be set to either Rosemount or NAMUR NE43 values.

Prerequisites

Requires firmware version 2.L3 or later.

Procedure

1. Select **Configure** → **Manual Setup** → **Device Setup**.
2. Select **Analog Output**.
   The current alarm limit option is presented.
3. Select **Alarm Level**.
4. Select the desired alarm limits option.
5. Select **Send** and follow the instructions.

C.9 Detecting thin interface layers

The Rosemount 5300 software uses an algorithm to enhance detection of thin interface layers. The algorithm is active for interface measurements where the upper product thickness is about 10 in. (25 cm) or less.

The thin layer detection function is enabled by default. In rare cases it might be relevant to disable thin layer detection, like the following situations:

1. Interface measurements in the upper part of HP/HTHP probes
   The thin layer detection functionality is impaired for measurement at the top of the HP/HTHP probes, approximately the top 60 cm. For interface measurements in this area the thin layer functionality may not work as desired.
2. Applications with disturbances from nozzle or other physical objects
   For interface measurements exposed to disturbances, the perfomance of the thin layer detection functionality might be affected. Tank disturbances can origin from the nozzle or objects in the tank e.g. spacers. Minor disturbances might decrease the thin layer detection accuracy. Larger disturbances can cause the thin interface detection to not work properly.

Related information

Interface measurements

C.9.1 Enable/disable thin layer detection using FDI/DD/DTM

The thin layer detection is initially enabled. It can be set to enabled or disabled.

Prerequisites

The thin layer detection is only applicable to:

- Firmware version 2.L3 or later.
- Measurement mode: Level and Interface Level.
- Probe types: Single lead or Coaxial/Large coaxial (standard/HP/C).

Note
When the thin layer detection is disabled, the minimum detectable upper product thickness is increased, typically 5.1 in. (13 cm).

Procedure

1. HART®: Select **Configure** → **Manual Setup** → **Level Setup**.
   FOUNDATION™ Fieldbus: Select **Configure** → **Manual Setup**.
2. Select the **Environment** tab.
   The *Use Thin Layer Detection* check box displays the current state of the thin layer detection, enabled or disabled.
3. Click the **Thin Layer Detection** button.
4. Select desired option to enable or disable the thin layer detection, and then select **Next**.
5. Select **Finish** when the *Method Complete* message appears.

C.9.2 Enable/disable thin layer detection using handheld communicator

The thin layer detection is initially turned on. It can be set to on or off.

Prerequisites

The thin layer detection is only applicable to:

- Firmware version 2.L3 or later.
- Measurement mode: Level and Interface Level.
- Probe types: Single lead or Coaxial/Large coaxial (standard/HP/C).

Note
When the thin layer detection is disabled, the minimum detectable upper product thickness is increased, typically 5.1 in. (13 cm).

Procedure

1. HART®: Select **Configure** → **Manual Setup** → **Level Setup** → **Environment**.
   FOUNDATION™ Fieldbus: Select **Configure** → **Manual Setup** → **Environment**.
2. Select **Thin Layer Detection**.
   The current state of the thin layer detection is presented.
3. Set thin layer detection to desired state.
4. Select **Send** and follow the instructions.

C.9.3 Enable/disable thin layer detection using RRM

The thin layer detection is initially enabled. It can be set to enabled or disabled.

Prerequisites

The thin layer detection is only applicable to:

- Firmware version 2.L3 or later.
- Measurement mode: Level and Interface Level.

- Probe types: Single lead or Coaxial/Large coaxial (standard/HP/C).

Note
When the thin layer detection is disabled, the minimum detectable upper product thickness is increased, typically 5.1 in. (13 cm).

Procedure

1. Select **Setup** → **Tank**.
2. Select the **Environment** tab.
3. Under *Advanced* select/deselect the **Thin Layer Detection** checkbox to enable/disable the thin layer detection.
4. Select **Store**.

D Remote mounting

D.1 Remote housing, new units

Remote Housing can be used to place the head apart from the probe if it is in a hot or vibrating place. With Remote Housing, you can place the transmitter head in a better position to be able to read the display, for example.

The remote housing assembly is shipped with the transmitter head mounted on the probe and the remote connection in a separate box.

The transmitter head must have the remote connection installed before functioning.

The parts in the shipping unit consist of:

- Transmitter head mounted on probe
- Remote connection
  - Bracket kit
  - Bracket (1 pcs)
  - Clamping bracket (4 pcs)
  - U-bolt (2 pcs)
  - Screw (3 pcs)
  - Nut (4 pcs)

D.2 Remote connection, field retrofit

To upgrade a currently installed Rosemount™ 5300 Level Transmitter with a remote housing, the embedded software needs revision 2.A2 or later, and the Spare Part Kit (03300-7006-000X) must be ordered. The position X corresponds to the remote housing cable length in meters.

The Rosemount 5300 Level Transmitter head must be configured for remote housing to work.

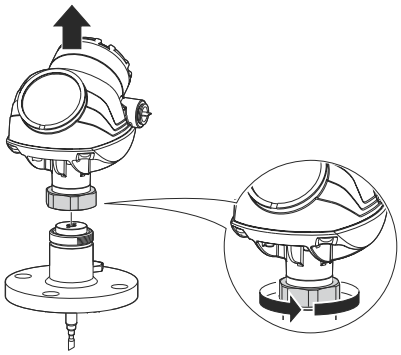
The Spare Part Kit consists of:

- Remote connection
- Bracket kit
  - Bracket (1 pcs)
  - Clamping bracket (4 pcs)
  - U-bolt (2 pcs)
  - Screw (3 pcs)
  - Nut (4 pcs)

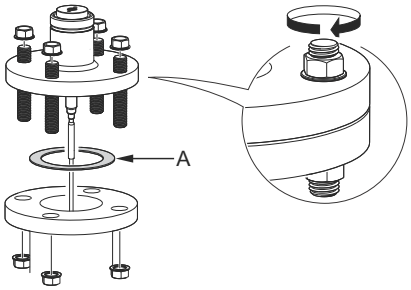
D.3 Install remote housing

Procedure

1. Carefully remove the transmitter.

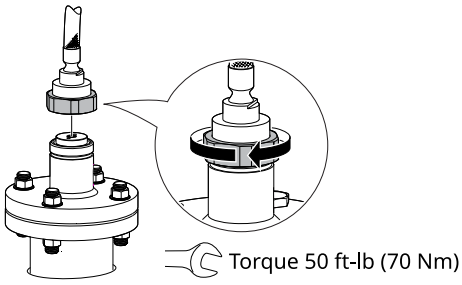


2. If installing a new unit, mount the probe on tank.



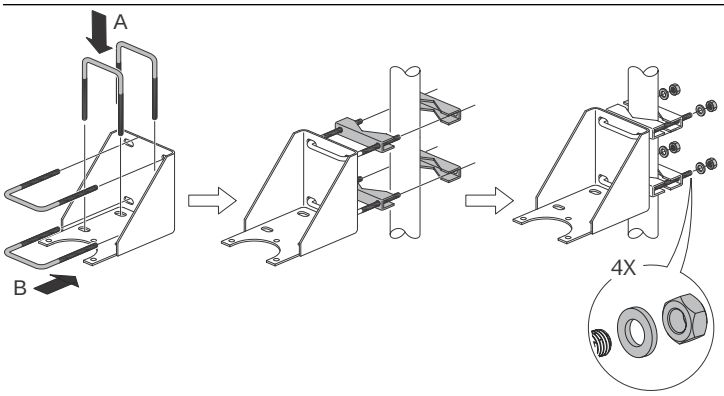
A. Gasket

3.



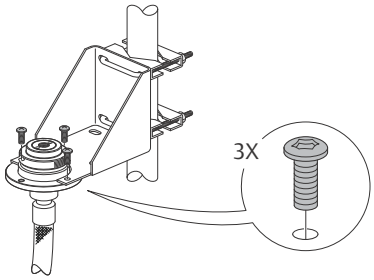
Note
Re-tighten after 24 hours and again after the first temperature cycle. Check at regular intervals and re-tighten if necessary.

4. Mount the bracket to the pipe.

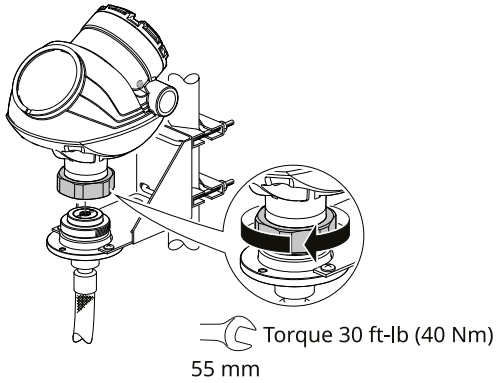


A. Horizontal pipe
B. Vertical pipe

5. Fasten the housing support.



6.



Note
Re-tighten after 24 hours and again after the first temperature cycle. Check at regular intervals and re-tighten if necessary.

D.4 Remote housing configuration

When using remote housing, the remote connection length should be configured. If the Remote Housing is ordered with a transmitter, it is configured in the factory.

D.4.1 Configure remote housing using FDI/DD/DTM

Prerequisites

Note
When disconnecting a remote housing cable from a probe in low temperatures, -22 °F (-30 °C), the configuration tool may not show that the probe is missing.

Procedure

1. Select **Configure** → **Level Setup**.
2. Select the **Probe** tab.
3. In the *Remote Housing* list, select the remote housing length.
4. Select **Send**.

D.4.2 Configure remote housing using RRM

Prerequisites

Note
When disconnecting a remote housing cable from a probe in low temperatures, -22 °F (-30 °C), Rosemount Radar Master may not show that the probe is missing.

Procedure

1. Select **Setup** → **Tank**.
2. Select the **Probe** tab.
3. Select the **Advanced** button.
4. In the *Remote Housing* list, select the remote housing length.
5. Select **Store**.

E FOUNDATION™ Fieldbus Block Information

E.1 Resource Transducer Block

E.1.1 Resource block parameters

This section contains information on the resource block of the Rosemount 5300.

The resource block defines the physical resources of the device. The resource block also handles functionality that is common across multiple blocks. The block has no linkable inputs or outputs.

Table E-1: Resource Block Parameters

Index Number	Parameter	Description
01	ST_REV	The revision level of the static data associated with the function block.
02	TAG_DESC	The user description of the intended application of the block.
03	STRATEGY	The strategy field can be used to identify grouping of blocks.
04	ALERT_KEY	The identification number of the plant unit.
05	MODE_BLK	The actual, target, permitted, and normal modes of the block: Target: The mode to “go to” Actual: The mode the “block is currently in” Permitted: Allowed modes that target may take on Normal: Most common mode for actual
06	BLOCK_ERR	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
07	RS_STATE	State of the function block application state machine.
08	TEST_RW	Read/write test parameter - used only for conformance testing.
09	DD_RESOURCE	String identifying the tag of the resource which contains the Device Description for this resource.
10	MANUFAC_ID	Manufacturer identification number – used by an interface device to locate the DD file for the resource.
11	DEV_TYPE	Manufacturer’s model number associated with the resource - used by interface devices to locate the DD file for the resource.
12	DEV_REV	Manufacturer revision number associated with the resource - used by an interface device to locate the DD file for the resource.

Table E-1: Resource Block Parameters *(continued)*

Index Number	Parameter	Description
13	DD_REV	Revision of the DD associated with the resource - used by an interface device to locate the DD file for the resource. The DD_REV specifies the minimum DD revision that is compatible with the device (within the same device revision). A vendor can release an updated DD with the DD_REVISION higher than the DD_REV. This allows a vendor to release an updated DD files set that will be compatible with an existing device revision in the field. The host can always load a higher DD_REVISION for a given DEV_REV/DEV_REVISION. As per Foundation requirement the DD_REV will always be 01.
14	GRANT_DENY	Options for controlling access of host computers and local control panels to operating, tuning, and alarm parameters of the block. Not used by device.
15	HARD_TYPES	The types of hardware available as channel numbers.
16	RESTART	Allows a manual restart to be initiated. Several degrees of restart are possible. They are the following: 1 Run – is the passive state of the parameter 2 Restart resource – not used 3 Restart with defaults – intended to reset parameters to default values, i.e. their value before any configuration was done 4 Restart processor – does a warm start of CPU
17	FEATURES	Used to show supported resource block options. The supported features are: • SOFT_WRITE_LOCK_SUPPORT • REPORT_SUPPORT • UNICODE_SUPPORT • MULTI_BIT_ALARM • RESTART/RELINK AFTER FB ACTION
18	FEATURES_SEL	Used to select resource block options.
19	CYCLE_TYPE	Identifies the block execution methods available for this resource.
20	CYCLE_SEL	Used to select the block execution method for this resource. The Rosemount 5300 supports the following: Scheduled: Blocks are only executed based on the function block schedule. Block Execution: A block may be executed by linking to another blocks completion.
21	MIN_CYCLE_T	Time duration of the shortest cycle interval of which the resource is capable.
22	MEMORY_SIZE	Available configuration memory in the empty resource. To be checked before attempting a download.
23	NV_CYCLE_T	Minimum time interval specified by the manufacturer for writing copies of NV parameters to non-volatile memory. Zero means it will never be automatically copied. At the end of NV_CYCLE_T, only those parameters which have changed need to be updated in NVRAM.
24	FREE_SPACE	Percent of memory available for further configuration. Zero in a pre-configured device.
25	FREE_TIME	Percent of the block processing time that is free to process additional blocks.

Table E-1: Resource Block Parameters *(continued)*

Index Number	Parameter	Description
26	SHED_RCAS	Time duration at which to give up on computer writes to function block RCas locations. Shed from RCas shall never happen when SHED_ROUT = 0
27	SHED_ROUT	Time duration at which to give up on computer writes to function block ROut locations. Shed from ROut shall never happen when SHED_ROUT = 0
28	FAULT_STATE	Condition set by loss of communication to an output block, fault promoted to an output block or physical contact. When FAIL_SAFE condition is set, then output function blocks will perform their FAIL_SAFE actions.
29	SET_FSTATE	Allows the FAIL_SAFE condition to be manually initiated by selecting Set.
30	CLR_FSTATE	Writing a Clear to this parameter will clear the device FAIL_SAFE if the field condition has cleared.
31	MAX_NOTIFY	Maximum number of unconfirmed notify messages possible.
32	LIM_NOTIFY	Maximum number of unconfirmed alert notify messages allowed.
33	CONFIRM_TIME	The time the resource will wait for confirmation of receipt of a report before trying again. Retry will not happen when CONFIRM_TIME=0.
34	WRITE_LOCK	When hardware write protection is selected, WRITE_LOCK becomes an indicator of the jumper setting and is unavailable for software write protection. When software write lock is selected, and WRITE_LOCK is set, no writings from anywhere else are allowed, except to clear WRITE_LOCK. Block input will continue to be updated.
35	UPDATE_EVT	This alert is generated by any change to the static data.
36	BLOCK_ALM	The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alarm is entered in the subcode field. The first alarm to become active will set the Active status in the Status parameter. As soon as the Unreported status is cleared by the alarm reporting task, another block alarm may be reported without clearing the Active status, if the subcode has changed.
37	ALARM_SUM	The current alarm status, unacknowledged states, unreported states, and disabled states of the alarms associated with the function block.
38	ACK_OPTION	Selection of whether alarms associated with the function block will be automatically acknowledged.
39	WRITE_PRI	Priority of the alarm generated by clearing the write lock.
40	WRITE_ALM	This alert is generated if the write lock parameter is cleared.
41	ITK_VER	Major revision number of the inter operability test case used in certifying this device as interoperable. The format and range are controlled by the Fieldbus Foundation.
42	FD_VER	A parameter equal to the value of the major version of the Field Diagnostics specification that this device was designed to.
43	FD_FAIL_ACTIVE	This parameter reflects the error conditions that are being detected as active as selected for this category. It is a bit string, so that multiple conditions may be shown.
44	FD_OFFSPEC_ACTIVE	
45	FD_MAINT_ACTIVE	
46	FD_CHECK_ACTIVE	
47	FD_FAIL_MAP	This parameter maps conditions to be detected as active for this alarm category. Thus the same condition may be active in all, some, or none of the 4 alarm categories.
48	FD_OFFSPEC_MAP	

Table E-1: Resource Block Parameters *(continued)*

Index Number	Parameter	Description
49	FD_MAINT_MAP	
50	FD_CHECK_MAP	
51	FD_FAIL_MASK	This parameter allows the user to suppress any single or multiple conditions that are active, in this category, from being broadcast to the host through the alarm parameter. A bit equal to '1' will mask i.e. inhibit the broadcast of a condition, and a bit equal to '0' will unmask i.e. allow broadcast of a condition.
52	FD_OFFSPEC_MASK	
53	FD_MAINT_MASK	
54	FD_CHECK_MASK	
55	FD_FAIL_ALM	This parameter is used primarily to broadcast a change in the associated active conditions, which are not masked, for this alarm category to a Host System.
56	FD_OFFSPEC_ALM	
57	FD_MAINT_ALM	
58	FD_CHECK_ALM	
59	FD_FAIL_PRI	This parameter allows the user to specify the priority of this alarm category.
60	FD_OFFSPEC_PRI	
61	FD_MAINT_PRI	
62	FD_CHECK_PRI	
63	FD_SIMULATE	This parameter allows the conditions to be manually supplied when simulation is enabled. When simulation is disabled both the diagnostic simulate value and the diagnostic value tracks the actual conditions. The simulate jumper is required for simulation to be enabled and while simulation is enabled the recommended action will show that simulation is active. Elements: see Table E-2.
64	FD_RECOMMEN_ACT	This parameter is a device enumerated summarization of the most severe condition or conditions detected. The DD help should describe by enumerated action, what should be done to alleviate the condition or conditions. 0 is defined as Not Initialized, 1 is defined as No Action Required, all others defined by manufacturer.
65	FD_EXTENDED_ACTIVE	An optional parameter or parameters to allow the user finer detail on conditions causing an active condition in the FD_*_ACTIVE parameters.
66	FD_EXTENDED_MAP	An optional parameter or parameters to allow the user finer control on enabling conditions contributing to the conditions in FD_*_ACTIVE parameters.
67	COMPATIBILITY_REV	This parameter is used when replacing field devices. The correct value of this parameter is the DEV_REV value of the replaced device.
68	HARDWARE_REVISION	Hardware revision.
69	SOFTWARE_REV	Software revision of source code with resource block.
70	PD_TAG	PD tag description of device.
71	DEV_STRING	This is used to load new licensing into the device. The value can be written but will always read back with a value of 0.
72	DEV_OPTIONS	Indicates which miscellaneous device licensing options are enabled.
73	OUTPUT_BOARD_SN	Output board serial number. For the Rosemount 5300 this is the same as Main Label Device ID which can be found on the main label that is attached to the housing.

Table E-1: Resource Block Parameters *(continued)*

Index Number	Parameter	Description
74	FINAL_ASSY_NUM	Final assembly number given by manufacturer.
75	DOWNLOAD_MODE	Gives access to the boot block code for over-the-wire downloads. 0 = Uninitialized 1 = Run mode 2 = Download mode
76	HEALTH_INDEX	Parameter representing the overall health of the device, 100 being perfect and 1 being non-functioning. The value is based on the active PWA alarms.
77	FAILED_PRI	Designates the alarming priority of the FAILED_ALM and also used as switch b/w FD and legacy PWA. If value is greater than or equal to 1 then PWA alerts will be active in device else device will have FD alerts.
78	RECOMMENDED_ACTION	Enumerated list of recommended actions displayed with a device alert.
79	FAILED_ALM	Alarm indicating a failure within a device which makes the device non-operational.
80	MAINT_ALM	Alarm indicating the device needs maintenance soon. If the condition is ignored, the device will eventually fail.
81	ADVISE_ALM	Alarm indicating advisory alarms. These conditions do not have a direct impact on the process or device integrity.
82	FAILED_ENABLE	Enabled FAILED_ALM alarm conditions. Corresponds bit for bit to the FAILED_ACTIVE. A bit on means that the corresponding alarm condition is enabled and will be detected. A bit off means the corresponding alarm condition is disabled and will not be detected. This parameter is the Read Only copy of FD_FAIL_MAP.
83	FAILED_MASK	Mask of FAILED_ALM. Corresponds bit of bit to FAILED_ACTIVE. A bit on means that the condition is masked out from alarming. This parameter is the Read Only copy of FD_FAIL_MASK.
84	FAILED_ACTIVE	Enumerated list of failure conditions within a device. All open bits are free to be used as appropriate for each specific device. This parameter is the Read Only copy of FD_FAIL_ACTIVE.
85	MAINT_PRI	Designates the alarming priority of the MAINT_ALM
86	MAINT_ENABLE	Enabled MAINT_ALM alarm conditions. Corresponds bit for bit to the MAINT_ACTIVE. A bit on means that the corresponding alarm condition is enabled and will be detected. A bit off means the corresponding alarm condition is disabled and will not be detected. This parameter is the Read Only copy of FD_OFFSPEC_MAP.
87	MAINT_MASK	Mask of MAINT_ALM. Corresponds bit of bit to MAINT_ACTIVE. A bit on means that the condition is masked out from alarming. This parameter is the Read Only copy of FD_OFFSPEC_MASK.
88	MAINT_ACTIVE	Enumerated list of maintenance conditions within a device. This parameter is the Read Only copy of FD_OFFSPEC_ACTIVE.
89	ADVISE_PRI	Designates the alarming priority of the ADVISE_ALM.

Table E-1: Resource Block Parameters *(continued)*

Index Number	Parameter	Description
90	ADVISE_ENABLE	Enabled ADVISE_ALM alarm conditions. Corresponds bit for bit to the ADVISE_ACTIVE. A bit on means that the corresponding alarm condition is enabled and will be detected. A bit off means the corresponding alarm condition is disabled and will not be detected. This parameter is the Read Only copy of FD_MAINT_MASK & FD_CHECK_MASK.
91	ADVISE_MASK	Mask of ADVISE_ALM. Corresponds bit by bit to ADVISE_ACTIVE. A bit on means that the condition is masked out from alarming. This parameter is the Read Only copy of FD_MAINT_MASK & FD_CHECK_MASK.
92	ADVISE_ACTIVE	Enumerated list of advisory conditions within a device. All open bits are free to be used as appropriate for each specific device. This parameter is the Read Only copy of FD_MAINT_ACTIVE & FD_CHECK_ACTIVE.

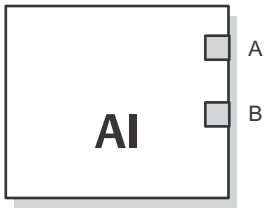
Table E-2: FD_SIMULATE elements

Index	Parameter	Data Type	Size	Description
1	Diagnostic Simulate Value	Bit string	4	Writable. Used for diagnostics when simulation is enabled
2	Diagnostic Value	Bit string	4	Current diagnostics detected by the device.
3	Enable	Unsigned 8	1	Enable/Disable simulation. Dynamic, so simulation will always be disabled after a device restart.

E.2 Analog-Input Block

E.2.1 Analog Input block system parameters

Figure E-1: Analog-Input Block



A. OUT_D = Discrete output that signals a selected alarm condition
B. OUT = The block output value and status

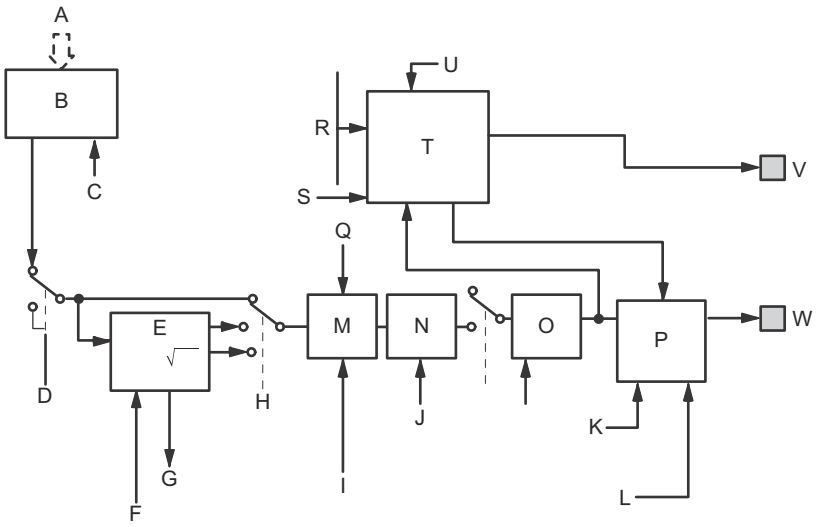
The Analog Input (AI) function block processes field device measurements and makes them available to other function blocks. The output value from the AI block is in engineering units and contains a status indicating the quality of the measurement. The measuring device may have several measurements or derived values available in different channels. Use the channel number to define the variable that the AI block processes.

The AI block supports alarming, signal scaling, signal filtering, signal status calculation, mode control, and simulation. In Automatic mode, the block's output parameter (OUT) reflects the process variable (PV) value and status. In Manual mode, OUT may be set manually. The Manual mode is reflected on the output status. A discrete output (OUT_D) is

provided to indicate whether a selected alarm condition is active. Alarm detection is based on the OUT value and user specified alarm limits.

Table E-3 lists the AI block parameters and their units of measure, descriptions, and index numbers.

Figure E-2: Analog Input Function Block Schematic



A. Analog Measurement
B. Access Analog Measurement
C. CHANNEL
D. SIMULATE
E. Convert
F. OUT_SCALE; XD_SCALE
G. FIELD_VAL
H. L_TYPE
I. IO_OPTS
J. PV_FTIME
K. MODE
L. STATUS_OPTS
M. Cutoff
N. Filter
O. PV
P. Status Calc.
Q. LOW_CUT
R. HI_HI_LIM; HI_LIM; LO_LO_LIM; LO_LIM
S. ALARM_HYS
T. Alarm Detection
U. ALARM_TYPE
V. OUT_D = discrete output that signals a selected alarm condition
W. OUT = block output value and status

Table E-3: Definitions of Analog Input Function Block System Parameters

Index Number	Parameter	Units	Description
01	ST_REV	None	The revision level of the static data associated with the function block. The revision value will be incremented each time a static parameter value in the block is changed.
02	TAG_DESC	None	The user description of the intended application of the block.
03	STRATEGY	None	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
04	ALERT_KEY	None	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
05	MODE_BLK	None	The actual, target, permitted, and normal modes of the block. Target: The mode to “go to” Actual: The mode the “block is currently in” Permitted: Allowed modes that target may take on Normal: Most common mode for target
06	BLOCK_ERR	None	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
07	PV	EU of XD_SCALE	The process variable used in block execution.
08	OUT	EU of OUT_SCALE	The block output value and status.
09	SIMULATE	None	A group of data that contains the current transducer value and status, the simulated transducer value and status, and the enable/disable bit.
10	XD_SCALE	None	The high and low scale values, engineering units code, and number of digits to the right of the decimal point associated with the channel input value.
11	OUT_SCALE	None	The high and low scale values, engineering units code, and number of digits to the right of the decimal point associated with OUT.
12	GRANT_DENY	None	Options for controlling access of host computers and local control panels to operating, tuning, and alarm parameters of the block. Not used by device.
13	IO_OPTS	None	Allows the selection of input/output options used to alter the PV. Low cutoff enabled is the only selectable option.
14	STATUS_OPTS	None	Allows you to select option for status handling and processing.
15	CHANNEL	None	The CHANNEL value is used to select the measurement value. You must configure the CHANNEL parameter before you can configure the XD_SCALE parameter.
16	L_TYPE	None	Linearization type. Determines whether the field value is used directly (Direct) or is converted linearly (Indirect).
17	LOW_CUT	%	If percentage value of transducer input fails below this, PV = 0.
18	PV_FTIME	Seconds	The time constant of the first-order PV filter. It is the time required for a 63 percent change in the IN value.
19	FIELD_VAL	Percent	The value and status from the transducer block or from the simulated input when simulation is enabled.
20	UPDATE_EVT	None	This alert is generated by any change to the static data.

Table E-3: Definitions of Analog Input Function Block System Parameters *(continued)*

Index Number	Parameter	Units	Description
21	BLOCK_ALM	None	The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed.
22	ALARM_SUM	None	The summary alarm is used for all process alarms in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed.
23	ACK_OPTION	None	Used to set auto acknowledgment of alarms.
24	ALARM_HYS	Percent	The amount the alarm value must return within the alarm limit before the associated active alarm condition clears.
25	HI_HI_PRI	None	The priority of the HI HI alarm.
26	HI_HI_LIM	EU of PV_SCALE	The setting for the alarm limit used to detect the HI HI alarm condition.
27	HI_PRI	None	The priority of the HI alarm.
28	HI_LIM	EU of PV_SCALE	The setting for the alarm limit used to detect the HI alarm condition.
29	LO_PRI	None	The priority of the LO alarm.
30	LO_LIM	EU of PV_SCALE	The setting for the alarm limit used to detect the LO alarm condition.
31	LO_LO_PRI	None	The priority of the LO LO alarm.
32	LO_LO_LIM	EU of PV_SCALE	The setting for the alarm limit used to detect the LO LO alarm condition.
33	HI_HI_ALM	None	The HI HI alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm.
34	HI_ALM	None	The HI alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm.
35	LO_ALM	None	The LO alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm.
36	LO_LO_ALM	None	The LO LO alarm data, which includes a value of the alarm, a timestamp of occurrence and the state of the alarm.
37	OUT_D	None	Discrete output to indicate a selected alarm condition.
38	ALARM_SEL	None	Used to select the process alarm conditions that will cause the OUT_D parameter to be set.
39	STDDEV	Percent	Standard deviation of the measurement.
40	CAP_STDDEV	Seconds	Capability standard deviation, the best deviation that can be achieved.

E.2.2 Modes

The AI Function Block supports three modes of operation as defined by the MODE_BLK parameter:

Manual (Man)	The block output (OUT) may be set manually.
Automatic (Auto)	OUT reflects the analog input measurement or the simulated value when simulation is enabled.
Out of Service (O/S)	The block is not processed. FIELD_VAL and PV are not updated and the OUT status is set to Bad: Out of Service. The BLOCK_ERR parameter shows Out of Service. In this mode, you can make changes to all configurable parameters. The target mode of a block may be restricted to one or more of the supported modes.

E.2.3 Configure the AI block

⚠ A minimum of four parameters are required to configure the AI block. The parameters are described below with example configurations shown at the end of this section.

CHANNEL

Select the channel that corresponds to the desired sensor measurement:

Table E-4: AI Block Channels

AI block	TB channel value	Process variable
Level	1	CHANNEL_RADAR_LEVEL
Ullage	2	CHANNEL_RADAR_ULLAGE
Level rate	3	CHANNEL_RADAR_LEVELRATE
Signal strength	4	CHANNEL_RADAR_SIGNAL_STRENGTH
Volume	5	CHANNEL_RADAR_VOLUME
Internal temperature	6	CHANNEL_RADAR_INTERNAL_TEMPERATURE
Upper product volume	7	CHANNEL_UPPER_PRODUCT_VOLUME
Lower product volume	8	CHANNEL_LOWER_ PRODUCT_VOLUME
Interface distance	9	CHANNEL_INTERFACE_ DISTANCE
Upper product thickness	10	CHANNEL_UPPER_ PRODUCT_THICKNESS
Interface level	11	CHANNEL_INTERFACE_LEVEL
Interface level rate	12	CHANNEL_INTERFACE_ LEVELRATE
Interface signal strength	13	CHANNEL_INTERFACE_ SIGNALSTRENGTH
Signal quality	14	CHANNEL_SIGNAL_QUALITY
Surface/noise margin	15	CHANNEL_ SURFACE_NOISE_MARGIN
Vapor DC	16	CHANNEL_VAPOR_DC

L_TYPE

The L_TYPE parameter defines the relationship of the transmitter measurement (level, distance, level rate, signal strength, volume, and average temperature) to the desired output of the AI block. The relationship can be direct or indirect root.

Direct	Select direct when the desired output will be the same as the transmitter measurement (level, distance, level rate, signal strength, volume, and internal temperature).
Indirect	Select indirect when the desired output is a calculated measurement based on the transmitter measurement (level, distance, level rate, signal strength, volume, and internal temperature). The relationship between the transmitter measurement and the calculated measurement will be linear.
Indirect square root	Select indirect square root when the desired output is an inferred measurement based on the transmitter measurement and the relationship between the sensor measurement and the inferred measurement is square root (e.g. level).

XD_SCALE and OUT_SCALE

The XD_SCALE and OUT_SCALE each include three parameters: 0%, 100%, and engineering units. Set these based on the L_TYPE:

L_TYPE is direct	When the desired output is the measured variable, set the XD_SCALE to represent the operating range of the process. Set OUT_SCALE to match XD_SCALE.
L_TYPE is indirect	When an inferred measurement is made based on the sensor measurement, set the XD_SCALE to represent the operating range that the sensor will see in the process. Determine the inferred measurement values that correspond to the XD_SCALE 0 and 100% points and set these for the OUT_SCALE.
L_TYPE is indirect square root	When an inferred measurement is made based on the transmitter measurement and the relationship between the inferred measurement and sensor measurement is square root, set the XD_SCALE to represent the operating range that the sensor will see in the process. Determine the inferred measurement values that correspond to the XD_SCALE 0 and 100% points and set these for the OUT_SCALE.

Engineering units

Note
To avoid configuration errors, only select engineering units for XD_SCALE and OUT_SCALE that are supported by the device.

Related information

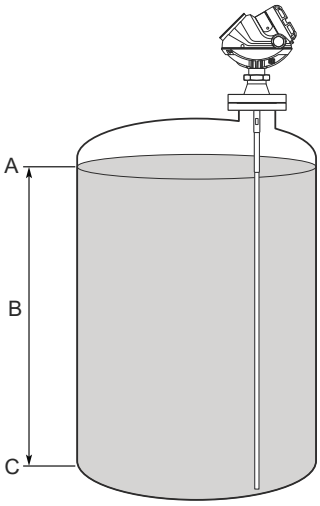
Supported units

Application example 1

Radar level transmitter, level value

A level transmitter is measuring the level in a 33 ft. (10 m) high tank.

Figure E-3: Situation Diagram



A. 100%
B. 33 ft. (10 m)
C. 0%

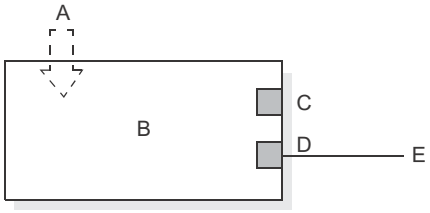
Solution

Table E-5 lists the appropriate configuration settings, and Figure E-4 illustrates the correct function block configuration.

Table E-5: Analog Input Function Block Configuration for a Typical Level Transmitter

Parameter	Configured values
L_TYPE	Direct
XD_SCALE	Not Used
OUT_SCALE	Not Used
CHANNEL	CH1: Level

Figure E-4: Analog Input Function Block Diagram for a Typical Level Transmitter



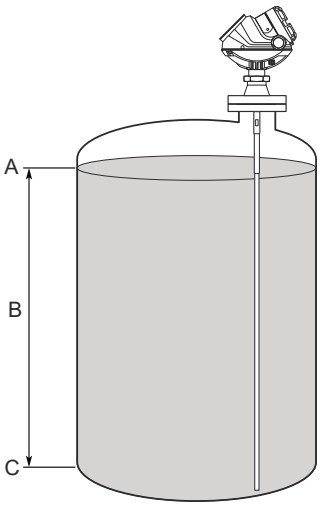
A. Level measurement
B. AI function block
C. OUT_D
D. OUT
E. To another function block

Application example 2

Radar level gauge, level value in percent (%)

The maximum level in the tank is 46 ft. (14 m). The level value is displayed in percentage of the full span (see Figure E-5).

Figure E-5: Situation Diagram



A. 100%
B. 46 ft. (14 m)
C. 0%

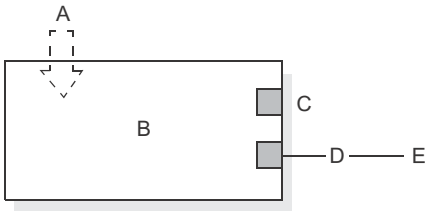
Solution

Table E-6 lists the appropriate configuration settings, and Figure E-6 illustrates the correct function block configuration.

Table E-6: Analog Input Function Block Configuration for a Level Transmitter Where Level Output is Scaled between 0-100%

Parameter	Configured values
L_TYPE	Indirect
XD_SCALE	0 to 14 m
OUT_SCALE	0 to 100%
CHANNEL	CH1: Level

Figure E-6: Function Block Diagram for a Level Transmitter Where Level Output is Scaled between 0-100%



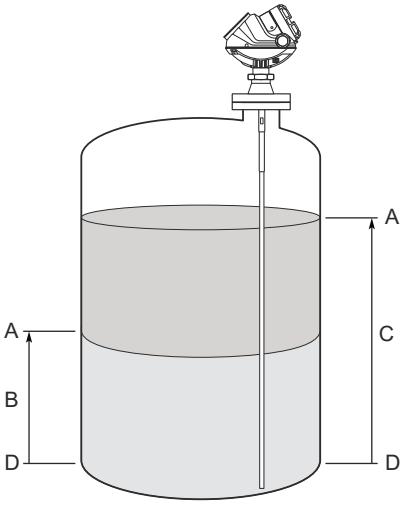
A. Level measurement - percent
B. AI function block
C. OUT_D
D. OUT
E. 0 to 100%

Application example 3

Radar level transmitter, product level, and interface level value

A level transmitter is measuring the product level and the interface level in a 33 ft. (10 m) high tank. The maximum interface level is 10 ft. (3 m).

Figure E-7: Situation Diagram



A. 100%
B. 10 ft. (3 m)
C. 33 ft. (10 m)
D. 0%

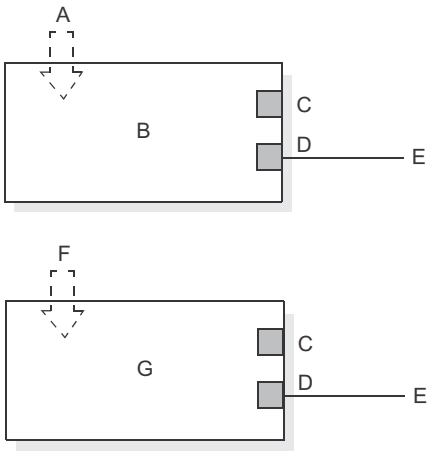
Solution

Table E-7 lists the appropriate configuration settings, and Figure E-8 illustrates the correct function block configuration.

Table E-7: Analog Input Function Block Configuration for a Level and Interface Transmitter

AI function block product level		AI function block interface level	
Parameter	**Configured values**	**Parameter**	**Configured values**
L_TYPE	Direct	L_TYPE	Direct
XD_SCALE	Not used	XD_SCALE	Not used
OUT_SCALE	Not used	OUT_SCALE	Not used
CHANNEL	CH1: level	CHANNEL	CH11: interface level

Figure E-8: Analog Input Function Block Diagram for a Level and Interface Transmitter



A. Level measurement
B. AI function block (product level)
C. OUT_D
D. OUT
E. To another function block
F. Interface level measurement
G. AI function block (interface level)

E.2.4 Process alarms

Process Alarm detection is based on the OUT value. Configure the alarm limits of the following standard alarms:

- High (HI_LIM)
- High high (HI_HI_LIM)
- Low (LO_LIM)
- Low low (LO_LO_LIM)

To avoid alarm chattering when the variable is oscillating around the alarm limit, an alarm hysteresis in percent of the PV span can be set using the ALARM_HYS parameter.

The priority of each alarm is set in the following parameters:

- HI_PRI

- HI_HI_PRI
- LO_PRI
- LO_LO_PRI

Alarm priority

Alarms are grouped into five levels of priority:

Table E-8: Alarm Levels of Priority

Priority number	Priority description
0	The alarm condition is not used.
1	An alarm condition with a priority of 1 is recognized by the system, but is not reported to the operator.
2	An alarm condition with a priority of 2 is reported to the operator.
3-7	Alarm conditions of priority 3 to 7 are advisory alarms of increasing priority.
8-15	Alarm conditions of priority 8 to 15 are critical alarms of increasing priority.

E.2.5 Status options

Status options (**STATUS_OPTS**) supported by the AI block are shown below:

Propagate fault forward — If the status from the sensor is **Bad, Device failure** or **Bad, Sensor failure**, then propagate it to **OUT** without generating an alarm. The use of these sub-status in **OUT** is determined by this option. Through this option, the user may determine whether alarming (sending of an alert) will be done by the block or propagated downstream for alarming.

Uncertain if limited — Set the output status of the Analog Input block to **Uncertain** if the measured or calculated value is limited.

BAD if limited — Set the output status to **Bad** if the sensor is violating a high or low limit.

Uncertain if Man mode — Set the output status of the Analog Input block to **Uncertain** if the actual mode of the block is **Man**.

Note
The instrument must be in **Out of Service** mode to set the status option.

E.2.6 Advanced features

The AI function block provided with Fisher™-Rosemount™ fieldbus devices provides added capability through the addition of the following parameters:

ALARM_TYPE — Allows one or more of the process alarm conditions detected by the AI function block to be used in setting its OUT_D parameter.

OUT_D — Discrete output of the AI function block based on the detection of process alarm condition(s). This parameter may be linked to other function blocks that require a discrete input based on the detected alarm condition.

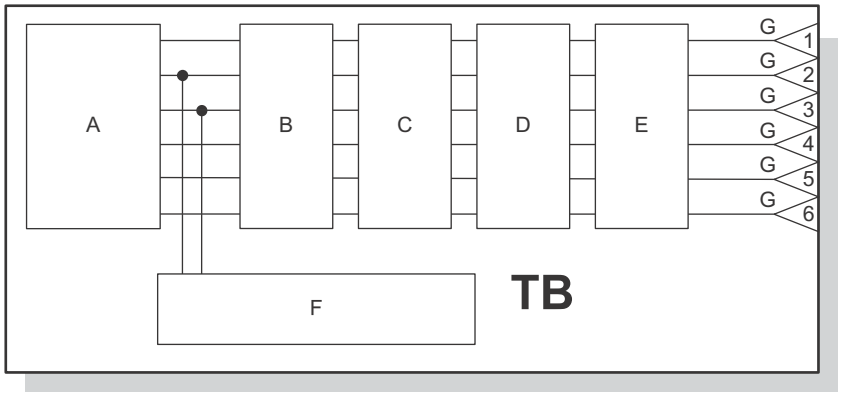
STD_DEV and CAP_STDDEV — Diagnostic parameters that can be used to determine the variability of the process.

E.3 Level Transducer Block

E.3.1 Overview

This section contains information on the Rosemount™ 5300 Level Transducer Block (TB). Descriptions of all Transducer Block parameters, errors, and diagnostics are listed.

Figure E-9: Transducer Block Diagram



A. Digital Signal Conversion
B. Linearization
C. Temperature Compensation
D. Damping
E. Units/Ranging
F. Diagnostics
G. Channel

Definition

The transducer block contains the actual measurement data, including a level and distance reading. Channels 1–16 are assigned to these measurements (see Figure E-9). The transducer block includes information about sensor type, engineering units, and all parameters needed to configure the transmitter.

Channel definitions

Each input has an assigned channel which can be linked to the AI block. The channels for the Rosemount™ 5300 Level Transmitter are the following:

Table E-9: Channel Assignments

Channel Name	Channel Number	Process variable
Level	1	CHANNEL_RADAR_LEVEL
Ullage	2	CHANNEL_RADAR_ULLAGE
Level Rate	3	CHANNEL_RADAR_LEVELRATE
Signal Strength	4	CHANNEL_RADAR_SIGNAL_STRENGTH
Volume	5	CHANNEL_RADAR_VOLUME
Internal Temperature	6	CHANNEL_RADAR_INTERNAL_TEMPERATURE
Upper Product Volume	7	CHANNEL_UPPER_PRODUCT_VOLUME

Table E-9: Channel Assignments *(continued)*

Channel Name	Channel Number	Process variable
Lower Product Volume	8	CHANNEL_LOWER_ PRODUCT_VOLUME
Interface Distance	9	CHANNEL_INTERFACE_ DISTANCE
Upper Product Thickness	10	CHANNEL_UPPER_ PRODUCT_THICKNESS
Interface Level	11	CHANNEL_INTERFACE_LEVEL
Interface Level Rate	12	CHANNEL_INTERFACE_ LEVELRATE
Interface Signal Strength	13	CHANNEL_INTERFACE_ SIGNALSTRENGTH
Signal Quality	14	CHANNEL_SIGNAL_QUALITY
Surface/Noise Margin	15	CHANNEL_ SURFACE_NOISE_MARGIN
Vapor DC	16	CHANNEL_VAPOR_DC

E.3.2 Level transducer block parameters

Table E-10: Level Transducer Block Parameters and Descriptions

Index Number	Parameter	Description
1	ST_REV	The revision level of the static data associated with the function block. The revision value increments each time a static parameter value in the block is changed.
2	TAG_DESC	The user description of the intended application of the block.
3	STRATEGY	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
4	ALERT_KEY	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
5	MODE_BLK	The actual, target, permitted, and normal modes of the block. Target: The mode to “go to” Actual: The mode the “block is currently in” Permitted: Allowed modes that target may take on Normal: Most common mode for target
6	BLOCK_ERR	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
7	UPDATE_EVT	This alert is generated by any change to the static data.
8	BLOCK_ALM	The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed.
9	TRANSDUCER_DIRECTORY	Directory that specifies the number and starting indices of the transducers in the transducer block.
10	TRANSDUCER_TYPE	Identifies the transducer.
11	TRANSDUCER_TYPE_VER	Transducer type version
12	XD_ERROR	A transducer block alarm subcode.
13	COLLECTION_DIRECTORY	A directory that specifies the number, starting indices, and DD Item ID’s of the data collections in each transducer within a transducer block.
14	RADAR_LEVEL	Level
15	RADAR_LEVEL_RANGE	See Table E-21
16	RADAR_ULLAGE	Distance (Ullage)
17	RADAR_LEVELRATE	Level rate
18	RADAR_LEVELRATE_RANGE	See Table E-22
19	RADAR_LEVEL_SIGNAL_STRENGTH	Signal strength
20	RADAR_LEVEL_SIGNAL_STRENGTH_RANGE	See Table E-24

Table E-10: Level Transducer Block Parameters and Descriptions *(continued)*

Index Number	Parameter	Description
21	RADAR_VOLUME	Volume
22	RADAR_VOLUME_RANGE	See Table E-25
23	RADAR_INTERNAL_TEMPERATURE	Internal temperature
24	RADAR_INTERNAL_TEMPERATURE_RANGE	Range, unit and number of decimals
25	VOLUME_UPPER	The calculated volume value of the upper product at the current level and interface
26	VOLUME_LOWER	The calculated volume value of the lower product at the current interface
27	INTERFACE_DISTANCE	The distance to the interface (from the upper reference point).
28	UPPER_PRODUCT_THICKNESS	The thickness of the upper product (from the surface value to the interface value).
29	INTERFACE_LEVEL	The current interface level value (from the zero level reference point and up to the interface).
30	INTERFACE_LEVELRATE	The current velocity at which the interface is moving. A positive value indicates the interface is moving up.
31	INTERFACE_SIGNAL_STRENGTH	The current signal strength of the interface echo.
32	PROBE_TYPE	Select the type of probe that is mounted to this device. Use User Defined probe if your probe can not be found in the list or if you have done modifications to a standard probe.
33	PROBE_LENGTH	Enter the length of the probe measured from the device's upper reference point (normally the upper side of the tank flange) down to the probe end. If a weight is used it shall not be included in the length.
34	PROBE_ANGLE	Defines the angle compared to the plumb line at which the device with probe is mounted (0°means that probe is mounted vertically).
35	PROBE_END_PULSE_POLARITY	This parameter is used for User Defined probes only. Contact Emerson™ Service Department for more information
36	PROBE_IMPEDANCE	This parameter is used for User Defined probes only. Contact Emerson Service Department for more information
37	TCL	This parameter is used for User Defined probes only. Contact Emerson Service Department for more information
38	PROPAGATION_FACTOR	This parameter is used for User Defined probes only. Contact Emerson Service Department for more information
39	REF_PULSE_AMPL	This parameter is used for User Defined probes only. Contact Emerson Service Department for more information
40	GEOM_TANK_HEIGHT	Tank height (R)
41	GEOM_HOLD_OFF_DIST	Hold off distance

Table E-10: Level Transducer Block Parameters and Descriptions *(continued)*

Index Number	Parameter	Description
42	VAPOR_DC	Enter the dielectric constant for the vapor gas in the tank. For air at 20 degC and atmospherical pressure the vapor DC is close to 1, but for high pressure/high temperature applications the DC may increase and affect the accuracy of the measurement
43	UPPER_PRODUCT_DC	Enter the Upper Product Dielectric Constant (DC) as dielectric accurate as possible. This value affects the accuracy of the interface level measurement
44	LOWER_PRODUCT_DC_RANGE	Enter the range of the dielectric constant (DC) for the lower product in the tank. If you are uncertain about the value for this parameter or are changing product in the tank on a regular basis choose Unknown
45	PRODUCT_DIELEC_RANGE	Enter the range of the Product DC for the product in the tank. If you are uncertain about the value for this parameter or are changing product in the tank on a regular basis choose Unknown
46	MEAS_MODE	Select the Measurement Mode to use in the device. Some modes require software options to be enabled in the device. You can upgrade the device to enable more software options
47	DAMPING_VALUE	Damping value
48	GEOM_OFFSET_DIST	Distance offset
49	GEOM_CALIBRATION_DIST	Calibration distance
50	LCD_SETTINGS	Use quick startup mode
51	LCD_PARAMETERS	Parameters to show
52	LCD_LANGUAGE	Language on display
53	LCD_LENGTH_UNIT	Length unit on display
54	LCD_VOLUME_UNIT	Volume unit on display
55	LCD_TEMPERATURE_UNIT	Temperature unit on display
56	LCD_VELOCITY_UNIT	Velocity unit on display
57	MAX_INTERNAL_TEMPERATURE	The maximum temperature that has been measured inside the device during operation
58	MIN_INTERNAL_TEMPERATURE	The minimum temperature that has been measured inside the device during operation
59	OPERATION TIME	The total number of hours the device has been in operation
60	ENV_ENVIRONMENT	Process condition
61	ENV_PRESENTATION	Tank presentation
62	ENV_DEVICE_MODE	Service mode
63	ENV_WRITE_PROTECT	Write protect
64	DIAGN_DEV_ALERT	Errors, Warnings, Status, Plant web alerts
65	DIAGN_VERSION	Gauge SW version
66	DIAGN_REVISION	P1451 revision

Table E-10: Level Transducer Block Parameters and Descriptions *(continued)*

Index Number	Parameter	Description
67	DIAGN_DEVICE_ID	Device ID for the gauge.
68	DIAGN_DEVICE_MODEL	Type of 5300. LF or HF
69	STATS_ATTEMPTS	The total number of messages sent to the transducer A/D board
70	STATS_FAILURES	The total number of failed A/D board message attempts
71	STATS_TIMEOUTS	The total number of timed out A/D board message attempts
72	MAX_UPPER_PRODUCT_THICKNESS	This is the maximum thickness of the upper product that the device is able to measure through. If the thickness of the upper product is larger than this value, the device will not be able to locate the interface echo
73	MEAS_STATUS	Measurement status
74	INTERFACE_STATUS	Interface status
75	REMOTE_HOUSING	Select the length of the remote housing connection used in the installation.
76	MEAS_VAPOR_DC	Measured Vapor Dielectric Constant
77	SPEC_CONFIG_TNZ	Configure Trim Near Zone
78	SPEC_CONFIG_PEP	Configure Probe End Projection
79	SPEC_CONFIG_TANK_MATERIAL	Configure Tank Material
80	SPEC_CONFIG_VC	Configure Vapor Compensation
81	VC_WARNING	Vapor Compensation Warning
82	PEP_STATUS	Probe End Projection Status
83	TANK_MATERIAL	Tank material
84	SW_SUPPORT2	Defines what options are enabled in the device.
85	MOUNTING_TYPE	Mounting type
86	PIPE_DIAMETER	Inner diameter, pipe/chamber/nozzle
87	NOZZLE_HEIGHT	Nozzle height
88	DEVICE_HW_CONFIG	
89	DEVICE_STATUS	Device status
90	VOLUME_STATUS	Volume status
91	MWM_WARNING	Sweep dump active
92	MEAS_WARNING	Probe End Projection DC est limited
93	CONFIG_WARNING	Configuration warning
94	VAPOR_COMP_STATUS	Vapor Compensation Status
95	P1451_SLAVE_STATS	
96	P1451_HOST_STATS	

Table E-10: Level Transducer Block Parameters and Descriptions *(continued)*

Index Number	Parameter	Description
97	FF_SUPPORT_INFO	
98	SENSOR_DIAGNOSTICS	
99	HEART_BEAT_COUNT	

Table E-11: Probe Type

VALUE	PROBE_TYPE
0	User defined
3	Coaxial
4	Rigid Single 0.3 in. (8 mm)
5	Flexible Single
10	Coaxial HTHP
11	Coaxial HP/C
12	Rigid Single HTHP/HP 0.3 in. (8 mm)
13	Flexible Single HTHP
20	Rigid Single PTFE
21	Flexible Single PTFE
30	Rigid Single HP/C 0.3 in. (8 mm)
31	Flexible Single HP
32	Flexible Single PA
33	Rigid Single 0.5 in. (13 mm)
40	Rigid Single HTHP 0.5 in. (13 mm)
41	Rigid Single HP/C 0.5 in. (13 mm)
42	Large coaxial
43	Large coaxial HP/C

Table E-12: Device Mode

VALUE	ENV_DEVICE_MODE
0	Normal operation
1	Spare
2	Restart device
3	Set to factory default database
4	Trim Near Zone

Table E-13: Environment

Bit Number	Value of ENV_ENVIRONMENT	Description
2	0x00000004	Turbulent
3	0x00000008	Foam
28	0x10000000	Rapid Changes

Table E-14: Presentation

Bit Number	Value of ENV_PRESENTATION	Description
28	0x10000000	Do Not Use Full Tank State
2	0x00000002	Use 3300 Full and Empty Detect Areas
3	0x00000004	Disable PEP PE Sign Change Logic
8	0x00000100	Show Negative Level as Zero
10	0x00000400	Probe End Projection
11	0x00000800	Do Not Use Automatic PEP DC Estimation
12	0x00001000	Do Not Reject Possible Double Bounces
18	0x00040000	Use Jump Filter
22	0x00400000	Show Level below Probe End as Zero
23	0x00800000	Use Vapor Compensation
24	0x01000000	Calculate Signal Quality Metrics

Table E-15: LCD Parameters

Bit Number	Value of LCD_PARAMETERS	Description
28	0x10000000	Level
1	0x00000002	Distance
2	0x00000004	Level Rate
3	0x00000008	Signal Strength
4	0x00000010	Volume
5	0x00000020	Internal Temperature
6	0x00000040	Analog Out Current
7	0x00000080	Percent Of Range
8	0x00000100	Com Quality
9	0x00000200	Interface Level
10	0x00000400	Interface Distance
11	0x00000800	Interface Level Rate
12	0x00001000	Interface Signal Strength
13	0x00002000	Upper Product Thickness
14	0x00004000	Lower Volume
15	0x00008000	Upper Volume
16	0x00010000	Signal Quality
17	0x00020000	Surface Noise Margin
18	0x00040000	Vapor DC

Table E-16: Product Dielectrical Range

VALUE	ENV_DIELECTR_CONST
0	1.4 - 1.9 (e.g. liquified gas, plastics)
1	1.9-2.5 (e.g. Oil Based)
2	2.5-4 (e.g. Oil Based)
3	4-10 (e.g. Alcohol, Acids)
4	>10 (e.g. Waterbased)
5	Unknown

Table E-17: Measurement Mode

VALUE	MEAS_MODE
0	Liquid Product Level
1	Product Level and Interface Level
2	Solid Product Level
3	Interface Level with Submerged Probe

E.3.3 Diagnostics device errors

In addition to the BLOCK_ERR and XD_ERROR parameters, more detailed information on the measurement status can be obtained via DIAGN_DEV_ALERT. Table E-18 lists the potential errors and the possible corrective actions for the given values. The corrective actions are in order of increasing system level compromises. The first step should always be to reset the gauge and then if the error persists, try the steps in Table E-18. Start with the first corrective action and then try the second.

Table E-18: Device Errors Diagnostics

Bit Number	Value of DIAGN_DEV_ALERT	Description	Corrective action
	0	No alarm active	
0	0x00000001	Reserved	
1	0x00000002	FF card to gauge comm fault	Replace gauge
2	0x00000004	Level measurement failure	Verify device installation and configuration
3	0x00000008	Temperature measurement failure	Check ambient temperature. If ambient temperature ok replace the device.
4	0x00000010	Volume measurement failure	Check volume configuration
5	0x00000020	Database Error	Load default database to the device and reconfigure the device
6	0x00000040	HW Error	Replace device
7	0x00000080	Microwave Unit Error	Replace device
8	0x00000100	Configuration Error	Load default database to the device and reconfigure the device
9	0x00000200	SW Error	Replace device
10	0x00000400	Invalid Strap Table	Check the Strapping Table configuration
11	0x00000800	Internal Temp Warning	Check ambient temperature at installation site
12	0x00001000	Database Warning	Check the device configuration
13	0x00002000	HW Warning	Check device installation and configuration
14	0x00004000	Microwave Unit Warning	Check device installation and configuration
15	0x00008000	Configuration Warning	Check the device configuration
16	0x00010000	SW Warning	Check device installation and configuration
17	0x00020000	Simulation Mode	Use Simulation Method under advanced configuration tool to get the device out of Simulation Mode
18	0x00040000	Volume Range Warning	Verify Strapping Table
19	0x00080000	Software Write Protected	

Table E-18: Device Errors Diagnostics *(continued)*

Bit Number	Value of DIAGN_DEV_ALERT	Description	Corrective action
20	0x00100000	Vapor Compensation Not Calibrated	
21	0x00200000	Vapor DC Estimation Limited	
22	0x00400000	Reference Reflector Not Found	
23	0x00800000	BaseLine too low	
24	0x01000000	BaseLine too high	
25	0x02000000	Gain control	
26	0x04000000	Unsupported Combination of Functions	
27	0x08000000		
28	0x10000000		
29	0x20000000	Probe Missing	Check probe connection
30	0x40000000	Interface Measurement Failure	Check interface measurement configuration
31	0x80000000	Hardware Write Protected	

E.4 Register Transducer block parameters

The Register Transducer block allows access to Database registers and Input registers. This makes it possible to read a selected set of register directly by accessing the memory location.

The Register Transducer block is only available with advanced service.

⚠ CAUTION

Since the Register Transducer block allows access to most registers, it should be handled with care and ONLY to be changed by trained and certified service personnel, or as guided by Emerson Automation Solutions support personnel.

Table E-19: Register Transducer Block Parameters

Index Number	Parameter	Description
1	ST_REV	The revision level of the static data associated with the function block. The revision value increments each time a static parameter value in the block is changed.
2	TAG_DESC	The user description of the intended application of the block.
3	STRATEGY	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
4	ALERT_KEY	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
5	MODE_BLK	The actual, target, permitted, and normal modes of the block. Target: The mode to “go to” Actual: The mode the “block is currently in” Permitted: Allowed modes that target may take on Normal: Most common mode for target
6	BLOCK_ERR	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
7	UPDATE_EVT	This alert is generated by any change to the static data
8	BLOCK_ALM	The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed.
9	TRANSDUCER_DIRECTORY	Directory that specifies the number and starting indices of the transducers in the transducer block.
10	TRANSDUCER_TYPE	Identifies the transducer.
11	TRANSDUCER_TYPE_VER	Transducer type version
12	XD_ERROR	A transducer block alarm sub code.
13	COLLECTION_DIRECTORY	A directory that specifies the number, starting indices, and DD Item ID’s of the data collections in each transducer within a transducer block.
14	RB_PARAMETER	

Table E-19: Register Transducer Block Parameters *(continued)*

Index Number	Parameter	Description
15-44	INP_REG_n_TYPE	Describes characteristics of input register n. Indicates requested value is displayed as a floating point (/ decimal) number.
	INP_REG_n_FLOAT	Input register n value, displayed as floating point number
	INP_REG_n_INT_DEC	Input register n value, displayed as decimal number
45-74	DB_REG_n_TYPE	Describes characteristics of holding register n. Indicates requested value is displayed as a floating point (/ decimal) number.
	DB_REG_n_FLOAT	Holding register n value, displayed as floating point number.
	DB_REG_n_INT_DEC	Holding register n value, displayed as decimal number.
75	RM_COMMAND	Defines what action to perform; Read Input/Holding Register, Restart Device, Poll Program Complete.
76	RM_DATA	RM_DATA is used by the configuration tool to read/write data from and to device.
77	RM_STATUS	Status of last executed command
78	INP_SEARCH_START_NBR	Input register search start number
79	DB_SEARCH_START_NBR	Holding register search start number

E.5 Advanced Configuration Transducer Block

E.5.1 Overview

The Advanced Configuration Transducer Block contains functions for the advanced configuration of the Rosemount™ 5300 Level Transmitter. It includes functions, such as amplitude threshold settings for filtering of disturbing echoes and noise, simulation of measurement values, Empty Tank Handling for optimizing measurements close to the tank bottom, and strapping table for volume measurements.

E.5.2 Advanced configuration transducer block parameters

Table E-20: Advanced Configuration Transducer Block Parameters

Index Number	Parameter	Description
1	ST_REV	The revision level of the static data associated with the function block. The revision value increments each time a static parameter value in the block is changed.
2	TAG_DESC	The user description of the intended application of the block.
3	STRATEGY	The strategy field can be used to identify grouping of blocks. This data is not checked or processed by the block.
4	ALERT_KEY	The identification number of the plant unit. This information may be used in the host for sorting alarms, etc.
5	MODE_BLK	The actual, target, permitted, and normal modes of the block. Target: The mode to “go to” Actual: The mode the “block is currently in” Permitted: Allowed modes that target may take on Normal: Most common mode for target
6	BLOCK_ERR	This parameter reflects the error status associated with the hardware or software components associated with a block. It is a bit string, so that multiple errors may be shown.
7	UPDATE_EVT	This alert is generated by any change to the static data.
8	BLOCK_ALM	The block alarm is used for all configuration, hardware, connection failure or system problems in the block. The cause of the alert is entered in the subcode field. The first alert to become active will set the Active status in the Status parameter. As soon as the Unreported status is cleared by the alert reporting task, another block alert may be reported without clearing the Active status, if the subcode has changed.
9	TRANSDUCER_DIRECTORY	Directory that specifies the number and starting indices of the transducers in the transducer block.
10	TRANSDUCER_TYPE	Identifies the transducer. 100 = Standard pressure with calibration
11	TRANSDUCER_TYPE_VER	Transducer type version
12	XD_ERROR	A transducer block alarm subcode.

Table E-20: Advanced Configuration Transducer Block Parameters *(continued)*

Index Number	Parameter	Description
13	COLLECTION_DIRECTORY	A directory that specifies the number, starting indices, and DD Item ID's of the data collections in each transducer within a transducer block.
14	AMPLITUDE_THRESHOLD_CURVE	ATC: filters out weak disturbance echoes and noise.
15	SIMULATION_MODE	Simulation of measurement values.
16	SET_CONSTANT_THRESHOLD	A constant amplitude threshold can be used to filter out noise.
17	RADAR_LEVEL_RANGE	See Table E-21
18	RADAR_LEVEL_ SIGNAL_STR_RANGE	See Table E-24
19	RADAR_VOLUME_RANGE	See Table E-25
20	ENV_PRESENTATION	
21	PROBE_END_THRESH	This threshold is used to locate the probe end echo. The probe end echo is used by the device to know when the tank is empty, but is sometimes also useful when no surface echo can be found.
22	REFERENCE_THRESH	This threshold is used to locate the reference echo.
23	INTERFACE_THRESH	This threshold is used to block out disturbing echoes and noise when locating the interface echo.
24	FULL_TANK_THRESH_OFFSET	By adding an offset to the Reference Threshold it is possible for the device to determine when the tank is full. If the reference echo amplitude is between the Reference Threshold and the Full Tank Threshold then the tank is considered full.
25	PEP_PRODUCT_DC	Enter the product dielectric constant for the product in the tank.
26	AUTO_CONF_MEAS_FUNC	
27	ECHO_TIME_OUT	Change this parameter to define the time in seconds before the device should start to search for a surface echo after it has been lost.
28	CLOSE_DIST	This parameter defines a window centered at the current surface position where new surface echo candidates can be selected. The size of the window is +/-Close Distance. Echoes outside this window will not be considered as surface echoes.
29	USED_PROBE_END_THRESH	Probe End Threshold currently used in the device.
30	USED_REFERENCE_THRESH	Reference Threshold currently used in the device.
31	USED_INTERFACE_THRESH	Interface Threshold currently used in the device.
32	USED_TANK_PRESENTATION	
33	USED_ECHO_TIME_OUT	Echo Timeout currently used in the device.
34	USED_CLOSE_DIST	Close Distance currently used in the device.
35	SW_SUPPORT2	Defines what options are enabled in the device.
36	USED_HOLD_OFF_DIST	The Hold Off Distance/Upper Null Zone currently used in the device.

Table E-20: Advanced Configuration Transducer Block Parameters *(continued)*

Index Number	Parameter	Description
37	USED_PEP_PRODUCT_DC	Product Dielectric currently used in the device.
38	START_CODE	This code determines what options are available in your device. Do not change your Start Code unless you have received a valid one. Use Enter Start Codes method to change it.
39	UNIT_CODE	Unit code 1 -4 can be sent to your local Emerson™ representative in order to receive new Start Codes for upgrading your device.
40	ENV_SET_START_CODE	Set Start Code
41	PROBE_END_ANCHORING	Select if the probe end is anchored to the tank bottom or not.
42	PEP_PROBE_END_OFFSET	Probe end offset
43	USED_PEP_ PROBE_END_OFFSET	
44	VOL_VOLUME_CALC_METHOD	Choose what kind of volume calculation method to use.
45	VOL_IDEAL_DIAMETER	Diameter of the tank (only for ideal tank shapes).
46	VOL_IDEAL_LENGTH	Length/height of the tank (only for ideal tank shapes).
47	VOL_VOLUME_OFFSET	Use this parameter to add a volume to each calculated volume value. The volume can for instance correspond to a sump volume that you wish to add to your calculation.
48	VOL_STRAP_TABLE_LENGTH	Number of points to use in the strapping table.
49	VOL_STRAP_LEVEL	Strap value level 1-20 points
50	VOL_STRAP_VOLUME	Strap value volume 1-20 points
51	ECHO_UPDATE	
52	ECHO_FOUND_DISTANCE	Distance to found echo peaks
53	ECHO_FOUND_AMPLITUDE	Signal amplitude of found echo peaks
54	ECHO_FOUND_CLASS	Echo peak types
55	PEP_STATUS	Probe End Projection Status
56	PEP_PRODUCT_DC_LIMIT	Probe End Projection Dielectric Constant Limit
57	PROBE_END_PULSE_POLARITY	Probe End Pulse Polarity
58	USED_MAX_VAPOR_DC	
59	REF_REFLECTOR_TYPE	Reference Reflector Type
60	VAPOR_DC_FILTER_FACTOR	Vapor Dielectric Constant Filter Factor
61	SIGNAL_QUALITY	Product surface echo amplitude compared to surface threshold (ATC) and noise. Zero indicates a bad signal quality and 10 a good signal quality.
62	MIN_SIGNAL_QUALITY	Minimum signal quality since the last time Signal Quality Metrics were reset.
63	MAX_SIGNAL_QUALITY	Maximum signal quality since the last time ‘Signal Quality Metrics’ were reset.

Table E-20: Advanced Configuration Transducer Block Parameters *(continued)*

Index Number	Parameter	Description
64	TIME_SINCE_LAST_RESET	Operation time elapsed since the last time 'Signal Quality Metrics' were reset.
65	SURFACE_NOISE_MARGIN	Surface/Noise Margin
66	MIN_SURFACE_NOISE_MARGIN	Minimum Surface/Noise Margin
67	MAX_SURFACE_NOISE_MARGIN	Maximum Surface/Noise Margin
68	VAPOR_COMP_STATUS	Vapor Compensation Status
69	DEVICE_COMMAND	
70	DEVICE_COMMAND_STATUS	
71	RADAR_INTERNAL_TEMPERATURE_RANGE	
72	MAX_PRESSURE	
73	MAX_TEMPERATURE	
74	MAX_VAPOR_DC	Maximum Vapor Dielectric Constant
75	MEAS_STATUS	Measurement Status
76	CENTERING_DISC	Specify if there is any centering disc close to the probe end and what material that disc is made of.
77	PEP_TRIM_EMPTY_FAILURE	Probe End Projection - Trim Empty Failure
78	PEP_TRIM_FILL_FAILURE	Probe End Projection - Fill Failure
79	PEP_RAW_PRODUCT_DC_EST	Probe End Projection - Raw Product Dielectric Constant Estimation
80	PEP_RAW_DC_EST_USED_DISTANCE	
81	USE_PROBE_END_PROJECTION	Use Probe End Projection
82	USE_STATIC_PRODUCT_DC	Use Static Product Dielectric Constant
83	CALCULATE_SIGNAL_QUALITY_METRICS	Calculate Signal Quality Metrics
84	USE_VAPOR_COMPENSATION	Use Vapor Compensation
85	SPEC_CONFIG_PEP	Configure Probe End Projection
86	SPEC_CONFIG_VC	Configure Vapor Compensation
87	SIGNAL_QUALITY_ALERT_LIMIT	Alert limit for low Signal Quality
88	SURFACE_NOISE_MARGIN_ALERT_LIMIT	Alert limit for low Surface/Noise Margin

E.6 Supported units

Unit codes

Table E-21: Length Units

ID	Display	Description
1010	m	meter
1012	cm	centimeter
1013	mm	millimeter
1018	ft	feet
1019	in	inch

Table E-22: Level Rate Units

ID	Display	Description
1061	m/s	meter / second
1063	m/h	meter / hour
1067	ft/s	feet / second
1069	in/m	inch / minute

Table E-23: Temperature Units

ID	Display	Description
1001	°C	Degree Celsius
1002	°F	Degree Fahrenheit

Table E-24: Signal Strength Units

ID	Display	Description
1243	mV	millivolt

Table E-25: Volume Units

ID	Display	Description
1034	m^3	Cubic meter
1038	L	Liter
1042	in^3	Cubic inch
1043	ft^3	Cubic feet
1044	Yd^3	Cubic yard
1048	Gallon	US gallon
1049	ImpGall	Imperial gallon
1051	Bbl	Barrel

Table E-26: Time Units

ID	Display	Description
1054	s	Seconds

Table E-27: Percent

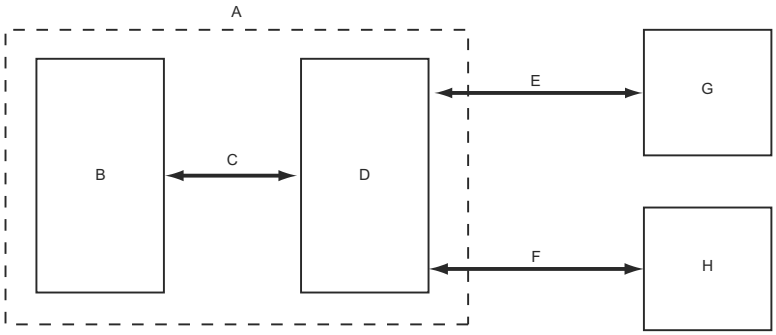
ID	Display	Description
1342	%	Percent

F HART® to Modbus® Converter (HMC) module

The Rosemount 5300 Level Transmitter is a Modbus compatible measurement device that supports communication with a Remote Terminal Unit (RTU) using a subset of read, write, and diagnostic commands used by most Modbus compatible host controllers. The transmitter also supports communication through Levelmaster and Modbus ASCII protocols.

The HART to Modbus Converter (HMC) module is located inside the Rosemount 5300 Level Transmitter enclosure and provides power to and communicates with the transmitter through a HART® interface.

Figure F-1: System Overview



A. Rosemount 5300 enclosure
B. Rosemount 5300 electronics
C. HART signals
D. HART to Modbus Converter
E. Modbus and Levelmaster communication
F. HART signals
G. Remote Terminal Unit
H. Rosemount Radar Master/Handheld communicator

During normal operation, the HMC "mirrors" the contents of process variables from the Rosemount 5300 Level Transmitter to the Modbus registers. To configure the Rosemount 5300 Level Transmitter, it is possible to connect a configuration tool to the HMC.

F.1 Workflow for commissioning a transmitter with Modbus® protocol

Procedure

1. Mount the transmitter on the tank.
2. Connect the power and communication wires.
3. Establish HART® communication with the transmitter. Do one of the following:
   - Connect to the MA/MB terminals (tunneling mode).
   - Connect to the HART terminals.

4. Configure the transmitter.
5. Configure the Modbus communication.
6. Configure Modbus host.
7. Verify output values as reported by the transmitter.

F.2 Modbus® communication protocol configuration

The Rosemount 5300 Level Transmitter can communicate with RTUs using Modbus RTU (often referred to as just “Modbus”), Modbus ASCII, and Levelmaster (also known as “ROS,” “Siemens,” or “Tank” protocol).

Table F-1: List of RTU Supported Protocols

RTU	Protocols
ABB Totalflow	Modbus RTU, Levelmaster
Bristol™ ControlWave™ Micro	Modbus RTU
Emerson ROC800 Series	Modbus RTU, Levelmaster(1)
Emerson FloBoss™ 107	Modbus RTU, Levelmaster(1)
Kimray® Inc. DACC™ 2000/3000	Levelmaster
ScadaPack	Modbus RTU
Thermo Electron Autopilot	Modbus RTU, Levelmaster

(1) Levelmaster protocol should be used when using the Emerson Digital Level Sensor (DLS) User Program or Application Module together with the device. Use Modbus RTU in other cases.

Modbus ASCII is not commonly used, since it doubles the amount of bytes for the same message as the Modbus RTU.

If you do not have any of these RTUs, check your RTU manual to see which protocols it supports.

F.2.1 Modbus® RTU communication setup

The Rosemount 5300 is configured with the default Modbus RTU address 246, and with the following Modbus RTU communication parameter default settings:

Table F-2: Modbus RTU Communication Parameters

Parameter	Default Value	Configurable Values
Baud Rate	9600	1200, 2400, 4800, 9600, 19200
Start Bits(1)	One	One
Data Bits(1)	Eight	Eight
Parity	None	None, Odd, Even
Stop Bits	One	One or Two
Address range	246	1-255

(1) Start Bits and Data Bits cannot be changed.

To reset the communication parameters to default Modbus RTU settings, use the following Modbus Message:

HMC

Modbus RTU parameter configuration

You want to use address 44 for the Rosemount 5300 Level Transmitter, and the following communication parameters are used by the host:

Table F-3: Communication Parameters Used by the Host (Example)

Parameter	Value
Baud Rate	4800
Start Bits	One
Data Bits	Eight
Parity	Odd
Stop Bits	Two

To configure the Rosemount 5300 Level Transmitter to communicate with the Host in this example, the following text string is written to the HART Slave 1 message area:

`HMC A44 B4800 PO S2.`

HMC These three letters are used for safety and will eliminate the risk of changing the configuration data by mistake.

A44 A indicates that the following number is the new address (address 44). Leading zeroes are not needed.

B4800 B indicates that the following number is the new baud rate (1200, 2400, 4800, 9600, 19200).

PO P identifies the following letter as parity type (O = odd, E = even, and N = none).

S2 S indicates that the following figure is the number of stop bits (1 = one, 2 = two).

Only values that differ from the current values need to be included. For example, if only the address is changed, the following text string is written into the 5300 (HART Slave 1) message area:

`HMC A127,`

indicates that 127 is the new address.

F.2.2 Levelmaster communication setup

The default and configurable parameter values can be found in Table F-4.

Table F-4: Levelmaster Communication Parameters

Parameter	Default value	Configurable value
Baud Rate	9600	1200, 2400, 4800, 9600, 19200
Start Bits	One	One
Data Bits	Seven	Seven, Eight
Parity	None	None, Odd, Even

Table F-4: Levelmaster Communication Parameters *(continued)*

Parameter	Default value	Configurable value
Stop Bits	One	One or Two
Address	1	1-99

To reset the communication parameters to default Levelmaster settings, use the following Modbus Message:

```
HMC M2
```

Levelmaster parameter configuration

You want to use address 2 for the Rosemount 5300 Level Transmitter and the host uses the following parameters:

Table F-5: Levelmaster Communication Parameters

Parameter	Value
Baud Rate	9600
Start Bits	One
Data Bits	Seven
Parity	None
Stop Bits	One

To configure the Rosemount 5300 Level Transmitter to communicate with the host in this example, the following text string is written to the Modbus message area:

```
HMC M2 A2 B9600 D7 PN S1.
```

Note
Include all the parameters when writing to the message area.

Note that an address must be unique on the bus.

HMC These three letters are used for safety and will eliminate the risk of changing the configuration data by mistake.

M2 This means that the Levelmaster protocol is to be used.

A2 A indicates that the following is the new address (address 2). Leading zeroes are not needed.

B9600 B indicates that the following number is the new baud rate (1200, 2400, 4800, 9600, 19200).

D7 D indicates that the following data bits are to be used (7 = seven, 8 = eight).

PN P identifies the following letter as parity type (O = odd, E = even, and N = none).

S1 S indicates that the following figure is the number of stop bits (1 = one, 2 = two).

Note
Start bits are not configurable and cannot be set.

Implemented Levelmaster functions

See Table F-6 for a description of the implemented Levelmaster functions in the HMC.

Table F-6: Implemented Functions of Levelmaster Protocol

Input format	Description	Output format
UnnN?	Return ID number	UnnNnnCcccc
UnnNmm	Set ID number	UnnNOKCcccc
UnnF?	Return number of floats	UnnFxCcccc
UnnFx?	Set number of floats	UnnFOKCcccc
Unn?	Return floats and other data	UnnDddd.ddFfffEeeeeWwwwCccc[1]

(1) In this case, number of floats is set to 1. If number of floats is set to 2, the Output Format would be: UnnDddd.ddDddd.ddFfffEeeeeWwwwCcccc

Note
If one float is sent, it is “Float1”. If two floats are sent, it is “Float 1” before “Float 0”.

Table F-7: Letters and Expressions

Letter	Description
nn	nn is used to identify slave to respond; nn is a number 00-99 or ** (wildcard). The EmulCtrl Address Holding register can be configured to a higher value than 99. In that case, the address will be truncated to 99.
mm	mm is the new ID number for the slave; mm is a number 00-99.
x	x is the number of floats returned when slave receives Unn?, x is a number 0-2.
cccc	Is the 16 bit CRC checksum, cccc are hexadecimal characters.
ddd.dd	ddd.dd is the distance value from slave 1. Note that the first d can also be a ‘-’ (minus).
Float 1	Slave 1 PV.
Float 0	Slave 1 SV.
fff	The temperature value. Configured by Holding Register 3208 in HMC.[1]
eeee	An error value. Bit 0: Invalid SV value (Float 0). Bit 8: Invalid Temperature value. Bit 12: Invalid PV value (Float 1).
Wwww	A warning value, not used in this implementation.

(1) Any of the four available variables from any of the five HART slaves can be selected as the temperature source. The least four significant bits (bit 0-3) select the variable number. Bits 4-7 select the HART slave address. If invalid values are used, the temperature value will be invalid, with no Error bit set. For example, if we want to use FV from HART Slave 3 as temperature source, we have to write the value 34 Hex (52 decimal).

F.2.3 Modbus ASCII communication setup

The parameter, default, and configurable values are shown in Table F-8.

Table F-8: Modbus ASCII Communication Parameters

Parameter	Default value	Configurable values
Baud Rate	9600	1200, 2400, 4800, 9600, 19200
Start Bits	One	One
Data Bits	Seven	Seven, Eight
Parity	None	None, Odd, even
Stop Bits	One	One or Two
Address	1	1-255

To reset the communication parameters to default Modbus ASCII settings, use the following Modbus message:

```
HMC M1
```

Modbus ASCII parameter configuration

You want to use address 246 for the Rosemount 5300 Level Transmitter and the host uses the following parameters:

Table F-9: Parameters Used by the Host (In Case of Modbus ASCII, Example)

Parameter	Value
Baud Rate	9600
Start Bits	One
Data Bits	Seven
Parity	None
Stop Bits	One

To configure the Rosemount 5300 Level Transmitter to communicate with the host in this example, the following text string is written to the Modbus message area:

```
HMC M1 A246 B9600 D7 PN S1.
```

Note
Include all the parameters when writing to the message area.

Note that an address must be unique on the bus.

HMC These three letters are used for safety and will eliminate the risk of changing the configuration data by mistake.

M1 This means that the Modbus ASCII protocol is to be used.

A246 A indicates that the following number is the new address (address 246). Leading zeroes are not needed.

B9600 B indicates that the following number is the new baud rate (1200, 2400, 4800, 9600, 19200).

D7 D indicates that the following data bits are to be used (7 = seven, 8 = eight).

PN P identifies the following letter as parity type (O = odd, E = even, and N = none).

S1 S indicates that the following figure is the number of stop bits (1 = one, 2 = two).

Note
Start bits are not configurable and cannot be set.

F.3 Common Modbus® host configuration

When using Modbus RTU or Modbus ASCII, the registers to receive status and variables must be configured in the host system.

The transmission of single-precision (4 bytes) IEEE 754 floating point numbers can be rearranged in different byte orders specified by the Floating Point Format Code. The format code information, stated for each Remote Terminal Unit (RTU) respectively, specifies which registers to poll from the Rosemount 5300 Level Transmitter in order for the RTU to correctly interpret floating point numbers. The byte transmission order for each format code is demonstrated in Table F-10.

Table F-10: Byte Transmission Order is Specified by the Floating Point Format Code

Format Code	Byte transmission order	Description
0	[AB] [CD]	Straight word order, most significant byte first
1	[CD] [AB]	Inverse word order, most significant byte first
2	[DC] [BA]	Inverse word order, least significant byte first
3	[BA] [DC]	Straight word order, least significant byte first

Note
Some Modbus hosts cannot read the information described here using Input Registers (Modbus function code 4). The Input Register information can also be read using Holding Register (Function code 3). In this case, Input Register number + 5000 is used as Holding Register number.

Between host system and device, it is recommended to use 60 seconds or less between polls, and three retries.

F.3.1 Input registers

The register area starting with 1300 can be configured to have any of the four format codes. The configuration is done by setting FloatingPointFormatCode register (holding register 3000) to 0-3. This configuration can be done with the Rosemount Radar Master program.

Note
Depending on the slave number the Rosemount 5300 Level Transmitter is using, different registers must be used with the default slave number being 1. Slave number is determined by the HART address.

Table F-11: Output Variables for the Configurable Floating Point Format (Default Code 1)

Register Name	Register Number	Note
Slave 1 Status Conf	1300	Bit information in bitfield. Bit 0: Invalid Measurement Slave 1 PV. Bit 1: Invalid Measurement Slave 1 Non PV. Bit 2: Invalid Measurement Slave 1 Non PV. Bit 3: Invalid Measurement Slave 1 Non PV. Bit 14: HART bus busy (slave in burst or other master present) Bit 15: HTM Task not running (option not available). **Note** Bit 1-3 is set when Invalid Measurement of Slave 1 Non PV. i.e. all three bits are set simultaneously.
Slave 1 PV Conf	1302	Primary variable from slave 1 represented in IEEE 754 format, using the byte order set in the FloatingPointFormatCode register.
Slave 1 SV Conf	1304	Secondary variable from slave 1 represented in IEEE 754 format, using the byte order set in the FloatingPointFormatCode register.
Slave 1 TV Conf	1306	Tertiary variable from slave 1 represented in IEEE 754 format, using the byte order set in the FloatingPointFormatCode register.
Slave 1 FV Conf	1308	Fourth variable from slave 1 represented in IEEE 754 format, using the byte order set in the FloatingPointFormatCode register.
Slave 2 data	1310-1318	Same data as for Slave 1.
Slave 3 data	1320-1328	Same data as for Slave 1.
Slave 4 data	1330-1338	Same data as for Slave 1.
Slave 5 data	1340-1348	Same data as for Slave 1.

The Rosemount 5300 Level Transmitter register area starting with register 2000 is used for hosts that require Floating Point Format Code 0 (see Table F-12).

Table F-12: Output Variables for Floating Point Format Code 0

Register Name	Register Number	Note
Slave 1 Status	2000	Bit information in bitfield: Bit 0: Invalid Measurement Slave 1 PV. Bit 1: Invalid Measurement Slave 1 SV. Bit 2: Invalid Measurement Slave 1 TV. Bit 3: Invalid Measurement Slave 1 FV. Bit 14: HART bus busy (slave in burst or other master present) Bit 15: HTM Task not running (option not available). **Note** Bit 1-3 is set when Invalid Measurement of Slave 1 Non PV, i.e. all three bits are set simultaneously.
Slave 1 PV	2002	Primary variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 0.
Slave 1 SV	2004	Secondary variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 0.
Slave 1 TV	2006	Tertiary variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 0.
Slave 1 FV (QV)	2008	Fourth variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 0.

Floating Point Format Codes 2 and 3 use register areas 2100 and 2200, respectively (see Table F-13 and Table F-14).

Table F-13: Output Variables for Floating Point Format Code 2

Register Name	Register Number	Note
Slave 1 Status	2100	Bit information in bitfield: Bit 0: Invalid Measurement Slave 1 PV. Bit 1: Invalid Measurement Slave 1 SV. Bit 2: Invalid Measurement Slave 1 TV. Bit 3: Invalid Measurement Slave 1 FV. Bit 14: HART bus busy (slave in burst or other master present) Bit 15: HTM Task not running (option not available). **Note** Bit 1-3 is set when Invalid Measurement of Slave 1 Non PV, i.e. all three bits are set simultaneously.
Slave 1 PV	2102	Primary variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 2.
Slave 1 SV	2104	Secondary variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 2.
Slave 1 TV	2106	Tertiary variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 2.
Slave 1 FV (QV)	2108	Fourth variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 2.

Table F-14: Output Variables for Floating Point Format Code 3

Register Name	Register Number	Note
Slave 1 Status	2200	Bit information in bitfield: Bit 0: Invalid Measurement Slave 1 PV. Bit 1: Invalid Measurement Slave 1 SV. Bit 2: Invalid Measurement Slave 1 TV. Bit 3: Invalid Measurement Slave 1 FV. Bit 14: HART bus busy (slave in burst or other master present) Bit 15: HTM Task not running (option not available). **Note** Bit 1-3 is set when Invalid Measurement of Slave 1 Non PV, i.e. all three bits are set simultaneously.
Slave 1 PV	2202	Primary variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 3.
Slave 1 SV	2204	Secondary variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 3.
Slave 1 TV	2206	Tertiary variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 3.
Slave 1 FV (QV)	2208	Fourth variable from slave 1 represented in IEEE 754 format, using Floating Point Format Code 3.

F.3.2 Measurement units

Measurement units for the various HART slaves are stored in input registers as a Unit Code presented in Table F-15.

Table F-15: Measurement Units and Corresponding Input Registers

Register Name	Register Number
Slave 1 PV Units	104
Slave 1 SV Units	108
Slave 1 TV Units	112
Slave 1 FV (QV) Units	116

Conversion from Unit Code to measurement unit is given in Table F-16.

Table F-16: Conversion of Unit Code to Measurement Unit

Measurement	Unit Code	Measurement Unit
Volume	40	US Gallon
	41	Liters
	42	Imperial Gallons
	43	Cubic Meters
	46	Barrels
	111	Cubic Yards
	112	Cubic Feet
	113	Cubic Inches
Length	44	Feet
	45	Meters
	47	Inches
	48	Centimeters
	49	Millimeters
Temperature	33	Degree Fahrenheit
	32	Degree Celsius

F.4 Specific Modbus® host configuration

The Remote Terminal Unit needs to be configured to communicate and correctly interpret data when reading input registers from the Rosemount 5300 Level Transmitter.

Baud rate

The specified Baud Rates are recommendations. If other Baud Rates are used, make sure the Rosemount 5300 Level Transmitter and the RTU are configured for the same communication speed.

Floating point format code

See Common Modbus® host configuration.

RTU data type

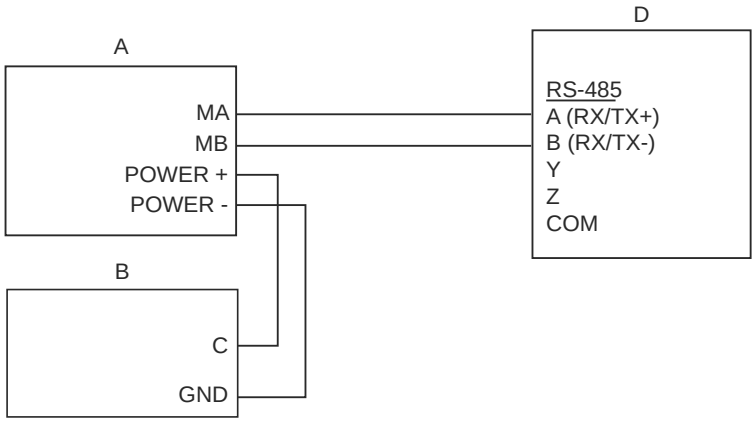
The RTU data type specifies which configuration to use in the RTU in order for the RTU to correctly interpret a floating point number transmitted from the Rosemount 5300 Level Transmitter with Modbus.

Input register base number

Data registers in the Rosemount 5300 Level Transmitter with Modbus are numbered exactly as they are transmitted in the Modbus communication. Some RTUs use different naming conventions and to configure the RTU to poll the correct registers from the Rosemount 5300 Level Transmitter Modbus, an Input Register Base Number is stated for each RTU respectively. For example, if the input register base number is 1 for the RTU, the Rosemount 5300 Level Transmitter Modbus input register 1302 has to be entered in the RTU address as input register 1303.

F.4.1 Emerson ROC800 Series

Figure F-2: Wiring Diagram for Connecting Rosemount 5300 Modbus to Emerson ROC800 Series



A. Rosemount 5300 Modbus
B. Power supply
C. + 8 to + 30 Vdc (max. rating)
D. ROC800 Series

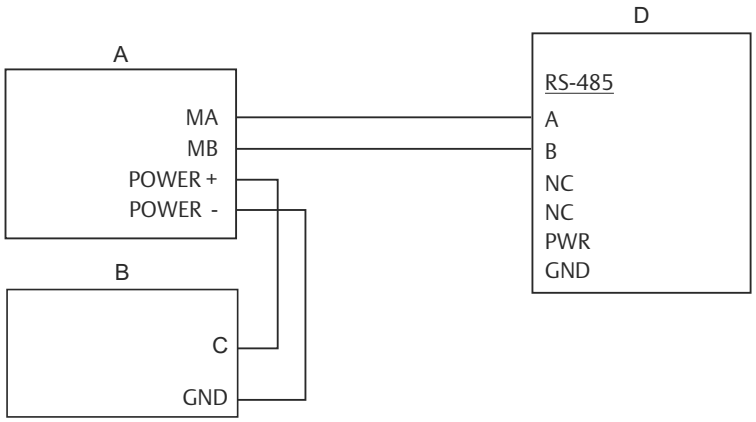
Table F-17: Parameter Values (In Case of Emerson ROC800 Series)

Parameter	Value
Baud Rate	9600
Floating Point Format Code	0
RTU Data Type	Conversion Code 66
Input Register Base Number	0

The Input Register Base Number needs to be added to the Input Register address of the Rosemount 5300 Level Transmitter. In this case, register 1300 needs to have 1300 entered as the address.

F.4.2 Emerson FloBoss 107

Figure F-3: Wiring Diagram for Connecting Rosemount 5300 Modbus to Emerson FloBoss 107



A. Rosemount 5300 Modbus
B. Power supply
C. + 8 to + 30 Vdc (max. rating)
D. FloBoss 107

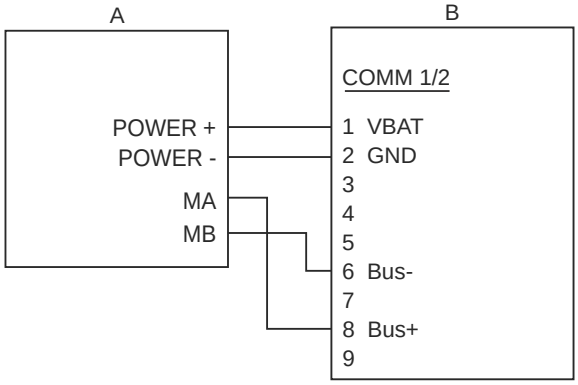
Table F-18: Parameter Values (In Case of Emerson FloBoss 107)

Parameter	Value
Baud Rate	9600
Floating Point Format Code	0
RTU Data Type	Conversion Code 66
Input Register Base Number	0

The Input Register Base Number needs to be added to the Input Register address of the Rosemount 5300 Level Transmitter. In this case, register 1300 needs to have 1300 entered as the address.

F.4.3 ABB TotalFlow

Figure F-4: Wiring Diagram for Connecting Rosemount 5300 Modbus to ABB TotalFlow



A. Rosemount 5300 Modbus
B. TOTALFLOW

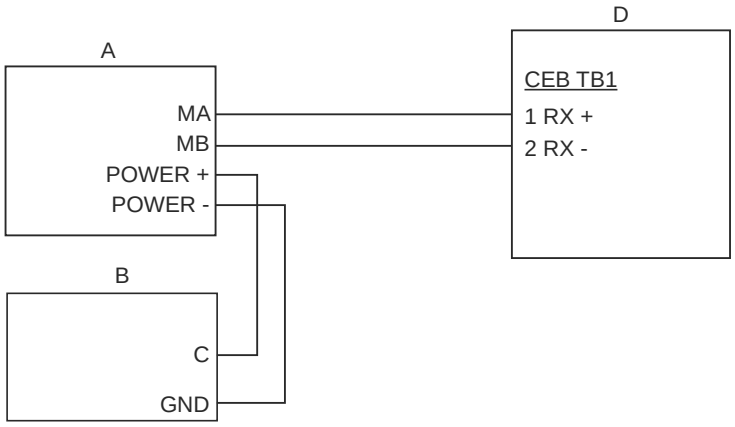
Table F-19: Parameter Values (In Case of ABB TotalFlow)

Parameter	Value
Baud Rate	9600
Floating Point Format Code	0
RTU Data Type	16 Bit Modicon
Input Register Base Number	1

The Input Register Base Number needs to be added to the Input Register address of the Rosemount 5300 Level Transmitter. In this case, register 1302 needs to have 1303 entered as the address etc.

F.4.4 Thermo Electron Autopilot

Figure F-5: Wiring Diagram for Connecting Rosemount 5300 Modbus to Thermo Electron Autopilot



A. Rosemount 5300 Modbus
B. Power supply
C. + 8 to + 30 Vdc (max. rating)
D. AutoPILOT

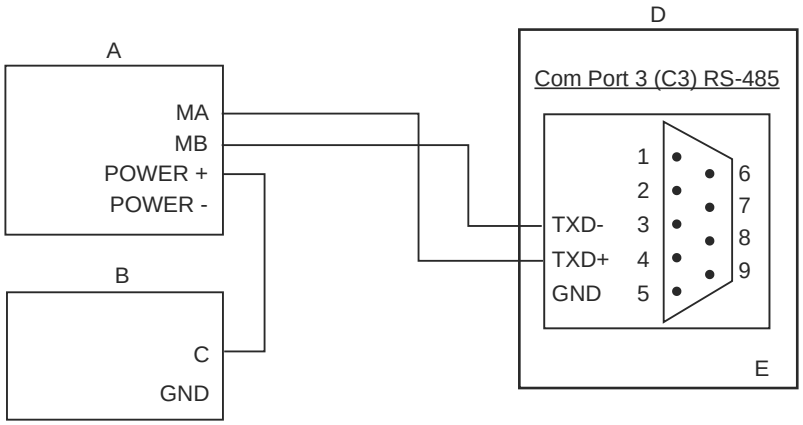
Table F-20: Parameter Values (In Case of Thermo Electron Autopilot)

Parameter	Value
Baud Rate	9600
Floating Point Format Code	1
RTU Data Type	IEEE Flt 2R
Input Register Base Number	0

The Input Register Base Number needs to be added to the Input Register address of the Rosemount 5300 Level Transmitter. In this case, register 1302 needs to have 1302 entered as the address etc.

F.4.5 Bristol ControlWave Micro

Figure F-6: Wiring Diagram for Connecting Rosemount 5300 Modbus to Bristol ControlWave Micro



A. Rosemount 5300 Modbus
B. Power supply
C. + 8 to + 30 Vdc (max. rating)
D. ControlWave Micro
E. DB9 Male

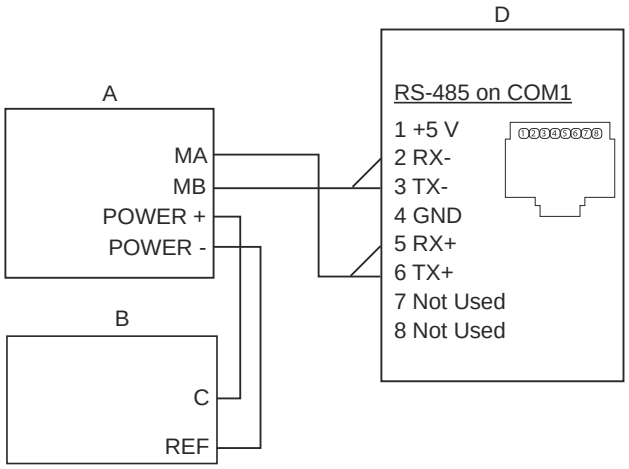
Table F-21: Parameter Values (In Case of Bristol ControlWave Micro)

Parameter	Value
Baud Rate	9600
Floating Point Format Code	2 (FC 4)
RTU Data Type	32-bit registers as 2 16-bit registers
Input Register Base Number	1

The Input Register Base Number needs to be added to the Input Register address of the Rosemount 5300 Level Transmitter. In this case, register 1302 needs to have 1303 entered as the address etc.

F.4.6 ScadaPack

Figure F-7: Wiring Diagram for Connecting Rosemount 5300 Modbus to SCADAPack 32



A. Rosemount 5300 Modbus
B. Power supply
C. + 8 to + 30 Vdc (max. rating)
D. SCADAPack32

Table F-22: Parameter Values (In Case of SCADAPack 32)

Parameter	Value
Baud Rate	9600
Floating Point Format Code	0
RTU Data Type	Floating Point
Input Register Base Number	30001

The Input Register Base Number needs to be added to the Input Register address of the Rosemount 5300 Level Transmitter. In this case, register 1302 needs to have 31303 entered as the address etc.

F.4.7 Kimray Inc. DACC 2000/3000

Table F-23 shows input types in Kimray Inc. IMI software and the corresponding value. The communication port must be configured to use “Tank Levels” protocol.

Table F-23: Kimray Inc. Input Types and Corresponding Values

Kimray Inc. Input Type	Rosemount 5300 Variable	Format
Tank Level1	PV	ddd.dd.alt. -dd.dd
Tank Level2	SV	ddd.dd.alt -dd.dd

00809-0100-4530
Rev. GE
2024

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EMERSON™

7.15 IOM for PDB

7.16 IOM for UCP

finder
SWITCH TO THE FUTURE

REPORT

40 Series
Miniature PCB/Plug-in relays



New PCB/Plug-in relays with 2 contacts 8A - $AgSnO_2$ Type 40.52

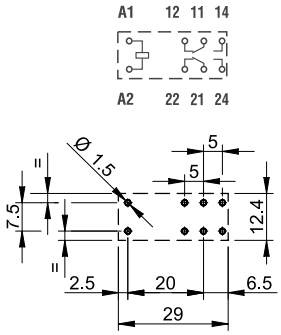
New relays with 2 CO contacts 8 A and low coil power.
$AgSnO_2$ contact guarantees much higher performance in the presence of loads with high inrush currents.

- 2 CO contacts 8 A
- $AgSnO_2$ contacts for maximum peak current up to 60 A for 5 ms
- AC and DC coils
- Complies EN 60335-1 glow wire requirements
- Ambient temperature range -40…+85°C
- 5.3 mm pin pitch for 95 Series sockets mount or PCB

Approvals

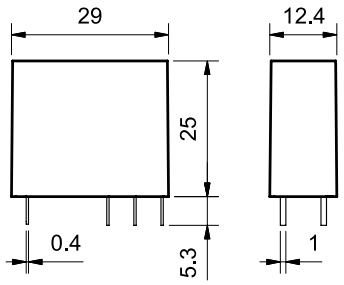
NEW

New PCB/Plug-in relays with 2 contacts 8A - $AgSnO_2$
Type 40.52



Copper side view

- 2 CO contacts rated 10 A
- Wide range of AC and DC coil voltages available
- Coil power AC, 1.2 VA (50 Hz)
  Standard DC, 650 mW
  Sensitive DC, 500 mW
- 8 mm Creepage and Clearance, 6 kV (1.2/50µs) between coil and contact
- Contact material AgNi or $AgSnO_2$
- Meets EN 60335-1 glow wire requirements
- 95 series sockets for PCB or 35 mm rail mounting (EN 60715) with Screw, Screwless or Push-in terminals
- Environmental protection: RT II - flux proof (Standard)
  RT III - wash tight (Option)
- Ambient temperature range -40…+85°C



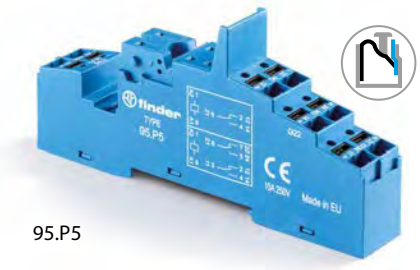


AC Version



DC Version

$AgSnO_2$ contact for inrush currents up to 60 A for 5 ms



95.P5



95.05



99.02

Sockets	Type 95.P5 Push-in terminals	Type 95.05 Screw terminals
Metal retaining clip	095.71	095.71
Plastic retaining and release clip (supplied with socket - packaging code SPA)	095.91.3	095.01
8-way jumper link	097.58	095.18
2-way jumper link (12.5mm pitch)	097.52	—
2-way jumper link (4.6mm pitch)	097.42	—
Marker tag holder (for tags 060.48 type)	097.00	097.00
Identification tag	095.00.4	095.00.4
Modules	99.02	99.02
Timer modules	86.30	86.30
Sheet of marker tags for plastic retaining and release clip 095.91.3 and for marker tag holder 097.00, 48 tags,6 x 12 mm, for CEMBRE thermal transfert printer	060.48	060.48

99.02 coil indication and EMC suppression modules		
Diode (+A1, standard polarity)	(6…220)V DC	99.02.3.000.00
LED	(6…24)V DC/AC	99.02.0.024.59
LED	(28…60)V DC/AC	99.02.0.060.59
LED	(110…240)V DC/AC	99.02.0.230.59
LED + Diode (+A1, standard polarity)	(6…24)V DC	99.02.9.024.99
LED + Diode (+A1, standard polarity)	(28…60)V DC	99.02.9.060.99
LED + Diode (+A1, standard polarity)	(110…220)V DC	99.02.9.220.99
LED + Varistor	(6…24)V DC/AC	99.02.0.024.98
LED + Varistor	(28…60)V DC/AC	99.02.0.060.98
LED + Varistor	(110…240)V DC/AC	99.02.0.230.98
RC circuit	(6…24)V DC/AC	99.02.0.024.09
RC circuit	(28…60)V DC/AC	99.02.0.060.09
RC circuit	(110…240)V DC/AC	99.02.0.230.09
Residual current by-pass	(110…240)V AC	99.02.8.230.07

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Bul. 140MT-C-DNC, 140MT-C-SHS, 140MT-C-DSL, 140MT-C-DS, 140MT-C-DSS, 140MT-C-DN/DRY66
Publication 140MT-IN004A-MU-P - March 2021

en Installation instructions

de Installationsanleitung
fr Notice d'installation
it Istruzioni per l'installazione
zh 安装说明
es Instrucciones de instalación
ru инструкция по установке
pt Instruções de instalação
ko 설치 매뉴얼

IEC/EN 60947-5-1
UL 60947-5-1
CAN/CSA-C22.2 No. 60947-5-1

At the end of its life, this equipment should be collected separately from any unsorted municipal waste.

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The installation and the operation of this device and any maintenance must be carried out by a qualified person in accordance with specific local standards and safety regulations. Before installing this device, read these operating instructions carefully. Do not touch live parts. To avoid damages to persons and material the devices have to be replaced in case of mechanical and/or electrical damage.

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Die Installation und die Inbetriebnahme dieses Gerätes sowie jegliche Wartungsarbeiten müssen durch eine qualifizierte Fachkraft durchgeführt werden. Dabei sind lokale Normen und Sicherheitsvorschriften zu beachten. Vor der Installation des Gerätes muss diese Betriebsanleitung aufmerksam gelesen werden. Spannung führende Teile nicht berühren. Um Personen- und Sachschäden auszuschließen, müssen die Geräte im Fall einer mechanischen und/oder elektrischen Beschädigung unbedingt ausgetauscht werden.

fr DANGER! TENSION ÉLECTRIQUE DANGEREUSE !
L'installation et la mise en service de cet appareil ainsi que toute opération de maintenance doivent être réalisées par une personne qualifiée, dans le respect des normes locales et des dispositions en matière de sécurité. Avant d'installer cet appareil, lisez attentivement cette notice d'utilisation. Ne pas toucher les éléments sous tension. Afi n d'éviter des dommages corporels et matériels, les appareils doivent être remplacés en cas de dommage mécanique et/ou électrique.

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L'installazione e la messa in esercizio di questo apparecchio e tutti gli interventi di manutenzione dovranno essere eseguiti da tecnici qualificati, in osservazione delle norme di legge locali e delle disposizioni di sicurezza. Non toccare le parti in tensione! Per escludere lesioni a persone e danni materiali, sostituire gli apparecchi in caso di danneggiamento meccanico e/o elettrico.

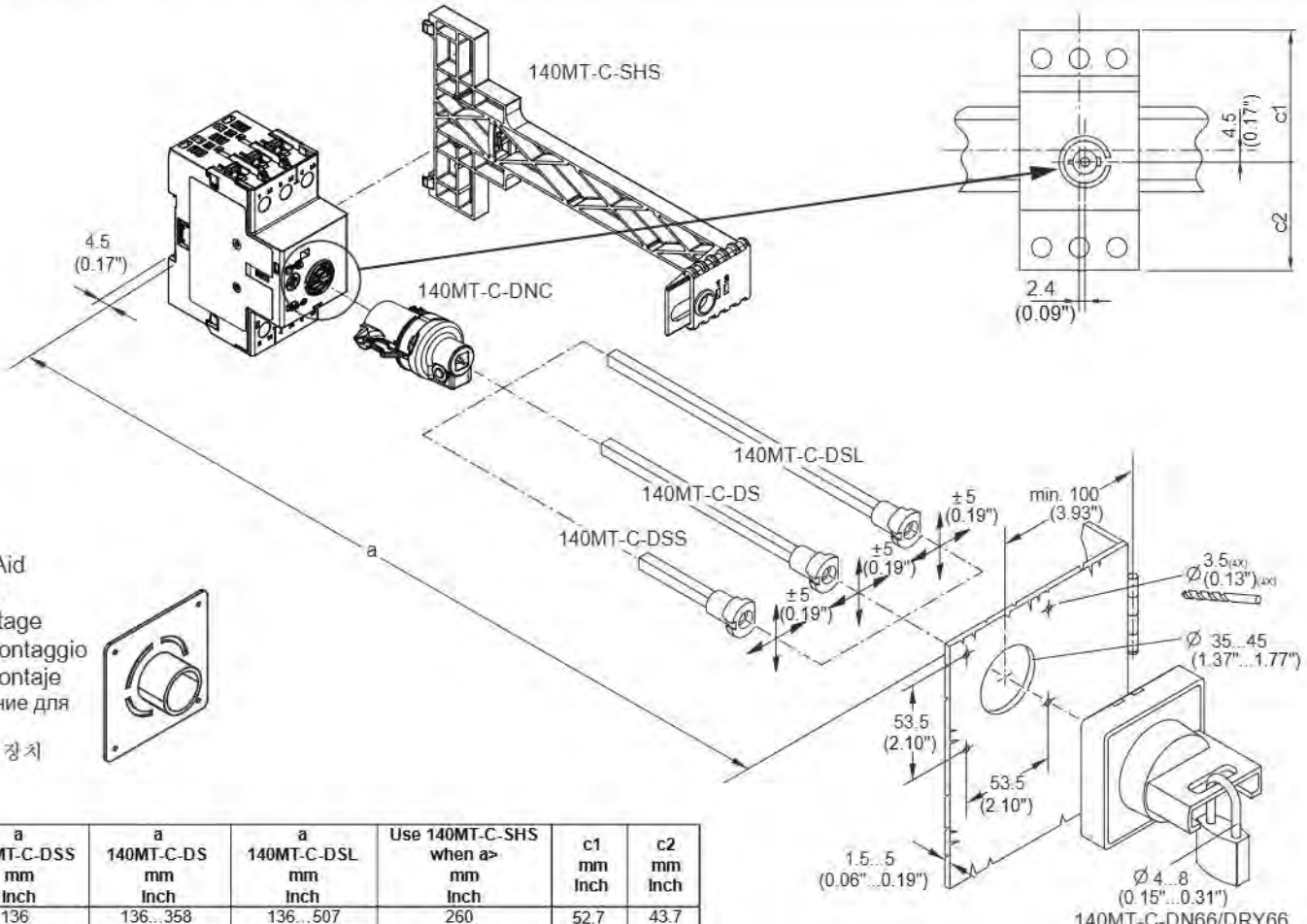
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La instalación y la puesta en funcionamiento de este dispositivo, así como cualquier trabajo de mantenimiento, deberán ser ejecutados por una persona competente cualificada. En esto, deberán observarse las normas locales y las normas de seguridad. No tocar piezas que se encuentren bajo tensión. Para evitar daños personales y materiales, los dispositivos deberán ser sustituidos al presentar cualquier daño mecánico y/o eléctrico.

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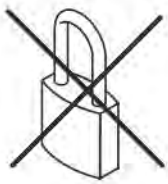
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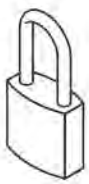
Assembling Aid
Montagehilfe
Aide de montage
Calibro de montaggio
Calibre de montaje
Приспособление для сборки
어셈블리 보조 장치
组装辅助

	a 140MT-C-DSS mm Inch	a 140MT-C-DS mm Inch	a 140MT-C-DSL mm Inch	Use 140MT-C-SHS when a> mm Inch	c1 mm Inch	c2 mm Inch
140MT-C3	136 5.354"	136...358 5.354"...14.094"	136...507 5.354"...19.960"	260 10.236"	52.7 2.074"	43.7 1.720"
140MT-D9	143 5.630"	143...364 5.630"...14.330"	143...513 5.630"...20.196"	266 10.472"	52.7 2.074"	43.7 1.720"
140UT-D7	143 5.630"	143...364 5.630"...14.330"	143...513 5.630"...20.196"	266 10.472"	62.1 2.444"	53.1 2.090"

Manipulation without ...
Manipulationen ohne ...
Manipulations sans ...
Manipulazioni senza ...
Manipulaciones sin ...
Обращение без ...
조작 없는...
不挂锁操作

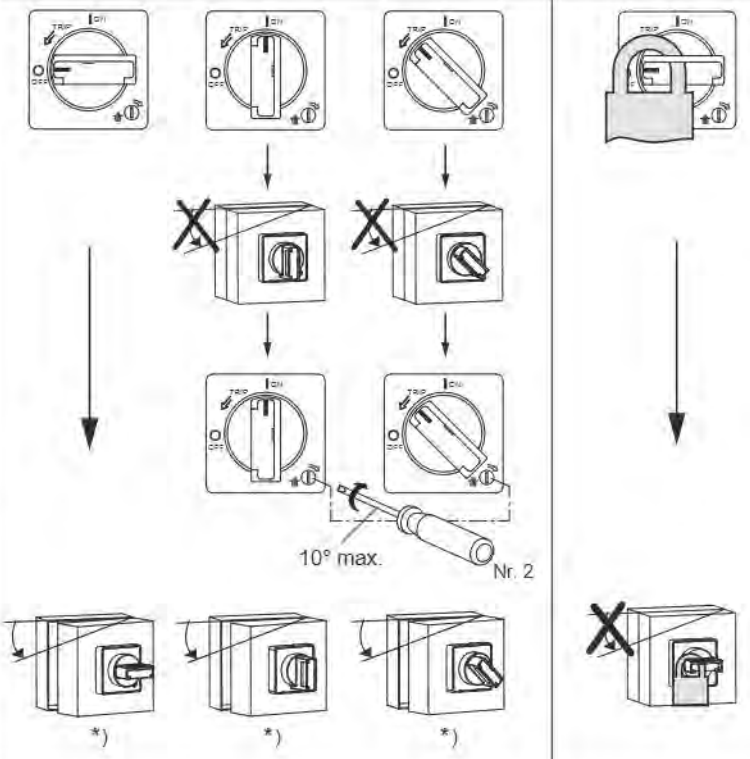


Manipulation with ...
Manipulationen mit ...
Manipulations avec ...
Manipulazioni con ...
Manipulaciones con ...
Обращение с ...
조작은...
挂锁操作



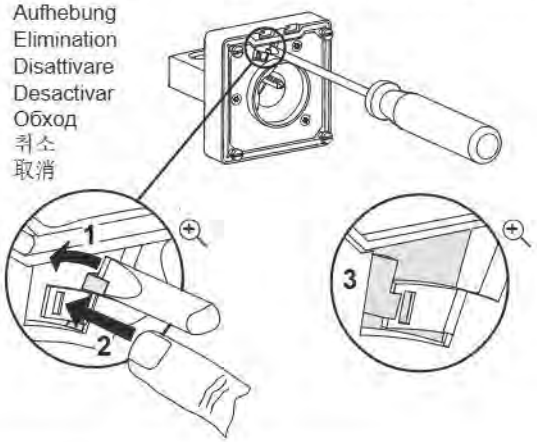
Handle positions
Griffpositionen
Positions de la crosse
Posizioni di presa
Posiciones de agarre
Положения ручки
핸들 위치
手柄位置

Door opening possibilities
Türöffnungsmöglichkeiten
Possibilités d'ouverture de la porte
Possibilità di aprire la porta
Posibilidades de apertura de la puerta
Способы открытия двери
도어 개방 가능성
开门的可能性

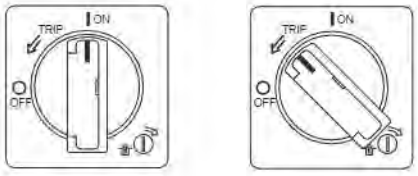


Cancellation of door interlocking, only admissible with 140MT-C-DN66
Aufhebung der Türverriegelung, nur zulässig bei 140MT-C-DN66
Elimination du verrouillage de la porte seulement permise avec 140MT-C-DN66
E'consentito disattivare il bloccaggio della porta solo in 140MT-C-DN66
Está permitido desactivar el bloqueo de la puerta solo en 140MT-C-DN66
Обход блокировки двери, только для 140MT-C-DN66
도어 연동 취소, 140MT-C-DN66만 허용 가능
取消门互锁，仅适用于140MT-C-DN66

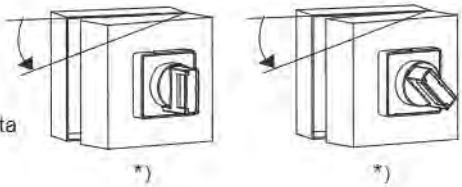
Cancellation
Aufhebung
Elimination
Disattivare
Desactivar
Обход
취소
取消



Handle positions
Griffpositionen
Positions de la crosse
Posizioni di presa
Posiciones de agarre
Положения ручки
핸들 위치
手柄位置



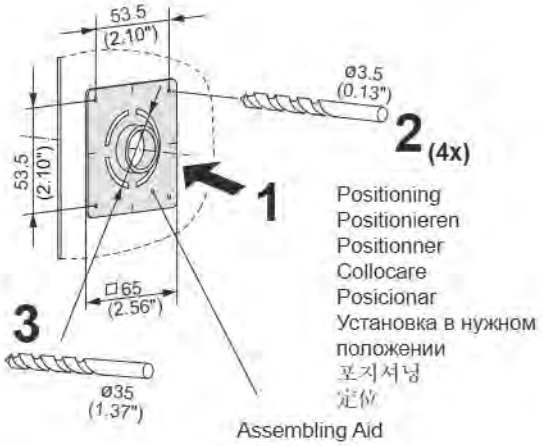
Door opening possibilities
Türöffnungsmöglichkeiten
Possibilités d'ouverture de la porte
Possibilità di aprire la porta
Posibilidades de apertura de la puerta
Способы открытия двери
도어 개방 가능성
开门的可能性



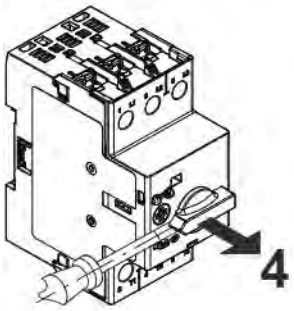
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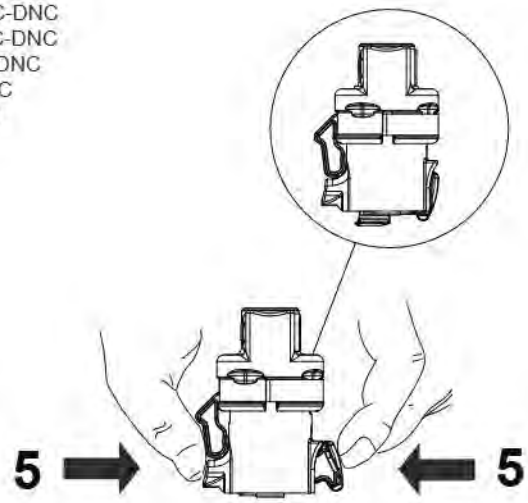
Warning: Don't change handle position at opened doors
Warnung: Bei geöffneter Tür Griffstellung nicht verändern
Attention: Lorsque la porte est ouverte, ne pas changer la position de la crosse
Attenzione: Non modifichi la posizione di presa quando le porte sono aperte
Atención: No cambie la posición de agarre con las puertas abiertas
Осторожно: запрещается менять положение ручки при открытой двери
경고 : 개방된 도어의 핸들 위치를 변경하지 마십시오
警告：请勿在打开的门上更改把手位

Mounting of 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC
Montage von 140MT-C-DN66/DRY66 +140MT-C-DSS/DS/DSL + 140MT-C-DNC
Montage des 140MT-C-DN66/DRY66 +140MT-C-DSS/DS/DSL + 140MT-C-DNC
Montaggio di 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC
Montaje de 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC
Монтаж 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC
140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC의 장착
安装140MT-C-DN66 / DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC

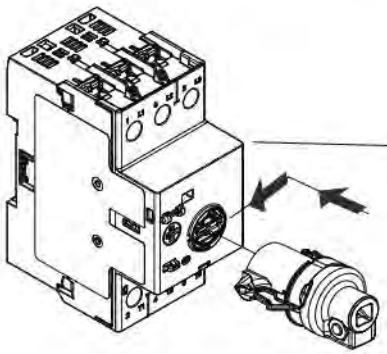


Positioning
Positionieren
Positionner
Collocare
Posicionar
Установка в нужном положении
포지셔닝
定位

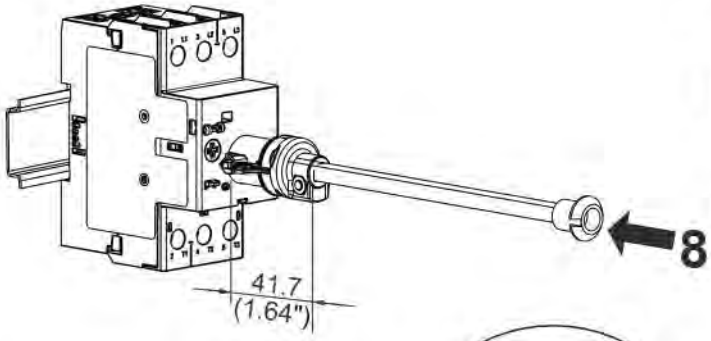


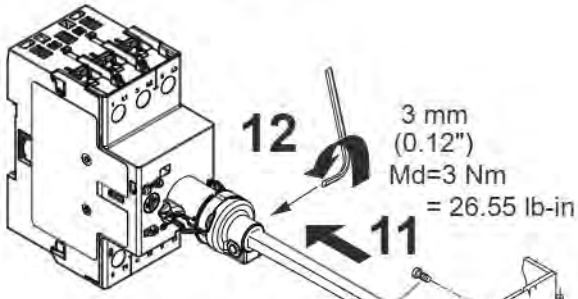


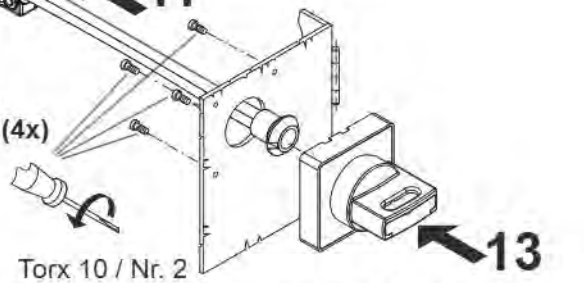
Assembling Aid
Montagehilfe
Aide de montage
Calibro de montaggio
Calibre de montaje
Приспособление для сборки
어셈블리 보조 장치
组装辅助



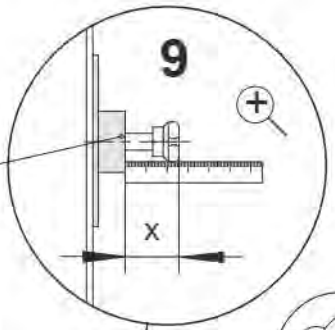


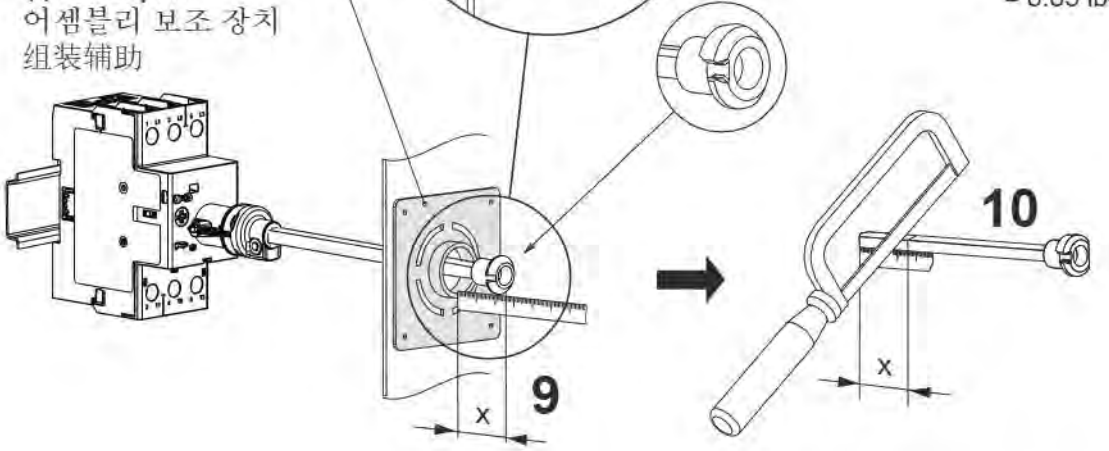




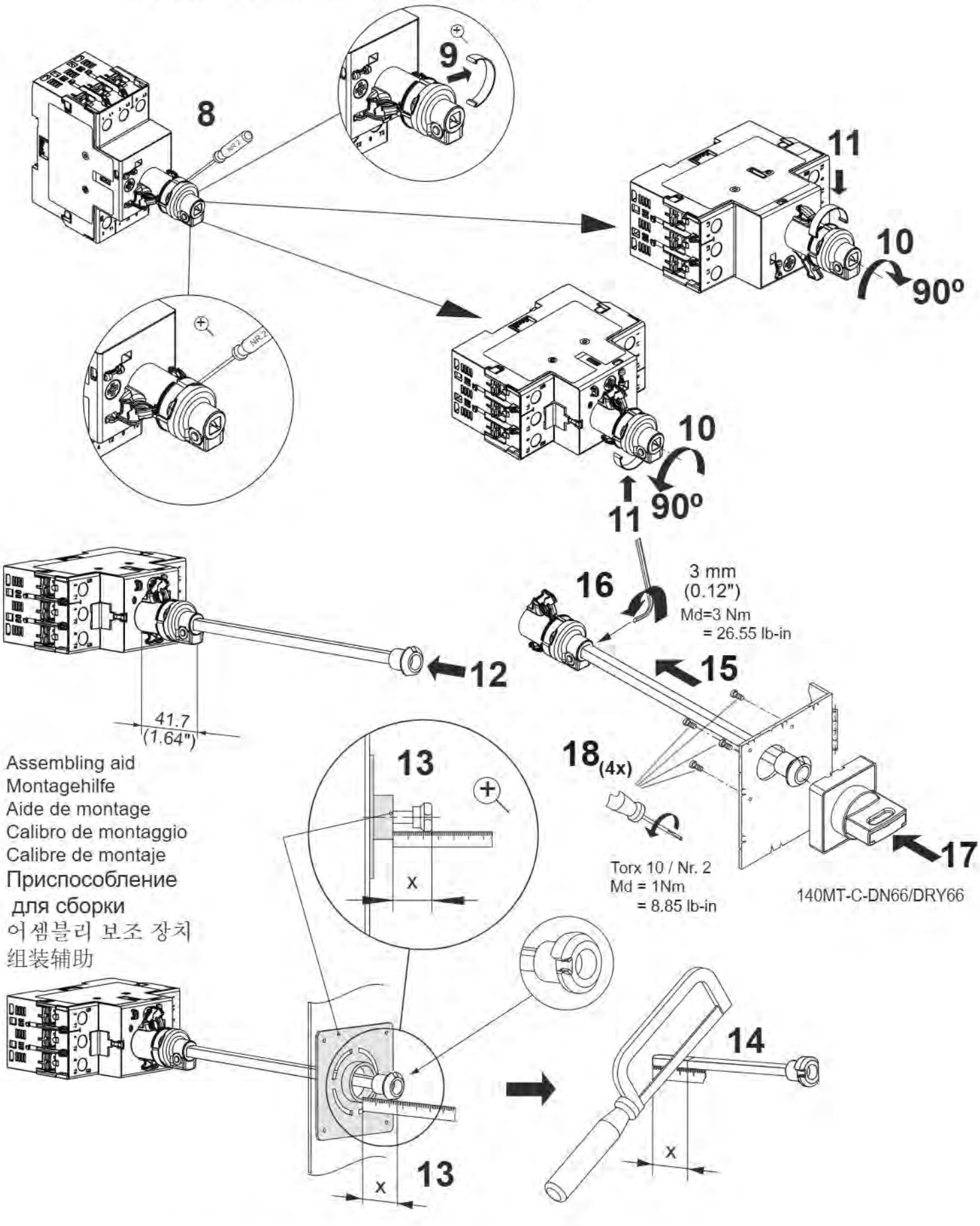


Assembling aid
Montagehilfe
Aide de montage
Calibro de montaggio
Calibre de montaje
Приспособление для сборки
어셈블리 보조 장치
组装辅助

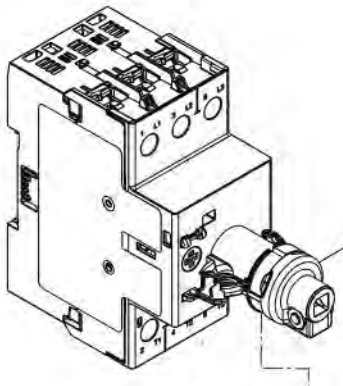


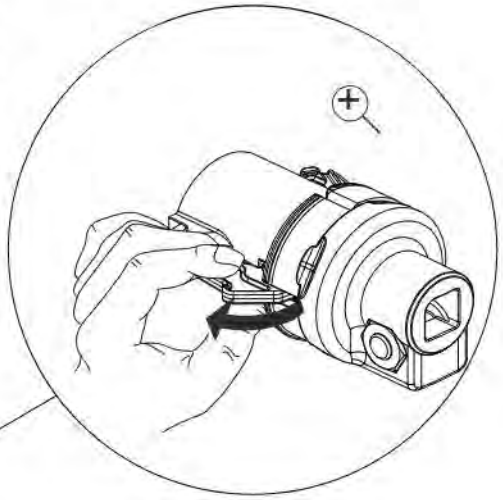


Mounting of 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC in horizontal position
Montage von 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC in Querlage
Montage des 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC pos. horizontale
Montaggio di 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC pos. horizontale
Montaje de 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC pos. horizontal
Монтаж 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC в горизонтальном положении
수평 위치에 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC 장착
水平安装140MT-C-DN66 / DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-DNC

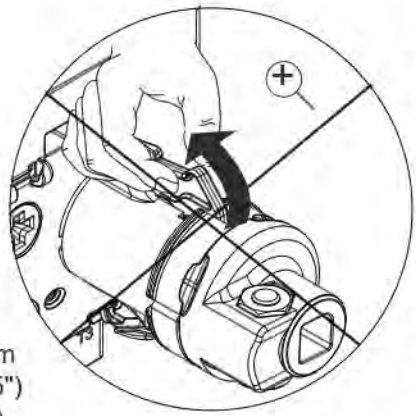


Mounting of 140MT-C-M3
Montage von 140MT-C-M3
Montage des 140MT-C-M3
Montaggio di 140MT-C-M3
Montaje de 140MT-C-M3
Монтаж 140MT-C-M3
140MT-C-M3의 장착
安装140MT-C-M3

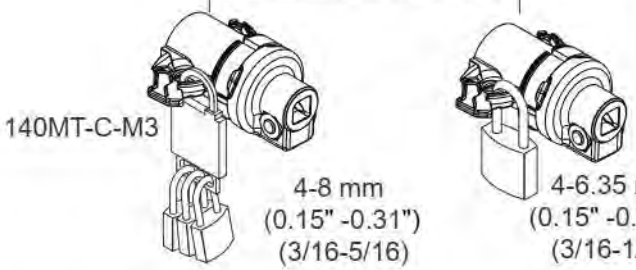




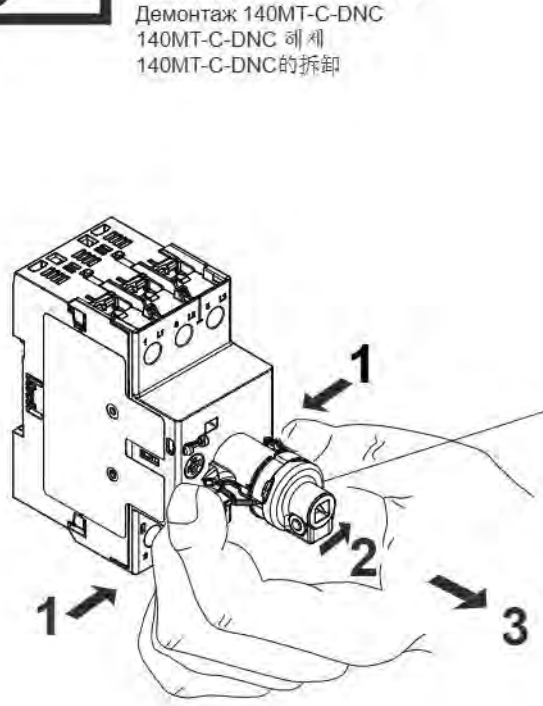
Pull out only when main device is in OFF position
Nur herausziehen, wenn sich das Hauptgerät in der Position OFF (AUS) befindet
Ne retirer que lorsque le dispositif principal est en position OFF.
Estrarre solo quando il sezionatore è in posizione OFF
Tire hacia afuera solo cuando el dispositivo principal esté en la posición OFF (apagado)
Тянуть, когда выключатель находится в ВЫКЛЮЧЕННОМ положении
디바이스가 OFF 위치에 있을 때만 꺼짐.
仅当主设备处于关闭位置时才拉出

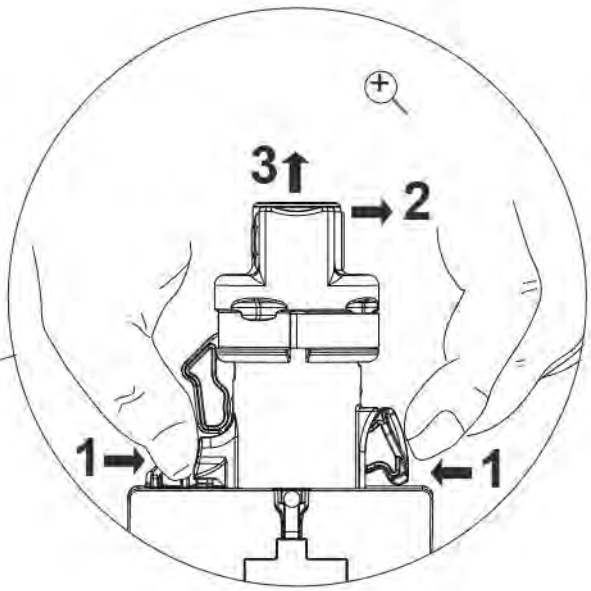


Do not pull out / operate when device is in ON position
Nicht herausziehen/in Betrieb nehmen, wenn sich das Gerät in der Position ON (EIN) befindet
Ne pas retirer / actionner lorsque le dispositif est en position ON.
Non estrarre / utilizzare quando il sezionatore è in posizione ON
No tire / opere cuando el dispositivo esté en la posición ON (encendido)
Не тянуть и не переключать, если выключатель ВКЛЮЧЕН
디바이스가 ON위치에 있을 때는 당기거나/작동하지 마십시오
当设备处于开启位置时，请勿拉出/操作

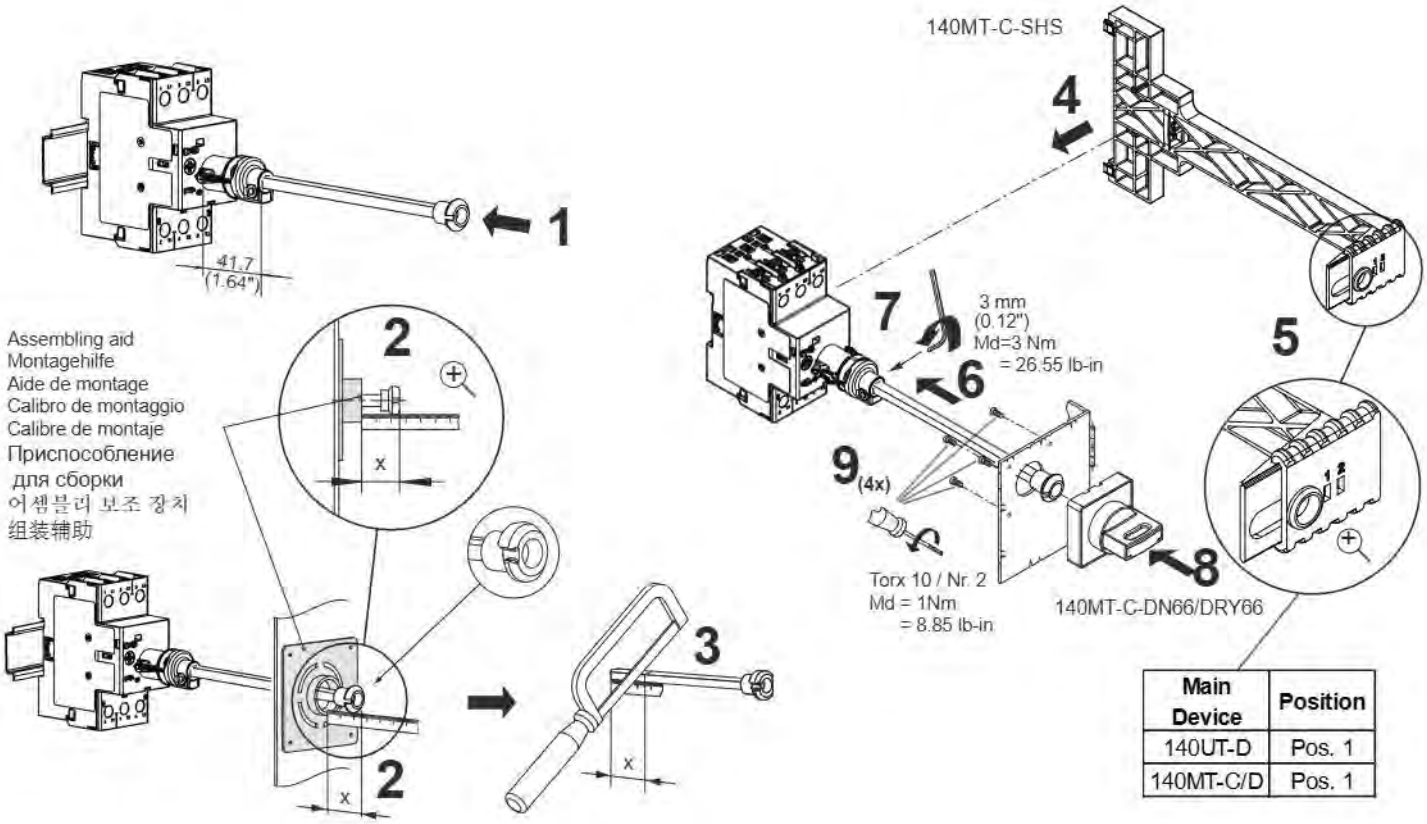


Demounting of 140MT-C-DNC
Desmontaje de 140MT-C-DNC
Démontage du 140MT-C-DNC
Smontaggio di 140MT-C-DNC
Desmontaje de 140MT-C-DNC
Демонтаж 140MT-C-DNC
140MT-C-DNC 해제
140MT-C-DNC的拆卸





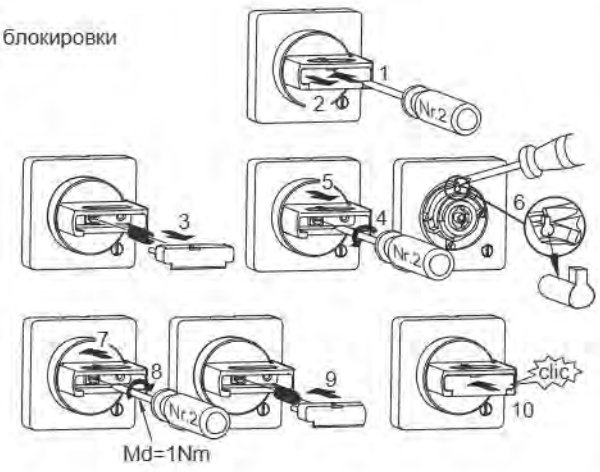
Mounting of 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-SHS
Montage von 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-SHS
Montage des 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-SHS
Montaggio di 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-SHS
Montaje de 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-SHS
Монтаж 140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-SHS
140MT-C-DN66/DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-SHS 장착
140MT-C-DN66 / DRY66 + 140MT-C-DSS/DS/DSL + 140MT-C-SHS的安装



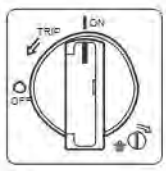
Main Device	Position
140UT-D	Pos. 1
140MT-C/D	Pos. 1

Activation of lockability at ON position, only admissible with 140MT-C-DN66
Aktivierung der Abschliessbarkeit in ON Stellung, nur zulässig bei 140MT-C-DN66
Activation du verrouillage en ON position, seulement permise avec 140MT-C-DN66
E'consentita l'attivazione della chiusura nella posizione ON solo in 140MT-C-DN66
Está permitida la activación del cierre en posición ON solo en 140MT-C-DN66
Включение блокировки во включенном положении, только для 140MT-C-DN66
ON 위치에서 잠금 기능 활성화, 140MT-C-DN66에서만 허용 가능
在ON位置激活锁定功能，仅适用于140MT-C-DN66

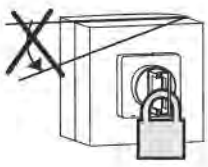
Activation
Aktivierung
Activation
Attivazione
Activación
Включение блокировки
활성화
激活



Handle position
Griffstellung
Position de la crosse
Posizione di presa
Posición de agarre
Положения ручки
핸들 위치
手柄位置

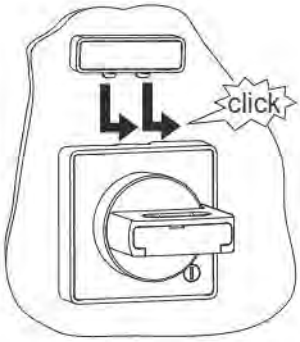


Door opening possibilities
Türöffnungsmöglichkeiten
Possibilités d'ouverture de la porte
Possibilità di aprire la porta
Posibilidades de apertura de la puerta
Способы открытия двери
도어 개방 가능성
开门的可能性





Mounting of 140MT-C-DFCN/DFCRY
Montage von 140MT-C-DFCN/DFCRY
Montage des 140MT-C-DFCN/DFCRY
Montaggio di 140MT-C-DFCN/DFCRY
Montaje de 140MT-C-DFCN/DFCRY
Монтаж 140MT-C-DFCN/DFCRY
140MT-C-DFCN/DFCRY 장착
140MT-C-DFCN / DFCRY的安装



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EEE Yönetmeliğine Uygundur

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PN-D177420
DIR 10002819264 (Version 00)

Rockwell Automation

140UT-D Molded Case Circuit Breakers

140UT-D7D2-C15



Representative Rendering, Not The Actual Product

Circuit Breaker -Current Limiting , D-Frame, 2 Pole, Rated Current 15A

Product Details

System Data	
Supply Voltage	480V 60Hz
Maximum Available Fault Current (at the Breaker)	0 kA
Circuit Breaker Data	
Pole Configuration	2 Pole
Rated Current (A) Code	15
Frame Size	D-Frame
Interrupt Rating [kA]	65 kA
Important Information	
Device Selection - Important Information	The MCCB you have selected is a Current Limiting Circuit Breaker

Supporting Documentation and Downloads

- Product Photo

Rockwell Automation

140UT-D Molded Case Circuit Breakers

140UT-D7D2-C25



Representative Rendering, Not The Actual Product

Circuit Breaker -Current Limiting , D-Frame, 2 Pole, Rated Current 25A

Product Details

System Data	
Supply Voltage	480V 60Hz
Maximum Available Fault Current (at the Breaker)	0 kA
Circuit Breaker Data	
Pole Configuration	2 Pole
Rated Current (A) Code	25
Frame Size	D-Frame
Interrupt Rating [kA]	65 kA
Important Information	
Device Selection - Important Information	The MCCB you have selected is a Current Limiting Circuit Breaker

Supporting Documentation and Downloads

- Product Photo

Technical Data

Original Instructions

Miniature Circuit Breakers in DC Applications

Bulletins 1489-M, 1492-SPM, and 1492-D

Topic	Page
Summary of Changes	2
1489-M Thermal-magnetic Miniature Circuit Breakers	3
1492-SPM Supplementary Protectors	4
1492-D DC High Voltage MCBs	5

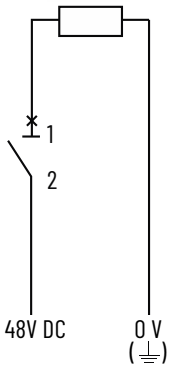
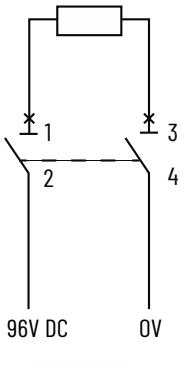
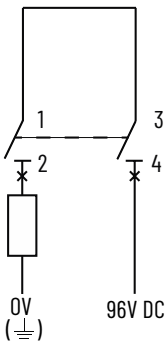
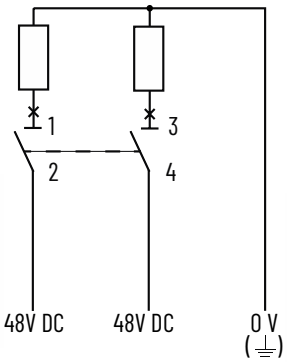
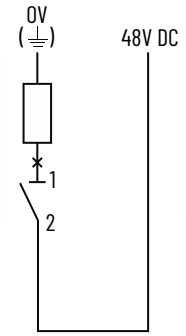
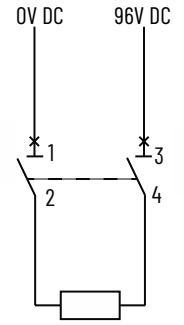
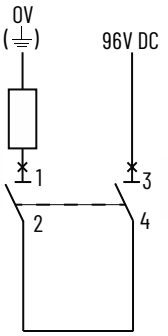
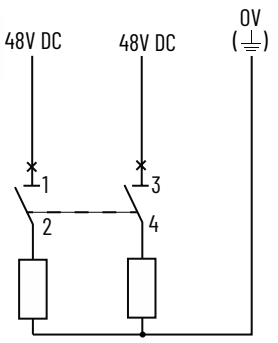
Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Updated diagram within table for 1489-M1, 1-pole for Supply from the Top and DC clarification.	3
Updated diagram within table for 1492-SPM1, 1-pole for Supply from the Top and DC clarification.	4
Updated diagram within table for 1492-D, 1-pole for Supply from the Top and DC clarification.	5

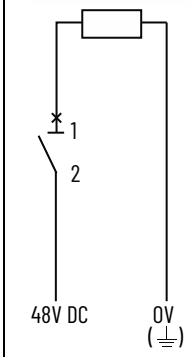
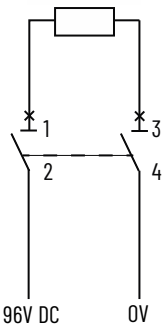
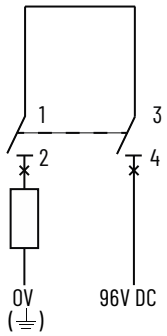
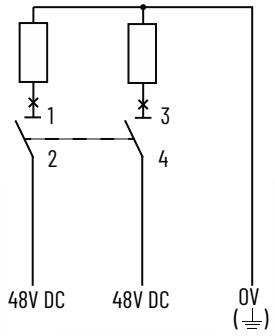
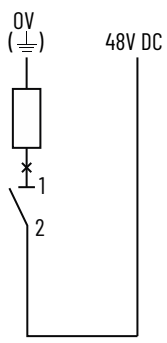
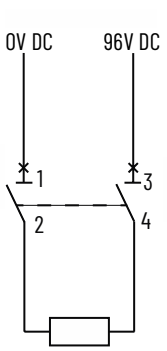
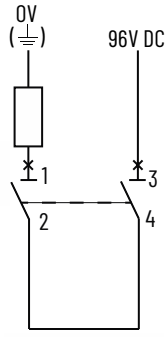
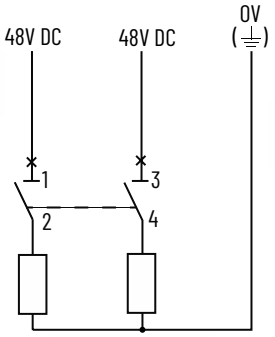
1489-M miniature circuit breakers (MCBs) can be used in the 1-pole version up to 48V DC and the 2-pole version with series connection of the two poles up to 96V DC. If voltages to earth exceeding 48V DC occur, see the 2-pole version of Bulletin 1489-M for 1-pole disconnection. During the installation process, polarity does not need to be considered. The outgoing circuit can be implemented from above or below the device. For voltage exceeding 48V DC up to 96V DC, series connection of two poles is required.

Example of Permissible Voltages between the Conductors - depending upon the number of poles and circuit layout

Description		**1489-M1, 1-pole**	**1489-M2, 2-pole**	**1489-M2, 2-pole**	**1489-M2, 2-pole**
Voltage Between Conductors	U_n	48V DC	96V DC	96V DC	96V DC
Voltages between Conductor and Earth	U_n	48V DC	48V DC	96V DC	48V DC
Supply from the Bottom					
Supply from the Top					

The 1492-SPM Supplementary Protectors can be used in the 1-pole version up to 48 DC and in the 2-pole version with series connection of the two poles up to 96V DC. If voltage to earth exceeding 48V DC occur, use the 2-pole version of the 1492-SPM for 1-pole disconnection. During the installation process, polarity does not need to be considered. Implement the outgoing circuit from above or below the device. For voltage exceeding 48V DC up to 96V DC, series connection of two poles is required.

Example of Permissible Voltages between the Conductors - depending upon the number of poles and circuit layout

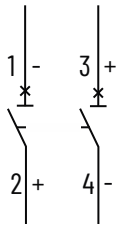
Description		1492-SPM1, 1-pole	1492-SPM2, 2-pole	1492-SPM2, 2-pole	1492-SPM2, 2-pole
Voltage between Conductors	U_n	48V DC	96V DC	96V DC	96V DC
Voltages between Conductor and Earth	U_n	48V DC	48V DC	96V DC	48V DC
Supply from the Bottom					
Supply from the Top					

In UL and CSA Applications: The 1492-D MCB products can be used up to 250V DC in the 1-pole version and up to 500V DC in the 2-pole version when both poles are wired in series to switch a one pole DC load.

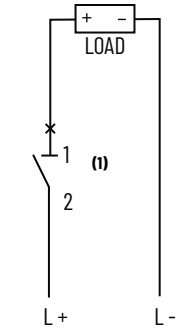
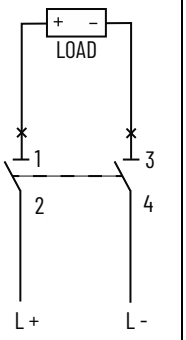
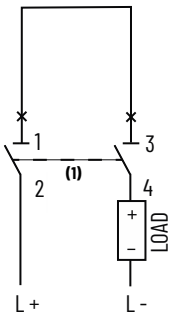
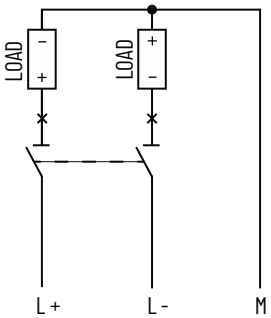
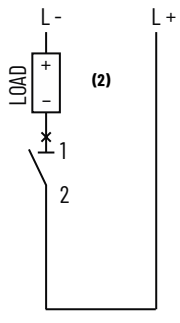
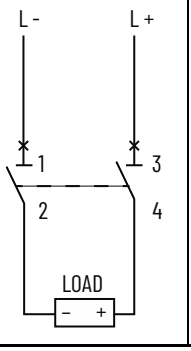
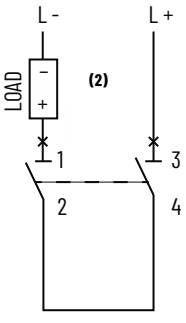
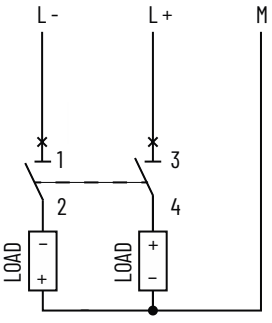
In IEC Applications: The 1492-D1 MCB products can be used up to 220V DC in the 1-pole version and up to 440V DC in the 2-pole version when wired in a series to switch a one pole DC load.

IMPORTANT Unlike the 1492-SPM, the 1492-D MCB is supplied with permanent magnets that help extinguish the arch. It is necessary to take the polarity of the 1492-D MCB and the supplied power into account during the installation process. Incorrect polarities can damage the 1492-D MCB. See the wiring diagrams below.

Polarity of 1492-D MCB

1-pole	2-pole
	

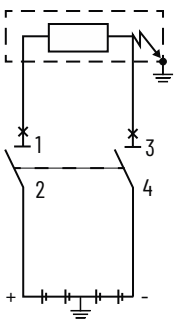
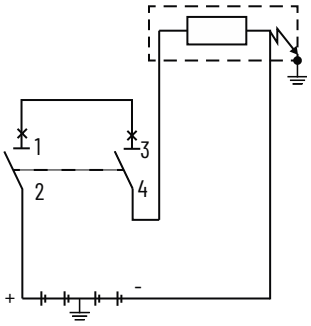
Examples of Supply Voltages and Wiring Diagram

Description	Application	1492-D 1-pole	1492-D 2-pole	1492-D 2-pole	1492-D 2-pole
Supply Voltage L+ to L-	UL/CSA	250V DC	500V DC	500V DC	500V DC
	IEC	220V DC	440V DC	440V DC	440V DC
Voltage L+ to Ground L- to Ground	UL/CSA	250V DC	250V DC	500V DC	250V DC
	IEC	220V DC	220V DC	440V DC	220V DC
Voltage Supplied from Below					
Voltage Supplied from Above					

Note No.	Information
1	The negative pole is grounded in the circuit
2	The position pole is grounded in the circuit

If voltages to earth ground exceed 250V DC (UL/CSA) or 220V DC (IEC), a 2-pole 1492-D must be used for 1-pole disconnection.

Examples for Symmetrical and Unsymmetrical Voltage Supplies - 1492-D2 2-Pole

Description		
Supply Voltage L+ to L-	500V DC All-pole Disconnection	500V DC 1-pole Disconnection
Voltage L+ to Ground, L- to Ground	250V DC Symmetrically Grounded	500V DC Unsymmetrically Grounded
Circuit Diagram Examples		

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Control Circuit and Load Protection Selection Guide, publication 1492-SG122	Provides selection information and specifications for Bulletin 188, 1489, 1492, 1694 devices.
Molded Case Circuit Breaker Selectivity Guide, publication 140G-TD050	Aids in selecting circuit breaker pairs for line and load side protection.
Short-circuit Current Ratings and Your Industrial Control Panel, publication SCCR-AT002	Provides examples for short-circuit current ratings of panels based on the methods stated in UL 508A Supplement B.
UL Standards Listing for Industrial Control Products, publication CMPNTS-SR002	Assists original equipment manufacturers (OEMs) with construction of panels, to help ensure that they conform to the requirements of Underwriters Laboratories.
American Standards, Configurations, and Ratings: Introduction to Motor Circuit Design, publication IC-AT001	Provides an overview of American motor circuit design based on methods that are outlined in the NEC.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Global Short-circuit Rating Tool, rok.auto/sccr	Provides coordinated high-fault branch circuit solutions for motor starters, soft starters, and component drives.
Product Certifications website, rok.auto/certifications.	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at rok.auto/literature.

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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ASIA PACIFIC: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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Supersedes Publication MCB-QR001A-EN-E - April 2019

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Fused Termination Module for use in SIL 2 Safety Shutdown Applications with Two 1756-IF16 Analog Input Modules ①

Module de terminaison à fusible pour une utilisation dans une application d'arrêt de sécurité SIL 2 avec deux modules d'entrées analogiques 1756-IF16 ①

Abschlussmodul für die Verwendung in SIL2-Sicherheitsschaltleisten mit zwei 1756-IF16-Analogeingangsmodulen ①

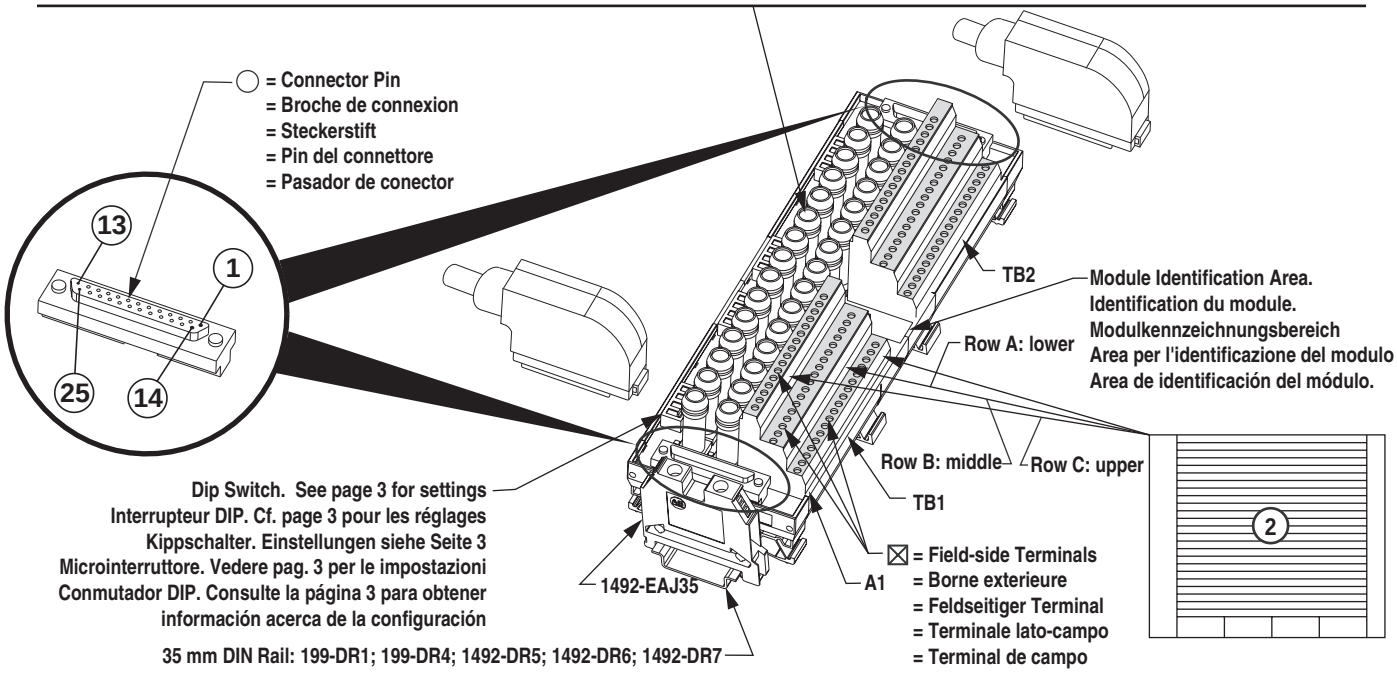
Modulo di terminazione con fusibile per uso con applicazioni di arresto di sicurezza SIL 2 con due moduli di ingresso analogico 1756-IF16 ①

Módulo de terminación con fusible para uso en sistemas de paralización de emergencia SIL 2 con dos módulos de entrada analógica 1756-IF16 ①

(Cat 1492-TAIFM16-F-3)

WARNING	To prevent electrical shock, disconnect from power source before installing or servicing.
AVERTISSEMENT	Avant le montage et la mise en service, couper l'alimentation secteur pour éviter toutes décharges.
WARNUNG	Vor Installations- oder Servicearbeiten Stromversorgung unterbrechen, um Elektroschocks zu vermeiden.
AVVERTENZA	Per prevenire infortuni, togliere tensione prima dell'installazione o manutenzione.
ADVERTENCIA	Desconéctese de la corriente eléctrica, antes de la instalación o del servicio, a fin de impedir sacudidas eléctricas.

Fuse Holders and Blown Fuse Indicator: See page 3 for fuse installation/removal.
Porte-fusibles et voyants de fusibles grillés: voir page 3 l'installation et le retrait des fusibles.
Sicherungshalterungen und Anzeige einer durchgebrannten Sicherung. Ein-und Ausbau der Sicherung siehe Seite 3.
Morsetti dei fusibili e indicatori dei fusibili bruciati: vedere il montaggio/smontaggio dei fusibili a pagina 3.
Sujetadores de fusibles e indicadores de fusible fundido: Vea la página 3 para obtener información sobre la instalación/extracción de fusibles.



① **The 1492-TAIFM16-F-3 is designed specifically for use in a Control Logix SIL2 safety shutdown application using two 1756-IF16 analog input modules. Refer to A-B reference manual Using Control Logix in SIL2 Applications (1756-RM001_-EN-P) for details. Using this module in a non SIL2 application with 1756-IF16 modules is at the discretion of the user.**

Le 1492-TAIFM16-F-3 est conçu spécifiquement pour une utilisation dans une application d'arrêt de sécurité Control Logix SIL2 utilisant deux modules d'entrées analogiques 1756-IF16. Se reporter au manuel de référence A-B Utilisation de Control Logix dans les applications SIL2 (1756-RM001_-EN-P) pour plus de détails. L'utilisation de ce module dans une application non SIL2 avec des modules 1756-IF16 est à la discrétion de l'utilisateur.

Das 1492-TAIFM16-F-3 ist speziell für die Verwendung in einer Control Logix SIL2-Sicherheitsschaltleiste mit zwei 1756-IF 6-Analogeingangsmodulen konzipiert. Einzelheiten finden Sie im A-B-Referenzhandbuch zur Verwendung von Control Logix in SIL2-Leisten (1756-RM001_-EN-P). Die Verwendung dieses Moduls in einer anderen Leiste (nicht SIL2) mit 1756-IF 16-Modulen erfolgt auf eigenes Risiko des Benutzers.

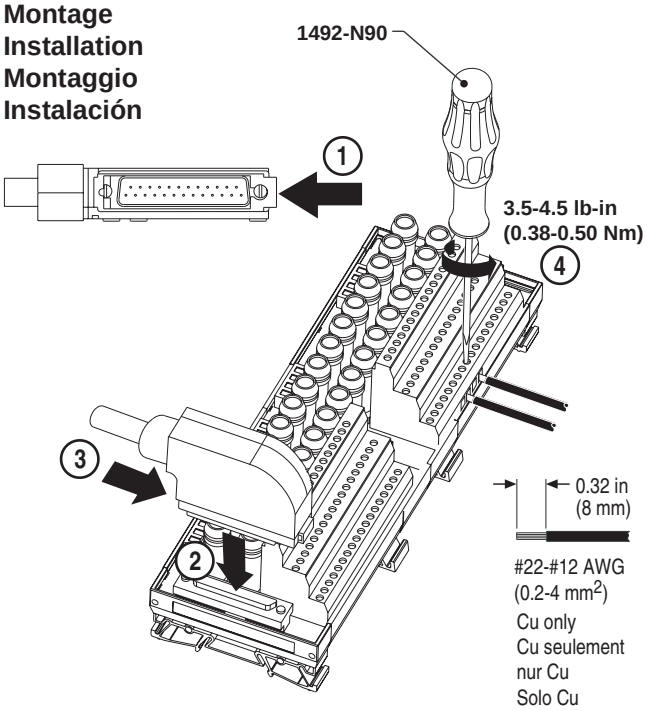
Il modulo 1492-TAIFM16-F-3 è progettato specificamente per l'uso con un'applicazione di arresto di sicurezza SIL2 Control Logix con due moduli di ingresso analogico 1756-IF16. Per dettagli, fare riferimento alla guida Allen-Bradley Using Control Logix in SIL2 Applications (1756-RM001_-EN-P). L'uso di questo modulo in un'applicazione non di tipo SIL2 con moduli 1756-IF16 è a discrezione dell'utente.

El 1492-TAIFM16-F-3 está creado específicamente para su utilización en una aplicación de corte de seguridad ControlLogix SIL2 mediante la utilización de dos módulos de entrada analógica 1756-IF16. Para obtener más información, consulte el manual de referencia A-B Utilización de ControlLogix en aplicaciones SIL2 (1756-RM001_-EN-P). La utilización de este módulo en una aplicación que no sea SIL2 con módulos 1756-IF16 es a criterio del usuario.

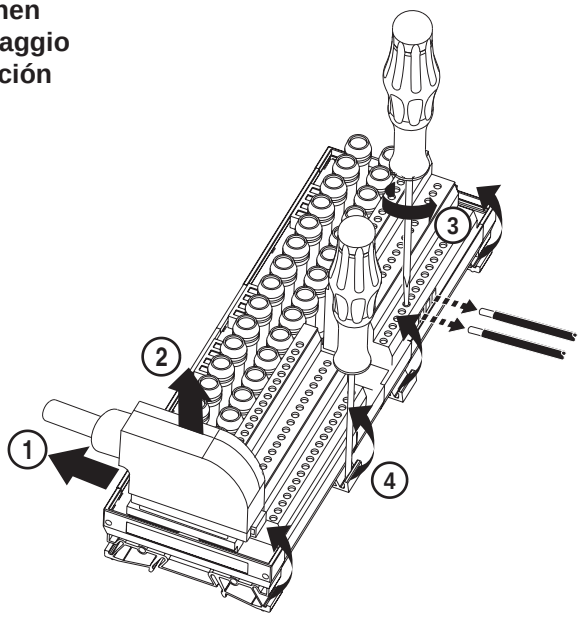
② **Adhesive Label Card. Provides I/O terminal wiring identification.**

PN-28295
DIR 41063-292 **(Version 04)**
Printed in U.S.A.

Installation
Montage
Installation
Montaggio
Instalación



Removal
Retrait
Entfernen
Smontaggio
Extracción



Cable Matrix
Matrice des câbles
Kabelmatrix
Matrice cavi
Matriz de cables

I/O Module **Module E/S** **E/A-Modul** **Modulo I/O** **Módulo de E/S**	**1492-TAIFM16-F-3** ③
1756-IF16 (In single-ended 0-5 VDC voltage mode)	1492-ACABLE①UA②

① Cables are available in 0.5m, 1.0m, 2.5m and 5.0m lengths (005=0.5m, 010=1.0m, 025 = 2.5m, 050=5.0m).Custom length cables also available. Contact local Sales Office for more information.

Câbles disponibles en 0,5m, 1,0m, 2,5m et 5,0m de longueur (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m).Câbles sur mesure à la demande. Contactez e bureau le plus proche.

Verfügbare Kabellängen 0,5m, 1,0m, 2,5m und 5,0m (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m).
Anwenderspezifizifische Längen stehen ebenfalls zur Verfügung. Kontaktieren Sie bitte Ihr lokales Vertriebsbüro für weitere Informationen.

I cavi sono disponibili in lunghezze di 0,5m, 1,0m, 2,5m e 5,0m (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m).
Sono disponibili anche cavi su misura. Per ulteriori informazioni, contattare l'ufficio vendite locale.

Cables disponibles en longitudes de 0,5m, 1,0m, 2,5m, 5,0m (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m).
Hay disponibles cables de varias longitudes. Para más información comuníquese con la oficina de ventas.

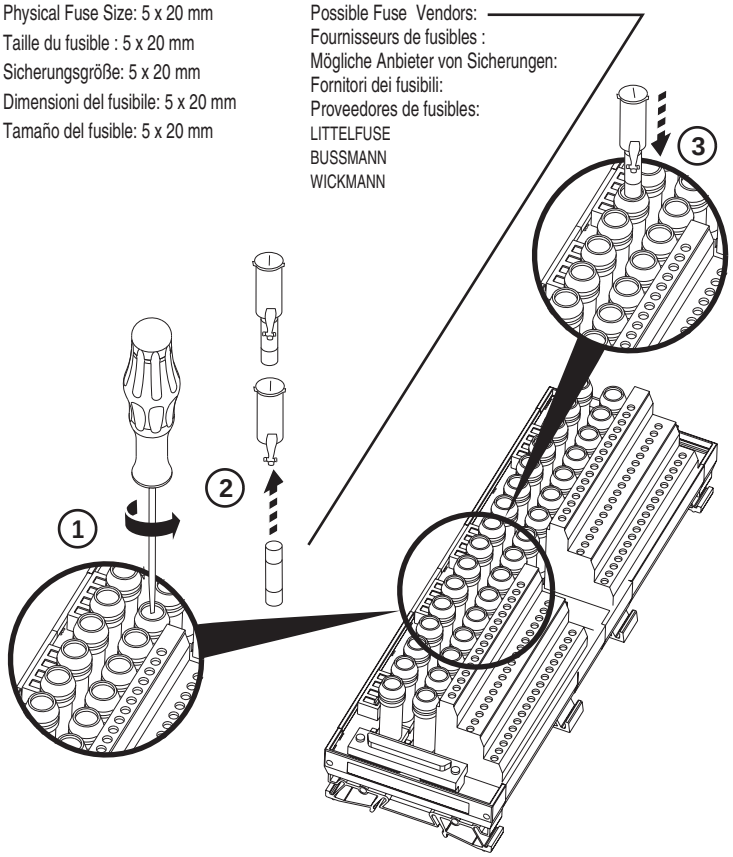
② Two cables required with 1492-TAIFM16-F-3
Deux câbles requis avec 1492-TAIFM16-F-3
Mit 1492-TAIFM16-F-3 sind zwei Kabel erforderlich
Sono necessari due cavi con il modulo 1492-TAIFM16-F-3
Se requiere dos cables con 1492-TAIFM16-F-3

③ Cable is limited for use within the control panel unless it is run through conduit. Cable is ITC (Instrumentation Tray Cable) rated.

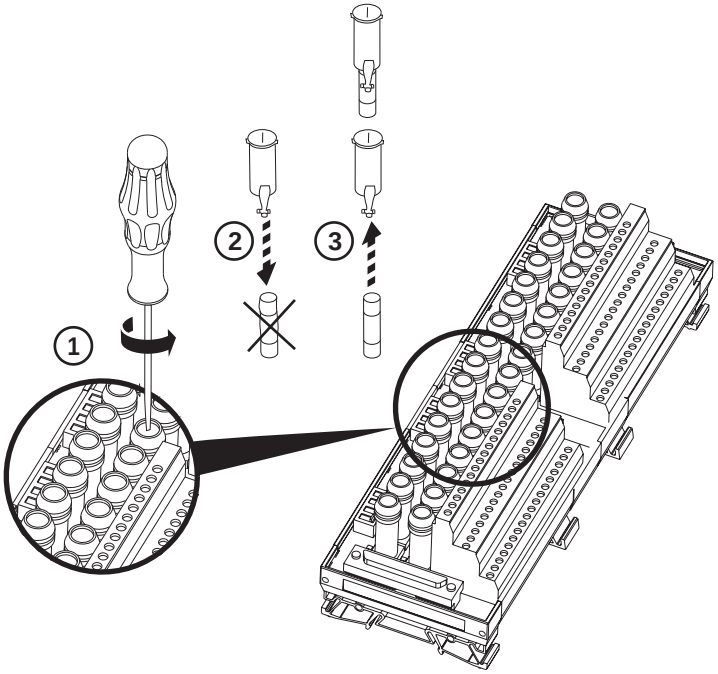
Fuse Installation ① ②
Montage du fusible
Installation der Sicherung
Installazione del fusibile
Instalación de fusibles

Physical Fuse Size: 5 x 20 mm
Taille du fusible : 5 x 20 mm
Sicherungsgröße: 5 x 20 mm
Dimensioni del fusibile: 5 x 20 mm
Tamaño del fusible: 5 x 20 mm

Possible Fuse Vendors:
Fournisseurs de fusibles :
Mögliche Anbieter von Sicherungen:
Fornitori dei fusibili:
Proveedores de fusibles:
LITTELFUSE
BUSSMANN
WICKMANN



Fuse Removal
Retrait du fusible
Entfernung der Sicherung
Rimozione del fusibile
Extracción de fusibles



① Module ships without fuses.
Module livré sans fusible.
Das Modul wird ohne Sicherungen geliefert.
Il modulo viene fornito privo di fusibili
El módulo se vende sin los fusibles.

② Size the amperage of the fuse to meet your application needs.
Adaptez l'ampérage du fusible en fonction de vos besoins.
Wählen Sie eine Sicherung mit der für Ihre Anforderungen geeigneten Amperezahl aus.
Scegliere l'amperaggio del fusibile in base alle esigenze dell'applicazione.
Ajuste el amperaje del fusible según las necesidades del sistema.

DIP Switch Settings
Reglages d'interrupteur DIP
Einstellungen des Kippschalters
Impostazioni del microinterruttore
Configuración del conmutador DIP



ON - CLOSED (Default): 16 SIL2 Sensors max. (1 Sensor Wiring: Connected to 2 Inputs: through a **Y** connection)
ON - FERME (par défaut) : 16 capteurs SIL2 maxi. (1 câblage de capteur : connecté à 2 entrées via une connexion e**n Y)**
EIN - GESCHLOSSEN (Standard): max. 16 SIL2-Sensoren (1 Sensorverkabelung: Anschluss an 2 Eingänge über einen Y-Anschluss)
ON - CHIUSO (impostazione predefinita): max 16 sensori SIL2 (cablaggio a un sensore: collegato a 2 ingressi tramite collegamento a Y)
ENCENDIDO - CERRADO (predeterminado): 16 sensores SIL2 máx. (1 cableado de sensor: Con conexión a 2 entradas: a través de una conexión Y)

OFF - OPEN : 32 Standard Sensors max. (Two Sensors Wiring: 1 to each module Input)
OFF - OUVERT : 32 capteurs standard maxi. (2 câblages de capteur : 1 pour chaque entrée de module)
AUS - OFFEN: max. 32 Standardsensoren (Zwei Sensorverkabelungen: 1 an jeden Moduleingang)
OFF - APERTO: max 32 sensori standard (cablaggio a due sensori: 1 per ciascun ingresso modulo)
APAGADO - ABIERTO: 32 sensores estándares máx. (dos cableados de sensores: 1 para cada módulo de entrada)

CH0 **CH3** **CH4** **CH7** **CH8** **CH11** **CH12** **CH16**



Pinout / Wiring Diagram
Brochage / Schéma de câblage
Anschlußbelegung / Verkabelungsschema
Disposizione dei piedini / Schema elettrico
Esquema de pins / Diagrama de cableado

① Cables are available in 0.5m, 1.0m, 2.5m, and 5.0m standard lengths (005=0.5m, 010=1.0m, 025=2.5m,050=5.0m). Custom length cables are also available.

Les câbles sont disponibles dans des longueurs standard de 0,5 m, 1,0 m, 2,5 m et 5,0 m (005=0,5 m, 010=1,0 m, 025=2,5 m, 050=5,0 m). Des longueurs personnalisées sont également disponibles.

Kabel sind in 0,5 m, 1,0 m, 2,5 m und 5,0 m Standardlängen (005=0,5 m, 010=1,0 m, 025=2,5 m, 050=5,0m) erhältlich. Sonderlängen sind ebenfalls erhältlich.

I cavi sono disponibili in lunghezze standard di 0,5m, 1,0m, 2,5m e 5,0m (005=0,5m, 010=1,0m, 025=2,5m e 050=5,0m). Sono inoltre disponibili cavi su misura.

Los cables se encuentran disponibles en longitudes estándares de 0,5 m, 1,0 m, 2,5 m, y 5,0 m (005 = 0,5 m, 010 = 1,0 m, 025 = 2,5 m, 050 = 5,0 m). También se encuentran disponibles cables de longitud a medida.

② LED provides blown fuse indication.

Un voyant indique si le fusible a sauté.

Die LED zeigt eine durchgebrannte Sicherung an.

La spia LED indica la presenza di un fusibile bruciato.

Indicador de fusible fundido.

③ All Shield terminals (Row A) are common.

Toutes les bornes blindées (rangée A) sont communes.

Alle Schirmungsklemmen (Reihe A) werden gemeinsam verwendet.

Tutti i terminali di schermo (serie A) sono comuni.

Todos los terminales de protección (serie A) son comunes.

④ Terminals starting with A are the lower row of terminals, B terminals are the middle row, C terminals are the upper row. TB1 is the left terminal block, TB2 is the right terminal block.

Les bornes commençant par A sont la rangée inférieure de bornes, les bornes B sont la rangée intermédiaire et les bornes C sont la rangée supérieure. TB1 est le bloc de bornes de gauche et TB2 est le bloc de bornes de droite.

Klemmen mit Anfangsbuchstaben A befinden sich in der unteren Reihe, Klemmen mit Anfangsbuchstaben B in der mittleren Reihe, Klemmen mit Anfangsbuchstaben C in der oberen Reihe. TB1 bezeichnet den linken Klemmenblock, TB2 den rechten Klemmenblock.

I terminali che iniziano con A sono quelli della serie inferiore, i terminali B sono quelli della serie centrale e i terminali C sono quelli della serie superiore. TB1 è il blocco terminali sinistro, TB2 è il blocco terminali destro.

Los terminales que empiezan con A son la serie inferior de terminales, los terminales B son la serie intermedia, los C son la serie superior. TB1 es el bloque terminal izquierdo, TB2 es el bloque terminal derecho.

⑤ Refer to PLC manual for proper grounding.

Se reporter au manuel de l'automate pour la mise à la masse appropriée.

Hinweise zur korrekten Erdung finden Sie im PLC-Handbuch.

Per il collegamento a terra, fare riferimento al manuale del modulo PLC.

Consulte el manual PLC para obtener información para la correcta conexión a tierra.

⑥ Dip switches provided to choose between 16 SIL2 sensors or 32 standard sensors. Factory Default: 16 SIL2 sensors.

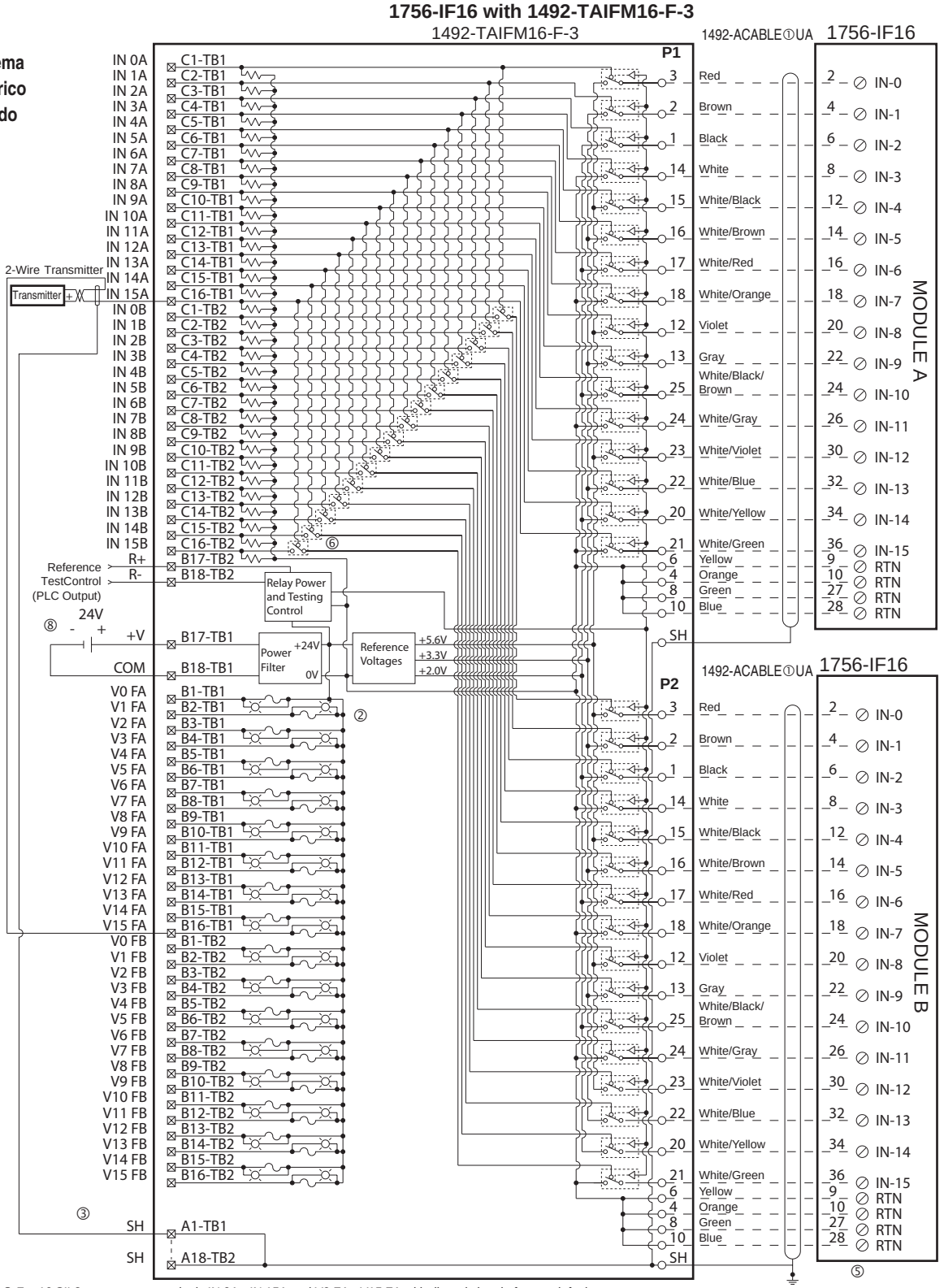
Les interrupteurs DIP fournis permettent de choisir entre 16 capteurs SIL2 et 32 capteurs standard. Le réglage par défaut en usine est de 16 capteurs SIL2.

Mit dem Kippschalter wird zwischen den 16

SIL2-Sensoren und den 32 Standardsensoren ausgewählt. Standardstellung: 16 SLI2-Sensoren.

I microinterruttori consentono di scegliere tra 16 sensori SIL2 e 32 sensori standard. Impostazione di fabbrica: 16 sensori SIL2.

Conmutadores DIP disponibles de 16 sensores SIL2 o de 32 sensores estándar. Predeterminado: 16 sensores SIL2.



⑦ For 16 SIL2 sensors use terminals IN 0A - IN 15A and V0 FA - V15 FA with dip switches in factory default.

Pour 16 capteurs SIL2, utiliser les bornes IN 0A - IN 15A et V0 FA - V15 FA avec les interrupteurs DIP ayant leur réglage par défaut en usine.

Verwenden Sie für die 16 SIL2-Sensoren die Klemmen IN 0A - IN 15A und V0 FA - V15 FA, wobei sich der Kippschalter in Standardstellung befinden muss.

Per il collegamento di 16 sensori SIL2 usare i terminali IN 0A - IN 15A e V0 FA - V15 FA con i microinterruttori configurati con le impostazioni di fabbrica.

Para 16 sensores SIL2, utilice terminales IN 0A - IN 15A y V0 FA - V15 FA con conmutadores DIP en valores predeterminados.

⑧ +24VDC input required for reference test terminals. Refer to Page 6 for specifications.

L'entrée +24VCC est nécessaire pour le test de référence de bornes. Reportez-vous en page 6 pour les spécifications.

Für Bezugsmessklemmen sind + 24 V DC Eingangsspannung erforderlich. Spezifikationen siehe Seite 6

È richiesta una tensione di ingresso di +24VCC per i terminali del test di riferimento. Fare riferimento a pagina 6 per le caratteristiche.

Entrada +24 VDC necesaria para terminales de prueba de referencia. Consulte la página 6 para obtener más información.

Transmitter must be 4-20mA (TAIFM16 resistor converts to voltage) or 0-5V output. A 0-10V output will cause premature IFM failure.

L'émetteur doit avoir une sortie de 4-20mA (la résistance TAIFM16 effectue la conversion en tension) ou 0-5V. Une sortie de 0-10V provoque une défaillance IFM prématurée.

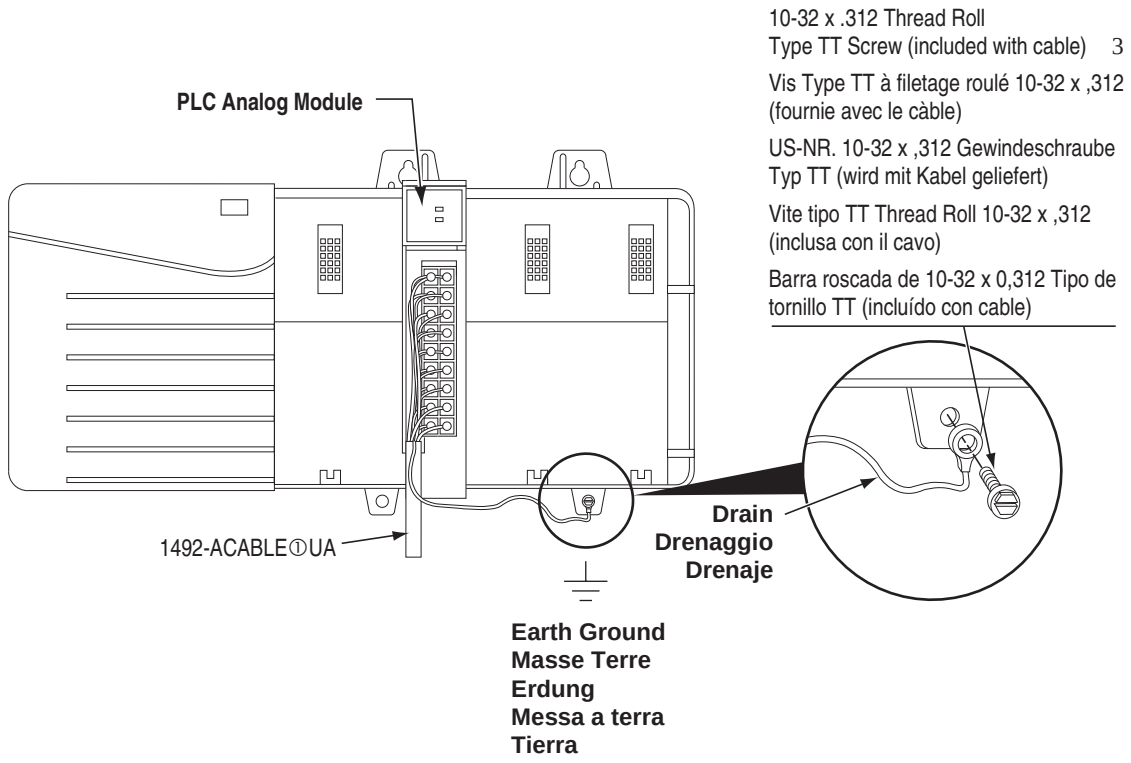
Die Ausgangsleistung des Transmitters muss 4-20 mA (vom TAIFM16-Widerstand in Spannung umgewandelt) oder 0-5 V betragen. Bei einer Ausgangsleistung von 0-10 V kommt es zu einem frühzeitigen IMF-Ausfall.

L'uscita del trasmettitore deve erogare 4-20mA (la resistenza TAIFM16 esegue la conversione in tensione) o 0-5V. Un'uscita 0-10V causerà guasti prematuri al modulo di interfaccia.

El transmisor debe tener una salida de 4-20 mA (la resistencia TAIFM16 se convierte a voltaje) o 0-5 V. Una salida de 0-10V causa fallos IFM prematuros.

Cable Shield Installation
Installation du câble blindé
Kabelab-schirmungs Installation
Installazione schermo del cavo
Instalación de pantalla de cable

NOTICE	Refer to Publications 1770-4.1 for generally recommended wiring and shield grounding guidelines.
REMARQUE	Voir les publications 1770-4.1 pour les conseils généraux de mise à la masse des câbles blindés.
HINWEIS	Sehen Sie Publikationen 1770-4.1 DE für generell empfohlene Verdrahtungs- und Abschirmungsanweisungen.
NOTA	Per procedure di cablaggio e messa a terra dello schermo generalmente consigliate consultare le pubblicazioni 1770-4.1.
AVISO	Consulte las publicaciones 1770-4.1 para obtener las recomendaciones más comunes sobre cableado y pautas para conexión a tierra.



Specifications Technische Daten Especificaciones Spécifications Specifiche

Catalog No. Référence Bestell-Nr. N. Catalogo Referencia	Voltage Tension Spannung Tensione Voltaje	Current / Circuit Courant/Circuit Strom/Schaltkreis Corrente/circuito Intensidad/circuito	Current / Module Courant/Module Strom/Modul Corrente/modulo Intensidad/módulo	Blown Fuse Indicator Circuit Current Courant circuit voyants Strom, Anzeigeschaltkreis Corrente circuito indicatori Intensidad del circuito de indicadores	Maximum Recurring Peak Voltage Tension de crele réurrente maximale Maximale periodische Hochstspannung Tensione massima di cresta ricorrente Voltaje de cresta iterativo máximo
1492-TAIFM16-F-3	19.2 - 26.4 VDC	0.25 Amps	1 Amp	2 mA	100 V_p

Catalog No. Référence Bestell-Nr. N. Catalogo Referencia	Reference Test Control Input Voltage Contrôle de test de référence de la tension d'entrée Eingangsspannung für Bezugsmessung Tensione in ingresso di controllo del test di riferimento Voltaje de entrada de control de prueba de referencia	Reference Test Control Input Current Contrôle de test de référence du courant d'entrée Eingangsstrom für Bezugsmessung Corrente in ingresso di controllo del test di riferimento Corriente de entrada de control de prueba de referencia	Module Power Consumption Consommation de puissance du module Stromverbrauch des Moduls Potenza di assorbimento del modulo Consumo de energía del módulo
1492-TAIFM16-F-3	19.2 - 30 VDC	10 mA	0.5 Watts @ 24VDC

Catalog No. Référence Bestell-Nr. N. Catalogo Referencia	Operating Temperature Range Plage températures de fonctionnement Betriebstemperaturbereich Limiti temperatura di funzionamento Rango de temperatura de funcionamient	Operating Humidity Humidité relative Betriebsluftfeuchtigkeit Umidità di esercizio Humedad operativa	Approx. Shipping Weight Poids d'embarquement approximatif Ungefähres Versandgewicht Peso approssimativo del carico Peso aproximado al momento de embarque	Dimensions Dimensions Abmessungen Dimensioni Dimensiones	Agency Certifications Certifications d'agence Behördenzertifizierungen Enti di certificazione Certificaciones de agencia
1492-TAIFM16-F-3	0° C - 60° C	5 - 95%	1.3 lb. 590 g.	9.88 in. (251 mm) W 3.27 in. (83 mm) H 2.74 in (69.5 mm) D	cULus (File: E113724, Guide No. NRAQ2) CE: Compliant for all applicable directives

②For transients > 100 Vp use a UL recognized suppression device rated at 2.5 kV withstand.
Pour des transitoires > 100 Vp utilisez un dispositif de suppression certifié UL à 2,5 kV nominal de tenue.
Für Einschaltstöße > 100 Vp verwenden Sie einen UL anerkannten Entstörer, der bewertet wurde bei 2,5 kV standzuhalten.
Per transitori > 100 Vp usare dispositivo di soppressione riconosciuto da UL capace di sopportare 2,5 kV.
Para transitorios > 100 Vp use un dispositivo de supresión reconocido UL clasificado con 2,5 kV.

③Non-condensing
Sans condensation
Nicht kondensierend
Senza condensa
sin condensación

④Application and proper use of the Reference Test Control circuit is based on interface with a 1756-OB16D or similar DC output module to drive the Testing Control Circuit. Refer to page 4 for test voltages.
L'application et l'utilisation appropriée du circuit de contrôle de test de référence sont basées sur l'interface avec 1756-OB16D ou un module de sortie CC similaire pour l'entraînement du circuit de contrôle de test. Se reporter à la page 4 pour les tensions de test.
Die korrekte Verwendung des Bezugsmessschaltkreises basiert auf einer Schnittstelle mit einem 1756-OB16D- oder einem ähnlichen DC-Ausgangsmodul zum Steuern des Bezugsmessschaltkreises. Einzelheiten zu Messspannungen finden Sie auf Seite 4.
L'applicazione e l'uso appropriato del circuito di controllo del test di riferimento si basano su un'interfaccia con un modulo di uscita CC 1756-OB16D o simile per la gestione del circuito. Fare riferimento a pag. 4 per le tensioni del test.
La aplicación y correcta utilización del circuito de control de pruebas de referencia están basadas en una interface con un módulo de salida de CD 1756-OB16D para hacer funcionar el circuito de control de pruebas. Consulte la página 4 para obtener información sobre los voltajes de prueba.

SURGE SUPPRESSION follow the literature recommendations of the PLC module being used.
SUPPRESSION DES SURTENSIONS se trouve à la suite de la littérature qui contient les recommandations relatives au module PLC utilisé.
ÜBERSPANNUNGSSCHUTZ Bitte beachten Sie die Dokumentationsempfehlungen für das jeweils benutzte SPS-Modul.
Per la **SOPPRESSIONE DEI PICCHI TEMPORANEI**, seguire le istruzioni riportate nella documentazione in dotazione al Modulo PLC utilizzato.
SUPRESIÓN DE SOBRETENSIÓN, siga las recomendaciones indicadas en la documentación del módulo PLC respectivo.

Reference Publications: Refer to 1770-4.1 and appropriate PLC I/O module installation manual.

PN-28295
DIR 41063-292 **(Version 04)**
Printed in U.S.A.

Rockwell Automation

Termination Module for use in SIL 2 Safety Shutdown Applications with Two 1756-OB16D DC Output Modules① ③

Module de terminaison à utiliser dans des applications d'arrêt d'urgence SIL 2 avec deux modules de sortie 1756-OB16D CC① ③

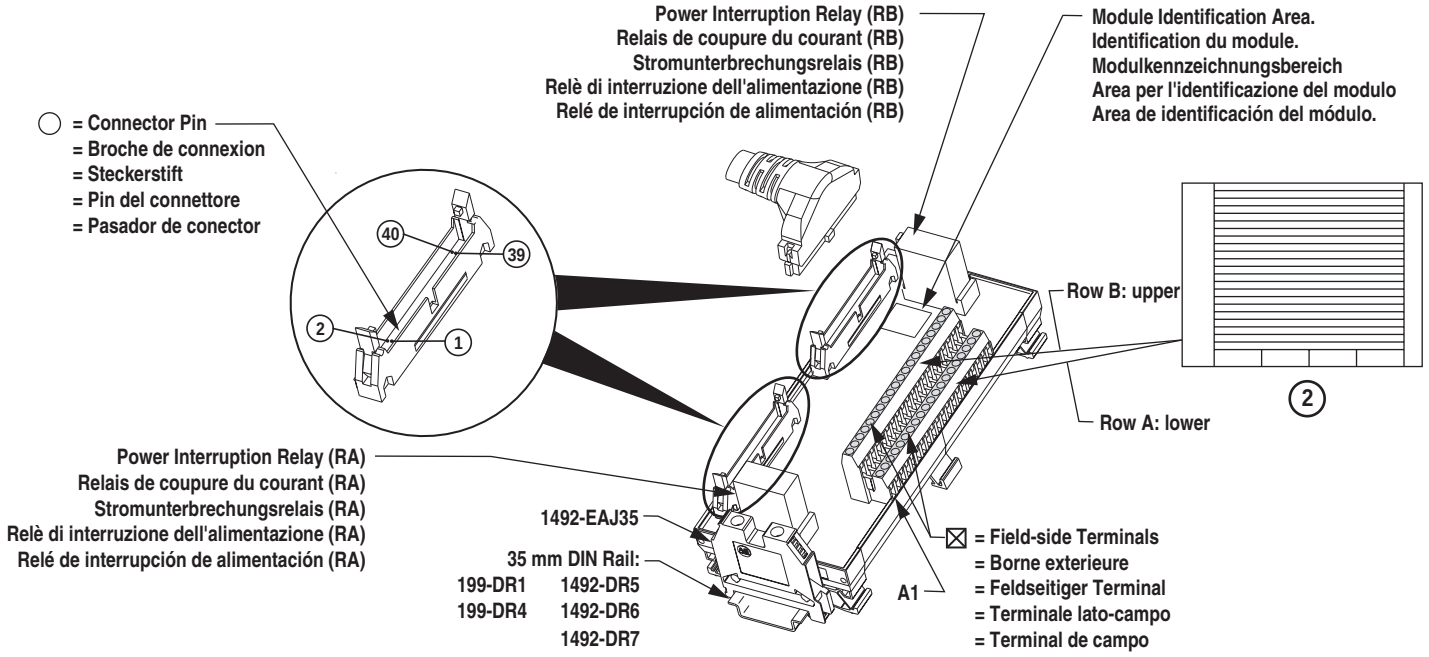
Abschlussmodul für die Verwendung in SIL2-Sicherheitssschaltleisten mit zwei 1756-OB16D DC-Ausgangsmodulen① ③

Modulo di terminazione per uso con applicazioni di arresto di sicurezza SIL 2 con due moduli di uscita CC 1756-OB16D① ③

Módulo de terminación para uso en sistemas de paralización de emergencia SIL 2 con dos módulos de salida 1756-OB16D de corriente continua① ③

(Cat 1492-TIFM40F-24-2)

WARNING	To prevent electrical shock, disconnect from power source before installing or servicing.
AVERTISSEMENT	Avant le montage et la mise en service, couper l'alimentation secteur pour éviter toutes décharges.
WARNUNG	Vor Installations- oder Servicearbeiten Stromversorgung unterbrechen, um Elektroschocks zu vermeiden.
AVVERTENZA	Per prevenire infortuni, togliere tensione prima dell'installazione o manutenzione.
ADVERTENCIA	Desconéctese de la corriente eléctrica, antes de la instalación o del servicio, a fin de impedir sacudidas eléctricas.



① **The 1492-TIFM40F-24-2 is designed specifically for use in a Control Logix SIL2 safety shutdown application using two 1756-OB16D DC output modules. Refer to A-B reference manual Using Control Logix in SIL2 Applications (1756-RM001_-EN-P) for details. Using this module in a non SIL2 application with 1756-OB16D modules is at the discretion of the user.**

Le 1492-TIFM40F-24-2 est tout spécialement conçu pour être utilisé dans un système d'arrêt d'urgence Control Logix SIL2 utilisant deux modules de sortie 1756-OB16D CC. Pour plus d'informations, reportez-vous au manuel de référence A-B Using Control Logix in SIL2 Applications (1756-RM001_-EN-P). Toute utilisation de ce module dans une application autre que SIL2 équipée de modules 1756-OB16D est laissée à la discréation de l'utilisateur.

Das 1492-TIFM40F-24-2 ist speziell für die Verwendung in einer Control Logix SIL2-Sicherheitsschaltleiste mit zwei 1756-OB16D DC-Ausgangsmodulen konzipiert. Einzelheiten finden Sie im A-B-Referenzhandbuch zur Verwendung von Control Logix in SIL2-Leisten (1756-RM001_-EN-P). Die Verwendung dieses Moduls in einer anderen Leiste (nicht SIL2) mit 1756-OB16D-Modulen erfolgt auf eigenes Risiko des Benutzers.

Il modulo 1492-TIFM40F-24-2 è progettato specificamente per l'uso con un'applicazione di arresto di sicurezza SIL2 Control Logix con due moduli di uscita CC 1756-OB16D. Per dettagli, fare riferimento alla guida Allen-Bradley Using Control Logix in SIL2 Applications (1756-RM001_-EN-P). L'uso di questo modulo in un'applicazione non di tipo SIL2 con moduli 1756-OB16D è a discrezione dell'utente.

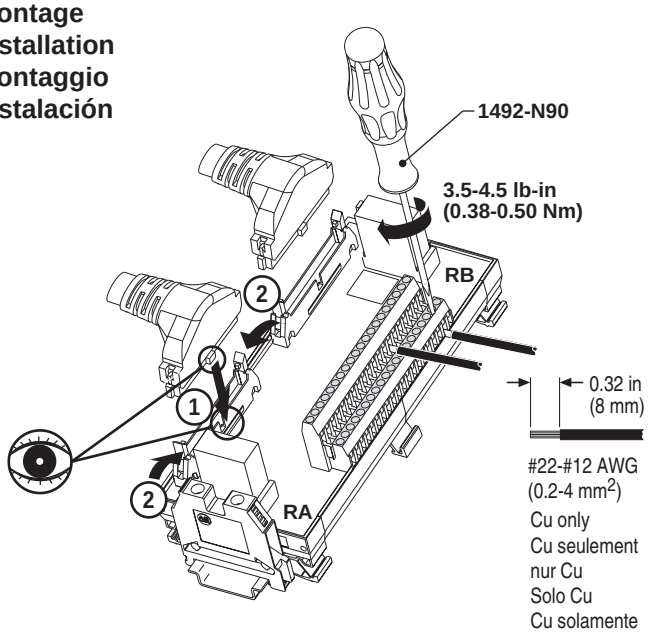
1492-TIFM40F-24-2 se ha diseñado específicamente para utilizarse en un sistema de paralización de emergencia Control Logix SIL2 con dos módulos de salida 1756-OB16D de corriente continua. Para obtener información adicional, consulte el manual de referencia A-B "Using Control Logix in SIL2 Applications (1756-RM001_-EN-P)". Queda a discreción del usuario el uso de este módulo en un sistema distinto a SIL 2 con módulos 1756-OB16D.

② **Adhesive Label Card. Provides I/O terminal wiring identification.**

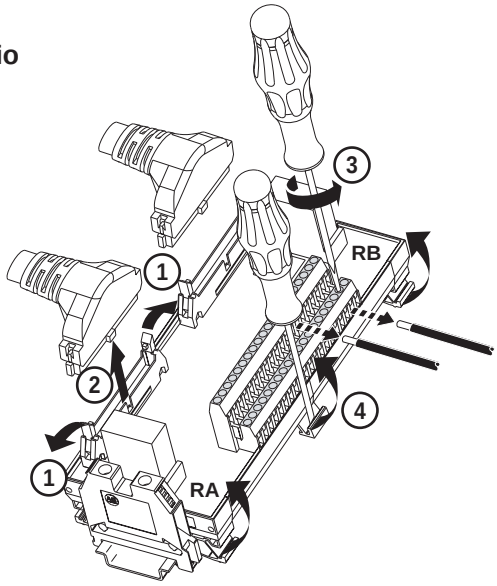
③ **The "no load" (e.g. wire off) detection feature of the 1756-OB16D output module will not function properly for those conditions between the 1492-TIFM40F-24-2 field terminals and the load. A no load (e.g. wire off) condition between the 1492-TIFM40F-24-2 field terminals and the output modules can be detected.**

PN-28294
DIR 41063-291 **(Version 04)**
Printed in U.S.A.

Installation
Montage
Installation
Montaggio
Instalación



Removal
Retrait
Entfernen
Smontaggio
Extracción



Cable Matrix
Matrice des câbles
Kabelmatrix
Matrice cavi
Matriz de cables

I/O Module **Module E/S** **E/A-Modul** **Modulo I/O** **Módulo de E/S**	**1492-TIFM40F-24-2** ③
1756-OB16D	1492-CABLE①Z ②

①Cables are available in 0.5m, 1.0m, 2.5m and 5.0m lengths (005=0.5m, 010=1.0m, 025 = 2.5m, 050=5.0m).Custom length cables also available. Contact local Sales Office for more information.

Câbles disponibles en 0,5m, 1,0m, 2,5m et 5,0m de longueur (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m).Câbles sur mesure à la demande. Contactez e bureau le plus proche.

Verfügbare Kabellängen 0,5m, 1,0m, 2,5m und 5,0m (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m). Anwenderspezifizifische Längen stehen ebenfalls zur Verfügung. Kontaktieren Sie bitte Ihr lokales Vertriebsbüro für weitere Informationen.

I cavi sono disponibili in lunghezze di 0,5m, 1,0m, 2,5m e 5,0m (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m).
Sono disponibili anche cavi su misura. Per ulteriori informazioni, contattare l'ufficio vendite locale.

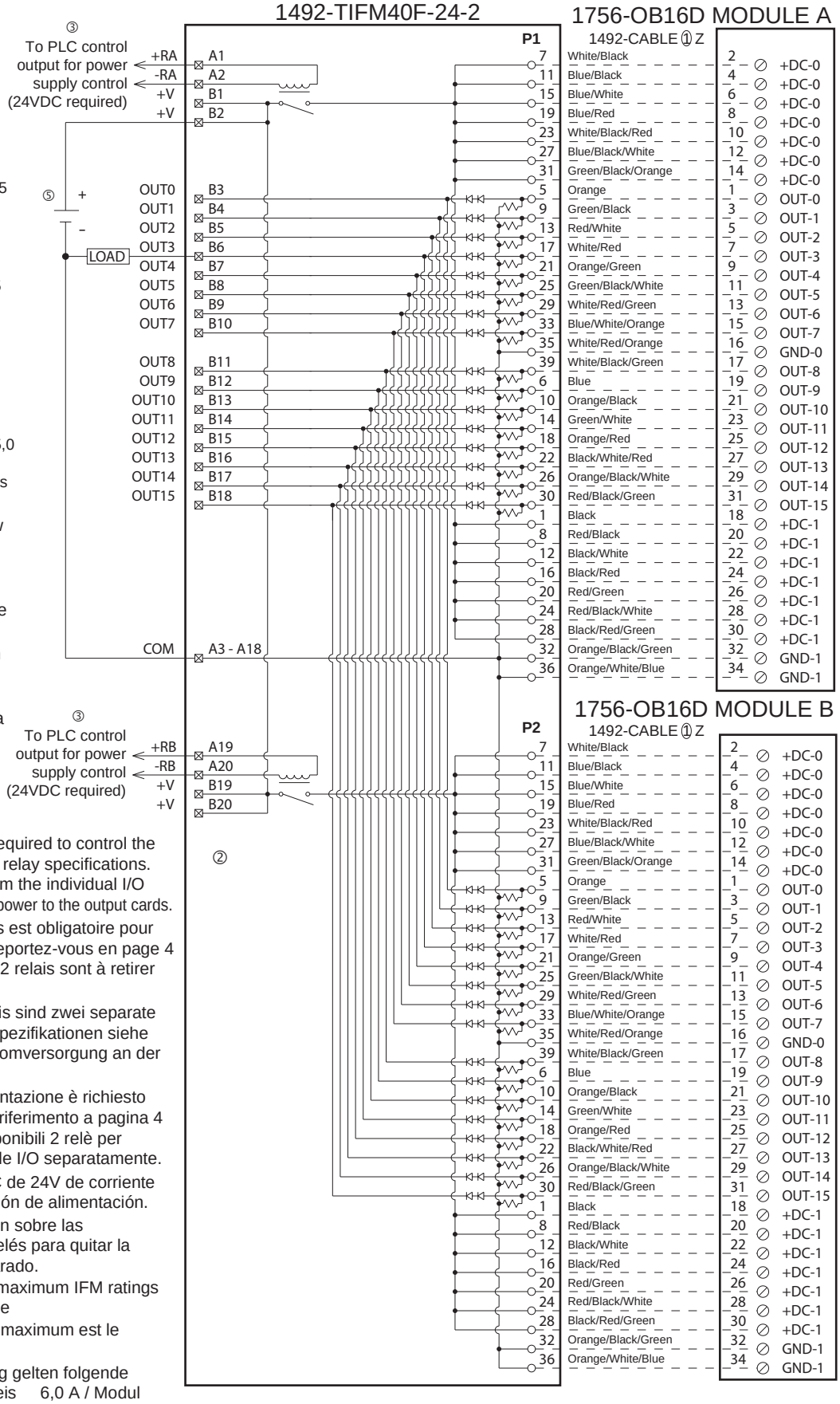
Cables disponibles en longitudes de 0,5m, 1,0m, 2,5m, 5,0m (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m).Hay disponibles cables de varias longitudes. Para más información comuníquese con la oficina de ventas.

②Two cables required with 1492-TIFM40F-24-2
Deux câbles requis avec 1492-TIFM40F-24-2
Mit 1492-TIFM40F-24-2 sind zwei Kabel erforderlich
Sono necessari due cavi con il modulo 1492-TIFM40F-24-2
Se requiere dos cables con 1492-TIFM40F-24-2

③Cable is limited for use within the control panel unless it is run through conduit. Cable is ITC (Instrumentation Tray Cable) rated.

Pinout / Wiring Diagram
Brochage / Schéma de câblage
Anschlußbelegung / Verkabelungsschema
Disposizione dei piedini / Schema elettrico
Esquema de pins / Diagrama de cableado

1756-OB16D with 1492-TIFM40F-24-2



① Cables are available in 0.5m, 1.0m, 2.5m, and 5.0m standard lengths (005=0.5m, 010=1.0m, 025=2.5m,050=5.0m). Custom length cables are also available.

Les câbles sont disponibles dans des longueurs standard de 0,5 m, 1,0 m, 2,5 m et 5,0 m (005=0,5 m, 010=1,0 m, 025=2,5 m, 050=5,0 m). Des longueurs personnalisées sont également disponibles.

Kabel sind in 0,5 m, 1,0 m, 2,5 m und 5,0 m Standardlängen (005=0,5 m, 010=1,0 m, 025=2,5 m, 050=5,0m) erhältlich. Sonderlängen sind ebenfalls erhältlich.

I cavi sono disponibili in lunghezze standard di 0,5m, 1,0m, 2,5m e 5,0m (005=0,5m, 010=1,0m, 025=2,5m e 050=5,0m). Sono inoltre disponibili cavi su misura.

Los cables se encuentran disponibles en longitudes estándares de 0,5 m, 1,0 m, 2,5 m, y 5,0 m (005 = 0,5 m, 010 = 1,0 m, 025 = 2,5 m, 050 = 5,0 m). También se encuentran disponibles cables de longitud a medida.

② Terminals starting with A are the lower row of terminals, B terminals are the upper row.

Les terminaisons commençant par A sont situées dans la rangée du bas, celles commençant par B correspondent à la rangée du haut.

Klemmen mit Anfangsbuchstaben A befinden sich in der unteren Reihe, Klemmen mit Anfangsbuchstaben B in der oberen Reihe.

I terminali che iniziano con A sono quelli della serie inferiore, i terminali B sono quelli della serie superiore.

Los terminales que empiezan con A son la serie inferior de terminales; los terminales B son la serie superior.

③ Use of separate 24VDC PLC outputs are required to control the power interruption relays. Refer to page 4 for relay specifications. Note: there are 2 relays to remove power from the individual I/O cards separately. Energize the relays to supply power to the output cards.

L'utilisation de sorties PLC 24 V CC séparées est obligatoire pour contrôler les relais de coupure du courant. Reportez-vous en page 4 pour les spécifications de relais. Remarque : 2 relais sont à retirer de chaque carte d'E/S.

Zur Steuerung des Stromunterbrechungsrelais sind zwei separate 24VDC PLC-Ausgänge erforderlich. Relais-Spezifikationen siehe Seite 4. Achtung: Es gibt 2 Relais, die die Stromversorgung an der jeweiligen E/A-Karte unterbrechen.

Per controllare i relè di interruzione dell'alimentazione è richiesto l'uso di uscite PLC a 24 VCC separate. Fare riferimento a pagina 4 per le caratteristiche del relè. Nota: sono disponibili 2 relè per rimuovere l'alimentazione dalle singole schede I/O separatamente.

Se requiere el uso de salidas separadas PLC de 24V de corriente continua para controlar los relés de interrupción de alimentación.

Consulte la página 4 para obtener información sobre las especificaciones de relé. Nota: Existen dos relés para quitar la alimentación de cada tarjeta de E/S por separado.

④ With this module and cable combination, maximum IFM ratings are as follows: 1.5 A / Circuit 6.0 A / Module

Avec ce module et ce câble, l'ampérage IFM maximum est le suivant : 1,5 A / circuit 6,0 A / module

Bei diesem Modul und bei dieser Verkabelung gelten folgende maximale IFM-Nennwerte: 1,5 A / Schaltkreis 6,0 A / Modul

I valori IFM massimi per questa combinazione di cavi e modulo sono i seguenti: 1,5 A / Circuito 6,0 A / Modulo

Con esta combinación de cable y módulo, la capacidad máxima de IFM es: 1,5 A / circuito 6,0 A / módulo

⑤ Use of one power source is required for this module combination.

Cette combinaison de modules doit être reliée à une source d'alimentation dédiée.

Für diese Modulkombination muss eine Stromquelle verwendet werden.

Questa combinazione di modulo richiede l'uso di una sorgente di alimentazione.

Se requiere el uso de una fuente de alimentación para esta combinación de módulo.

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Specifications Technische Daten Especificaciones Spécifications Specifiche

Catalog No. Référence Bestell-Nr. N. Catalogo Referencia	Voltage Tension Spannung Tensione Voltaje	Current / Circuit Courant/Circuit Strom/Schaltkreis Corrente/circuito Intensidad/circuito	Current / Module Courant/Module Strom/Modul Corrente/modulo Intensidad/módulo	Indicator Circuit Current Courant circuit voyants Strom, Anzeigeschaltkreis Corrente circuito indicatori Intensidad del circuito de indicadores	Maximum Recurring Peak Voltage ② Tension de crele réurrente maximale Maximale periodische Hochstspannung Tensione massima di cresta ricorrente Voltaje de cresta iterativo máximo
1492-TIFM40F-24-2	19.2 - 30 VDC	1.5 Amps	6 Amps	N/A	100 Vp②

Catalog No. Référence Bestell-Nr. N. Catalogo Referencia	Power Interruption Relay Coil Voltage ④ Tension de la bobine du relais de coupure du courant Spulenspannung des Stromunterbrechungsrelais Tensione di bobina del relè di interruzione dell'alimentazione Voltaje de bobina del relé de interrupción de alimentación	Power Interruption Relay Maximum Make / Break ④ Etablissement / coupure maximum du relais de coupure du courant Maximaler Ein- / Ausschaltwert des Stromunterbrechungsrelais Valore max. di attivazione/riposo del relè di interruzione dell'alimentazione Apertura y cierre máximo del relé de interrupción de alimentación	Replacement Part Number ④ Référence de la pièce de rechange Ersatzteilnummer Numero di parte per la sostituzione Número de pieza
1492-TIFM40F-24-2	19.2 - 26.4 VDC	360 VA	700-HK36Z24 (Form C: 1 N.O. & 1 N.C. contact) Note: Only N.O. contact used on this module

Catalog No. Référence Bestell-Nr. N. Catalogo Referencia	Operating Temperature Range Plage températures de fonctionnement Betriebstemperaturbereich Limiti temperatura di funzionamento Rango de temperatura de funcionamient	Operating Humidity Humidité relative Betriebsluftfeuchtigkeit Umidità di esercizio Humedad operativa	Approx. Shipping Weight Poids d'embarquement approximatif Ungefähres Versandgewicht Peso approssimativo del carico Peso aproximado al momento de embarque	Dimensions Dimensions Abmessungen Dimensioni Dimensiones	Agency Certifications Certifications d'agence Behördenzertifizierungen Enti di certificazione Certificaciones de agencia
1492-TIFM40F-24-2	0° C - 60° C	5 - 95% ③	1.1 lb. 499 g.	8.66 in. (220 mm) W 3.27 in. (83 mm) H 2.74 in (69.5 mm) D	cULus (File: E113724, Guide No. NRAQ2 CE: Compliant for all applicable directives

② For transients > 100 Vp use a UL recognized suppression device rated at 2.5 kV withstand.
Pour des transitoires > 100 Vp utilisez un dispositif de suppression certifié UL à 2,5 kV nominal de tenue.
Für Einschaltstöße > 100 Vp verwenden Sie einen UL anerkannten Entstörer, der bewertet wurde bei 2,5 kV standzuhalten.
Per transitori > 100 Vp usare dispositivo di soppressione riconosciuto da UL capace di sopportare 2,5 kV.
Para transitorios > 100 Vp use un dispositivo de supresión reconocido UL clasificado con 2,5 kV.

③ Non-condensing
Sans condensation
Nicht kondensierend
Senza condensa
sin condensación

④Application and proper use of the Power Interruption relay is based on interface with a 1756-OB16D or similar DC output module to drive the relay.
L'utilisation correcte du relais de coupure du courant est basée sur une interface avec un module de sortie 1756-OB16D ou CC similaire pour piloter le relais.
Die Anwendung bzw. ordnungsgemäße Verwendung des Stromunterbrechungsrelais basiert auf einer Schnittstelle mit einem 1756-OB16D- oder ähnlichem DC-Ausgangsmodul zum Steuern des Relais.
L'applicazione e l'uso appropriato del relè di interruzione dell'alimentazione si basano su un'interfaccia con un modulo di uscita CC 1756-OB16D o simile per la gestione del relè.
La aplicación y uso correcto del relé de interrupción de alimentación se basa en la interfaz con un 1756-OB16D o módulo de salida de corriente continua similar para controlar el relé.

SURGE SUPPRESSION follow the literature recommendations of the PLC module being used.
SUPPRESSION DES SURTENSIONS se trouve à la suite de la littérature qui contient les recommandations relatives au module PLC utilisé.
ÜBERSPANNUNGSSCHUTZ Bitte beachten Sie die Dokumentationsempfehlungen für das jeweils benutzte SPS-Modul.
Per la **SOPPRESSIONE DEI PICCHI TEMPORANEI**, seguire le istruzioni riportate nella documentazione in dotazione al Modulo PLC utilizzato.
SUPRESIÓN DE SOBRETENSIÓN, siga las recomendaciones indicadas en la documentación del módulo PLC respectivo.

Reference Publications: Refer to 1770-4.1 and appropriate PLC I/O module installation manual.

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Rockwell Automation

Fused Termination Module for use in a SIL2 Safety Shutdown Applications with Two 1756-IB32 DC Input Modules① ③

Module d'interface à fusible à utiliser dans des applications d'arrêt d'urgence SIL2 avec deux modules de sortie 1756-IB32 CC① ③

Abschlussmodul mit Sicherung für die Verwendung in SIL2- Sicherheitsschaltleisten mit zwei 1756-IB32 DC-Eingangsmodulen① ③

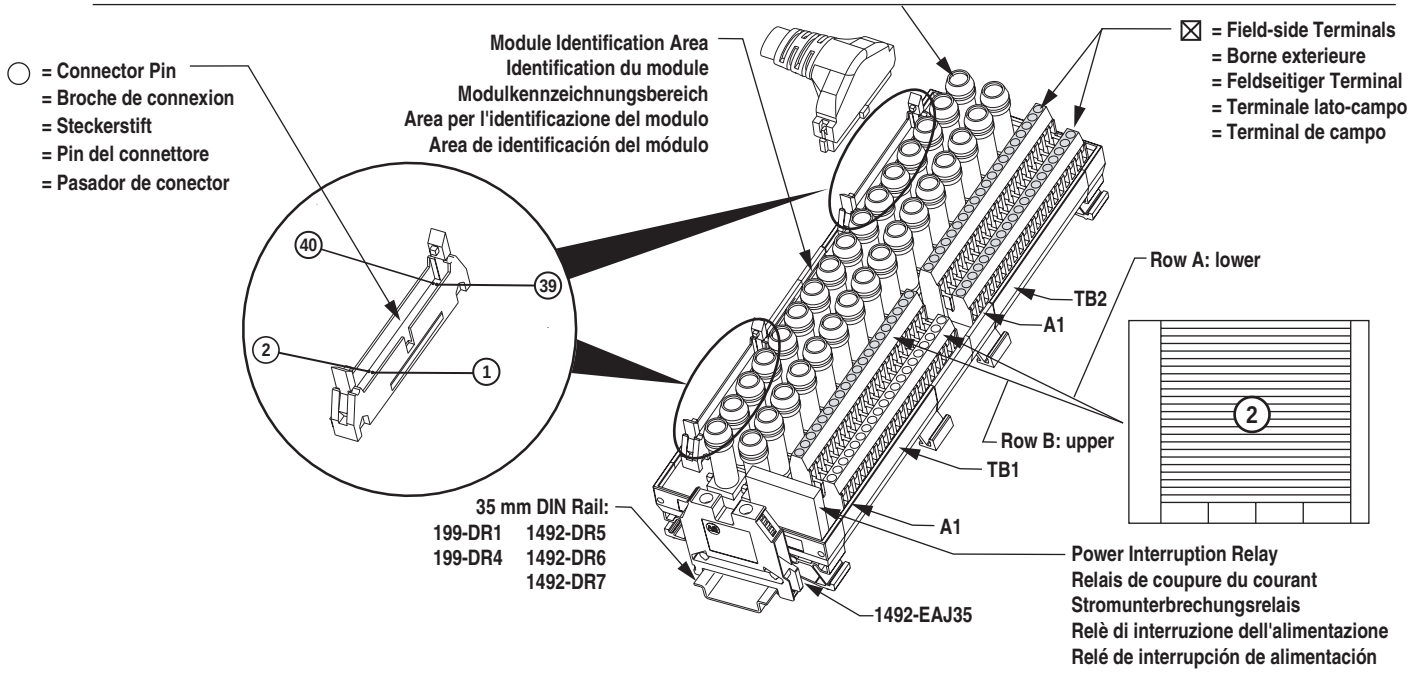
Modulo di terminazione con fusibile per uso con applicazioni di arresto di sicurezza SIL 2 con due moduli di ingresso CC 1756-IB32① ③

Módulo de terminación con fusible para uso en sistemas de paralización de emergencia SIL 2 con dos módulos de entrada 1756-IB32 CC de corriente continua① ③

(Cat 1492-TIFM40F-F24A-2)

WARNING	To prevent electrical shock, disconnect from power source before installing or servicing.
AVERTISSEMENT	Avant le montage et la mise en service, couper l'alimentation secteur pour éviter toutes décharges.
WARNUNG	Vor Installations- oder Servicearbeiten Stromversorgung unterbrechen, um Elektroschocks zu vermeiden.
AVVERTENZA	Per prevenire infortuni, togliere tensione prima dell'installazione o manutenzione.
ADVERTENCIA	Desconéctese de la corriente eléctrica, antes de la instalación o del servicio, a fin de impedir sacudidas eléctricas.

Fuse Holders: See page 3 for fuse installation/removal.
Porte-fusibles et voyants de fusibles grillés: voir page 3 l'installation et le retrait des fusibles.
Sicherungshalterungen und Anzeige einer durchgebrannten Sicherung. Ein-und Ausbau der Sicherung siehe Seite 3.
Morsetti dei fusibili e indicatori dei fusibili bruciati: vedere il montaggio/smontaggio dei fusibili a pagina 3.
Sujetadores de fusibles e indicadores de fusible fundido: Vea la página 3 para obtener información sobre la instalación/extracción de fusibles.



(1) **The 1492-TIFM40F-24A-2 is designed specifically for use in a Control Logix SIL2 safety shutdown application using two 1756-IB32 DC input modules. Refer to A-B reference manual Using Control Logix in SIL2 Applications (1756-RM001_-EN-P) for details. Using this module in a non SIL2 application with 1756-IB32 modules is at the discretion of the user.**

Le 1492-TIFM40F-24A-2 est tout spécialement conçu pour être utilisé dans un système d'arrêt d'urgence Control Logix SIL2 équipé de deux modules d'entrée 1756-IB32 CC. Pour plus d'informations, reportez-vous au manuel de référence A-B Using Control Logix in SIL2 Applications (1756-RM001_-EN-P). Toute utilisation de ce module dans une application autre que SIL2 équipée de modules 1756-IB32 est laissée à la discrétion de l'utilisateur.

Das 1492-TIFM40F-24A-2 ist speziell für die Verwendung in einer Control Logix SIL2-Sicherheitsschaltleiste mit zwei 1756-IB32 DC-Eingangsmodulen konzipiert. Einzelheiten finden Sie im A-B-Referenzhandbuch zur Verwendung von Control Logix in SIL2-Leisten (1756-RM001_-EN-P). Die Verwendung dieses Moduls in einer anderen Leiste (nicht SIL2) mit 1756-IB32-Modulen erfolgt auf eigenes Risiko des Benutzers.

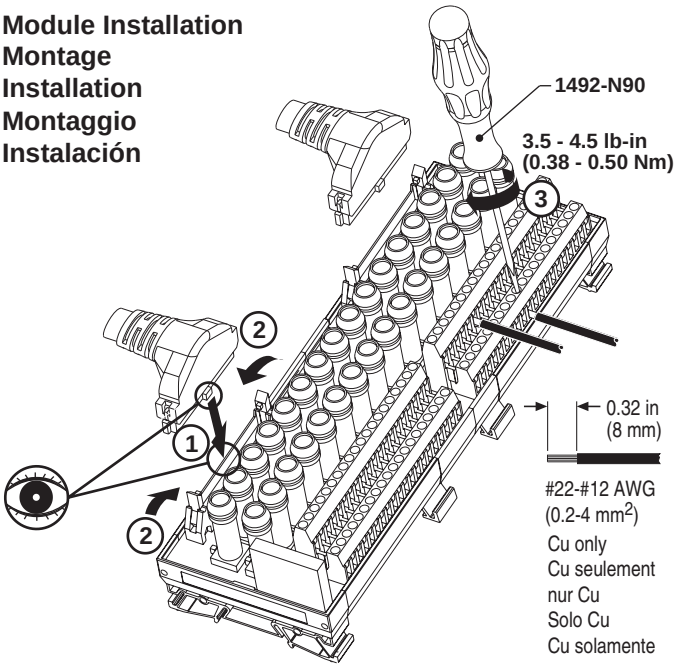
Il modulo 1492-TIFM40F-24A-2 è progettato specificamente per l'uso con un'applicazione di arresto di sicurezza SIL2 Control Logix con due moduli di ingresso CC 1756-IB32. Per dettagli, fare riferimento alla guida Allen-Bradley Using Control Logix in SIL2 Applications (1756-RM001_-EN-P). L'uso di questo modulo in un'applicazione non di tipo SIL2 con moduli 1756-IB32 è a discrezione dell'utente.

1492-TIFM40F-24A-2 se ha diseñado específicamente para utilizarse en un sistema de paralización de emergencia Control Logix SIL2 con dos módulos de entrada 1756-IB32 de corriente continua. Para obtener información adicional, consulte el manual de referencia A-B "Using Control Logix in SIL2 Applications (1756-RM001_-EN-P)". Queda a discreción del usuario el uso de este módulo en un sistema distinto a SIL 2 con módulos 1756-IB32.

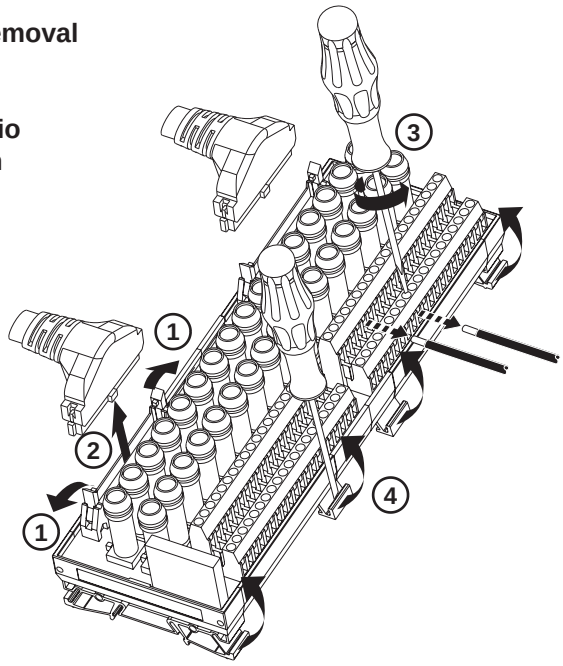
(2) **Adhesive Label Card. Provides I/O terminal wiring identification.**

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Module Installation
Montage
Installation
Montaggio
Instalación



Module Removal
Retrait
Entfernen
Smontaggio
Extracción



Cable Matrix
Matrice des câbles
Kabelmatrix
Matrice cavi
Matriz de cables

I/O Module **Module E/S** **E/A-Modul** **Modulo I/O** **Módulo de E/S**	**1492** **TIFM40F-F24A-2** ③
1756-IB32	1492-CABLE①Z ②

① Cables are available in 0.5m, 1.0m, 2.5m and 5.0m lengths (005=0.5m, 010=1.0m, 025 = 2.5m, 050=5.0m). Custom length cables also available. Contact local Sales Office for more information.

Câbles disponibles en 0,5m, 1,0m, 2,5m et 5,0m de longueur (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m). Câbles sur mesure à la demande. Contactez e bureau le plus proche.

Verfügbare Kabellängen 0,5m, 1,0m, 2,5m und 5,0m (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m). Anwenderspezifizifische Längen stehen ebenfalls zur Verfügung. Kontaktieren Sie bitte Ihr lokales Vertriebsbüro für weitere Informationen.

I cavi sono disponibili in lunghezze di 0,5m, 1,0m, 2,5m e 5,0m (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m).
Sono disponibili anche cavi su misura. Per ulteriori informazioni, contattare l'ufficio vendite locale.

Cables disponibles en longitudes de 0,5m, 1,0m, 2,5m, 5,0m (005=0,5m; 010=1,0m; 025=2,5m; 050=5,0m). Hay disponibles cables de varias longitudes. Para más información comuníquese con la oficina de ventas.

② Two cables required with 1492-TIFM40F-F24A-2

Deux câbles requis avec 1492-TIFM40F-F24A-2

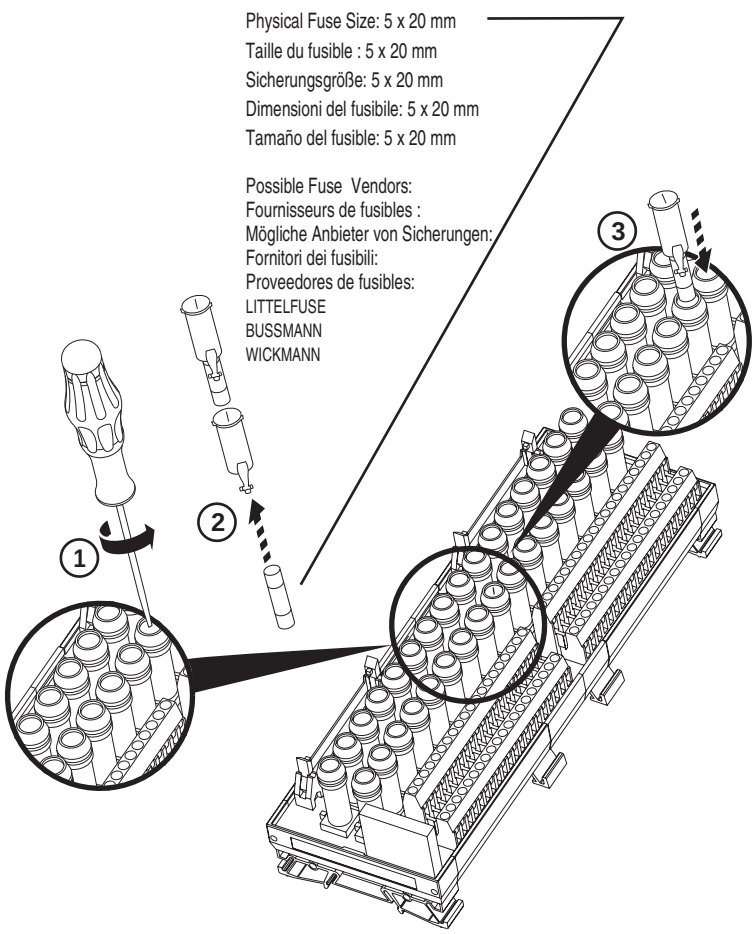
Mit 1492-TIFM40F-F24A-2 sind zwei Kabel erforderlich

Sono necessari due cavi con il modulo 1492-TIFM40F-F24A-2

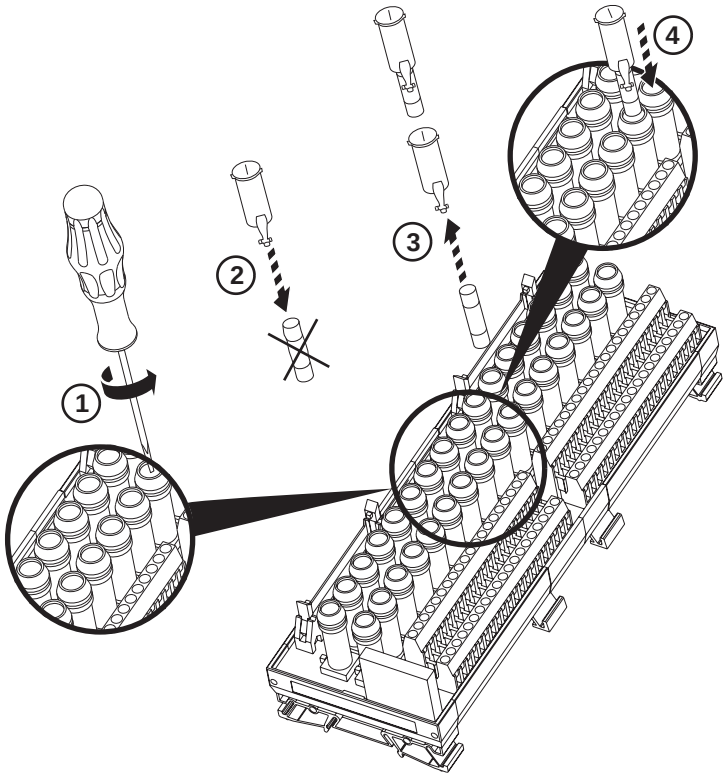
Se requiere dos cables con 1492-TIFM40F-F24A-2

③ Cable is limited for use within the control panel unless it is run through conduit. Cable is ITC (Instrumentation Tray Cable) rated.

Fuse Installation ① ②
Montage du fusible
Installation der Sicherung
Installazione del fusibile
Instalación de fusibles



Fuse Removal
Retrait du fusible
Entfernung der Sicherung
Rimozione del fusibile
Extracción de fusibles



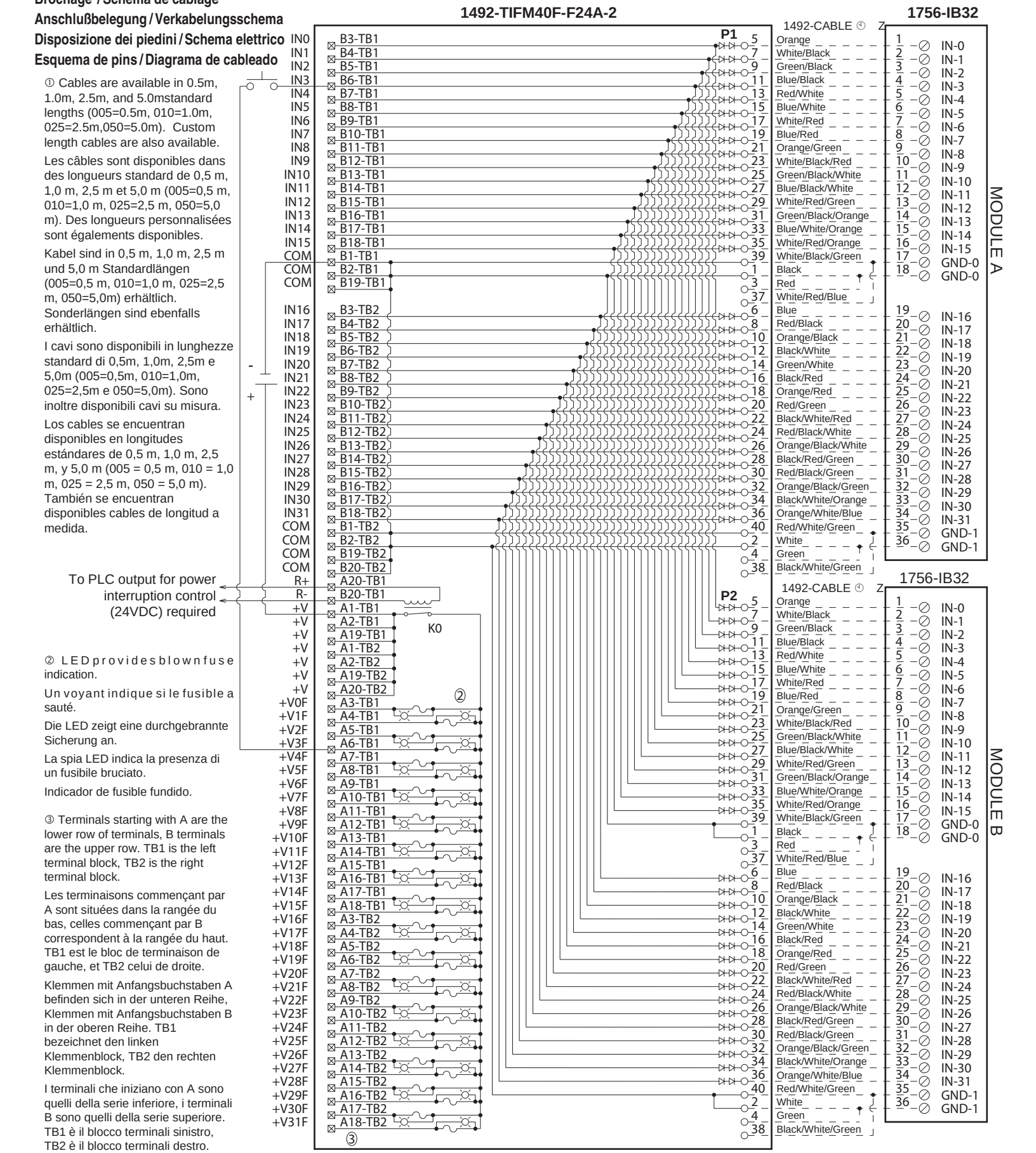
①Module ships without fuses.
Module livré sans fusible.
Das Modul wird ohne Sicherungen geliefert.
Il modulo viene fornito privo di fusibili
El módulo se vende sin los fusibles.

②Size the amperage of the fuse to meet your application needs.
Adaptez l'ampérage du fusible en fonction de vos besoins.
Wählen Sie eine Sicherung mit der für Ihre Anforderungen geeigneten Amperezahl aus.
Scegliere l'amperaggio del fusibile in base alle esigenze dell'applicazione.
Ajuste el amperaje del fusible según las necesidades del sistema.

The fuse holder is spring loaded. On initial fuse installation, (without a fuse installed) the fuse holder may need to be pried from the fuse holder barrel. A slot in the barrel is provided for this reason.

Pinout / Wiring Diagram
Brochage / Schéma de câblage
Anschlußbelegung / Verkabelungsschema
Disposizione dei piedini / Schema elettrico
Esquema de pins / Diagrama de cableado

1756-IB32 with 1492-TIFM40F-F24A-2



① Cables are available in 0.5m, 1.0m, 2.5m, and 5.0mstandard lengths (005=0.5m, 010=1.0m, 025=2.5m,050=5.0m). Custom length cables are also available.

Les câbles sont disponibles dans des longueurs standard de 0,5 m, 1,0 m, 2,5 m et 5,0 m (005=0,5 m, 010=1,0 m, 025=2,5 m, 050=5,0 m). Des longueurs personnalisées sont également disponibles.

Kabel sind in 0,5 m, 1,0 m, 2,5 m und 5,0 m Standardlängen (005=0,5 m, 010=1,0 m, 025=2,5 m, 050=5,0m) erhältlich. Sonderlängen sind ebenfalls erhältlich.

I cavi sono disponibili in lunghezze standard di 0,5m, 1,0m, 2,5m e 5,0m (005=0,5m, 010=1,0m, 025=2,5m e 050=5,0m). Sono inoltre disponibili cavi su misura.

Los cables se encuentran disponibles en longitudes estándares de 0,5 m, 1,0 m, 2,5 m, y 5,0 m (005 = 0,5 m, 010 = 1,0 m, 025 = 2,5 m, 050 = 5,0 m). También se encuentran disponibles cables de longitud a medida.

② LED provides blown fuse indication.

Un voyant indique si le fusible a sauté.

Die LED zeigt eine durchgebrannte Sicherung an.

La spia LED indica la presenza di un fusibile bruciato.

Indicador de fusible fundido.

③ Terminals starting with A are the lower row of terminals, B terminals are the upper row. TB1 is the left terminal block, TB2 is the right terminal block.

Les terminaisons commençant par A sont situées dans la rangée du bas, celles commençant par B correspondent à la rangée du haut. TB1 est le bloc de terminaison de gauche, et TB2 celui de droite.

Klemmen mit Anfangsbuchstaben A befinden sich in der unteren Reihe, Klemmen mit Anfangsbuchstaben B in der oberen Reihe. TB1 bezeichnet den linken Klemmenblock, TB2 den rechten Klemmenblock.

I terminali che iniziano con A sono quelli della serie inferiore, i terminali B sono quelli della serie superiore. TB1 è il blocco terminali sinistro, TB2 è il blocco terminali destro.

Los terminales que empiezan con A son la serie inferior de terminales; los terminales B son la serie superior. TB1 es el bloque terminal izquierdo, TB2 el bloque terminal derecho.

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Specifications Technische Daten Especificaciones Spécifications Specifiche

Catalog No. Référence Bestell-Nr. N. Catalogo Referencia	Voltage Tension Spannung Tensione Voltaje	Current/Circuit Courant/Circuit Strom/Schaltkreis Corrente/circuito Intensidad/circuito	Current/Module Courant/Module Strom/Modul Corrente/modulo Intensidad/módulo	Indicator Circuit Current Courant circuit voyants Strom, Anzeigeschaltkreis Corrente circuito indicatori Intensidad del circuito de indicadores	Maximum Recurring Peak Voltage ② Tension de crele réurrente maximale Maximale periodische Hochstspannung Tensione massima di cresta ricorrente Voltaje de cresta iterativo máximo
1492-TIFM40F-F24A-2	10 - 31.2 VDC	.25 Amps	3 Amps	1mA @ 10V 3mA @ 30V	600 Vp②

Catalog No. Référence Bestell-Nr. N. Catalogo Referencia	Power Interruption Relay Coil Voltage ④ Tension de la bobine du relais de coupure du courant Spulenspannung des Stromunterbrechungsrelais Tensione di bobina del relè di interruzione dell'alimentazione Voltaje de bobina del relé de interrupción de alimentación	Power Interruption Relay Maximum Make / Break ④ Etablissement / coupure maximum du relais de coupure du courant Maximaler Ein- / Ausschaltwert des Stromunterbrechungsrelais Valore max. di attivazione/riposo del relè di interruzione dell'alimentazione Apertura y cierre máximo del relé de interrupción de alimentación	Replacement Part Number ④ Référence de la pièce de rechange Ersatzteilnummer Numero di parte per la sostituzione Número de pieza
1492-TIFM40F-F24A-2	19.2 - 26.4 VDC	84 VA	700-TBR24

Catalog No. Référence Bestell-Nr. N. Catalogo Referencia	Operating Temperature Range Plage températures de fonctionnement Betriebstemperaturbereich Limiti temperatura di funzionamento Rango de temperatura de funcionamient	Operating Humidity Humidité relative Betriebsluftfeuchtigkeit Umidità di esercizio Humedad operativa	Approx. Shipping Weight Poids d'embarquement approximatif Ungefähres Versandgewicht Peso approssimativo del carico Peso aproximado al momento de embarque	Dimensions Dimensions Abmessungen Dimensioni Dimensiones	Agency Certifications Certifications d'agence Behördenzertifizierungen Enti di certificazione Certificaciones de agencia
1492-TIFM40F-F24A-2	0° C - 60° C	5 - 95% ③	1.6 lb 725 g	9.50 in. (190 mm) W 3.27 in. (83 mm) H 2.74 in (69.5 mm) D	cULus (File: E113724, Guide No. NRAQ2) CE: Compliant for all applicable directives

① For transients > 400 Vp use a UL recognized suppression device rated at 2.5 kV withstand.
Pour des transitoires > 400 Vp utilisez un dispositif de suppression certifié UL à 2,5 kV nominal de tenue.
Für Einschaltstöße > 400 Vp verwenden Sie einen UL anerkannten Entstörer, der bewertet wurde bei 2,5 kV standzuhalten.
Per transitori > 400 Vp usare dispositivo di soppressione riconosciuto da UL capace di sopportare 2,5 kV.
Para transitorios > 400 Vp use un dispositivo de supresión reconocido UL clasificado con 2,5 kV.

② Non-condensing
Sans condensation
Nicht kondensierend
Senza condensa
sin condensación

③Application and proper use of the Power Interruption relay is based on interface with a 1756-OB16D or similar DC output module to drive the relay.
L'utilisation correcte du relais de coupure du courant est basée sur une interface avec un module de sortie 1756-OB16D ou CC similaire pour piloter le relais.
Die Anwendung bzw. ordnungsgemäße Verwendung des Stromunterbrechungsrelais basiert auf einer Schnittstelle mit einem 1756-OB16D oder ähnlichem DC-Ausgangsmodul zum Steuern des Relais.
L'applicazione e l'uso appropriato del relè di interruzione dell'alimentazione si basano su un'interfaccia con un modulo di uscita CC 1756-OB16D o simile per la gestione del relè.
La aplicación y uso correcto del relé de interrupción de alimentación se basa en la interfaz con un 1756-OB16D o módulo de salida de corriente continua similar para controlar el relé.

SURGE SUPPRESSION follow the literature recommendations of the PLC module being used.
SUPPRESSION DES SURTENSIONS se trouve à la suite de la littérature qui contient les recommandations relatives au module PLC utilisé.
ÜBERSPANNUNGSSCHUTZ Bitte beachten Sie die Dokumentationsempfehlungen für das jeweils benutzte SPS-Modul.
Per la **SOPPRESSIONE DEI PICCHI TEMPORANEI**, seguire le istruzioni riportate nella documentazione in dotazione al Modulo PLC utilizzato.
SUPRESIÓN DE SOBRETENSIÓN, siga las recomendaciones indicadas en la documentación del módulo PLC respectivo.

Reference Publications: Refer to 1770-4.1 and appropriate PLC I/O module installation manual.

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Rockwell Automation

Technical Data

Original Instructions

Allen-Bradley by ROCKWELL AUTOMATION

1756 ControlLogix Chassis Specifications

Catalog Numbers 1756-A4/B, 1756-A4K/B, 1756-A4/C, 1756-A4K/C, 1756-A7/B, 1756-A7K/B, 1756-A7/C, 1756-A7K/C, 1756-A7XT/C, 1756-A7ZXT, 1756-A10/B, 1756-A10K/B, 1756-A10/C, 1756-A10K/C, 1756-A10XT/C, 1756-A10ZXT, 1756-A13/B, 1756-A13K/B, 1756-A13/C, 1756-A13K/C, 1756-A17/B, 1756-A17K/B, 1756-A17/C, 1756-A17K/C

Topic	Page
Summary of Changes	1
Standard ControlLogix Chassis Specifications	2
ControlLogix-XT Chassis Specifications	4
Spacing Requirements	6
Series B ControlLogix Chassis with Standard and Slim Power Supply Mounting Dimensions	8
Series C ControlLogix Chassis with Standard and Slim Power Supply Mounting Dimensions	11
Series D ControlLogix Chassis with Standard and Slim Power Supply Mounting Dimensions	14
ControlLogix Chassis with Redundant Power Supply Mounting Dimensions	16
ControlLogix Chassis Accessories	19
Additional Resources	19

The ControlLogix® system is a modular system that requires a 1756 ControlLogix chassis. The chassis are designed for only horizontal back-panel mounting. Place any module into any slot. The backplane provides a high-speed communication path between modules.

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Corrected Minimum Cabinet Size Technical Specifications	2, 4
Corrected Cabinet Clearance Spacing Requirements	6, 7
Added 1756-A7ZXT and 1756-A10ZXT chassis information	Throughout

Standard ControlLogix Chassis Specifications

The chassis backplane provides a high-speed communication path between modules and distributes power to each of the modules installed within the chassis.

Technical Specifications - ControlLogix Standard Chassis

Attribute	1756-A4, 1756-A4K	1756-A7, 1756-A7K	1756-A10, 1756-A10K	1756-A13, 1756-A13K	1756-A17, 1756-A17K
Backplane current, chassis/slot max @ 1.2V DC	1.5 A/–				
Backplane current, chassis/slot max @ 3.3V DC	4 A/4 A				
Backplane current, chassis/slot max @ 5.1V DC	15 A/6 A				
Backplane current, chassis/slot max @ 24V DC	2.8 A/2.8 A				
Power dissipation, max	4 W	4.5 W	5 W	5.4 W	6 W
Isolation voltage	Determined by installed power supply and modules				
Slots	4	7	10	13	17
Mounting method	Only horizontal				
Cabinet size (HxWxD), min	50.8 x 50.8 x 20.3 cm (20 x 20 x 8 in.)	50.8 x 61.0 x 20.3 cm (20 x 24 x 8 in.)	50.8 x 71.1 x 20.3 cm (20 x 28 x 8 in.)	50.8 x 81.3 x 20.3 cm (20 x 32 x 8 in.)	50.8 x 96.5 x 20.3 cm (20 x 38 x 8 in.)
Weight, approx	0.75 kg (1.7 lb)	1.10 kg (2.4 lb)	1.45 kg (3.2 lb)	1.90 kg (4.2 lb)	2.20 kg (4.8 lb)
Location	Panel				
Wire size	Functional earth ground – 8.3 mm^2 (8 AWG) solid or stranded copper wire rated at 90 °C (194 °F) or greater Protective earth ground - 2.1 mm^2 (14 AWG) solid or stranded copper wire rated at 90 °C (194 °F) or greater				
North American temperature code	T5 (Series B) T4 (Series C)				
IEC temperature code	T4	T5 (Series B) T4 (Series C)			
Enclosure type rating	None (open-style)				

Environmental Specifications - ControlLogix Standard Chassis

Attribute	Series B		Series C	
	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17	1756-A4K, 1756-A7K, 1756-A10K, 1756-A13K, 1756-A17K	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17	1756-A4K, 1756-A7K, 1756-A10K, 1756-A13K, 1756-A17K
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0...60 °C (32...140 °F)		-25...+60 °C (-13...+140 °F)	
Temperature, surrounding air max	60 °C (140 °F)			
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)			
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing			
Conformal Coated	–	Yes	–	Yes
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz			
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g			
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g		30 g	
Emissions	IEC 61000-6-4			
ESD Immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges			
Radiated RF Immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz			

Certifications - ControlLogix Standard Chassis

Certification[1]	Series B		Series C
	1756-A4, 1756-A4K	1756-A7, 1756-A7K, 1756-A10, 1756-A10K, 1756-A13, 1756-A13K, 1756-A17, 1756-A17K	1756-A4, 1756-A4K, 1756-A7, 1756-A7K, 1756-A10, 1756-A10K, 1756-A13, 1756-A13K, 1756-A17, 1756-A17K
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.		
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations.		
CE	European Union 2014/30/EU EMC Directive (EMC), compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)		
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions		
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-0; General Requirements • II 3 G Ex nA IIC T4 Gc X		European Union 2014/34/EU Directive, compliant with: • EN 60079-7; Potentially Explosive Atmospheres, Protection "e" • EN 60079-0; General Requirements • II 3 G Ex ec IIC T4 Gc • UL22ATEX2734X
IECEx	—		IECEx System, compliant with: • IEC 60079-7; Potentially Explosive Atmospheres, Protection "e" • IEC 60079-0; General Requirements • II 3 G ec IIC T4 Gc • IECExUL22.0025X
UKEx	In conformity with the following UKEx Statutory Instruments and their amendments: • Schedule 1 of the UKEx Regulation 2016 No. 1107 • Equipment protection by increased safety "e", reference certificate number UL22UKEX2451X • Zone 2 classification according to UKEx Regulation 2016 No. 1107		
UKCA	In conformity with the following UK Statutory Instruments and their amendments: • 2016 No. 1091, Electromagnetic Compatibility Regulations • 2016 No. 1107, Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations • 2012 No. 3032, Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment		
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3		
CCC	CCC 2020122309111998 CNCA-C23-01 强制性产品认证实施规则 防爆电气 CNCA-C23-01 CCC Implementation Rule Explosion-Proof Electrical Products		
Morocco	In conformity with the following regulations: • Arrêté ministériel n° 6404-15 du 1 er muharram 1437 (15 octobre 2015) Équipements électriques destinés à être utilisés sous certaines limites de tension • Arrêté ministériel n° 6404-15 du 29 ramadan 1436 (16 juillet 2015) Compatibilité électromagnétique des équipements		

(1) See the Product Certification website at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

Available Communication Modules

Network	Cat. No.	Description	Page
EtherNet/IP™	1756-EN2F, 1756-EN2T, 1756-EN2TK, 1756-EN2TP, 1756-EN2TPK, 1756-EN2TR, 1756-EN2TRK, 1756-EN3TR, 1756-EN3TRK, 1756-EN4TR, 1756-EN4TRK, 1756-ENBT	EtherNet/IP bridge	4
	1756-EN2TPXT, 1756-EN2TXT, 1756-EN2TRXT, 1756-EN4TRXT	ControlLogix-XT™ Ethernet/IP bridge	4
DeviceNet®	1756-DNB/E	DeviceNet bridge	14
Data Highway Plus™	1756-DHRIO	Data Highway Plus/Remote I/O module	16
	1756-DHRIOXT	ControlLogix-XT, Data Highway Plus/Remote I/O module	16
Remote I/O	1756-DHRIO	Data Highway Plus/Remote I/O module	16
	1756-RIO/B	Remote I/O module	16
	1756-DHRIOXT	ControlLogix-XT, Data Highway Plus/Remote I/O module	16
DH-485 module	1756-DH485	DH-485 module	21
SynchLink™	1756-SYNCH	SynchLink fiber-optic communication link	23

Communication Connections

A ControlLogix® system uses connections to establish communication links between devices. The types of connections include the following:

- Controller-to-local I/O modules or local communication modules
- Controller-to-remote I/O or remote communication modules
- Controller-to-remote I/O (rack-optimized) modules
- Produced and consumed tags
- Messages
- Controller access with the Studio 5000® environment
- Controller access with RSLinx® software for HMI or other applications

You indirectly determine the number of connections the controller uses by configuring the controller to communicate with other devices in the system. The limit of connections ultimately resides in the communication module you use for the connection. If a message path routes through a communication module, the connection that is related to the message also counts towards the connection limit of that communication module.

EtherNet/IP Network



The Ethernet Industrial (EtherNet/IP) network protocol is an open industrial-networking standard that supports both real-time I/O messaging and message exchange. The EtherNet/IP network uses off-the-shelf Ethernet communication chips and physical media.

For these requirements	Select this interface
Control I/O modules and drives Act as an adapter for I/O on remote EtherNet/IP links Communicate with other EtherNet/IP devices (messages and HMI) Bridge EtherNet/IP links to route messages to devices on other networks	1756-EN2F, 1756-EN2FK 1756-EN2T, 1756-EN2TK, 1756-EN2TXT 1756-EN2TP, 1756-EN2TPK, 1756-EN2TPXT 1756-EN2TR, 1756-EN2TRK, 1756-EN2TRXT 1756-EN4TR, 1756-EN4TRK, 1756-EN4TRXT 1756-ENBT, 1756-ENBTK
Support Device Level Ring (DLR) and linear topologies	1756-EN2TR, 1756-EN2TRK, 1756-EN2TRXT 1756-EN3TR, 1756-EN3TRK 1756-EN4TR, 1756-EN4TRK, 1756-EN4TRXT
Support Parallel Redundancy Protocol (PRP)	1756-EN2TP, 1756-EN2TPK, 1756-EN2TPXT 1756-EN4TR(1), 1756-EN4TRK(1), 1756-EN4TRXT(1)
Support redundant adapters(2)	1756-EN4TR, 1756-EN4TRK, 1756-EN4TRXT
Provide control in environments where temperatures range from -25...+70 °C (-13...+158 °F)	1756-EN2TPXT 1756-EN2TRXT 1756-EN2TXT 1756-EN4TRXT
Secure access to a control system from within the plant network	1756-EN4TR, 1756-EN4TRK, 1756-EN4TRXT

(1) 1756-EN4TR supports PRP with revision 4.001 and higher firmware.
(2) Redundant adapters require version 3.x and higher firmware.

For more information on redundant adapters and Ethernet, see the ControlLogix EtherNet/IP Network User Manual, publication 1756-UM004.

EtherNet/IP Network Specifications

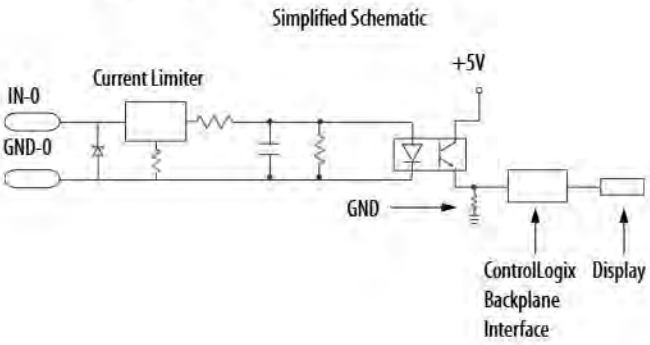
Table 1 - ControlLogix EtherNet/IP Connections Specifications(1)

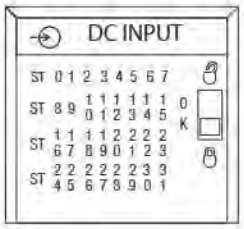
Cat. No.	Connections		CIP Unconnected Messages (backplane + Ethernet)
	TCP	CIP(2)	
1756-ENBT	64	128	64 + 64
1756-EN2F	128	256	128 + 128
1756-EN2T	128	256	128 + 128
1756-EN2TP	128	256	128 + 128
1756-EN2TR	128	256	128 + 128
1756-EN3TR	128	256	128 + 128
1756-EN4TR	512	1000 I/O 528 (3)	256+256

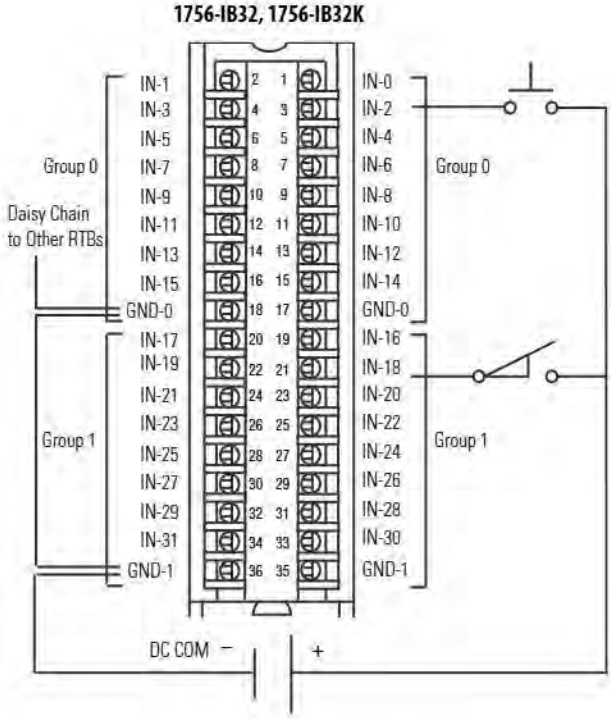
(1) There are 1000 CIP™ I/O connections and 528 CIP messaging connections.
(2) CIP connections can be used for all explicit or all implicit applications. For example, a 1756-ENBT module has a total of 128 CIP connections that can be used for any combination of connections.
(3) There are 1000 explicit connections and 528 implicit connections.

1756-IB32, 1756-IB32K

ControlLogix DC (10...31.2V) input module







Technical Specifications - 1756-IB32, 1756-IB32K

Attribute	1756-IB32, 1756-IB32K
Inputs	32 (16 points/group)
Voltage category	12/24V DC sink
Operating voltage range	10...31.2V DC
Input delay time (screw to backplane) Off to On On to Off	 Hardware delay: 380 µs max + filter time User-selectable filter time: 0 ms, 1 ms, or 2 ms Hardware delay: 420 µs max + filter time User-selectable filter time: 0 ms, 1 ms, 2 ms, 9 ms, or 18 ms
Current draw @ 5.1V	120 mA
Current draw @ 24V	2 mA
Total backplane power	0.66 W
Power dissipation, max	6.2 W @ 60 °C (140 °F)
Thermal dissipation	21.1 BTU/hr @ 60 °C (140 °F)
Off-state voltage, max	5V
Off-state current, max	2.27 mA
On-state current, min	4.8 mA @ 10V DC
On-state current, max	5.5 mA @ 31.2V DC

Technical Specifications - 1756-IB32, 1756-IB32K

Attribute	1756-IB32, 1756-IB32K
Inrush current, max	250 mA (decaying to < 37% in 22 ms, without activation)
Input impedance, max	5.67 kΩ @ 31.2V DC
Cyclic update time	200 µs...750 ms
Change of state	Software configurable
Time stamp of inputs	±200 µs
Isolation voltage	250V (continuous), reinforced insulation type, inputs-to-backplane 250V (continuous), basic insulation type, input group-to-group No isolation between individual group inputs
Module keying	Electronic, software configurable
Removable terminal block	1756-TBCH 1756-TBS6H
RTB keying	User-defined mechanical
Slot width	1
Wire category	1 - on signal ports(1)
Enclosure type	None (open-style)
North American temperature code	T4
IEC temperature code	T4
Reverse polarity protection	Yes

(1) Use this conductor category information for planning conductor routing as described in the system-level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Environmental Specifications - 1756-IB32, 1756-IB32K

Attribute	1756-IB32, 1756-IB32K
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0...60 °C (32...140 °F)
Temperature, surrounding air, max	60 °C (140 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test dB, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges

Environmental Specifications - 1756-IB32, 1756-IB32K

Attribute	1756-IB32, 1756-IB32K
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV at 5 kHz on signal ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz
Oscillatory surge withstand IEEE C37.90.1	3 kV

Certifications - 1756-IB32, 1756-IB32K

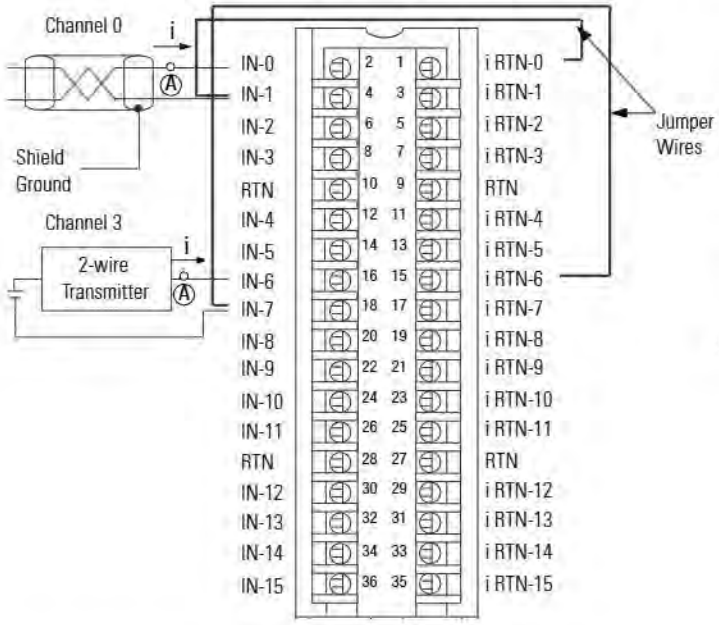
Certification (when product is marked)(1)	1756-IB32, 1756-IB32K
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.
CE	European Union 2014/30/EU EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: EN 61131-2; Programmable Controllers (Clause 11)
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-0; General Requirements II 3 G Ex nA IIC T4 X Gc
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

(1) See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

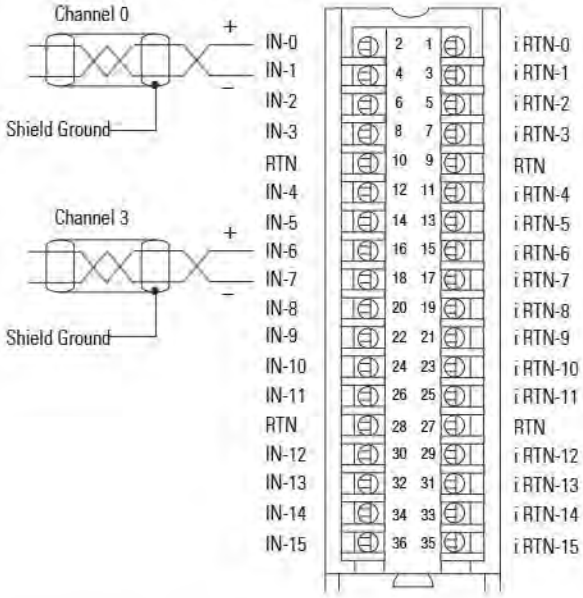
1756-IF16, 1756-IF16K

ControlLogix voltage/current analog input module

1756-IF16, 1756-IF16K Differential Current



1756-IF16, 1756-IF16K Differential Voltage



Use this table when wiring your module in Differential mode.

This channel	Uses these terminals
Channel 0	IN-0 (+), IN-1 (-), i RTN-0
Channel 1	IN-2 (+), IN-3 (-), i RTN-2
Channel 2	IN-4 (+), IN-5 (-), i RTN-4
Channel 3	IN-6 (+), IN-7 (-), i RTN-6
Channel 4	IN-8 (+), IN-9 (-), i RTN-8
Channel 5	IN-10 (+), IN-11 (-), i RTN-10
Channel 6	IN-12 (+), IN-13 (-), i RTN-12
Channel 7	IN-14 (+), IN-15 (-), i RTN-14

- All terminals marked RTN are connected internally.
- A 249 Ω current loop resistor is located between IN-*x* and i RTN-*x* terminals.
- If multiple (+) or multiple (-) terminals are tied together, connect that tie point to an RTN terminal to maintain the accuracy of the module.
- Place additional loop devices (such as strip chart recorders) at the A location in the current loop.

IMPORTANT: When operating in 4-channel, High-Speed mode, only use channels 0, 2, 4, and 6.

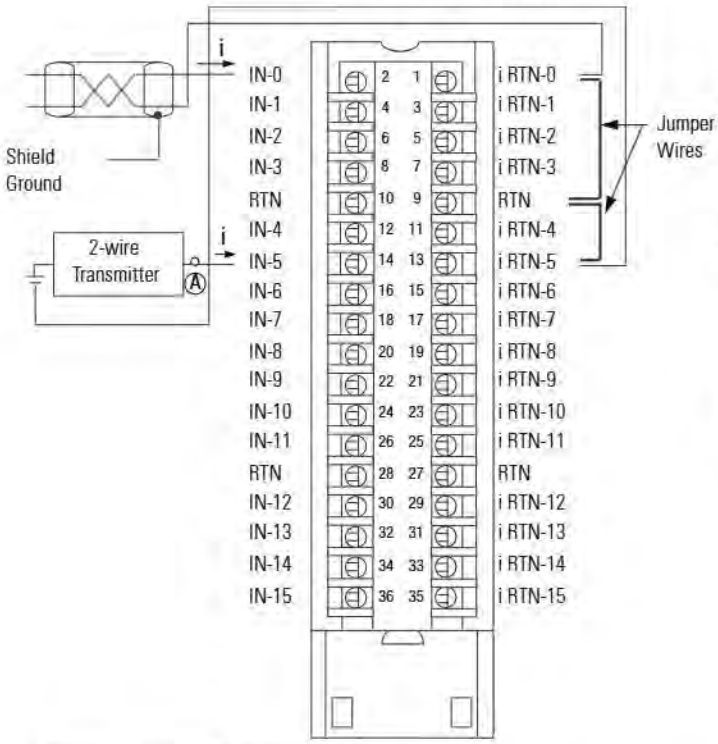
Use this table when wiring your module in Differential mode.

This channel	Uses these terminals
Channel 0	IN-0 (+), IN-1 (-)
Channel 1	IN-2 (+), IN-3 (-)
Channel 2	IN-4 (+), IN-5 (-)
Channel 3	IN-6 (+), IN-7 (-)
Channel 4	IN-8 (+), IN-9 (-)
Channel 5	IN-10 (+), IN-11 (-)
Channel 6	IN-12 (+), IN-13 (-)
Channel 7	IN-14 (+), IN-15 (-)

- All terminals marked RTN are connected internally.
- If multiple (+) or multiple (-) terminals are tied together, connect that tie point to an RTN terminal to maintain the accuracy of the module.
- Terminals marked RTN or i RTN are not used for differential voltage wiring.

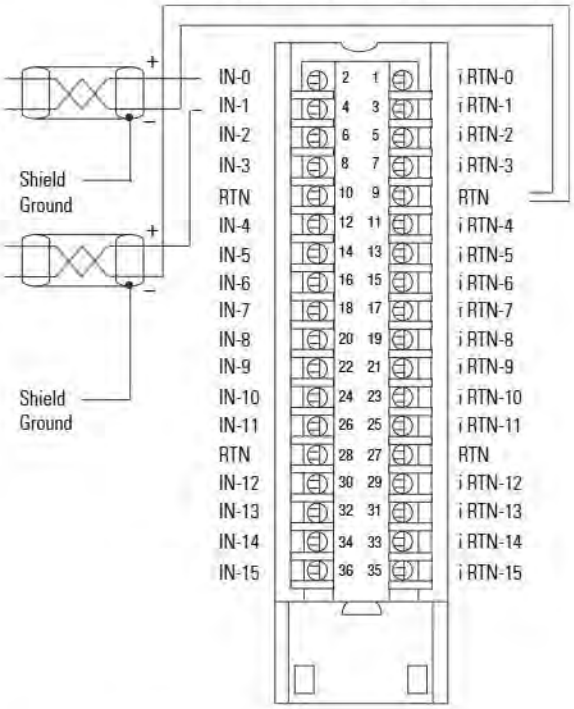
IMPORTANT: When operating in 4-channel, High-Speed mode, only use channels 0, 2, 4, and 6.

1756-IF16, 1756-IF16K Single-ended Current

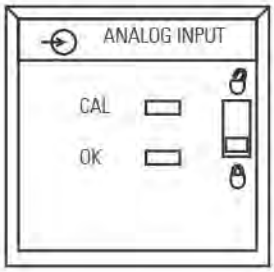


- All terminals marked RTN are connected internally.
- For current applications, all terminals marked i RTN must be wired to terminals marked RTN.
- A 249 Ω current loop resistor is located between IN-*x* and iRTN-*x* terminals.
- Place additional loop devices (such as strip chart recorders) at the A location in the current loop.

1756-IF16, 1756-IF16K Single-ended Voltage



- All terminals marked RTN are connected internally.
- Terminals marked i RTN are not used for single-ended voltage wiring.



Technical Specifications - 1756-IF16, 1756-IF16K

Attribute	1756-IF16, 1756-IF16K
Inputs	16 single ended, 8 differential or 4 differential (high speed)
Input range	±10V 0…10V 0…5V 0…20 mA
Resolution	320 µV/count (15 bits + sign bipolar) @ ±10.25V 160 µV/count (16 bits) @ 0…10.25V 80 µV/count (16 bits) @ 0…5.125V 0.32 µA/count (16 bits) @ 0…20.5 mA
Current draw @ 5.1V	150 mA
Current draw @ 24V	65 mA
Total backplane power	2.33 W
Voltage and current ratings	Backplane: 5.1V DC, 150 mA max 24V DC, 65 mA max Input Voltage Range: -10…+10V Input Current Range: 4…20mA Limited to 100VA
Power consumption	2.3 W
Power dissipation	Voltage: 2.3 W Current: 3.9 W
Thermal dissipation	Voltage: 7.84 BTU/hr Current: 13.3 BTU/hr
Input impedance	Voltage: >10 MΩ Current: 249 Ω
Open circuit detection time	Differential voltage - Positive full scale reading within 5 s Single-ended/differential current - Negative full scale reading within 5 s Single-ended voltage - Even-numbered channels go to positive full scale reading within 5 s, odd-numbered channels go to negative full scale reading within 5 s
Overvoltage protection, max	Voltage: 30V DC Current: 8V DC
Normal mode noise rejection	>80 dB @ 50/60 Hz(2)
Common mode noise rejection	>100 dB @ 50/60 Hz
Channel bandwidth	15 Hz (-3 dB)(2)
Settling time	<80 ms to 5% of full scale(2)
Calibrated accuracy 25 °C (77 °F)	Voltage: Better than 0.05% of range Current: Better than 0.15% of range
Offset drift	45 µV/°C
Gain drift with temperature	Voltage: 15 ppm/°C Current: 20 ppm/°C
Module error	Voltage: 0.1% of range Current: 0.3% of range
Module input scan time, min	16 pt single-ended: 16…488 ms 8 pt differential: 8…244 ms 4 pt differential: 5…122 ms(2)
Onboard data alarming	Yes
Scaling to engineering units	Yes
Real-time channel sampling	Yes

Technical Specifications - 1756-IF16, 1756-IF16K

Attribute	1756-IF16, 1756-IF16K
Data format	Integer mode (left justified, 2 s complement) IEEE 32-bit floating point
Module conversion method	Sigma-Delta
Isolation voltage	250V (continuous), Reinforced insulation type, Inputs-to-Backplane. No isolation between individual Inputs.
Module keying	Electronic, software configurable
Removable terminal block	1756-TBCH 1756-TBS6H
RTB keying	User-defined mechanical
Slot width	1
Wire size	1756-TBCH Single wire connection: 0.33…2.1 mm2(22…14 AWG) solid or stranded shielded copper wire, rated at 105 °C (221 °F) or greater, 1.2 mm (3/64 in.) insulation max 1756-TBS6H Single wire connection: 0.33…2.1 mm2(22…14 AWG) solid or stranded shielded copper wire, rated at 105 °C (221 °F) or greater, 1.2 mm (3/64 in.) insulation max
Terminal block torque specs	1756-TBCH: 0.5 N•m (4.4 lb•in)
Wire category(1)	2 - on signal ports
Enclosure type	None (open-style)
North American temp code	T4A
ATEX temp code	T4
IECEx temp code	T4

(1) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.
(2) Notch filter dependent.

Environmental Specifications - 1756-IF16, 1756-IF16K

Attribute	1756-IF16, 1756-IF16K
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)
Temperature, surrounding air, max	60 °C (140 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test N/A, Unpackaged Nonoperating Thermal Shock)	-40…+85 °C (-40…+185 °F)
Relative humidity IEC 60068-2-30 (Test dB, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges

Environmental Specifications - 1756-IF16, 1756-IF16K

Attribute	1756-IF16, 1756-IF16K
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±2 kV at 5 kHz on signal ports
Surge transient immunity IEC 61000-4-5	±2 kV line-earth (CM) on shielded ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz

Certifications - 1756-IF16, 1756-IF16K

Certification (when product is marked)[1]	1756-IF16, 1756-IF16K
UL	UL Listed Industrial Control Equipment. See UL File E65584.
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations
CE	European Union 2014/30/EU EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: EN 61131-2; Programmable Controllers (Clause 11)
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • DEMKO15ATEX1482X
IECEx	IECEx System, compliant with: • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • IECEx UL 15.0053X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

(1) See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

ControlLogix 5570 Controllers

Features - ControlLogix 5570 Controllers

Feature	1756-L71, 1756-L71K, 1756-L72, 1756-L72K, 1756-L73, 1756-L73K, 1756-L74, 1756-L74K, 1756-L75, 1756-L75K
Controller tasks	• 32 tasks, including a combination of continuous (1), periodic, and event tasks • 32 programs/tasks prior to RSLogix 5000® programming software, version 15.01.00 • 100 programs/task beginning with RSLogix 5000 programming software, version 15.01.00 • 1000 programs/task beginning with Logix Designer application, version 24.00.00
Built-in communication ports	1-port USB(1)
Communication options	• EtherNet/IP • ControlNet • DeviceNet • Data Highway Plus • Remote I/O • SERCOS • Third-party process and device networks
USB port communication	Programming, configuration, firmware update, and online edits only
Controller connections supported max(2)	500
Network connections, per network module	• 528 EtherNet/IP; 512 TCP (1756-EN4TR) • 256 EtherNet/IP; 128 TCP (1756-EN2x) • 128 EtherNet/IP; 64 TCP (1756-ENBT) • 100 ControlNet (1756-CN2/A) • 40 ControlNet (1756-CNB/D, 1756-CNB/E) • 128 ControlNet (1756-CN2/B)
Controller redundancy	Full support
Integrated motion	• SERCOS interface • Analog options (encoder input, LDT input, SSI input) • Integrated Motion on the EtherNet/IP network
Programming languages	• Relay ladder logic • Structured text • Function Block Diagram • Sequential function chart (SFC)

(1) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.
(2) ControlLogix 5570 controllers use connections to establish communication links between devices. For more information on how to use and calculate connections, see the ControlLogix System User Manual, publication 1756-UM001.

Technical Specifications - ControlLogix 5570 Controllers

Attribute	1756-L71, 1756-L71K	1756-L72, 1756-L72K	1756-L73, 1756-L73K	1756-L74, 1756-L74K	1756-L75, 1756-L75K
User memory	2 MB	4 MB	8 MB	16 MB	32 MB
I/O memory	0.98 MB				
Optional nonvolatile memory storage	1 GB (1784-SD1 ships with every controller) 2 GB (1784-SD2)				
Digital I/O max	128,000				
Analog I/O max	4000				
Total I/O max	128,000				
Energy storage module	• 1756-ESMCAP, 1756-ESMCAPK capacitor energy storage module (removable, ships installed with every controller) • 1756-ESMNSE, 1756-ESMNSEK capacitor energy storage module (removable, no residual WallClockTime power backup) • 1756-ESMNRM, 1756-ESMNRMK capacitor energy storage module (nonremovable, helps prevent USB connection and SD card use to help secure the controller)				
Current draw @ 1.2V DC	5 mA				
Current draw @ 5.1V DC	800 mA				
Power dissipation	2.5 W				
Thermal dissipation	8.5 BTU/hr				
Isolation voltage	30V (continuous), basic insulation type, USB port-to-system Compliant and tested according to IEC/UL 61010-1				
USB port[1]	USB 2.0, full speed (12 Mbps)				
Weight approx	0.25 kg (0.55 lb)				
Slot width	1				
Module location	Chassis-based, any slot				
Chassis	1756-A4, 1756-A4K, 1756-A7, 1756-A7K, 1756-A10, 1756-A10K, 1756-A13, 1756-A13K, 1756-A17, 1756-A17K				
Power supply, standard	1756-PA50, 1756-PA72, 1756-PA72K, 1756-PA75, 1756-PA75K, 1756-PB50, 1756-PB72, 1756-PB72K, 1756-PB75, 1756-PB75K, 1756-PH75				
Power supply, redundant	1756-PA75R, 1756-PA75RK, 1756-PB75R, 1756-PB75RK, 1756-PSCA2, 1756-PSCA2K				
Wire category[2]	3 - on USB port				
Temperature code	T4				
Enclosure type rating	None (open-style)				

(1) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.
(2) Use this conductor category information to plan conductor routing. See Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Environmental Specifications - ControlLogix 5570 Controllers

Attribute	1756-L71, 1756-L72,1756-L73, 1756-L74, 1756-L75	1756-L71K, 1756-L72K, 1756-L73K, 1756-L74K, 1756-L75K
Temperature, operating IEC 60068-2-1 (Test Ae, Operating Cold), IEC 60068-2-2 (Test Be, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0 °C ≤ Ta ≤ +60 °C (+32 °F ≤ Ta ≤ +140 °F)	
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)	
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing	
Conformal Coated	No	Yes
Corrosive Atmosphere ASTM B845-97 Method H Accelerated Test (20-Day Exposure)	—	Severity Level G3[1][2] per ANSI/ISA 71.04-2013, Airborne Contaminants—Gases Severity Level CX[1] per IEC 60721-3-3:2019, Chemically Active Substances
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz	
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g	
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g (45 g with SD card installed)	
Emissions	IEC 61000-6-4	
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges	
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz	
Conducted RF Immunity IEC 61000-4-6	Not applicable: USB is a temporary programming port.	

(1) Port Plugs must remain installed in unused ports at all times during storage and operation for the product to meet its corrosive atmosphere rating.
(2) Up to 9.6 microns per year, corrosion rate of copper.

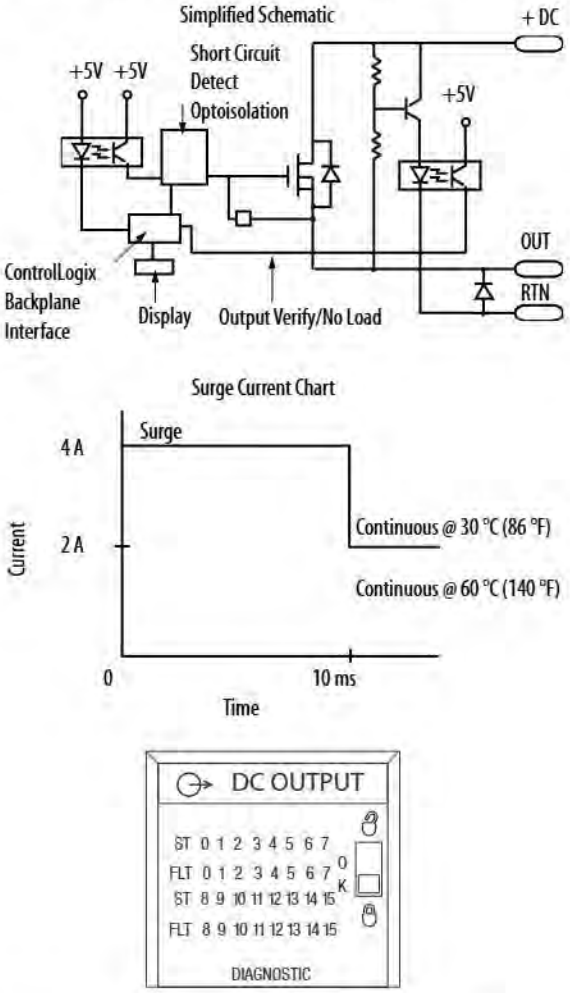
Certifications - ControlLogix 5570 Controllers

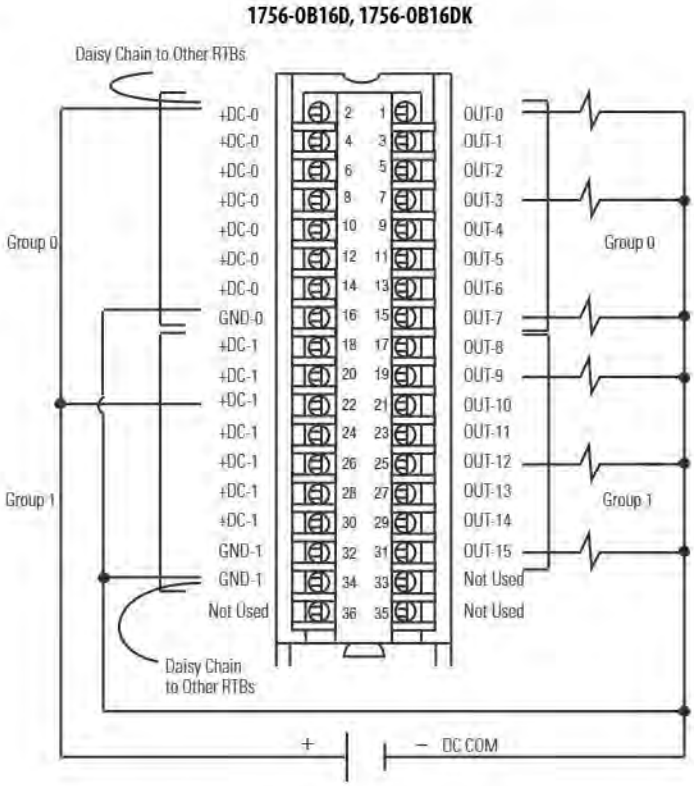
Certification[1]	1756-L71, 1756-L71K, 1756-L72, 1756-L72K, 1756-L73, 1756-L73K, 1756-L74, 1756-L74K, 1756-L75, 1756-L75K
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: • EN IEC 60079-0; General Requirements • EN IEC 60079-7; Potentially Explosive Atmospheres, Protection "e" • II 3 G Ex ec IIC T4 Gc • UL 22 ATEX 2817X
IECEx	IECEx System, compliant with: • IEC 60079-7; Potentially Explosive Atmospheres, Protection "e" • IEC 60079-0; General Requirements • II 3 G Ex ec IIC T4 Gc • IECEx UL 22.0062X
UKEx	In conformity with the following UKEx Statutory Instruments and their amendments: • Schedule 1 of the UKEx Regulation 2016 No. 1107 • Equipment protection by increased safety "e", reference certificate number UL22UKEX2601X • Zone 2 classification according to UKEx Regulation 2016 No. 1107
UKCA	In conformity with the following UK Statutory Instruments and their amendments: • 2016 No. 1091, Electromagnetic Compatibility Regulations • 2016 No. 1107, Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations • 2012 No. 3032, Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with Article 58-2 of Radio Waves Act, Clause 3
CCC	CCC 2020122309111998 CNCA-C23-01 强制性产品认证实施规则 防爆电气 CNCA-C23-01 CCC Implementation Rule Explosion-Proof Electrical Products
Morocco	In conformity with the following regulations: • Arrêté ministériel n° 6404-15 du 1 er muharram 1437 (15 octobre 2015) Équipements électriques destinés à être utilisés sous certaines limites de tension • Arrêté ministériel n° 6404-15 du 29 ramadan 1436 (16 juillet 2015) Compatibilité électromagnétique des équipements

(1) When marked. See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

1756-OB16D, 1756-OB16DK

ControlLogix DC (19.2...30V) diagnostic output module





Diagnostic Specifications - 1756-OB16D, 1756-OB16DK

Attribute	1756-OB16D, 1756-OB16DK
Short trip	8 A for 180 ms, min 10 A for 120 ms, min
No load	Off-state detection only
Output verification	On-state detection only
Pulse test	Configurable maximum pulse width
Time stamp of diagnostics	±1 ms

Technical Specifications - 1756-OB16D, 1756-OB16DK

Attribute	1756-OB16D, 1756-OB16DK
Outputs	16 diagnostic (8 points/group)
Pilot duty (DC-13SQ)	2A @ 30°C (86 °F) 1A @ 60°C (140 °F)
Voltage category	24V DC source
Operating voltage range	19.2…30V DC
Output delay time Off to On On to Off	 60 µs nom/1 ms max 630 µs nom/5 ms max
Current draw @ 5.1V	250 mA
Current draw @ 24V	140 mA
Total backplane power	4.64 W
Power dissipation, max	3.3 W @ 60 °C (140 °F)
Thermal dissipation	11.25 BTU/hr
Off-state leakage current per point, max	1 mA per point
On-state voltage drop, max	1.2V DC @ 2 A
Current per point, max	2 A @ 30 °C (86 °F) linear derating 1 A @ 60 °C (140 °F) linear derating
Current per module, max	8 A @ 30 °C (86 °F) linear derating 4 A @ 60 °C (140 °F) linear derating
Surge current per point	4 A for 10 ms per point, repeatable every 1 s
Load current, min	3 mA per point
Scheduled outputs	Synchronization within 16.7 s max, reference to the Coordinated System Time
States in Fault mode per point	Hold last state, On or Off (Off is default)
States in Program mode per point	Hold last state, On or Off (Off is default)
Isolation voltage	250V (continuous), basic insulation type, outputs-to-backplane, and output group-to-group No isolation between individual group outputs
Module keying	Electronic, software configurable
Fusing	Electronically fused per point
Removable terminal block	1756-TBCH 1756-TBS6H
RTB keying	User-defined mechanical
Slot width	1
Wire category	1(1)
Enclosure type	None (open-style)
North American temperature code	T4A
IEC temperature code	T4

(1) Use this conductor category information for planning conductor routing as described in the system-level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Environmental Specifications - 1756-OB16D, 1756-OB16DK

Attribute	1756-OB16D, 1756-OB16DK
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0 °C < Ta < 60 °C (32 °F < Ta < 140 °F)
Temperature, surrounding air, max	60 °C (140 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock	-40…+85 °C (-40…+185 °F)
Relative humidity IEC 60068-2-30 (Test dB, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1k Hz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV at 5 kHz on signal ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

Certifications - 1756-OB16D, 1756-OB16DK

Certification (when product is marked)[1]	1756-OB16D, 1756-OB16DK
UL	UL Listed Industrial Control Equipment. See UL File E65584.
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: • EN 61131-2; Programmable Controllers (Clause 11)
RCM	Australian Radiocommunications Act, compliant with: • EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-0; General Requirements • II 3 G Ex nA IIC T4 X
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

(1) See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

Redundant Power Supplies

To build a redundant power supply system, you need the following.

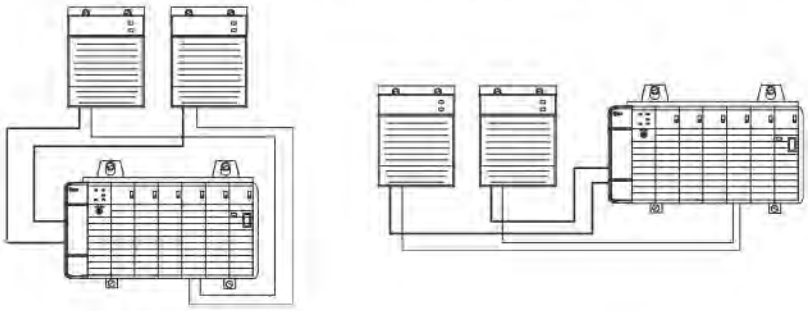
Cat. No.	Description	Amount
1756-PA75R/A, 1756-PA75RK/A, 1756-PAXTR, 1756-PB75R/A, 1756-PB75RK/A, or 1756-PBXTR	Redundant power supply	2
1756-CPR2[1] 1756-CPR2D[2] or 1756-CPR2U[2]	Redundant power supply cable (Length = 0.91 m [3 ft])	2
1756-PSCA2, 1756-PSCA2K, or 1756-PSCA2XT	Redundant power supply chassis adapter[3]	1
User-supplied	Annunciator wiring[4] (Length, max = 10 m [32.8 ft])	2

(1) Cable bend radius is 12.7 cm (5.0 in.).
(2) Requires 10.16 cm (4.0 in.) of clearance next to the chassis adapter.
(3) The 1756-PSCA2 or 1756-PSCA-2XT chassis adapter is a passive device. The adapter funnels power from the redundant power supplies to the single power connector on the ControlLogix® series B chassis backplane.
(4) Optional user-provided annunciator wiring can be connected to the solid-state relay for status and troubleshooting.

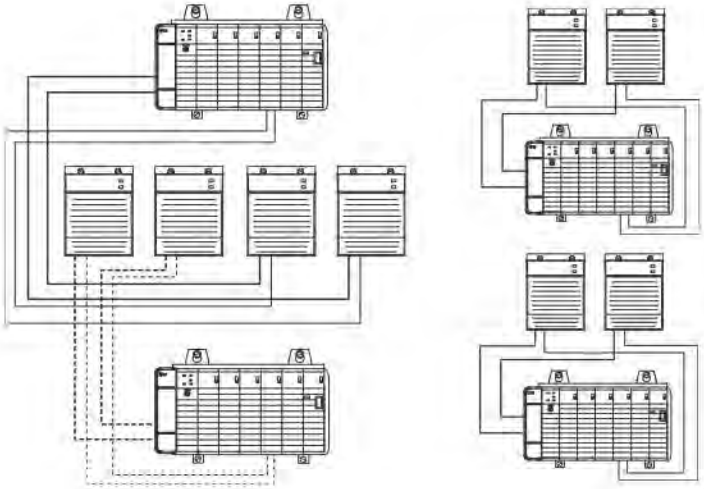
System Configuration Recommendations

We recommend that you use one of these methods to configure your redundant power supply system.

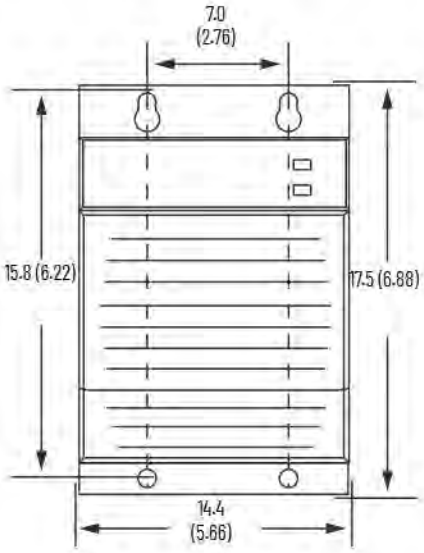
Recommended Configurations for a System That Uses One Chassis

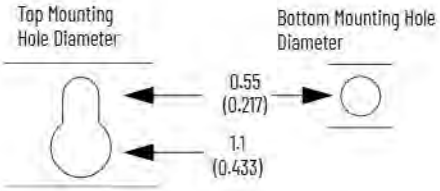


Recommended Configurations for a System That Uses Two Chassis



Mounting Dimensions





Dimensions are in cm (in.).

Redundant Power Supply Features

The redundant power supplies offer the same features as the standard power supplies, and the following:

- Redundant operation
- Automatic chassis load sharing between the redundant power supplies
- Status indicators for visual operating status of the pair
- Solid-state relay for system recognition of supply status when wired to an input module
- The ControlLogix redundant power supply system is designed to account for operational anomalies in only the power supply (the chassis adapter and power supply cables are excluded)

Technical Specifications - ControlLogix Redundant Power Supplies

Attribute	1756-PA75R, 1756-PA75RK	1756-PB75R, 1756-PB75RK
Input voltage range	85...265V AC[1]	18...32V DC[2]
Input voltage	120V/240V AC, 50/60 Hz	24V DC
Input frequency range	47...63 Hz	–
Input power, max	120VA 115 W	110 W
Output power, max	75 W @ 0...60 °C (32...140 °F)	
Inrush current, max	20 A	30 A
Hold up time[3]	2 cycles @ 60 Hz 2 cycles @ 50 Hz	20 ms
Current capacity @ 1.2V	1.5 A	
Current capacity @ 3.3V	4 A	
Current capacity @ 5.1V	13 A	
Current capacity @ 24V	2.8 A	
Annunciator power	240V AC 50/60 Hz, 240V DC, 50 mA, resistive only	90V DC for ATEX/IECEx
Isolation voltage	250V (continuous), Reinforced Insulation Type, Power Input to Backplane, Power Input to Annunciator, Annunciator to Backplane Type tested at 3250V DC for 60 s	
Dimensions (HxWxD), approx	17.5 x 14.5 x 13.7 cm (6.9 x 5.7 x 5.4 in.)	
Weight, approx	1.45 kg (3.2 lb)	

Technical Specifications - ControlLogix Redundant Power Supplies (Continued)

Attribute	1756-PA75R, 1756-PA75RK	1756-PB75R, 1756-PB75RK
Chassis	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17	
Wire size	Power: 2.5 mm^2 (14 AWG) solid or stranded copper wire that is rated at 90 °C (194 °F), or greater, 1.2 mm (3/64 in.) insulation max Annunciator: 0.25...2.5 mm^2 (22...14 AWG) solid or stranded copper wire that is rated at 90 °C (194 °F), or greater, 1.2 mm (3/64 in.) insulation max	
Wire category (4)	3 - on annunciator ports 1 - on power ports 3 - on 1756-CPR2 connections	
Pilot duty rating	Annunciator - not rated	
Conductor screw torque	0.565 N•m (5 lb•in)	
North American temperature code	T3C	T4
ATEX temperature code	-	T4
IEC temperature code	-	T4
Enclosure type rating	None (open-style)	

(1) UL certification for 120/240V AC, 50/60 Hz nominal. Rockwell Automation specified 85...265V AC, 47...63 Hz.
(2) UL certification for 24V DC nominal. Rockwell Automation specified 18...32V DC.
(3) The hold up time is the time between input voltage removal and DC power failure.
(4) Use this conductor category information to plan conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Environmental Specifications - ControlLogix Redundant Power Supplies

Attribute	1756-PA75R, 1756-PA75RK	1756-PB75R, 1756-PB75RK
Temperature, operating IEC 60068-2-1 (Test Ae, Operating Cold), IEC 60068-2-2 (Test Be, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0...60 °C (32...140 °F)	
Temperature, surrounding air, max	60 °C 140 °F)	
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)	
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing	
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz	
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g	
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g	
Emissions	IEC 61000-6-4	
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges	
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz	
EFT/B immunity IEC 61000-4-4	±4 kV at 5 kHz on power ports ±4 kV at 5 kHz on annunciator ports	
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports	
Conducted RF immunity IEC 61000-4-6	15V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz	

Environmental Specifications - ControlLogix Redundant Power Supplies (Continued)

Attribute	1756-PA75R, 1756-PA75RK	1756-PB75R, 1756-PB75RK
Conducted audio immunity IEC 945	2 W max from rated frequency to the 200th harmonic on AC supply ports	
Voltage variation IEC 61000-4-11	30% dips for 1 period at 0° and 180° on AC supply ports 60% dips for 5 and 50 periods on AC supply ports ±10% fluctuations for 15 min on AC supply ports >95% interruptions for 250 periods on AC supply ports	-
Voltage variation IEC 61000-4-29	-	10 ms interruption on DC supply ports(1) 60% dips for 100 ms on DC supply ports 100% dips for 50 ms on DC supply ports ±20% fluctuations for 15 min on DC supply ports 5 s interruptions on DC supply ports(2)

(1) Short interruption test verifies ride-through. The supply remains fully functional under this condition.
(2) Long interruption test verifies that repetitive inrush surge currents do not create any unsafe conditions. The supply fully shuts down and starts up in this test.

Certifications - ControlLogix Redundant Power Supplies

Certification(1)	1756-PA75R, 1756-PA75RK	1756-PB75R, 1756-PB75RK
c-UL-us	UL Listed Industrial Control Equipment, which is certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, which are certified for U.S. and Canada. See UL File E194810.	
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.	
UKCA	In conformity with the following UK Statutory Instruments and their amendments: • 2016 No. 1091, Electromagnetic Compatibility Regulations • 2016 No. 1101, Electrical Equipment (Safety) Regulations • 2016 No. 1107, Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations • 2012 No. 3032, Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment	
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations	
CE	European Union 2014/30/EU EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: • EN 61131-2; Programmable Controllers (Clause 11)	
RCM	Australian Radiocommunications Act, compliant with: • EN 61000-6-4; Industrial Emissions	
Ex	-	European Union 2014/34/EU ATEX Directive, compliant with: • EN IEC 60079-0; General Requirements • EN IEC 60079-7; Potentially Explosive Atmospheres, Protection "e" • II 3 G Ex ec IIC T4 Gc • UL 22 ATEX 2819X
IECEx	-	IECEx System, compliant with: • IEC 60079-0; General Requirements • IEC 60079-7; Potentially Explosive Atmospheres, Protection "e" • II 3 G Ex ec IIC T4 Gc • IECEx UL 22.0064X
UKEX	-	In conformity with the following UKex Statutory Instruments and their amendments: • Schedule 1 of the UKEX Regulation 2016 No. 1107 • Equipment protection by increased safety "e", reference certificate number UL22UKEX2605X • Zone 2 classification according to UKEX Regulation 2016 No. 1107
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3	
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation	
CCC	CCC 2020122309111830, 2020122309111998, 2020122309113868 CNCA-C23-01 强制性产品认证实施规则 防爆电气 CNCA-C23-01 CCC Implementation Rule Explosion-Proof Electrical Products	

(1) See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

Controller Redundancy

In a redundant controller system, you need these components:

- Two 1756 chassis, each with the same of the following:
  - Number of slots
  - Modules in the same slots
  - Redundancy firmware revisions in each module
  - Approved module firmware revisions for use in your controller redundancy system.
- One 1756-RM2, 1756-RM2K, or 1756-RM2XT module per chassis that supports the following:
  - One or two controllers of the same family
  - as many as seven communication modules
- One or two 1756-RMCx cables

Technical Specifications - 1756-RM2, 1756-RM2K, 1756-RM2XT Redundancy Modules

Attribute	1756-RM2, 1756-RM2K	1756-RM2XT
Current draw @ 5.1V DC	1.16 A	
Current draw @ 24V DC	3.4 mA	
Power dissipation	6 W, max	
Thermal dissipation	21 BTU/hr	
Connector cables	1756-RMC1, 1 m (3.28 ft) 1756-RMC3, 3 m (9.84 ft) 1756-RMC10, 10 m (32.81 ft)	
Slot width	1 slot	
Module location	Chassis-based, any slot	
Chassis	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17	1756-A7XT, 1756-A10XT, 1756-A4LXT, 1756-A5LXT, 1756-A7LXT
Controller families, supported	ControlLogix 5570, ControlLogix 5580	
Power supply, standard	1756-PA72, 1756-PA75, 1756-PB72, 1756-PB75	1756-PAXT, 1756-PBXT
Power supply, redundant	1756-PA75R, 1756-PB75R, 1756-PSCA2	None
Temperature code	T4	
Enclosure type	None (open-style)	
Weight, approx	0.29 kg (0.64 lb)	
Mounting	ControlLogix-XT™ chassis, single-slot module	

Environmental Specifications - 1756-RM2, 1756-RM2K, 1756-RM2XT Redundancy Modules

Attribute	1756-RM2	1756-RM2K	1756-RM2XT
Temperature, operating IEC 60068-2-1 (Test Ae, Operating Cold), IEC 60068-2-2 (Test Be, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0...60 °C (32...140 °F)		-25...+70 °C (-13...+158 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)		
Conformal Coated	No	Yes	
Corrosive Atmosphere ASTM B845-97 Method H Accelerated Test (20-Day Exposure)	—	Severity Level G3[1] per ANSI/ISA 71.04-2013, Airborne Contaminants—Gases Severity Level CX[1][2] per IEC 60721-3-3:2019, Chemically Active Substances	
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing		
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz		
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g		
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g		
Emissions	IEC 61000-6-4		
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges		
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz		

(1) Port Plugs must remain installed in unused ports at all times during storage and operation for the product to meet its corrosive atmosphere rating.
(2) Up to 9.6 microns per year, corrosion rate of copper.

Certifications - 1756-RM2, 1756-RM2K, 1756-RM2XT Redundancy Modules

Certification[1]	1756-RM2, 1756-RM2K	1756-RM2XT
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.	–
CE	European Union 2014/30/EU EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)	
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions	
c-UL-us	UL Listed Industrial Control Equipment, certified for U.S. and Canada. See UL file E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.	
Ex	European Union 2014/34/EU ATEX Directive, compliant with: • EN IEC 60079-0; General Requirements • EN IEC 60079-7; Potentially Explosive Atmospheres, Protection "e" • II 3 G Ex ec IIC T4 Gc • UL 22 ATEX 2818X	
IECEx	IECEx System, compliant with: • IEC 60079-7; Potentially Explosive Atmospheres, Protection "e" • IEC 60079-0; General Requirements • II 3 G Ex ec IIC T4 Gc • IECEx UL 22.0063X	
UKEx	In conformity with the following UKEx Statutory Instruments and their amendments: • Schedule 1 of the UKEx Regulation 2016 No. 1107 • Equipment protection by increased safety "e", reference certificate number UL22UKEX2604X • Zone 2 classification according to UKEx Regulation 2016 No. 1107	
UKCA	In conformity with the following UK Statutory Instruments and their amendments: • 2016 No. 1091 - Electromagnetic Compatibility Regulations • 2016 No. 1107 - Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations • 2012 No. 3032 - Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations	
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations	–
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with Article 58-2 of Radio Waves Act, Clause 3	
CCC	CCC 2020122309111998 CNCA-C23-01 强制性产品认证实施规则 防爆电气 CNCA-C23-01 CCC Implementation Rule Explosion-Proof Electrical Products	

(1) When marked. See the Product Certification website at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

Stratix 5700 PoE Switches

Table 29 - Technical Specifications - Stratix 5700 PoE Switches

Attribute	1783-BMS12T4E2CGL, 1783-BMS12T4E2CGP, 1783-BMS12T4E2CGNK	
Ethernet data rate	10/100 Mbps	
Alarm relay	30V DC, 1 A or 48V DC, 0.5 A	
Switch power input, max	12...48V DC, 0.5...3.0 A, Class 2/SELV	
PoE power input(1)	44...57V DC, 2.5 A max	
PoE+ power input(1)	50...57V DC, 2.5 A max	
Power consumption(2)	15 W @ 24V DC 40 °C (104 °F), 30 W max	
Power dissipation	30 W	
Isolation voltage	60V (continuous), basic insulation type, DC power ports to ground, and PoE power ports to ground No isolation between individual Ethernet ports No isolation between PoE power and Ethernet ports No isolation between console port and system Type tested at 1585V DC for 60 s	
Wire size, Ethernet connection(3)	RJ45 connector according to IEC 60603-7, 2- or 4-pair Category 5e minimum cable according to TIA 568-B.1 or Category 5 cable according to ISO/IEC 24702	
Wire size, DC power connection	0.5...0.8 mm^2 (20...18 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater, 1.2 mm (3/64 in.) insulation max, 6.3 mm (0.25 in.) ±0.5 mm (0.02 in.) strip length	
Wire size, alarm connection	0.5...0.8 mm^2 (20...18 AWG) solid or stranded, UL/CSA-rated style 1007 or 1569 twisted-pair copper appliance wiring material (AWM) wire, 6.3 mm (0.25 in.) ±0.5 mm (0.02 in.) strip length	
Wire size, ground connection	4.0 mm^2 (12 AWG) min, stranded copper wire	
Screw torque, power and alarm terminals	0.23 N•m (2.0 in•lb)	
Screw torque, ground terminals, max	0.96 N•m (8.5 in•lb)	
Weight, approx	1.11 kg (2.45 lb)	
Wiring category(4)	3 - on console and alarm ports 2 - on DC power ports 2 - on Ethernet ports	
Pilot duty rating	Alarm not rated	
Enclosure type rating	None (open-style)	
North American temp code	T4	
IEC temp code	T4	
SFP modules(5)	1783-SFP100FX 1783-SFP100LX 1783-SFP100EXC 1783-SFP100ZXC 1783-SFP100T(6)	1783-SFP1GSX(7) 1783-SFP1GLX(7) 1783-SFP1GEXE(7) 1783-SFP1GZX(7) 1783-SFP1GTE(7)
Memory card	1784-SD1	
Industry standards	Substation KEMA (IEEE 1613, IEC 61850 - 3) IEEE 1613 Electric Power Stations Communications Networking IEC 61850-3 Electric Substations Communications Networking	

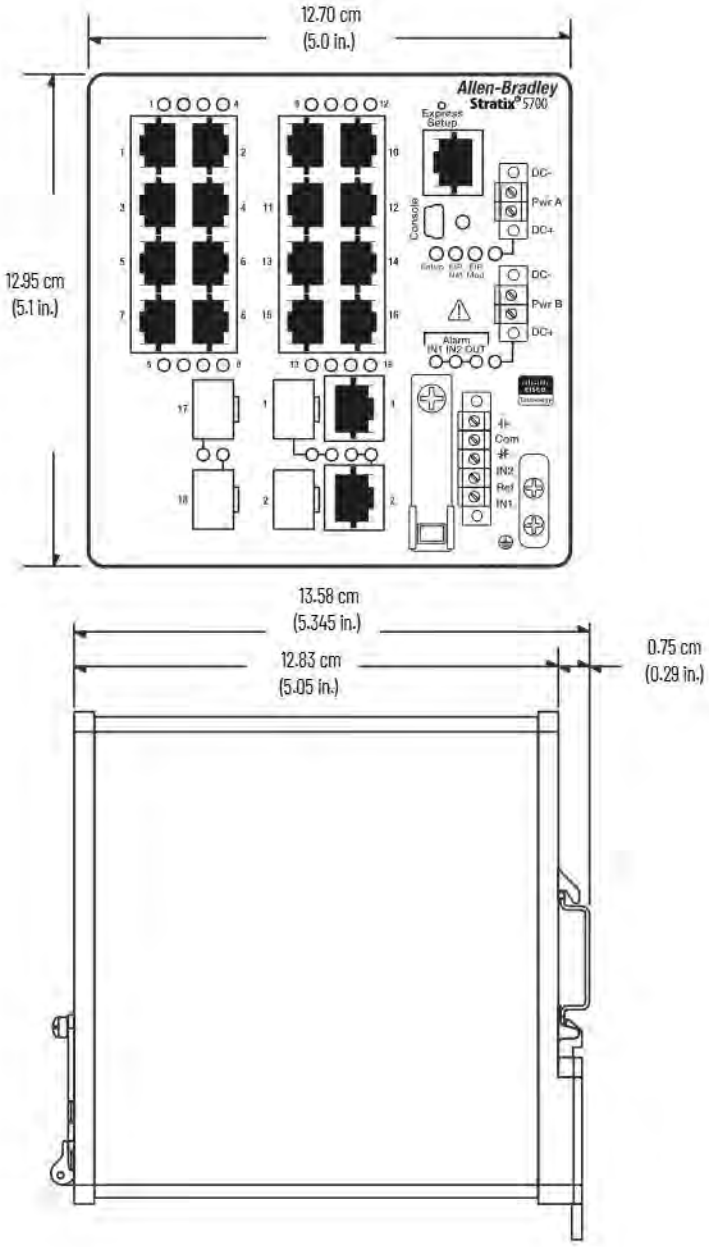
(1) The initial power allocation and the maximum power allocation on a PoE port are configurable in Device Manager or the Logix Designer application. For details about PoE power budgets, see the Stratix Managed Switches User Manual, publication 1783-UM007.

(2) For PoE configurations, the power consumption values listed represent the highest values that can be configured using all ports. A general guideline is 0.5 W per 30 W PoE+ port used.
(3) See page 87 for recommended products.
(4) Use this conductor category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.
(5) SFP modules are supported only on switches with combo ports or SFP slots. For SFP specifications, see page 85.
(6) The 1783-SFP100T module requires Stratix 5700 firmware revision 8.001or later.
(7) Gigabit Ethernet (GE) SFP modules work only in GE SFP slots. For a list of Stratix 5700 catalog numbers with GE SFP slots, see page 38.

Table 30 - Environmental Specifications - Stratix 5700 PoE Switches

Attribute	1783-BMS12T4E2CGL, 1783-BMS12T4E2CGP, 1783-BMS12T4E2CGNK
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-40...+60 °C (-40...+140 °F)
Temperature, surrounding air, max	60 °C (140 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions CISPR11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 1V/m with 1 kHz sine-wave 80% AM from 1000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV at 5 kHz on DC power ports ±4 kV at 5 kHz on alarm ports ±4 kV at 5 kHz on Ethernet ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on DC power ports ±2 kV line-earth (CM) on Ethernet ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz
Damped oscillatory wave immunity IEC 61000-4-18	±1 kV line-line (DM) and ±2.5 kV line-earth (CM) on power ports

18-port and 20-port Switches
1783-BMS12T4E2CGNK, 1783-BMS12T4E2CGP, 1783-BMS12T4E2CGL, 1783-BMS20CL, 1783-BMS20CA, 1783-BMS20CGL, 1783-BMS20CGP, 1783-BMS20CGN, 1783-BMS20CGPK



Installation Instructions

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

Ethernet Taps Installation Instructions

Catalog Numbers 1783-ETAP, 1783-ETAPK, 1783-ETAP1F, 1783-ETAP1FK, 1783-ETAP2F, 1783-ETAP2FK

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Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

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Rockwell Automation



ATTENTION: Read this document and the documents listed in the Additional Resources section about installation, configuration and operation of this equipment before you install, configure, operate or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice. If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

注意：在安装、配置、操作和维护本产品前，请阅读本文档以及 “其他资源” 部分列出的有关设备安装、配置和操作的相应文档。除了所有适用规范、法律和标准的相关要求之外，用户还必须熟悉安装和接线说明。

安装、调整、投运、使用、组装、拆卸和维护等各项操作必须由经过适当训练的专业人员按照适用的操作规范实施。

如果未按照制造商指定的方式使用该设备，则可能会损害设备提供的保护。

ATENCIÓN: Antes de instalar, configurar, poner en funcionamiento o realizar el mantenimiento de este producto, lea este documento y los documentos listados en la sección Recursos adicionales acerca de la instalación, configuración y operación de este equipo. Los usuarios deben familiarizarse con las instrucciones de instalación y cableado y con los requisitos de todos los códigos, leyes y estándares vigentes.

El personal debidamente capacitado debe realizar las actividades relacionadas a la instalación, ajustes, puesta en servicio, uso, ensamblaje, desensamblaje y mantenimiento de conformidad con el código de práctica aplicable. Si este equipo se usa de una manera no especificada por el fabricante, la protección provista por el equipo puede resultar afectada.

ATENÇÃO: Leia este e os demais documentos sobre instalação, configuração e operação do equipamento que estão na seção Recursos adicionais antes de instalar, configurar, operar ou manter este produto. Os usuários devem se familiarizar com as instruções de instalação e fiação além das especificações para todos os códigos, leis e normas aplicáveis.

É necessário que as atividades, incluindo instalação, ajustes, colocação em serviço, utilização, montagem, desmontagem e manutenção sejam realizadas por pessoal qualificado e especializado, de acordo com o código de prática aplicável.

Caso este equipamento seja utilizado de maneira não estabelecida pelo fabricante, a proteção fornecida pelo equipamento pode ficar prejudicada.

ВНИМАНИЕ: Перед тем как устанавливать, настраивать, эксплуатировать или обслуживать данное оборудование, прочитайте этот документ и документы, перечисленные в разделе «Дополнительные ресурсы». В этих документах изложены сведения об установке, настройке и эксплуатации данного оборудования. Пользователи обязаны ознакомиться с инструкциями по установке и прокладке соединений, а также с требованиями всех применимых норм, законов и стандартов.

Все действия, включая установку, наладку, ввод в эксплуатацию, использование, сборку, разборку и техническое обслуживание, должны выполняться обученным персоналом в соответствии с применимыми нормами и правилами.

Если оборудование используется не предусмотренным производителем образом, защита оборудования может быть нарушена.

注意：本製品を設置、構成、稼動または保守する前に、本書および本機器の設置、設定、操作についての参考資料の該当箇所に記載されている文書に目を通してください。ユーザは、すべての該当する条例、法律、規格の要件に加えて、設置および配線の手順に習熟している必要があります。

設置調整、運転の開始、使用、組立て、解体、保守を含む諸作業は、該当する実施規則に従って訓練を受けた適切な作業員が実行する必要があります。

本機器が製造メーカにより指定されていない方法で使用されている場合、機器により提供されている保護が損なわれる恐れがあります。

ACHTUNG: Lesen Sie dieses Dokument und die im Abschnitt „Weitere Informationen“aufgeführten Dokumente, die Informationen zu Installation, Konfiguration und Bedienung dieses Produkts enthalten, bevor Sie dieses Produkt installieren, konfigurieren, bedienen oder warten. Anwender müssen sich neben den Bestimmungen aller anwendbaren Vorschriften, Gesetze und Normen zusätzlich mit den Installations- und Verdrahtungsanweisungen vertraut machen.

Arbeiten im Rahmen der Installation, Anpassung, Inbetriebnahme, Verwendung, Montage, Demontage oder Instandhaltung dürfen nur durch ausreichend geschulte Mitarbeiter und in Übereinstimmung mit den anwendbaren Ausführungsvorschriften vorgenommen werden.

Wenn das Gerät in einer Weise verwendet wird, die vom Hersteller nicht vorgesehen ist, kann die Schutzfunktion beeinträchtigt sein.

ATTENTION : Lisez ce document et les documents listés dans la section Ressources complémentaires relatifs à l'installation, la configuration et le fonctionnement de cet équipement avant d'installer, configurer, utiliser ou entretenir ce produit. Les utilisateurs doivent se familiariser avec les instructions d'installation et de câblage en plus des exigences relatives aux codes, lois et normes en vigueur.

Les activités relatives à l'installation, le réglage, la mise en service, l'utilisation, l'assemblage, le démontage et l'entretien doivent être réalisées par des personnes formées selon le code de pratique en vigueur.

Si cet équipement est utilisé d'une façon qui n'a pas été définie par le fabricant, la protection fournie par l'équipement peut être compromise.

주의 : 본 제품 설치 , 설정 , 작동 또는 유지 보수하기 전에 본 문서를 포함하여 설치 , 설정 및 작동에 관한 참고 자료 섹션의 문서들을 반드시 읽고 숙지하십시오 . 사용자는 모든 관련 규정 , 법규 및 표준에서 요구하는 사항에 대해 반드시 설치 및 배선 지침을 숙지해야 합니다 .

설치 , 조정 , 가동 , 사용 , 조립 , 분해 , 유지보수 등 모든 작업은 관련 규정에 따라 적절한 교육을 받은 사용자를 통해서만 수행해야 합니다 .

본 장비를 제조사가 명시하지 않은 방법으로 사용하면 장비의 보호 기능이 손상될 수 있습니다 .

ATTENZIONE Prima di installare, configurare ed utilizzare il prodotto, o effettuare interventi di manutenzione su di esso, leggere il presente documento ed i documenti elencati nella sezione “Altre risorse”, riguardanti l'installazione, la configurazione ed il funzionamento dell'apparecchiatura. Gli utenti devono leggere e comprendere le istruzioni di installazione e cablaggio, oltre ai requisiti previsti dalle leggi, codici e standard applicabili.

Le attività come installazione, regolazioni, utilizzo, assemblaggio, disassemblaggio e manutenzione devono essere svolte da personale adeguatamente addestrato, nel rispetto delle procedure previste.

Qualora l'apparecchio venga utilizzato con modalità diverse da quanto previsto dal produttore, la sua funzione di protezione potrebbe venire compromessa.

DİKKAT: Bu ürünün kurulumu, yapılandırılması, işletilmesi veya bakımı öncesinde bu dokümanı ve bu ekipmanın kurulumu, yapılandırılması ve işletimi ile ilgili İlave Kaynaklar bölümünde yer listelenmiş dokümanları okuyun. Kullanıcılar yürürlükteki tüm yönetmelikler, yasalar ve standartların gereksinimlerine ek olarak kurulum ve kablolama talimatlarını da öğrenmek zorundadır.

Kurulum, ayarlama, hizmete alma, kullanma, parçaları birleştirme, parçaları sökme ve bakım gibi aktiviteler sadece uygun eğitimleri almış kişiler tarafından yürürlükteki uygulama yönetmeliklerine uygun şekilde yapılabilir.

Bu ekipman üretici tarafından belirlenmiş amacın dışında kullanılırsa, ekipman tarafından sağlanan koruma bozulabilir.

注意事項：在安裝、設定、操作或維護本產品前，請先閱讀此文件以及列於 「其他資源」章節中有關安裝、設定與操作此設備的文件。使用者必須熟悉安裝和配線指示，並符合所有法規、法律和標準要求。

包括安裝、調整、交付使用、使用、組裝、拆卸和維護等動作都必須交由已經過適當訓練的人員進行，以符合適用的實作法規。

如果將設備用於非製造商指定的用途時，可能會造成設備所提供的保護功能受損。

POZOR: Než začnete instalovat, konfigurovat či provozovat tento výrobek nebo provádět jeho údržbu, přečtěte si tento dokument a dokumenty uvedené v části Dodatečné zdroje ohledně instalace, konfigurace a provozu tohoto zařízení. Uživatelé se musejí vedle požadavků všech relevantních vyhlášek, zákonů a norem nutně seznámit také s pokyny pro instalaci a elektrické zapojení.

Činnosti zahrnující instalaci, nastavení, uvedení do provozu, užívání, montáž, demontáž a údržbu musí vykonávat vhodně proškolený personál v souladu s příslušnými prováděcími předpisy.

Pokud se toto zařízení používá způsobem neodpovidajícím specifikaci výrobce, může být narušena ochrana, kterou toto zařízení poskytuje.

UWAGA: Przed instalacją , konfiguracją , użytkowaniem lub konserwacją tego produktu należy przeczytać niniejszy dokument oraz wszystkie dokumenty wymienione w sekcji Dodatkowe źródła omawiają ce instalację, konfigurację i procedury użytkowania tego urzą dzenia. Użytkownicy mają obowią zek zapoznać się z instrukcjami dotyczą cymi instalacji oraz oprzewodowania, jak również z obowią zują cymi kodeksami, prawem i normami.

Działania obejmują ce instalację, regulację, przekazanie do użytkowania, użytkowanie, montaż, demontaż oraz konserwację muszą być wykonywane przez odpowiednio przeszkolony personel zgodnie z obowią zują cym kodeksem postępowania.

Jeśli urzą dzenie jest użytkowane w sposób inny niż określony przez producenta, zabezpieczenie zapewniane przez urzą dzenie może zostać ograniczone.

OBS! Läs detta dokument samt dokumentet, som står listat i avsnittet Övriga resurser, om installation, konfigurering och drift av denna utrustning innan du installerar, konfigurerar eller börjar använda eller utföra underhållsarbete på produkten. Användare måste bekanta sig med instruktioner för installation och kabeldragning, förutom krav enligt gällande koder, lagar och standarder.

Åtgärder som installation, justering, service, användning, montering, demontering och underhållsarbete måste utföras av personal med lämplig utbildning enligt lämpligt bruk.

Om denna utrustning används på ett sätt som inte anges av tillverkaren kan det hända att utrustningens skyddsanordningar försätts ur funktion.

LET OP: Lees dit document en de documenten die genoemd worden in de paragraaf Aanvullende informatie over de installatie, configuratie en bediening van deze apparatuur voordat u dit product installeert, configureert, bediend of onderhoudt. Gebruikers moeten zich vertrouwd maken met de installatie en de bedradingsinstructies, naast de vereisten van alle toepasselijke regels, wetten en normen.

Activiteiten zoals het installeren, afstellen, in gebruik stellen, gebruiken, monteren, demonteren en het uitvoeren van onderhoud mogen uitsluitend worden uitgevoerd door hiervoor opgeleid personeel en in overeenstemming met de geldende praktijkregels.

Indien de apparatuur wordt gebruikt op een wijze die niet is gespecificeerd door de fabrikant, dan bestaat het gevaar dat de beveiliging van de apparatuur niet goed werkt.

North American Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations.	Informations sur l'utilisation de cet équipement en environnements dangereux.
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.	Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.
WARNING: **Explosion Hazard –** • Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. • Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. • Substitution of components may impair suitability for Class I, Division 2. • If this product contains batteries, they must only be changed in an area known to be nonhazardous.	**AVERTISSEMENT:** **Risque d'Explosion –** • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit. • La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

UK and European Hazardous Location Approval

The following applies to products marked Ⓔx II 3 G:

- Are Equipment Group II, Equipment Category 3, and comply with the Essential Health and Safety Requirements relating to the design and construction of such equipment given in Annex II to EU Directive 2014/34/EU and Schedule 1 of the UKEX Regulation 2016 No.1107. See the UKEX and EU Declaration of Conformity at https://www.rockwellautomation.com/global/certification/overview.page for details.
- The type of protection is Ex ec IIC T4 Gc (ETAP1F/2F).
- The type of protection is Ex ec IIC T5 Gc (ETAP).
- Equipment protection by increased safety "e", reference certificate number DEMKO 13 ATEX 1342963X and UL22UKEX2652X.
- Are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are unlikely to occur, or are likely to occur only infrequently and for short periods. Such locations correspond to Zone 2 classification according to UKEX Regulation 2016 No.1107 and ATEX directive 2014/34/EU.
- May have catalog numbers followed by a "K" to indicate a conformal coating option.

ATTENTION: This equipment is not resistant to sunlight or other sources of UV radiation.

IEC Hazardous Location Approval

The following applies to products marked IECEx certification:

- Are intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air are unlikely to occur, or are likely to occur only infrequently and for short periods. Such locations correspond to Zone 2 classification.
- The type of protection is Ex ec IIC T4 Gc (ETAP1F/2F).
- The type of protection is Ex ec IIC T5 Gc (ETAP).
- IECEx certificate number IECEx UL 14.0092X.
- May have catalog numbers followed by a "K" to indicate a conformal coating option.

Special Conditions for Safe Use

WARNING:

- This equipment is not resistant to sunlight or other sources of UV radiation.
- This equipment shall be mounted in an ATEX/IECEx Zone 2 certified enclosure with a minimum ingress protection rating of at least IP54 (in accordance with EN/IEC 60079-0) and used in an environment of not more than Pollution Degree 2 (as defined in EN/IEC 60664-1) when applied in Zone 2 environments. The enclosure must be accessible only by the use of a tool.
- This equipment shall be used within its specified ratings defined by Rockwell Automation.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 140% of the peak rated voltage when applied in Zone 2 environments.
- The instructions in the user manual shall be observed.
- Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.

Environment and Enclosure

ATTENTION: This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in EN 60664-1), at altitudes up to 2000 m (6562 ft) without derating.
This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR 11. Without appropriate precautions, there may be difficulties with electromagnetic compatibility in residential and other environments due to conducted and radiated disturbances.

This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see the following:

- Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation publication 1770-4.1, for additional installation requirements
- NEMA 250 and EN 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosures

Prevent Electrostatic Discharge

ATTENTION: This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- Use a static-safe workstation, if available.
- Store the equipment in appropriate static-safe packaging when not in use.

Linear and Star Network Considerations

When using the tap in a linear or star network, be sure that Ring Supervisor mode is not enabled. By default, the tap is configured to be a non-supervisor ring node.

IMPORTANT For 1783-ETAP, 1783-ETAP1F, and 1783-ETAP2F modules running firmware revision 2.001 or later, DIP switch 3 is used to make the tap a ring supervisor in a DLR network. To avoid adversely impacting communication in a linear or star network, take these precautions:

- Make sure switch 3 remains in the Off position. If switch 3 is in the On position, the tap will be automatically enabled as a ring supervisor.
- Make sure that the Ring Supervisor mode is not enabled in RSLinx® Classic software or the Studio 5000 Logix Designer® application. When switch 3 is in the Off position, the programming software controls whether the tap is a ring supervisor.

Device Level Ring (DLR) Network Considerations

When using the tap in a DLR network, consider whether the tap will be a ring supervisor. By default, the tap is configured to be a non-supervisor ring node. Use one of these methods for controlling supervisor functionality:

- Use RSLinx Classic software or the Studio 5000 Logix Designer application to set the Ring Supervisor mode and other supervisor-related parameters. This is the default method. If you choose this option, follow the procedures in the online Help that accompanies the software to enable Ring Supervisor mode.
- Use the DIP switches to automatically enable Ring Supervisor mode with the current supervisor-related parameters stored in the tap's memory.[a] See Set the DIP Switches on page 9 for additional information.

IMPORTANT Use these precautions when configuring a DLR network:

- Make sure that at least one node is acting as supervisor before connecting the last link of a DLR network and physically closing the ring.
- Do not connect nodes that do not support a DLR as members of the ring.

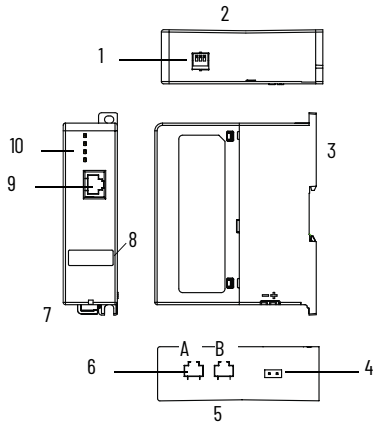
Grounding Considerations

This product is intended to be mounted to a well-grounded mounting surface, such as a metal pane or DIN rail.

ATTENTION: This product is grounded through the DIN rail to chassis ground. Use zinc-plated yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (for example, aluminum or plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure the DIN rail to mounting surface approximately every 200 mm (7.8 in.) and use end-anchors appropriately.

See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1, for additional information.

(a) Using switch 3 to control Ring Supervisor mode is supported only on 1783-ETAP modules running firmware revision 2.001 or later.



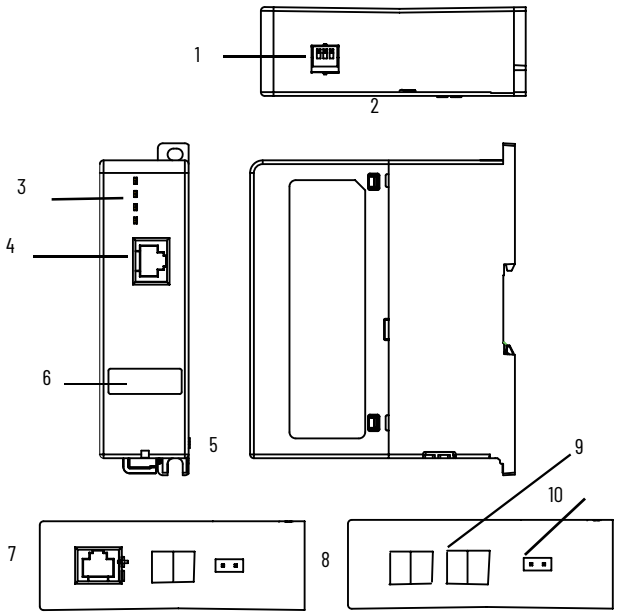
1783-ETAP Module Components

Item	Description	Item	Description
1	DIP switches	6	Ports for connection to linear or ring network A: Port 1 B: Port 2
2	Top view	7	Front view
3	Side view	8	MAC ID label
4	DC connector	9	Device port on front panel
5	Bottom view	10	Status indicators

By default, the individual ports on the tap auto-negotiate link speeds (10 Mbps or 100 Mbps) and duplex setting (full or half).

IMPORTANT Configure the Ethernet port on the device that you connect to a tap so that it matches the tap's speed and duplex settings.

Failure to make the speed and duplex settings of directly connected devices match may result in higher error rates, or loss of network connectivity.



1783-ETAP1F, 1783-ETAP2F Module Components

Item	Description	Item	Description
1	DIP switches	6	MAC ID label
2	Top view	7	Bottom view, 1783-ETAP1F
3	Status indicators	8	Bottom view, 1783-ETAP2F
4	Device port on front panel	9	Ports for connection to linear or ring network(1)
5	Side view	10	DC connector

(1) The 1783-ETAP2F tap has two fiber-optic ports. The 1783-ETAP1F tap has one fiber-optic port.

By default, the 10Base-T and 100BASE-TX ports on the tap autonegotiate link speeds (10 Mbps or 100 Mbps) and duplex setting (full or half). The 100Base-FX fiber interfaces provide 100 Mbps, full-duplex operation.

IMPORTANT Configure the Ethernet port on the device that you connect to a tap so that it matches the tap's speed and duplex settings.

Failure to make the speed and duplex settings of directly connected devices match may result in higher error rates or loss of network connectivity.

Software Requirements

You must have these versions of software.

Software	Version
RSLinx® Classic	2.56.00 or later
Studio 5000 Logix Designer	21.00.00 or later

Install the Tap

WARNING: For hazardous location applications, use the supplied Phoenix MSTB 2.5/2-ST-5.08 power terminal block.

Follow these procedures to install the tap.

1. Mount the tap in one of these configurations:
   - Panel mount
   - DIN rail mount
2. Wire the tap.
3. Connect the Ethernet ports.
4. Download the tap Add-on Profile (AOP) if you are using the Studio 5000 Logix Designer application, version 17.01.
5. Download the EDS file for the tap.
6. Configure Internet Protocol settings.
7. Set the DIP switches.

This publication describes these steps in detail.

Mount the Tap

The 1783-ETAP, 1783-ETAP1F, and 1783-ETAP2F modules are suitable for both **vertical and horizontal mounting** orientations.

Install the tap on a DIN rail or panel-mount the tap.

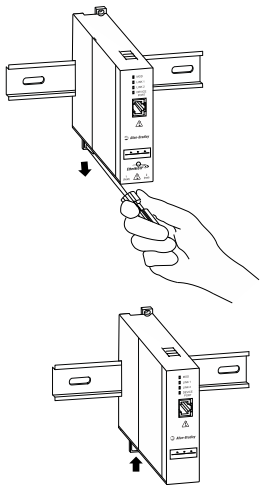
IMPORTANT For 1783-ETAP modules:
When mounting the tap, allow a minimum clearance between the product and adjacent equipment of 2.54 cm (1 in.) on all sides.

IMPORTANT For 1783-ETAP1F, 1783-ETAP2F modules:
- When mounting the tap, be sure to provide 7.62 cm (3 in.) of space on the bottom of the tap and 2.54 cm (1 in.) of space on the remaining sides of the tap.
- Allow at least 5.08 cm (2 in.) for the fiber cable bend radius. Contact the cable manufacturer for more information on recommended cable bend radii.

WARNING: EXPLOSION HAZARD
An electric arc can occur if you connect or disconnect the following:
- Communication cable with power that is applied to this module or any device on the network
- Wiring while the field-side power is on

This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.
For hazardous location applications, use the supplied Phoenix MSTB 2.5/2-ST-5.08 power terminal block.

DIN Rail Mounting



To install the tap on a DIN rail, proceed as follows.

1. Mount your DIN rail.
2. Use a screwdriver to open the latch at the bottom of the tap.
3. Hook the latch over the DIN rail while holding the latch open with your screwdriver.
4. Remove the screwdriver and push the latch to close.

The top figure shows using a screwdriver to open the latch so that you can remove the tap from the DIN rail. The bottom figure shows the latch at the bottom of the tap in the open position.

Panel Mounting

To panel mount a tap, proceed as follows.

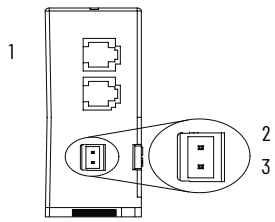
1. Use the tap as a template and mark pilot holes on your panel.
2. Drill the pilot holes for M4 or #8 screws.

Wire the Tap

ATTENTION: To comply with the CE Low Voltage Directive (LVD), this equipment must be powered from a source compliant with safety extra low voltage (SELV) or protected extra low voltage (PELV).
To comply with UL restrictions, this equipment must be powered from a source compliant with Class 2.

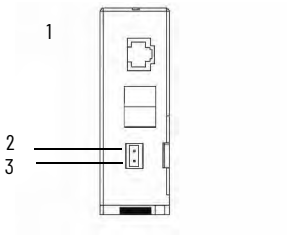
Provide DC power to the tap by using the DC connector at the bottom of the tap.

ATTENTION: Do not wire more than two conductors on any single terminal.



1783-ETAP Terminals

Item	Description
1	Tap bottom
2	DC- (0V DC) terminal
3	DC+ (24V DC nom) terminal



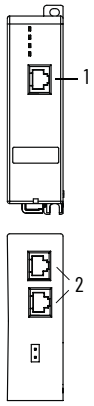
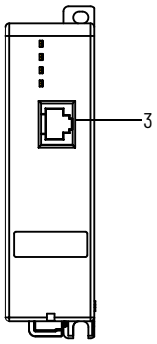
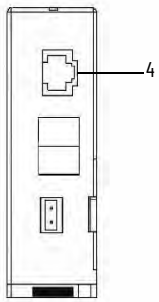
1783-ETAP1F, 1783-ETAP2F Terminals

Item	Description
1	Tap bottom
2	DC- (0V DC) terminal
3	DC+ (24V DC nom) terminal

Connect the RJ45 Ports

Follow these steps to connect the copper Ethernet ports on the tap.

1. Locate the copper Ethernet RJ45 ports on the front and bottom of the tap, as shown in the figure.

1783-ETAP	1783-ETAP1F	1783-ETAP2F
		

Item	Description
1	Device port on 1783-ETAP module front panel
2	Ports on 1783-ETAP module bottom for connection to the linear or ring network
3	Device port on 1783-ETAP1F module front panel
4	RJ45 port on 1783-ETAP2F module bottom for connection to a linear, star, or ring network

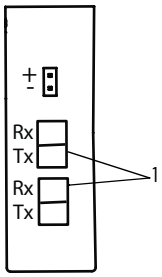
2. Connect one end of an Ethernet cable to the front panel port used as a device port.
3. Connect the other end of the Ethernet cable to the appropriate device in your network.
4. Connect one end of a second Ethernet cable to a port at the bottom of the tap and connect the other end of the Ethernet cable to the linear or ring network.
5. Repeat with the other port at the bottom of the tap if the port is used by your network.

IMPORTANT When configuring a DLR network, refer to Device Level Ring (DLR) Network Considerations on page 4 to avoid adversely impacting your network.

Connect the 1783-ETAP1F and 1783-ETAP2F Fiber Ethernet Ports

Follow these steps to connect the fiber Ethernet ports on 1783-ETAP1F and 1783-ETAP2F modules.

ATTENTION: Do not look at the optical port. The optical port can expose the eye beyond the maximum permissible exposure recommendations and presents a hazard.



Item	Description
1	Fiber ports on tap bottom for connection to the ring network

1. Locate the fiber Ethernet ports on the bottom of the tap, as shown in the figure (1783-ETAP2F tap shown).
2. Connect the duplex LC connector end of the fiber-optic cable, in the proper orientation, to the fiber-optic Ethernet port on the bottom of the tap.
3. Connect the other end of the fiber-optic cable to the linear or ring network.
4. Repeat step 2 and step 3 with the remaining fiber-optic Ethernet port at the bottom of the tap, if used by your network.

Download the EDS File

To use RSLinx® Classic communication software to configure the tap, follow these steps to download the EDS file for the tap.

IMPORTANT	If the port on your personal computer that is connected to the tap is configured to obtain its IP address automatically, expect a wait time of up to two minutes before communication is established after connecting the tap to a computer. If two or more taps are connected to one another, and each tap is using the default IP address, the computer is only able to communicate with the tap to which it is directly connected.

1. Obtain the EDS file from rok.auto/pcdc.
2. From the Network pull-down menu, choose the EtherNet/IP™ network.
3. From the Device Type pull-down, choose Communication Adapter.
4. In the Bulletin/catalog number field, type 1783-ETAP.
5. Click Search.
6. Click Download to download the EDS file for the tap.
7. Save the file to an appropriate location on your computer.
8. Use your configuration software to register the downloaded file.

   If you are using RSLinx Classic communication software, use the EDS Hardware Installation Tool.

   Choose Start > All Programs > Rockwell Software > RSLinx > Tools.

Configure Internet Protocol Settings

Configure Internet Protocol (IP) settings, such as the IP address, in one of these ways:

- Use the tap's default IP address of 169.254.1.1 by connecting the tap directly to a computer. To establish communication between a computer and the tap's default IP address, you have the following options:
  - Enter a unique IP address in the local area connection properties for your computer. The computer's IP address must be on the same subnet as the tap's default IP address, such as 169.254.1.2.
  - Configure your computer to obtain its IP address automatically.
- Use IP settings that are configured in RSLinx Classic software or the Studio 5000 Logix Designer application.
- Acquire IP settings from a DHCP server.
- Acquire IP settings from a BOOTP server.

Use the DIP switches on the tap to select the configuration method to use for IP settings. Refer to Set the DIP Switches on page 9.

Use the DHCP/BOOTP Server

If your network infrastructure does not provide DHCP/BOOT functionality, you may download our DHCP/BOOTP server software to a personal computer running a Microsoft Windows® operating system. You can use this computer as the DHCP/BOOTP server.

To set the network address by using the Rockwell Automation DHCP/BOOTP server, follow these steps.

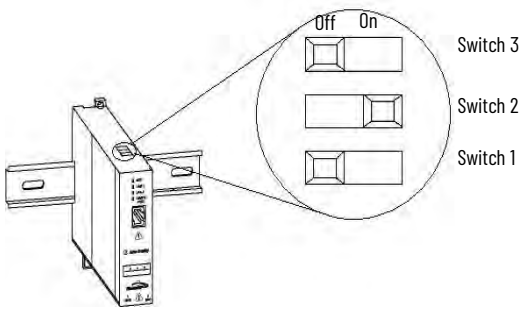
1. Access the DHCP/BOOTP utility at https://ab.rockwellautomation.com.
2. Download the version 2.3.2 DHCP/BOOTP utility.
3. Extract the zipped files to a temporary directory.
4. In the temporary directory, double-click setup.exe to install the DHCP/BOOTP utility.
5. Run the utility.
6. See the following chart, which describes what happens next, depending on whether DHCP/BOOTP is enabled on the tap.

DHCP/BOOTP Status	Result
Enabled	Tap asks for an IP address from a DHCP/BOOTP server. Consult the online help available in the BOOTP/DHCP application to configure the server to provide the desired IP address for your tap.
Not enabled	Tap uses the IP settings that are stored in nonvolatile memory. The default IP address that is stored in memory is 169.254.1.1.

Set the DIP Switches

Use the DIP switches on the tap to do the following:

- Specify the method for configuring Internet Protocol (IP) settings, such as the IP address.
- Enable the Ring Supervisor mode with its current parameters.
- Restore the factory default settings.



See the illustration to understand DIP switch On and Off positions.

Use this procedure to set the DIP switches.

1.Move the switches to the desired position, and then cycle power to the tap.

IMPORTANT The switch settings take effect only at power-up. The tap's behavior will not be modified by switch changes until the tap is power cycled.

Power-up Behavior		Switch 1	Switch 2	Switch 3
Internet Protocol settings	Uses the IP settings that are configured by software[1] or Uses the default IP address of 169.254.1.1 if settings have not been configured by software	Off	Off	The position of switch 3 does not affect IP settings
	Uses the IP settings that are acquired by a BOOTP server	On	Off	
	Uses the IP settings that are acquired by a DHCP server	Off	On	
Ring Supervisor mode	Enables Ring Supervisor mode with the current supervisor-related parameters[2]	The positions of switches 1 and 2 do not affect Ring Supervisor mode		On[3]
	Allows Ring Supervisor mode and supervisor-related parameters to be enabled and configured by software			Off
Restores the factory default settings and then suspends operation		On	On	On or Off

(1) RSLinx Classic software or the Studio 5000 Logix Designer application is required.
(2) For information about supervisor-related parameters, refer to the EtherNet/IP Device Level Ring Application Technique, publication ENET-AT007.
(3) Using switch 3 to control Ring Supervisor mode is supported only on 1783-ETAP modules running firmware revision 2.001 or later.

2. Observe these guidelines for use of the DIP switches:
   - Out of the box, all three switches are in the Off position. In this state, the tap is configured to be a non-supervisor ring node and will respond to the default IP address of 169.254.1.1. If your application does not require access to the tap's diagnostic information or configuration, no further action is required. Otherwise, select alternate DIP switch settings or configure the tap by using RSLinx Classic software or the Studio 5000 Logix Designer application.
   - When a switch is pushed to the left, it is in the Off position.
   - When a switch is pushed to the right, it is in the On position.
   - To select BOOTP, move switch 1 to the On position and switch 2 to the Off position.
   - To select DHCP, move switch 1 to the Off position and switch 2 to the On position.
   - To enable Ring Supervisor mode with the current supervisor-related parameters, move switch 3 to the On position.
   - To restore the factory default settings and suspend operation, move both switch 1 and 2 to the On position. When both switches 1 and 2 are in the On position, the position of switch 3 is ignored. When operation is suspended, the OK status indicator blinks red. To resume normal operation, move the switches to the desired positions and then cycle power to the tap.

Use the Web Interface

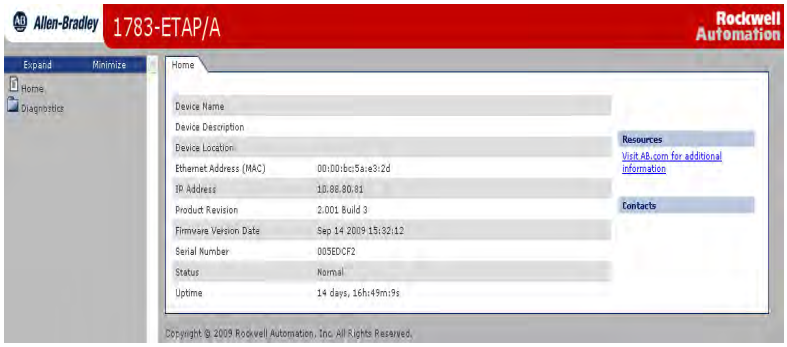
The tap supports a Web interface that provides diagnostic read-only information. Follow these steps to access the Web interface.

1. Connect a computer to any of the tap's Ethernet ports.
2. Browse to the tap by entering the tap's IP address (the out-of-the-box default is 169.254.1.1) in your web browser's address bar.

If you configure the tap with an IP address, you can also access the tap Web interface from any computer that is connected to the network.

3. Click Enter.

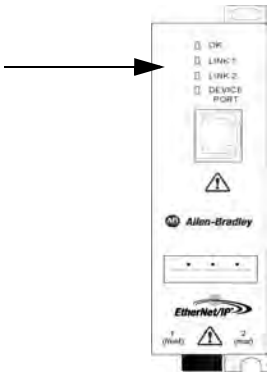
   You see the 1783-ETAP tap page, which provides general information about the tap.



4. In the left pane, click Diagnostics.
   You see links to these pages:
   - Diagnostic Overview
   - Network Settings
   - Ethernet Statistics
   - Ring Statistics

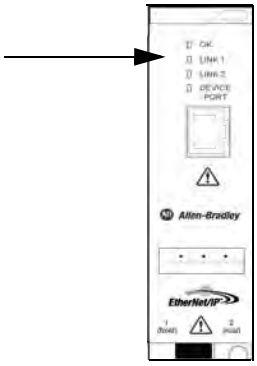
Webpage	Topics
Diagnostic Overview	• Module resource utilization • Web server read and write hits • Module settings • Ring status • Network management features
Network Settings	• Network interface details, such as IP address and subnet mask • Ethernet Interface configuration method • Ethernet port details
Ethernet Statistics	• Ethernet counters • Ethernet port details • Error information
Ring Statistics	Ring supervisor, configuration, and fault details

1783-ETAP Status Indicators



Indicator	Status	Description
OK	Off	Tap is not powered.
	Flashing green	Tap is not configured.
	Steady green	Tap is powered, configured, and operating correctly.
	Flashing red	Recoverable fault, such as duplicate IP address or update in progress, is detected.
	Steady red	Unrecoverable fault detected.
LINK1, LINK2	Off	One of these conditions exists: • No link. • Port administratively disabled. • Port that is disabled because of rapid ring fault condition, and this tap is the active ring supervisor (LINK 2). • Ring network has encountered a rare, partial network fault, and this tap is the active supervisor (LINK 2).
	Green	One of these conditions exists: • A 100 Mbps (full or half-duplex) link exists. • The ring network is operating normally and this tap is the active supervisor (LINK 2).
	Flashing green	A 100 Mbps link exists and there is activity.
	Steady yellow	One of these conditions exists: • A 10 Mbps (full or half-duplex) link exists. • Ring network is operating normally, and this tap is the active supervisor (LINK 2).
	Flashing yellow	A 10 Mbps link exists and there is activity.

1783-ETAP1F, 1783-ETAP2F Status Indicators



Indicator	Status	Description
OK	Off	Tap is not powered.
	Flashing green	Tap is not configured.
	Steady green	Tap is powered, configured, and operating correctly.
	Flashing red	Recoverable fault, such as duplicate IP address detected, or an update in progress, is detected.
	Steady red	Unrecoverable fault detected.
LINK 1, LINK 2	Off	One of these conditions exists: • No link. • Port administratively disabled. • Ring network has encountered a rare, partial network fault, or rapid ring fault condition, and this tap is the active supervisor (LINK 2).
	Steady green	One of these conditions exists: • RJ45 port: a 100 Mbps (full or half-duplex) link exists, and there is no activity. • Fiber port: a 100 Mbps (full-duplex) link exists, and there is no activity. • Ring network is operating normally, and this tap is the active supervisor (LINK 2).
	Flashing green	A 100 Mbps link exists and there is activity.
	Steady yellow	RJ45 port only. One of these conditions exists: • A 10 Mbps (full or half-duplex) link exists. • Ring network is operating normally, and this tap is the active supervisor (LINK 2).
	Flashing yellow	RJ45 port only. A 10 Mbps link exists and there is activity.

Specifications

Attribute	1783-ETAP, 1783-ETAPK	1783-ETAP1F, 1783-ETAP1FK	1783-ETAP2F, 1783-ETAP2FK
Power consumption, max	3 W	4.8 W	6.24 W
Current consumption, max	125 mA @ 24V DC	200 mA @ 24V DC	260 mA @ 24V DC
DC power supply voltage rating	• 24V DC (20.4...27.6V DC) • 台灣使用的rating為24V DC		
Ethernet connections	• RJ45 connector according to IEC 60603-7, 2 or 4 pair • Category 5e minimum cable according to TIA 568-B.1 • Category 5 cable according to ISO/IEC 24702		
DC power connections	• One 0.33...3.3 mm^2 (22...12 AWG) • Two 0.33...1.3 mm^2 (22...16 AWG) solid • Stranded copper wire rated at 75 °C (167 °F) or greater • 1.2 mm (3/64 in.) insulation max		
Torque	0.6...0.8 N•m (5...7 lb•in) on power connector		
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-25 °C ≤ Ta ≤ +70 °C (-13 °F ≤ Ta ≤ +158 °F)	-25 °C ≤ Ta ≤ +60 °C (-13 °F ≤ Ta ≤ +140 °F)	
Temperature, surrounding air, Ta, max	70 °C (158 °F)	60 °C (140 °F)	

WARNING: This product is a class A equipment:
- This product must not be used in residential areas.
- This product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the other devices.

<警告使用者>此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Stratix Ethernet Switches Specifications, publication 1783-TD001	Contains technical specifications, environmental specifications, certifications, and other information pertaining to Stratix® Ethernet switches.

You can view or download publications at https://www.rockwellautomation.com/literature/. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Rockwell Automation maintains current product environmental information on its website at https://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page.

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	rok.auto/support
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

Documentation Feedback

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Waste Electrical and Electronic Equipment (WEEE)



At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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Technical Data

Original Instructions

PanelView Plus 7 Performance Terminals

Catalog Numbers 2711P-xxx22x9P, 2711P-xxx22x9P-B, 2711P-xxx22x9PK, 2711P-Txx22D9P-BSHK, 2711P-T12W22D9P-BMxxx

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The PanelView™ Plus 7 Performance terminals are operator interface devices. They monitor and control devices that are attached to ControlLogix® and CompactLogix™ 5370 controllers on an EtherNet/IP™ network. Animated graphic and text displays provide operators a view into the operating state of a machine or process. Operators interact with the control system by using touch screen or keypad input.



The PanelView Plus 7 Performance terminals include these features and capabilities:

- FactoryTalk® View Machine Edition software provides a familiar environment for creating HMI applications
- Connection to ControlLogix or CompactLogix 5370 controllers
- Ethernet communication that can support Device Level Ring (DLR), linear, or star network topologies
- Conformal coating available for all DC power, touch-only terminals, and the 15-in. DC power, keypad and touch terminal
- Stainless steel, hygienic, brandless, DC-power, and conformal coating are available for the touch-only units in the 9-in. wide screen, 10-in., 12-in. wide screen, and 15-in. terminal sizes
- On-machine mounting available for the 12.1-in. wide screen, touch-only terminals

Summary of Changes

This publication contains new and updated information as indicated in the following table.

Topic	Page
Added 10-in. and 15-in. stainless steel catalog numbers and information	Throughout
Corrected the Corrosive Atmosphere rating information in the Environmental Specifications table	3
Updated the CE (LVD), KDD, and RoHS information in the Certifications table	4

Catalog Numbers

This publication is applicable to these currently available PanelView Plus 7 Performance terminals.

PanelView Plus 7 Performance	2711P-T7C22D9P, 2711P-B7C22D9P, 2711P-T9W22D9P, 2711P-T10C22D9P, 2711P-B10C22D9P, 2711P-T12W22D9P, 2711P-T15C22D9P, 2711P-B15C22D9P, 2711P-T19C22D9P
PanelView Plus 7 Performance Conformal Coated	2711P-T7C22D9PK, 2711P-T9W22D9PK, 2711P-T10C22D9PK, 2711P-T12W22D9PK, 2711P-T15C22D9PK, 2711P-T19C22D9PK, 2711P-B15C22D9PK
PanelView Plus 7 Performance Brandless	2711P-T7C22D9P-B, 2711P-B7C22D9P-B, 2711P-T9W22D9P-B, 2711P-T10C22D9P-B, 2711P-B10C22D9P-B, 2711P-T12W22D9P-B, 2711P-T15C22D9P-B, 2711P-B15C22D9P-B, 2711P-T19C22D9P-B
PanelView Plus 7 Performance Stainless Steel	2711P-T9W22D9P-BSHK, 2711P-T10C22D9P-BSHK, 2711P-T12W22D9P-BSHK, 2711P-T15C22D9P-BSHK
ArmorView Plus 7	2711P-T12W22D9P-BM001, 2711P-T12W22D9P-BM002, 2711P-T12W22D9P-BM003, 2711P-T12W22D9P-BM004, 2711P-T12W22D9P-BM005, 2711P-T12W22D9P-BM006, 2711P-T12W22D9P-BM007, 2711P-T12W22D9P-BM008, 2711P-T12W22D9P-BM009, 2711P-T12W22D9P-BM010, 2711P-T12W22D9P-BM011, 2711P-T12W22D9P-BM012, 2711P-T12W22D9P-BM013, 2711P-T12W22D9P-BM014, 2711P-T12W22D9P-BM015, 2711P-T12W22D9P-BM016

This publication is also applicable to these discontinued PanelView Plus 7 Performance terminals.

PanelView Plus 7 Performance	2711P-T7C22A9P, 2711P B7C22A9P, 2711P-T9W22A9P, 2711P-T10C22A9P, 2711P-B10C22A9P, 2711P-T12W22A9P, 2711P-T15C22A9P, 2711P-B15C22A9P, 2711P-T19C22A9P
PanelView Plus 7 Performance Brandless	2711P-T7C22A9P-B, 2711P-B7C22A9P-B, 2711P-T9W22A9P-B, 2711P-T10C22A9P-B, 2711P-B10C22A9P-B, 2711P-T12W22A9P-B, 2711P-T15C22A9P-B, 2711P-B15C22A9P-B, 2711P-T19C22A9P-B

PanelView Plus 7 Performance terminal catalog numbers ending in:

- 'K' are conformal coated for extended protection in harsh, corrosive environments
- '-B' exclude the Allen-Bradley brand marking. You can put your own brand labels on these terminals
- 'BSHK' are conformal coated, brandless, and feature a stainless-steel 316 bezel

Environmental Specifications

This table lists environmental specifications for the PanelView Plus 7 Performance and ArmorView™ Plus 7 terminals.

Environmental Specifications

Attribute	Value
Temperature, operating	6.5-in., 9-in., 10.4-in., 12.1-in., and 15-in. terminals 0…55 °C (32…131 °F) 19-in. terminals (Series A) 0…50 °C (32…122 °F) 19-in. terminals (Series B) 0…55 °C (32…131 °F) ArmorView Plus 7 terminals 0…50 °C (32…122 °F) ambient(1)
Temperature, nonoperating	-25…+70 °C (-13…+158 °F)(2)
Heat dissipation	Typical BTU measurements were taken at 25 °C (77 °F): 6.5-in. DC (touch, and touch with keypad), 51 BTU (typical) (Series B, 38 BTU) 6.5-in. AC (touch, and touch with keypad), 53 BTU (typical) 9-in. DC, 55 BTU (typical) Series A (Series B for stainless steel) 9-in. DC, 41 BTU (typical) Series B (Series C for stainless steel) 9-in. AC, 58 BTU (typical) 10.4-in. DC (touch, and touch with keypad) Series A, 51 BTU (typical) 10.4-in. DC (touch, and touch with keypad) Series B (Series C for stainless steel), 48 BTU (typical) 10.4-in. AC (touch, and touch with keypad), 56 BTU (typical) 12.1-in. DC Series A (Series B for stainless steel), 60 BTU (typical) 12.1-in. DC Series B (Series C for stainless steel), 49 BTU (typical) 12.1-in. AC, 67 BTU (typical) 15-in. DC (touch, and touch with keypad) Series A, 61 BTU (typical) 15-in. DC (touch, and touch with keypad) Series B (Series C for stainless steel), 71 BTU (typical) 15-in. AC (touch, and touch with keypad), 68 BTU (typical) 19-in. DC, 114 BTU (typical) (Series B, 92 BTU) 19-in. AC, 119 BTU (typical)
Altitude, operating	2000 m (6562 ft)(2)
Relative humidity	5…95% without condensation(2)
Vibration	6.5-in., 9-in., 10.4-in., 12.1-in. terminals, and 12.1-in. terminal in the ArmorView Plus 7 enclosure 0.012 pk-pk, 10…57 Hz 2 g peak at 57…500 Hz 15-in. and 19-in. terminals 0.006 pk-pk, 10…57 Hz 1 g peak at 57…640 Hz
Shock, operating	15 g at 11 ms(3)
Shock, nonoperating	30 g at 11 ms(3)
Enclosure ratings	NEMA and UL Type 12, 13, 4X, also rated IP66 as Classified by UL(4) (5)
Corrosive Atmosphere(6) ASTM B845-97 Method K Accelerated Test (20-Day Exposure)	Severity Level G3(7)(8) per ANSI/ISA 71.04-2013, Airborne Contaminants—Gases Severity Level CX(7) per IEC 60721-3-3:2019, Chemically Active Substances

(1) The optional I/O plate (included in the VESA Mounting Kit—2711P-RVESA01) is rated to 0…45 °C (32…113 °F).
(2) These values are the same for the ArmorView Plus 7 terminals.
(3) These values are the same for the ArmorView Plus 7 terminals when the VESA mount is used. When the arm mount coupling is used, the values are 5 g at 11 ms.
(4) The ArmorView Plus 7 terminals enclosure ratings are 12, 13, 4, or 4X (see the ArmorView Plus 7 Installation Instructions, publication 2711P-IN013 for more detail) and IP66 as classified by UL.
(5) The PanelView Plus 7 Performance Stainless Steel Series B and Series C terminals are also rated IP69 as Classified by UL and tested for IP69K according to ISO 20653.
(6) Only applicable to terminals that have a 'K' or "BSHK" in the catalog number.
(7) Port plugs/covers must remain installed in unused ports at all times during storage and operation for the product to maintain its corrosive atmosphere rating.
(8) Up to 86.4 g/(m^2·yr), mass loss of copper due to corrosion.

Resistance to Chemicals

The outer surfaces of the terminal including the bezel, touch screen overlay, and panel gasket seal are tested for chemical resistance. Some of the chemicals can cause discoloration, but they do not interfere with the operation of the terminal.

For more information on the chemical resistance of the product, go to https://rockwellautomation.custhelp.com and search the Knowledgebase using the keywords, 'Chemical Resistance PanelView Plus'.

IMPORTANT Do not operate the terminal in direct sunlight. Direct exposure to ultraviolet light can discolor the touch screen.

Certifications

This table lists certifications for the PanelView Plus 7 Performance terminals.

Certification[1]	Value
CE (EMC)	European Union 2014/35/EU EMC Directive, compliant with: EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers
CE (LVD)[2]	European Union 2014/30/EU Low Voltage Directive, compliant with: EN 61010-2-201; Safety Requirements for Control Equipment
c-UL-us	Both ArmorView Plus 7 (E113724) and PanelView Plus 7 Performance (UL Category Control Number E10314) terminals hold the following certifications: • c-UL-us Listed Industrial Control Equipment for US and Canada per standards UL 61010-1, UL 61010-2-201, CSA-C22.2 No. 61010-1, and CSA-C22.2 No. 61010-2-201. • Enclosure type ratings per UL50 and CSA C22.2 No. 94.2. • Enclosure ingress protection that is classified by UL per IEC 60529. In addition, PanelView Plus 7 Performance (E10314) terminals hold the following certifications: • cULus Listed Industrial Control Equipment for use in Hazardous Locations per standards ANSI/ISA 12.12.01 and CSA C22.2 No. 213 rated: – Class I, Div 2, Groups A, B, C, D – Class II, Div 2, Groups F and G – Class III, Div 1 and 2
EtherNet/IP	ODVA conformance that is tested to EtherNet/IP specifications
KCC	Certificate of compliance R-R-RAA-2711P-12BM for ArmorView Plus 7 MSIP-REM-RAA-2711P-X22XP for PanelView Plus 7 Performance
NSF	Stainless Steel Series B and C Terminals only, compliant with: • NSF/ANSI/3-A 14159-1; Hygiene Requirements for the Design of Meat and Poultry Processing Equipment • NSF/ANSI 169; Special Purpose Food Equipment and Devices
RCM	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
RoHS	China RoHS, Türkiye RoHS, KSA RoHS, UAE RoHS, European RoHS 2011/65/EU (incorporating 2015/863)
UKCA	BS EN 61010-2-201; Safety Requirements for Control Equipment BS EN 61131-2; Programmable Controllers
Morocco	NM EN 61010-2-201; Safety Requirements for Control Equipment NM EN 61131-2; Programmable Controllers

(1) When marked. See the Product Certification link at rok.auto/certification for Declarations of Conformity, Certificates, and other certification details.
(2) This EU directive does not apply to PanelView products with a voltage rating under 50 Vac or 75 Vdc.

Technical Specifications

PanelView Plus 7 Performance Terminals

Technical Specifications - PanelView Plus 7 Performance 7-in and 9-in Terminals

Attribute	6.5-in. Touch		6.5-in. Touch with Keypad		9-in. Touch	
	2711P--T7C22D9P, 2711P--T7C22D9P-B, 2711P-T7C22D9PK	2711P-T7C22A9P, 2711P-T7C22A9P-B	2711P-B7C22D9P, 2711P-B7C22D9P-B	2711P-B7C22A9P, 2711P-B7C22A9P-B	2711P-T9W22D9P, 2711P-T9W22D9P-B, 2711P-T9W22D9PK	2711P-T9W22A9P, 2711P-T9W22A9P-B
Operator input	Touch		Touch with keypad		Touch	
Display type	TFT Color					
Display size, diagonal	6.5-in.				9-in. widescreen	
Viewing area (W x H)	132 x 99 mm (5.2 x 3.9 in.)				196 x 118 mm (7.7 x 4.6 in.)	
Display resolution	**(Series A)** 640 x 480 VGA, 18-bit color graphics **(Series B)** 640 x 480 VGA, 24-bit color graphics				**(Series A)** 800 x 480 WVGA, 18-bit color graphics **(Series B)** 800 x 480 WVGA, 24-bit color graphics	
Aspect ratio	4:3				5:3	
Brightness, typical	300 cd/m^2 (nits) or more					
Backlight life	White light-emitting diode, solid-state Life: 50,000 h min at 40 °C (104 °F) to half-brightness, backlight is not replaceable					
Touch screen	Analog resistive Actuation rating: 1 million presses Operating force: 100 grams					
Battery (real-time clock backup)	Accuracy: ±2 minutes per month. Battery life: 4 years min at 25 °C (77 °F) Replacement: CR2032 lithium coin cell					
Memory: • System • User	**(Series A)** 512 MB RAM and 512 MB storage 80 MB, approx, nonvolatile storage for applications **(Series B)** 4 GB RAM and 19.87 GB storage 2 GB, approx, nonvolatile storage for applications					
Secure Digital (SD) card slots	One SD card slot for external storage; supports cat. no. 1784-SDx and 1784-SDHCx cards					
USB ports: • Host • Device	**(Series A)** Two USB high-speed 2.0 host ports (type A) support removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release **(Series B)** One USB high-speed 3.0 host port (only supports up to 500 mA current output) and one USB 2.0 host port (Type A) supports removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release					
Operating system	**(Series A)** Windows® CE 6.0 with Extended Features and Microsoft Office Viewers (includes FTP, VNC client server, ActiveX controls, PDF reader, third-party device support) **(Series B)** Windows 10 IoT Core					
Ethernet ports	Two 10/100Base-T, Auto MDI/MDIX Ethernet ports that support Device Level Ring (DLR), linear, or star network topologies					
Software	FactoryTalk View Studio for Machine Edition, FactoryTalk ViewPoint, version 2.6 or later					
Input voltage	24V DC nom (18...30V DC)	100...240V AC	24V DC nom (18...30V DC)	100...240V AC	24V DC nom (18...30V DC)	100...240V AC
Power consumption	**(Series A)** 50 W max (2.1 A at 24V DC) **(Series B)** 29 W max	105VA	**(Series A)** 50 W max (2.1 A at 24V DC) **(Series B)** 29 W max	105VA	**(Series A)** 50 W max (2.1 A at 24V DC) **(Series B)** 30 W max	105VA
Power supply	Supports (SELV) and (PELV) 24V DC supplies(1)	–	Supports (SELV) and (PELV) 24V DC supplies(1)	–	Supports (SELV) and (PELV) 24V DC supplies(1)	–
Weight, approx	1.2 kg (2.65 lb)		1.47 kg (3.25 lb)		1.58 kg (3.48 lb)	
Dimensions, approx (H x W x D)	170 x 212 x 69.6 mm (6.69 x 8.35 x 2.74 in.)		179 x 285 x 69.6 mm (7.05 x 11.22 x 2.74 in.)		190 x 280 x 69.6 mm (7.48 x 11.02 x 2.74 in.)	
Cutout dimensions, approx (H x W)	142 x 184 mm (5.59 x 7.24 in.)		142 x 237 mm (5.59 x 9.33 in.)		162 x 252 mm (6.38 x 9.92 in.)	

(1) DC-powered terminals support safety extra low voltage (SELV) and protective extra low voltage (PELV) 24V DC power supplies such as cat. nos. 1606-XLP95E, 1606-XLP100E, 2711P-RSACDIN.

Technical Specifications - PanelView Plus 7 Performance 10-in and 12-in Terminals

Attribute	10.4-in. Touch		10.4-in. Touch with Keypad		12.1-in. Touch	
	2711P-T10C22D9P, 2711P-T10C22D9P-B, 2711P-T10C22D9PK	2711P-T10C22A9P, 2711P-T10C22A9P-B	2711P-B10C22D9P, 2711P-B10C22D9P-B	2711P-B10C22A9P, 2711P-B10C22A9P-B	2711P-T12W22D9P, 2711P-T12W22D9P-B, 2711P-T12W22D9PK	2711P-T12W22A9P, 2711P-T12W22A9P-B
Operator input	Touch		Touch with keypad		Touch	
Display type	TFT Color					
Display size, diagonal	10.4-in.				12.1-in. wide screen	
Viewing area (W x H)	211 x 158 mm (8.3 x 6.2 in.)				261 x 163 mm (10.3 x 6.4 in.)	
Display resolution	**(Series A)** 800 x 600 VGA, 18-bit color graphics **(Series B)** 800 x 600 VGA, 24-bit color graphics				**(Series A)** 1280 x 800 WXGA, 18-bit color graphics **(Series B)** 1280 x 800 WXGA, 24-bit color graphics	
Aspect ratio	4:3				16:10	
Brightness, typical	300 cd/m2 (Nits) or more					
Backlight life	White light-emitting diode, solid-state Life: 50,000 h min at 40 °C (104 °F) to half-brightness, backlight is not replaceable					
Touch screen	Analog resistive Actuation rating: 1 million presses Operating force: 100 grams					
Battery (real-time clock backup)	Accuracy: ±2 minutes per month. Battery life: 4 years min at 25 °C (77 °F) Replacement: CR2032 lithium coin cell					
Memory: • System • User	**(Series A)** 512 MB RAM and 512 MB storage 80 MB, approx, nonvolatile storage for applications **(Series B)** 4 GB RAM and 19.87 GB storage 2 GB, approx, nonvolatile storage for applications					
Secure Digital (SD) card slot	One SD card slot for external storage; supports cat. no. 1784-SD*x* and 1784-SDHCx cards					
USB ports: • Host • Device	**(Series A)** Two USB high-speed 2.0 host ports (type A) support removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release **(Series B)** One USB high-speed 3.0 host port and one USB 2.0 host port (Type A) supports removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release					
Operating system	**(Series A)** Windows CE 6.0 with Extended Features and Microsoft Office Viewers (includes FTP, VNC client server, ActiveX controls, PDF reader, third-party device support) **(Series B)** Windows 10 IoT Core					
Ethernet ports	Two 10/100Base-T, Auto MDI/MDIX Ethernet ports that support Device Level Ring (DLR), linear, or star network topologies					
Software	FactoryTalk View Studio for Machine Edition, FactoryTalk ViewPoint, version 2.6 or later					
Input voltage	24V DC nom (18...30V DC)	100...240V AC	24V DC nom (18...30V DC)	100...240V AC	24V DC nom (18...30V DC)	100...240V AC
Power consumption	**(Series A)** 50 W max (2.1 A at 24V DC) **(Series B)** 32 W max	105VA	**(Series A)** 50 W max (2.1 A at 24V DC) **(Series B)** 32 W max	105VA	**(Series A)** 50 W max (2.1 A at 24V DC) **(Series B)** 33 W max	105VA
Power supply	Supports (SELV) and (PELV) 24V DC supplies[1]	–	Supports (SELV) and (PELV) 24V DC supplies[1]	–	Supports (SELV) and (PELV) 24V DC supplies[1]	–
Weight, approx	2.28 kg (5.03 lb)		2.58 kg (5.69 lb)		2.54 kg (5.60 lb)	
Dimensions, approx (H x W x D)	252 x 297 x 69.6 mm (9.92 x 11.69 x 2.74 in.)		252 x 385 x 69.6 mm (9.92 x 15.16 x 2.74 in.)		240 x 340 x 69.6 mm (9.69 x 13.39 x 2.74 in.)	
Cutout dimensions, approx (H x W)	224 x 269 mm (8.82 x 10.59 in.)		224 x 335 mm (8.82 x 13.19 in.)		218 x 312 mm (8.58 x 12.28 in.)	

(1) DC-powered terminals support safety extra low voltage (SELV) and protective extra low voltage (PELV) 24V DC power supplies such as cat. nos. 1606-XLP95E, 1606-XLP100E, 2711P-RSACDIN.

Technical Specifications - PanelView Plus 7 Performance 15-in and 19-in Terminals

Attribute	15-in. Touch		15-in. Touch with Keypad		19-in. Touch	
	2711P-T15C22D9P, 2711P-T15C22D9P-B, 2711P-T15C22D9PK	2711P-T15C22A9P, 2711P-T15C22A9P-B	2711P-B15C22D9P, 2711P-B15C22D9P-B, 2711P-B15C22D9PK	2711P-B15C22A9P, 2711P-B15C22A9P-B	2711P-T19C22D9P, 2711P-T19C22D9P-B, 2711P-T19C22D9PK	2711P-T19C22A9P, 2711P-T19C22A9P-B
Operator input	Touch		Touch with keypad		Touch	
Display type	TFT Color					
Display size, diagonal	15-in.				19-in.	
Viewing area (W x H)	304 x 228 mm (12.0 x 9.0 in.)				376 x 301 mm (14.8 x 11.9 in.)	
Display resolution	**(Series A)** 1024 x 768 XGA, 18-bit color graphics **(Series B)** 1024 x 768 XGA, 24-bit color graphics				**(Series A)** 1280 x 1024 SXGA, 18-bit color graphics **(Series B)** 1280 x 1024 SXGA, 24-bit color graphics	
Aspect ratio	4:3				5:4	
Brightness, typical	300 cd/m2 (nits) or more					
Backlight life	White light-emitting diode, solid-state Life: 50,000 h min at 40 °C (104 °F) to half-brightness, backlight is not replaceable					
Touch screen	Analog resistive Actuation rating: 1 million presses Operating force: 100 grams					
Battery (real-time clock backup)	Accuracy: ±2 minutes per month. Battery life: 4 years min at 25 °C (77 °F) Replacement: CR2032 lithium coin cell					
Memory: • System • User	**(Series A)** 512 MB RAM and 512 MB storage 80 MB, approx, nonvolatile storage for applications **(Series B)** 4 GB RAM and 19.87 GB storage 2 GB, approx, nonvolatile storage for applications					
Secure Digital (SD) card slot	One SD card slot for external storage; supports cat. no. 1784-SD*x* and 1784-SDHC*x* cards					
USB ports: • Host • Device	**(Series A)** Two USB high-speed 2.0 host ports (type A) support removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release **(Series B)** One USB high-speed 3.0 host port and one USB 2.0 host port (Type A) supports removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release					
Operating system	**(Series A)** Windows CE 6.0 with Extended Features and Microsoft Office Viewers (includes FTP, VNC client server, ActiveX controls, PDF reader, third-party device support) **(Series B)** Windows 10 IoT Core					
Ethernet ports	Two 10/100Base-T, Auto MDI/MDIX Ethernet ports that support Device Level Ring (DLR), linear, or star network topologies					
Software	FactoryTalk View Studio for Machine Edition, FactoryTalk ViewPoint, version 2.6 or later					
Input voltage	24V DC nom (18...30V DC)	100...240V AC	24V DC nom (18...30V DC)	100...240V AC	24V DC nom (18...30V DC)	100...240V AC
Power consumption	**(Series A)** 50 W max (2.1 A at 24V DC) **(Series B)** 39 W max	105VA	**(Series A)** 50 W max (2.1 A at 24V DC) **(Series B)** 39 W max	105VA	**(Series A)** 50 W max (2.1 A at 24V DC) **(Series B)** 45 W max	105VA
Power supply	Supports (SELV) and (PELV) 24V DC supplies[1]	–	Supports (SELV) and (PELV) 24V DC supplies[1]	–	Supports (SELV) and (PELV) 24V DC supplies[1]	–
Weight, approx	3.69 kg (8.14 lb)		4.14 kg (9.13 lb)		5.62 kg (12.40 lb)	
Dimensions, approx (H x W x D)	318 x 381 x 69.6 mm (12.52 x 15.00 x 2.74 in)		322 x 484 x 69.6 mm (12.68 x 19.06 x 2.74 in)		411 x 485 x 69.6 mm (16.18 x 19.09 x 2.74 in)	
Cutout dimensions, approx (H x W)	290 x 353 mm (11.42 x 13.90 in)		290 x 418 mm (11.42 x 16.46 in)		383 x 457 mm (15.08 x 17.99 in)	

(1) DC-powered terminals support safety extra low voltage (SELV) and protective extra low voltage (PELV) 24V DC power supplies such as cat. nos. 1606-XLP95E, 1606-XLP100E, 2711P-RSACDIN.

PanelView Plus 7 Performance Stainless Steel Terminals

Technical Specifications - PanelView Plus 7 Performance Stainless Steel Terminals

Attribute	9-in. Touch 2711P-T9W22D9P-BSHK	10.4-in. Touch 2711P-T10C22D9P-BSHK	12.1-in. Touch 2711P-T12W22D9P-BSHK	15-in. Touch 2711P-T15C22D9P-BSHK
Operator input	Touch			
Display type	TFT Color			
Display size, diagonal	9-in. wide screen	10.4-in. screen	12.1-in. wide screen	15-in. screen
Viewing area (W x H)	196 x 118 mm (7.7 x 4.6 in.)	211 x 158 mm (8.3 x 6.2 in.)	261 x 163 mm (10.3 x 6.4 in.)	304 x 228 mm (12.0 x 9.0 in.)
Display resolution	**(Series B)** 800 x 480 WVGA, 18-bit color graphics **(Series C)** 800 x 480 WVGA, 24-bit color graphics	**(Series C)** 800 x 600 SVGA, 24-bit color graphics	**(Series B)** 1280 x 800 WXGA, 18-bit color graphics **(Series C)** 1280 x 800 WXGA, 24-bit color graphics	**(Series C)** 1024 x 768 XGA, 24-bit color graphics
Aspect ratio	5:3	4:3	16:10	4:3
Brightness, typical	300 cd/m2 (nits) or more			
Backlight life	White light-emitting diode, solid-state Life: 50,000 h min at 40 °C (104 °F) to half-brightness, backlight is not replaceable			
Touch screen	Analog resistive Actuation rating: 1 million presses Operating force: 100 grams			
Battery (real-time clock backup)	Accuracy: ±2 minutes per month Battery life: 4 years min at 25 °C (77 °F) Replacement: CR2032 lithium coin cell			
Memory: • System • User	**(Series B)** 512 MB RAM and 512 MB storage 80 MB, approx, nonvolatile storage for applications **(Series C)** 4 GB RAM and 19.87 GB storage 2 GB, approx, nonvolatile storage for applications	**(Series C)** 4 GB RAM and 19.87 GB storage 2 GB, approx, nonvolatile storage for applications	**(Series B)** 512 MB RAM and 512 MB storage 80 MB, approx, nonvolatile storage for applications **(Series C)** 4 GB RAM and 19.87 GB storage 2 GB, approx, nonvolatile storage for applications	**(Series C)** 4 GB RAM and 19.87 GB storage 2 GB, approx, nonvolatile storage for applications
Secure Digital (SD) card slot	One SD card slot for external storage; supports cat. no. 1784-SD*x* and 1784-SDHC*x* cards			
USB ports: • Host • Device	**(Series B)** Two USB high-speed 2.0 host ports (type A) support removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release **(Series C)** One USB high-speed 3.0 host port and one USB 2.0 host port (Type A) supports removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release	**(Series C)** One USB high-speed 3.0 host port and one USB 2.0 host port (Type A) supports removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release	**(Series B)** Two USB high-speed 2.0 host ports (type A) support removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release **(Series C)** One USB high-speed 3.0 host port and one USB 2.0 host port (Type A) supports removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release	**(Series C)** One USB high-speed 3.0 host port and one USB 2.0 host port (Type A) supports removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release
Operating system	**(Series B)** Windows CE 6.0 with Extended Features and Microsoft Office Viewers (includes FTP, VNC client server, ActiveX controls, PDF reader, third-party device support) **(Series C)** Windows 10 IoT Core	**(Series C)** Windows 10 IoT Core	**(Series B)** Windows CE 6.0 with Extended Features and Microsoft Office Viewers (includes FTP, VNC client server, ActiveX controls, PDF reader, third-party device support) **(Series C)** Windows 10 IoT Core	**(Series C)** Windows 10 IoT Core
Ethernet ports	Two 10/100Base-T, Auto MDI/MDIX Ethernet ports that support Device Level Ring (DLR), linear, or star network topologies			
Software	FactoryTalk View Studio for Machine Edition, FactoryTalk ViewPoint, version 2.6 or later			
Input voltage	24V DC nom (18...30V DC)			
Power consumption	**(Series B)** 50 W max (2.1 A at 24V DC) **(Series C)** 30 W max	**(Series C)** 32 W max	**(Series B)** 50 W max (2.1 A at 24V DC) **(Series C)** 33 W max	**(Series C)** 39 W max
Power supply	Supports (SELV) and (PELV) 24V DC supplies(1)			
Stainless-steel bezel	316 stainless steel with hygienic No. 4 finish			
Silicone gasket	Gasket material is compliant with FDA 21 CFR 177.2600			
Weight, approx	2.1 kg (4.6 lb)	3.25 kg (7.2 lbs)	3.7 kg (8.2 lb)	4.7 kg (10.4 lbs)
Dimensions, approx (H x W x D)	190 x 280 x 69.6 mm (7.48 x 11.02 x 2.74 in.)	252 x 297 x 69.6 mm (9.92 x 11.69 x 2.74 in.)	240 x 340 x 69.6 mm (9.69 x 13.39 x 2.74 in.)	318 x 381 x 69.6 mm 12.52 x 15.00 x 2.74 in
Cutout dimensions, approx (H x W)	162 x 252 mm (6.38 x 9.92 in.)	224 x 269 mm (8.82 x 10.59 in.)	218 x 312 mm (8.58 x 12.28 in.)	290 x 353 mm 11.42 x 13.90 in

(1) DC-powered terminals support safety extra low voltage (SELV) and protective extra low voltage (PELV) 24V DC power supplies such as cat. nos. 1606-XLP95E, 1606-XLP100E, 2711P-RSACDIN.

ArmorView Plus 7 Terminals

Technical Specifications - ArmorView Plus 7 Terminals

Attribute	12.1 in. Touch	
	2711P-T12W22D9P-BM001, 2711P-T12W22D9P-BM002	2711P-T12W22D9P-BM003...2711P-T12W22D9P-BM016
Operator input	Touch	Touch screen and push button, selector switches, or keyswitches
Display type	TFT Color	
Display size, diagonal	12.1-in. wide screen	
Viewing area (W x H)	261 x 163 mm (10.3 x 6.4 in.)	
Display resolution	**(Series A)** 1280 x 800 WXGA, 18-bit color graphics **(Series B)** 1280 x 800 WXGA, 24-bit color graphics	
Aspect ratio	16:10	
Brightness, typical	300 cd/m2 (nits) or more	
Backlight life	White light-emitting diode, solid-state Life: 50,000 h min at 40 °C (104 °F) to half-brightness, backlight is not replaceable	
Touch screen	Analog resistive Actuation rating: 1 million presses Operating force: 100 grams	
E-stop	–	Illuminated twist-to-release 300,000 cycles
Push buttons	–	Momentary push buttons 10,000,000 cycles
Selector switches	–	Two-position selector, three-position selector, three-position key selector 1,000,000 cycles
Battery (real-time clock backup)	Accuracy: ±2 minutes per month Battery life: 4 years min at 25 °C (77 °F) Replacement: CR2032 lithium coin cell	
Memory: • System • User	**(Series A)** 512 MB RAM and 512 MB storage 80 MB, approx, nonvolatile storage for applications **(Series B)** 4 GB RAM and 19.87 GB storage 2 GB, approx, nonvolatile storage for applications	
Secure Digital (SD) card slot	One SD card slot for external storage; supports cat. nos. 1784-SD*x* and 1784-SDHC*x* cards	
USB ports: • Host • Device	**(Series A)** Two USB high-speed 2.0 host ports (type A) support removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release **(Series B)** One USB high-speed 3.0 host port and one USB 2.0 host port (Type A) supports removable flash drives for external storage One high-speed 2.0 device port (type B) that will be functional in a future release	
Operating system	**(Series A)** Windows CE 6.0 with Extended Features and MS Office Viewers (includes FTP, VNC client server, ActiveX controls, PDF reader, third-party device support) **(Series B)** Windows 10 IoT Core	
Ethernet ports	Two 10/100Base-T, Auto MDI/MDIX Ethernet ports that support Device Level Ring (DLR), linear, or star network topologies	
Software	FactoryTalk View Studio for Machine Edition, FactoryTalk ViewPoint, version 2.6 or later	
Input voltage	24V DC nom (18...30V DC)	
Power consumption	37 W max (1.54 A at 24V DC)	
Power supply	Supports (SELV) and (PELV) 24V DC supplies(1)	
Weight, approx (with arm adapter)	7.41 kg (16.34 lb)	
Weight, approx (with VESA Kit)	8.19 kg (18.06 lb)	
Dimensions with arm adapter, approx (H x W x D)	381.6 x 345 x 166.6 mm (15.02 x 13.58 x 6.56 in.)	
Dimensions with I/O plate, approx (H x W x D)	345 x 345 x 166.6 mm (13.58 x 13.58 x 6.56 in.)	

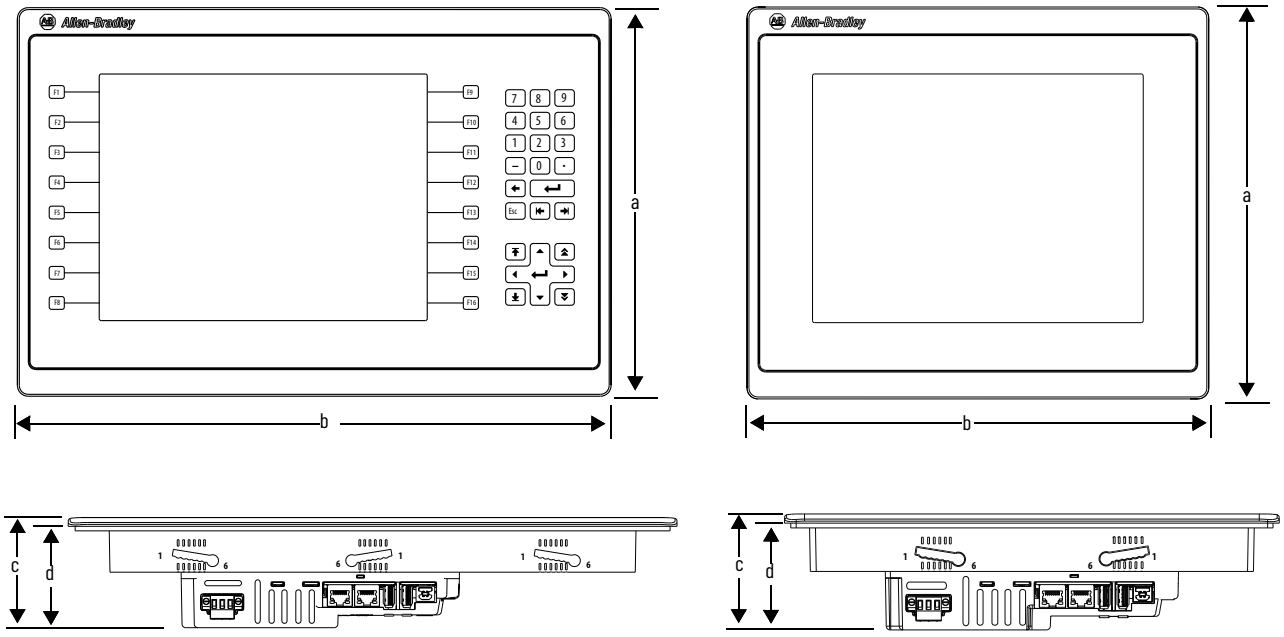
(1) DC-powered terminals support safety extra low voltage (SELV) and protective extra low voltage (PELV) 24V DC power supplies such as cat. nos. 1606-XLP95E, 1606-XLP100E, 2711P-RSACDIN.

Product Dimensions

PanelView Plus 7 Performance Terminals

This section provides product dimensions for the PanelView Plus 7 Performance terminals. The PanelView Plus 7 Performance 10.4-inch touch and combination keypad with touch devices are shown for illustrative purposes. Stainless steel terminals use different mounting clips, but the dimensions are the same. Dimensions for the 12.1-in. ArmorView Plus 7 terminals can be found on page 11.

PanelView Plus 7 Performance Terminal Dimensions - 10.4-in. Model



PanelView Plus 7 Performance Terminal Dimensions

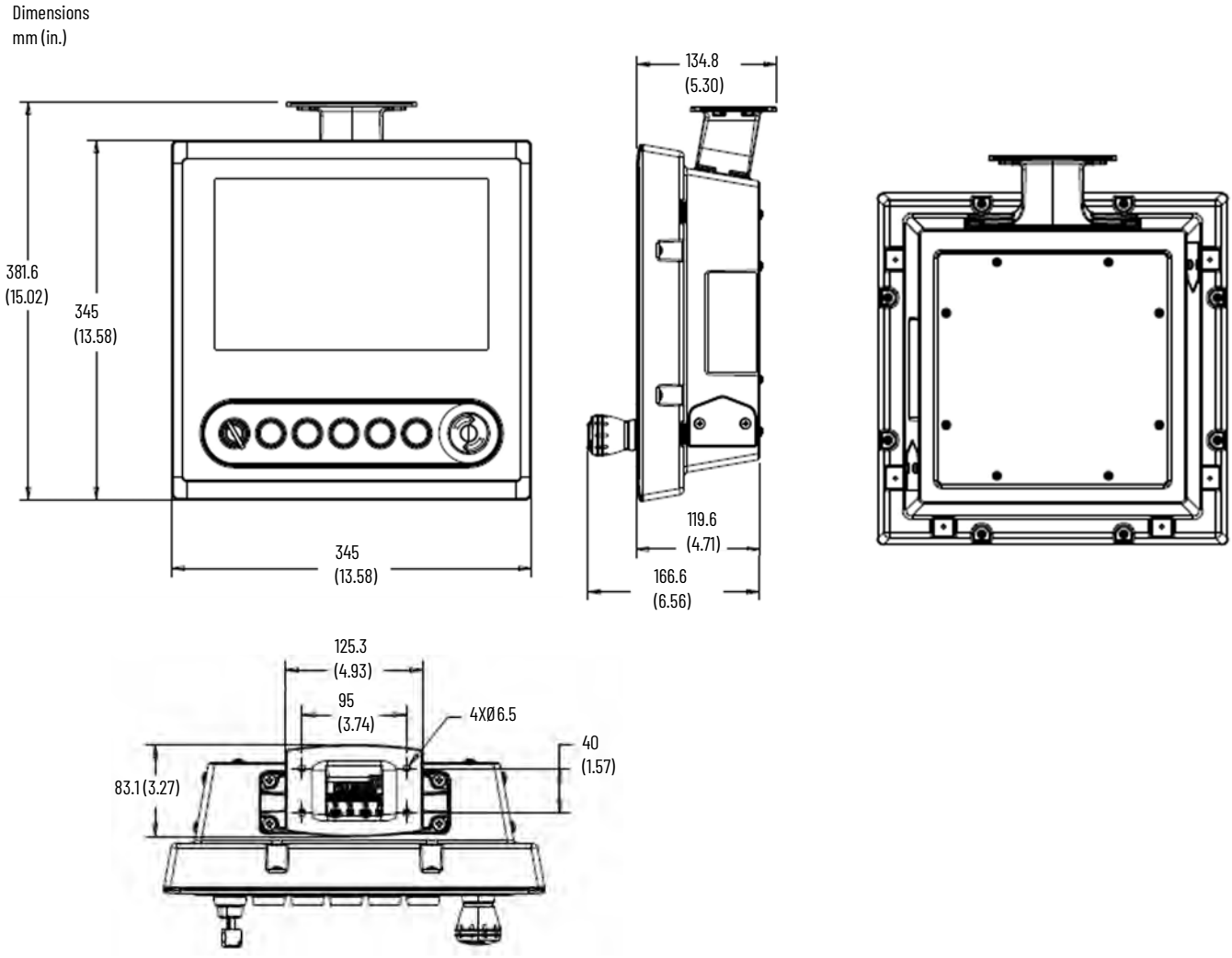
Terminal Size	Input Type	Height (a) mm (in.)	Width (b) mm (in.)	Overall Depth (c) mm (in.)	Mounted Depth (d) mm (in.)
6.5-in.	Key/touch	179 (7.05)	285 (11.22)	69.6 (2.74)	63.6 (2.50)
	Touch	170 (6.69)	212 (8.35)		
9-in.	Touch	190 (7.48)	280 (11.02)		
10.4-in.	Key/touch	252 (9.92)	385 (15.16)		
	Touch	252 (9.92)	297 (11.69)		
12.1-in.	Touch	246 (9.69)	340 (13.39)		
15-in.	Key/touch	322 (12.68)	484 (19.06)		
	Touch	318 (12.52)	381 (15.00)		
19-in.	Touch	411 (16.18)	485 (19.09)		

When mounted in a panel, the front of the bezel extends less than 6.36 mm (0.25 in.) from the front of the panel.

ArmorView Plus 7 Terminals

This section provides product dimensions for the ArmorView Plus 7 terminals. This terminal provides options for mounting on an arm mount system, a pedestal, or VESA bracket (with the use of an optional VESA kit).

ArmorView Plus 7 Terminals Dimensions with Arm Adapter



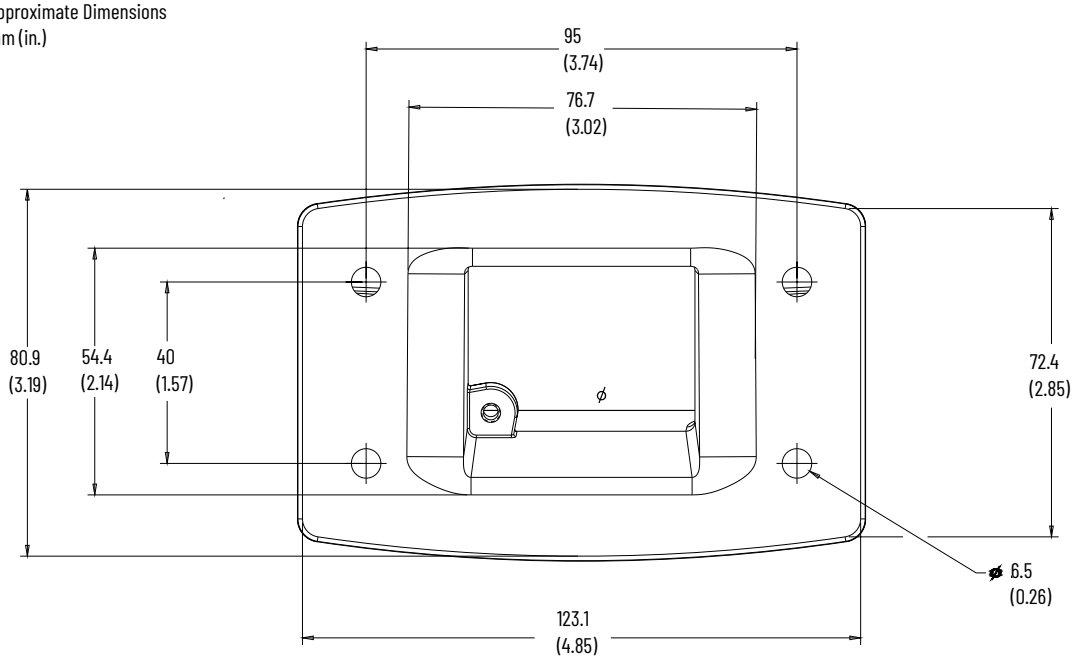
The ArmorView Plus 7 product is designed to be used with couplers that have the same mounting pattern, such as those shown in the table. For information about the dimensions of the arm mount adapter, see Arm Mount Adapter Dimensions on page 12.

	Rittal	Hoffman	Other
Supported Coupling	CP 6501.130 (CP40 120x65) CP 6206.340 (CP60 swivel) CP 6206.360 (CP60 rigid)	S1MFC	Any compatible coupling(1)
Supported Arm Systems	CP40 (steel) CP60 (extruded aluminum)	Syspend 180	
Supported Pedestal Systems	CP 6106.500 with these CP60 couplings: CP 6206.340 CP 6206.360	–	

(1) The arm mount adapter accommodates coupling with four M6 mounting screws 95 mm (3.74 in.) x 40 mm (1.58 in.) with a seal that is contained in 80.9 mm (3.19 in.) x 123.1 mm (4.85 in.). The product will only meet specified NEMA, UL Type, and IEC ratings with user-installed accessories (stack light, buttons, indicators, and so on), if the accessories have equivalent ratings and are installed properly.

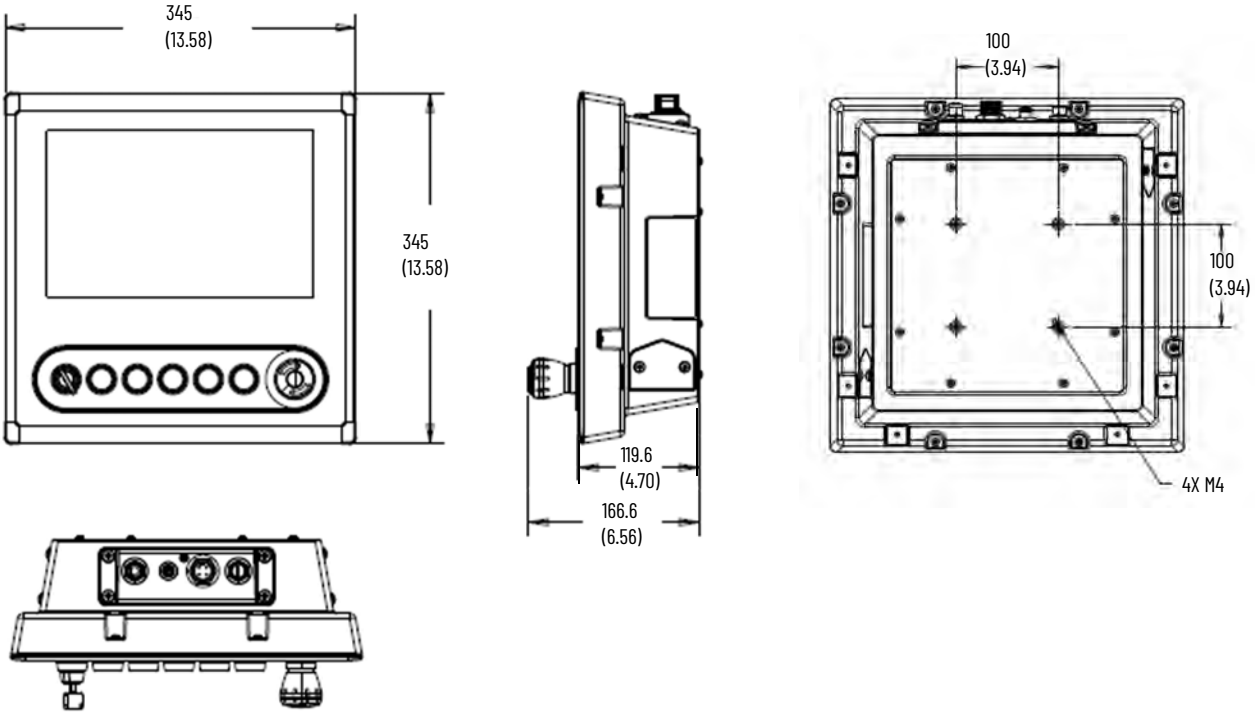
Arm Mount Adapter Dimensions

Approximate Dimensions
mm (in.)



ArmorView Plus 7 Terminals Dimensions with VESA Mount and I/O Plate

Approximate Dimensions
mm (in.)



ArmorView Plus 7 Terminals Dimensions

ArmorView Plus 7 Terminals	Height mm (in.)	Width mm (in.)	Overall Depth without E-stop mm (in.)	Overall Depth with E-stop mm (in.)
With Arm Adapter	381.6 (15.02)	345 (13.58)	119.6 (4.71)	166.6 (6.56)
With VESA Mount and I/O Plate	345 (13.58)	345 (13.58)	119.6 (4.71)	166.6 (6.56)

Accessories

This section describes accessories for the PanelView Plus 7 Performance and ArmorView Plus 7 terminals.

Protective Overlays

Cat. No. (1)	Display Size	Operator Input		Quantity
		Touch	Key and Touch	
2711P-RGT7SP	6.5-in.	•		3
2711P-RGB7P			•	
2711P-RGT9SP	9-in. (wide)	•		
2711P-RGT10SP	10.4-in.	•		
2711P-RGB10P			•	
2711P-RGT12SP(2)	12.1-in. (wide)	•		
2711P-RGT15SP	15-in.	•		
2711P-RGB15P			•	
2711P-RGT19P	19-in.	•		

(1) The use of protective overlays may not be compatible in all hygienic applications. Consult the standards and protocols for your hygienic applications before you use a protective overlay on a stainless-steel terminal.
(2) On ArmorView Plus 7 terminals, the protective overlay covers only the touch screen portion of the product.

Power Supplies and Power Terminal Blocks

Cat. No.	Description	Quantity
1606-XLP95E	DIN rail power supply, 24…28V DC output voltage, 95 W	1
1606-XLP100E	DIN rail power supply, 24…28V DC output voltage, 100 W	1
2711P-RSACDIN	DIN rail power supply, AC-to-DC, 85…265V AC, 47…63 Hz	1
2711P-RTBAP	3-pin AC power terminal block	10
2711P-RTBDSP	3-pin DC power terminal block	10

Mounting Hardware

Cat. No.	Description	Quantity
2711P-RMCP(1)	Replacement mounting levers (black)	16
2711P-RTMC(2)	Replacement mounting clips (only for stainless-steel terminals)	8

(1) Catalog number 2711P-RMCP mounting levers are used with PanelView Plus 7 Performance terminals. Do not use gray mounting levers; they are not compatible with PanelView Plus 7 Performance terminals.
(2) Catalog number 2711P-RTMC mounting clips are used for stainless-steel terminals, catalog numbers 2711P-T9W22D9P-BSHK 2711P-T10C22D9P-BSHK, 2711P-T12W22D9P-BSHK, or 2711P-T15C22D9P-BSHK. **NOTE:** 2711P-T12W22D9P-BSHK requires 10 mounting clips and 2711P-T15C22D9P-BSHK requires 12 mounting clips. If you need more than eight clips, order two 2711P-RTMC mounting clip kits.

Secure Digital (SD) Cards(1)

Cat. No.	Description	Quantity
1784-SD1	1 GB SD card	1
1784-SD2	2 GB SD card	1
1784-SDHC8	8 GB High Capacity SD card	1
1784-SDHC32	32 GB High Capacity SD card	1
2711C-RCSD	USB to SD adapter for SD card	1

(1) To help reduce the chance of corruption when you use SD Cards or USB drives with the terminal, Rockwell Automation recommends that you use only the above SD card catalog numbers.

Battery Replacement

Cat. No.	Description	Quantity
2711P-RY2032	Lithium coin cell battery, CR2032 equivalent	1

IMPORTANT Before you select the appropriate replacement gasket, you must identify the series of your PanelView Plus 7 Performance Stainless Steel terminal. The terminal series information can be found on the product nameplate label.

The gaskets that are listed for use on Series B or Series C terminals are not certified for use on Series A terminals, and the gaskets that are listed for use on Series A terminals are not certified for use on Series B or Series C terminals.

Hygienic Gasket Replacement Kits for Stainless Steel Terminals

Cat. No.	Description[1]	Terminal Series	Quantity
2711P-RGST9W	Hygienic gasket, blue silicone For 9-in. Series A stainless-steel terminals	A	1
2711P-RGST12W	Hygienic gasket, blue silicone For 12-in. Series A stainless-steel terminals	A	1
2711P-RGST9WB	Hygienic gasket, blue, silicone, with ribs For 9-in. Series B and Series C stainless-steel terminals	B or C	1
2711P-RGST12WB	Hygienic gasket, blue, silicone, with ribs For 12-in. Series B and Series C stainless-steel terminals	B or C	1
2711P-RGST10	Hygienic gasket, blue, silicone, with ribs For 10-in. Series C stainless-steel terminals	C	1
2711P-RGST15	Hygienic gasket, blue, silicone, with ribs For 15-in. Series C stainless-steel terminals	C	1

(1) Gasket material is compliant with FDA 21 CFR 177.2600.

VESA Kit for ArmorView Plus 7 Terminals

Cat. No.	Description	Quantity
2711P-RVESA01	VESA access cover, I/O plate fitted with these cables: • Power to terminal • Connection to E-stop button • Ethernet (I/O Plate to Ethernet I/O Module) • Ethernet (I/O Plate to PanelView terminal)[1] • Ground wire • M16 hole plug[2]	1

(1) For units that don't have an Ethernet I/O module and require a DLR connection, you must remove the Ethernet I/O module cable and replace it with the Ethernet I/O module to terminal cable.
(2) For terminals that do not have an E-stop on the I/O plate, you can replace the connector with the M16 hole plug.

Handle Kit for ArmorView Plus 7 Terminals

Cat. No.	Description	Quantity
2711P-RHNDL01[1]	One-handle	1

(1) You can install one, two, or three handles to an ArmorView Plus 7 terminal. Indentations for installing the handle are located opposite the arm mount adapter (or the I/O plate), and on both sides. To install more than one handle, order multiple handle kits.

Stack Light for ArmorView Plus 7 Terminals

Cat. No.	Description	Quantity
854J-BVMC (vertical mount)[1]	Stack light	1

(1) You can install a stack light on either side of an ArmorView Plus 7 terminal. To install two stack lights, order two stack light kits.

Cables for ArmorView Plus 7 Terminals

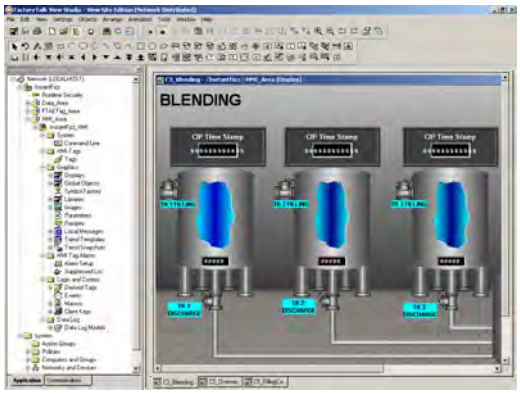
Cat. No.	Description	Quantity
2711P-RIOIN3M	Input point cable for customer-installed switch (3-pin male Pico™ style connector for Ethernet I/O module)	1
2711P-RIOUT3M	Output point cable for customer-installed indicator light (3-pin male Pico style connector for Ethernet I/O module)	1

HMI Software

All PanelView Plus 7 terminals are configured with FactoryTalk View Studio software and have an integrated runtime system called FactoryTalk View Machine Edition Station.

Machine Edition Station runs projects that are developed with FactoryTalk View Studio software and is included on all PanelView Plus 7 terminals.

Two versions of FactoryTalk View Studio software support application development for PanelView Plus 7 terminals.



Cat. No.[1]	Description
9701-VWSTMENE	FactoryTalk View Studio for Machine Edition software - Configuration software for developing and testing machine-level human machine interface (HMI) applications. Includes FactoryTalk Linx and KEPServer Enterprise software.
9701-VWSTENE	FactoryTalk View Studio software - Configuration software for developing and testing machine-level and supervisory-level human machine interface (HMI) applications.

(1) To order localized versions of the software, replace EN in the catalog number with DE for German, FR for French, JP for Japanese, or ZH for Chinese.

You can import PanelView Standard/PanelBuilder® 32 and PanelView applications into FactoryTalk View Studio software as Machine Edition applications by using the Machine Edition Import Wizard. The Import Wizard steps you through a few options such as scaling to a new screen resolution size, and then converts objects, text, tags, and communication configurations to ones that are available in Machine Edition.



FactoryTalk ViewPoint software, an Add-On to FactoryTalk View Studio software, allows plant managers, production supervisors, system integrators, and other key personnel to view and control real-time plant floor operations remotely from a web browser. FactoryTalk ViewPoint enabled displays are fully scalable and animated in the browser. You can also view displays that are not the active display of the terminal from a remote location.

Each PanelView Plus 7 terminal contains one license that supports one client connection to the terminal. No additional software is required.

For a complete list of available HMI software, visit https://www.rockwellautomation.com/en-us/products/software.html#hmi.

Additional Resources

These documents contain more information about related products from Rockwell Automation.

Resource	Description
PanelView Plus 7 Performance Terminals User Manual, publication 2711P-UM008	Provides instructions on how to install, configure, and operate the PanelView Plus 7 Performance terminals.
ArmorView Plus 7 Installation Instructions, publication 2711P-IN013	Provides instructions on how to install the ArmorView Plus 7 components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines on how to install a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications.	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at rok.auto/literature.

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	rok.auto/support
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

Documentation Feedback

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Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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ASIA PACIFIC: Rockwell Automation SEA Pte Ltd, 2 Corporation Road, #04-05, Main Lobby, Corporation Place, Singapore 618494, Tel: (65) 6510 6608
UNITED KINGDOM: Rockwell Automation Ltd., Pitfield, Kiln Farm, Milton Keynes, MK11 3DR, United Kingdom, Tel: (44) (1908) 838-800

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WPE 2.5

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Product image



A protective feed through terminal block is an electrical conductor for the purpose of safety and is used in many applications. To establish the electrical and mechanical connection between copper conductors and the mounting support plate, PE terminal blocks are used. They have one or more contact points for connection with and/or bifurcation of protective earth conductors.

General ordering data

Version	PE terminal, Screw connection, Green/yellow, 2.5 mm², 800 V, Number of connections: 2, Number of levels: 1, TS 35, V-0, Wemid
Order No.	1010000000
Type	WPE 2.5
GTIN (EAN)	4008190143640
Qty.	100 pc(s).

WPE 2.5

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Technical data

Dimensions and weights

Depth	46.5 mm	Depth (inches)	1.831 inch
Depth including DIN rail	47 mm	Height	60 mm
Height (inches)	2.362 inch	Width	5.1 mm
Width (inches)	0.201 inch	Net weight	16.22 g

Temperatures

Storage temperature	-25 °C...55 °C	Operating temperature range	For operating temperature range see EC Design Test Certificate / IEC Ex-Certificate of Conformity
Continuous operating temp., min.	-60 °C	Continuous operating temp., max.	130 °C

Material data

Material	Wemid	Colour	Green/yellow
UL 94 flammability rating	V-0		

Rating data IECEx/ATEX

Certificate No. (ATEX)	DEMKO14ATEX1338U	Certificate No. (IECEX)	IECEXULD14.0005U
Wire cross section max. (ATEX)	2.5 mm²	Wire cross section max. (IECEX)	2.5 mm²
Operating temperature range	For operating temperature range see EC Design Test Certificate / IEC Ex-Certificate of Conformity	Marking EN 60079-7	Ex eb II C Gb
Ex 2014/34/EU label	II 2 G D		

System specifications

Version	Screw connection, With PE connection, One end without connector	End cover plate required	Yes
Number of potentials	1	Number of levels	1
Number of clamping points per level	2	Number of potentials per tier	1
Levels cross-connected internally	No	PE connection	Yes
Rail	TS 35	N-function	No
PE function	Yes	PEN function	No

Additional technical data

Explosion-tested version	Yes	Installation advice	when screwed in
Interlock	for screw fixing	Number of similar terminals	1
Open sides	right	Type of mounting	when screwed in

CSA rating data

Certificate No. (CSA)	200039-1888378	Wire cross section max. (CSA)	12 AWG
Wire cross section min. (CSA)	26 AWG		

Conductors for clamping (additional connection)

Connection type, additional connection	Screw / solder connection

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Technical data

Conductors for clamping (rated connection)

Blade size	0.6 x 3.5 mm	Clamping range, max.	4 mm²
Clamping range, min.	0.05 mm²	Clamping screw	M 2.5
Connection cross-section, stranded, max.	4 mm²	Connection cross-section, stranded, min.	0.5 mm²
Connection direction	top	Gauge to IEC 60947-1	A3
Number of connections	2	Stripping length	10 mm
Tightening torque, max.	0.6 Nm	Tightening torque, min.	0.4 Nm
Torque level with DMS electric screwdriver	1	Type of connection	Screw connection
Wire connection cross section AWG, max.	AWG 12	Wire connection cross section AWG, min.	AWG 30
Wire connection cross section, finely stranded, max.	4 mm²	Wire connection cross section, finely stranded, min.	0.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, max.	2.5 mm²	Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, min.	0.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, max.	2.5 mm²	Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, min.	0.5 mm²
Wire connection cross-section, solid core, max.	4 mm²	Wire connection cross-section, solid core, min.	0.5 mm²

Dimensions

TS 35 offset	32 mm

General

Installation advice	when screwed in	Rail	TS 35
Standards	IEC 60947-7-2	Wire connection cross section AWG, max.	AWG 12
Wire connection cross section AWG, min.	AWG 30		

PE rating data

Rated short-time current	300 A (2.5 mm²)	Centre screw on PE terminals	M 2.5
Tightening torque range for fixing screw	0.4...0.8 Nm	PEN function	No

Rating data

Rated cross-section	2.5 mm²	Rated voltage to adjoining terminal	800 V
Rated DC voltage	800 V	Standards	IEC 60947-7-2
Volume resistance according to IEC 60947-7-x	1.33 mΩ	Rated impulse withstand voltage to adjacent terminal	8 kV
Power loss in accordance with IEC 60947-7-x	0.77 W	Pollution severity	3

UL rating data

Certificate No. (UR)	E60693	Conductor size Factory wiring max. (UR)	12 AWG
Conductor size Factory wiring min. (UR)	26 AWG	Conductor size Field wiring max. (UR)	12 AWG
Conductor size Field wiring min. (UR)	22 AWG		

WPE 2.5

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Technical data

Classifications

ETIM 6.0	EC000901	ETIM 7.0	EC000901
ETIM 8.0	EC000901	ETIM 9.0	EC000901
ECLASS 9.0	27-14-11-41	ECLASS 9.1	27-14-11-41
ECLASS 10.0	27-14-11-41	ECLASS 11.0	27-14-11-41
ECLASS 12.0	27-14-11-41	ECLASS 13.0	27-25-01-03
ECLASS 14.0	27-25-01-03		

Environmental Product Compliance

RoHS Compliance Status	Compliant without exemption
REACH SVHC	No SVHC above 0.1 wt%

Approvals

Approvals	
ROHS	Conform
UL File Number Search	UL Website
Certificate No. (UR)	E60693
Certificate No. (cURusEX)	E184763

Downloads

Approval/Certificate/Document of Conformity	Attestation of Conformity IECEx Certificate UKCA Ex Attestation of Conformity CB Test Certificate CB Certificate Lloyds Register Certificate POLSKIREJ certificate UKCA Ex Certificate 16-AV4BO-0265U. DNV Certificate CCC Ex Certificate CE Declaration of Conformity ATEX Certificate UKCA declaration of conformity Confirmation of Standards EN 45545-2_2020-10
Engineering Data	CAD data – STEP
User Documentation	NTI WDU/WPE 2.5.pdf Beipackzettel_WPE_2.5.pdf StorageConditionsTerminalBlocks
Catalogues	Catalogues in PDF-format
Brochures	

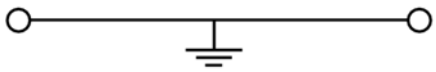
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WPE 2.5

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Drawings



WDU 2.5

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Product image



To feed through power, signal, and data is the classical requirement in electrical engineering and panel building. The insulating material, the connection system and the design of the terminal blocks are the differentiating features. A feed-through terminal block is suitable for joining and/or connecting one or more conductors. They could have one or more connection levels that are on the same potential or insulated against one another.

General ordering data

Version	Feed-through terminal block, Screw connection, dark beige, 2.5 mm², 24 A, 800 V, Number of connections: 2
Order No.	1020000000
Type	WDU 2.5
GTIN (EAN)	4008190099633
Qty.	100 pc(s).

WDU 2.5

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
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Germany

www.weidmueller.com

Technical data

Dimensions and weights

Depth	46.5 mm	Depth (inches)	1.831 inch
Height	60 mm	Height (inches)	2.362 inch
Width	5.1 mm	Width (inches)	0.201 inch
Net weight	7.59 g		

Temperatures

Storage temperature	-25 °C...55 °C	Operating temperature range	For operating temperature range see EC Design Test Certificate / IEC Ex-Certificate of Conformity
Continuous operating temp., min.	-60 °C	Continuous operating temp., max.	130 °C

Material data

Material	Wemid	Colour	dark beige
UL 94 flammability rating	V-0		

Rating data IECEx/ATEX

Certificate No. (ATEX)	DEMKO14ATEX1338U	Certificate No. (IECEX)	IECEXULD14.0005U
Max. voltage (ATEX)	690 V	Current (ATEX)	24 A
Wire cross section max. (ATEX)	2.5 mm²	Max. voltage (IECEX)	690 V
Current (IECEX)	24 A	Wire cross section max. (IECEX)	2.5 mm²
Operating temperature range	For operating temperature range see EC Design Test Certificate / IEC Ex-Certificate of Conformity	Marking EN 60079-7	Ex eb II C Gb
Ex 2014/34/EU label	II 2 G D		

System specifications

Version	Screw connection, for plug-in cross-connector, for screwable cross-connection, One end without connector	End cover plate required	Yes
Number of potentials	1	Number of levels	1
Number of clamping points per level	2	Number of potentials per tier	1
Levels cross-connected internally	No	PE connection	No
Rail	TS 35	N-function	No
PE function	No	PEN function	No

2 clampable conductors (H05V/H07V) with equal cross-section (rated connection)

Cross-section for connected wire, solid, two clampable wires, max.	1.5 mm²	Cross-section for connected wire, solid, two clampable wires, min.	0.5 mm²
Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, max.	1.5 mm²	Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, min.	0.5 mm²
Wire connection cross section, finely stranded, two clampable wires, min.	0.5 mm²	Wire cross-section, finely stranded, two clampable wires, max.	1.5 mm²

Additional technical data

Explosion-tested version	Yes	Number of similar terminals	1
Open sides	right	Type of mounting	Snap-on

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WDU 2.5

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Technical data

CSA rating data

Certificate No. (CSA)	200039-1057876	Current size C (CSA)	20 A
Voltage size C (CSA)	600 V	Wire cross section max. (CSA)	12 AWG
Wire cross section min. (CSA)	26 AWG		

Conductors for clamping (additional connection)

Connection type, additional connection	Screw connection

Conductors for clamping (rated connection)

Blade size	0.6 x 3.5 mm			
Clampable conductor	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	solid, H05(07) V-U	
		min.	0.5 mm²	
		max.	4 mm²	
		nominal	2.5 mm²	
	wire end ferrule	Stripping length	min.	10 mm
			max.	10 mm
			nominal	10 mm
		Tightening torque	min.	0.4 Nm
			max.	0.8 Nm
		Recommended wire-end ferrule		
	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	stranded, H07V-R	
		min.	1.5 mm²	
		max.	4 mm²	
		nominal	2.5 mm²	
	wire end ferrule	Stripping length	min.	10 mm
			max.	10 mm
			nominal	10 mm
		Tightening torque	min.	0.4 Nm
			max.	0.8 Nm
		Recommended wire-end ferrule		
	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	flexible, H05(07) V-K	
		min.	0.5 mm²	
		max.	2.5 mm²	
		nominal	2.5 mm²	
	wire end ferrule	Stripping length	min.	10 mm
			max.	10 mm
			nominal	10 mm
		Tightening torque	min.	0.4 Nm
			max.	0.8 Nm
		Recommended wire-end ferrule		
Clamping range, max.	4 mm²			
Clamping range, min.	0.05 mm²			
Clamping screw	M 2.5			
Connection cross-section, stranded, max.	4 mm²			
Connection cross-section, stranded, min.	0.5 mm²			
Connection direction	on side			
Gauge to IEC 60947-1	A3			

WDU 2.5

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Technical data

Number of connections	2
Stripping length	10 mm
Tightening torque, max.	0.8 Nm
Tightening torque, min.	0.4 Nm
Torque level with DMS electric screwdriver	1
Twin wire-end ferrules, max.	1.5 mm²
Twin wire-end ferrules, min.	0.5 mm²
Type of connection	Screw connection
Wire connection cross section AWG, max.	AWG 12
Wire connection cross section AWG, min.	AWG 30
Wire connection cross section, finely stranded, max.	4 mm²
Wire connection cross section, finely stranded, min.	0.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, max.	2.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, min.	0.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, max.	2.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, min.	0.5 mm²
Wire connection cross-section, solid core, max.	4 mm²
Wire connection cross-section, solid core, min.	0.5 mm²

General

Rail	TS 35	Standards	IEC 60947-7-1
Wire connection cross section AWG, max.	AWG 12	Wire connection cross section AWG, min.	AWG 30

Rating data

Rated cross-section	2.5 mm²	Rated voltage	800 V
Rated DC voltage	800 V	Rated current	24 A
Current at maximum wires	32 A	Standards	IEC 60947-7-1
Volume resistance according to IEC 60947-7-x	1.33 mΩ	Rated impulse withstand voltage	8 kV
Power loss in accordance with IEC 60947-7-x	0.77 W	Pollution severity	3

UL rating data

Certificate No. (UR)	E60693	Conductor size Factory wiring max. (UR)	12 AWG
Conductor size Factory wiring min. (UR)	30 AWG	Conductor size Field wiring max. (UR)	12 AWG
Conductor size Field wiring min. (UR)	28 AWG	Current size B (UR)	25 A
Current size C (UR)	25 A	Voltage size B (UR)	600 V
Voltage size C (UR)	600 V		

WDU 2.5

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Technical data

Classifications

ETIM 6.0	EC000897	ETIM 7.0	EC000897
ETIM 8.0	EC000897	ETIM 9.0	EC000897
ECLASS 9.0	27-14-11-20	ECLASS 9.1	27-14-11-20
ECLASS 10.0	27-14-11-20	ECLASS 11.0	27-14-11-20
ECLASS 12.0	27-14-11-20	ECLASS 13.0	27-25-01-01
ECLASS 14.0	27-25-01-01		

Environmental Product Compliance

RoHS Compliance Status	Compliant without exemption
REACH SVHC	No SVHC above 0.1 wt%

Approvals

Approvals	
ROHS	Conform
UL File Number Search	UL Website
Certificate No. (UR)	E60693
Certificate No. (cURusEX)	E184763

Downloads

Approval/Certificate/Document of Conformity	Attestation of Conformity IECEx Certificate UKCA Ex Attestation of Conformity CB Testreport CB Certificate NEMKO certificate Lloyds Register Certificate POLSKIREJ certificate UKCA Ex Certificate 16-AV4BO-0265U. DNV Certificate CCC Ex Certificate CE Declaration of Conformity ATEX Certificate UKCA declaration of conformity Confirmation of Standards EN 45545-2_2020-10
Engineering Data	CAD data – STEP
User Documentation	NTI WDU/WPE 2.5.pdf StorageConditionsTerminalBlocks
Catalogues	Catalogues in PDF-format
Brochures	

Creation date March 12, 2025 11:06:31 AM CET

WDU 2.5

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Drawings



WDU 6

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www.weidmueller.com

Product image



To feed through power, signal, and data is the classical requirement in electrical engineering and panel building. The insulating material, the connection system and the design of the terminal blocks are the differentiating features. A feed-through terminal block is suitable for joining and/or connecting one or more conductors. They could have one or more connection levels that are on the same potential or insulated against one another.

General ordering data

Version	Feed-through terminal block, Screw connection, dark beige, 6 mm², 41 A, 800 V, Number of connections: 2
Order No.	1020200000
Type	WDU 6
GTIN (EAN)	4008190163440
Qty.	100 pc(s).

WDU 6

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Technical data

Dimensions and weights

Depth	46.5 mm	Depth (inches)	1.831 inch
Depth including DIN rail	47 mm	Height	60 mm
Height (inches)	2.362 inch	Width	7.9 mm
Width (inches)	0.311 inch	Net weight	12.75 g

Temperatures

Storage temperature	-25 °C...55 °C	Operating temperature range	For operating temperature range see EC Design Test Certificate / IEC Ex-Certificate of Conformity
Continuous operating temp., min.	-60 °C	Continuous operating temp., max.	130 °C

Material data

Material	Wemid	Colour	dark beige
UL 94 flammability rating	V-0		

Rating data IECEx/ATEX

Certificate No. (ATEX)	DEMKO14ATEX1338U	Certificate No. (IECEX)	IECEXULD14.0005U
Max. voltage (ATEX)	690 V	Current (ATEX)	41 A
Wire cross section max. (ATEX)	10 mm²	Max. voltage (IECEX)	690 V
Current (IECEX)	41 A	Wire cross section max. (IECEX)	10 mm²
Operating temperature range	For operating temperature range see EC Design Test Certificate / IEC Ex-Certificate of Conformity	Marking EN 60079-7	Ex eb II C Gb
Ex 2014/34/EU label	II 2 G D		

System specifications

Version	Screw connection, for screwable cross-connection, One end without connector	End cover plate required	Yes
Number of potentials	1	Number of levels	1
Number of clamping points per level	2	Number of potentials per tier	1
Levels cross-connected internally	No	PE connection	No
Rail	TS 35	N-function	No
PE function	No	PEN function	No

2 clampable conductors (H05V/H07V) with equal cross-section (rated connection)

Cross-section for connected wire, solid, two clampable wires, max.	2.5 mm²	Cross-section for connected wire, solid, two clampable wires, min.	0.5 mm²
Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, max.	2.5 mm²	Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, min.	0.5 mm²
Wire connection cross section, finely stranded, two clampable wires, min.	0.5 mm²	Wire cross-section, finely stranded, two clampable wires, max.	2.5 mm²

Additional technical data

Explosion-tested version	Yes	Number of similar terminals	1
Open sides	right	Type of mounting	Snap-on

Creation date March 12, 2025 9:40:05 AM CET

WDU 6

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

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Technical data

CSA rating data

Certificate No. (CSA)	200039-1057876	Current size C (CSA)	50 A
Voltage size C (CSA)	600 V	Wire cross section max. (CSA)	8 AWG
Wire cross section min. (CSA)	22 AWG		

Conductors for clamping (additional connection)

Connection type, additional connection	Screw connection

Conductors for clamping (rated connection)

Blade size	0.8 x 4.0 mm			
Clampable conductor	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	solid, H05(07) V-U	
		min.	0.5 mm²	
		max.	10 mm²	
		nominal	6 mm²	
	wire end ferrule	Stripping length	min.	12 mm
			max.	12 mm
			nominal	12 mm
		Tightening torque	min.	0.8 Nm
			max.	1.6 Nm
		Recommended wire-end ferrule		
	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	stranded, H07V-R	
		min.	1.5 mm²	
		max.	10 mm²	
		nominal	6 mm²	
	wire end ferrule	Stripping length	min.	12 mm
			max.	12 mm
			nominal	12 mm
		Tightening torque	min.	0.8 Nm
			max.	1.6 Nm
		Recommended wire-end ferrule		
	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	flexible, H05(07) V-K	
		min.	0.5 mm²	
		max.	10 mm²	
		nominal	6 mm²	
	wire end ferrule	Stripping length	min.	12 mm
			max.	12 mm
			nominal	12 mm
		Tightening torque	min.	0.8 Nm
			max.	1.6 Nm
		Recommended wire-end ferrule		
Clamping range, max.	10 mm²			
Clamping range, min.	0.22 mm²			
Clamping screw	M 3.5			
Connection cross-section, stranded, max.	10 mm²			
Connection cross-section, stranded, min.	1.5 mm²			
Connection direction	on side			
Gauge to IEC 60947-1	A5			

WDU 6

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Technical data

Number of connections	2
Stripping length	12 mm
Tightening torque, max.	1.6 Nm
Tightening torque, min.	0.8 Nm
Torque level with DMS electric screwdriver	3
Twin wire-end ferrules, max.	4 mm²
Twin wire-end ferrules, min.	0.5 mm²
Type of connection	Screw connection
Wire connection cross section AWG, max.	AWG 8
Wire connection cross section AWG, min.	AWG 26
Wire connection cross section, finely stranded, max.	10 mm²
Wire connection cross section, finely stranded, min.	0.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, max.	6 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, min.	0.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, max.	6 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, min.	0.5 mm²
Wire connection cross-section, solid core, max.	10 mm²
Wire connection cross-section, solid core, min.	0.5 mm²

General

Rail	TS 35	Standards	IEC 60947-7-1
Wire connection cross section AWG, max.	AWG 8	Wire connection cross section AWG, min.	AWG 26

Rating data

Rated cross-section	6 mm²	Rated voltage	800 V
Rated DC voltage	800 V	Rated current	41 A
Current at maximum wires	57 A	Standards	IEC 60947-7-1
Volume resistance according to IEC 60947-7-x	0.78 mΩ	Rated impulse withstand voltage	8 kV
Power loss in accordance with IEC 60947-7-x	1.31 W	Pollution severity	3

UL rating data

Certificate No. (UR)	E60693	Conductor size Factory wiring max. (UR)	8 AWG
Conductor size Factory wiring min. (UR)	22 AWG	Conductor size Field wiring max. (UR)	8 AWG
Conductor size Field wiring min. (UR)	22 AWG	Current size C (UR)	50 A
Voltage size C (UR)	600 V		

WDU 6

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

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Technical data

Classifications

ETIM 6.0	EC000897	ETIM 7.0	EC000897
ETIM 8.0	EC000897	ETIM 9.0	EC000897
ECLASS 9.0	27-14-11-20	ECLASS 9.1	27-14-11-20
ECLASS 10.0	27-14-11-20	ECLASS 11.0	27-14-11-20
ECLASS 12.0	27-14-11-20	ECLASS 13.0	27-25-01-01
ECLASS 14.0	27-25-01-01		

Environmental Product Compliance

RoHS Compliance Status	Compliant without exemption
REACH SVHC	No SVHC above 0.1 wt%

Approvals

Approvals	
ROHS	Conform
UL File Number Search	UL Website
Certificate No. (UR)	E60693
Certificate No. (cURusEX)	E184763

Downloads

Approval/Certificate/Document of Conformity	Attestation of Conformity IECEx Certificate UKCA Ex Attestation of Conformity CB Testreport CB Certificate NEMKO certificate Lloyds Register Certificate POLSKIREJ certificate UKCA Ex Certificate 16-AV4BO-0265U. DNV Certificate CCC Ex Certificate CE Declaration of Conformity ATEX Certificate UKCA declaration of conformity Confirmation of Standards EN 45545-2_2020-10
Engineering Data	CAD data – STEP
User Documentation	NTI WDU/WPE 6 StorageConditionsTerminalBlocks
Catalogues	Catalogues in PDF-format
Brochures	

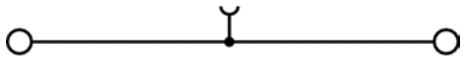
Creation date March 12, 2025 9:40:05 AM CET

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Drawings



TRS 24VDC 1CO

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Product image





- 1 CO contact
- Contact material: AgNi
- Unique multi-voltage input from 24 to 230 V UC
- Input voltages from 5 V DC to 230 V UC with coloured marking: AC: red, DC: blue, UC: white

General ordering data

Version	TERMSERIES, Relay module, Number of contacts: 1, CO contact AgNi, Rated control voltage: 24 V DC ±20 %, Continuous current: 6 A, Screw connection, Test button available: No
Order No.	1122770000
Type	TRS 24VDC 1CO
GTIN (EAN)	4032248904808
Qty.	10 pc(s).

TRS 24VDC 1CO

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Technical data

Dimensions and weights

Depth	87.8 mm	Depth (inches)	3.457 inch
Height	89.6 mm	Height (inches)	3.528 inch
Width	6.4 mm	Width (inches)	0.252 inch
Net weight	33 g		

Temperatures

Storage temperature	-40 °C...85 °C	Operating temperature	-40 °C...60 °C
Humidity	5-95% relative humidity, T_u = 40°C, without condensation		

Rated data UL

Ambient temperature (operational), max.	60 °C	Connection cross-section AWG, min.	AWG 26
Connection cross-section AWG, max.	AWG 14	Type of conductor	rigid copper conductor, flexible copper conductor
Tightening torque, max.	0.4 Nm	Pollution severity level	2

Control side

Rated control voltage	24 V DC ±20 %	Rated current DC	11.5 mA
Power rating	280 mW	Status indicator	Green LED
Protective circuit	Free-wheeling diode, Reverse polarity protection	Coil voltage of the replacement relay deviating from the rated control voltage	No
Coil voltage of the replacement relay	24 V DC		

Load side

Rated switching voltage	250 V AC	Continuous current	6 A
Max. switching frequency at rated load	0.1 Hz	Max. switching voltage, AC	250 V
Max. switching voltage, DC	250 V	Inrush current	20 A / 20 ms
AC switching capacity (resistive), max.	1500 VA	DC switching capacity (resistive), max.	144 W @ 24 V
Switch-on delay	≤ 6 ms	Switch-off delay	≤ 16 ms
Contact type	1 CO contact (AgNi)	Mechanical service life	5 x 10^6 switching cycles
Min. switching power	1 mA @ 24 V, 10 mA @ 12 V, 100 mA @ 5 V		

General data

Operating altitude	≤ 2000 m, above sea level	
Rail	TS 35	
Test button available	No	
Mechanical switch position indicator	No	
Colour	black	
UL94 flammability rating component	Component	Housing
	UL94 flammability rating	V-0
	Component	Retaining clip
	UL94 flammability rating	V-0

TRS 24VDC 1CO

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
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Technical data

Insulation coordination

Rated voltage	300 V	Pollution severity	2
Surge voltage category	III	Clearance and creepage distances for control side - load side	≥ 6 mm
Dielectric strength for control side - load side	4 kV_{eff} / 1 Min.	Type of isolation at input and output	reinforced insulation
Dielectric strength of open contact	1 kV_{eff} / 1 min	Dielectric strength to mounting rail	4 kV_{eff} / 1 Min.
Impulse withstand voltage	6 kV (1.2/50 µs)	Protection degree	IP20

Further details of approvals / standards

Certificate No. (DNV)	TAA00001E5	Certificate no. (cULus)	E141197

Connection data

Wire connection method	Screw connection	Stripping length, rated connection	8 mm
Tightening torque, max.	0.4 Nm	Clamping range, rated connection	1.5 mm²
Clamping range, min.	0.14 mm²	Clamping range, max.	2.5 mm²
Wire connection cross section AWG, min.	AWG 26	Wire connection cross section AWG, max.	AWG 14
Wire cross-section, solid, min.	0.14 mm²	Wire cross-section, solid, max.	2.5 mm²
Wire cross-section, solid, min. (AWG)	AWG 26	Wire cross-section, solid, max. (AWG)	AWG 14
Wire connection cross section, finely stranded, min.	0.14 mm²	Wire connection cross section, finely stranded, max.	2.5 mm²
Wire cross-section, finely stranded, min. (AWG)	AWG 26	Wire cross-section, finely stranded, max. (AWG)	AWG 16
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, min.	0.25 mm²	Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, max.	2.5 mm²
Conductor cross-section, flexible, AEH (DIN 46228-1), min.	0.25 mm²	Conductor cross-section, flexible, AEH (DIN 46228-1), max.	1.5 mm²
Wire connection cross section, finely stranded, two clampable wires, min.	0.5 mm²	Wire cross-section, finely stranded, two clampable wires, max.	1 mm²
Blade size	SD 0.6 x 3.5		

Classifications

ETIM 6.0	EC001437	ETIM 7.0	EC001437
ETIM 8.0	EC001437	ETIM 9.0	EC001437
ECLASS 9.0	27-37-16-01	ECLASS 9.1	27-37-16-01
ECLASS 10.0	27-37-16-01	ECLASS 11.0	27-37-16-01
ECLASS 12.0	27-37-16-01	ECLASS 13.0	27-37-16-01
ECLASS 14.0	27-37-16-01		

Environmental Product Compliance

RoHS Compliance Status	Compliant with exemption
RoHS Exemption (if applicable/known)	7a, 7cI
REACH SVHC	Lead 7439-92-1
SCIP	9e2cbc49-76d9-4611-b8ec-5b4f549a0aa9

TRS 24VDC 1CO

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Technical data

Approvals

Approvals	
ROHS	Conform
UL File Number Search	UL Website
Certificate no. (cULus)	E141197

Downloads

Approval/Certificate/Document of Conformity	EU Konformitätserklärung / EU Declaration of Conformity
Engineering Data	CAD data – STEP
User Documentation	Beipackzettel / Package Insert – multilingual FL_TERMSERIES_RSS1COAgNi_LOAD_GUIDE
Catalogues	Catalogues in PDF-format
Brochures	

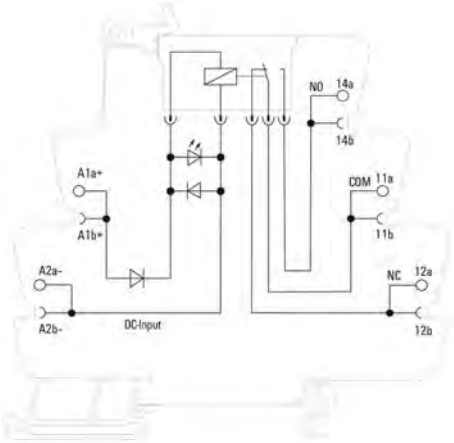
TRS 24VDC 1CO

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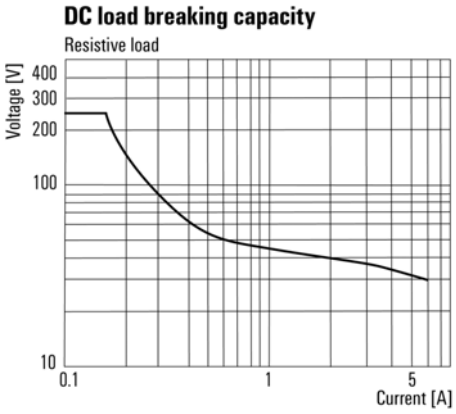
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Drawings

Wiring diagram

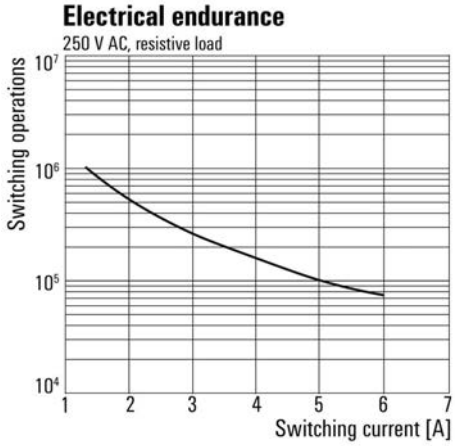


Graph



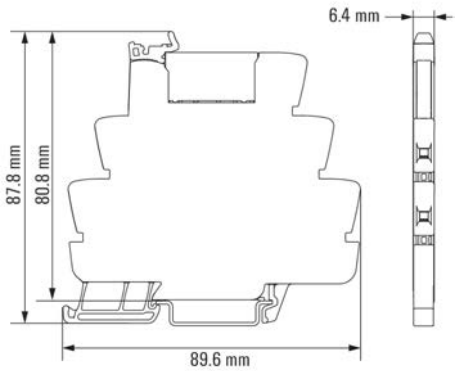
DC load limit curve
Resistive load

Graph



Electrical service life230 V AC resistive load
230 V AC resistive load

Dimensional drawing



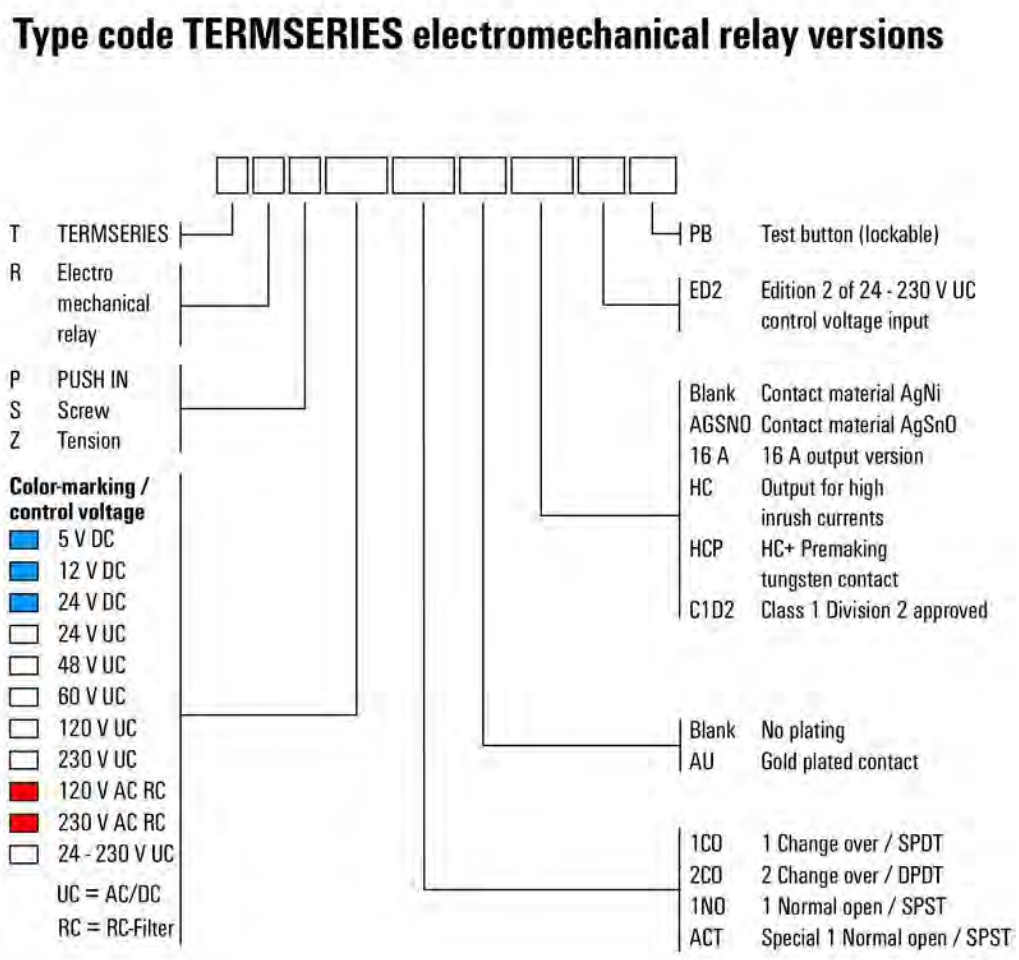
TRS 24VDC 1CO

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Drawings

Miscellaneous



Type codes

WTR 2.5/SI LD 36V

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

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Product image



In some applications it is useful to protect the feed through connection with a separate fuse. Fuse terminal blocks are made up of one terminal block bottom section with a fuse insertion carrier. The fuses vary from pivoting fuse levers and pluggable fuse holders to screwable closures and flat plug-in fuses.

General ordering data

Version	Fuse terminal, Screw connection, dark beige, 2.5 mm², 6.3 A, 36 V, Number of connections: 2, Number of levels: 1, TS 35
Order No.	1763950000
Type	WTR 2.5/SI LD 36V
GTIN (EAN)	4032248107742
Qty.	25 pc(s).

WTR 2.5/SI LD 36V

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Technical data

Dimensions and weights

Depth	97 mm	Depth (inches)	3.819 inch
Height	60 mm	Height (inches)	2.362 inch
Width	5.1 mm	Width (inches)	0.201 inch
Net weight	15.12 g		

Temperatures

Storage temperature	-25 °C...55 °C	Continuous operating temp., min.	-50 °C
Continuous operating temp., max.	120 °C		

Material data

Material	Wemid	Colour	dark beige
UL 94 flammability rating	V-0		

System specifications

Version	Screw connection, Fuse isolator, with LED, for plug-in cross-connector, One end without connector	End cover plate required	Yes
Number of potentials	1	Number of levels	1
Number of clamping points per level	2	Number of potentials per tier	1
Levels cross-connected internally	No	PE connection	No
Rail	TS 35	N-function	No
PE function	No	PEN function	No

2 clampable conductors (H05V/H07V) with equal cross-section (rated connection)

Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, max.	1.5 mm²	Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, min.	0.5 mm²
Wire connection cross section, finely stranded, two clampable wires, min.	0.5 mm²	Wire cross-section, finely stranded, two clampable wires, max.	1.5 mm²

Additional technical data

Explosion-tested version	No	Number of similar terminals	1
Open sides	right	Type of mounting	Snap-on

CSA rating data

Certificate No. (CSA)	154685-1152890	Wire cross section max. (CSA)	12 AWG
Wire cross section min. (CSA)	26 AWG		

Conductors for clamping (additional connection)

Conductor cross-section, flexible plus plastic collar DIN 46228/1, further connection, max.	2.5 mm²	Connection type, additional connection	Screw connection

Conductors for clamping (rated connection)

Blade size	0.6 x 3.5 mm

WTR 2.5/SI LD 36V

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Technical data

Clampable conductor	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	solid, H05(07) V-U	
		min.	0.5 mm²	
		max.	4 mm²	
		nominal	2.5 mm²	
	wire end ferrule	Stripping length	min.	10 mm
			max.	10 mm
			nominal	10 mm
		Tightening torque	min.	0.4 Nm
			max.	0.8 Nm
		Recommended wire-end ferrule		
	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	stranded, H07V-R	
		min.	1.5 mm²	
		max.	4 mm²	
		nominal	2.5 mm²	
	wire end ferrule	Stripping length	min.	10 mm
			max.	10 mm
			nominal	10 mm
		Tightening torque	min.	0.4 Nm
			max.	0.8 Nm
		Recommended wire-end ferrule		
	Connection specification	Screw connection		
	Cross-section for conductor connection	Type	flexible, H05(07) V-K	
		min.	0.5 mm²	
		max.	4 mm²	
		nominal	2.5 mm²	
	wire end ferrule	Stripping length	min.	10 mm
			max.	10 mm
			nominal	10 mm
		Tightening torque	min.	0.4 Nm
			max.	0.8 Nm
		Recommended wire-end ferrule		

Clamping range, max.	4 mm²
Clamping range, min.	0.05 mm²
Clamping screw	M 2.5
Connection cross-section, stranded, max.	4 mm²
Connection cross-section, stranded, min.	1.5 mm²
Connection direction	on side
Gauge to IEC 60947-1	A3
Number of connections	2
Stripping length	10 mm
Tightening torque, max.	0.8 Nm
Tightening torque, min.	0.4 Nm
Torque level with DMS electric screwdriver	1
Type of connection	Screw connection
Type of connection 2	Screw connection
Wire connection cross section AWG, max.	AWG 12
Wire connection cross section AWG, min.	AWG 26
Wire connection cross section, finely stranded, max.	4 mm²

WTR 2.5/SI LD 36V

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

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Technical data

Wire connection cross section, finely stranded, min.	0.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, max.	2.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, min.	0.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, max.	2.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, min.	0.5 mm²
Wire connection cross-section, solid core, max.	4 mm²
Wire connection cross-section, solid core, min.	0.5 mm²

Display element

Type of voltage for indicator	AC/DC

Fuse terminals

Cartridge fuse	G-Si. 5 x 20	Display	Red LED
Fuse holder (cartridge holder)	pluggable	Operating voltage, max.	36 V
Type of voltage for indicator	AC/DC		

General

Rail	TS 35	Standards	IEC 60947-7-3
Wire connection cross section AWG, max.	AWG 12	Wire connection cross section AWG, min.	AWG 26

Rating data

Rated cross-section	2.5 mm²	Rated voltage	36 V
Rated voltage to adjoining terminal	400 V	Rated DC voltage	36 V
Rated current	6.3 A	Current at maximum wires	6.3 A
Standards	IEC 60947-7-3	Volume resistance according to IEC 60947-7-x	1.33 mΩ
Rated impulse withstand voltage	6 kV	Power loss in accordance with IEC 60947-7-x	0.77 W
Pollution severity	3		

UL rating data

Certificate No. (UR)	E60693	Conductor size Factory wiring max. (UR)	12 AWG
Conductor size Factory wiring min. (UR)	22 AWG	Conductor size Field wiring max. (UR)	12 AWG
Conductor size Field wiring min. (UR)	22 AWG		

WTR 2.5/SI LD 36V

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Technical data

Classifications

ETIM 6.0	EC000899	ETIM 7.0	EC000899
ETIM 8.0	EC000899	ETIM 9.0	EC000899
ECLASS 9.0	27-14-11-16	ECLASS 9.1	27-14-11-16
ECLASS 10.0	27-14-11-16	ECLASS 11.0	27-14-11-16
ECLASS 12.0	27-14-11-16	ECLASS 13.0	27-25-01-13
ECLASS 14.0	27-25-01-13		

Environmental Product Compliance

RoHS Compliance Status	Compliant with exemption
RoHS Exemption (if applicable/known)	7cl
REACH SVHC	No SVHC above 0.1 wt%

Important note

Product information	The voltage depends on the selected fuse element or the selected indicator light

Approvals

Approvals

ROHS	Conform
UL File Number Search	UL Website
Certificate No. (UR)	E60693

Downloads

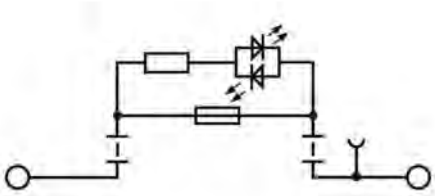
Approval/Certificate/Document of Conformity	CB Testreport CB Certificate CB Test certificate CE Declaration of Conformity UKCA declaration of conformity
Engineering Data	CAD data – STEP
User Documentation	StorageConditionsTerminalBlocks Instruction sheet
Catalogues	Catalogues in PDF-format
Brochures	

WTR 2.5/SI LD 36V

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Drawings



WTR 2.5

Weidmüller Interface GmbH & Co. KG
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www.weidmueller.com

Product image



In some applications it makes sense to add a test point or a disconnect element to the feed through terminal for testing and safety purposes. With test disconnect terminals you measure electric circuits in the absence of voltage. While the disconnecting points clearance and creepage distance is not assessed in dimensional terms, the specified rated impulse voltage strength must be proven.

General ordering data

Version	Test-disconnect terminal, Screw connection, dark beige, 2.5 mm², 24 A, 500 V, Number of connections: 2, Number of levels: 1
Order No.	1855610000
Type	WTR 2.5
GTIN (EAN)	4032248458417
Qty.	100 pc(s).

WTR 2.5

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Technical data

Dimensions and weights

Depth	48 mm	Depth (inches)	1.89 inch
Depth including DIN rail	49 mm	Height	60 mm
Height (inches)	2.362 inch	Width	5.1 mm
Width (inches)	0.201 inch	Net weight	8.01 g

Temperatures

Storage temperature	-25 °C...55 °C	Continuous operating temp., min.	-50 °C
Continuous operating temp., max.	120 °C		

Material data

Material	Wemid	Colour	dark beige
UL 94 flammability rating	V-0		

Rating data IECEx/ATEX

Certificate No. (ATEX)	DEMKO14ATEX1389U	Certificate No. (IECEX)	IECExUL14.0097U
Max. voltage (ATEX)	500 V	Current (ATEX)	21 A
Wire cross section max. (ATEX)	2.5 mm²	Max. voltage (IECEX)	500 V
Current (IECEX)	21 A	Wire cross section max. (IECEX)	2.5 mm²
Marking EN 60079-7	Ex ec II C Gc	Ex 2014/34/EU label	II 3 G D

System specifications

Version	Screw connection, Spacer, for plug-in cross-connector, One end without connector	End cover plate required	Yes
Number of potentials	1	Number of levels	1
Number of clamping points per level	2	Number of potentials per tier	1
Levels cross-connected internally	No	PE connection	No
Rail	TS 35	N-function	No
PE function	No	PEN function	No

2 clampable conductors (H05V/H07V) with equal cross-section (rated connection)

Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, max.	1.5 mm²	Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, min.	0.5 mm²
Wire connection cross section, finely stranded, two clampable wires, min.	0.5 mm²	Wire cross-section, finely stranded, two clampable wires, max.	1.5 mm²

Additional technical data

Explosion-tested version	No	Open sides	right
Type of mounting	Snap-on		

CSA rating data

Certificate No. (CSA)	154685-1152890	Current size C (CSA)	10 A
Voltage size C (CSA)	300 V	Wire cross section max. (CSA)	12 AWG
Wire cross section min. (CSA)	26 AWG		

WTR 2.5

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Technical data

Conductors for clamping (additional connection)

Connection type, additional connection	Screw connection

Conductors for clamping (rated connection)

Blade size	0.6 x 3.5 mm	Clamping range, max.	4 mm²
Clamping range, min.	0.05 mm²	Clamping screw	M 2.5
Connection cross-section, stranded, max.	4 mm²	Connection cross-section, stranded, min.	1.5 mm²
Connection direction	on side	Gauge to IEC 60947-1	A3
Number of connections	2	Stripping length	10 mm
Tightening torque, max.	0.8 Nm	Tightening torque, min.	0.4 Nm
Torque level with DMS electric screwdriver	1	Type of connection	Screw connection
Type of connection 2	Screw connection	Wire connection cross section AWG, max.	AWG 12
Wire connection cross section AWG, min.	AWG 30	Wire connection cross section, finely stranded, max.	4 mm²
Wire connection cross section, finely stranded, min.	0.5 mm²	Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, max.	2.5 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, min.	0.5 mm²	Wire connection cross-section, solid core, max.	4 mm²
Wire connection cross-section, solid core, min.	0.5 mm²		

Disconnect terminals

Cross-disconnect	without	Integral test socket	No
Slitting	Pivoting		

General

Rail	TS 35	Standards	IEC 60947-7-1
Wire connection cross section AWG, max.	AWG 12	Wire connection cross section AWG, min.	AWG 30

Rating data

Rated cross-section	2.5 mm²	Rated voltage	500 V
Rated DC voltage	500 V	Rated current	24 A
Current at maximum wires	24 A	Standards	IEC 60947-7-1
Volume resistance according to IEC 60947-7-x	1.33 mΩ	Rated impulse withstand voltage	6 kV
Power loss in accordance with IEC 60947-7-x	0.77 W	Pollution severity	3

UL rating data

Certificate No. (UR)	E60693	Conductor size Factory wiring max. (UR)	12 AWG
Conductor size Factory wiring min. (UR)	30 AWG	Conductor size Field wiring max. (UR)	12 AWG
Conductor size Field wiring min. (UR)	30 AWG	Current size C (UR)	20 A
Voltage size C (UR)	600 V		

WTR 2.5

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Technical data

Classifications

ETIM 6.0	EC000902	ETIM 7.0	EC000902
ETIM 8.0	EC000902	ETIM 9.0	EC000902
ECLASS 9.0	27-14-11-26	ECLASS 9.1	27-14-11-26
ECLASS 10.0	27-14-11-26	ECLASS 11.0	27-14-11-26
ECLASS 12.0	27-14-11-26	ECLASS 13.0	27-25-01-09
ECLASS 14.0	27-25-01-09		

Environmental Product Compliance

RoHS Compliance Status	Compliant without exemption
REACH SVHC	No SVHC above 0.1 wt%

Approvals

Approvals	
ROHS	Conform
UL File Number Search	UL Website
Certificate No. (UR)	E60693

Downloads

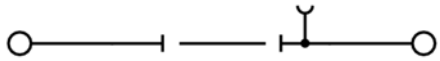
Approval/Certificate/Document of Conformity	Attestation of Conformity UKCA Ex Attestation of Conformity ATEX Certificate IECEx Certificate AEx ec Certificate CB Test Certificate CB Certificate POLSKIREJ certificate CCC Ex Certificate UKCA Ex Certificate DNV Certificate CE Declaration of Conformity UKCA declaration of conformity Confirmation of Standards EN 45545-2_2020-10
Engineering Data	CAD data – STEP
User Documentation	StorageConditionsTerminalBlocks NTI WTR 2.5
Catalogues	Catalogues in PDF-format
Brochures	

WTR 2.5

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Drawings



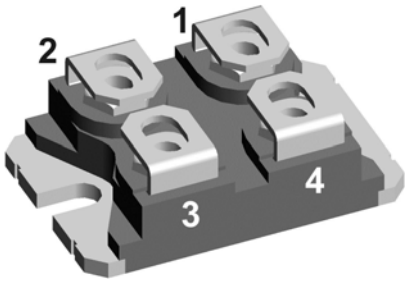
HiPerFRED

V_{RRM} = 300 V
I_{FAV} = 2x 90 A
t_{rr} = 30 ns

High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Parallel legs

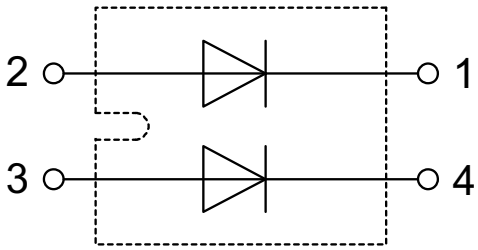
Part number

DSEP2x91-03A



Backside: isolated

E72873



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low Irm-values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low Irm reduces:
  - Power dissipation within the diode
  - Turn-on loss in the commutating switch

Applications:

- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

Package: SOT-227B (minibloc)

- Isolation Voltage: 3000 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate: Copper internally DCB isolated
- Advanced power cycling

Disclaimer Notice

Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.

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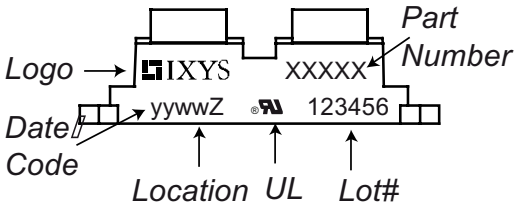
Fast Diode

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			300	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			300	V
I_R	*reverse current, drain current*	V_R = 300 V	T_{VJ} = 25°C			1	mA
		V_R = 300 V	T_{VJ} = 150°C			4	mA
V_F	*forward voltage drop*	I_F = 90 A	T_{VJ} = 25°C			1,54	V
		I_F = 180 A				1,86	V
		I_F = 90 A	T_{VJ} = 150°C			1,10	V
		I_F = 180 A				1,44	V
I_{FAV}	*average forward current*	T_C = 75°C	T_{VJ} = 150°C			90	A
		rectangular d = 0.5					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			0,77	V
r_F	*slope resistance* }					3,7	mΩ
R_{thJC}	*thermal resistance junction to case*					0,6	K/W
R_{thCH}	*thermal resistance case to heatsink*				0,1		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			200	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine; V_R = 0 V	T_{VJ} = 45°C			1,00	kA
C_J	*junction capacitance*	V_R = 150 V f = 1 MHz	T_{VJ} = 25°C		273		pF
I_{RM}	*max. reverse recovery current*		T_{VJ} = 25°C		12		A
		I_F = 90 A; V_R = 150 V	T_{VJ} = 100°C		15		A
t_{rr}	*reverse recovery time*	$-di_F/dt$ = 600 A/µs	T_{VJ} = 25°C		40		ns
			T_{VJ} = 100°C		60		ns

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Package SOT-227B (minibloc)					Ratings			
Symbol	**Definition**	**Conditions**			**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal					100	A
T_{VJ}	*virtual junction temperature*				-40		150	°C
T_{op}	*operation temperature*				-40		125	°C
T_{stg}	*storage temperature*				-40		150	°C
Weight						30		g
M_D	*mounting torque*				1,1		1,5	Nm
M_T	*terminal torque*				1,1		1,5	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	10,5	3,2			mm
$d_{Spb/Apb}$			*terminal to backside*	8,6	6,8			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA		3000			V
		t = 1 minute			2500			V

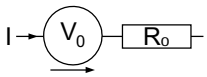
Product Marking



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEP2x91-03A	DSEP2x91-03A	Tube	10	476269

Equivalent Circuits for Simulation

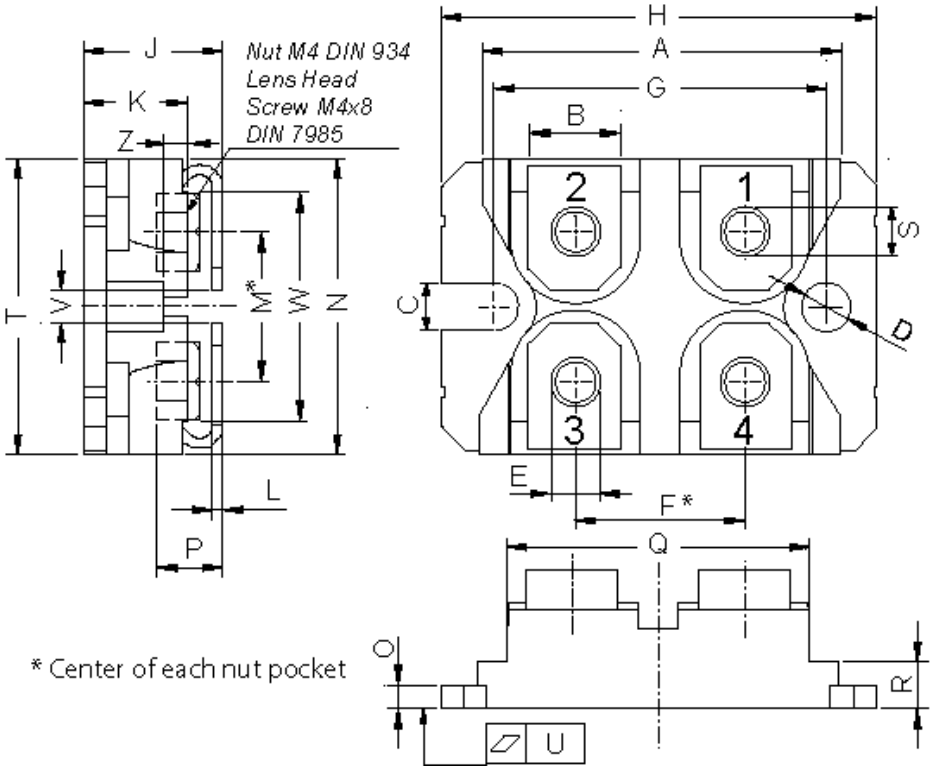
** on die level* T_{VJ} = 150 °C



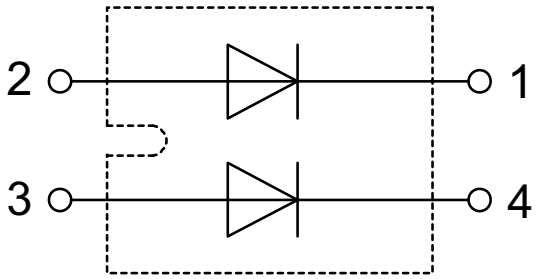
		Fast Diode	
$V_{0\,max}$	*threshold voltage*	0,77	V
$R_{0\,max}$	*slope resistance **	1,8	mΩ

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Outlines SOT-227B (minibloc)



Dim.	Millimeter		Inches	
	min	max	min	max
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.23	1.488	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.74	0.84	0.029	0.033
M	12.50	13.10	0.492	0.516
N	25.15	25.42	0.990	1.001
O	1.95	2.13	0.077	0.084
P	4.95	6.20	0.195	0.244
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.167
S	4.55	4.85	0.179	0.191
T	24.59	25.25	0.968	0.994
U	-0.05	0.10	-0.002	0.004
V	3.20	5.50	0.126	0.217
W	19.81	21.08	0.780	0.830
Z	2.50	2.70	0.098	0.106



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Fast Diode

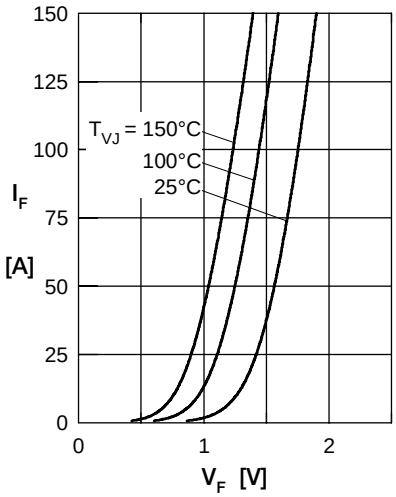


Fig. 1 Forward current I_F versus V_F

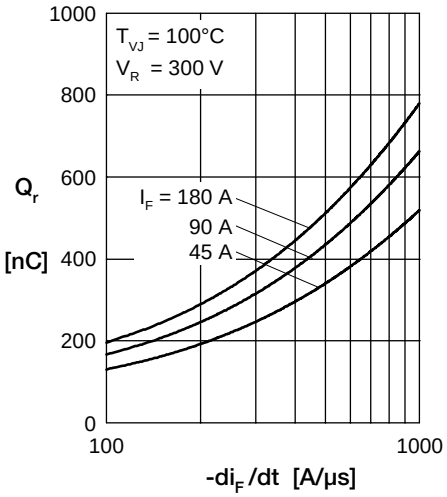


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

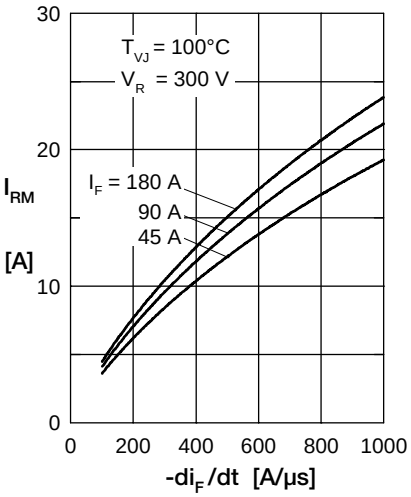


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

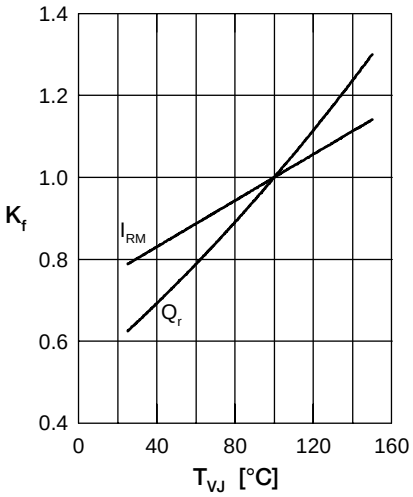


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

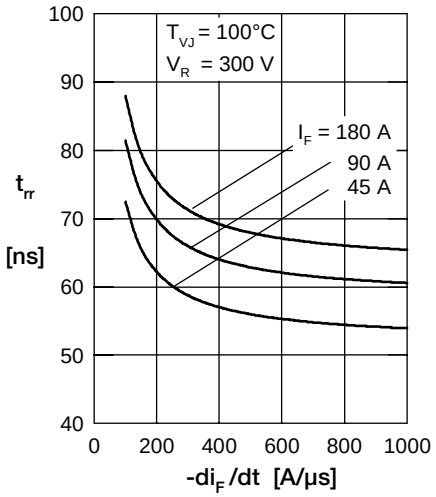


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

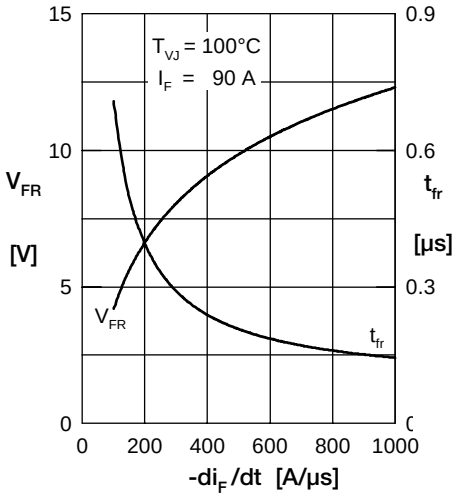


Fig. 6 Peak forward voltage V_{FR} and tfr versus di_F/dt

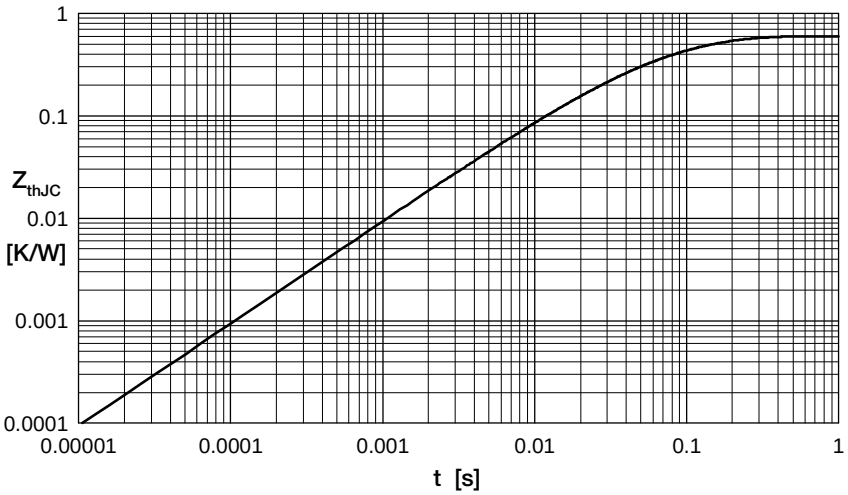


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.212	0.0055
2	0.248	0.0092
3	0.063	0.0007
4	0.077	0.0391

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HART Multiplexer

HiDMux2700

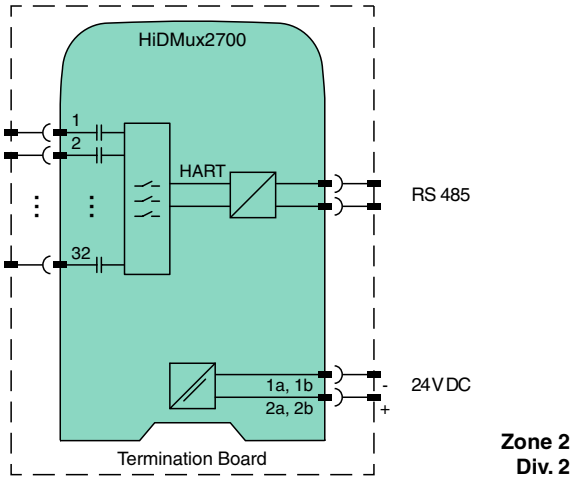
- 32-channel
- 24 V DC supply
- HART field device input (revision 5 to 7)
- RS-485 interface
- Up to SIL 3 acc. to IEC/EN 61508

HART Multiplexer

Function

The HART multiplexer provides 32 signal channels for connection to SMART transmitters or control devices supporting digital communication according to the HART standard.
Full three-port isolation is included and each input channel has dual capacitor isolation for freedom of loop connection.
Each HART multiplexer is networked simply by connecting the high-speed RS 485 output in a multidrop configuration.
The device interrogates each field device, under the supervision of the workstation, retrieving information for storage in its internal database, which is then easily accessed.
This module is intended to mount on an HiD Termination Board or HART Communcation Board. Also special boards for DCS integration are available.
For additional information, refer to the manual and www.pepperl-fuchs.com.

Connection



Technical Data

Functional safety related parameters		
Safety Integrity Level (SIL)		SIL 3
Supply		
Connection		SL1: 1a, 1b(-); 2a, 2b(+)
Rated voltage	U_r	20.4 ... 30 V DC via Termination Board
Rated current	I_r	28 mA at 24 V , RS-485, quiescent current
Power dissipation		0.7 W at 24 V
HART signal channels (non-intrinsically safe)		
Number of channels		32

Release date: 2024-11-20 Date of issue: 2024-11-20 Filename: 211968_eng.pdf

Technical Data

Conformity	HART field device input (revision 5 to 7)
Signal range	0.12 V_{pp} < signal < 1.5 V_{pp}
Leakage current	< 3 µA at -20 ... 85 °C (-4 ... 185 °F)
Terminating resistor	external 230 ... 500 Ω standard (up to 1000 Ω possible)
Output voltage	≥ 400 mV_{ss} (with the terminator resistance specified above)
Output resistance	100 Ω or smaller, capacitive coupling
DC isolation	dual capacitor each channel
Common mode voltage	up to 30 V
Input impedance	> 5 kΩ , according to HART specification
Input voltage range	0.12 ... 1.5 V_{ss}
Common mode voltage	max. 30 V
Differential mode clamping	± 5.2 V , for transient or AC signals
Common mode clamping	± 10 V , for transient or AC signals
Carrier detect level	signal > 0.12 V_{pp}, carrier detection activated signal < 0.08 V_{pp}, carrier detection not activated
Transmit amplitude	200 Ω load, 0.43 V_{pp} < signal < 0.49 V_{pp} 500 Ω load, 1.1 V_{pp} < signal < 1.2 V_{pp}
Device type	DC isolated bus device
Impedance	high impedance
Data link type	HART primary and secondary
Field multi point support	option available upon request
Interface	
Transfer rate	9600 MBit/s, 19200 MBit/s or 38400 MBit/s, selectable via switch
Address	1 ... 31 , adjustable via DIP switch
Type	RS-485 , differential pair and grounding
Topology	multi point, primary module/secondary module connection
Galvanic isolation	
Interface/power supply	500 V_{rms}
Interface/field channels	1000 V_{eff}
Power supply/field channels	1000 V_{eff}
Indicators/settings	
Display elements	LEDs LED PWR ON (power supply), one green LED LED HART TX (HART transmission), one yellow LED LED FAULT (lead fault), one red LED
Control elements	DIP switches at the housing side for: - secondary module address - baud rate - test mode on/off
Configuration	via DIP switches
Labeling	space for labeling at the front
Directive conformity	
Electromagnetic compatibility	
Directive 2014/30/EU	EN 61326-1:2013 (industrial locations)
Conformity	
Electromagnetic compatibility	NE 21:2012 For further information see system description.
Degree of protection	IEC 60529:2001
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Relative humidity	5 ... 95 %, noncondensing
Mechanical specifications	
Degree of protection	IP20
Mass	approx. 140 g
Dimensions	18 x 114 x 130 mm (0.7 x 4.5 x 5.1 inch) (W x H x D)
Mounting	on termination board

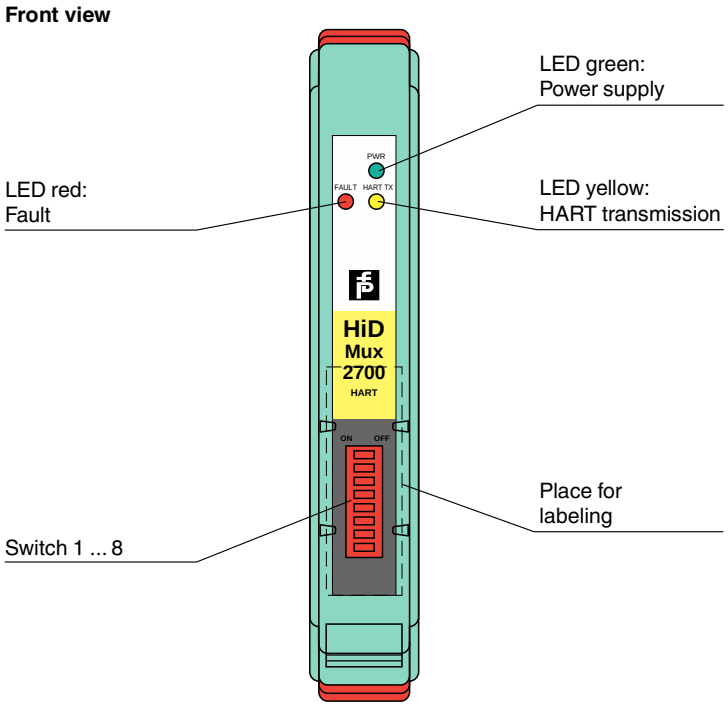
Release date: 2024-11-20 Date of issue: 2024-11-20 Filename: 211968_eng.pdf

Technical Data

Data for application in connection with hazardous areas	
Certificate	CML 17 ATEX 3337X
Marking	Ⓔx II 3G Ex ec IIC T4 Gc
Directive conformity	
Directive 2014/34/EU	EN IEC 60079-0:2018+AC:2020 , EN 60079-7:2015+A1:2018
International approvals	
CSA approval	
CSA certificate	1256050
Approved for	Class I, Division 2, Groups A, B, C, D and non-explosion hazardous area
IECEx approval	
IECEx certificate	IECEx CML 17.0178X
IECEx marking	Ex ec IIC T4 Gc
General information	
Supplementary information	Observe the certificates, declarations of conformity, instruction manuals, and manuals where applicable. For information see www.pepperl-fuchs.com.

Assembly

Front view



Additional Information

Conformity
The HART MUX primary module generally complies with the HART FSK physical layer specification rev. 8.0 available from the HART Communication Foundation. HART is a registered trademark of the HART Communication Foundation.
High Specification Front End Design
Two decoupling capacitors are provided, one for each signal connection. Both the positive (+Ue) and the negative (-Ue) signal wires are therefore decoupled from DC signal. Only the high frequency digital HART protocol signal passes through to the internal multiplexer circuitry.
Failure of any one capacitor from either a short circuit or open circuit means that availability of 4 ... 20 mA control signal will not be affected.
- no DC loading of 4 ... 20 mA control signal
- no single point of failure
- high noise immunity

The max. 30 V DC input voltage (specified between all terminals, both belonging to the same channel or not) makes it possible to connect any multiplexer terminal to whatever voltage level can be derived from a 24 V DC supply, +20 % tolerance included.
3 Port Isolation
The 3 port isolation structure of the primary module is depicted in the previous page. As you can see, both the 24 V supply input and the RS-485 serial interface are isolated from the HART section, i. e. from the HART signals on the field devices. This is full galvanic isolation, implemented either by transformer or by optocoupler.
Self Contained Architecture
Each primary module is a stand alone device containing all necessary hardware to communicate with up to 32 HART protocol enabled field devices and a host PC via RS-485 interface. The advantages are:

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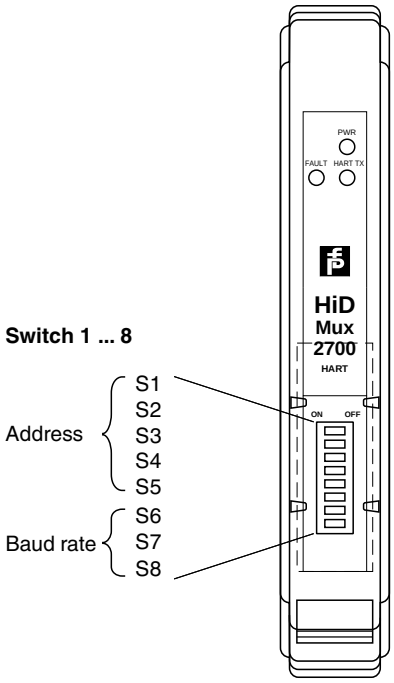
Additional Information

- Fast polling
- One module design
- RS-485 interface direct from module
- No communications bottleneck
- Ideal for valve diagnostics

Wide Software Compatibility
The primary module is fully compatible with F-R AMS (ver 5.0 is also an OPC server), Valve Link and Cornerstone.
Additional compatibility extends to HART OPC server software available from HCF (HART Communication Foundation). Allowing users to write dedicated applications for their specific needs.
Fully tested, by all key PAM vendors.

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Configuration



RS-485 Address					
	S1	S2	S3	S4	S5
1	ON	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF
5	ON	OFF	ON	OFF	OFF
6	OFF	ON	ON	OFF	OFF
7	ON	ON	ON	OFF	OFF
8	OFF	OFF	OFF	ON	OFF
9	ON	OFF	OFF	ON	OFF
10	OFF	ON	OFF	ON	OFF
11	ON	ON	OFF	ON	OFF
12	OFF	OFF	ON	ON	OFF
13	ON	OFF	ON	ON	OFF
14	OFF	ON	ON	ON	OFF
15	ON	ON	ON	ON	OFF
16	OFF	OFF	OFF	OFF	ON
17	ON	OFF	OFF	OFF	ON
18	OFF	ON	OFF	OFF	ON
19	ON	ON	OFF	OFF	ON
20	OFF	OFF	ON	OFF	ON
21	ON	OFF	ON	OFF	ON
22	OFF	ON	ON	OFF	ON
23	ON	ON	ON	OFF	ON
24	OFF	OFF	OFF	ON	ON
25	ON	OFF	OFF	ON	ON
26	OFF	ON	OFF	ON	ON
27	ON	ON	OFF	ON	ON
28	OFF	OFF	ON	ON	ON
29	ON	OFF	ON	ON	ON
30	OFF	ON	ON	ON	ON
31	ON	ON	ON	ON	ON

RS-485 Baud Rate			
	S6	**S7**	**S8**
9600	OFF	OFF	OFF
19200	ON	OFF	OFF
38400	OFF	ON	OFF

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EtherNet/IP Gateway

ICDM-RX/EN-DB9/RJ45-PM

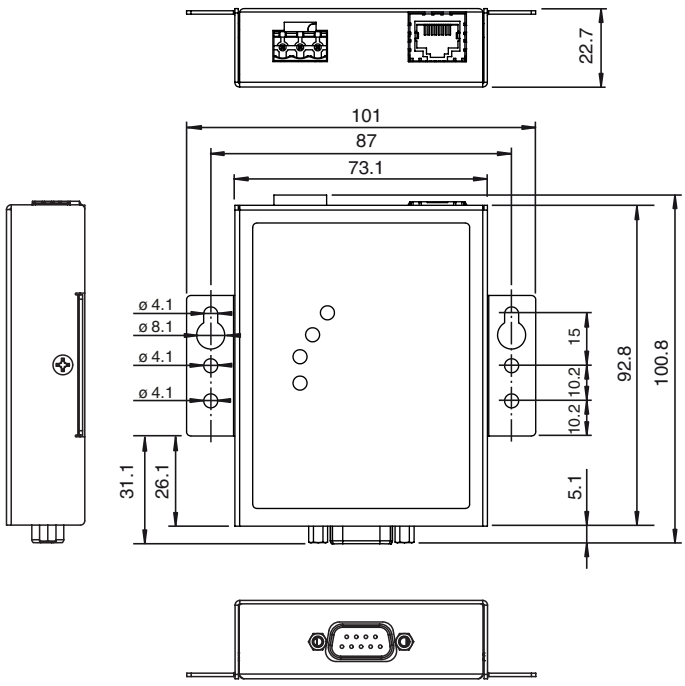
- Panel mounting and DB9 serial connector
- EtherNet/IP to serial and Ethernet TCP/IP raw/ASCII devices.
- RS-232/422/485 software selectable interfaces
- Web-based configuration

EtherNet/IP 1-port panel mount DB9

Function

The ICDM-RX/EN product family enables the connection of serial devices (RS-232 / RS-422 / RS-485) or Ethernet TCP/IP devices to an Industrial EtherNet/IP network. Highly advanced raw/ASCII device interface functionality simplifies PLC programming and ensures robust operation. These features greatly simplify connecting devices such as barcode scanners, RFID readers, weigh scales, vision systems, printers, encoders, and sensors to PLCs. The integrated webserver enables complete configuration of all module parameters like serial interface, baud rate, parity, data bits, stop bits, flow control, or delimiting characters.
Products are available in different versions for DB9 or screw terminal connection.

Dimensions



Technical Data

General specifications		
UL File Number		E185802
MTBF		48.4 a
Indicators/operating means		

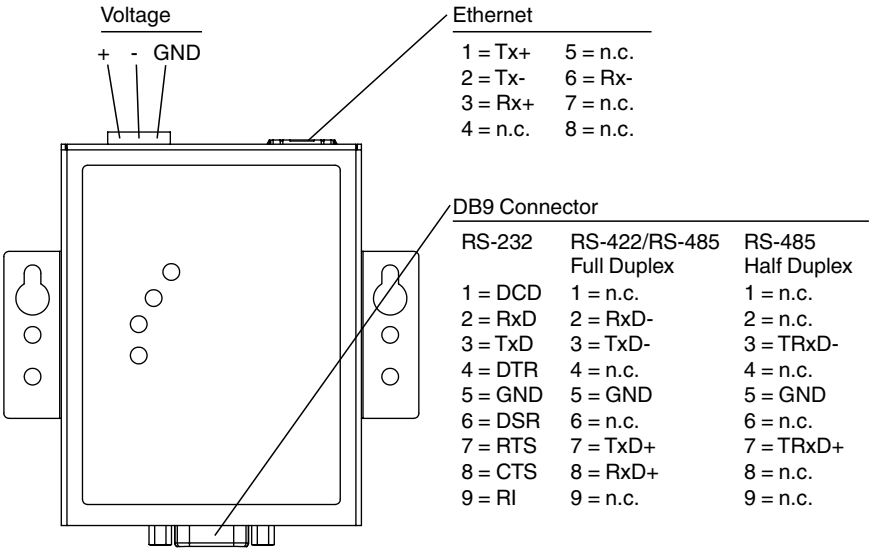
Release date: 2024-04-25 Date of issue: 2024-04-25 Filename: 70114020_eng.pdf

Technical Data

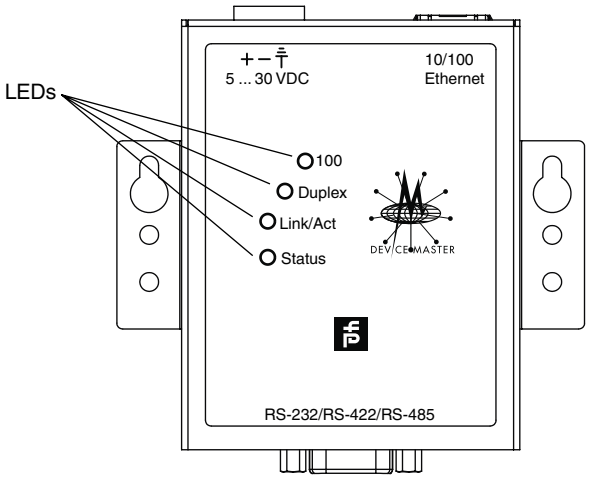
LED indication		see manual
Electrical specifications		
Rated operating voltage	U_e	5 ... 30 V DC
Nominal voltage		24 V DC
Interface		
Interface type		Software selectable interfaces: RS-232 , RS-422 , RS-485 (2 and 4-wire)
Physical		1 x DB9
Protocol		Raw serial
Supported baud rates		300 bps to 230Kbps
Interface 1		
Interface type		Industrial Ethernet
Physical		1 x RJ45
Protocol		EtherNet/IP
Additional protocols		ARP, BOOTP, DHCP/RARP, HTTP, HTTPS, SSH, SSL/TLS, ICMP, RFC 1006 (ISO over TCP), SNMP (MIB-II), TCP/IP &UDP socket services, Telnet, and TFTP, and supports IP multicast data transmission
Transfer rate		10/100 Mbps
Directive conformity		
Electromagnetic compatibility		
Directive 2014/30/EU		EN 61000-6-2:2005 , EN 61000-6-4:2007 + A1:2011
RoHS		EN IEC 63000:2018
Standard conformity		
Electrical safety		CSA C22.2 No. 60950 / CSA C22.2 No. 60950/UL60950
Emitted interference		EN 61000-6-4, EN 55032, FCC Part 15 Subpart B, ICES-003, AS/NZS CISPR 32
Noise immunity		EN 61000-6-2
Ambient conditions		
Ambient temperature		-40 ... 75 °C (-40 ... 167 °F)
Storage temperature		-40 ... 85 °C (-40 ... 185 °F)
Relative humidity		max. 95 %
Altitude		0 ... 3048 m
Mechanical specifications		
Degree of protection		IP20
Connection		Power Supply: pluggable screw terminal Fieldbus: 1 x RJ45 Inputs/outputs: 1 x DB9
Material		
Housing		stainless steel
Mass		220g
Dimensions		
Height		71.1 mm
Width		20.3 mm
Length		91.4 mm
Construction type		Cabinet module
Mounting		panel mount

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Connection



Indication



Release date: 2024-04-25 Date of issue: 2024-04-25 Filename: 70114020_eng.pdf

87045 LIMOGES Cedex
Telephone: (+33) 05 55 06 87 87 - Fax: (+33) 05 55 06 88 88

Modular distribution blocks with staggered bars

Catalogue numbers: 4 004 00 / 01 / 02 / 03
4 004 04 / 05 / 06 / 07 / 08 / 09 / 10 / 11



CONTENTS

1. General characteristics 1
2. Range 1
3. Technical characteristics 2
4. Dimensions - Weight 4
5. IP 2X terminal blocks 5
6. Photovoltaic application 5

⚠ Make sure the power supply is disconnected before any intervention.
Strictly comply with instructions for installation and use.

1. GENERAL CHARACTERISTICS

Legrand modular distribution blocks with staggered bars enable safe and rapid two-pole or four-pole distribution. Compliant with standard EN 60947-1, they combine electrical performance and mechanical robustness, as well as ergonomic design to facilitate the use of this key component of electrical distribution systems.

Thanks to a maximized cabling space, an optimized bars orientation and an adapted sizing of screw connections, cabling and connection are facilitated. Moreover, the input and large sections outputs are staggered between each bar to avoid overlapping of large conductors.



The connection points are also sufficiently spaced to allow the use of standard ferrules without problem related to insulating part.

A transparent insulating protection equips each brass bar for maximum safety. Moreover, a system integrated to this protection brakes the accidental unscrewing of the screws of unconnected connections.

A protection also isolates the rear of the distribution block from the mounting rail.

A transparent protective cover, removable and rotating 180° (up to 125 A) makes it possible to adapt to all wiring situations.

2. RANGE

Two-pole

Cat. N°	Rated operational current 40°C (1)	Input	Number of outputs (2)	Number of modules
4 004 00	40 A	Internal	12	6
4 004 01	100 A	Internal	6	4
4 004 02	100 A	Internal	10	6
4 004 03	125 A	Internal	14	8

(1) The current Imax is given for the maximum rigid section that can be connected at the input
(2) For each bar

Four-pole
The 100/125/160 A four-pole distribution blocks with external input offer a connection of the input separate from the outputs.

Cat. N°	Rated operational current 40°C (1)	Input	Number of outputs (2)	Number of modules
4 004 04	40 A	Internal	12	6
4 004 05	100 A	Internal	6	4
4 004 06	100 A	Internal	10	6
4 004 07	100 A	External	11	8
4 004 08	125 A	Internal	10	6
4 004 09	125 A	Internal	14	8
4 004 10	125 A	External	15	10
4 004 11	160 A	External	13	10

(1) The current Imax is given for the maximum rigid section that can be connected at the input
(2) For each bar

Connection capacity, see page 2

Modular distribution blocks with staggered bars

Catalogue numbers: 4 004 00 / 01 / 02 / 03
4 004 04 / 05 / 06 / 07 / 08 / 09 / 10 / 11

3. TECHNICAL CHARACTERISTICS

■ 3.1 Connection capacity

Two-pole range

Cat. N°	Ie 40 °C	Input		Outputs			Nb. of mod.
		RIGID copper conductor	FLEXIBLE copper conductor (with or without ferrule)	Nb. (1)	RIGID copper conductor	FLEXIBLE copper conductor (with or without ferrule)	
4 004 00	40 A	2.5 to 10 mm²	1.5 to 10 mm²	2	2.5 to 10 mm²	1.5 to 10 mm²	6
				10	1.5 to 6 mm²	0.75 to 4 mm²	
4 004 01	100 A	10 to 25 mm²	6 to 16 mm²	1	10 to 25 mm²	6 to 16 mm²	4
				5	2.5 to 10 mm²	1.5 to 10 mm²	
4 004 02	100 A	10 to 25 mm²	6 to 16 mm²	2	10 to 25 mm²	6 to 16 mm²	6
				8	2.5 to 10 mm²	1.5 to 10 mm²	
4 004 03	125 A	10 to 35 mm²	6 (2) to 25 mm²	3	10 to 25 mm²	6 to 16 mm²	8
				11	2.5 to 10 mm²	1.5 to 10 mm²	

(1) For each bar
(2) Flexible conductor less than 16 mm² only with ferrule

Four-pole range

Cat. N°	Ie 40 °C	Input		Outputs			Nb. of mod.
		RIGID copper conductor	FLEXIBLE copper conductor (with or without ferrule)	Nb. (1)	RIGID copper conductor	FLEXIBLE copper conductor (with or without ferrule)	
4 004 04	40 A	2.5 to 10 mm²	1.5 to 10 mm²	2	2.5 to 10 mm²	1.5 to 10 mm²	6
				10	1.5 to 6 mm²	0.75 to 4 mm²	
4 004 05	100 A	10 to 25 mm²	6 to 16 mm²	1	10 to 25 mm²	6 to 16 mm²	4
				5	2.5 to 10 mm²	1.5 to 10 mm²	
4 004 06	100 A	10 to 25 mm²	6 to 16 mm²	2	10 to 25 mm²	6 to 16 mm²	6
				8	2.5 to 10 mm²	1.5 to 10 mm²	
4 004 07	100 A	10 to 35 mm² (3)	6 (2) to 25 mm² (3)	3	10 to 25 mm²	6 to 16 mm²	8
				8	2.5 to 10 mm²	1.5 to 10 mm²	
4 004 08	125 A	10 to 35 mm²	6 (2) to 25 mm²	3	10 to 25 mm²	6 to 16 mm²	6
				7	2.5 to 10 mm²	1.5 to 10 mm²	
4 004 09	125 A	10 to 35 mm²	6 (2) to 25 mm²	3	10 to 25 mm²	6 to 16 mm²	8
				11	2.5 to 10 mm²	1.5 to 10 mm²	
4 004 10	125 A	16 to 35 mm² (3)	16 to 35 mm² (3) (4)	2	10 to 35 mm²	6 (2) to 25 mm²	10
				1	10 to 25 mm²	6 to 16 mm²	
				12	2.5 to 10 mm²	1.5 to 10 mm²	
4 004 11	160 A	35 to 70 mm² (3)	35 to 70 mm² (3)	2	10 to 35 mm²	6 (2) to 25 mm²	10
				4	10 to 25 mm²	6 to 16 mm²	
				7	2.5 to 16 mm²	1.5 à 10 mm²	

(1) For each bar
(2) Flexible conductor less than 16 mm² only with ferrule
(3) External input
(4) Only flexible conductor with ferrule

3. TECHNICAL CHARACTERISTICS (continued)

■ 3.2 Connexion points dimensions

Each cylindrical hole is provided with a bevel to facilitate connection.

Cat. N°	Input (mm)	Outputs (mm)
4 004 00	Ø 5.6	Ø 5.6
		Ø 5.1
4 004 01	Ø 7.6	Ø 7.6
		Ø 5.6
4 004 02	Ø 7.6	Ø 7.6
		Ø 5.6
4 004 03	Ø 8.6	Ø 7.6
		Ø 5.6
4 004 04	Ø 5.6	Ø 5.6
		Ø 5.1
4 004 05	Ø 7.6	Ø 7.6
		Ø 5.6
4 004 06	Ø 7.6	Ø 7.6
		Ø 5.6
4 004 07	Ø 8.6 (1)	Ø 7.6
		Ø 5.6
4 004 08	Ø 8.6	Ø 7.6
		Ø 5.6
4 004 09	Ø 8.6	Ø 7.6
		Ø 5.6
4 004 10	 8 x 9.5 (1)	Ø 8.6
		Ø 7.6
		Ø 5.6
4 004 11	 13 x 11 (1)	Ø 8.9
		Ø 7.6
		Ø 5.6

(1) External input

■ 3.3 Tightening torques

Cat. N°	Tightening torque	Tool
4 004 00	2 Nm	Screwdriver PZ-2 / flathead 5.5 mm
4 004 01		
4 004 02		
4 004 03		
4 004 04		
4 004 05		
4 004 06		
4 004 07		
4 004 08		
4 004 09		
4 004 10		
4 004 11	External inputs : 15 Nm	6 mm Allen spanner
	Outputs : 2 Nm	Screwdriver PZ-2 / flathead 5.5 mm

3. TECHNICAL CHARACTERISTICS (continued)

■ 3.4 Connection with Starfix ferrule

Cat. N°	Sections of flexible Copper conductor	Starfix cat. N°
4 004 00	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68
	0.75 to 4 mm²	0 376 62/63/64/66/67 0 377 62/63/64/66/67
4 004 01	6 to 16 mm²	0 376 68/69/70/72 0 377 68
	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68
4 004 02	6 to 16 mm²	0 376 68/69/70/72 0 377 68
	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68
4 004 03	6 to 25 mm²	0 376 68/69/70/72/71 0 377 68
	6 to 16 mm²	0 376 68/69/70/72 0 377 68
	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68
4 004 04	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68
	0.75 to 4 mm²	0 376 62/63/64/66/67 0 377 62/63/64/66/67
4 004 05	6 to 16 mm²	0 376 68/69/70/72 0 377 68
	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68
4 004 06	6 to 16 mm²	0 376 68/69/70/72 0 377 68
	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68
4 004 07	6 to 25 mm²	0 376 68/69/70/72/71 0 377 68
	6 to 16 mm²	0 376 68/69/70/72 0 377 68
	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68
4 004 08	6 to 25 mm²	0 376 68/69/70/72/71 0 377 68
	6 to 16 mm²	0 376 68/69/70/72 0 377 68
	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68
4 004 09	6 to 25 mm²	0 376 68/69/70/72/71 0 377 68
	6 to 16 mm²	0 376 68/69/70/72 0 377 68
	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68
4 004 10	16 to 35 mm²	0 376 70/72/71/77
	6 to 25 mm²	0 376 68/69/70/72/71 0 377 68
	6 to 16 mm²	0 376 68/69/70/72 0 377 68
	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68
4 004 11	35 to 70 mm²	0 376 77/78
	10 to 16/25 mm² (1)	0 376 69/70/72
	6 to 16 mm²	0 376 68/69/70/72 0 377 68
	1.5 to 10 mm²	0 376 64/66/67/68/69 0 377 64/66/67/68

(1) 4 ferrules 25 mm² supplied with the distribution block

3. TECHNICAL CHARACTERISTICS (continued)

■ 3.5 Electrical characteristics

Compliant with standard EN 60947-1
Pollution degree 3 - Overvoltage Category III
Rated operational current Ie at 40°C
Rated insulation voltage Ui : 500 V
Rated impulse withstand voltage Uimp : 8 kV

Rated peak withstand current Ipk (1) :

Cat. N°	Ipk (60 ms)
4 004 00 to 4 004 09	26 kÂ
4 004 10	20 kÂ
4 004 11	27 kÂ

(1) Peak short-circuit current Icc

Rated short-time withstand current:

Cat. N°	Icw (1 s)
4 004 00 to 4 004 10	4.5 kA
4 004 11	8.4 kA

Dissipated power:

Cat. N°	Power dissipated at rated operational current Ie
4 004 00	1 W
4 004 01	6 W
4 004 02	7 W
4 004 03	12 W
4 004 04	2 W
4 004 05	11 W
4 004 06	14 W
4 004 07	15 W
4 004 08	23 W
4 004 09	24 W
4 004 10	33 W
4 004 11	48 W

Derating:
Coefficient to be applied to the rated operational current Ie for operation at ambient temperature above 40°C

Ambient temperature	40°C	45°C	50°C	55°C	60°C	65°C	70°C	75°C
Derating coefficient	1	0.92	0.86	0.8	0.73	0.65	0.56	0.45

■ 3.6 Other characteristics

Fixing on symmetrical / DIN rail by clipping
Cover opening with flathead screwdriver
Operating temperature at rated operational current Ie: - 25 ° to + 40 ° C (derating for higher temperatures)
Installation altitude : 2000 m maximum (beyond : contact us)
Self-extinguishing 960 ° C - UL94 V-0 for supports of active parts
Transport and storage temperature: - 25 ° C to + 55 ° C
RoHS compliance

■ 3.7 Materials

Side parts: RAL 7035 gray polyamide
Bars: solid brass
Internal bar protection: Clear colorless polycarbonate
External bar protection: RAL 7035 gray polyamide
Screws: zinc-plated steel
Cover: Transparent blue polycarbonate
Protection / rail : translucent PVC

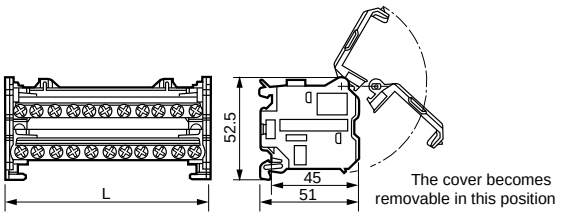
Modular distribution blocks with staggered bars

Catalogue numbers: 4 004 00 / 01 / 02 / 03
4 004 04 / 05 / 06 / 07 / 08 / 09 / 10 / 11

4. DIMENSIONS - WEIGHT

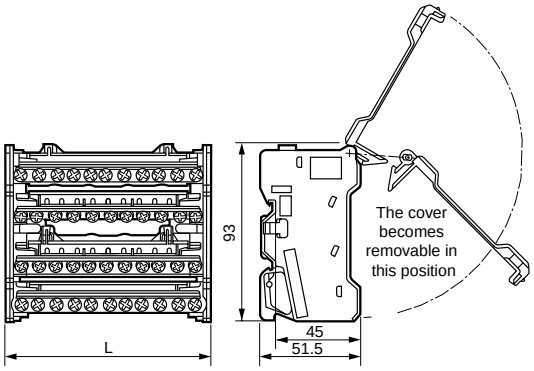
Two-pole 40/100/125 A

Cat. N°	L (mm)
4 004 00	106
4 004 01	70.5
4 004 02	106
4 004 03	143



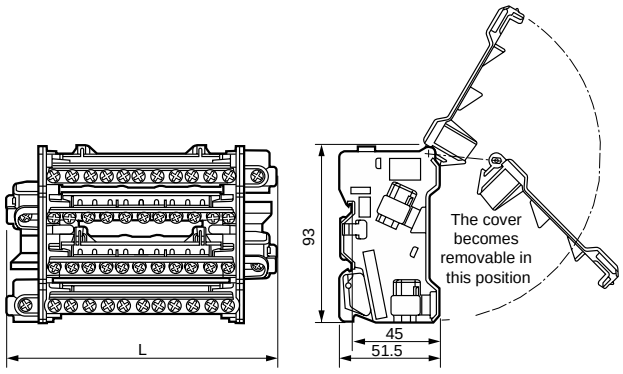
Four-pole 40/100/125 A

Cat. N°	L (mm)
4 004 04	106
4 004 05	70.5
4 004 06	106
4 004 08	106
4 004 09	143

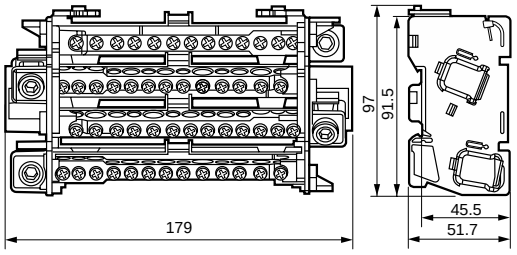


Four-pole 100/125 A (with external inputs)

Cat. N°	L (mm)
4 004 07	139
4 004 10	176

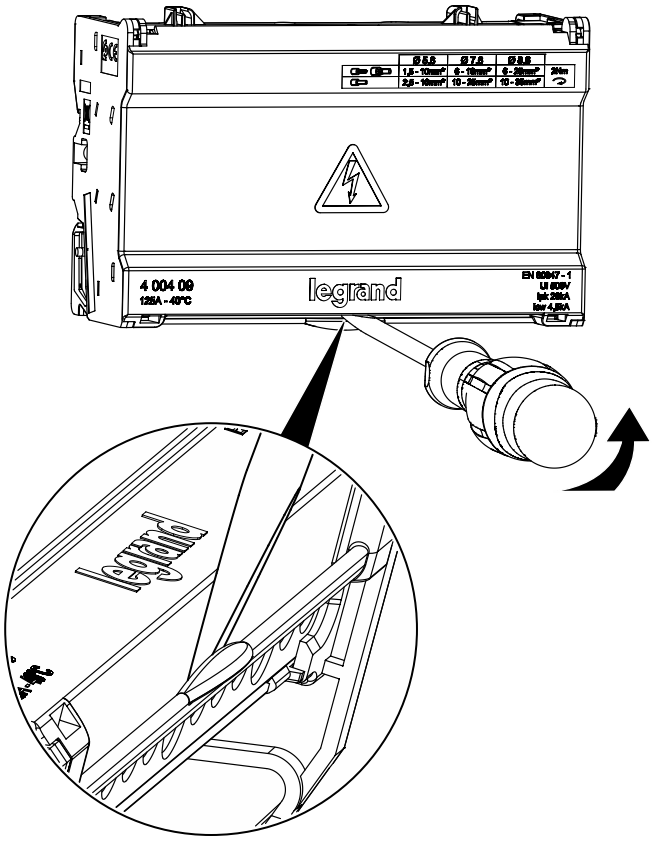


Four-pole 160 A (with external inputs) – Cat. N° 4 004 11



4. DIMENSIONS - WEIGHT (continued)

Cover opening:



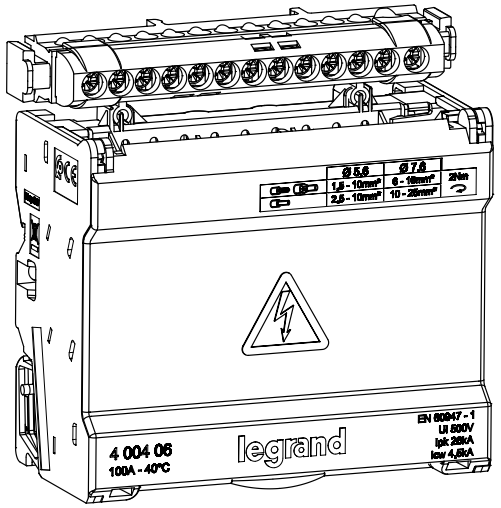
Cat. N°	Weight (kg)
4 004 00	0.193
4 004 01	0.124
4 004 02	0.192
4 004 03	0.240
4 004 04	0.370
4 004 05	0.238
4 004 06	0.350
4 004 07	0.407
4 004 08	0.342
4 004 09	0.466
4 004 10	0.526
4 004 11	0.706

Modular distribution blocks with staggered bars

Catalogue numbers: 4 004 00 / 01 / 02 / 03
4 004 04 / 05 / 06 / 07 / 08 / 09 / 10 / 11

5. IP 2X TERMINAL BLOCKS

IP 2X terminal blocks increase the number of earth or neutral outputs. They fix directly to the distributor.



Cat. N°	IP 2X terminal block	Derating	
		Voltage	Current
4 004 00	0 048 34 (1)	400 V	40 A
4 004 01	0 048 32 (1)		80 A
4 004 02	0 048 34 (1)		80 A
4 004 03	0 048 35 (1)		100 A
4 004 04	0 048 44 (2)		40 A
4 004 05	0 048 42 (2)		80 A
4 004 06	0 048 44 (2)		80 A
4 004 07	0 048 45 (2)		80 A
4 004 08	0 048 44 (2)		100 A
4 004 09	0 048 45 (2)		100 A
4 004 10	0 048 45 (2)		100 A
4 004 11	0 048 45 (2)		100 A

(1) ⏚ - (2) Neutral

6. PHOTOVOLTAIC APPLICATION

ELECTRICAL CHARACTERISTICS IN PHOTOVOLTAIC APPLICATION		
Cat. N°	Operational current 60°C	Ui (1)
4 004 00	32 A	800 V ⎓
4 004 01	80 A	
4 004 02	80 A	
4 004 03	100 A	

(1) Pollution degree 2

CONNECTION CAPACITY IN PHOTOVOLTAIC APPLICATION			
Cat. N°	INPUT	OUTPUTS	
	« Solar » copper conductor	Number of outputs (1)	« Solar » copper conductor
4 004 00	4 to 10 mm²	2	4 to 10 mm²
		10	1.5 to 4 mm²
4 004 01	6 to 16 mm²	1	6 to 16 mm²
		5	1.5 to 6 mm²
4 004 02	6 to 16 mm²	2	6 to 16 mm²
		8	1.5 to 6 mm²
4 004 03	10 to 25 mm²	3	6 to 16 mm²
		11	1.5 to 6 mm²

(1) For each bar

DATASHEET

Modbus TCP/IP Client/Server Enhanced Communication Module for ControlLogix®

MVI56E-MNET/MNETXT

The MVI56E Modbus TCP/IP Client/Server Enhanced Communication Module allows Rockwell Automation® ControlLogix processors to interface easily with Modicon Programmable Automation Controllers (PACs) and a wide variety of Modbus TCP/IP-compatible instruments and devices.

MVI56E enhancements include local and remote configuration and diagnostics through the module's Ethernet port, and CIPconnect® technology for bridging through Rockwell Automation ControlNet and EtherNet/IP networks.

The MVI56E-MNET and MVI56E-MNETXT are functionally the same. The MVI56E-MNET is designed for standard process applications. The MVI56E-MNETXT is designed for the Logix-XT™ control platform, allowing it to operate in extreme environments. It tolerates higher operating temperatures, and has a conformal coating to protect it from harsh or caustic conditions.



Features	Benefits
Backward-Compatible	♦ Upgrade earlier MVI56-MNET modules without changing existing ladder logic programs or module configurations ♦ Enhanced features and flexibility without incurring expensive reprogramming costs
For Extreme Environments (MVI56E-MNETXT only)	♦ Conforms to the EN60079-0 and EN60079-15 standards for applications in caustic and extreme temperature environments ♦ Operates in temperature extremes from -25°C to 70°C (-13°F to 158°F) ♦ Conformal coating protects against caustic or corrosive environmental elements
RSLogix 5000 Integrated	♦ Module communication is integrated within RSLogix™ 5000 using a sample (AOI) or sample ladder logic file
Graphical User Interface Software	♦ ProSoft Configuration Builder (PCB) provides online or offline configuration and diagnostics using the high-speed Ethernet port ♦ CIPconnect®-enabled, allows remote configuration and diagnostic access across multiple bridged EtherNet/IP™ and ControlNet™ networks using Rockwell Automation 1756-ENxT and 1756-CNB network interface modules
ProSoft Discovery Service	♦ Software utility to locate MVI56E modules on the network and assign a temporary IP address for easy configuration

Configuration

ProSoft Configuration Builder (PCB) provides a graphical configuration tool for quick management of module configuration files, as well as viewing communication and module diagnostic information.

CIPconnect technology routes connections over multiple EtherNet/IP or ControlNet paths, allowing you to manage the module from remote locations.

The MVI56E-MNET/MNETXT Setup Guide, with the sample configuration, provides step-by-step instructions on how to move data through the module from the Modbus TCP/IP network to the processor.

General Specifications

- Backward compatible with previous MVI56-MNET versions
- Single-slot 1756 ControlLogix backplane compatible
- 10/100 Mbps auto crossover detection Ethernet configuration and application port
- User-definable module data memory mapping of up to 5000 16-bit registers
- CIPconnect-enabled network configuration and diagnostics monitoring using ControlLogix 1756-ENxT and 1756-CNB modules and EtherNet/IP pass-through communication
- ProSoft Configuration Builder (PCB) software supported, a Windows-based graphical user interface providing simple product and network configuration
- Sample ladder logic and Add-On Instructions (AOI) are used for data transfer between module and processor
- 4-character, alpha-numeric, scrolling LED display of status and diagnostics data in plain English – no cryptic error or alarm codes to decipher
- ProSoft Discovery Service (PDS) software used to locate the module on the network and assign temporary IP address
- Personality Module - a non-volatile, industrial-grade Compact Flash (CF) card used to store network and module configuration, allowing quick in-the-field product replacement by transferring the CF card

Modbus TCP/IP Specifications

- ProSoft Technology's Modbus TCP/IP implementation (MNET) includes both Client (Master) and server (slave) capabilities
- Modbus data types overlap in the module's memory database, so the same data can be conveniently read or written as bit-level or register-level data.
- Configurable floating-point data movement is possible, including support for Enron or Daniel® floating-point formats

Modbus TCP/IP Server (Slave)

- Supports ten independent server connections for Service Port 502 (MBAP)
- Supports ten independent server connections for Service Port 2000 (Encapsulated)
- Accepts Modbus Function Codes 1, 2, 3, 4, 5, 6, 8, 15, 16, 17, 22 and 23
- Module data can be derived from other Modbus server devices on the network through the Client or from the ControlLogix processor

Modbus TCP/IP Client (Master)

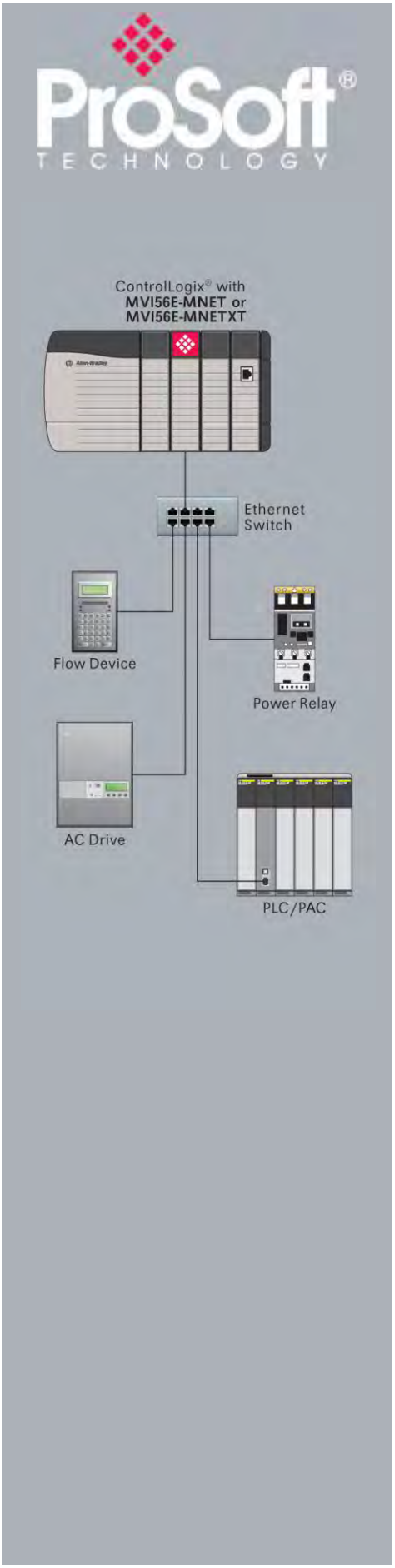
- Actively reads data from and writes data to Modbus TCP/IP devices, using MBAP or Encapsulated Modbus message formats
- Transmit Modbus Function Codes 1, 2, 3, 4, 5, 6, 7, 15, and 16
- Offers one Client connection with up to 100 commands to talk to multiple servers
- ControlLogix processor can be programmed to use special functions to control the activity on the Client by actively selecting commands to execute from the command list (Command Control) or by issuing commands directly from the ladder logic (Event Commands)

Status Data

- Error codes, counters, and module status available from module memory through the server, through the Client, or through the ladder logic and controller tags in RSLogix™ 5000

Functional Specifications

- The MVI56E-MNETand MVI56E-MNETXT are functionally identical. The MVI56E-MNET is for normal process and control environments. The MVI56E-MNETXT is conformal coated for extra protection in harsh or caustic environments and operates in extreme high or low temperature environments.
- Both modules transfer data in the largest possible I/O image block sizes, which optimizes data through-put and update time.
- Both modules appear to the ControlLogix processor as input/output (I/O) modules, rather than communication modules.
- Both modules work well in local rack applications and may be used in remote rack applications. (For information on a remote rack optimized, reduced data block version of the MNET module, look for the MVI56E-MNETR.)
- Retrieving module status and executing special functions (command control, event commands, etc.) are supported in ladder logic by special block transfer codes.



Hardware Specifications

Specification	Description
Backplane Current Load	800 mA @ 5 VDC 3 mA @ 24 VDC
Operating Temperature	0°C to 60°C (32°F to 140°F) - MVI56E-MNET -25°C to 70°C (-13°F to 158°F) - MVI56E-MNETXT
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Shock	30 g operational 50 g non-operational Vibration: 5 g from 10 Hz to 150 Hz
Relative Humidity	5% to 95% RH, with no condensation
LED Indicators	Battery Status (ERR) Application Status (APP) Module Status (OK)
4-Character, Scrolling, Alpha-Numeric LED Display	Shows Module, Version, IP, Application Port Setting, Port Status, and Error Information
Debug/Configuration/Application Ethernet port (E1)	
Ethernet Port	10/100 Base-T, RJ45 Connector, for CAT5 cable Link and Activity LED indicators Auto-crossover cable detection

Agency Approvals & Certifications

Please visit our website: www.prosoft-technology.com

Additional Products

ProSoft Technology® offers a full complement of hardware and software solutions for a wide variety of industrial communication platforms. For a complete list of products, visit our web site at: www.prosoft-technology.com

Ordering Information

To order this product, please use the following:

Modbus TCP/IP Client/Server Enhanced Communication Module for ControlLogix®

MVI56E-MNET
MVI56E-MNETXT

To place an order, please contact your local ProSoft Technology distributor. For a list of ProSoft Technology distributors near you, go to: www.prosoft-technology.com and select *Where to Buy* from the menu.

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Specifications subject to change without notice.

1500W Single Output Power Supply

RSP-1500 series

User's Manual

Dimension

L	*	W	*	H	
278	*	127	*	83.5 (2U)	mm
10.9	*	5	*	3.29 (2U)	inch



R33100 RoHS

UL62368-1 BSEN/EN62368-1 TPTC004 IEC62368-1

Industrial Automate Telecom Network EV

Features

- Universal AC input / Full range
- Built-in active PFC function
- High efficiency up to 91%
- Forced air cooling by built-in DC fan
- Output voltage programmable
- Active current sharing up to 6000W (3+1)
- Built-in remote ON-OFF control / remote sense / auxiliary power / power OK signal
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Optional conformal coating
- 5 years warranty

Applications

- Factory control or automation apparatus
- Test and measurement instrument
- Laser related machine
- Burn-in facility
- Digital broadcasting
- RF application

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

Description

RSP-1500 is a 1.5KW single output enclosed type AC/DC power supply. This series operates for 90~264VAC input voltage and offers the models with the DC output mostly demanded from the industry. Each model is cooled by the built-in fan working for the temperature up to 70℃. Moreover, RSP-1500 provides vast design flexibility by equipping various built-in functions such as the output programming, active current sharing, remote ON-OFF control, auxiliary power, etc.

Model Encoding / Order Information

RSP - 1500 - 48

- 48 — Output voltage (5V/12V/15V/24V/27V/48V)
- 1500 — Output wattage
- RSP — Series name

1500W Single Output Power Supply — RSP-1500 series

SPECIFICATION

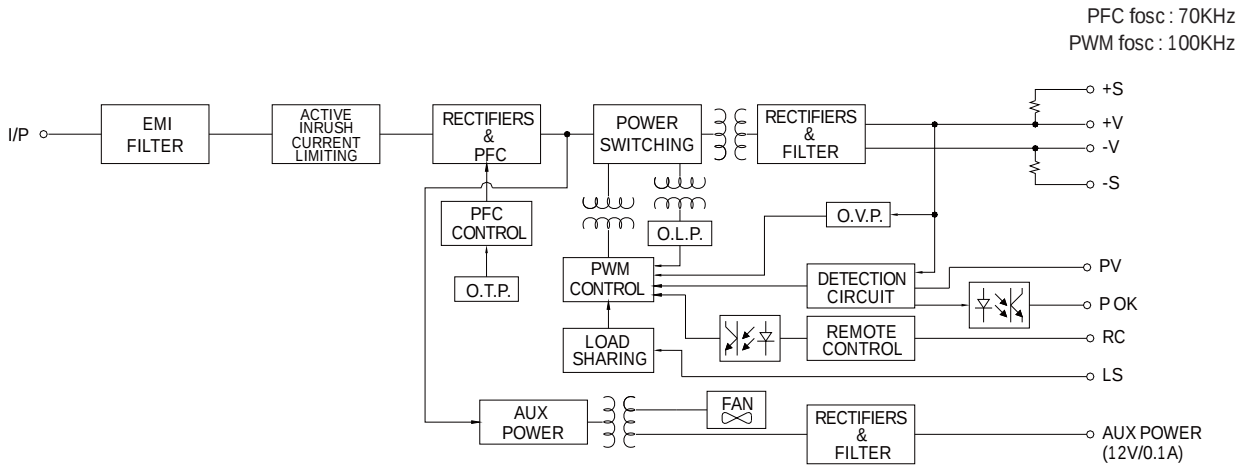
MODEL		RSP-1500-5	RSP-1500-12	RSP-1500-15	RSP-1500-24	RSP-1500-27	RSP-1500-48
OUTPUT	DC VOLTAGE	5V	12V	15V	24V	27V	48V
	RATED CURRENT	240A	125A	100A	63A	56A	32A
	CURRENT RANGE	0 ~ 240A	0 ~ 125A	0 ~ 100A	0 ~ 63A	0 ~ 56A	0 ~ 32A
	RATED POWER	1200W	1500W	1500W	1512W	1512W	1536W
	RIPPLE & NOISE (max.) Note.2	150mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p	200mVp-p
	VOLTAGE ADJ. RANGE	4.5 ~ 5.5V	10 ~ 13.5V	13.5 ~ 16.5V	20 ~ 26.4V	24 ~ 30V	43 ~ 56V
	VOLTAGE TOLERANCE Note.3	±2.0%	±1.0%	±1.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	LOAD REGULATION	±2.0%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	SETUP, RISE TIME	1500ms, 100ms at full load					
	HOLD UP TIME (Typ.)	10ms at full load		14ms at full load		16ms at full load	
INPUT	VOLTAGE RANGE	90 ~ 264VAC 127 ~ 370VDC					
	FREQUENCY RANGE	47 ~ 63Hz					
	POWER FACTOR (Typ.)	0.95/230VAC 0.98/115VAC at full load					
	EFFICIENCY (Typ.)	80%	87%	87%	90%	90%	91%
	AC CURRENT (Typ.)	17A/115VAC 8A/230VAC					
	INRUSH CURRENT (Typ.)	30A/115VAC 60A/230VAC					
	LEAKAGE CURRENT	<2.0mA / 240VAC					
PROTECTION	OVERLOAD Note.4	105 ~135% rated output power					
		Protection type : Constant current limiting unit will shut down o/p voltage after 5sec. Re-power on to recover					
	OVER VOLTAGE	5.75 ~ 6.75V	13.8 ~ 16.8V	17 ~ 20.5V	27.6 ~ 32.4V	31 ~ 36.5V	57.6 ~ 67.2V
		Protection type : Shut down o/p voltage, re-power on to recover					
	OVER TEMPERATURE	Shut down o/p voltage, recovers automatically after temperature goes down					
FUNCTION	OUTPUT VOLTAGE PROGRAMMABLE(PV)	Adjustment of output voltage is allowable to 70 ~ 100% of nominal output voltage. Please refer to the Function Manual.					
	CURRENT SHARING	Up to 6000W or (3+1) units. Please refer to the Function Manual.					
	AUXILIARY POWER	12V@0.1A(Only for Remote ON-OFF control)					
	REMOTE ON-OFF CONTROL	Please see the Function Manual.					
	REMOTE SENSE	Compensate voltage drop on the load wiring up to 0.3V. Please refer to the Function Manual.					
	ALARM SIGNAL OUTPUT	Power OK signal. Please see the Function Manual.					
ENVIRONMENT	WORKING TEMP.	-20 ~ +70℃ (Refer to "Derating Curve")					
	WORKING HUMIDITY	20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY	-40 ~ +85℃, 10 ~ 95% RH non-condensing					
	TEMP. COEFFICIENT	±0.05%/℃ (0 ~ 50℃)					
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes					
SAFETY & EMC (Note 5)	SAFETY STANDARDS	UL62368-1, CAN/CSA C22.2 No. 62368-1, TUV BS EN/EN62368-1, BSMI CNS15598-1, AS/NZS62368.1, EAC TP TC 004 approved					
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:2KVAC O/P-FG:0.5KVAC					
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH					
	EMC EMISSION	Parameter		Standard		Test Level / Note	
		Conducted		BS EN/EN55032 (CISPR32), BSMI CNS15936		Class B/Class A (only for BSMI)	
		Radiated		BS EN/EN55032 (CISPR32), BSMI CNS15936		Class A	
		Harmonic Current		BS EN/EN61000-3-2		-----	
		Voltage Flicker		BS EN/EN61000-3-3		-----	
	EMC IMMUNITY	BS EN/EN55035, BS EN/EN61000-6-2					
		Parameter		Standard		Test Level / Note	
		ESD		BS EN/EN61000-4-2		Level 3, 8KV air ; Level 2, 4KV contact	
		Radiated		BS EN/EN61000-4-3		Level 3	
		EFT / Burst		BS EN/EN61000-4-4		Level 2	
		Surge		BS EN/EN61000-4-5		Level 3, 2KV/Line-Earth ; Level 2, 1KV/Line-Line	
		Conducted		BS EN/EN61000-4-6		Level 3	
		Magnetic Field		BS EN/EN61000-4-8		Level 4	
		Voltage Dips and Interruptions		BS EN/EN61000-4-11		>95% dip 0.5 periods, 30% dip 25 periods, >95% interruptions 250 periods	
OTHERS	MTBF	814.4K hrs min. Telcordia SR-332 (Bellcore) ; 90.4K hrs min. MIL-HDBK-217F (25℃)					
	DIMENSION	278*127*83.5mm (L*W*H)					
	PACKING	3.0Kg; 4pcs/13Kg/1.19CUFT					

NOTE

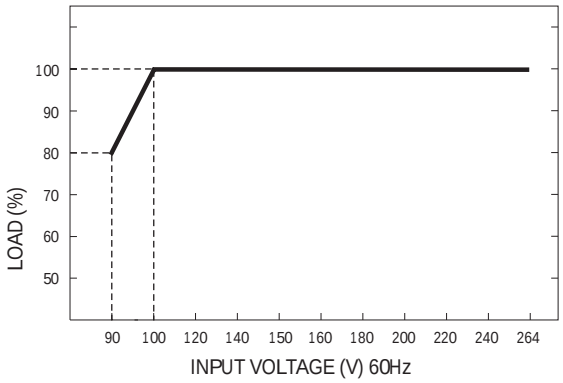
1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. Derating may be needed under low input voltages. Please check the derating curve for more details.
5. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 720mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.” (as available on https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf)
6. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

Block Diagram

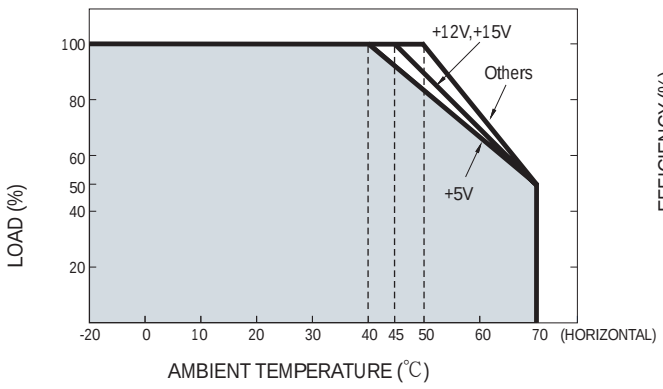


Static Characteristics

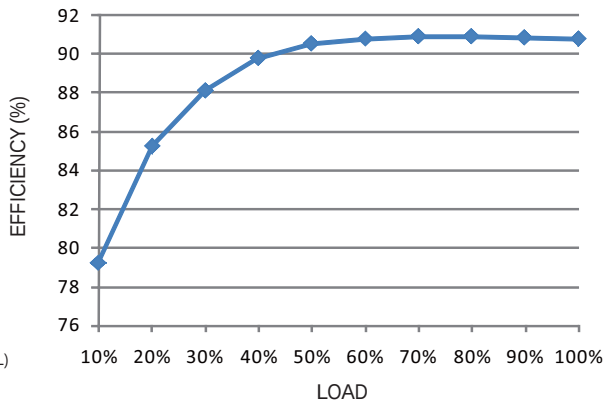


INPUT \ MODEL	5V	12V	15V
100~264VAC	1200W 240A	1500W 125A	1500W 100A
90VAC	960W 192A	1200W 100A	1200W 80A
INPUT \ MODEL	24V	27V	48V
100~264VAC	1512W 63A	1512W 56A	1536W 32A
90VAC	1209.6W 50.4A	1209.6W 44.8A	1228.8W 25.6A

Derating Curve



Efficiency vs Load (48V Model)

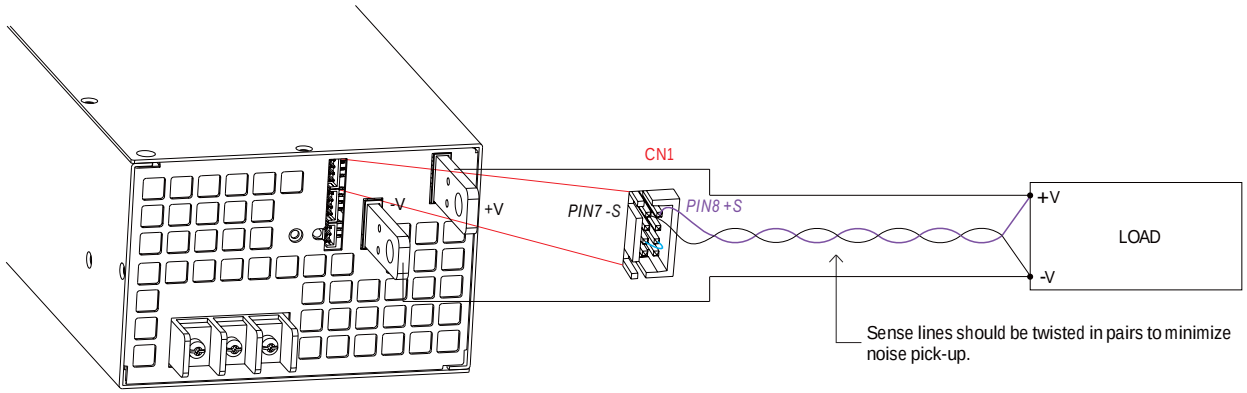


◎ The curve above is measured at 230VAC.

■ Function Manual

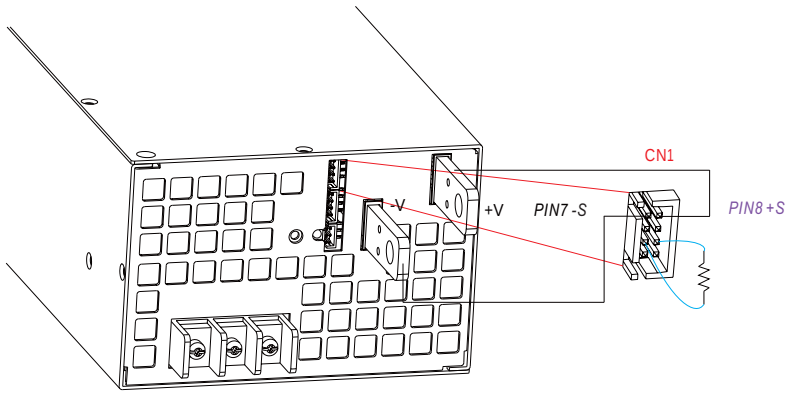
1. Remote Sense

※ The Remote Sense compensates voltage drop on the load wiring up to 0.3V



2. Output Voltage Programming (or, PV / remote voltage programming / remote adjust / margin programming / dynamic voltage trim)

※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed to 70~100%(Typ.) of the nominal voltage by applying EXTERNAL RESISTANCE



◎ Connect an external resistor between *TRIM(pin4)* & *-S(pin3 or pin4 or pin5)* on CN1 or CN2, and +S & +V, -S & -V also need to be connected.

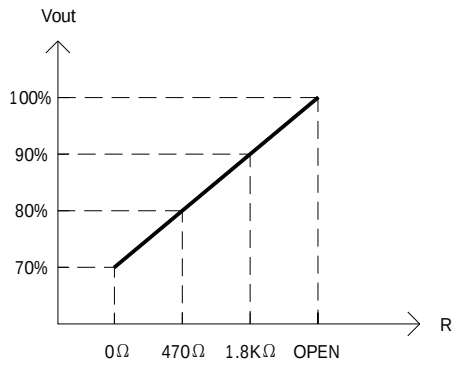
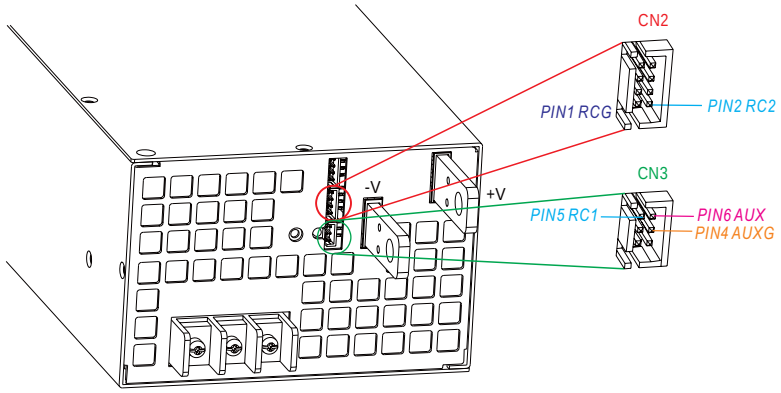


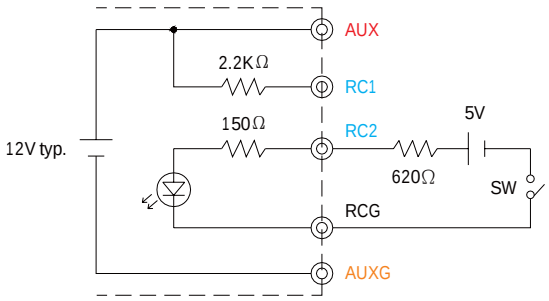
Fig. 2.2 External Resistance (Typical)

3.Remote ON-OFF

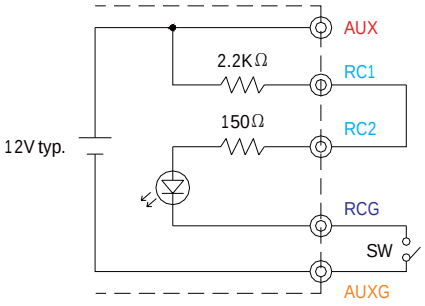
※ Remote ON-OFF is activated by the configuration with respect to CN1,CN2 and CN3 as shown in the following diagram.



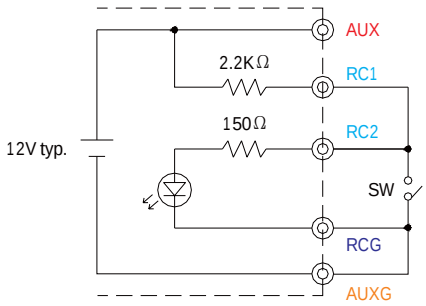
Example 3.2(A): Using external voltage source



Example 3.2(B): Using internal 12V auxiliary output



Example 3.2(C): Using internal 12V auxiliary output

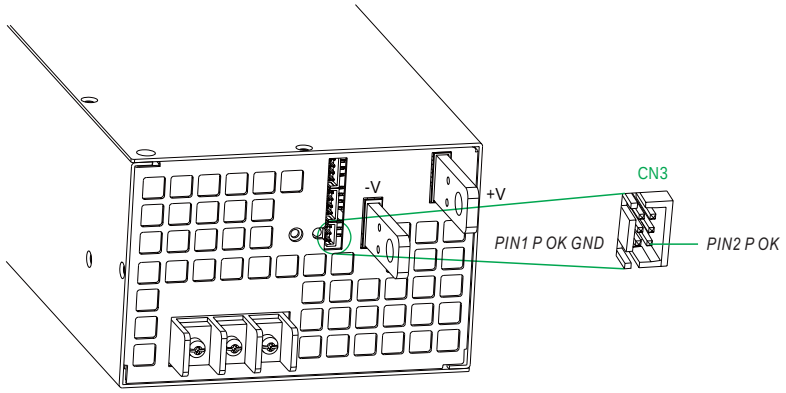


◎ Connection Method

		Fig. 3.2(A)	Fig. 3.2(B)	Fig. 3.2(C)
SW Logic	Output on	SW Open	SW Open	SW Close
	Output off	SW Close	SW Close	SW Open

4.Alarm Signal Output

※ Alarm signal is sent out through "*P OK*" & "*P OK GND*" and pins on CN3. Please acknowledge an external voltage source is required for this function.



Function	Description	Output of alarm(P OK)
P OK	The signal is "Low" when the power supply is above 65% of the rated output voltage, or say, Power OK	Low (0.5V max at 10mA)
	The signal turns to be "High" when the power supply is under 65% of the rated output voltage, or say, Power Fail	High or open (External applied voltage 10mA max.)

Table 4.1 Explanation of alarm

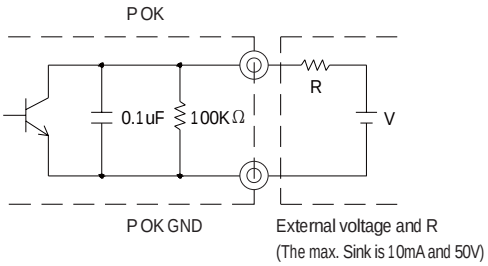


Fig. 4.1 Internal circuit of P OK (Open collector method)

5.Current Sharing with Remote Sense

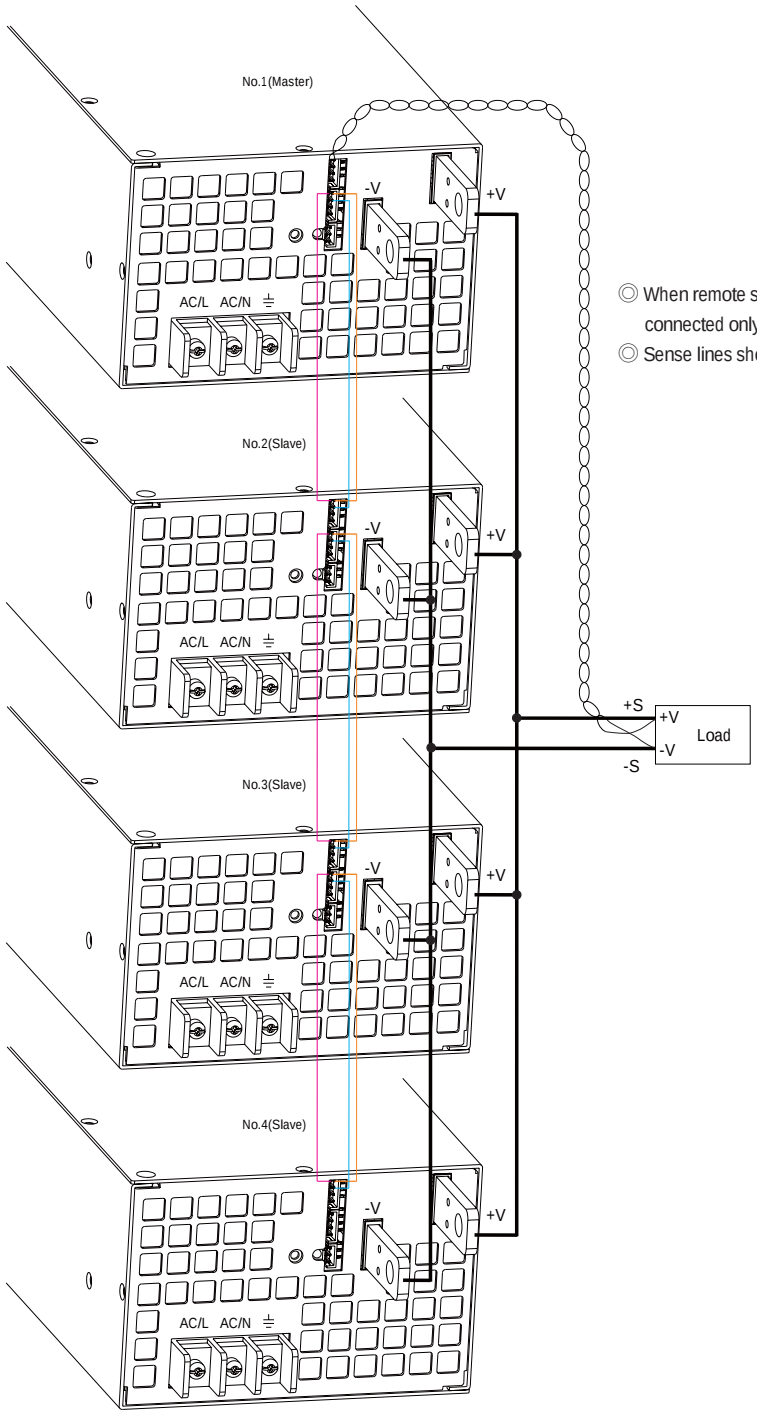
RSP-1500 has the built-in active current sharing function and can be connected in parallel, up to 4 units, to provide higher output power as exhibited below:

※ The power supplies should be paralleled using short and large diameter wiring and then connected to the load.

※ Difference of output voltages among parallel units should be less than 0.2V.

※ The total output current must not exceed the value determined by the following equation:

Maximum output current at parallel operation=(Rated current per unit)×(Number of unit)×0.9



◎ When remote sensing is used in parallel operation, the sensing wire must be connected only to the master unit

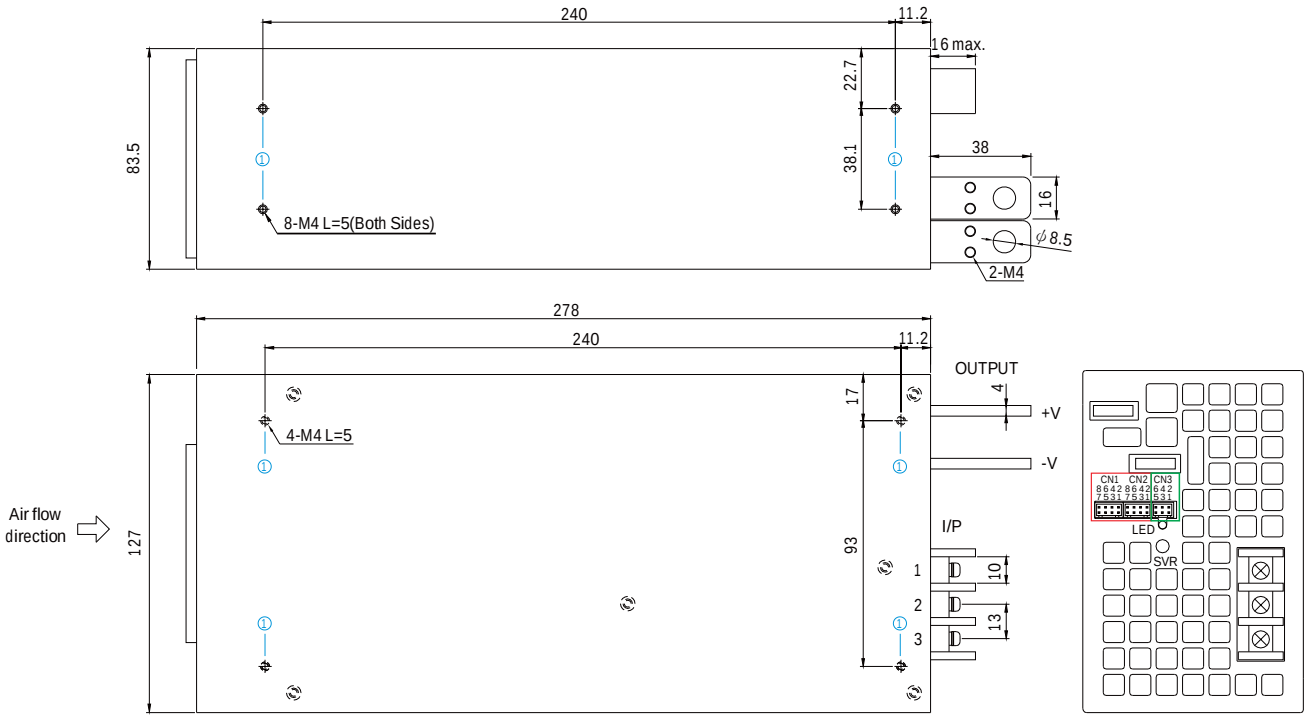
◎ Sense lines should be twisted in pairs to minimize noise pick-up.

◎ +S,-S and CS are connected mutually in paralle.

■ Mechanical Specification

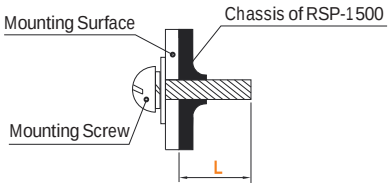
(Unit: mm , tolerance ±1mm)

Case No.943A

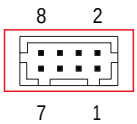


※ Mounting Instruction

Hole No.	Recommended Screw Size	MAX. Penetration Depth L	Recommended mounting torque
①	M4	5mm	7~10Kgf-cm



※ Control Pin No. Assignment (CN1,CN2) : HRS DF11-8DP-2DS or equivalent

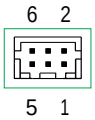


Mating Housing	HRS DF11-8DS or equivalent
Terminal	HRS DF11-**SC or equivalent

◎ CN1 and CN2 are connected internally.

Pin No.	Function	Description
1	RCG	Remote ON-OFF Ground
2	RC2	Remote ON-OFF
3,5,7	-S	Negative sensing for remote sense
4	TRIM	Connection for output voltage programming
6	LS(Current Share)	Current Share
8	+S	Postive sensing for remote sense

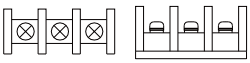
※Control Pin No. Assignment (CN3) : HRS DF11-6DP-2DS or equivalent



Mating Housing	HRS DF11-6DS or equivalent
Terminal	HRS DF11-**SC or equivalent

Pin No.	Function	Description
1	P OK GND	Power OK Ground
2	P OK	Power OK Signal
3	RCG	Remote ON-OFF Ground
4	AUXG	Auxiliary Ground
5	RC1	Remote ON-OFF
6	AUX	Auxiliary Output

※AC Input Terminal Pin No. Assignment

Pin No.	Assignment	Diagram	Maximum mounting torque
1	FG ⏚		18Kgf-cm
2	AC/N		
3	AC/L		

■ Installation Manual

Please refer to : http://www.meanwell.com/manual.html

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SK 3110.000
Thermostat

State: 12/03/2025 (Source: rittal.com/com-en)

SK 3110.000 - Thermostat Enclosure internal thermostat

Particularly suitable for controlling fans, heaters and heat exchangers, this thermostat can also be used as a signal generator for monitoring the enclosure internal temperature.

Features

Model No.	SK 3110.000
Product description	Particularly suitable for controlling fans, heaters and heat exchangers, this thermostat can also be used as a signal generator for monitoring the enclosure internal temperature.
Benefits	Time-saving connection technique using a terminal strip with a screw connection from the outside. Flexible mounting on a vertical or horizontal 35 mm support rail to EN 50 022, and snap fastening in the enclosure section or on the mounting plate using the supplied adaptor
Technical specifications	Bi-metal controller as a temperature-sensitive element with thermal feedback Contact population: Single-pole change-over contact as a quick-break contact Permissible contact load: Category 5 – 3 (heating) AC 10 (4) A (inductive load at cos φ = 0.6)/category 5- 4 (cooling): AC 5 (4) A (inductive load at cos φ = 0.6)/DC = max. 30 W Switching difference: approx. 1 K ± 0.8 K
Colour	RAL 7035
Dimensions	Width: 71 mm Height: 71 mm Depth: 33.5 mm
Setting range	5 °C...60 °C
Rated operating voltage	24 V - 230 V, 1~ 24 V - 60 V (DC)
Packs of	1 pc(s).
Net weight	0.095
Gross weight	0.12

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Features

Customs tariff number	90321020
EAN	4028177036598
E-Number Sweden	E3404752
ETIM 9	EC004587
ETIM 8	EC004587
ECLASS 8.0	27210707

Approvals

Approvals	UL + C-UL (listed) VDE
Certificates	EAC
Explanations	Declaration of conformity Declaration of conformity UK

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SK 3240.110

TopTherm fan-and-filter units

State: 12/03/2025 (Source: rittal.com/com-en)

ENCLOSURES | POWER DISTRIBUTION | CLIMATE CONTROL | IT INFRASTRUCTURE | SOFTWARE & SERVICES

FRIEDHELM LOH GROUP

SK 3240.110 - TopTherm fan-and-filter units

Complete fan unit for tool-free mounting on surfaces. Air throughput from 20 - 900 m³/h, standard protection category IP 54.

Features

Model No.	SK 3240.110
Design	wall-mounted
Product description	Fan-and-filter units with diagonal fan technology have superior pressure stability and ensure a more constant air throughput. The diagonal direction of outflow ensures more even heat dissipation from the enclosure.
Colour	RAL 7035
Supply includes	Complete unit ready to install, including chopped-fibre filter mat
Fan	Diagonal, shaded pole motor
Air throughput, unimpeded airflow (with chopped-fibre filter)	At 50 Hz: 175 m³/h At 60 Hz: 155 m³/h
Air throughput, unimpeded airflow (with pleated filter)	At 50 Hz: 218 m³/h At 60 Hz: 188 m³/h
Air throughput with outlet filter including chopped-fibre filter mat (quantity x order number)	1 x 3240200: 130/110 m³/h 2 x 3240200: 159/135 m³/h
Rated operating voltage	115 V, 1~, 50 Hz/60 Hz
Power consumption Pel	At 50 Hz: 35 W At 60 Hz: 34 W
Rated current max.	At 50 Hz: 0.42 A At 60 Hz: 0.38 A
Dimensions	Width: 255 mm Height: 255 mm
Installation depth	107 mm
Mounting cut-out	Cut-out width: 224 mm Cut-out height: 224 mm

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Features

IP protection category to IEC 60 529	IP 54 with chopped-fibre filter/pleated filter IP 55 with pleated filter and absorber mat IP56 with chopped-fibre filter/pleated filter and hose-proof hood
Protection category NEMA	Type 12 with chopped-fibre filter/pleated filter Type 3 Type 3R Type 4 Type 4X with chopped-fibre filter/pleated filter and hose-proof hood
Pre-fuse	Miniature circuit-breaker/fuse: 4 A
Note	To increase the air throughput, a pleated filter may optionally be used (see characteristic curve). Suitable for use with fan-and-filter units, roof-mounted fans and outlet filters. With the fan-and-filter unit 3237.XXX, electrical connection is made via two single wires (length approx. 300 mm) on the unit, for all other fan-and-filter units, a screwless spring terminal is used
Service life of fans (L10, 40 °C)	At 50 Hz: 72,000 h At 60 Hz: 76,000 h
Operating temperature range	-30 °C...55 °C
Storage temperature range	-30 °C...70 °C
Noise level	At 50 Hz: 51 dB(A) At 60 Hz: 46 dB(A)
Packs of	1 pc(s).
Net weight	2.1
Gross weight	2.267
Customs tariff number	84145915
EAN	4028177651951
ETIM 9	EC000320
ETIM 8	EC000320
ECLASS 8.0	27180716

Approvals

Approvals	CSA UL + C-UL - FTTA UR + C-UR (recognized)
Explanations	Declaration of conformity Declaration of conformity UK

Tender text

Fan-and-filter units with diagonal fan technology
have superior pressure stability and ensure a more
constant air throughput. The diagonal direction of outflow
ensures more even heat dissipation from the enclosure
Air troughput (unimpeded air flow): 175 / 155 m3/h
Power consumption: 35 / 34 W
Rated current: 0,42 / 0,38 A
Rated operating voltage: 115 V, 1~, 50/60 Hz
Fan: Diagonal, shaded pole motor
Dimensions [WxH]: 255x255 mm
Build depth: 25 mm
Installation depth: 107 mm
Mounting cut-out [WxH]: 224x224 mm
Operating temperature range: -30°C to 55°C
Storage temperature range: -30°C to 70°C
Colour: RAL 7035
Protection category IP to IEC 60 529:
IP 54 with fleece filter/pleated filter
IP 55 with pleated filter and absorber mat
IP 56 with fleece filter/pleated filter and hose-proof hood
Protection category NEMA:
Type 12 with fleece filter/pleated filter
Type 3, 3R, 4, 4X with fleece filter/pleated filter and hose-proof hood
Noise level: 51 / 46 db(A)
Service life of fans: 72.000 / 76.000 h
Weight: 2,08 kg

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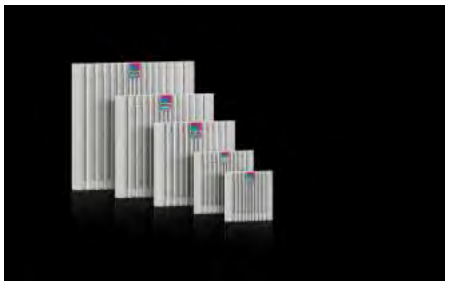
SK 3240.400

Blue e+ outlet filter

State: 12/03/2025 (Source: rittal.com/com-en)

SK 3240.400 - Blue e+ outlet filter EMC

For ventilation by convection, an outlet filter can be fitted in both the upper and lower sections of the enclosure.



Features

Model No.	SK 3240.400
Design	wall-mounted EMC
Benefits	Easy filter changes, thanks to a new opening mechanism on the louvred grille Faster installation on the enclosure with optimised detent hooks Tool-free assembly
Colour	RAL 7035
Supply includes	Outlet filter EMC filter mat
Mounting cut-out	Cut-out width: 224 mm Cut-out height: 224 mm
To fit Model No.	SK 3240.8xx/3241.8xx
Dimensions	Width: 255 mm Height: 255 mm Depth: 45.2 mm
Protection category NEMA	Type 12 with chopped-fibre filter Type 3 Type 3R Type 4 Type 4X with chopped-fibre filter and hose-proof hood

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Features

IP protection category to IEC 60 529	IP 54 with chopped-fibre filter IP56 with chopped-fibre filter and hose-proof hood
Weight/pack	0.56 kg
Packs of	1 pc(s).
Net weight	0.4
Gross weight	0.661
Customs tariff number	39269097
EAN	4028177998346
ETIM 9	EC002513
ETIM 8	EC002513
ECLASS 8.0	27180706

Approvals

Approvals	UL + C-UL - FTTA UR + C-UR (recognized)

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SZ 2500.314
LED system light

State: 12/03/2025 (Source: rittal.com/com-en)

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FRIEDHELM LOH GROUP

SZ 2500.314 - LED system light

LED system light – the first light especially for enclosures! Highly innovative LED technology for even more light into the very last corner.

Features

Model No.	SZ 2500.314
Design	with socket, with motion detector
Benefits	Optimum illumination of the entire enclosure Optionally with clip, screw and magnetic attachment A configuration to suit every application
Design	Motion sensor Socket 90° rotating connector Adjustable light direction Adjustable light distribution
Material	Light body: Extruded aluminium Light cover: Polycarbonate Light ends: PC-ABS
Colour	Enclosure: RAL 7016
Supply includes	Assembly screws
Power consumption	13 W
Connection options	Infeed, 3-pole Through-wiring, 3-pole
Motion detector	Yes
Overvoltage category	II
Protection class	II (all-insulated)
Light – installation type	Screw-fastening Clip attachment
Rated impulse withstand voltage, phase to earth	2500 V AC
Rated insulation voltage	300 V AC

Features

Installation options	Directly onto the enclosure section with 25 mm pitch pattern
Luminous flux	1,200 lm
Light colour	4000 K (neutral white)
Note	Connection accessories should be ordered separately
Dimensions	Width: 437 mm Height: 85 mm Depth: 44 mm
Operating temperature range	-20 °C...55 °C
Sockets	USA/CDN (type B, NEMA 5-15)
Rated operating voltage	100 V - 125 V, 1~, 50 Hz/60 Hz
Socket version	USA/CDN (type B, NEMA 5-15)
IP protection category to IEC 60 529	IP 20
Packs of	1 pc(s).
Net weight	0.6
Gross weight	0.684
Customs tariff number	94054990
EAN	4028177811287
ETIM 9	EC000321
ETIM 8	EC000321
ECLASS 8.0	27189241

Approvals

Approvals	ENEC UL
Explanations	Declaration of conformity Declaration of conformity UK

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TS 8601.860
Earthquake base/plinth

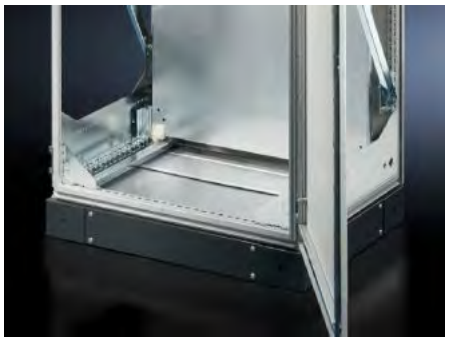
State: 12/03/2025 (Source: rittal.com/com-en)

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FRIEDHELM LOH GROUP

TS 8601.860 - Earthquake base/plinth for VX, TS

For stable attachment of the earthquake-resistant enclosure to the subsurface. External metric M6 thread for a stable connection to the subsurface from the outside.



Features

Model No.	TS 8601.860
Product description	For stable attachment of the earthquake-resistant enclosure to the subsurface. External metric M6 thread for a stable connection to the subsurface from the outside.
Material	Corner pieces: Sheet steel 5 mm Trim panels: Sheet steel 2 mm
Surface finish	Powder-coated
Colour	RAL 7022
Supply includes	Base/plinth, fully assembled 4 corner pieces 2 depth stays 1 trim panel front/rear
Note	Meets earthquake zone 4 to Telcordia GR-63-Core in conjunction with a comfort handle and an earthquake kit.
Dimensions	Height: 100 mm
To fit	Enclosure type: VX TS Width: = 800 mm Depth: = 600 mm
Packs of	1 pc(s).

Features

Net weight	15.06
Gross weight	15.87
PCF per pack (cradle-to-gate)	60.6 kg CO2 eq (Cat B)
Note on PCF category	Category B: PCF value (cradle-to-gate) based on the product weight, approximately calculated and self-declared
Customs tariff number	94039910
EAN	4028177413597
ETIM 9	EC000721
ECLASS 8.0	27182003

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VX 8808.000

Bayed enclosure system VX25

State: 12/03/2025 (Source: rittal.com/com-en)

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FRIEDHELM LOH GROUP

VX 8808.000 - Bayed enclosure system VX25 Basic enclosure

The standard in enclosure manufacturing: Enclosure frame with one front door, rear panel, mounting plate, roof plate, divided gland plates. Perfectly suited to efficient enclosure interior installation.

Features

Model No.	VX 8808.000
Material	Enclosure frame: Sheet steel, 1.5 mm Roof: Sheet steel, 1.5 mm Door: Sheet steel, 2.0 mm Rear panel: Sheet steel, 1.5 mm Gland plates: Sheet steel, 1.5 mm Mounting plate: Sheet steel, 3.0 mm
Surface finish	Enclosure frame: Dipcoat-primed Door, roof and rear panel: Dipcoat-primed, powder-coated on the outside, textured paint Mounting plate and gland plates: Zinc-plated
Colour	RAL 7035
Supply includes	Enclosure frame Door(s) Door hinged on the right, may be swapped to the left Roof plate Rear panel Gland plates Mounting plate 2 punched rails 18 x 39 mm Lock: 3 mm double-bit
Dimensions	Width: 800 mm Height: 2,000 mm Depth: 800 mm
Dimensions mounting plate (W x H)	699 mm x 1,896 mm

Features

Protection category to IEC 60 529	IP 55
Protection category NEMA	NEMA 1 NEMA 12
Type rating to UL 50E	Type 1 Type 12
IK Code	IK10
Number of doors	1
Basic material	Sheet steel
Packs of	1 pc(s).
Net weight	124.14
Gross weight	138.2
PCF per pack (cradle-to-gate)	340 kg CO2 eq (Cat B)
Note on PCF category	Category B: PCF value (cradle-to-gate) based on the product weight, approximately calculated and self-declared
EAN	4028177813854
ETIM 9	EC000261
ETIM 8	EC000261
ECLASS 8.0	27180101

Approvals

Approvals	Bureau Veritas DNV-GL Lloyds Register of Shipping UL + C-UL (listed)
Certificates	Surface finish
Explanations	Manufacturer's declaration Declaration of conformity Declaration of conformity UK

Tender text

Enclosure (baying system) single door

Housing:
symmetrical frame construction, consisting of
closed an profiled hollow section with 25 mm
pitch pattern.
Frame with integrated blind rivet nut M6 enables for
protection class oriented fixing
of fitting parts at the profile.
All sections have chamfered edges.
Horizontal sections have a protection lip above the seal.
Circumferential equal profiles with two mounting levels
accessible from inside and outside of the frame for
space-saving and fast interior installation.
The entire square perforation enables the use of cage nuts
and metrical screws up to M8.
Welded base frame with integrated base reinforcement
allows to fasten the enclosure on the underground through
the inner side of the enclosure.
Mounted three-piece gland plate, removable and exchangable.
Bayable on all sides.
Load capacity up to 15.000 N.
Door:
with foamed-in seal, with removable tubular door frame
with holes on a 25 mm pitch pattern and
integrated cable clamping.
4-point latch locking rod, double-bit insert to DIN 43668,
Door hinge may be swapped from right to left.
Hinges with captive hinge pins, door opening angle 130°
tool-less retrofittable to 180°. Floor clearance 17 mm.
Rear panel and roof plate:
With foamed-in seal, removable. Rear panel and
roof plate screw-fastened and removable. Rear panel
with positioning aid. Roof with roof fastening screws M12.
Mounting plate:
C-folded on the sides, depth-adjustable via integral
plastic sliders and with re-usable mounting rails,
depth-adjustable in a 25 mm pitch pattern. Including
mounting pattern for easy positioning of components.

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Flat parts:
Roof, door and rear panel included in the scope of supply.
Side panels are available as separate accessory.
Rear panel, roof and gland plates are electrically conductive connected with the frame (automatic potential equalisation) to DIN 62 208 and prepared for the additional attachment of earthing straps.
QR Code:
Printed QR Code on roof, door, mounting plate, rear panel and type plate for unambiguous marking and for easy recall of relevant product information and documentation, as well as clear traceability of single parts.
Material:
Enclosure frame, rear panel and roof: 1.5 mm sheet steel
Door: 2 mm sheet steel
Mounting plate: 3 mm sheet steel, zinc-plated
Surface Finish:
Triple surface treatment ensures optimum protection against corrosion and is resistant to mineral oils, lubricants, machining emulsions and solvents:
nanoceramic coating,
electro-phoretic dipcoat-priming,
textured powder coating in RAL 7035 for outside surfaces.
Protection category to IEC 60 529 (with mounted side panels): IP 55
Protection category to UL 508A: Type 1, 12
Impact protection to IEC 62 262: IK10
Dimensions (W x H x D): 800x2000x800 mm

WDK 4N V

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Product image



To feed through power, signal, and data is the classical requirement in electrical engineering and panel building. The insulating material, the connection system and the design of the terminal blocks are the differentiating features. A feed-through terminal block is suitable for joining and/or connecting one or more conductors. They could have one or more connection levels that are on the same potential or insulated against one another.

General ordering data

Version	Multi-tier modular terminal, Screw connection, dark beige, 4 mm², 800 V, 800 V, Number of connections: 4, Number of levels: 2, TS 35, V-0, Wemid
Order No.	1041910000
Type	WDK 4N V
GTIN (EAN)	4032248138753
Qty.	50 pc(s).

WDK 4N V

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Technical data

Dimensions and weights

Depth	63.25 mm	Depth (inches)	2.49 inch
Depth including DIN rail	64.15 mm	Height	60.7 mm
Height (inches)	2.39 inch	Width	6.1 mm
Width (inches)	0.24 inch	Net weight	15.09 g

Temperatures

Storage temperature	-25 °C...55 °C	Operating temperature range	For operating temperature range see EC Design Test Certificate / IEC Ex-Certificate of Conformity
Continuous operating temp., min.	-60 °C	Continuous operating temp., max.	130 °C

Material data

Material	Wemid	Colour	dark beige
UL 94 flammability rating	V-0		

Rating data IECEx/ATEX

Certificate No. (ATEX)	DEMKO15ATEX1346U	Certificate No. (IECEX)	IECEXULD15.0003U
Max. voltage (ATEX)	550 V	Current (ATEX)	30 A
Wire cross section max. (ATEX)	6 mm²	Max. voltage (IECEX)	550 V
Current (IECEX)	30 A	Wire cross section max. (IECEX)	6 mm²
Operating temperature range	For operating temperature range see EC Design Test Certificate / IEC Ex-Certificate of Conformity	Marking EN 60079-7	Ex eb II C Gb
Ex 2014/34/EU label	II 2 G D		

System specifications

Version	Screw connection, for plug-in cross-connector, One end without connector, Vertically cross-connected	End cover plate required	Yes
Number of potentials	1	Number of levels	2
Number of clamping points per level	2	Levels cross-connected internally	Yes
PE connection	No	Rail	TS 35
N-function	No	PE function	No
PEN function	No		

2 clampable conductors (H05V/H07V) with equal cross-section (rated connection)

Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, max.	1.5 mm²	Wire connection cross section, finely stranded with wire-end ferrules DIN 46228/1, 2 clampable wires, min.	0.5 mm²
Wire connection cross section, finely stranded, two clampable wires, min.	0.5 mm²	Wire cross-section, finely stranded, two clampable wires, max.	1.5 mm²

Additional technical data

Explosion-tested version	Yes	Number of similar terminals	1
Open sides	right	Type of mounting	Snap-on

WDK 4N V

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Technical data

CSA rating data

Certificate No. (CSA)	200039-1057876	Current size C (CSA)	30 A
Current size D (CSA)	5 A	Voltage size C (CSA)	300 V
Voltage size D (CSA)	600 V	Wire cross section max. (CSA)	10 AWG
Wire cross section min. (CSA)	26 AWG		

Conductors for clamping (additional connection)

Connection type, additional connection	Screw connection

Conductors for clamping (rated connection)

Blade size	0.6 x 3.5 mm	Clamping range, max.	6 mm²
Clamping range, min.	0.13 mm²	Clamping screw	M 3
Connection cross-section, stranded, max.	6 mm²	Connection cross-section, stranded, min.	1.5 mm²
Connection direction	on side	Gauge to IEC 60947-1	A4
Number of connections	4	Stripping length	8 mm
Tightening torque, max.	1 Nm	Tightening torque, min.	0.5 Nm
Torque level with DMS electric screwdriver	2	Type of connection	Screw connection
Type of connection 2	Screw connection	Wire connection cross section AWG, max.	AWG 10
Wire connection cross section AWG, min.	AWG 26	Wire connection cross section, finely stranded, max.	4 mm²
Wire connection cross section, finely stranded, min.	0.5 mm²	Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, max.	4 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/1, min.	0.5 mm²	Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, max.	4 mm²
Wire connection cross-section, finely stranded with wire-end ferrules DIN 46228/4, min.	0.5 mm²	Wire connection cross-section, solid core, max.	6 mm²
Wire connection cross-section, solid core, min.	0.5 mm²		

General

Number of poles	1	Rail	TS 35
Standards	IEC 60947-7-1	Wire connection cross section AWG, max.	AWG 10
Wire connection cross section AWG, min.	AWG 26		

Rating data

Rated cross-section	4 mm²	Rated voltage	800 V
Rated DC voltage	800 V	Rated current	32 A
Current at maximum wires	35 A	Standards	IEC 60947-7-1
Volume resistance according to IEC 60947-7-x	2 mΩ	Rated impulse withstand voltage	8 kV
Power loss in accordance with IEC 60947-7-x	1.02 W	Pollution severity	3

WDK 4N V

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Technical data

UL rating data

Certificate No. (UR)	E60693	Conductor size Factory wiring max. (UR)	10 AWG
Conductor size Factory wiring min. (UR)	26 AWG	Conductor size Field wiring max. (UR)	10 AWG
Conductor size Field wiring min. (UR)	26 AWG	Current size C (UR)	35 A
Voltage size C (UR)	600 V		

Classifications

ETIM 6.0	EC000897	ETIM 7.0	EC000897
ETIM 8.0	EC000897	ETIM 9.0	EC000897
ECLASS 9.0	27-14-11-20	ECLASS 9.1	27-14-11-20
ECLASS 10.0	27-14-11-20	ECLASS 11.0	27-14-11-20
ECLASS 12.0	27-14-11-20	ECLASS 13.0	27-25-01-02
ECLASS 14.0	27-25-01-02		

Environmental Product Compliance

RoHS Compliance Status	Compliant without exemption
REACH SVHC	No SVHC above 0.1 wt%

Approvals

Approvals

ROHS	Conform
UL File Number Search	UL Website
Certificate No. (UR)	E60693
Certificate No. (cURusEX)	E184763

Downloads

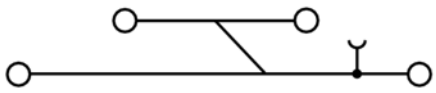
Approval/Certificate/Document of Conformity	Attestation of Conformity UKCA Ex Attestation of Conformity IECEx Certificate ATEX Certificate ATEX Certificate CB Test Certificate CB Certificate CCC Ex Certificate UKCA Ex Certificate CE Declaration of Conformity UKCA declaration of conformity Confirmation of Standards EN 45545-2_2020-10
Engineering Data	CAD data – STEP
User Documentation	Operating instructions_WDKV_DKV.pdf StorageConditionsTerminalBlocks NTI WDK-WPE 4N V
Catalogues	Catalogues in PDF-format
Brochures	

WDK 4N V

Weidmüller Interface GmbH & Co. KG
Klingenbergstraße 26
D-32758 Detmold
Germany

www.weidmueller.com

Drawings



7.17 IOM for Insulation

PAROC Pro Section 140





Certification Number	0809-CPR-1016 / Eurofins Expert Services Ltd, Kivimiehentie 4, FI-02150 Espoo. Finland
Designation Code	MW-EN 14303-T8/T9-ST(+)680-WS1-CL10
Short Description	Stone wool pipe section
Application	Thermal insulation of industrial pipework in higher temperature. In ships thermal insulation of pipes in higher temperature. Also possible to use with facings AluCoat, G4 and G7. See "Facings".

The notified body Eurofins Expert Services Ltd. (0809) performed and issued the certificates:
Type-Examination (Module B) certificate No. VTT-C-12177-15-17

Nominal Density	140 kg/m³

PAROC stone wool products are capable of withstanding high temperatures. The binder starts to evaporate when its temperature exceeds approximately 200°C. The insulating properties remain unchanged, but the compressive stress weakens. The softening temperature of stone wool products is over 1000°C.

Dimensions

Dimensions		
Thickness	**Inner Diameter**	**Pipe Section Length**
20 - 160 mm	12 - 1016 mm	1200 mm
In accordance with EN 13467	In accordance with EN 13467	In accordance with EN 13467

Dimensional Stability		
Property	**Value**	**According to**
Maximum Service Temperature - Dimensional Stability	680 °C	EN 14303:2009+A1:2013 (EN 14707)

Packaging

Package Type	Cartons or plastic packs on pallet

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Fire Properties

Reaction to Fire		
Property	**Value**	**According to**
Reaction to Fire, Euroclass	$A1_L$	EN 14303:2009+A1:2013 (EN 13501-1)

Other Fire Properties		
Property	**Value**	**According to**
Fire Classification (IMO)	Non-combustible	IMO FTP Code Part 1

Thermal Properties

Thermal Resistance		
Property	**Value**	**According to**
Thermal Conductivity in 50 °C, λ_{50}	0,041 W/mK	EN 14303:2009+A1:2013 (EN ISO 8497)
Thermal Conductivity in 100 °C, λ_{100}	0,047 W/mK	EN 14303:2009+A1:2013 (EN ISO 8497)
Thermal Conductivity in 150 °C, λ_{150}	0,054 W/mK	EN 14303:2009+A1:2013 (EN ISO 8497)
Thermal Conductivity in 200 °C, λ_{200}	0,063 W/mK	EN 14303:2009+A1:2013 (EN ISO 8497)
Thermal Conductivity in 250 °C, λ_{250}	0,073 W/mK	EN 14303:2009+A1:2013 (EN ISO 8497)
Thermal Conductivity in 300 °C, λ_{300}	0,085 W/mK	EN 14303:2009+A1:2013 (EN ISO 8497)
Thermal Conductivity in 400 °C, λ_{400}	0,110 W/mK	EN 14303:2009+A1:2013 (EN ISO 8497)
Dimensions and Tolerances	T8/T9	EN 14303:2009+A1:2013

Moisture Properties

Water Permeability		
Property	**Value**	**According to**
Water Absorption, Short Term WS, W_p	≤ 1 kg/m²	EN 14303:2009+A1:2013 (EN 13472)

Rate of Release of Corrosive Substances

Trace Quantities of Water Soluble Ions and the pH Value		
Property	**Value**	**According to**
Chloride Ions, Cl-	< 10 ppm	EN 14303:2009+A1:2013 (EN 13468)

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7.18 IOM for Heat Tracing

PETK

Power and End Termination Kit

INSTALLATION PROCEDURES

- ☐ **PETK-1D** **for BSX, RSX, VSX-HT**
- ☐ **PETK-2D** **for KSX, HTSX, USX**
- ☐ **PETK-3D** **for HPT, FP**

Order separately to be used in conjunction with Thermon connection kits



PETK

Receiving, Storing and Handling

1. Inspect materials for damage incurred during shipping.
2. Report damages to the carrier for settlement.
3. Identify parts against the packing list to ensure the proper type and quantity has been received.
4. Store in a dry location.

PETK Power and End Termination Kits (per cable)	
PETK-1D	for BSX, RSX, VSX-HT
PETK-2D	for KSX, HTSX, USX
PETK-3D	for HPT, FP

Kit Contents



Item	Qty.	Description
1	1	RTV Tube
2	1	Power Connection Boot
3	1	End Cap
4	1	Tape Strip (PETK-3D Only)
5	1	End Termination Caution Label
6	1	GRW-G Grommet (For PETK-3D Terminator kits only)

Installation Precautions

- To minimize the potential for arcing and fire caused by product damage or improper installation use ground-fault protection. The National Electrical Code (NEC) and Canadian Electrical Code (CEC) require ground-fault protection of equipment for each branch circuit supplying electric heat tracing.
- Installation must comply with Thermon requirements and be installed in accordance with the NEC, CEC, or any other applicable national and local codes.
- Component approvals and performance ratings are based on the use of Thermon specified parts only.
- De-energize all power sources before opening enclosure.
- Keep ends of heating cable and kit components dry before and during installation.
- Individuals installing these products are responsible for complying with all applicable safety and health guidelines. Proper Personal Protective Equipment (PPE) should be utilized during installation. Contact Thermon if you have any additional questions.

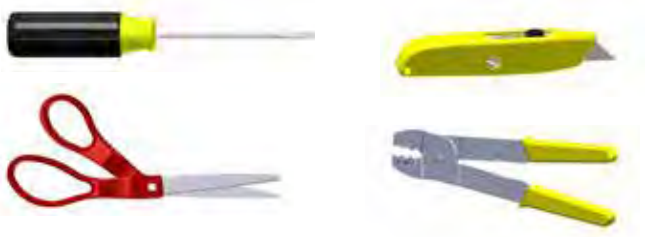
PETK Certifications/Approvals[1]

FM Approved

Note:

1. These sets have been evaluated as components of Thermon's Approved connection kits, such that the area use ratings depend on the rating of the connection kits.

Tools Required



IMPORTANT!

Heating cable must be properly installed within expediter assembly and mounted to pipe prior to terminating with PETK kit.

See Terminator and/or TracePlus Installation Instructions for expediter mounting details.



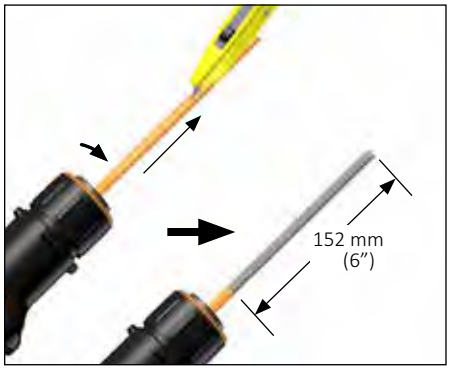
Terminator: Route cable through base entry and mount expediter to pipe using pipe band. Do not band over cable.

Note: For HPT and FP cable exchange grommet in Terminator with GRW-G provided in PETK-3D.



TracePlus: Route cable through base entry and mount expediter to pipe using pipe band. Do not band over cable.

Step 1: Remove Heating Cable Overjacket and Separate Metallic Braid to Form Pigtail



1a. Cut and remove heating cable overjacket.

Do not cut metallic braid.

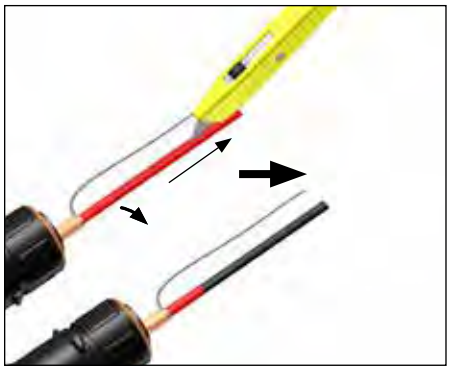


1b. Separate braid strands at edge of overjacket and pull cable through opening in braid.

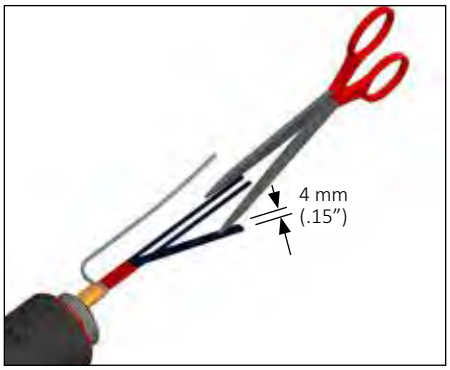


1c. Twist braid into a pigtail. Trim ends of braid.

Step 2: Matrix Removal for BSX, RSX, HTSX, KSX, USX, and VSX-HT Cables

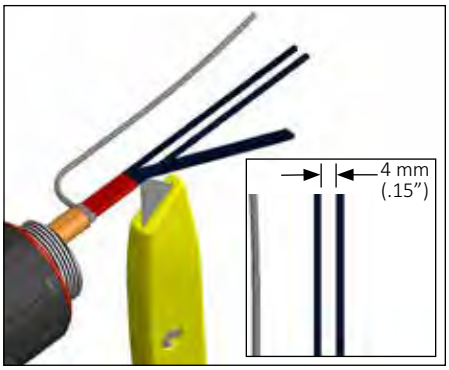


2a. Cut and remove primary insulation jacket (BSX and RSX cables only).



2b. Cut a 4 mm strip of conductive matrix between the conductors.

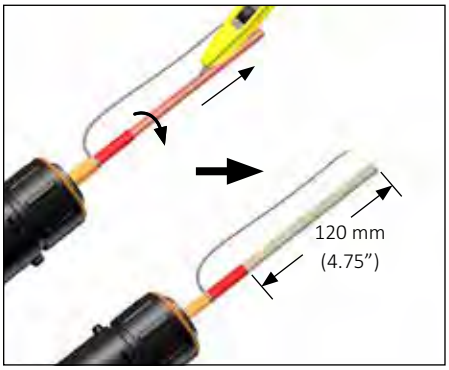
Do not cut bus wire strands.



2c. Cut and remove the 4 mm matrix strip.

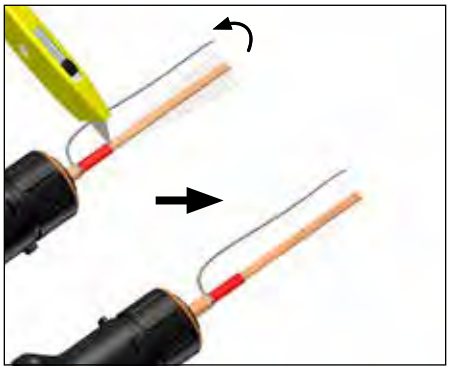
PETK

Step 2: Heating Element Removal for HPT and FP Cables

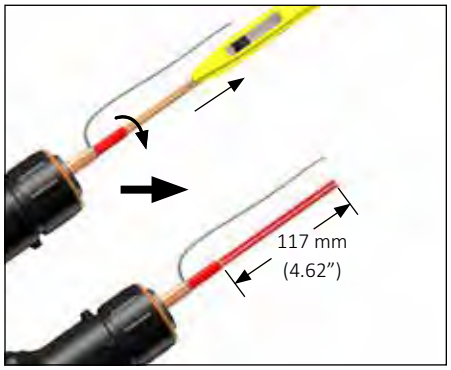


2a. Cut and remove primary insulation jacket.

NOTE: Bus connection must be no more than 50 mm (2") from pipe as addressed in connection kit instructions.



2b. Cut and remove fiberglass overlay and heating element. Push any remaining heating element wire under the primary insulation jacket.



2c. Cut and remove pairing jacket.

Do not cut bus wire insulation.

Step 3: Install Power Boot on Heating Cables

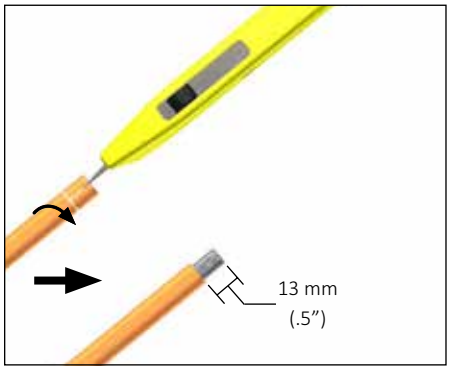


3a. Apply RTV sealant to cable to cover distance of at least 3 mm and slide boot onto the end of the cable.

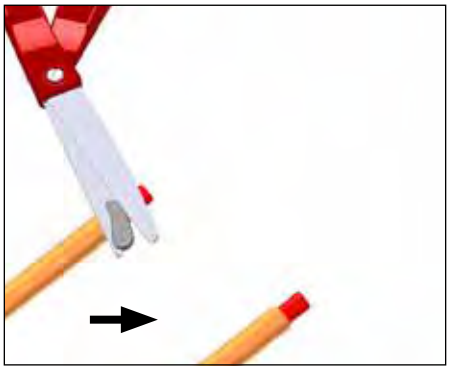


3b. Slide boot onto the end of the cable. Expose 13 mm (0.5") of bus wire.

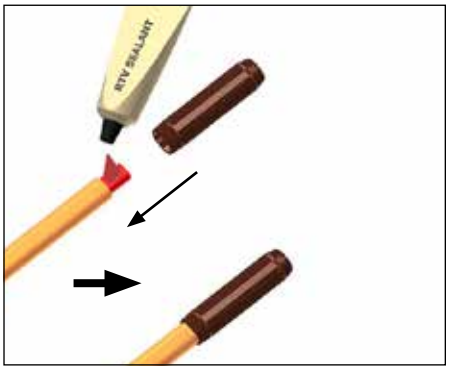
Step 4: End Termination for BSX, RSX, HTSX, KSX, USX, and VSX-HT



4a. Cut and remove heating cable overjacket.

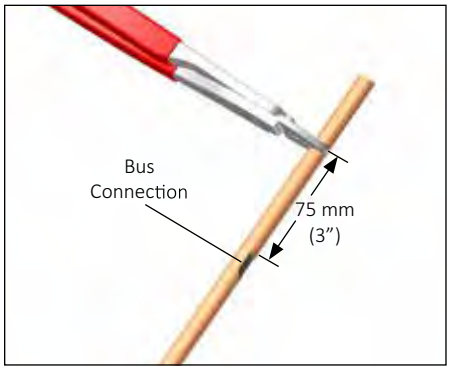


4b. Trim away exposed braid from cable.

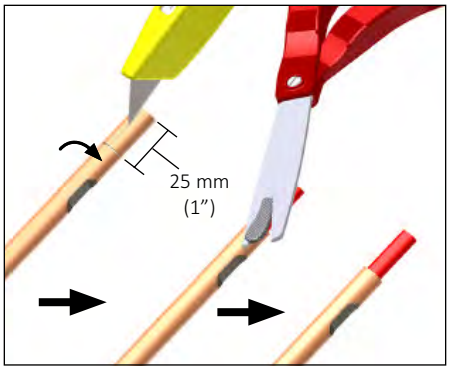


4c. Fill the end cap with RTV sealant and apply a circumferential bead to cable [minimum of 3 mm (0.12") wide]. Slide end cap onto end of cable.

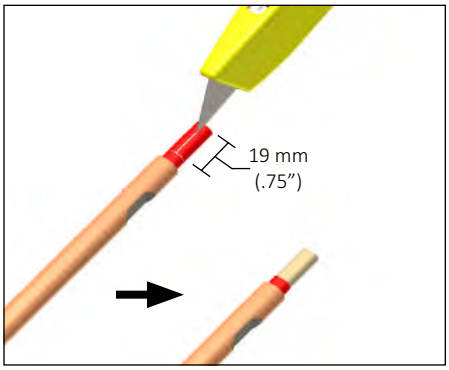
Step 4: End Termination for HPT and FP



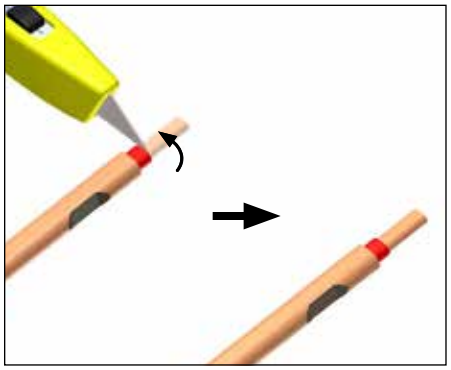
4a. Trim the cable 75 mm (3") from the bus connection.



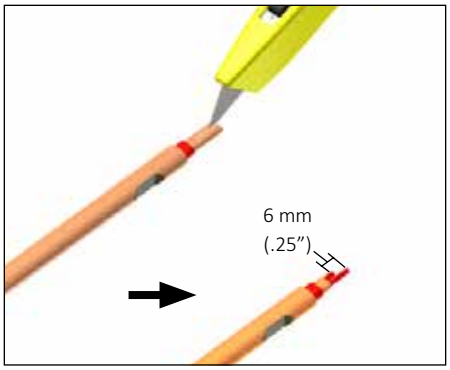
4b. Cut and remove overjacket and trim away exposed braid from cable.



4c. Cut and remove primary insulation jacket.

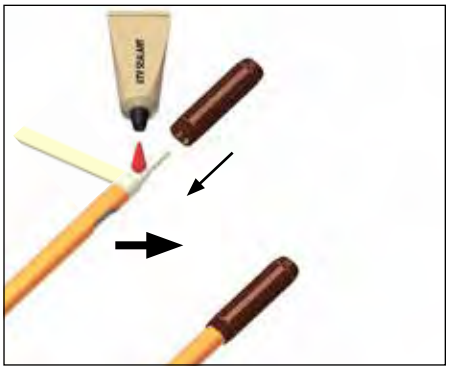


4d. Cut and remove fiberglass overlay and heating element. Push any remaining heating element wire under the primary insulation jacket.



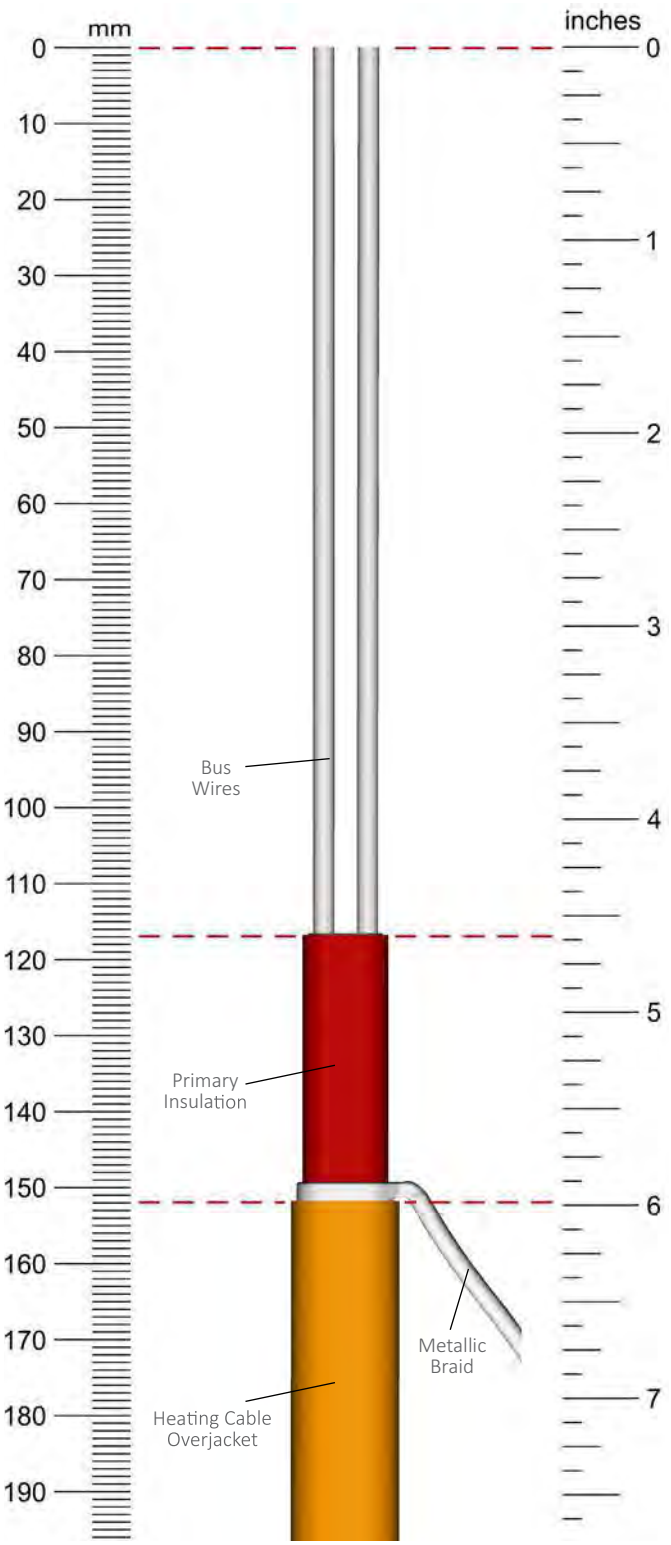
4e. Cut and remove pairing jacket. Stagger cut one of the bus wires.

Do not cut bus wire strands.

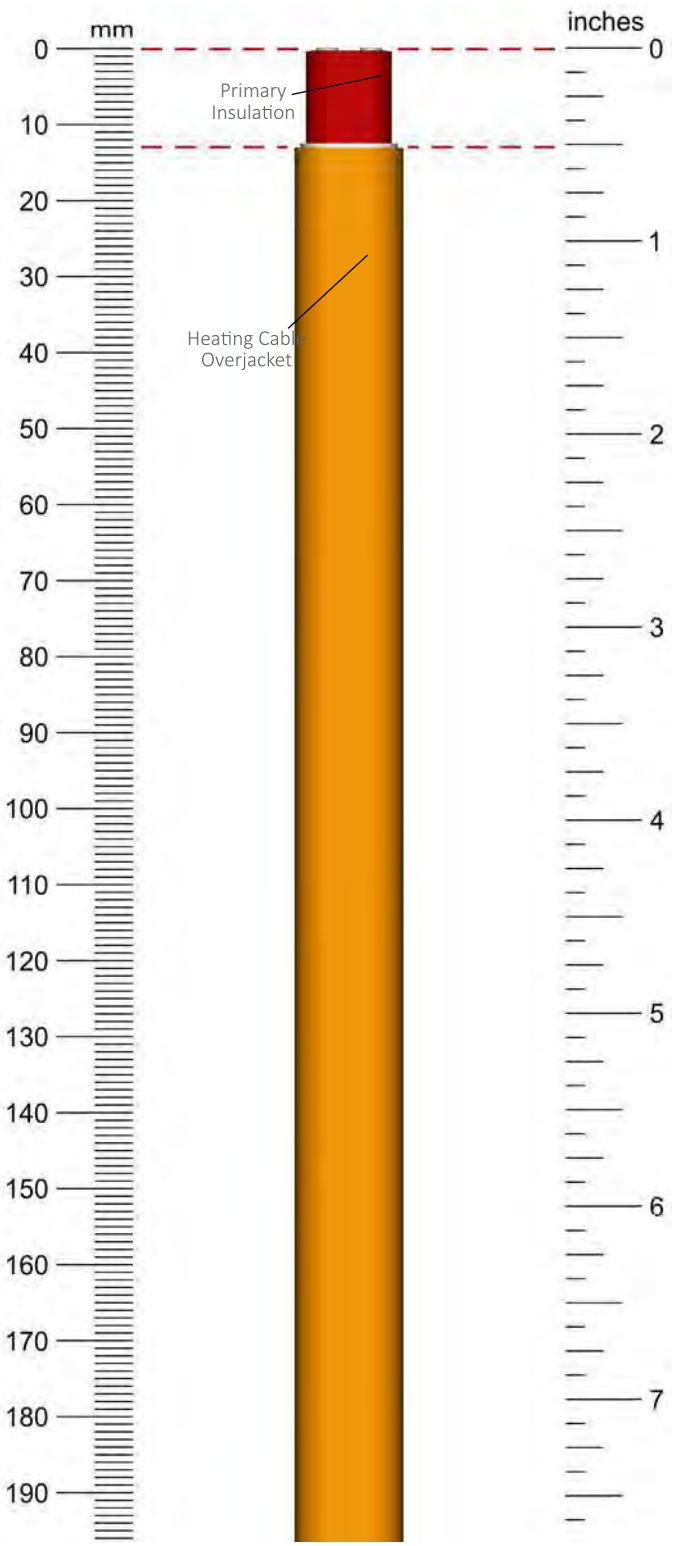


4f. Tape bus wires individually and then together. Continue taping to cover overjacket. Fill the end cap with RTV sealant and apply a circumferential bead to cable [minimum of 3 mm (0.12") wide]. Slide end cap onto end of cable.

Cable Take-off for BSX, RSX, HTSX, KSX, USX, and VSX-HT



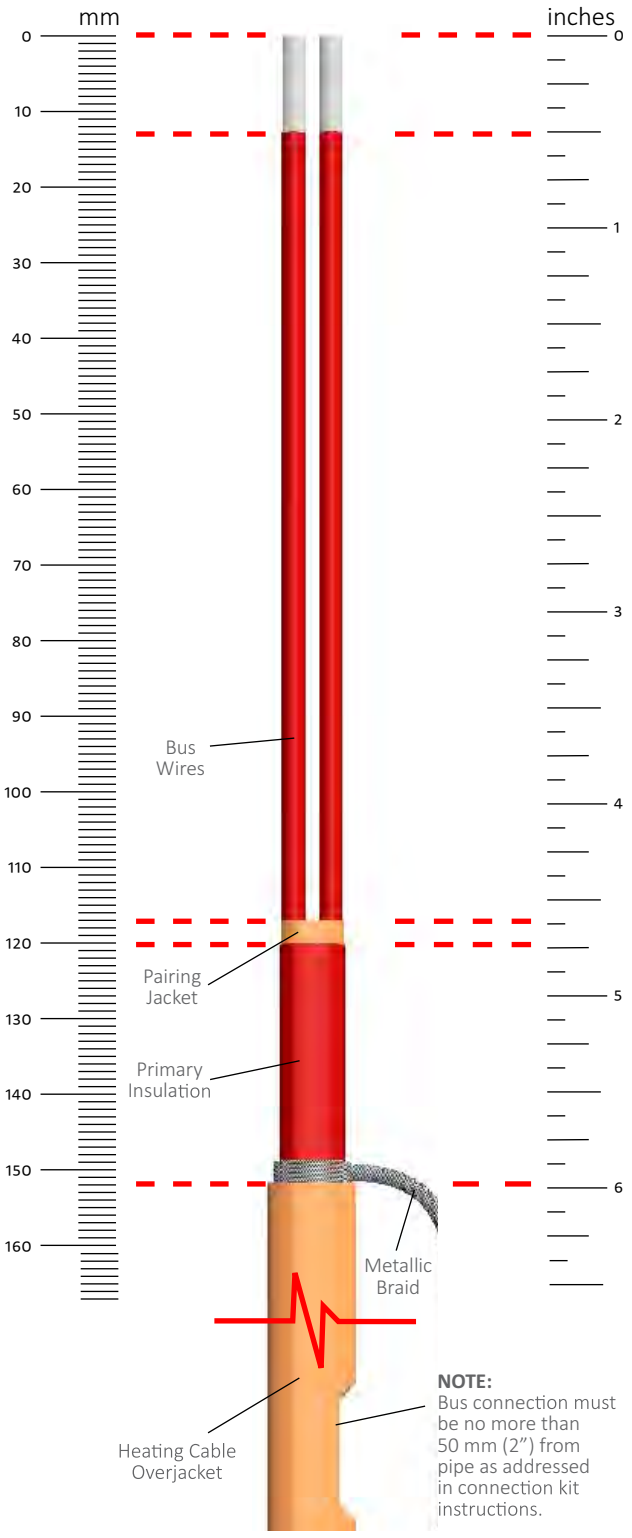
For Power Connecton Boot Termination



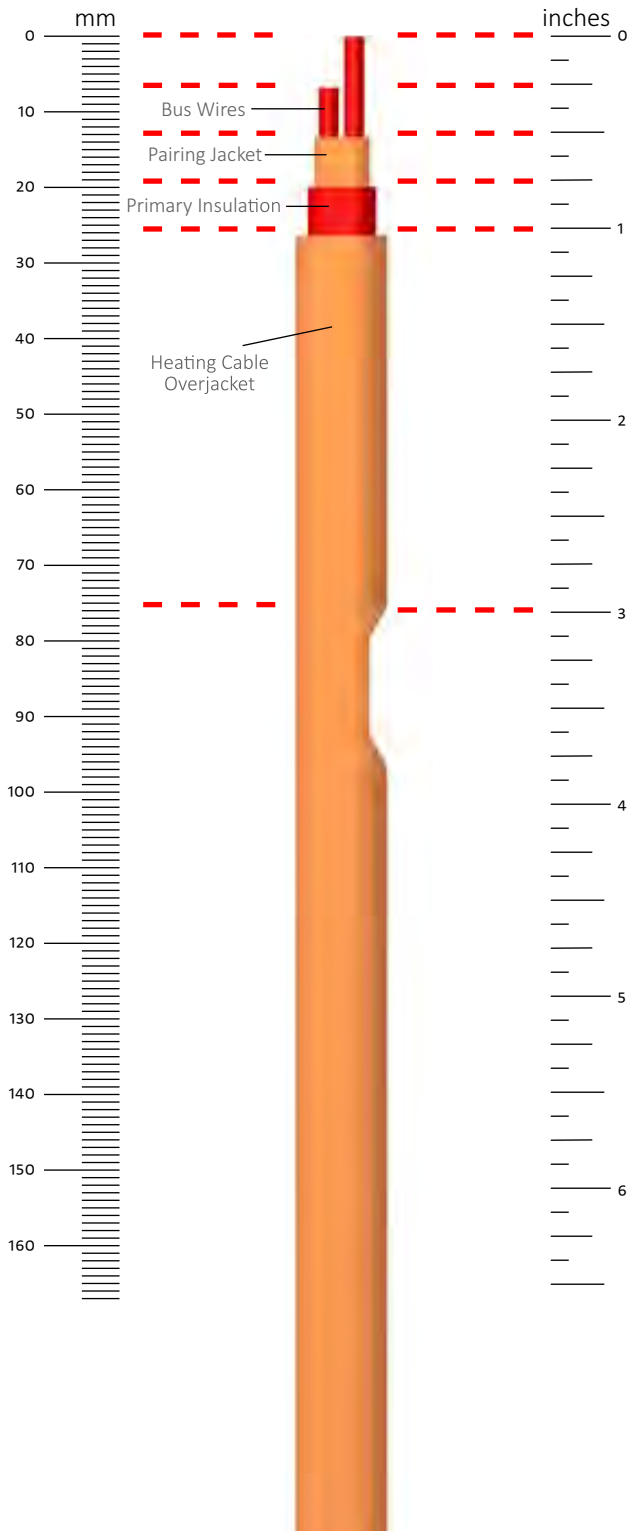
For End Cap Termination

NOTE: Images may not be printed to scale.

Cable Take-off for HPT and FP Heating Cables



For Power Connection Boot Termination



For End Cap Termination

NOTE: Images may not be printed to scale.

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Electric Heat Tracing

INSTALLATION, MAINTENANCE, & TROUBLESHOOTING



THERMON

About These Instructions

The installation instructions within this document describe the installation of Thermon trace heating systems in typical piping applications and are suitable for use with the flexible trace heating products listed on this page.

These instructions are not intended for mineral-insulated (MI) trace heaters. Instructions and documentation for other products and applications may be found at www.thermon.com.

For translations of this document in languages other than English, please contact Thermon. The English language version of this document shall govern.

IMPORTANT: To maintain warranty coverage of the trace heating system, the steps in these installation instructions, including testing, must be followed and documented on the Installation Report (page 12), wherever required in the text.



The National Electric Code and Canadian Electrical Code require ground-fault protection be provided for electric heat tracing .

Types of Heating Cables

Self-Regulating Heating Cables:

BSX™ Self-Regulating Heating Cable
(refer to Form TEP0067)

RSX™ Self-Regulating Heating Cable
(refer to Form TEP0004)

KSX™ Self-Regulating Heating Cable
(refer to Form TEP0072)

HTSX™ Self-Regulating Heating Cable
(refer to Form TEP0074)

USX™ Self-Regulating Heating Cable
(refer to Form TEP0239)

VSX-HT™ Self-Regulating Heating Cable
(refer to Form TEP0208)

Power-Limiting Heating Cable:

HPT™ Power-Limiting Heating Cable
(refer to Form TEP0011)

Parallel Constant Watt Heating Cable:

FP Parallel Constant Watt Heating Cable
(refer to Form TEP0016)

Series Constant Watt Heating Cables:

TEK™ Series Constant Watt Heating Cable
(refer to Form TEP0021)

HTEK™ Series Constant Watt Heating Cable
(refer to Form TEP0022)

For insulated externally heated surfaces, lower T-class systems may be obtained by utilizing stabilized designs or controlled designs using methods described in IEC/IEEE/EN 60079-30-1, Clause 4.5, using CompuTrace Electric Heat Tracing Design Software or by Thermon Engineering.

Safety and Site Practice

- Installation shall be carried out under the supervision of a qualified person.
- Persons involved in the installation and testing of electric trace heating systems shall be suitably trained in all special techniques required, including:
  - the purpose and function of the electrical trace heating system,
  - its associated power supply and control equipment, and
  - how to recognize and avoid the hazards associated with its operation and maintenance.
- All personnel shall use all appropriate personal protective equipment (PPE), including protective clothing, to protect against potential arc flash and shock hazards.
- All personnel shall comply with all applicable safety and health guidelines, including Thermon requirements, the regulations outlined in the NEC and CEC, and EN/IEC/IEEE 60079-30-2 for hazardous areas (as applicable), and any other applicable national and local electric codes.
- During installation, the trace heating system parameters shall be verified. Tests shall be performed in the field **and documented in the Installation Report** (page 12) as instructed.

Complete Electric Heat Tracing System

A complete electric heat tracing system will typically include the following components[1]:

1. Electric heat tracing cable[2] (self-regulating, power-limiting, parallel constant watt or series constant watt).
2. Power connection kit.
3. RTD sensor or control thermostat[3].
4. In-line/T-splice kit (permits two or three cables to be spliced together).
5. Cable end termination.
6. Attachment tape (use on 12” (30 cm) intervals or as required by code or specification).
7. “Electric Heat Tracing” label (peel-and-stick label attaches to insulation vapor barrier on 10’ intervals or as required by code or specification).
8. Thermal insulation[4] and vapor barrier (by others).

The absence of any of these items can cause a system to malfunction or represent a safety hazard.

Notes

1 See Page 3 for trace heater types and references for approvals.
2 Power connections must be used with correctly-installed certified enclosures that are suitable for the application (such as Terminator™). When connecting certified terminals using associated accessories, the required creepage distances and clearances shall be observed.
3 Temperature control is recommended for all freeze-protection and temperature-maintenance trace heating applications.
4 All heat-traced lines must be thermally insulated.

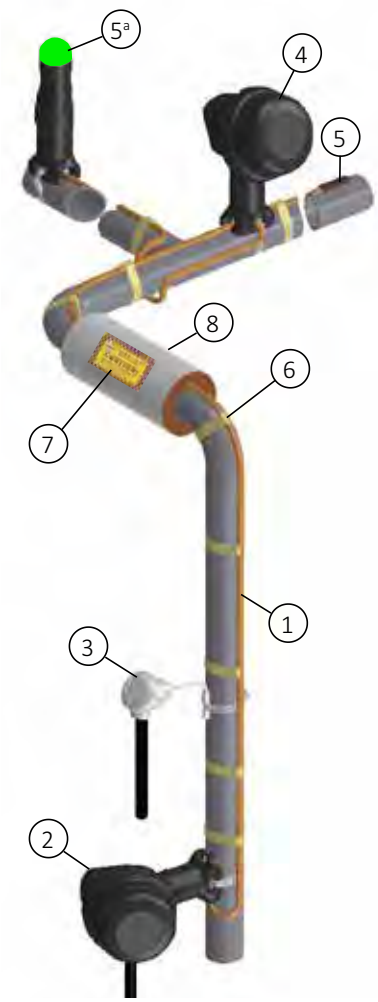


Illustration A: Typical Trace Heating Installation

Trace Heating System Design

- The design of electrical resistance trace heating systems shall be overseen by persons knowledgeable of trace heating, following the design methodology for explosive atmospheres as specified by Thermon Engineering or CompuTrace Electric Heat Tracing Design Software.
- For insulated externally heated surfaces, lower T-class systems may be obtained by utilizing stabilized designs or controlled designs using methods described in IEC/IEEE/EN 60079-30-1, Clause 4.5, using CompuTrace Electric Heat Tracing Design Software or by Thermon Engineering. The system design parameters, including the resulting T-class, shall be retained as a record of system documentation for each design for at least as long as the system is in use. The parameters in the system documentation shall be checked during commissioning of the system.
- The stabilized design method may be used for self-regulating, power-limiting, and constant-watt heating cables without a limiting device.
- Series heating cable output and T-rating are dependent upon several variables, including supply voltage, cable resistance, and temperature conditions.

Upon Receiving the Trace Heater

1. Make sure that the correct type (including the correct nominal power output and voltage level) has been received.

   All flexible trace heaters, of the types covered in this document, are printed with the catalog number, voltage rating and power output (in W/m or W/ft) on the jacket. To verify the year of construction, please contact Thermon with the batch code number printed on the trace heater jacket.

2. **Record the reel number, reel length, trace heater type, and nominal power output and voltage in the Pre-Installation section of the Installation Report** (page 12).
3. Visually inspect cable for any damage incurred during shipment. **Note any observed damage** in the Installation Report.
4. Perform the Insulation Resistance (IR) Test, described on this page, to confirm the trace heater's electrical integrity. **Record the reading** in the Installation Report.
5. Store the trace heater in a dry location.

Before Installing

- Be sure all piping and equipment to be traced have been completely installed and pressure-tested.
- Ensure that all surface areas where the trace heater is to be installed are reasonably clean. Remove any dirt, rust, and scale with a wire brush. Remove oil and grease films with a suitable solvent.
- De-energize power sources before installation.
- Keep ends of trace heaters and kit components dry before and during the installation.

Insulation Resistance (IR) Testing

The insulation resistance (IR) test establishes the electrical integrity of the trace heater. For the flexible trace heaters covered in this document, the IR test should be performed with a megger capable of delivering a voltage of at least 500 Vdc. It is strongly recommended that polymeric insulated trace heaters should be tested at 2500 Vdc.

1. If not done already, prepare the conductors of the trace heater according to the instructions accompanying the power and end termination kit(s) provided with the system.
2. Connect the megger's positive lead to the cable bus wires, shorted together.
3. Connect the megger's negative lead to the metallic braid.
4. Set the megger test voltage to at least 500 Vdc.
5. Energize the megger for 60 seconds.
6. Readings of at least 20 MΩ are acceptable.



Readings below 20 MΩ usually indicate that the electrical insulation of the trace heater has been compromised.

Check the trace heater for signs of physical damage between the braid and the heating element. Small cuts or scuff marks on the outer jacket will not affect the megger reading unless there is penetration through the braid and dielectric insulation jacket.

Initial Trace Heater Installation

- Begin installing the trace heater at the proposed end-of-circuit location, following the guidance in the isometric system diagrams (if provided).
- Lay out the trace heater on the pipe, at the 4 or 8 o'clock position (Illustration B), securing it tightly against the pipe with attachment tape. Wrap bands of tape around the trace heater and pipe at intervals of 12" (30 cm) or less, keeping the trace heater in close contact with the pipe.
- If accessibility is a problem, the trace heater may be installed at the 10 or 2 o'clock position.
- Refer to Table 1 (page 7) to estimate the number of rolls of attachment tape required, based on the pipe length and diameter[1].
- A continuous covering of aluminum foil tape may also be required under special circumstances, including:
  - where spray or foam[2] thermal insulation will be applied,
  - where nonmetallic piping is used, or
  - design requirements dictate the use of aluminum tape.
- Allow extra length of trace heater for power connections, splices, and any in-line heat sinks, such as valves, flanges, and supports (Illustration C). See page 7 and page 8 for details on how to properly install the trace heater at these sites and the allowance of trace heater required.
- Install temperature sensors at least 90° away from trace heater locations.
- **CAUTION**: For series constant-watt trace heaters (HTEK, TEK, TESH), do not allow the heating portion of the trace heater to touch, cross over, or overlap itself.
- **CAUTION**: Do not exceed the trace heater's specified minimum bend radius. Refer to product's specification sheets for the minimum bend radius of a specific trace heater type.

Notes

1 Table 1 assumes circumferential bands every 30 cm along the length of the piping.
2 Verify that the curing temperature of the insulation is less than the exposure temperature of the trace heater.

Illustration B: Heating Cable vs. Sensor Location

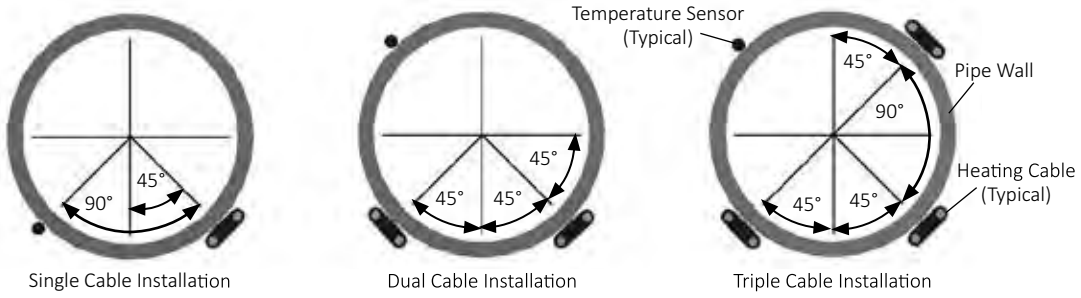


Illustration C: Temporary Installation

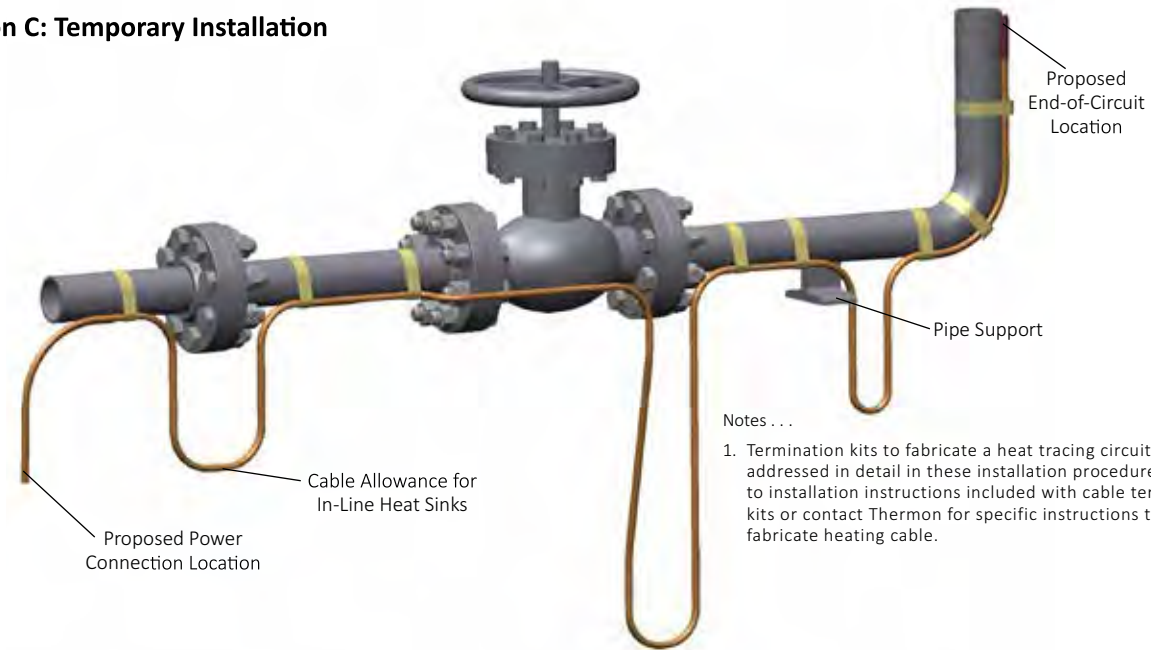


Table 1: Attachment Tape (Value Represents Approximate Linear Pipe Length Allowance Per Roll)

Tape Length	Pipe Diameter in Inches															
	½"-1"	1¼"	1½"	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"
36 yd	130'	115'	110'	95'	75'	65'	50'	40'	35'	30'	26'	23'	21'	19'	16'	13'
60 yd	215'	195'	180'	160'	125'	105'	80'	65'	55'	50'	43'	38'	35'	31'	27'	22'

Installation on Elbows, Pipe Supports, and Flanges

- **Elbows**: Locate the trace heater on the outside radius of the elbow (Illustration D). Secure the trace heater to the pipe with attachment tape on each side of the elbow.
- **Pipe Supports**: For uninsulated pipe supports, allow twice the length of the support, plus an additional 40 cm of trace heater. Install the trace heater in a loop, following Illustration E as a guide. Insulated pipe supports do not require additional length of trace heater.
- **Flanges**: Loop the trace heater around the pipe on each side of, and adjacent to, the flange (Illustration F). Be sure to keep the trace heater in close contact with the flange throughout the length of the bend.

Refer to Table 2 (page 8) for typical flange allowances.

Illustration D: Pipe Elbow



Illustration E: Uninsulated Pipe Support

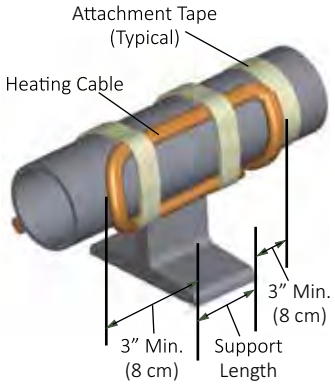
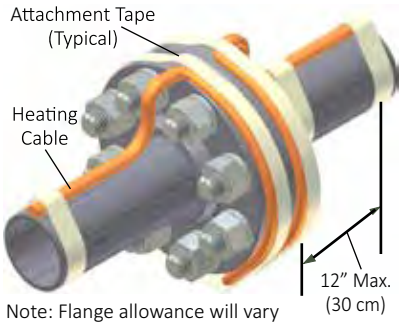


Illustration F: Pipe Flange



Note: Flange allowance will vary based on method of insulating flange and adjacent piping.



Circuit Layout on Support

Note . . .

1. Only applicable for pipe ≥ 50mm.

Installation on Valves and Pumps

- Valves, pumps, and other miscellaneous equipment require additional passes of trace heater to offset the increased heat loss that occurs at these sites.
- Refer to the isometric system drawings, provided by Thermon Engineering, for allowances specific to each line and circuit.

  Allowances for typical valves and pumps are provided in Table 2.
- Install the trace heaters using a looping technique, using Illustrations G and H as a guide, such that the valve or pump may be removed for required service and maintenance.
- Keep the trace heater in close contact with the pipe and heat sink areas, to compensate for additional heat loss.

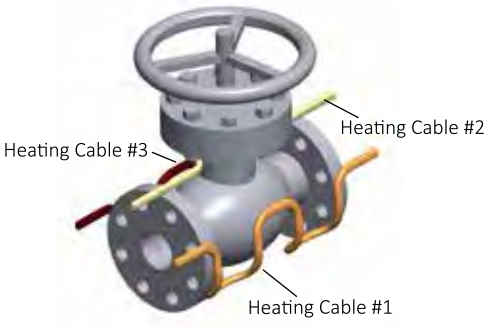
Table 2: Valve and Pump Allowances[1]

Pipe Size	Valve Allowance			Pump Allowance		Flange Allowance
	Screwed or Welded	Flanged	Butterfly	Screwed	Flanged	
½"	6"	1'	0	1'	2'	1’ 3"
¾"	9"	1' 6"	0	1' 6"	3'	1’ 6"
1"	1'	2'	1'	2'	4'	1’ 6”
1¼"	1' 6"	2'	1'	3'	4' 6"	2’ 0"
1½"	1' 6"	2' 6"	1' 6"	3'	5'	2’ 0"
2"	2'	2' 6"	2'	4'	5' 6"	2’ 3"
3"	2' 6"	3' 6"	2' 6"	5'	7'	2’ 3"
4"	4'	5'	3'	8'	10'	2’ 9"
6"	7'	8'	3' 6"	14'	16'	3’ 3"
8"	9' 6"	11'	4'	19'	22'	3’ 9"
10"	12' 6"	14'	4'	25'	28'	4’ 3"
12"	15'	16' 6"	5'	30'	33'	5’ 0"
14"	18'	19' 6"	5' 6"	36'	39'	5’ 6"
16"	21' 6"	23'	6'	43'	46'	6’ 0"
18"	25' 6"	27'	6' 6"	51'	54'	6’ 6"
20"	28' 6"	30'	7'	57'	60'	7’ 3"
24"	34'	36'	8'	68'	72'	8’ 3"
30"	40'	42'	10'	80'	84'	10’ 0"

Note

1. The valve allowance given is the total amount of additional cable to be installed on the valve. If multiple tracers are used, total valve allowance may be divided among the individual tracers. The total valve allowance may be alternated among tracers for multiple valves in a heat trace circuit. Allowances are for 150 pound valves. More cable is required for higher rated valves. Refer to heat trace isometric drawing for project specific allowances.

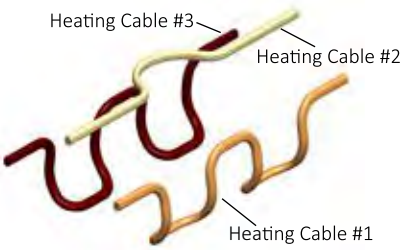
Illustration G: Typical Valve Detail



Heating Cable Serpentined on Valve

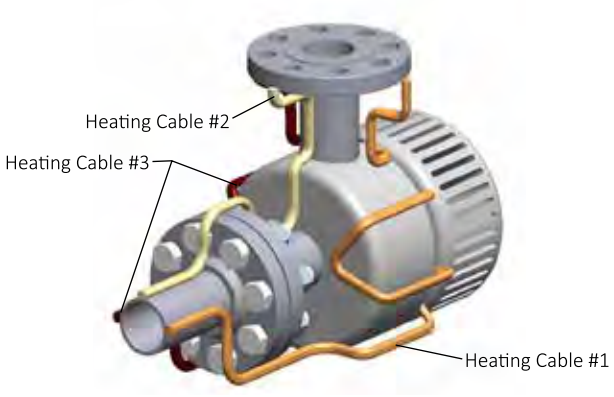


Single Circuit Layout on Valve



Multiple Circuit Layout on Valve [2]

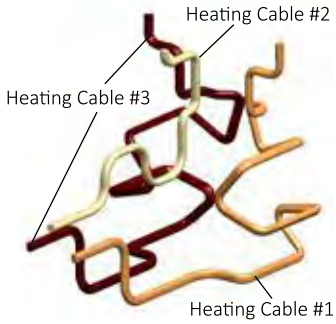
Illustration H: Typical Pump Detail



Heating Cable Serpentined on Pump



Single Circuit Layout on Pump

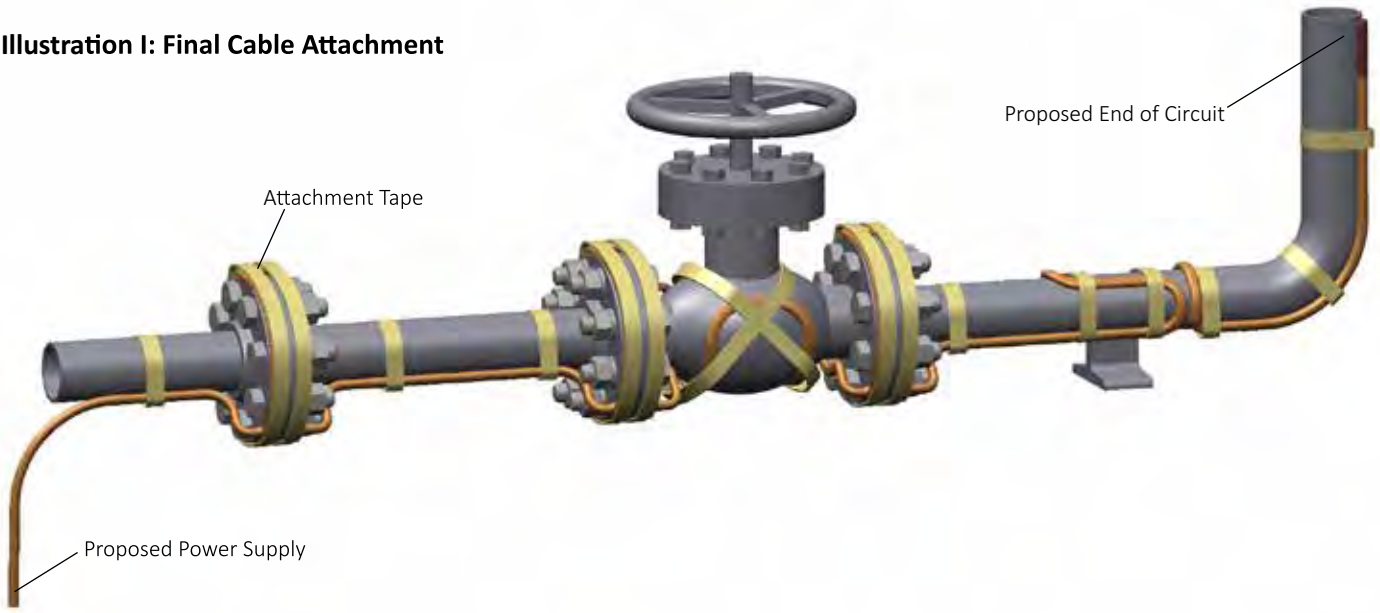


Multiple Circuit Layout on Pump [2]

Completing the Trace Heater Installation

1. Secure the end-of-circuit termination kit and work back toward the power supply (Illustration I).
2. Keep the trace heater in secure contact with the pipe, using bands of attachment tape at least every 30 cm.
3. Secure any required temperature sensors to the pipe using attachment tape.
4. Complete any required splice connections in accordance with the installation instructions provided with the splice kit.
5. Install any power connection kits in accordance with the detailed installation instructions provided with the kit.
6. Connect the metallic braid of the trace heater to a suitable earthing/ground terminal.
7. Before completing the power connections, perform an Insulation Resistance (IR) Test (page 5) and **record the result in the After Installation** section of the Installation Report (page 12). The recorded value shall not be less than 20 MΩ.
8. **Record the line number and all other associated circuit information** in the After Installation section of the Installation Report.

Illustration I: Final Cable Attachment



Installing Thermal Insulation

Properly installed and well-maintained thermal insulation is critical to the performance of the trace heating system. Without proper insulation, heat losses are generally too high to be offset by a conventional heat tracing system.

1. Properly insulate all heat sinks, including pipe supports, hangers, flanges, and in most cases, valve bonnets.
2. Install a protective vapor barrier over the insulation, regardless of the type or thickness of insulation used. The vapor barrier protects the insulation from moisture intrusion and physical damage and ensures the proper performance of the trace heating system.
3. Seal all penetrations around the vapor barrier.
4. After ensuring that the insulation is weather-tight, **document the completion of the insulation** in the After Installation of Thermal Insulation section of the Installation Report (page 12).

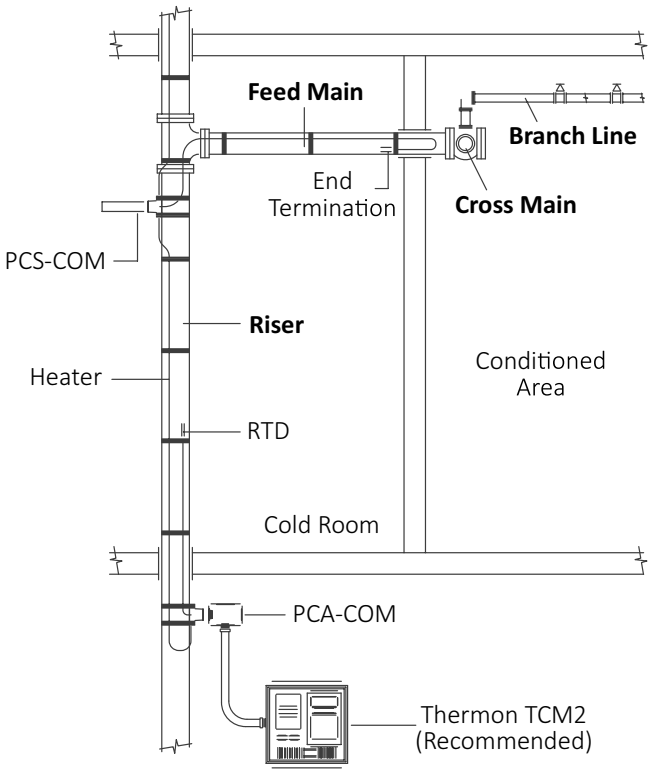
After Installing Thermal Insulation

The presence of trace heaters shall be made evident by posting of caution signs or markings at appropriate locations and/or at frequent intervals along the circuit.

1. Apply the provided peel-and-stick “Electric Heat Tracing- Caution” labels along the pipe, on the outermost surface of the thermal insulation or vapor barrier, at intervals of 3 m or less.
2. Apply the caution labels at any other appropriate locations, such as valves.

Installation Guidelines for Fire Protection Systems

1. Where above ground water-filled supply pipes, risers, system risers or feed mains pass through open areas, cold rooms, passageways, or other areas exposed to freezing temperatures, the pipe shall be protected against freezing in accordance with NPFA 13, "Standard for the Installation of Sprinkler Systems".
2. Thermon's BSX Self-Regulating Heating Cables are approved for use on Fire Protection System Piping feed mains, risers, and cross mains. This application approval includes piping which connects between buildings in unheated areas, piping located in unheated areas or piping through coolers or freezers. As with all heat traced piping systems, thermal insulation is required to ensure the heating system can compensate for heat losses.
3. In accordance with IEEE 515.1 guidelines, the use of ambient sensing control with low temperature and continuity monitoring as a minimum for all fire protection piping heat tracing systems is required. Thermon recommends the use of the Thermon TCM2 electronic controller for these applications, having capability of annunciating the following faults/alarms locally as well as remotely:
   - Ground / Earth fault
   - Low temperature
   - High temperature
   - Sensor failure
   - Controller failure
   - Low current
   - Circuit fault
   - High temperature limit controller, if provided.
4. Pipe sections that lie in different ambient conditions (e.g. inside the building (heated areas) and outside the building) should not be under the same temperature control zone.
5. The heat tracing system shall be designed to maintain the pipe temperatures between 4°C and 38°C, or if necessary for the installation, an additional 'Hi Temp' limit sensor should be included to limit the runaway pipe temperature within 55°C or 8°C below the sprinkler temperature rating, whichever is lower. A low-temperature alarm with contacts for a remote annunciation shall be provided for each fire sprinkler line trace heating circuit with a set-point of 2°C.
6. The alarms of sprinkler system temperature/electrical control shall be connected to a fire detection alarm system monitoring.
7. Both of the two basic sprinkler system types i.e. wet (where the branch lines are always filled with water) and dry type (where the sprinkler head/sensor activates the upstream control valve) require heat tracing for the branch lines up to the sprinkler head. In case of dry type, the tracing is meant to keep the empty branch pipes above freezing point, so that when upstream control valve operates the pipe body does not cool down the incoming water.
8. Trace heating systems for fire sprinkler systems shall be permanently connected to the power supply.
9. The heat tracer braid shall be connected to earth / ground terminal at every termination and suitable external grounding.
10. If backup power is being provided for the building electrical systems, it shall also provide backup power supply for the trace heating system or equivalent.



THE NFPA DEFINES THE FOLLOWING:

Branch Lines—The pipes in which the sprinklers are placed, either directly or through risers.

Cross Mains—The pipes supplying the branch lines, either directly or through risers.

Feed Mains—The pipes supplying cross mains, either directly or through risers.

Risers—The vertical supply pipes in a sprinkler system.

Circuit Protection Requirements

- Each branch circuit must use over-current protection that isolates all appropriate power conductors from the supply (typically circuit breakers).
- Ground fault equipment protection is required for each circuit.
- For typical installations (with TT and TN grounding systems), the means of protection must include a residual current protective device for each branch circuit.
- For fixed-level earth/ground-fault circuit interrupters, a minimum 30 mA trip level is recommended. The preferred trip level for adjustable devices is 30 mA above any inherent capacitive leakage characteristic of the heater, as specified by Thermon Engineering.
- Where conditions of maintenance and supervision ensure that only qualified persons will service the installed systems, and continued circuit operation is necessary for the safe operation of the equipment or processes, ground-fault detection without interruption is acceptable if alarmed in a manner to assure an acknowledged response.
- For IT grounding systems, a means of protection against ground faults is required that includes an electrical insulation monitoring device that shall disconnect the supply whenever the electrical resistance is not greater than 50 ohms/volt of rated voltage.

Final Inspection

1. After installing the thermal insulation and vapor barrier **BUT BEFORE ENERGIZING THE CIRCUIT**, repeat the IR test to verify that the trace heater has not been damaged during installation. **Record the IR value** in the After Installation of Thermal Insulation section of the Installation Report (page 12).
2. For Series Heating Cables, measure the electric loop resistance and **record the resistance values** in the Installation Report.
3. Ensure that all junction boxes, temperature controllers, cable glands, etc., are properly secured.
4. If a temperature controller is used, force the circuit on and energize the circuit at the rated voltage.
5. After 5 minutes, measure the voltage, current, pipe temperature, and ambient temperature. **Record these values in the Final Commissioning section of the Installation Report**.
6. If a control device is used, verify its settings to ensure that the maximum surface temperature does not exceed the system T-rating, in accordance with IEC/IEEE/EN 60079-30-1, Clause 4.

Documentation Retention

The trace heating system documentation shall be retained for each trace heating circuit for as long as the system is in use. This includes:

- System Design Parameters And T-Class
- Isometric Circuit Diagrams
- Maintenance Records
- Operating History
- These Instructions
- All Other Documentation Provided By Thermon

Installation Report

Project Information				
Project No.		Installer		
Unit No.				
Customer Reference No.		Inspector		
Thermon Reference No.				
Pre-Installation				
Reel No.		Insulation Resistance (IR)		
Reel Length	m/ft	Single-Phase:		MΩ/GΩ
Trace Heater Type		3-Phase (for Series Trace Heaters):	L_1	MΩ/GΩ
Power Output (nom.)	W/m/W/ft		L_2	MΩ/GΩ
Voltage (nom.)	V		L_3	MΩ/GΩ
Notes		Tested By/Date		
		Witnessed By/Date		
After Installation				
Line No.		Braid Connected to Ground?		
Equipment No.		Unused Entries Plugged Off?		
Circuit/Heater No.		Insulation Resistance (IR)		
Circuit Switch No.		Single-Phase:		MΩ/GΩ
Thermostat No.		3-Phase (for Series Trace Heaters):	L_1	MΩ/GΩ
Junction Box No.			L_2	MΩ/GΩ
Panel No.			L_3	MΩ/GΩ
Breaker No.				
Trace Heater Line Length	m/ft			
Notes		Tested By/Date		
		Witnessed By/Date		
After Installation of Thermal Insulation				
Insulation Weather-Tight?		Insulation Resistance (IR)		
Caution Labels Placed?		Single-Phase:		MΩ/GΩ
Electrical Loop Resistance (for Series Trace Heaters) L-L	Ω	3-Phase (for Series Trace Heaters):	L_1	MΩ/GΩ
L_1-L_2	Ω		L_2	MΩ/GΩ
L_2-L_3	Ω		L_3	MΩ/GΩ
L_3-L_1	Ω			
Notes		Tested By/Date		
		Witnessed By/Date		
Final Commissioning				
Perform final measurements after energizing circuit for 5 minutes.				
Ambient Temperature	°C/°F	Voltage		V
Pipe Temperature	°C/°F	Current		A
Notes		Tested By/Date		
		Witnessed By/Date		

NOTE: All Insulation Resistance (IR) values shall be at least 20 MΩ for a successful installation.

Maintenance and Repair

- Once the system has been successfully installed, an ongoing preventive maintenance program should be implemented, using qualified personnel. The trace heating system should be inspected and tested on a regular basis, at least once per year.
- Keep records of the operating and maintenance history for each circuit, including all test results performed during maintenance and inspection. Record-keeping during scheduled maintenance will help to establish a "normal" range of operation. Insulation resistance readings that deviate from the normal range may indicate problems with a circuit.
- If the system fails any test, refer to the troubleshooting guide below to address the issue. De-energize the affected circuits and make the necessary repairs immediately.

Before maintenance, repair, or modification

CAUTION: Consult the trace heating system documentation prior to maintenance, repair, or modification.

1. Identify the circuit or equipment to be de-energized and all possible sources of electrical energy supplies to the specific circuit and equipment.
2. De-energize all power sources.
3. Apply lockout/tagout devices according to established procedures.
4. Test for the absence of voltage with an approved voltmeter (where the voltmeter is tested on a known circuit voltage prior to and immediately following application).
5. For protection against the accidental energizing of supply conductors, apply temporary jumpers rated for the available fault duty between each supply conductor and earth/ground.

NOTE: In the event of an ground fault or over-current interruption, devices shall not be reset until the cause of the trip has been investigated by qualified personnel.

After maintenance, repair, or modification

1. Test the operation of each affected circuit.
2. The insulation resistance of the trace heater shall be measured and recorded and shall not be less than 20 MΩ.
3. Visually verify that all circuit-disconnect devices are open before reconnecting power.

Troubleshooting Guide

This troubleshooting guide aims to help to diagnose and resolve many issues on-site.

Many problems with electric trace heating systems can be attributed to two causes:

- Wet, damaged, or missing insulation. Visually inspect the insulation along the entire length of the circuit, making sure that it is intact and dry throughout.
- Physical damage incurred from recent repairs and maintenance to any in-line or nearby equipment.

Other possible causes are listed below, with their symptoms and potential remedies.

If any circuit is suspected to be damaged, de-energize the circuit and perform the Insulation Resistance Test outlined on page 5. Readings below 20 MΩ indicate that the trace heater may be physically damaged.

Symptom	Possible Cause	Remedy
No heat/no current	• Loss of power/voltage	• Check the circuit breaker and electrical connections
	• Controller setpoint too low	• Verify/adjust setpoint
	• High-temperature limit switch activated	• May require manual reset to re-enable trace heating circuit
	• "Open" series heating circuit	• Repair or replace circuit[1]
	• Controller failure	• Repair sensor or controller[2]

Symptom	Possible Cause	Remedy
Low system temperature	• Controller setpoint too low	• Verify/adjust setpoint
	• Temperature sensor located too close to trace heater or other heat source; may be accompanied by excessive cycling of control relays/contacts	• Relocate sensor
	• Insulation material and/or thickness different than designed	• Replace insulation; increase insulation thickness (if dry); review design[3]
	• Ambient temperature lower than designed	• Install higher-output trace heater; increase insulation thickness; review design[3]
	• Low voltage (check at power connection point)	• Adjust voltage to meet design requirements[3]
Low temperature in sections	• Wet, damaged, or missing insulation	• Repair or replace insulation and barrier
	• Trace heater damaged	• Repair or replace section; splice kits are available from Thermon
	• Heat sinks (valves, pumps, pipe supports, etc.)	• Insulate heat sinks or increase passes of tracing on heat sinks
	• Significant changes in elevation along length of the heat-traced pipe	• Consider dividing heating circuit into separate, independently controlled segments
High system temperature	• Controller “on” continuously	• Adjust setpoint or replace sensor[2]
	• Controller fails with contacts closed	• Replace sensor or controller[2]
	• Sensor located on uninsulated pipe or too close to heatsink	• Relocate sensor to an area representative of conditions along length of pipe
	• Backup heating circuit controller “on” continuously	• Adjust setpoint or replace backup controller
Excessive cycling	• Temperature sensor located too close to trace heater or other heat source; may be accompanied by low system temperature	• Relocate sensor
	• Ambient temperature near controller setpoint	• Temporarily alter controller setpoint
	• Connected voltage too high	• Lower voltage
	• Trace heater output too high (overdesign)	• Install lower-output trace heater or lower the voltage
	• Controller differential too narrow	• Widen the differential or replace controller to avoid premature contact failure
Temperature variations along pipe	• Inconsistent trace heater installation along pipe	• Check consistency of trace heater installation, especially at heat sinks
	• Inconsistent trace heater performance	• Compare calculated power per unit length (W x A/length) for the measured pipe temperature with designed trace heater output for the same temperature; regional damage to trace heater can cause partial failure
	• Unanticipated flow patterns or process operating temperatures	• Redistribute heating circuits to accommodate existing flow patterns; confirm process conditions

Notes

1 Flexible, polymer-jacketed trace heaters (such as those covered in this document) may be field-spliced. Mineral-insulated (MI) trace heaters typically require replacement.

2 Mechanical thermostat sensors cannot be repaired or replaced. RTD and thermocouple sensors may be replaced. Some controllers have replaceable contacts/relays or may require a manual reset if a “trip-off” condition was detected.

3 Before making any changes to system parameters, consult Thermon for the impact on trace heater performance.



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Electric Heat Tracing

Maintenance and Troubleshooting Guide for Frost Heave Prevention

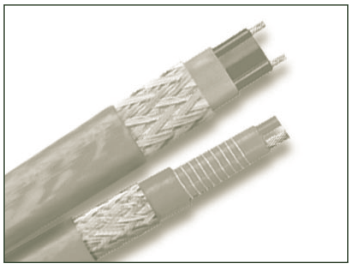
THERMON®

The Heat Tracing Specialists®

Introduction

A complete electric heat tracing system will typically include the following components:

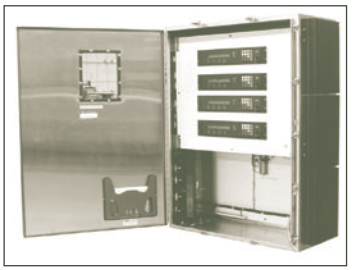
1. Electric heat tracing cable (self-regulating and parallel constant watt).



2. Power and end termination kit.



3. Temperature controller.



The absence of any of these items can cause a system to malfunction or represent a safety hazard.

Cable Testing

After a heat tracing circuit has been installed and fabricated, the heating cable should be tested to ensure electrical resistance integrity. The cable should be tested with at least a 500 Vdc megohmmeter (megger) between the heating cable bus wires and the heating cable metallic braid. It is recommended that the test voltage for polymer-insulated heating cables be 2500 Vdc.

After properly terminating the cable, connect the positive lead of the megger to the bus wires and the negative lead to the metallic braid. The minimum acceptable level for the megger reading for any polymer-insulated heat tracing cable is **20 megohms**.

Final Inspection

The heating circuit can now be tested for proper operation. This includes measuring and recording the connected voltage, steady-state current draw, length and type of cable. (See the Inspection Report Form.)

Maintenance

Once the heat tracing system has been installed, an ongoing preventive maintenance program should be implemented using qualified personnel. Support documentation providing general information and an operating history of the specific circuits in the system should be maintained.

The results of the operational testing described above form the testing “base line” or normal range. Subsequent measurements should be recorded periodically and compared to this base-line data to help identify potential malfunctions.

Inspection Report Form for Electric Heat Tracing

Location	System	Reference Drawing(s)	Circuit #

CIRCUIT INFORMATION			
Heater Cat. No.	Circuit Length	Brkr. Panel No.	
Power Connection	Design Voltage	Brkr. Pole(s) No.	
	Ground-Fault Protection (type)		
	Ground-Fault Trip Setting		
Heater Controller			

VISUAL							
Panel Number	Date						
	Initial						
Heating System Components							
Enclosures, Boxes Sealed							
Presence of Moisture							
Sign of Corrosion							
Heater Lead Discoloration							
Heating and/or High Limit Controller							
Operating Properly							
Controller Setpoint							

ELECTRICAL						
Dielectric Insulation Resistance Testing (bypass controller if applicable) Refer to IEEE 515-2004, Section 7.2.2						
Test Voltage						
Megger Value						
Heater Supply Voltage						
Value at Power Source						
Value at Field Connection						
Heater Circuit Current Reading						
Amps Reading at 5 min.						
Ground-Fault Current						

Comments and Actions

Performed by	Company	Date
Approved by	Company	Date

Troubleshooting

The following information is intended to assist in troubleshooting electric heat tracing systems. The primary objective is to provide an enhanced understanding of the elements of a successful heat tracing installation.

If an electric heat tracing circuit is suspected to be damaged, a dielectric insulation resistance (megger) test should be performed using a 2500 Vdc megohmmeter for polymer-insulated heating cables. Periodic testing with accurate records will establish a "normal" range of operation (refer to the Inspection Report Form). Dielectric insulation resistance readings which deviate from the normal range can quickly reveal a damaged circuit.

I. No heat/no current	A. Loss of power (voltage)	A. Restore power to tracing circuit (check circuit breaker and electrical connections). Poorly made terminations can cause EPD-type breakers to trip unexpectedly
	B. Controller setpoint too low	B. Adjust setpoint
	C. Controller failure	C. Repair sensor or controller
II. Low system temperature	A. Controller setpoint too low	A. Adjust setpoint
	B. Low voltage (check at power connection point)	B. Adjust voltage to meet design requirements [1]
III. High system temperature	A. Controller "on" continuously	A. Adjust setpoint or replace sensor
	B. Controller failed with contacts closed	B. Replace sensor or controller
IV. Excessive cycling	A. Controller differential too narrow	A. Widen differential or replace controller to avoid premature contact failure

Notes . . .

1. The operation of most electric heat tracing cables is dramatically affected by changes in the supply voltage. Before making any changes, consult the cable manufacturer with information on the alternate voltages available. Otherwise, cable failure and/or an electrical safety hazard may result in some situations.

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PRODUCT SPECIFICATIONS

E4X/7-35235JB and E4X/7-200600JB

ADJUSTABLE CONTROL THERMOSTATS

APPLICATION

The E4X/7-35235JB and E4X/7-200600JB are designed for use as adjustable control thermostats for freeze protection and temperature maintenance applications requiring pipewall or tankwall sensing. The design of the thermostats permits their use as a junction box for connecting the heating cable to power by using the optional mounting kit (TM4X for ordinary locations or TM7 for Division 2 hazardous locations). Both thermostats feature an epoxy-coated cast aluminum NEMA 4X/NEMA 7 enclosure to provide watertight, dust tight, corrosion-resistant and explosion-proof protection to the thermostat switch. The differentiating factors between the two thermostats are the adjustable control range and maximum bulb exposure temperature.

The E4X/7-35235JB and E4X/7-200600JB thermostats are approved for use in both ordinary (nonclassified) and hazardous (classified) locations.



E4X/7-35235JB / E4X/7-200600JB

RATINGS

Voltage rating.....125/240/277/480 Vac
Switch rating.....30/30/25/15 amps
Switch type.....SPST[1]
Electrical connection[2].....screw terminals on switch
Adjustable control range
- E4X/7-35235JB..... 35°F to 235°F (2°C to 113°C)
- E4X/7-200600JB..... 200°F to 600°F (93°C to 316°C)

Maximum control differential
- E4X/7-35235JB.....9°F (5°C)
- E4X/7-200600JB.....15°F (9°C)

Maximum bulb exposure temperature
- E4X/7-35235JB.....300°F (149°C)
- E4X/7-200600JB.....650°F (343°C)

Bulb dimensions..... 1/4” x 6-3/8” (6.4 x 162 mm)
Bulb material.....nickel-plated copper
Capillary length.....6’ (1.8 m)
Capillary material.....nickel-plated copper
Capillary armor.....flexible stainless steel

Notes

1. The National Electrical Code, Article 427-56(b) states: “Temperature- controlled switching devices which do not have an “off” position shall not be required to open all ungrounded conductors and shall not be permitted to serve as the disconnecting means.” The E4X/7-35235JB and E4X/7-200600JB thermostats have no “off” position and therefore may be used for switching one conductor of a two-phase heating circuit.
2. The E4X/7-35235JB and E4X/7-200600JB utilize two 1” NPT conduit hub openings for the mounting expediter and incoming power. The thermostats include an internal grounding terminal and are available with an optional TB2F terminal block.



TM4X optional mounting kit (purchased separately) components include:

- Pipe-mounted expediter
- 2 stainless steel pipe attachment bands.
- Heater cable grommet
- 2 power connection boots
- RTV adhesive
- Wire fasteners and grounding lug



TM7 optional mounting kit (purchased separately) components include:

- Pipe-mounted expediter
- Cable seal assembly
- 2 stainless steel pipe attachment bands
- Heater cable grommet
- 2 power connection boots
- RTV adhesive
- Wire fasteners and grounding lug

CERTIFICATIONS/APPROVALS

FM Approvals
Ordinary Locations
Hazardous (Classified) Locations
Class I, Divisions 1 and 2, Groups B, C and D
Class II, Divisions 1 and 2, Groups F and G
Class III, Divisions 1 and 2

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ISO 9001 REGISTERED

PRODUCT SPECIFICATIONS

E4X/7-35235JB and E4X/7-200600JB

ADJUSTABLE CONTROL THERMOSTATS

The following installation procedures are suggested guidelines for the installation of a Thermon mechanical thermostat. They are not intended to preclude the use of other methods utilizing accepted engineering or field construction practices.

UPON RECEIVING THERMOSTAT

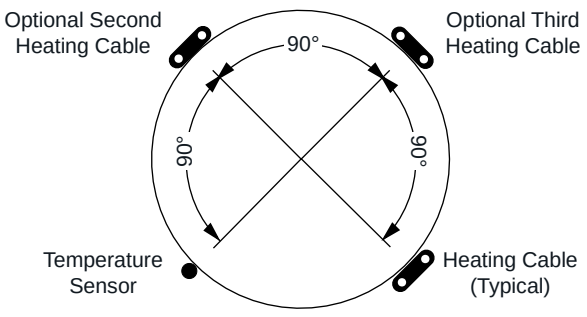
1. Upon receiving thermostat, check to make sure the proper type has been received.
2. Store in a dry place.

APPLICATIONS

1. Mechanical thermostats are used for freeze protection or temperature maintenance of piping, tanks and instrumentation.
2. Thermostat may be installed in ordinary (nonclassified) and hazardous (classified) locations depending on the specific approvals. Ensure that thermostat/junction box combination is suitable for the area classification. If installed in classified (hazardous) locations, approved explosion-proof seal fittings shall be installed on all electrical wire entries.
3. Check the line voltage and the heater circuit current to be sure that the ratings of the thermostat are not exceeded.
4. Mount the thermostat/junction box vertically upright and in a position that will prevent condensation from draining into the enclosure from the connected conduit.

THERMOSTAT CONNECTIONS

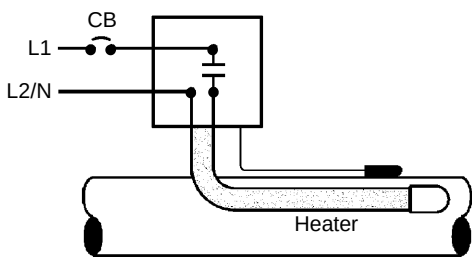
- When a line sensing controller is specified, the sensor should be placed at least 90° around the circumference from the heating cable, or at least 2” (5 cm) from the cable. Mount the bulb in a location that is representative of the overall system temperature away from valves, pipe supports, nozzles, or other heat sinks. Fasten the bulb, capillary and flexible armor (where provided) securely to the pipe/vessel with fiber or metallic tape, being sure that the entire length of the bulb is in intimate contact with the pipe surface. The bulb may be covered with a parallel pass of metallic tape to enhance heat transfer. The thermostat may require more than one support point. Prevent kinking of the capillary.
- For line sensing control, a leg of the heating circuit is to be connected in series with the control contacts as shown in the illustration below. Seal all thermal insulation penetrations after installation to prevent moisture intrusion.
- For ambient sensing control, a leg of the heating circuit should be connected in series with the control contacts as shown in the illustration below. When using an ambient sensing temperature controller, the mounting location should be representative of the coldest region, and the sensing element should not be exposed to direct sunlight or any additional heat source.



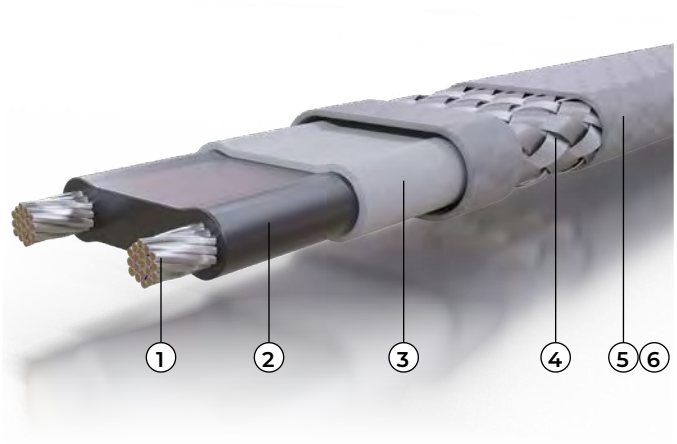
Heating Cable vs. Sensor Location (Line Sensing Control)

5. **All electric power supply circuits should be disconnected and locked out prior to beginning wiring of the thermostat/junction box.**
6. Set the thermostat dial to the control set point, and complete the electrical wiring. The heating system should not be energized prior to the circuit being properly tested.
7. Once the piping or vessel is insulated and in service, the temperature of the process fluid may be measured and compared with the control set point. Adjust the set point where necessary.
8. **Power should always be disconnected and a lockout/tagout procedure performed prior to opening the thermostat/junction box enclosure for maintenance.**
9. Any modification to the enclosure or deviation from these procedures may affect unit’s rating or approvals. Contact factory if modifications are necessary.
10. If recalibration becomes necessary, contact factory for procedures/assistance.

TYPICAL WIRING DIAGRAM



PRODUCT DATASHEET
BSX™
SELF-REGULATING HEAT TRACING



APPLICATION

BSX self-regulating heating cables are designed to provide freeze protection or process temperature maintenance to metallic and nonmetallic piping, tanks and equipment. The heat output of BSX cable varies in response to the surrounding conditions along the entire length of a circuit. Whenever the heat loss of the insulated pipe, tank or equipment increases (as ambient temperature drops), the heat output of the cable increases. Conversely, when the heat loss decreases (as the ambient temperature rises or product flows), the cable reacts by reducing its heat output. BSX cables are approved for use in ordinary (nonclassified) areas and hazardous (classified) areas.

RATINGS

Available watt densities	10, 16, 26, 33 W/m @ 10°C (3, 5, 8, 10 W/ft @ 50°F)
Supply voltages	110-120 or 208-277 Vac
Max. maintenance temperature	65°C (150°F)
Max. continuous exposure temperature	
Power-off	85°C (185°F)
Minimum installation temperature	-51°C (-60°F)
Minimum bend radius	
@ -15°C (5°F)	10 mm (0.38”)
@ -60°C (-76°F)	32 mm (1.25”)
T-rating [1]	
10, 16, 26 W/m (3, 5, 8 W/ft)	T6 85°C (185°F)
33 W/m (10 W/ft)	T5 100°C (212°F)

Notes
1. T-rating per the National Electrical Code and Canadian Electrical Code.

CONSTRUCTION

1 Nickel-plated copper bus wires (16 AWG)

2 Radiation cross-linked semiconductive heating matrix

3 Radiation cross-linked dielectric insulation

4 Tinned copper braid

5 Polyolefin overjacket provides additional protection for cable and braid where exposure to aqueous inorganic chemicals is expected.

OPTIONS

6 FOJ Fluoropolymer overjacket over tinned copper braid provides additional protection to cable and braid where exposure to organic chemicals or corrosives is expected.

BASIC ACCESSORIES

Thermon offers system accessories designed specifically for rapid, trouble-free installation of Thermon heating cables.

All cables require a connection kit to comply with approval requirements. Information on accessories to complete a heater circuit installation can be found in the “Heating Cable Systems Accessories” product specification sheet (Form TEP0010).

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PRODUCT DATASHEET

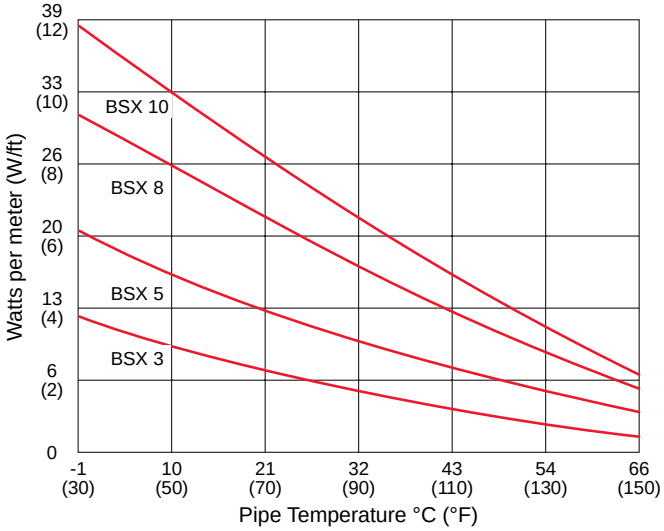
BSX™

SELF-REGULATING HEAT TRACING

POWER OUTPUT CURVES [1]

The power outputs shown apply to cable installed on insulated metallic pipe (using the procedures outlined in IEEE 515) at the service voltages stated below. For use on other service voltages, contact Thermon.

Catalog Number 120 Vac Nominal	Catalog Number 240 Vac Nominal	Power Output at 10°C (50°F) W/m (ft)
BSX 3-1	BSX 3-2	10 (3)
BSX 5-1	BSX 5-2	16 (5)
BSX 8-1	BSX 8-2	26 (8)
BSX 10-1	BSX 10-2	33 (10)



CERTIFICATIONS/APPROVALS

FM Approvals
Ordinary Locations
Hazardous (Classified) Locations
Class I, Division 2, Groups B, C and D
Class II, Division 2, Groups F and G
Class III, Divisions 1 and 2
Class I, Zones 1 and 2, AEx e II

Underwriters Laboratories Inc.
Ordinary Locations
Hazardous (Classified) Locations
Class I, Division 2, Groups A, B, C and D
Class II, Division 2, Groups F and G
Class III, Divisions 1 and 2

Canadian Standards Association
Ordinary Locations
Hazardous (Classified) Locations
Class I, Divisions 1 & 2, Groups A, B, C and D
Class II, Divisions 1 & 2, Groups E, F and G
Ex e II

Notes

1. For more precise power output values as a function of pipe temperature, refer to CompuTrace®.
2. Based on the trip current characteristic of Type QOB or Type QO equipment protection devices. For devices with other trip current characteristics, contact Thermon.
3. The maximum circuit length is for one continuous length of cable, not the sum of segments of cable. Refer to CompuTrace® design software or contact Thermon for current loading of segments.

CIRCUIT BREAKER SIZING [2]

Maximum circuit lengths for various circuit breaker amperages are shown below. Breaker sizing should be based on the National Electrical Code, Canadian Electrical Code or any other applicable code. The National Electrical Code and Canadian Electrical Code require ground-fault protection of equipment for each branch circuit supplying electric heating equipment. Check local codes for ground-fault protection requirements.

120 Vac Service Voltage		Max. Circuit Length [3] vs. Breaker Size m (ft)		
Catalog Number	Start-Up Temperature °C (°F)	20 A	30 A	40 A
BSX 3-1	10 (50)	108 (354)	108 (354)	108 (354)
	0 (32)	108 (354)	108 (354)	108 (354)
	-20 (-4)	96 (315)	108 (354)	108 (354)
	-40 (-40)	79 (259)	108 (354)	108 (354)
BSX 5-1	10 (50)	73 (240)	88 (289)	88 (289)
	0 (32)	73 (240)	88 (289)	88 (289)
	-20 (-4)	61 (200)	88 (289)	88 (289)
	-40 (-40)	50 (164)	76 (249)	81 (266)
BSX 8-1	10 (50)	58 (190)	81 (266)	81 (266)
	0 (32)	57 (187)	81 (266)	81 (266)
	-20 (-4)	44 (144)	67 (220)	79 (259)
	-40 (-40)	37 (121)	55 (180)	65 (213)
BSX 10-1	10 (50)	48 (157)	66 (217)	66 (217)
	0 (32)	42 (138)	63 (207)	66 (217)
	-20 (-4)	33 (108)	50 (164)	66 (217)
	-40 (-40)	27 (89)	41 (135)	55 (180)

240 Vac Service Voltage		Max. Circuit Length [3] vs. Breaker Size m (ft)		
Catalog Number	Start-Up Temperature °C (°F)	20 A	30 A	40 A
BSX 3-2	10 (50)	214 (702)	214 (702)	214 (702)
	0 (32)	214 (702)	214 (702)	214 (702)
	-20 (-4)	192 (630)	214 (702)	214 (702)
	-40 (-40)	158 (518)	214 (702)	214 (702)
BSX 5-2	10 (50)	146 (479)	178 (584)	178 (584)
	0 (32)	146 (479)	178 (584)	178 (584)
	-20 (-4)	117 (384)	175 (574)	178 (584)
	-40 (-40)	96 (315)	145 (476)	163 (535)
BSX 8-2	10 (50)	117 (384)	154 (505)	154 (505)
	0 (32)	108 (354)	154 (505)	154 (505)
	-20 (-4)	84 (276)	127 (417)	154 (505)
	-40 (-40)	69 (226)	104 (341)	131 (430)
BSX 10-2	10 (50)	96 (315)	133 (436)	133 (436)
	0 (32)	85 (279)	127 (417)	133 (436)
	-20 (-4)	67 (220)	101 (331)	133 (436)
	-40 (-40)	55 (180)	83 (272)	111 (364)

MCDERMOTT	SUPPLIER DOCUMENT COVER SHEET	Woodfibre LNG

350106 Woodfibre LNG Project

Supplier Name:	Cannon Artes spa
Purchase Order Title:	Oily Water Treatment Package
Equipment / Tag Number(s):	01-A-6417
Supplier Document No:	EL.23.287-02
SDR Code:	A04, A05

Supplier's Revision Record

Rev	Date	Issue State	By	Checked	Approved
5	26-Aug-25	Issued for Review	FF	CI	AC
4	10-Jun-25	Issued for Review	FF	CI	AC
3	30-Apr-25	Issued for Review	FF	CI	AC
2	28-Feb-25	Issued for Review	FF	CI	AC
1	3-Feb-25	Issued for Review	FF	CI	AC

Project Document Number

Project Number	Purchase Order Number		Seq. No.	Purchaser's Revision
350106	PO-11417-02	SD	000005	5

DOCUMENT TITLE: Schedule of Manufacturer's Commissioning and Start-Up and 2 Years Operation Spares

SUPPLIER DOCUMENT REVIEW STATUS

Purchaser's review of Supplier's documents does not relieve Supplier of the responsibility for correctness under the Purchase Order. Permission to proceed does not constitute acceptance of design, detail and calculations, test methods or materials developed or selected by the Supplier and does not relieve the Supplier from full compliance with the Purchase Order or any other obligations, nor detract from any of the Purchaser's rights.

Purchaser's Review Stamp

MCDERMOTT
Woodfibre LNG EPFC Project
Project No. 350106

Engineering Review Status
Code 2 - Reviewed with Minor Comments
Reviewed with minor non-technical comments. Supplier is to address comments and resubmit immediately

By: parveen.parveen
Date: September 8, 2025

These comments do not relieve the supplier of his responsibility to meet the requirements of the PO.

No comment except "include PDB spares when finalized"

Should the Supplier consider that any comments made by the Purchaser change the Scope of Supply, the Supplier shall advise the price and delivery implications of such changes within five working days of receipt. The Supplier must not incorporate such changes without prior approval of the Purchaser of the revised price and/or delivery period. RETROSPECTIVE CLAIMS WILL NOT BE CONSIDERED.

This document consists of this front sheet plus 3 number of pages.

THE EQUIPMENT CONSISTS OF THE FOLLOWING UNITS/COMPONENTS

Reference Document: CMS-780-01-SP-00002

Project Document Number:

PO Number:	SPIL Rev No:
350106-PO-11417-02	5
Equipment:	Supplier:
OILY WATER TREATMENT PACKAGE	CANNON ARTES S.P.A.

SPARE PARTS INTERCHANGEABILITY LIST (SPIL)

Woodfibre LNG

1	Tag No.	01-A-6417	01-H-6417-41	01-P-6417-22 A/B	01-P-6417-21A/B	01-PRV-6422201-PRV-6422	01-HE-6417-31	01-HE-6417-32	01-UCP-A6417-01	01-PDB-6417																												
2	Equipment Manufacturer's Model/Type No.	MFR STD	MFR STD	3196 / 1.5x3x6 STI	60A6	1905-3IJ-2-CC*MS-31-RF-LA-HP	MFR STD		MFR STD	MFR STD																												
3	Equipment Manufacturer's Reference / Serial No.	-	5119	GD07A529-1/2	317117 317288						SPIL Item Number	Total Number of Identical Parts Installed	MATERIALS DATA							Comm'g Spares				2Y Operating Spares				Ins (Capital) Spares										
													Supplier's Description of Spare Parts	Supplier Drawing No.	MDR Tag No.	Supplier's Part No.	Original Manufacturer's Part No.	Material Specification	Original Manufacturer's Name	Recommended by Supplier	Required by Comm'g	Quantity to Purchase	Quantity to Ship	Recommended By Supplier	Required by Ops	Quantity to Purchase	Quantity to Ship	Insurance Spares (Capital Spares)	Quantity to Purchase	Quantity to Ship	Shelf Life (in Months)	Unit Price in (state Currency)	Unit of Measure	Delivery Time (weeks)	WLNG Part No.
4	No. of Units	1	1	2	2	2	2	1	1		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29				
5	Quantity of parts / spare parts per unit / main component																																					
		39									1	39	SPIRAL WOUND GASKET 4" 150LB 4.5 mm	350106-PO-11417-02-SD-000053 Sh.2 Pos.4, Sh.5 Pos.13,Sh.10 Pos.13, Sh.12 Pos.12, Sh.17 Pos.5, Sh.19 Pos.5, Sh.20 Pos.5, Sh.21 Pos.5, Sh.22 Pos.19, Sh.23 Pos.19	11417-02-001	302401811_07	302401811_07	SS304/GRAPHITE	CANNON ARTES	39	39	39		78				0	0		24	12.00 €	NO.	10	
		56									2	56	SPIRAL WOUND GASKET 3" 150LB 4.5 mm	350106-PO-11417-02-SD-000053 Sh.3 Pos.4, Sh.4 Pos.4, Sh.7 Pos.7, Sh.8 Pos.7, Sh.9 Pos.4, Sh.3 Pos.4, Sh.10 Pos.14, Sh.11 Pos.5, Sh.12 Pos.12, Sh.13 Pos.18, Sh.14 Pos.18, Sh.15 Pos.12, Sh.16 Pos.5, Sh.22 Pos.20, Sh.23 Pos.20	11417-02-002	302401811_06	302401811_06	SS304/GRAPHITE	CANNON ARTES	56	56	56		112				0	0		24	10.00 €	NO.	10	
		4									3	4	SPIRAL WOUND GASKET 1"1/2 150LB 4.5 mm	350106-PO-11417-02-SD-000053 Sh.5 Pos.14, Sh.13 Pos.20, Sh.14 Pos.20	11417-02-003	302401811_04	302401811_04	SS304/GRAPHITE	CANNON ARTES	4	4	4		8				0	0		24	6.00 €	NO.	10	
		13									4	13	SPIRAL WOUND GASKET 3/4" 150LB 4.5 mm	350106-PO-11417-02-SD-000053 Sh.5 Pos.15, Sh.10 Pos.15, Sh.12 Pos.14, Sh.13 Pos.21, Sh.14 Pos.21, Sh.18 Pos.5, Sh.22 Pos.22, Sh.23 Pos.22, Sh.24 Pos.5	11417-02-004	302401811_02	302401811_02	SS304/GRAPHITE	CANNON ARTES	13	13	13		26				0	0		24	4.00 €	NO.	10	
		536									5	536	SET OF STUD BOLT 5/8" X 95 +N.2 NUTS + N.2 WASHERS	350106-PO-11417-02-SD-000053 Sh.2 Pos.5, Sh.3 Pos.5, Sh.4 Pos.5, Sh.5 Pos.18, Sh.7 Pos.9, Sh.8 Pos.8, Sh.9 Pos.5, Sh.10 Pos.17/18, Sh.11 Pos.6, Sh.12 Pos.16/17, Sh.13 Pos.23, Sh.15 Pos.14, Sh.16 Pos.6, Sh.17 Pos.6, Sh.19 Pos.6, Sh.20 Pos.6, Sh.21 Pos.6, Sh.22 Pos.24/25, Sh.23 Pos.24/25	11417-02-005	302101827_05	302101827_05	ALLOY STEEL ASTM A193 GRADE B7 / ASTM A194 GR.2H/ CS	CANNON ARTES	54	54	54		54				0	0		120	15.00 €	SET	10	
		12									6	12	SET OF STUD BOLT 1/2" X 75 +N.2 NUTS + N.2 WASHERS	350106-PO-11417-02-SD-000053 Sh.5 Pos. 19, Sh.13 Pos.25	11417-02-006	302101827_03	302101827_03	ALLOY STEEL ASTM A193 GRADE B7 / ASTM A194 GR.2H/ CS	CANNON ARTES	2	2	2		2				0	0		120	6.00 €	SET	10	
		52									7	52	SET OF STUD BOLT 1/2" X 65 +N.2 NUTS + N.2 WASHERS	350106-PO-11417-02-SD-000053 Sh.5 Pos. 20, Sh.10 Pos. 19, Sh.12 Pos. 18, Sh.13 Pos. 26, Sh.14 Pos. 26, Sh.18 Pos. 6, Sh.22 Pos. 27, Sh.23 Pos. 27, Sh.24 Pos. 6	11417-02-007	302101827_01	302101827_01	ALLOY STEEL ASTM A193 GRADE B7 / ASTM A194 GR.2H/ CS	CANNON ARTES	6	6	6		6				0	0		120	6.00 €	SET	10	
		20									8	20	SET OF STUD BOLT 5/8" X 90 +N.2 NUTS + N.2 WASHERS	350106-PO-11417-02-SD-000053 Sh.13 Pos.24, Sh.14 Pos.24, Sh.15 Pos.15, Sh.22 Pos.26, Sh.23 Pos.26	11417-02-008	302101827_04	302101827_04	ALLOY STEEL ASTM A193 GRADE B7 / ASTM A194 GR.2H/ CS	CANNON ARTES	4	4	4		2				0	0		120	12.00 €	SET	10	
		4									9	4	SET OF STUD BOLT 1/2" X 70 +N.2 NUTS + N.2 WASHERS	350106-PO-11417-02-SD-000053 Sh.14 Pos.25	11417-02-009	302101827_02	302101827_02	ALLOY STEEL ASTM A193 GRADE B7 / ASTM A194 GR.2H/ CS	CANNON ARTES	2	2	2		1				0	0		120	8.00 €	SET	10	
		16									10	16	SET OF STUD BOLT 5/8" X 110 +N.2 NUTS + N.2 WASHERS	350106-PO-11417-02-SD-000052 Sh.1 POS.3	11417-02-010	302101827_06	302101827_06	ALLOY STEEL ASTM A193 GRADE B7 / ASTM A194 GR.2H/ CS	CANNON ARTES	2	2	2		2				0	0		120	14.00 €	SET	10	
		5									11	5	SPIRAL WOUND GASKET 2" 150LB	350106-PO-11417-02-SD-000053 Sh.13 Pos.19, Sh.14 Pos.19, Sh.15 Pos.13, Sh.22 Pos.21, Sh.23 Pos.21	11417-02-011	302101827_05	302101827_05	SS304/GRAPHITE	CANNON ARTES	5	5	5		10				0	0		24	10.00 €	NO.	10	
		2									12	2	SPIRAL WOUND GASKET 2" 300LB	350106-PO-11417-02-SD-000052 Sh.1 POS.2	11417-02-012	302401811_08	302401811_08	SS304/GRAPHITE	CANNON ARTES	2	2	2		4				0	0		24	10.00 €	NO.	10	
			4								13	4	GASKET 200 X 177 E	350106-PO-11417-02-SD-000044 DETAIL 4	11417-02-013	4475-901-82	302401250_02	PTFE	CANNON ARTES	4	4	4		8				0	0		24	100.00 €	NO.	10	
			16								14	16	SET OF STUD BOLT M16 X 75 +N.2 NUTS + N.2 WASHERS	350106-PO-11417-02-SD-000044 DETAIL 4	11417-02-014	4475-901-84	4475-901-84	SA193GR.B7/SA194 GR.2H-HDG/CS	CANNON ARTES	2	2	2		2				0	0		120	10.00 €	SET	10	

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MCDERMOTT

SUPPLIER DOCUMENT COVER SHEET

Woodfibre LNG

350106 Woodfibre LNG Project

Supplier Name:	Cannon Artes spa
Purchase Order Title:	Oily Water Treatment Package
Equipment / Tag Number(s):	01-A-6417
Supplier Document No:	TS.23.287-22
SDR Code:	D20

Supplier's Revision Record

Rev	Date	Issue State	By	Checked	Approved
5	10-Sep-24	Issued for Review	ES	CI	AC
4	8-Jul-24	Issued for Review	ES	CI	AC
3	11-Apr-24	Issued for Review	ES	CI	AC
2	14-Feb-24	Issued for Review	ES	CI	AC
1	18-Dec-23	Issued for Review	ES	CI	AC

Project Document Number

Project Number	Purchase Order Number		Seq. No.	
350106	PO-11417-02	SD	000034	

DOCUMENT TITLE: Control Philosophy and Logic Diagram

SUPPLIER DOCUMENT REVIEW STATUS

Purchaser's review of Supplier's documents does not relieve Supplier of the responsibility for correctness under the Purchase Order. Permission to proceed does not constitute acceptance of design, detail and calculations, test methods or materials developed or selected by the Supplier and does not relieve the Supplier from full compliance with the Purchase Order or any other obligations, nor detract from any of the Purchaser's rights.

Purchaser's Review Stamp

MCDERMOTT

Woodfibre LNG EPFC Project
Project No. 350106

Engineering Review Status
Code 1 - No Comments

By:
parveen.parveen

Date:
September 23, 2024

These comments do not relieve the supplier of his responsibility to meet the requirements of the PO.

Should the Supplier consider that any comments made by the Purchaser change the Scope of Supply, the Supplier shall advise the price and delivery implications of such changes within five working days of receipt. The Supplier must not incorporate such changes without prior approval of the Purchaser of the revised price and/or delivery period. RETROSPECTIVE CLAIMS WILL NOT BE CONSIDERED.

This document consists of this front sheet plus 41 number of pages.

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1. SCOPE

The present document describes the control philosophy, general principles and detailed operation of the Oily Water Treatment Package 01-A-6417.

2. REFERENCE DOCUMENTS

DOCUMENT DESCRIPTION	DOC. No.
P&ID	350106-PO-11417-02-SD-000033
CAUSE AND EFFECT CHARTS	350106-PO-11417-02-SD-000036
RANGE, ALARM, TIMER & TRIP SETTING LIST	350106-PO-11417-02-SD-000062
PROCESS & SIZING CALCULATIONS	350106-PO-11417-02-SD-000070

3. GLOSSARY AND DEFINITIONS

DCS	Distributed Control System
UCP	Unit Control Panel
PLC	Programmable logic controller
PHASE	It indicates generic status of the package. During each phase valves that must be open, running of pumps, enabled alarms and duration time phase are strictly decided by process requirements and established by sequence charts
AUTOMATIC OPERATION	Package follows logic implemented by PLC
MANUAL OPERATION	Specific sequence phase is initiated manually by operator. Package remains in this phase until another commands is selected
CPI	Corrugated Plate Interceptor
MCC	Motor Control Center
LCS	Local Control Station
HMI	Human Machine Interface
HS	Hand Switch
CPI pack	Corrugated Plate Interceptor - Coalescer pack

4. UNIT DESCRIPTION

The Oily Water Treatment Package 01-A-6417 is provided for the removal of free and dispersed oil and settleable & suspended solids from the oily water received from Oily Water Storage Tank 01-T-6469. The Oily Water Storage Tank 01-T-6469 (by others) collects the oily water from oily water sumps.

The PACKAGE INLET FEED PUMP 01-P-6417-21 A/B (provided loose by Artes and installed by MDR in upstream package) take suction from the Oily Water Storage Tank 01-T-6469 and feeds the Oily Water Treatment Package (at TP 201) with a fixed flowrate of 30 m^3/hr.

The Oily Water Treatment Package 01-A-6417 duty is a 12 hour batch operation.

The Oily Water Treatment Package is mainly composed by:

- Two PACKAGE INLET FEED PUMPS 01-P-6417-21 A/B (2x100% (1 DTY, 1 STB)) - Positive displacement type [Note 1]

- One CPI SEPARATOR 01-H-6417-41 (1X100%)

- Two TREATED WATER FORWARDING PUMPS 01-P-6417-22 A/B (2 x 100 % (1DTY-1STB)) – Centrifugal type

4.1 CPI SEPARATOR 01-H-6417-41

The CPI SEPARATOR 01-H-6417-41 is designed to separate oil with droplet size of 60 microns and bigger at a maximum flowrate of 30m3/hr. The flowrate is monitored by flow transmitter 01-FT-64237.

It is equipped with CPI pack and a motorized belt skimmer.

When the oil-water flows through the CPI pack, the oil rises to the liquid surface while the suspended solids settle to the bottom of the separator (hopper). The skimmer automatically starts when the package starts and is operating continuously collecting the oil on the surface and depositing it to the skimmed oil compartment (which is part of CPI separator). Process interlock will close 01-XV-64098 (MDR scope) when belt oil skimmer (Z-6417-61) is not operating. Skimmer motor Run Feedback (01-XXL-64226A) is used for this control interlock.

The recovered oil (concentration 70%) is stored in the skimmed oil compartment, which will be emptied periodically (approximately after 10 batch operations of 12 hours) by a vacuum truck equipped with vacuum suction pump (by Client). The level in skimmed oil compartment is monitored by level transmitter 01-LT-64232 type guided wave radar. The skimmed oil compartment is also

equipped with a sight glass for local indication. In case the skimmed oil compartment is not emptied when required, it is provided with a safety margin in order to guarantee additional 5 batch operations of 12 hours before the overflow. High High level by 01-LT-64232 stops PACKAGE INLET FEED PUMP 01-P-6417-21 A/B to avoid the overflow.

The sludge stored in the hopper is at 1% concentration therefore cannot be detected with a level transmitter. The hopper is emptied of the sludge periodically (after every single batch operation of 12 hours) by a vacuum truck equipped with vacuum suction pump for off-site disposal (by Client). The hopper is equipped with a sight glass for local indication. In case the hopper is not emptied when required, it is provided with a safety margin in order to guarantee additional 6 hours of operation. After this time in operation sludge dragging in treated effluent could occur.

4.3 TREATED WATER

The treated water from the separator overflows the weir directly into the treated water compartment (which is part of CPI separator). The treated water compartment is emptied using the TREATED WATER FORWARDING PUMP 01-P-6417-22 A/B (one on line one in standby), that is started/stopped using the guided wave radar level transmitter 01-LT-64231, and is disposed via outlet line to Howe Sound (by others). To protect the pump the level transmitter 01-LT-64233 will stop FORWARDING PUMP 01-P-6417-22 A/B in case of Low Low level. The pump stop is managed by UCP 01-UCP-A6417-01.

The discharge line of TREATED WATER FORWARDING PUMP 01-P-6417-22 A/B is equipped with two oil in water analysers 01-AT-64241 / 01-AT-64242 and ON/OFF valves 01-XV-64244 (OFF-SPEC line) and 01-XV-64243 (treated water line). In case of off-spec water (high alarm at 10.5 ppm), the ON/OFF valve 01-XV-64244 will open and the ON/OFF valve 01-XV-64243 will close in order to route the water back to Storage Tank 01-T-6469 for additional treatment. When the water meets the specification (normal value ≤ 10 ppm) the discharge line is automatically reversed closing valve 01-XV-64244 and opening valve 01-XV-64243.

4.6 WINTERIZATION

The PACKAGE INLET FEED PUMP 01-P-6417-21 A/B and TREATED WATER FORWARDING PUMP 01-P-6417-22 A/B and related piping, valves and instrumentation are provided with electric heat tracing and insulation in order to maintain a minimum operating temperature of 10°C.

The CPI SEPARATOR 01-H-6417-41 is provided with electric heat tracing, insulation and electrical heaters 01-HE-6417-31 and 01-HE-6417-32 in order to maintain a minimum operating temperature of 10°C.

The electrical heater 01-HE-6417-31 is energized/deenergized by temperature transmitter 01-TT-64235 while the electrical heater 01-HE-6417-32 is energized/deenergized by temperature transmitter 01-TT-64236. The energized/deenergized temperatures are respectively 10°C and 38°C

4.7 UCP & POWER DISTRIBUTION BOARD

The Oily Water Treatment Package 01-A-6417 is controlled by UCP 01-UCP-A6417-01 PLC based (located in remote building) and is connected to the DCS (by others). The package can be operated in Automatic or Manual mode of operation or can be put in OFF-line mode. The UCP controls the operation of the package and is equipped with a local HMI panel as interface between the PLC and the operator. The operator using the HMI panel can monitor or modify the operation of the Package.

The PACKAGE INLET FEED PUMPS 01-P-6417-21 A/B are installed upstream of the package and are powered by MCC (by others) connected to UCP 01-UCP-A6417-01.

The Oily Water Treatment Package 01-A-6417 is equipped with a local Power Distribution Board installed in local cabinet positioned within the package. The Power Distribution Board feeds all electrical items within the package (i.e driver of forwarding pumps, skimmer motor, heaters, heat tracing, instruments etc.). The Power Distribution Board is equipped with the following buttons on the front face of the panel:

- SELECTOR LOCAL-O-REMOTE: using the Hand Switch, the operator can select “REMOTE” (controlled by PLC) or “LOCAL” (controlled by operator) or “O” OFF-line.

- EMERGENCY STOP BUTTON: if emergency stop button is pressed, the whole package will go in OFF-line mode.

- GREEN LAMP START: Steady green lamp when it is operating.

- RED LAMP STOP: Steady red lamp when it is not operating.

- ORANGE LAMP FAULT: Steady orange lamp when it is FAULT.

- START HS: using the Hand Switch, the operator can START the unit (only if SELECTOR LOCAL-0-REMOTE is in LOCAL)

- STOP HS: using the Hand Switch, the operator can STOP the unit (only if SELECTOR LOCAL-0-REMOTE is in LOCAL)

The LOCAL operation is possible during the Automatic and Manual mode of operation only for the item not in service and only for maintenance purpose. In case the process requires the unit to be put in service while in LOCAL mode, an alarm will be energized at the UCP. All interlocks are by-passed during the LOCAL mode leaving the item under the responsibility of the operator.

5. OPERATION MODE

The Oily Water Treatment Package 01-A-6417 is controlled by UCP and can be operated in Automatic or Manual mode of operation or can be put in OFF-line mode using the AUTO / MAN / OFF selectors on HMI:

- AUTO: Automatic mode of operation through UCP
- MAN: Manual mode of operation through UCP
- OFF: off-line

In Automatic mode there is only one phase that is the "SERVICE". During the "SERVICE" phase in Automatic mode all unit operations/equipment (pumps, skimmers heaters , etc.) are controlled started/stopped by the UCP.

In Manual mode there is only the "SERVICE" phase but with the difference that operator controls all equipment operations (Start/Stop the pumps, skimmer and electrical heaters) regardless of set point. In Manual mode, in case any set point is reached the pumps, skimmer and electrical heaters will not automatically Start/Stop. The operator must take action to start/stop or energize the equipment to insure proper operation of the unit.

Automatic mode of operation shall be the normal mode of operation. Manual mode of operation is provided only for flexibility and maintenance purposes.

5.1 AUTOMATIC MODE OF OPERATION

To operate the package in automatic mode the operator shall perform the following actions:

1) Select all items in REMOTE with Local-O-Remote switch from LCS (LCS provided in the POWER DISTRIBUTION BOARD)

2) Select START on HMI panel of UCP

3) Select AUTO in the HMI panel of UCP (Respective signalization of AUTO mode will be displayed in the HMI panel)

The package will start to operate in SERVICE phase (SERVICE phase will be displayed in the HMI panel) and will continue if not tripped by automatic process conditions or manually stopped by operator selecting MAN or OFF on the HMI panel of UCP.

At unit start up, all timers start counting. In case the operator selects MAN mode the timers continue the counting. If the operator selects OFF the timers are frozen. The reset of the timers happens when the set-point is reached.

During the SERVICE phase in AUTO mode, all items are controlled by the UCP and the operator can only monitor the package operation.

The current status of all variables are displayed on the HMI panel as well as, all alarms and set points.

UNIT STARTUP PERMISSIVES	
NON-CONFORMITY ALARM 01-XA-64010	Not activated
EMERGENCY STOP BUTTON HZS on LCS	Not activated
PACKAGE INLET FEED PUMP 01-P-6417-21 A/B	At least one pump selected in REMOTE and not in FAULT
OIL SKIMMER 01-Z-6417-61	Selected in REMOTE and not in FAULT
01-LT-64231 01-LT-64232	HH alarm not active
TREATED WATER FORWARDING PUMP 01-P-6417-22 A/B	At least one pump selected in REMOTE and not in FAULT
01-XV-64243 01-XV-64244	One XV opened and the other one is closed

5.2 MANUAL MODE OF OPERATION FROM UCP HMI

To operate the package in manual mode the operator shall perform the following actions:

1) Select all items in REMOTE with Local-O-Remote switch from LCS (LCS provided in the POWER DISTRIBUTION BOARD)

2) Select START on the HMI panel

3) Select MAN in the HMI panel (MAN mode will be displayed in the HMI panel)

The package will start to operate in SERVICE phase (SERVICE phase will be displayed in the HMI panel) and will continue if not tripped by automatic process conditions or manually stopped by operator selecting AUTO or OFF in the HMI panel of UCP.

At unit startup all timers start counting, in case the operator selects AUTO mode the timers continue the counting. If the operator selects OFF the timers are frozen. The reset of the timers happens when the set-point is reached.

During the SERVICE phase in MAN mode, in case any set point is reached, the items will not automatically start/stop and the operator shall control the package operation using the start/stop selector provided for each item in the HMI panel.

The current status of all variables are displayed on the HMI panel as well as, all alarms and set points.

5.3 OFF-LINE

To put the unit in OFF-line the operator shall select OFF on the HMI panel (OFF mode will be displayed in the HMI panel).

When OFF mode is selected, all items are stopped and all timers are frozen.

Operator can restart the SERVICE phase by simply selecting AUTO or MAN on the HMI panel, the timers will continue counting.

5.4 INTERFACE WITH PLANT DCS

The UCP communicates with the plant DCS via Modbus TCP/IP communication for monitoring the complete package at the DCS operator workstation.

In addition to redundant interface with plant DCS, UCP shall also has following interfaces :

1. Interface with plant AMS - Simplex connection (from HART Mux in UCP)

2. Time Synchronization (NTP) - Simplex connection

5.5 ROTATING EQUIPMENT

All pumps are redundant with one on line and one in standby.

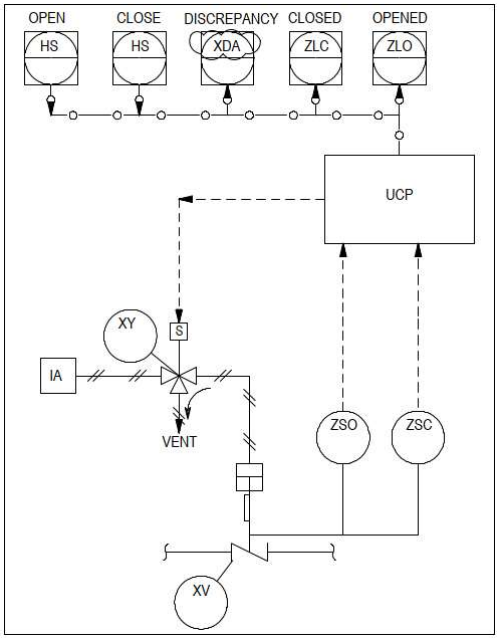
The on line equipment is started and stopped automatically through the UCP sequence. The standby equipment is started in case the on line equipment fails during operation.

It is not required to switch on-line and standby pumps to equalize run time. On-line and standby pumps are switched only in case the on line pump fails or during maintenance.

In case of discrepancy between command and feedback signal (time delay for feedback signals shall be adjustable during commissioning of the plant) or on line and stand by equipment are both in operation a Non-Conformity alarm will be generated by the UCP and the sequence is stopped. The operator must manually check the unit for the cause of the alarm. After the resolution of the problem the operator must select "RESET" button in UCP and the sequence has to be started where it has been stopped.

5.6 ON/OFF valve

The following typical is expected for the ON/OFF valve within the package:



The On-Off valve includes two limit switches to indicate full open and full closed position.

The field actuator is commanded through the UCP sequence or Open/Close selector in UCP.

When OFF mode is selected, the ON/OFF valve is in its fail safe position i.e. fail close.

During transition the ON/OFF valve in open position will close first and then the required valve will open.

Non-Conformity alarm for “irregular valve position” will be generated by the UCP in case of mismatch between the commands from UCP and the actual status of each valve, or in case of incongruence of limit switches (both on or both off). In the case of irregular valve position, the sequence is stopped. Once the alarm occurs the operator must manually check the unit for the cause of the alarm. After the resolution of the problem the operator must select "RESET" button in UCP and the sequence has to be started where it has been stopped.

6. PROCESS INDICATIONS AND ALARMS

The process variables and alarms will be displayed on the UCP, as part of the standard configuration.

Other alarms and indications are a product of logic configuration and are specified as required in this document.

The following process variables and alarms will be displayed on the UCP, all set points can be adjusted on site.

INSTRUMENT TAG NO.	PROCESS VARIABLE	ACTION	SET POINT
01-FT-64237	High flow in CPI SEPARATOR 01-H-6417-41	Alarm – operator to check (Only if the persist for more than 5 seconds)	31 m3/h
01-TT-64235	High High temperature in CPI SEPARATOR 01-H-6417-41	Alarm – operator to check (Only if the persist for more than 5 seconds)	39°C
01-TT-64235	High temperature in CPI SEPARATOR 01-H-6417-41	STOP heater 01-HE-6417-31	38°C
01-TT-64235	Low temperature in CPI SEPARATOR 01-H-6417-41	START heater 01-HE-6417-31	10°C
01-TT-64235	Low Low temperature in CPI SEPARATOR 01-H-6417-41	Alarm – operator to check (Only if the persist for more than 5 seconds)	9°C
01-TT-64236	High High temperature in CPI SEPARATOR 01-H-6417-41 (TREATED WATER COMPARTMENT)	Alarm – operator to check (Only if the persist for more than 5 seconds)	39°C
01-TT-64236	High temperature in CPI SEPARATOR 01-H-6417-41 (TREATED WATER COMPARTMENT)	STOP heater 01-HE-6417-32	38°C

01-TT-64236	Low temperature in CPI SEPARATOR 01-H-6417-41 (TREATED WATER COMPARTMENT)	START heater 01-HE-6417-32	10°C
01-TT-64236	Low Low temperature in CPI SEPARATOR 01-H-6417-41 (TREATED WATER COMPARTMENT)	Alarm – operator to check (Only if the persist for more than 5 seconds)	9°C
01-LT-64231	High High level in CPI SEPARATOR 01-H-6417-41 (TREATED WATER COMPARTMENT)	ALARM and STOP PACKAGE INLET FEED PUMP 01-P-6417-21 A/B	2600 mm 87%
01-LT-64231	High level in CPI SEPARATOR 01-H-6417-41 (TREATED WATER COMPARTMENT)	START TREATED WATER FORWARDING PUMP 01-P-6417-22 A/B	2450 mm 82%
01-LT-64231	Low level in CPI SEPARATOR 01-H-6417-41 (TREATED WATER COMPARTMENT)	Alarm – operator to check	850 mm 28%
01-LT-64233	Low Low level in CPI SEPARATOR 01-H-6417-41 (TREATED WATER COMPARTMENT)	STOP TREATED WATER FORWARDING PUMP 01-P-6417-22 A/B	700 mm 24%
01-LT-64232	High High level in CPI SEPARATOR 01-H-6417-41 (SKIMMED OIL COMPARTMENT)	ALARM and STOP PACKAGE INLET FEED PUMP 01-P-6417-21 A/B	1600 mm 80%
01-LT-64232	High level in CPI SEPARATOR 01-H-6417-41 (SKIMMED OIL COMPARTMENT)	Alarm – operator to check	700 mm 35%
01-LT-64232	Low level in CPI SEPARATOR 01-H-6417-41 (SKIMMED OIL	Alarm – operator to check	100 mm 5%

	COMPARTMENT)		
01-AT-64241	High oil concentration in treated water (offspec)	Alarm and OPEN 01-XV-64244 and CLOSE 01-XV-64243 (Only if the persist for more than 5 seconds)	10.5 ppm (Note 2)
01-AT-64241	Low oil concentration in treated water	AUTO OPEN 01-XV-64243 and CLOSE 01-XV-64244	<=10 ppm (Note 2)
01-AT-64242	High oil concentration in treated water (offspec)	Alarm and OPEN 01-XV-64244 and CLOSE 01-XV-64243 (Only if the persist for more than 5 seconds)	10.5 ppm (Note 2)
01-AT-64242	Low oil concentration in treated water	AUTO OPEN 01-XV-64243 and CLOSE 01-XV-64244	<=10 ppm (Note 2)
01-T-64235	Timer for sludge removal	Alarm – operator to check	12 hours
01-T-64236	Timer for oil removal	Alarm – operator to check	10 batch operations

Notes:

1. All timers and set points are adjustable and can be changed through UCP HMI with the following password protected level accesses:

   a. Operator: access to change parameters with Supervisor authorization;

   b. Supervisor: free access to change parameters with next communication to Configurator / Engineer;

   c. Configurator / Engineer: free access to change parameters with next communication to Supervisor.

2. Just one AT is required for the action.

7. ENGINEERING LAPTOP

The laptop is provided loose with carrying case and as per following details.

- Brand and Model

Notebook Dell Latitude

- Processor

13th Gen Intel® Core™ i7-1355U (12 MB cache, 10 cores, 12 threads, up to 5.0 GHz Turbo)

- Operating System

Windows 11 Pro, English, Dutch, French, German, Italian

- Graphics Card

Integrated Intel® Iris® Xe or UHD Graphics for i7-1355U Processor

- Display

15.6", FHD 1920x1080, 60Hz, WVA/IPS, Non-Touch, Anti-Glare, 250 nit, NTSC 45%, FHD+IR Camera, WLAN

- Memory

16 GB: 2 x 8 GB, DDR4, 3200 MT/s

- Storage

256 GB, M.2 2230, PCIe NVMe, SSD, Class 35

- Keyboard

English UK backlit keyboard with numeric keypad, 100-key

- Ports

1 USB 3.2 Gen 2 Type-C® port with DisplayPort Alt mode/Power Delivery

2 USB 3.2 Gen 1 port

1 USB 3.2 Gen 1 port with PowerShare

1 HDMI 1.4 port

1 universal audio port

1 power-adapter port

1 RJ-45 Ethernet port

- Slots

1 microSIM slot (On computers with WWAN configuration)

1 wedge-shaped lock slot

- Camera

720p at 30 fps HD camera

1080p at 30 fps FHD + IR camera

1080p at 30 fps FHD

Dual-array microphones

- Audio and Speakers

Stereo speakers with Waves MaxxAudio® Pro, Realtek ALC3204 Audio Controller, 2 W x 2 = 4 W total

- Wireless

Intel® Wi-Fi 6E AX211, 2x2, 802.11ax, Bluetooth® wireless card

- Primary Battery

3 Cell, 54 Wh, ExpressCharge™, ExpressCharge™ Boost capable

- Power

65W AC rugged adapter, 4.5mm barrel, E4

The notebook is provided with the following licensed software installed:

1) FactoryTalk View (Allen-Bradley / Rockwell-Automation)

2) Studio 5000 (Allen-Bradley / Rockwell-Automation)

8. LOGIC DIAGRAM

SHEET INDEX

Logic Diagrams

Oily water treatment package

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Sh.Rev.

CUSTOMER IDENTIFICATION CODE

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INPUT | **PLC SOFTWARE** | **OUTPUT**

0=
1=

CONNECTOR

Connector ID 14
Page reference 12 LAH-4007
Tag

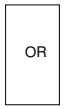
ANALOGIC INPUT ALARM

> HOLD **Alarm Threshold**
0 - HOLD **Analogic Scale**
LAH-
Tag

AND LOGIC OPERATION



OR LOGIC OPERATION



NOT LOGIC OPERATION



SET-RESET INSTRUCTION



SELECTOR

Selection for true IN_1
Selection for false IN_0 OUT **Selected value**
Selection variable SEL

SELECTOR

CONSTANT VALUE



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1=

PLC SOFTWARE

SEQUENCER

State WAIT_READY

Transition condition connector

09 CF_SERVICE_R
11 EQ
Service Request

Transition

State SERVICE

TIMER

TIMER
24 hrs

TIMER ON

DI
10 m

OUTPUT

0=
1=

	LEGEND 3 Logic Diagrams Oily water treatment package	Document Number 350106-PO-11417-02-SD-000034 Revision 5 Sheet 21 next 22 Sh.Rev. CUSTOMER IDENTIFICATION CODE
	Legend 3	

INPUT | **PLC SOFTWARE** | **OUTPUT**

0=
1=

VALVE MANAGEMENT BLOCK

XV-4003		
Limit switch open	D1	
Limit switch close	D0	
	P1 OP1	**Solenoid command**
	P0	
Automatic open	A1	
Automatic close	A0	
	I1 XA	**Valve anomaly**
	I0	
	SI Mode	

MOTOR MANAGEMENT BLOCK

PZ4001A		
Motor running	D1	
Motor avaliable	D0	
	P1 OP1	**Start Command**
	P0	
Automatic start	A1 OP0	**Stop Command**
Automatic stop	A0	
	I1 X	**Motor anomaly**
	I0	
	SI Mode	

PID MANAGEMENT BLOCK

PID	
PV	Out
Sp	
Ext_En	
MAN	
MAN OUT	
AUT	
CAS	
Kp	
Ti	
Td	
Lim Hi	
Lim Lo	
Direct(+)	
Track en	
SP Track en	

START PLANT Condition

Logic Diagrams

Oily water treatment package

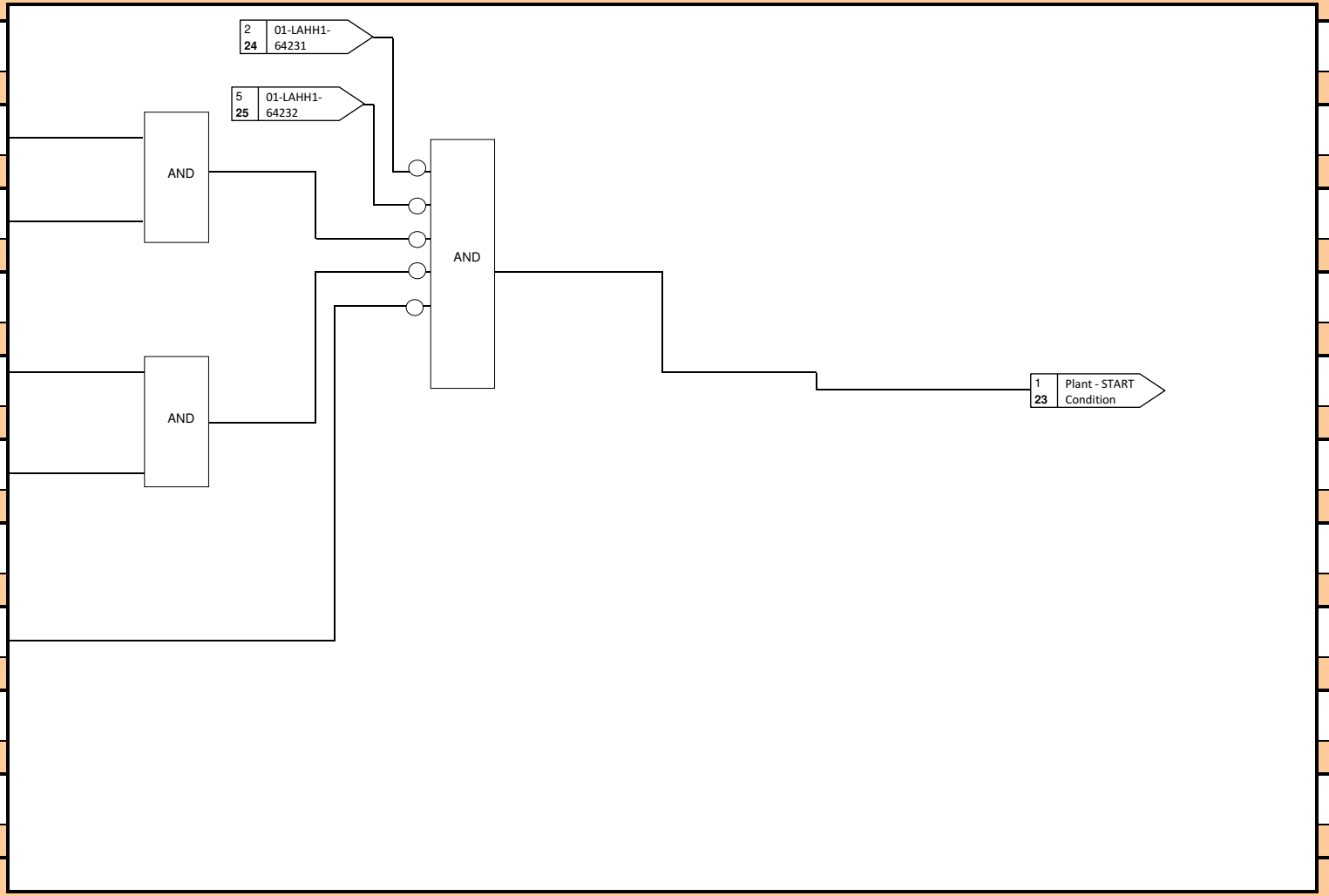
Start Plant Condition

Document Number	Revision
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Sheet 22 next 23	
Sh.Rev.	
CUSTOMER IDENTIFICATION CODE	

INPUT

	0= 1=
01-XA-64224 PACKAGE INLET FEED PUMP MOTOR-A FAULT	
PLC DIGITAL	0= 1= **FAULT**
01-XA-64225 PACKAGE INLET FEED PUMP MOTOR-B FAULT	
PLC DIGITAL	0= 1= **FAULT**
	0= 1=
01-XA-64227 TREATED WATER FORWARDING PUMP-A FAULT	
PLC DIGITAL	0= 1= **FAULT**
01-XA-64228 TREATED WATER FORWARDING PUMP-B FAULT	
PLC DIGITAL	0= 1= **FAULT**
	0= 1=
01-XA-64226 OIL SKIMMER MOTOR FAULT	
PLC DIGITAL	0= 1= **FAULT**
	0= 1=
	0= 1=

PLC SOFTWARE



OUTPUT

	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=

START PLANT COMMAND

Logic Diagrams

Oily water treatment package

Start Plant command

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Sh.Rev.	
CUSTOMER IDENTIFICATION CODE	

INPUT

PLC SOFTWARE

OUTPUT

	0= 1=

01-HS-002
START HMI HANDSWITCH

HMI DIGITAL	0= 1= **START**

01-HS-001
AUTOMATIC HMI HANDSWITCH

HMI DIGITAL	0= 1= **AUTOMATIC**

	0= 1=

	0= 1=

01-HS-003
STOP HMI HANDSWITCH

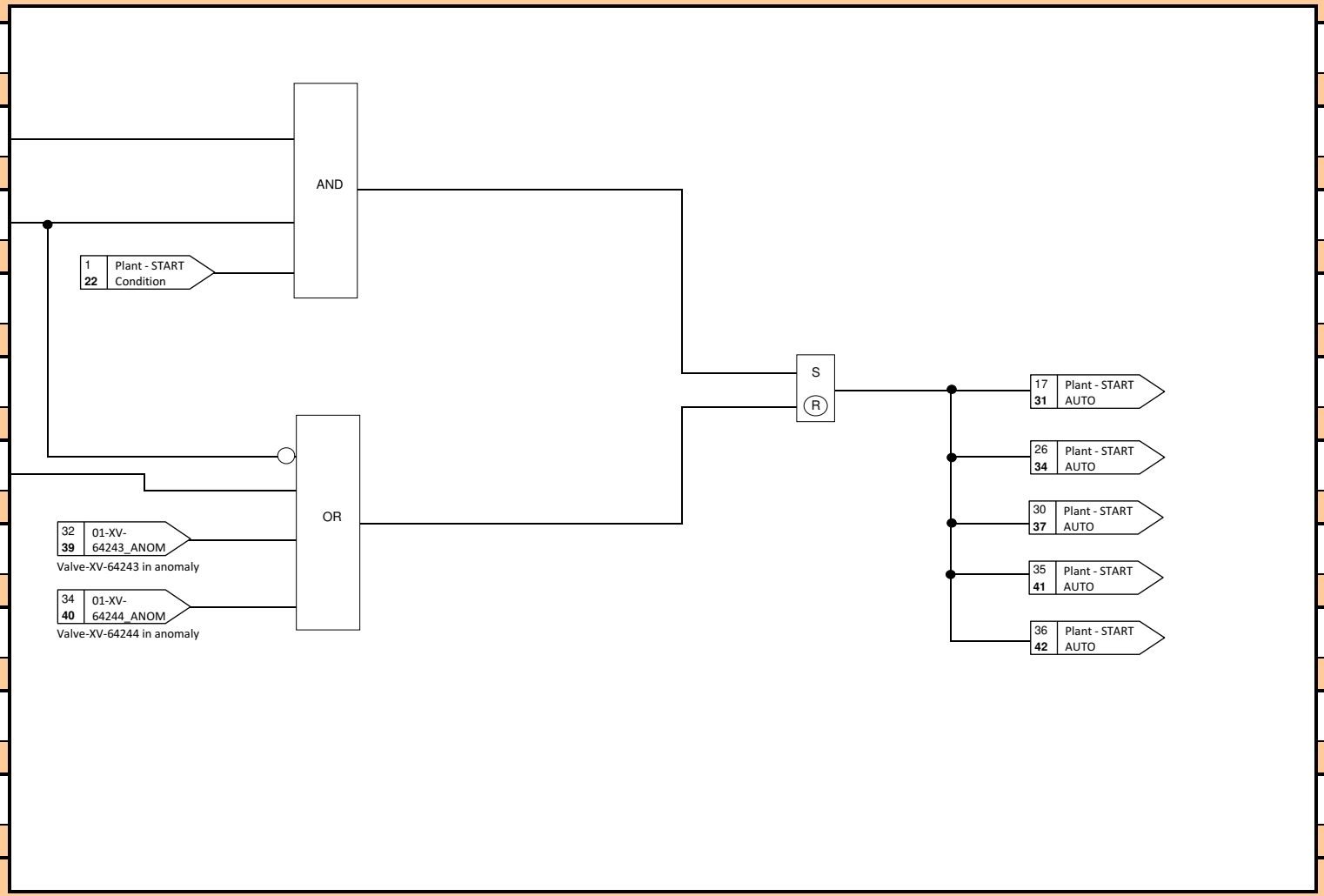
HMI DIGITAL	0= 1= **STOP**

	0= 1=

	0= 1=

	0= 1=

	0= 1=



	0= 1=

	0= 1=

	0= 1=

	0= 1=

	0= 1=

	0= 1=

	0= 1=

	0= 1=

	0= 1=

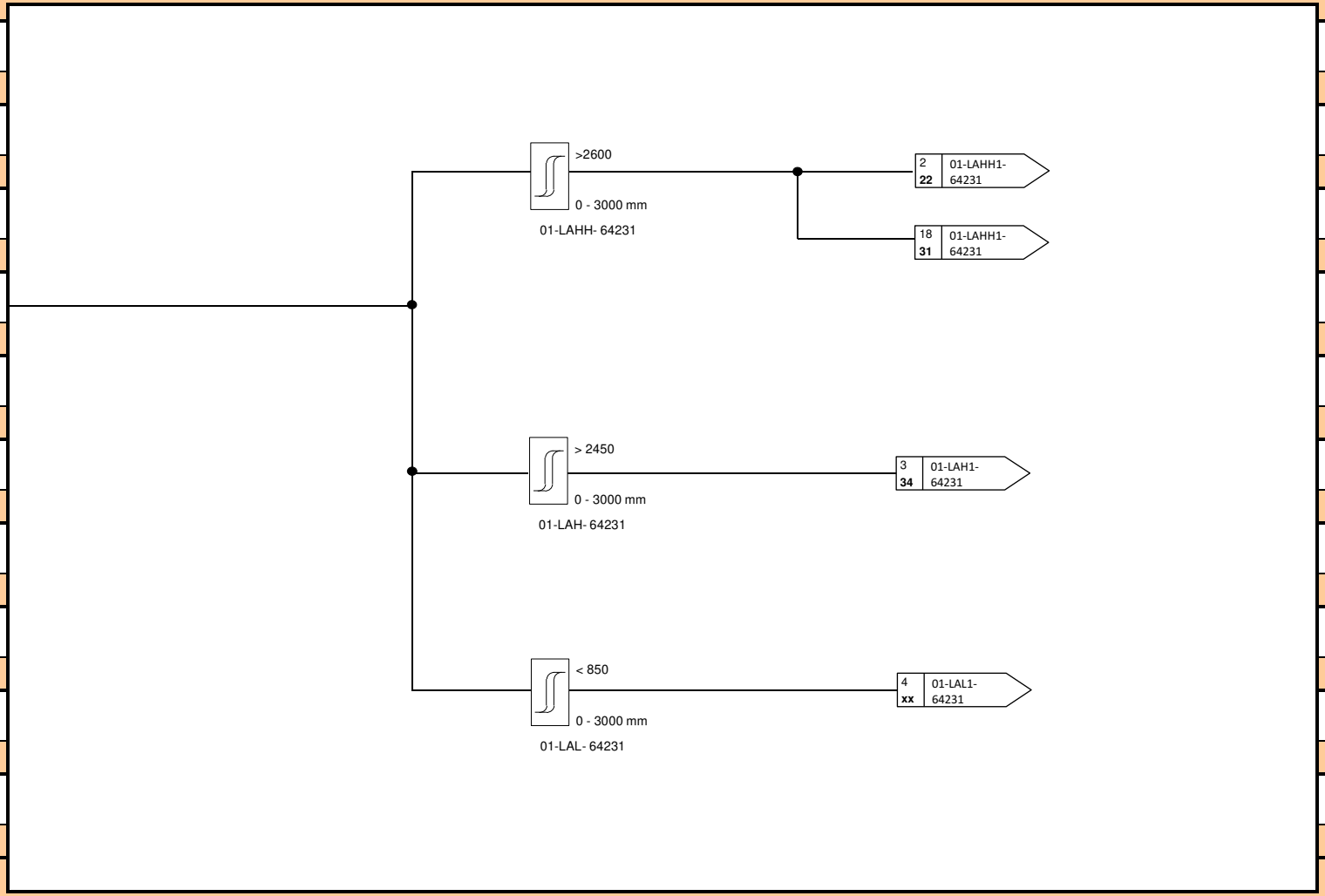
	01-LT-64231 - LEVEL IN TREATED WATER COMPARTMENT Logic Diagrams Oily water treatment package	Document Number: 350106-PO-11417-02-SD-000034 Revision: 5 Sheet 24 next 25 Sh.Rev. CUSTOMER IDENTIFICATION CODE
	01-LT-64231 - LEVEL IN TREATED WATER COMPARTMENT Alarm generation	

INPUT

01-LT-64231
LEVEL IN TREATED WATER COMPARTMENT
PLC ANALOGIC

0=
1=

PLC SOFTWARE



OUTPUT

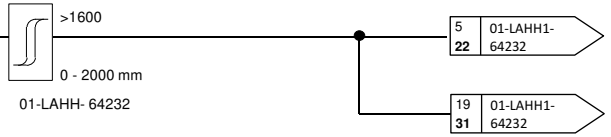
0=
1=

	01-LT-64232 - LEVEL IN SKIMMED OIL COMPARTMENT Logic Diagrams Oily water treatment package	Document Number: 350106-PO-11417-02-SD-000034 Revision: 5 Sheet 25 next 26 Sh.Rev. CUSTOMER IDENTIFICATION CODE
	01-LT-64232 - LEVEL IN SKIMMED OIL COMPARTMENT Alarm generation	

INPUT

01-LT-64232
LEVEL IN SKIMMED OIL COMPARTMENT
PLC ANALOGIC

PLC SOFTWARE

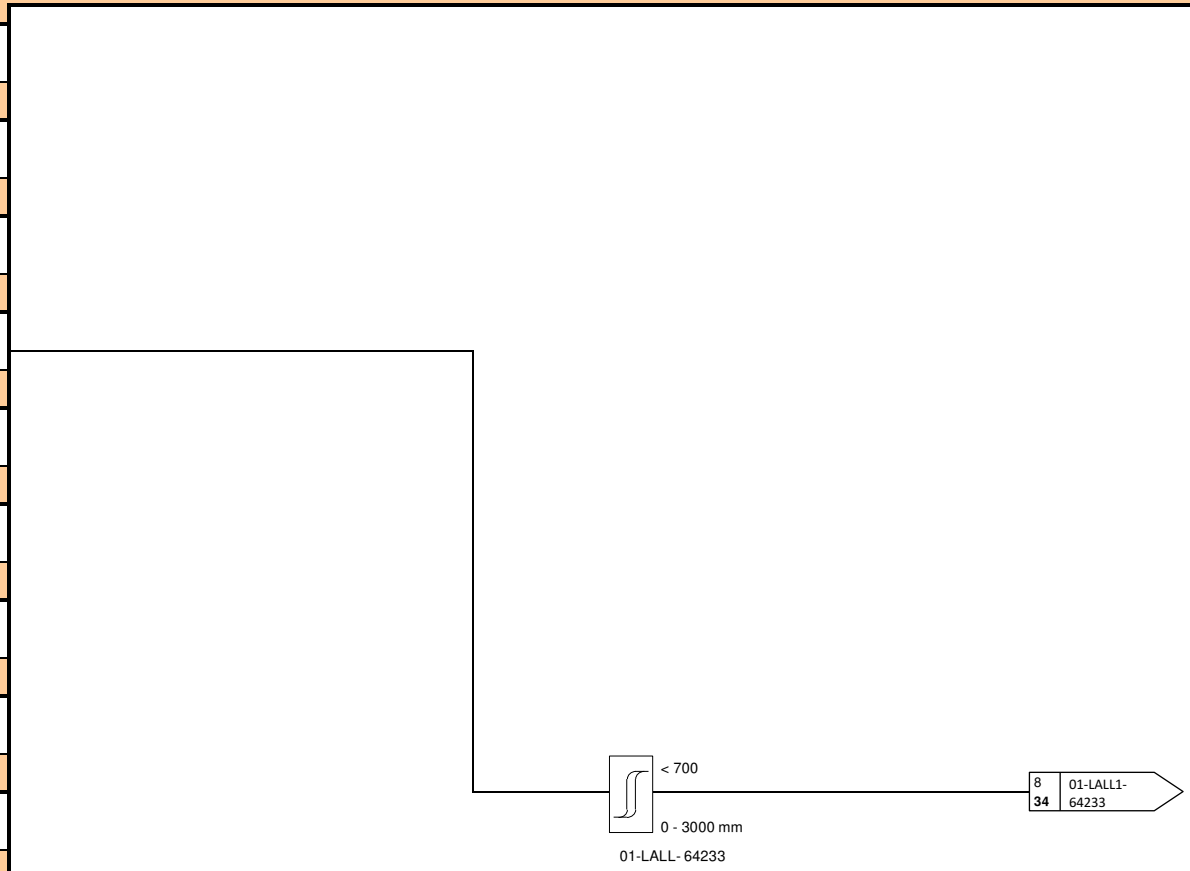


OUTPUT

	01-LT-64233 - LEVEL IN TREATED WATER COMPARTMENT Logic Diagrams Oily water treatment package	Document Number 350106-PO-11417-02-SD-000034 Revision 5 Sheet 26 next 27 Sh.Rev. CUSTOMER IDENTIFICATION CODE
	01-LT-64233 - LEVEL IN TREATED WATER COMPARTMENT Alarm generation	

INPUT | **PLC SOFTWARE** | **OUTPUT**

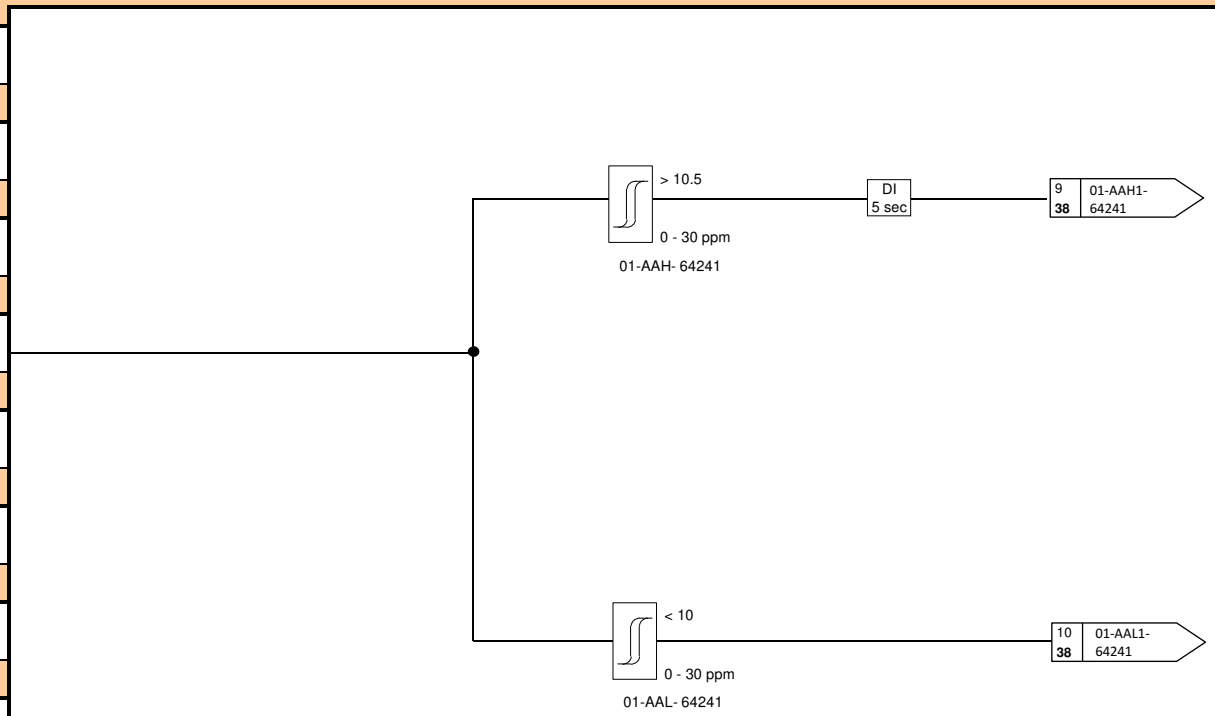
01-LT-64233
LEVEL IN TREATED WATER COMPARTMENT
PLC ANALOGIC



	01-AT-64241 - OIL CONCENTATION IN TREATED WATER Logic Diagrams Oily water treatment package	Document Number: 350106-PO-11417-02-SD-000034 Revision: 5 Sheet 27 next 28 Sh.Rev. CUSTOMER IDENTIFICATION CODE
	01-AT-64241 - OIL CONCENTATION IN TREATED WATER Alarm generation	

INPUT | **PLC SOFTWARE** | **OUTPUT**

01-AT-64241
OIL CONCENTATION IN TREATED WATER
PLC
ANALOGIC



	01-AT-64242 - OIL CONCENTATION IN TREATED WATER Logic Diagrams Oily water treatment package	Document Number: 350106-PO-11417-02-SD-000034 Revision: 5 Sheet 28 next 29 Sh.Rev. CUSTOMER IDENTIFICATION CODE
	01-AT-64242 - OIL CONCENTATION IN TREATED WATER Alarm generation	

INPUT | **PLC SOFTWARE** | **OUTPUT**

01-AT-64242
OIL CONCENTATION IN TREATED WATER
PLC
ANALOGIC

> 10.5
0 - 30 ppm
01-AAH- 64242

DI
5 sec

11
38
01-AAH1-
64242

< 10
0 - 30 ppm
01-AAL- 64242

12
38
01-AAL1-
64242

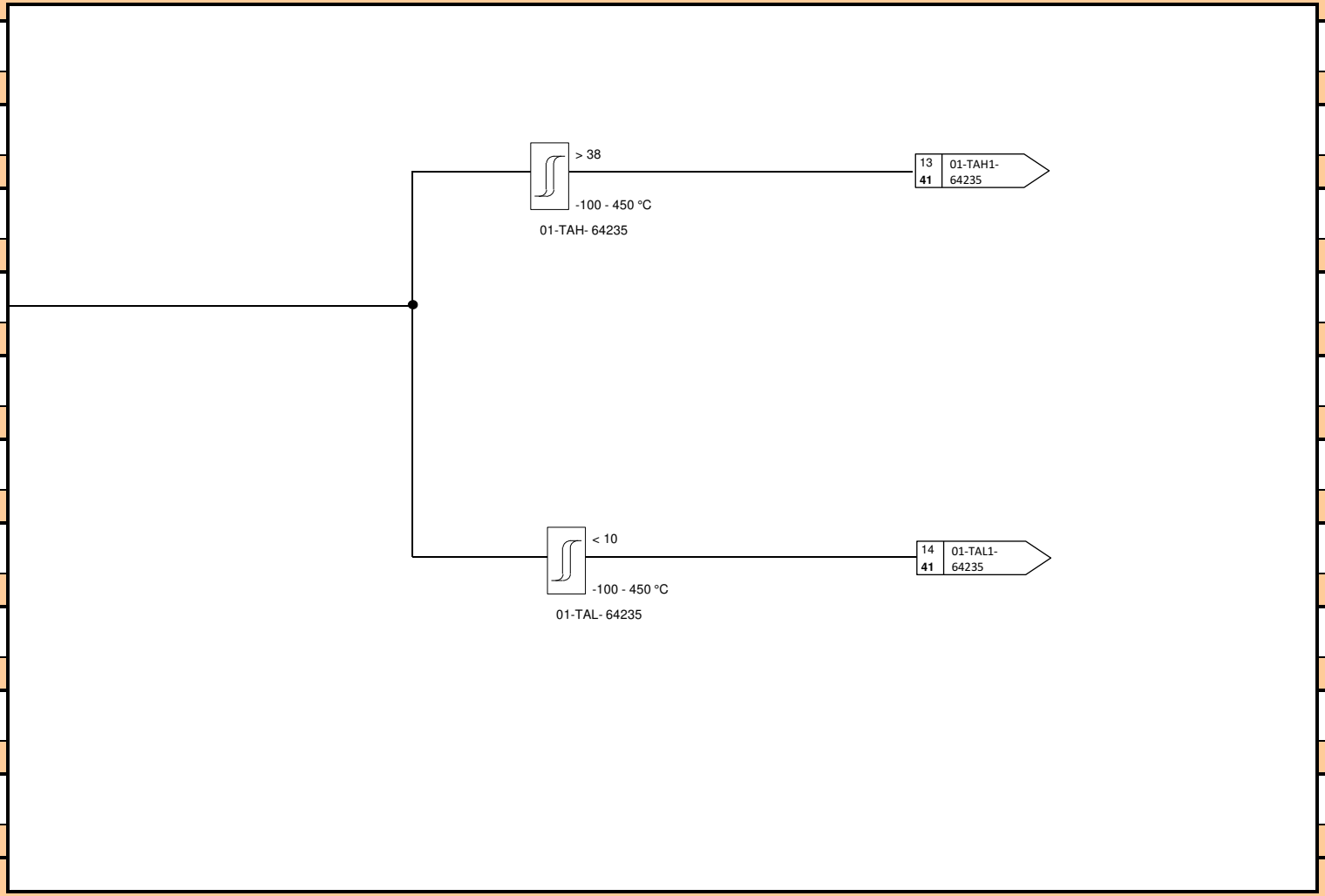
0=
1=

	01-TT-64235 - TEMPERATURE IN CPI COMPARTMENT Logic Diagrams Oily water treatment package	Document Number: 350106-PO-11417-02-SD-000034 Revision: 5 Sheet 29 next 30 Sh.Rev. CUSTOMER IDENTIFICATION CODE
	01-TT-64235 - TEMPERATURE IN CPI COMPARTMENT Alarm generation	

INPUT

01-TT-64235
TEMPERATURE IN CPI COMPARTMENT
PLC
ANALOGIC

PLC SOFTWARE

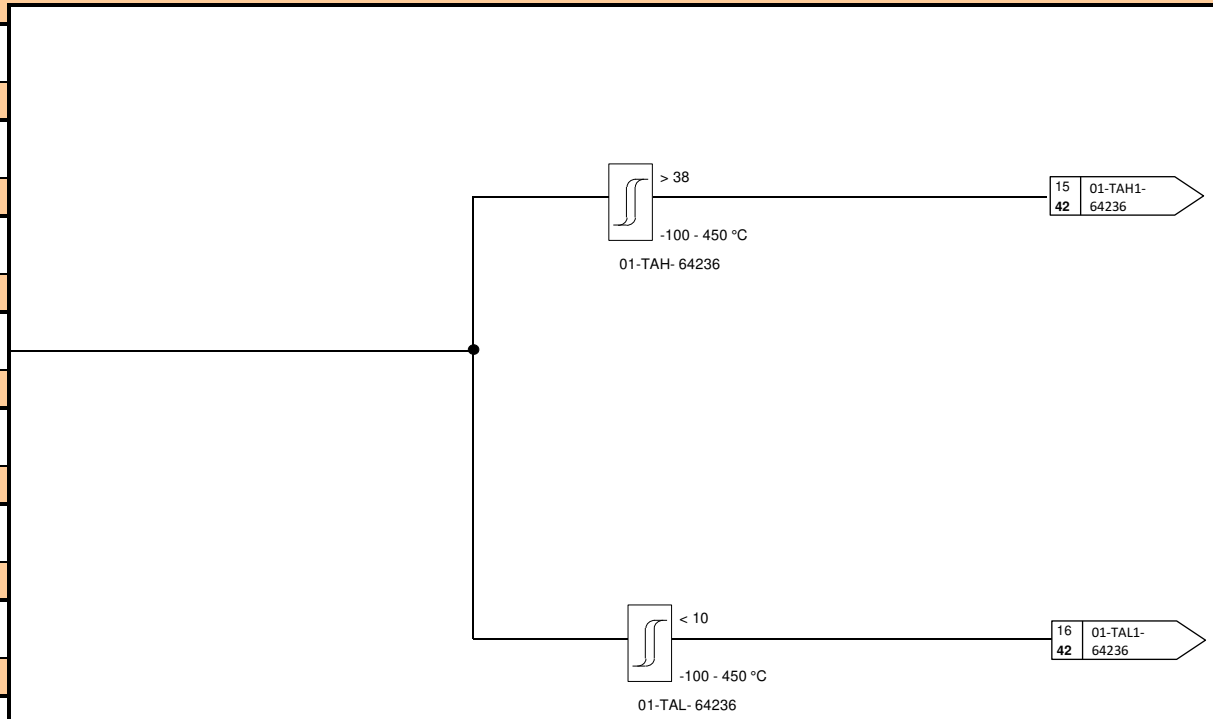


OUTPUT

	01-TT-64236 - TEMPERATURE IN TREATED WATER COMPARTMENT Logic Diagrams Oily water treatment package	Document Number: 350106-PO-11417-02-SD-000034 Revision: 5 Sheet 30 next 31 Sh.Rev. CUSTOMER IDENTIFICATION CODE
	01-TT-64236 - TEMPERATURE IN TREATED WATER COMPARTMENT Alarm generation	

INPUT | **PLC SOFTWARE** | **OUTPUT**

01-TT-64236
TEMPERATURE IN TREATED WATER COMPARTMENT
PLC ANALOGIC



AUTOSTART PUMPS 01-P-6417-21A/B

Logic Diagrams

Oily water treatment package

Document Number	Revision
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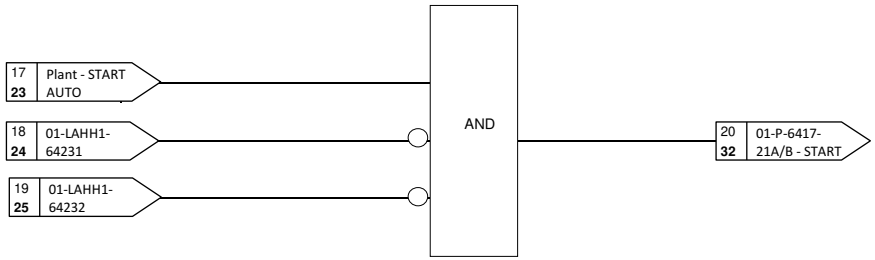
Sheet 31 next 32

Sh.Rev.

CUSTOMER IDENTIFICATION CODE

PUMPS 01-P-6417-21A/B Start command logic

INPUT | **PLC SOFTWARE** | **OUTPUT**



MOTOR PUMPS 01-P-6417-21A/B

Logic Diagrams

Oily water treatment package

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CUSTOMER IDENTIFICATION CODE	

MOTOR PUMPS 01-P-6417-21A/B Command logic

INPUT

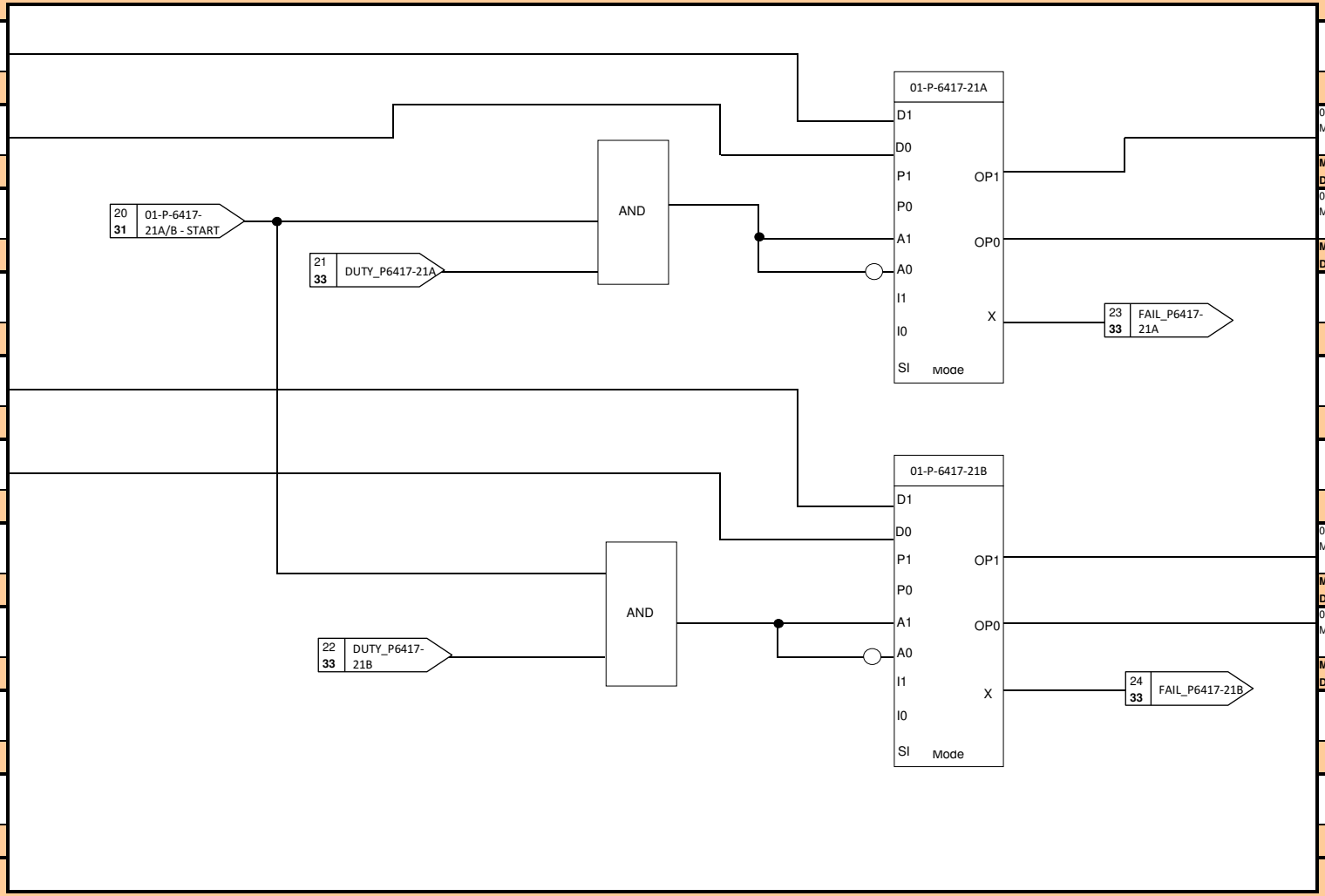
01-XXL-64224
MOTOR PUMPS 01-P-6417-21A Running
PLC DIGITAL 0= 1= **RUNNING**

01-XA-64224
MOTOR PUMPS 01-P-6417-21A Fault
PLC DIGITAL 0= 1= **FAULT**

01-XXL-64225
MOTOR PUMPS 01-P-6417-21B Running
PLC DIGITAL 0= 1= **RUNNING**

01-XA-64225
MOTOR PUMPS 01-P-6417-21B Fault
PLC DIGITAL 0= 1= **FAULT**

PLC SOFTWARE



OUTPUT

01-XXY-64224A
MOTOR PUMPS 01-P-6417-21A START
MCC DIGITAL 0= 1= **START**

01-XXY-64224B
MOTOR PUMPS 01-P-6417-21A STOP
MCC DIGITAL 0= 1= **STOP**

01-XXY-64225A
MOTOR PUMPS 01-P-6417-21B START
MCC DIGITAL 0= 1= **START**

01-XXY-64225B
MOTOR PUMPS 01-P-6417-21B STOP
MCC DIGITAL 0= 1= **STOP**

DUTY/STANDBY PUMPS 01-P-6417-21A/B

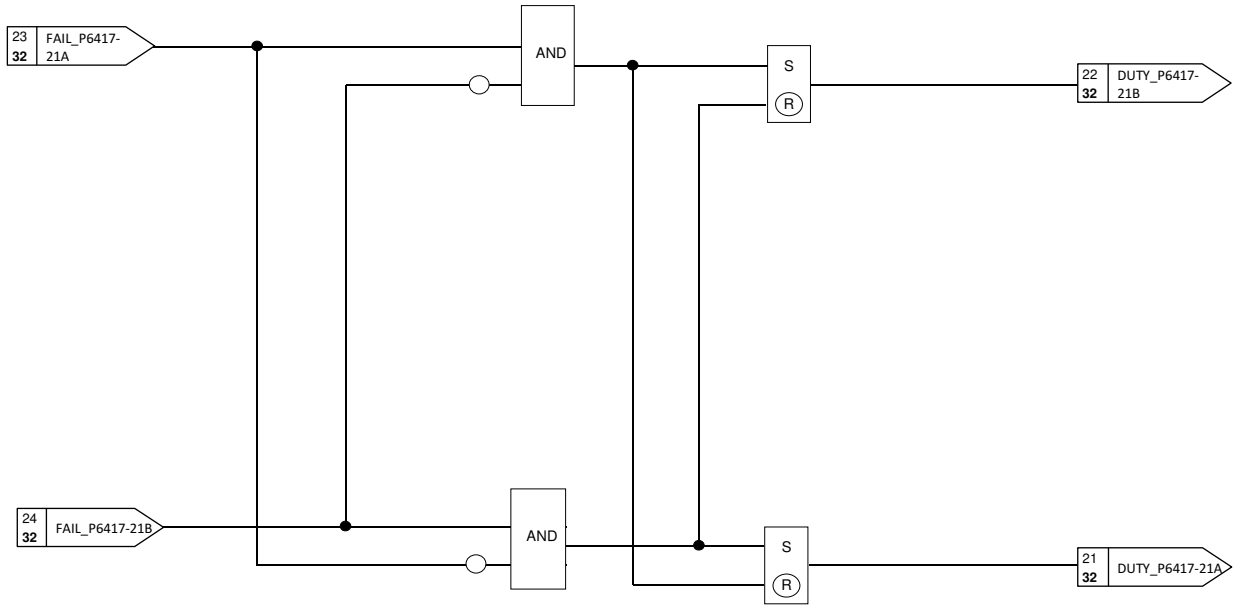
Logic Diagrams

Oily water treatment package

DUTY/STANDBY switchover logic PUMPS 01-P-6417-21A/B

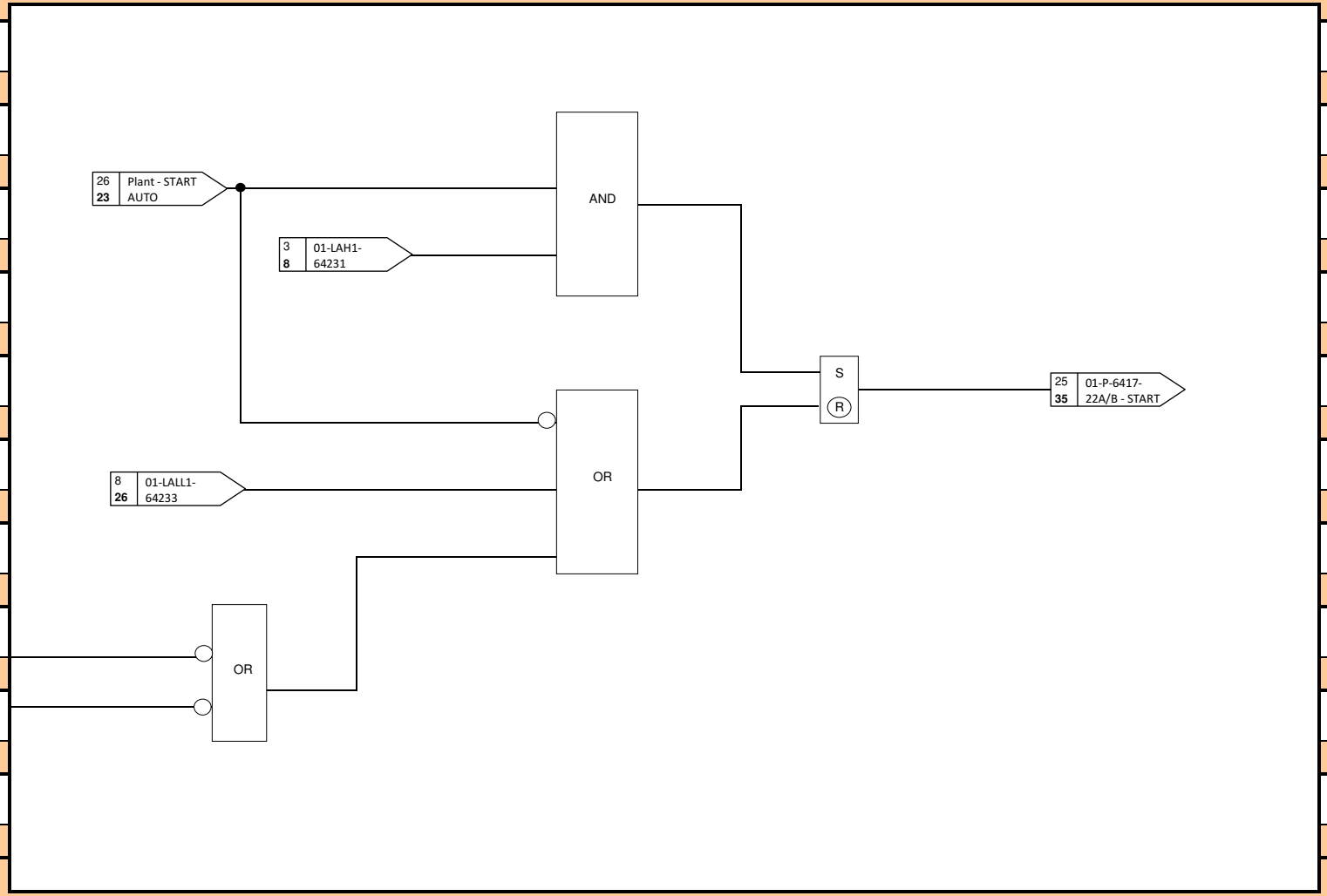
Document Number	Revision
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Sh.Rev.	
CUSTOMER IDENTIFICATION CODE	

INPUT **PLC SOFTWARE** **OUTPUT**



	AUTOSTART PUMPS 01-P-6417-22A/B Logic Diagrams Oily water treatment package	Document Number 350106-PO-11417-02-SD-000034 Revision 5 Sheet 34 next 35 Sh.Rev. CUSTOMER IDENTIFICATION CODE
	PUMPS 01-P-6417-22A/B Start command logic	

INPUT | **PLC SOFTWARE** | **OUTPUT**



INPUT		OUTPUT
	0= 1=	0= 1=
	0= 1=	0= 1=
	0= 1=	0= 1=
	0= 1=	0= 1=
	0= 1=	0= 1=
	0= 1=	0= 1=
	0= 1=	0= 1=
01-ZSO-64243 01-XV-64243 Valve opened		
PLC DIGITAL	0= 1= **OPENED**	0= 1=
01-ZSO-64244 01-XV-64244 Valve opened		
PLC DIGITAL	0= 1= **OPENED**	0= 1=
	0= 1=	0= 1=
	0= 1=	0= 1=

MOTOR PUMPS 01-P-6417-22A/B

Logic Diagrams

Oily water treatment package

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Sheet 35 next 36

Sh.Rev.

CUSTOMER IDENTIFICATION CODE

MOTOR PUMPS 01-P-6417-22A/B Command logic

INPUT | **PLC SOFTWARE** | **OUTPUT**

01-XXL-64227
MOTOR PUMPS 01-P-6417-22A Running
PLC DIGITAL 0= 1= RUNNING

01-XA-64227
MOTOR PUMPS 01-P-6417-22A Fault
PLC DIGITAL 0= 1= FAULT

0= 1=

0= 1=

01-XXL-64228
MOTOR PUMPS 01-P-6417-22B Running
PLC DIGITAL 0= 1= RUNNING

01-XA-64228
MOTOR PUMPS 01-P-6417-22B Fault
PLC DIGITAL 0= 1= FAULT

0= 1=

0= 1=

0= 1=

0= 1=

25 34 01-P-6417-22A/B - START

26 36 DUTY_P6417-22A

AND

01-P-6417-22A
D1
D0
P1 OP1
P0
A1 OP0
A0
I1
I0 X
SI Mode

28 36 FAIL_P6417-22A

27 36 DUTY_P6417-22B

AND

01-P-6417-22B
D1
D0
P1 OP1
P0
A1 OP0
A0
I1
I0 X
SI Mode

29 36 FAIL_P6417-22B

0= 1=

01-XXY-64227A
MOTOR PUMPS 01-P-6417-22A START
MCC DIGITAL 0= 1= START

01-XXY-64227B
MOTOR PUMPS 01-P-6417-22A STOP
MCC DIGITAL 0= 1= STOP

0= 1=

0= 1=

01-XXY-64228A
MOTOR PUMPS 01-P-6417-22B START
MCC DIGITAL 0= 1= START

01-XXY-64228B
MOTOR PUMPS 01-P-6417-22B STOP
MCC DIGITAL 0= 1= STOP

0= 1=

0= 1=

DUTY/STANDBY PUMPS 01-P-6417-22A/B

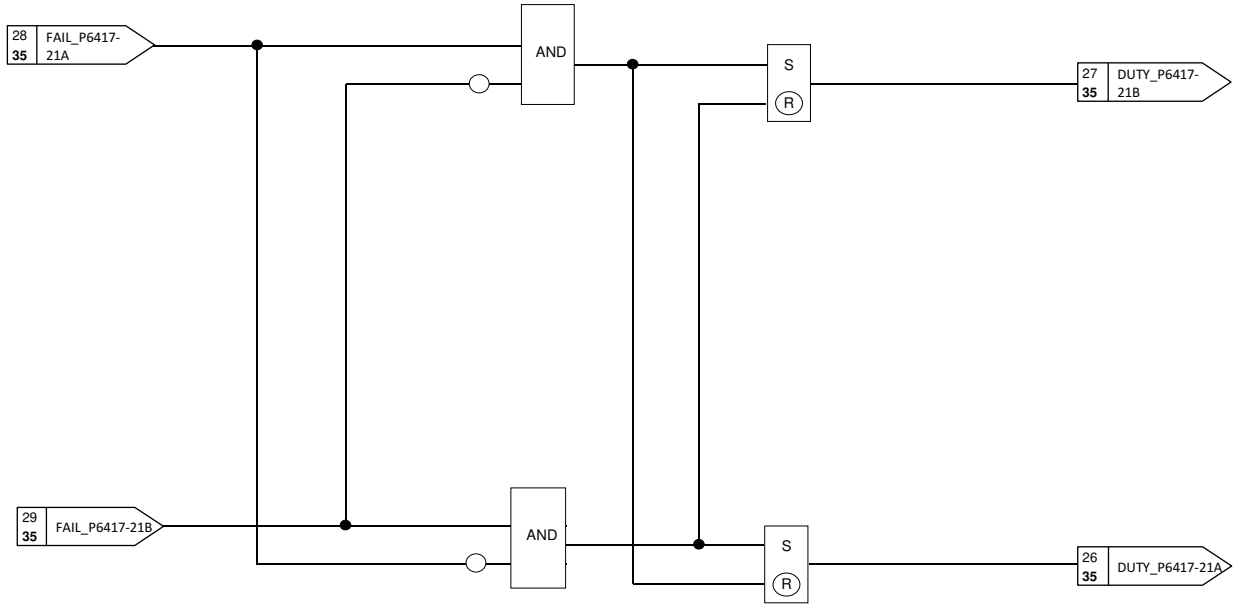
Logic Diagrams

Oily water treatment package

DUTY/STANDBY switchover logic PUMPS 01-P-6417-22A/B

Document Number	Revision
350106-PO-11417-02-SD-000034	5
Sheet 36 next 37	
Sh.Rev.	
CUSTOMER IDENTIFICATION CODE	

INPUT | **PLC SOFTWARE** | **OUTPUT**



	SKIMMER 01-Z-6417-61	Document Number 350106-PO-11417-02-SD-000034 Revision 5
	Logic Diagrams Oily water treatment package	Sheet 37 next 38
	SKIMMER 01-Z-6417-61 Command logic	Sh.Rev. CUSTOMER IDENTIFICATION CODE

INPUT

01-XXL-64226
SKIMMER 01-Z-6417-61 Running

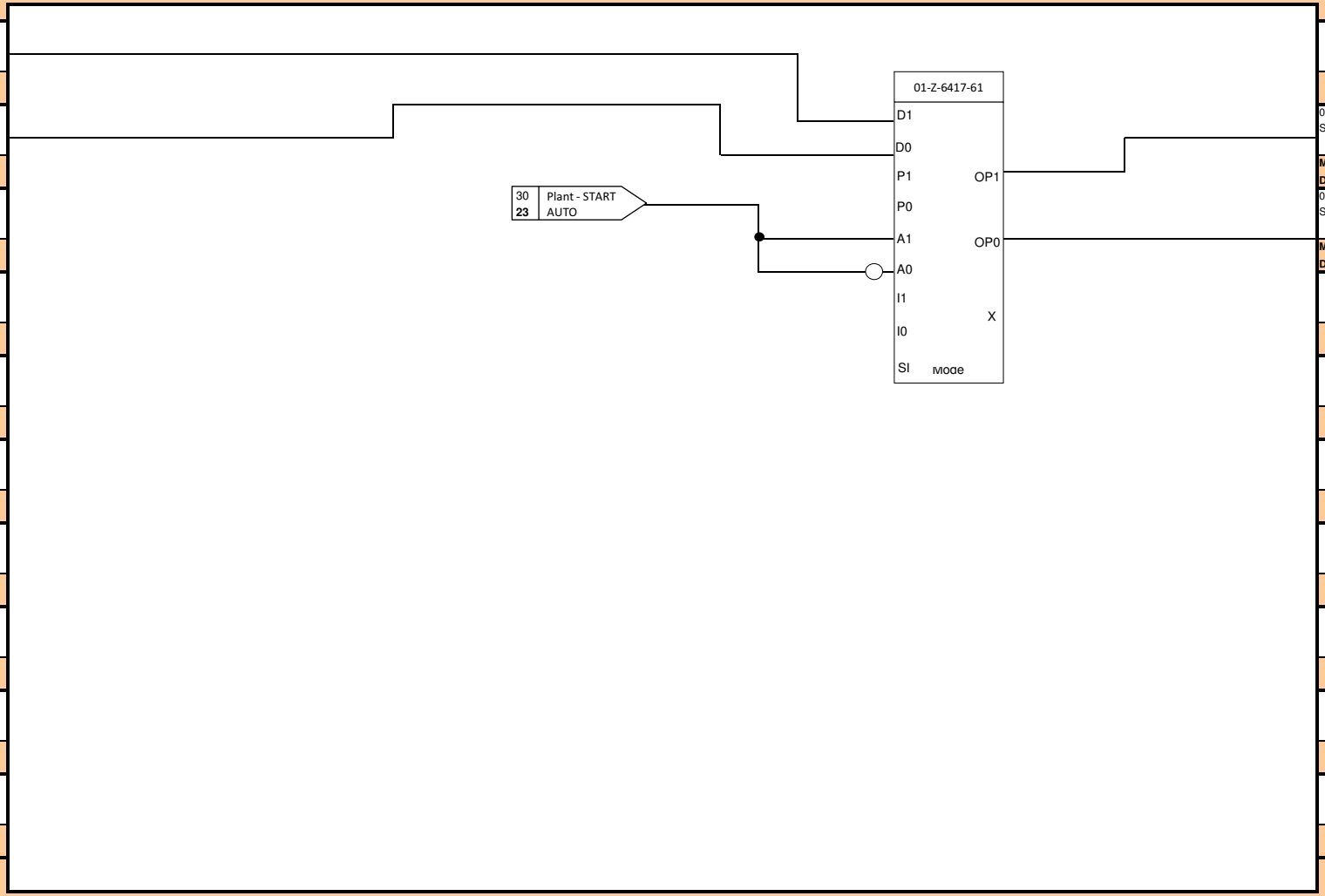
PLC DIGITAL	0= 1= **RUNNING**

01-XA-64226
SKIMMER 01-Z-6417-61 Fault

PLC DIGITAL	0= 1= **FAULT**

	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=

PLC SOFTWARE



OUTPUT

	0= 1=

01-XXY-64226A
SKIMMER 01-Z-6417-61 START

MCC DIGITAL	0= 1= **START**

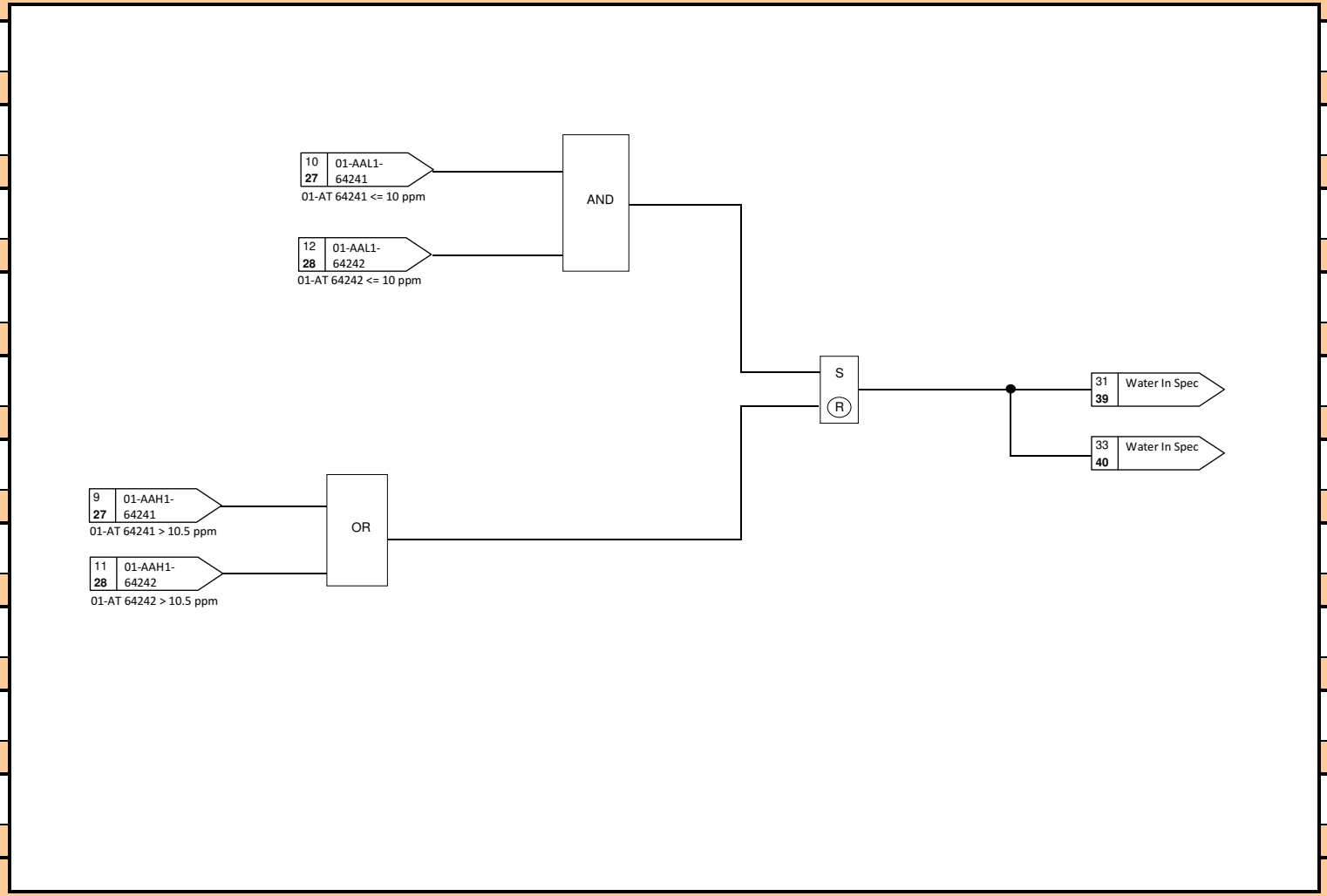
01-XXY-64226B
SKIMMER 01-Z-6417-61 STOP

MCC DIGITAL	0= 1= **STOP**

	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=
	0= 1=

	In spec - off spec water condition Logic Diagrams Oily water treatment package	Document Number 350106-PO-11417-02-SD-000034 Revision 5 Sheet 38 next 39 Sh.Rev. CUSTOMER IDENTIFICATION CODE
	In spec - off spec water condition	

INPUT | **PLC SOFTWARE** | **OUTPUT**



VALVE 01-XV-64243

Logic Diagrams

Oily water treatment package

VALVE 01-XV-64243 Command logic

Document Number	Revision
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Sh.Rev.	
CUSTOMER IDENTIFICATION CODE	

INPUT

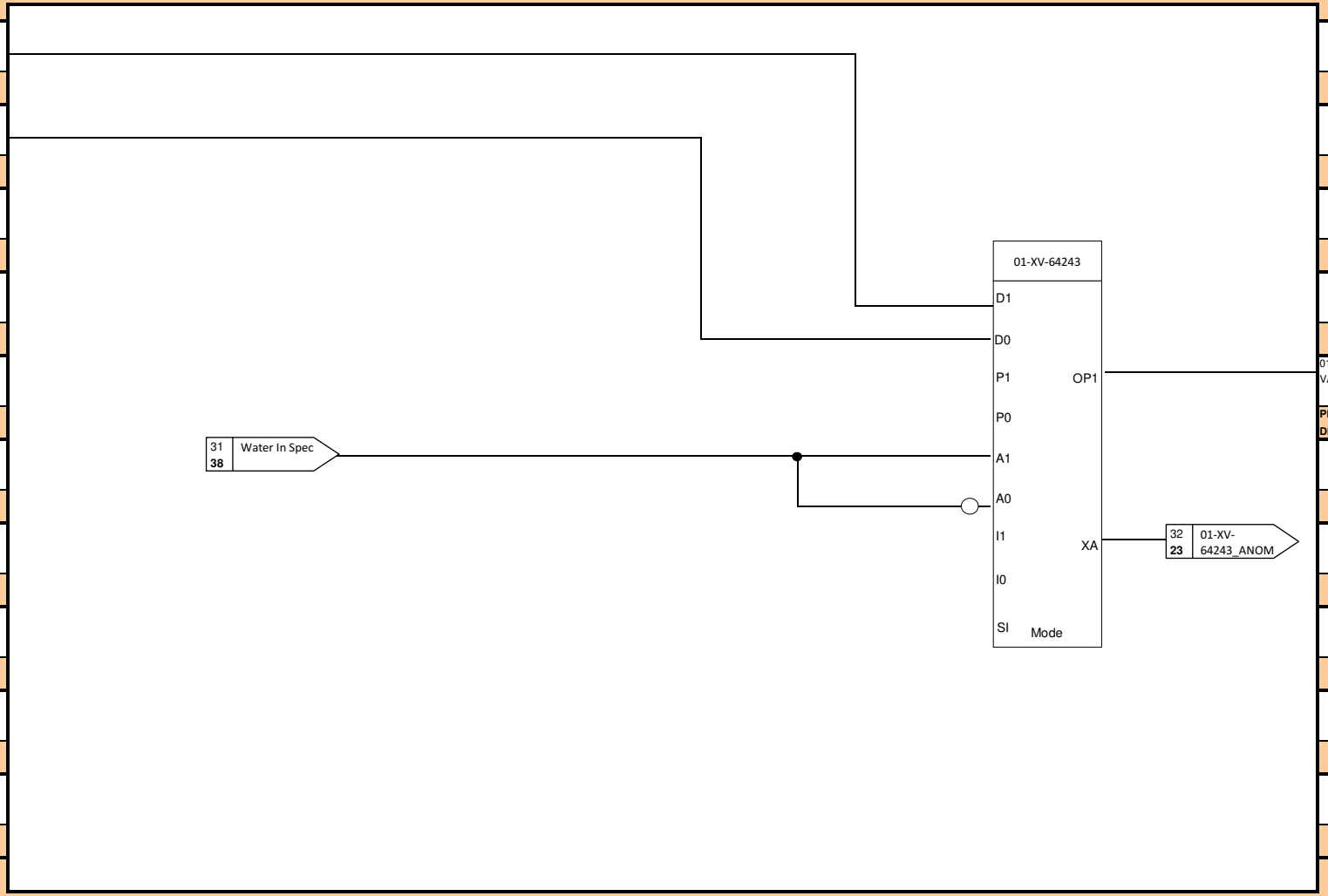
01-ZSO-64243
VALVE LIMIT SWITCH OPEN

PLC DIGITAL	0= 1= **OPEN**

01-ZSC-64243
VALVE LIMIT SWITCH CLOSE

PLC DIGITAL	0= 1= **CLOSE**

PLC SOFTWARE



OUTPUT

01-XY-64243
VALVE 01-XV-64243 OPEN COMMAND

PLC DIGITAL	0= 1= **OPEN**

VALVE 01-XV-64244

Logic Diagrams

Oily water treatment package

VALVE 01-XV-64244 Command logic

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Sh.Rev.

CUSTOMER IDENTIFICATION CODE

INPUT

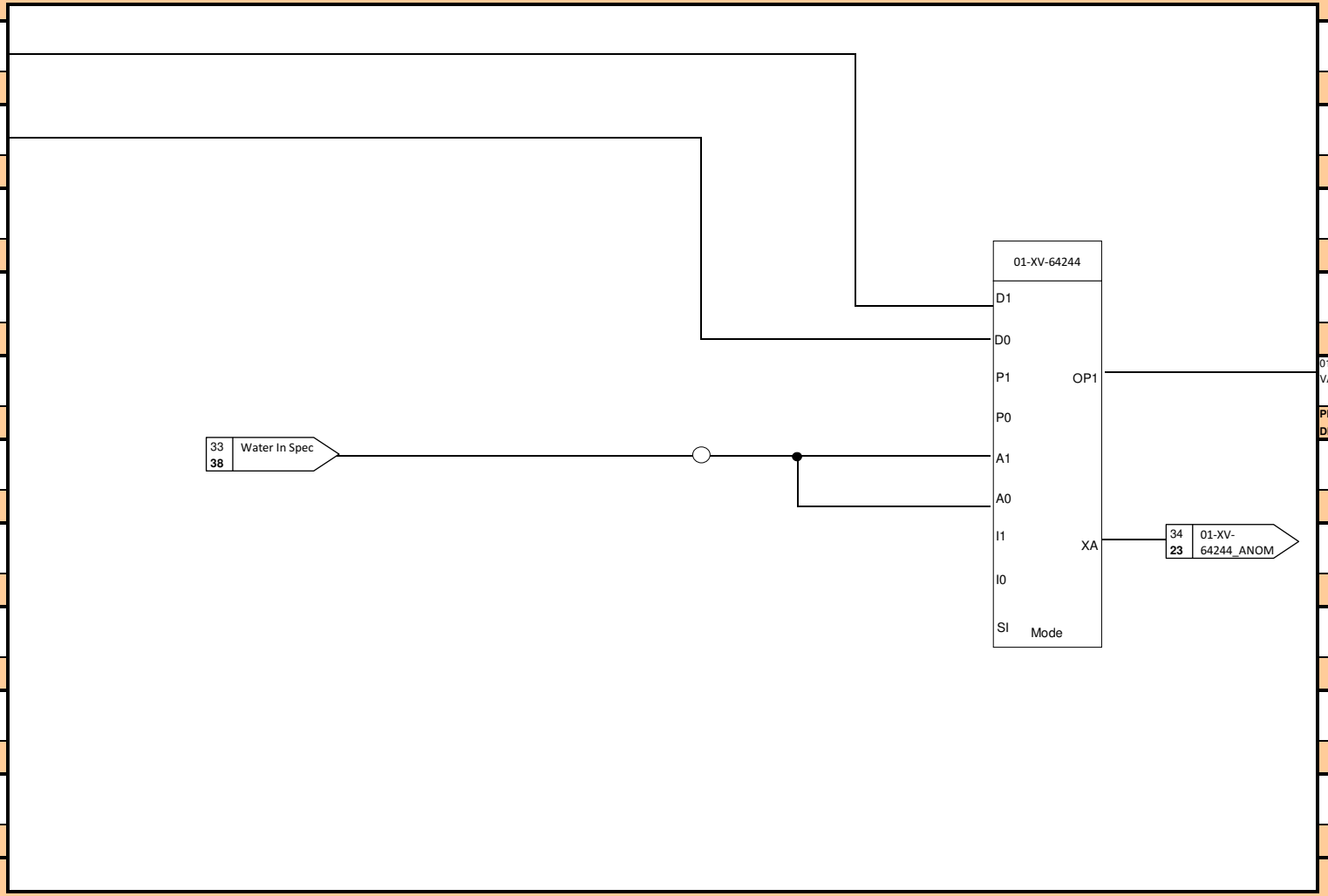
01-ZSO-64244
VALVE LIMIT SWITCH OPEN

PLC DIGITAL	0= 1= **OPEN**

01-ZSC-64244
VALVE LIMIT SWITCH CLOSE

PLC DIGITAL	0= 1= **CLOSE**

PLC SOFTWARE



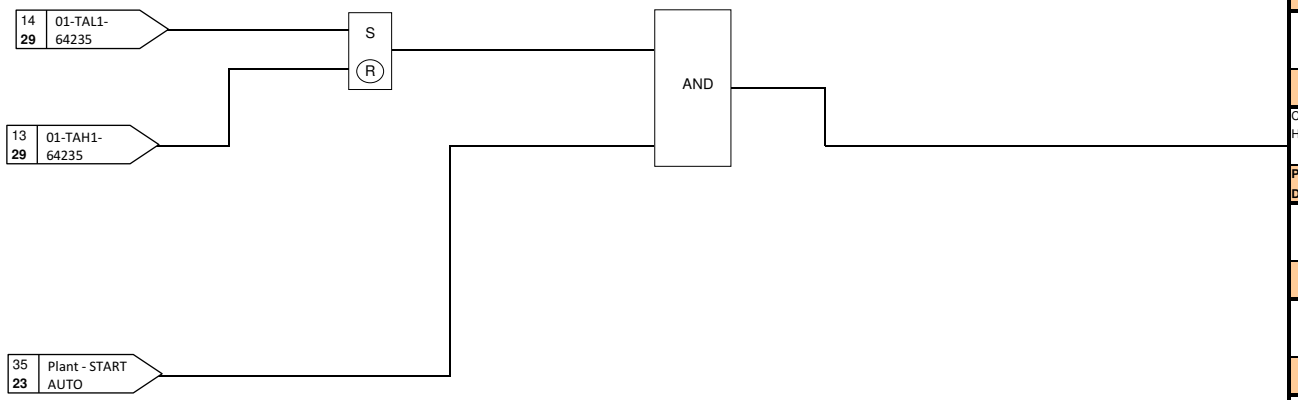
OUTPUT

01-XY-64244
VALVE 01-XV-64244 OPEN COMMAND

PLC DIGITAL	0= 1= **OPEN**

	HEATER 01-HE-6417-31 Logic Diagrams Oily water treatment package	Document Number 350106-PO-11417-02-SD-000034 Revision 5 Sheet 41 next 42 Sh.Rev. CUSTOMER IDENTIFICATION CODE
	HEATER 01-HE-6417-31 Command logic	

INPUT | **PLC SOFTWARE** | **OUTPUT**

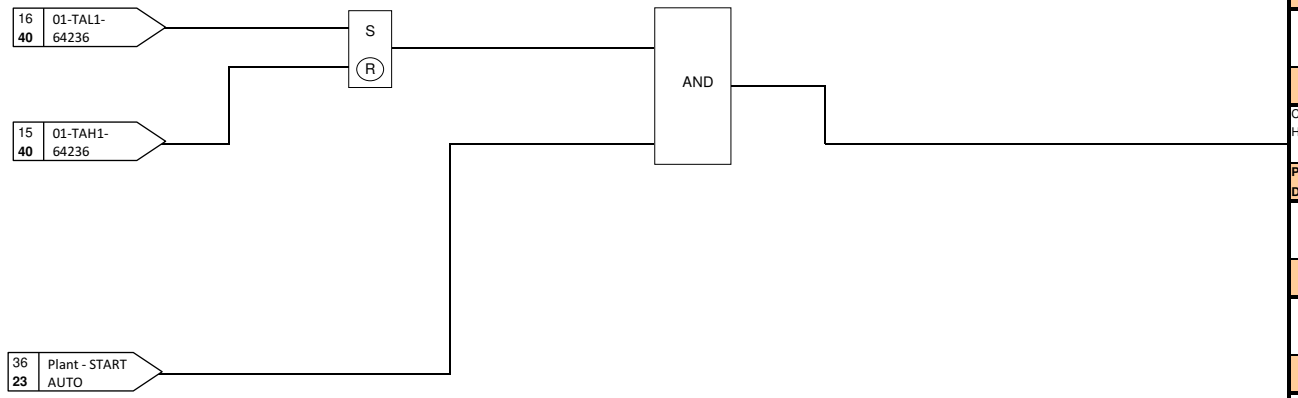


0=
1=

C-64211
HEATER 01-HE-6417-31 Start
PLC
DIGITAL
0=
1= START

	HEATER 01-HE-6417-32 Logic Diagrams Oily water treatment package	Document Number 350106-PO-11417-02-SD-000034 Revision 5 Sheet 42 next Sh.Rev. CUSTOMER IDENTIFICATION CODE
	HEATER 01-HE-6417-32 Command logic	

INPUT | **PLC SOFTWARE** | **OUTPUT**



0=
1=

C-64212
HEATER 01-HE-6417-32 Start

PLC
DIGITAL

0=
1= START

MCDERMOTT	SUPPLIER DOCUMENT COVER SHEET	Woodfibre LNG

350106 Woodfibre LNG Project

Supplier Name:	Cannon Artes spa
Purchase Order Title:	Oily Water Treatment Package
Equipment / Tag Number(s):	01-A-6417
Supplier Document No:	TS.23.287-24
SDR Code:	D22

Supplier's Revision Record

Rev	Date	Issue State	By	Checked	Approved
7	25-Jun-24	Issued for Review	ES	CI	AC
6	6-Jun-24	Issued for Review	ES	CI	AC
5	20-May-24	Issued for Review	ES	CI	AC
4	29-Apr-24	Issued for Review	ES	CI	AC

Project Document Number

Project Number	Purchase Order Number		Seq. No.
350106	PO-11417-02	SD	000036

DOCUMENT TITLE: **Cause and Effect Charts**

SUPPLIER DOCUMENT REVIEW STATUS

Purchaser's review of Supplier's documents does not relieve Supplier of the responsibility for correctness under the Purchase Order. Permission to proceed does not constitute acceptance of design, detail and calculations, test methods or materials developed or selected by the Supplier and does not relieve the Supplier from full compliance with the Purchase Order or any other obligations, nor detract from any of the Purchaser's rights.

Purchaser's Review Stamp

Woodfibre LNG	WLNG Review Approval Status
Code 2	Accepted with Comments — Work may proceed subject to incorporation of minor comments.
By: c_asantana	Date: July 22, 2024

MCDERMOTT	Woodfibre LNG EPFC Project Project No. 350106
Engineering Review Status Code 1 - No Comments	By: parveen.parveen Date: July 9, 2024
These comments do not relieve the supplier of his responsibility to meet the requirements of the PO.	

Should the Supplier consider that any comments made by the Purchaser change the Scope of Supply, the Supplier shall advise the price and delivery implications of such changes within five working days of receipt. The Supplier must not incorporate such changes without prior approval of the Purchaser of the revised price and/or delivery period. RETROSPECTIVE CLAIMS WILL NOT BE CONSIDERED.

This document consists of this front sheet plus 1 number of pages.

Cause and Effect Charts

350106 Woodfibre LNG Project

Oily Water Treatment Package 01-A-6417

MCDERMOTT

Woodfibre LNG

Cannon Artes

PROJ. NO.	350106	DOC. NO.	350106-PO-11417-02-SD-000036	SHEET	[1] OF [1]	REV	07

LEGEND

X	ACTION
Tx	ACTION DELAYED BY X SECONDS
P	PERMISSIVE
SUI	START-UP-INHIBIT

Actions
X: ACTIVATE
C: CLOSE
O: OPEN
S: START
T: TRIP
ST: STOP

EFFECT

DEVICE TAG	ACTION	SERVICE DESCRIPTION	ESD/P&ID/C&E	NOTES
01-P-6417-22 A		TREATED WATER FORWARDING PUMP	350106-PO-11417-02-SD-000033 PAGE 04 OF 05	
01-P-6417-22 B		TREATED WATER FORWARDING PUMP	350106-PO-11417-02-SD-000033 PAGE 04 OF 05	
01-HE-6417-31		HEATER	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	
01-HE-6417-32		HEATER	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	
01-P-6417-21 A		PACKAGE INLET FEED PUMP	350106-PO-11417-02-SD-000033 PAGE 01 OF 05	
01-P-6417-21 B		PACKAGE INLET FEED PUMP	350106-PO-11417-02-SD-000033 PAGE 02 OF 05	
01-XV-64244		ON-OFF VALVE OFF-SPEC.OILY WATER TO 01-T-6469	350106-PO-11417-02-SD-000033 PAGE 04 OF 05	
01-XV-64243		ON-OFF VALVE TREATED EFFLUENT TO HOWE SOUND	350106-PO-11417-02-SD-000033 PAGE 04 OF 05	
01-XV-64098		XV (MDR scope)		

CAUSE

DEVICE TAG	FUNCTION	SERVICE DESCRIPTION	ESD/P&ID/C&E	SYSTEM	INTERLOCK	NOTES		1	2	3	4	5	6	7	8	9
01-LT-64233	LOW LOW	LEVEL IN CPI SEPARATOR 01-H-6417-41	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	UCP	01-I-64221		1	ST	ST							
01-TT-64235	HIGH	TEMPERATURE IN CPI COMPARTMENT 01-H-6417-41	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	UCP	01-I-64211		2			ST						
01-TT-64235	LOW	TEMPERATURE IN CPI COMPARTMENT 01-H-6417-41	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	UCP	01-I-64211		3			S						
01-TT-64236	HIGH	TEMPERATURE IN TREATED WATER COMPARTMENT	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	UCP	01-I-64212		4				ST					
01-TT-64236	LOW	TEMPERATURE IN TREATED WATER COMPARTMENT	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	UCP	01-I-64212		5				S					
01-LT-64231	HIGH	LEVEL IN TREATED WATER COMPARTMENT 01-H-6417-41	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	UCP	01-I-64214		6	S	S							
01-LT-64231	HIGH HIGH	LEVEL IN TREATED WATER COMPARTMENT 01-H-6417-41	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	UCP	01-I-64214		7					ST	ST			
01-LT-64232	HIGH HIGH	LEVEL IN SKIMMED OIL COMPARTMENT 01-H-6417-41	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	UCP	01-I-64215		8					ST	ST			
01-AT-64241	HIGH	OIL IN TREATED WATER ANALYZER	350106-PO-11417-02-SD-000033 PAGE 04 OF 05	UCP	01-I-64213		9							O	C	
01-AT-64242	HIGH	OIL IN TREATED WATER ANALYZER	350106-PO-11417-02-SD-000033 PAGE 04 OF 05	UCP	01-I-64213		10							O	C	
01-AT-64241	LOW	OIL IN TREATED WATER ANALYZER	350106-PO-11417-02-SD-000033 PAGE 04 OF 05	UCP	01-I-64213		11							C	O	
01-AT-64242	LOW	OIL IN TREATED WATER ANALYZER	350106-PO-11417-02-SD-000033 PAGE 04 OF 05	UCP	01-I-64213		12							C	O	
01-XS-64226 A	NOT RUNNING / NOT OPERATING	Non Operation of Belt Oil skimmer Motor (01-M-6417-61)	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	DCS	01-C-64001		13									C
01-XS-64226 A	RUNNING / OPERATING	WHEN BELT OIL SKIMMER MOTOR (01-M-6417-61) IS RUNNING	350106-PO-11417-02-SD-000033 PAGE 03 OF 05	DCS	01-C-64001		14									O

Valve not indicated on drawings

Appendix 4.3: Effluent Model Inputs and Results

APPENDIX 4.3-1: BACKGROUND WATER QUALITY SAMPLES AND STATISTICAL SUMMARY

Appendix 4.3-1: Background Water Quality Samples and Statistical Summary

				Alkalinity, Total	Hardness	Organic Carbon, Dissolved (DOC)	Organic Carbon, Total (TOC)	Oxygen, Dissolved	pH-field	Temperature	Total Suspended Solids (TSS)	Total Dissolved Solids (TDS)	Ammonia, Total (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulfate	D-Al
				mg/L	mg/L	mg/L	mg/L	mg/L	s.u.	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Statistics																				
Sample Count				49	63	69	43	63	60	64	69	43	69	67	69	69	67	69	69	69
Minimum				1.6	3.14	1.83	2.04	8.98	5.6	1.9	2	10	0.005	0.05	0.16	0.02	0.014	0.001	1.1	0.0484
10th Percentile				2.5	3.674	2.636	2.794	10.448	6.09	4.2419	2	16	0.005	0.05	0.404	0.02	0.036	0.001	1.298	0.09024
Median				5.1	6.31	3.97	4.53	11.81	6.6	8.15	3	24	0.0062	0.05	0.51	0.02	0.077	0.001	1.77	0.143
90th Percentile				20.04	20.14	5.992	6.636	13.136	7.6	12.07	4.14	48.6	0.05	0.1	0.96	0.1	0.2226	0.01	2.856	0.2156
Maximum				36.5	34.7	7.82	10.4	14.33	8.2	15.9	15.6	71	0.091	0.1	19.6	0.1	0.43	0.01	7.83	0.264
Station ID	**Laboratory ID**	**Sample Date**	**Sample Class**																	
OUT-01	VA24A9285-003	2024-04-29	M	5.1	6.31	3.32	3.75	11.5	6.6	10.2	3	16	0.005	0.05	0.89	0.02	0.0747	0.001	2.35	0.0903
OUT-01	VA24B1636-006	2024-05-23	M	4.5	5.27	2.75	2.89	12.19	7	11.7	3	16	0.0063	0.05	0.5	0.02	0.0445	0.001	1.71	0.091
OUT-01	VA24C6562-005	2024-10-04	M	9.1	11.7	5.75	5.73	8.98	5.9	12	3	26	0.0078	0.05	0.82	0.02	0.316	0.001	3.05	0.148
OUT-01	VA24C8965-004	2024-10-27	M	4.1	6.8	6.63	6.72				3	27	0.005	0.05	0.66	0.02	0.077	0.001	1.8	0.257
OUT-01	661-455931031-0	2024-10-28	F					11.16		10.1										
OUT-01	VA24D0618-001	2024-11-12	M	4.1	6.22	4.8	4.59	11.16	7.1	9.8	3	24	0.005	0.05	0.62	0.02	0.0854	0.001	1.86	0.17
OUT-01	VA24D4181-001	2024-12-20	M	4.4	5.2	3.39	3.29	12.07	8.2	6.5	3	18	0.005	0.05	0.55	0.02	0.119	0.001	1.49	0.139
OUT-01	VA25A2292-001	2025-01-31	M	23	29.2	2.96	3.28	13.04	7.1	3.9	3	71	0.0085	0.05	19.6	0.02	0.421	0.001	7.83	0.0625
OUT-01	VA25A3846-001	2025-02-23	M	3.5	4.36	4.02	3.79	12.32	6.8	4.9	3	17	0.005	0.05	0.5	0.02	0.186	0.001	1.5	0.14
OUT-01	VA25A5181-001	2025-03-09	M	1.8	3.41	4.93	5.82	11.45	7.6	7.2	3.7	18	0.005	0.05	0.5	0.02	0.0468	0.001	1.29	0.199
OUT-01	VA25A5326-001	2025-03-11	M																	
OUT-01	VA25A7638-004	2025-04-07	M	7	7.83	3.55	3.85	11.42	6.6	9.1	3	24	0.005	0.05	0.5	0.02	0.0807	0.001	1.67	0.113
OUT-01	VA25A8149-001	2025-04-11	M	6.6	7.1	2.53	2.72	12.26	6.3	10.9	3	18	0.005	0.05	0.5	0.02	0.0551	0.001	1.44	0.069
OUT-01	VA25B1692-001	2025-05-20	M	7.2	9	3.78	3.98	12.21	6.3	9.9	3	21	0.0062	0.05	0.5	0.02	0.104	0.001	2.25	0.141
OUT-02	VA24A9285-004	2024-04-29	M	7.7	9.34	6.42	6.3	10.8		10.4	3	20	0.005	0.05	0.5	0.02	0.0806	0.001	1.76	0.214
OUT-02	VA24B0452-003	2024-05-10	M	10.5	11.7	3.05	2.77		7.8	13	3	16	0.005	0.05	0.72	0.02	0.0643	0.001	2.02	0.0925
OUT-02	VA24B1054-003	2024-05-16	M	24.6	23.5	2.39	2.65	9.1	6.6	12.1	3	41	0.005	0.05	0.96	0.02	0.121	0.001	2.85	0.0657
OUT-02	VA24B1929-002	2024-05-27	M	5	6.19	4.15	2.98	12	6.6	10.2	3	22	0.005	0.05	0.5	0.02	0.0746	0.001	1.9	0.095
OUT-02	VA24B5289-006	2024-06-26	M	31.3	28.7	2.16	2.04	11	6.6	14	3	49	0.005	0.05	1.5	0.02	0.219	0.001	4.4	0.0484
OUT-02	VA24C6562-006	2024-10-04	M	2.8	4.81	5.41	5.29	10.41	5.6	11.8	3	10	0.006	0.05	0.82	0.02	0.178	0.001	1.77	0.169
OUT-02	VA24C8483-001	2024-10-23	M	2.5	4.2	4.02	3.66	11.55	6.35	9.6	3	21	0.005	0.05	0.66	0.02	0.0314	0.001	1.83	0.121
OUT-02	VA24C8965-003	2024-10-26	M	6.3	7.83	4.13	5.79	11.32	5.77	10	4.6	31	0.005	0.05	0.93	0.02	0.166	0.001	2.88	0.206
OUT-02	VA24D0618-002	2024-11-12	M	2.8	5.27	5.51	5.55	11.57	6.6	9.6	3	19	0.005	0.05	0.58	0.02	0.0575	0.001	1.75	0.214
OUT-02	VA24D3590-001	2024-12-15	M	3.2	5.29	4.55	5.06	12.39	7.7	7	3	24	0.007	0.05	0.75	0.02	0.0771	0.001	1.62	0.185
OUT-02	VA25A2292-002	2025-01-31	M	5.2	7.25	3.28	3.57	13.16	6.9	3.5	3	23	0.005	0.05	0.96	0.02	0.188	0.001	1.91	0.118
OUT-02	VA25A3846-002	2025-02-23	M	1.6	3.54	4.18	4.17	12.57	7.5	4.5	3	12	0.005	0.05	0.5	0.02	0.0844	0.001	1.49	0.156
OUT-02	VA25A5181-002	2025-03-09	M	2.5	4.64	6.65	7.05	11.81	7.6	6.9	4.3	21	0.0083	0.05	0.5	0.02	0.0381	0.001	1.55	0.263
OUT-02	VA25A5326-002	2025-03-11	M																	
OUT-02	VA25A7638-005	2025-04-06	M	3.9	5.36	3.85	5.3	12.11	7.1	7.7	3	22	0.005	0.05	0.5	0.02	0.0573	0.001	1.66	0.122
OUT-02	VA25A8149-002	2025-04-11	M	3.2	4.39	3.68	3.8	14.33	8	10.4	3	14	0.005	0.05	0.5	0.02	0.0287	0.001	1.54	0.15
OUT-02	VA25A8563-001	2025-04-16	M	2.8	3.97	3.12	2.94	11.7	6.6	7.8	3	16	0.005	0.05	0.5	0.02	0.0348	0.001	1.7	0.0959
OUT-02	VA25A8974-001	2025-04-22	M	5.5	6.29	2.42	2.35	11.13	6.9	10.6	3.3	22	0.005	0.05	0.5	0.02	0.0612	0.001	2.05	0.085
OUT-06	VA24A7873-AB-006	2024-04-12	M	36.5	34.7	3.85	3.74				3	54	0.005	0.05	0.5	0.02	0.154	0.001	3.9	0.128
OUT-06	VA24A9263-003	2024-04-28	M	19.3	19.8	4.73	4.66				3	32	0.0073	0.05	0.5	0.02	0.133	0.0012	3.07	0.202
OUT-06	VA24C8159-007	2024-10-20	M	18.3	20.2	7.57	10.4	10.52	6.2	14.6	15.6	47	0.005	0.05	0.66	0.02	0.43	0.001	2.22	0.222
OUT-06	VA24C8964-001	2024-10-27	M	17	20.2	6	6	10.85	6.7	10.5	3	40	0.0096	0.05	0.65	0.02	0.244	0.001	2.44	0.182
OUT-06	VA24D0615-001	2024-11-11	M	18.2	19.9	5.63	5.75	10.93	6.5	9.8	3	25	0.005	0.05	0.61	0.02	0.184	0.001	2.54	0.168
OUT-06	VA24D3590-002	2024-12-15	M	16.9	19.2	4.96	4.98	12.03	6.8	7.9	3	43	0.005	0.05	0.64	0.02	0.165	0.001	2.57	0.149
OUT-06	VA25A2339-001	2025-02-01	M	12	14.2	4.3	4.53	13.01	7.7	1.9	3	25	0.0072	0.05	0.66	0.02	0.288	0.001	2.14	0.149
OUT-06	VA25A3650-001	2025-02-20	M	8.7	11	4.21	4.6				3	52	0.005	0.05	0.53	0.02	0.228	0.001	1.86	0.142
OUT-06	VA25A3682-001	2025-02-20	M	8.7	11.1	4.54	4.46	13.42	6.7	5.5	3	42	0.0052	0.05	0.51	0.02	0.236	0.001	1.79	0.163
OUT-06	VA25A5181-003	2025-03-09	M	8.7	10.8	7.82	7.74	11.65	7.2	7.6	4.1	25	0.005	0.05	0.5	0.02	0.103	0.001	1.78	0.232
OUT-06	VA25A7638-006	2025-04-07	M	8.5	9.72	5.08	5.4	11.63	7.3	8.9	3	29	0.005	0.05	0.5	0.02	0.068	0.001	1.8	0.16
OUT-06	VA25A8149-003	2025-04-11	M	31.3	31.4	3.92	3.95	11.88	6.9	10.6	3	51	0.005	0.05	0.5	0.02	0.0987	0.001	3.3	0.119
SW-05	22D2212-23	2022-04-20	M			2.66		12.57	6.1	5.4	3.3		0.05	0.1	0.89	0.1	0.056	0.01	2.5	0.129
SW-05	22E2480-17	2022-05-18	M			5.29		13.16		4.8	12.5		0.05	0.1	0.44	0.1	0.036	0.01	1.2	0.178
SW-05	22F3538-05	2022-06-22	M			2.35		10.43	6.29	11.5	2.7		0.054	0.1	0.25	0.1	0.047	0.01	1.3	0.0956
SW-05	22K1308-05	2022-11-09	M		4.88	2.54		12.68	7.46	5.5	2		0.05	0.1	0.98	0.1	0.036	0.01	1.6	0.107

Appendix 4.3-1: Background Water Quality Samples and Statistical Summary

				Alkalinity, Total	Hardness	Organic Carbon, Dissolved (DOC)	Organic Carbon, Total (TOC)	Oxygen, Dissolved	pH-field	Temperature	Total Suspended Solids (TSS)	Total Dissolved Solids (TDS)	Ammonia, Total (as N)	Bromide	Chloride	Fluoride	Nitrate (as N)	Nitrite (as N)	Sulfate	D-Al
				mg/L	mg/L	mg/L	mg/L	mg/L	s.u.	°C	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Statistics																				
Sample Count				49	63	69	43	63	60	64	69	43	69	67	69	69	67	69	69	69
Minimum				1.6	3.14	1.83	2.04	8.98	5.6	1.9	2	10	0.005	0.05	0.16	0.02	0.014	0.001	1.1	0.0484
10th Percentile				2.5	3.674	2.636	2.794	10.448	6.09	4.2419	2	16	0.005	0.05	0.404	0.02	0.036	0.001	1.298	0.09024
Median				5.1	6.31	3.97	4.53	11.81	6.6	8.15	3	24	0.0062	0.05	0.51	0.02	0.077	0.001	1.77	0.143
90th Percentile				20.04	20.14	5.992	6.636	13.136	7.6	12.07	4.14	48.6	0.05	0.1	0.96	0.1	0.2226	0.01	2.856	0.2156
Maximum				36.5	34.7	7.82	10.4	14.33	8.2	15.9	15.6	71	0.091	0.1	19.6	0.1	0.43	0.01	7.83	0.264
Station ID	**Laboratory ID**	**Sample Date**	**Sample Class**																	
SW-05	22L0650-05	2022-12-06	M		5.26	1.83		13.5	6.18	2.653	2		0.05	0.1	1.15	0.1	0.0871	0.005	1.7	0.0841
SW-05	23A2725-05	2023-01-26	M		4.07	2.9		12.68	6.26	4.63	2		0.05	0.1	0.47	0.1	0.05	0.005	1.6	0.116
SW-05	23B2818-05	2023-02-27	M		3.5	2.7		13.75	6.51	2	4		0.079	0.1	0.56	0.1	0.052	0.01	1.1	0.11
SW-05	23C1944-05	2023-03-16	M		3.14	2.75		13.2	6.22	4.3	3.3		0.05	0.1	0.57	0.1	0.044	0.01	1.2	0.116
SW-05	23D3227-05	2023-04-27	M		3.35	2.66		11.59	7.28	7.5	4		0.05	0.1	0.45	0.1	0.014	0.01	1.1	0.122
SW-05	23J2428-05	2023-10-19	M	2.6	5.84	5.92		10.97	6	11.8	2.8		0.05	0.1	0.85	0.1		0.01	1.5	0.264
SW-05	23J2428-05RE1	2023-10-19	M																	
SW-05	23J2428-05RE2	2023-10-19	M																	
SW-05	23K2005-05	2023-11-16	M	2.5	3.6	3.1		12.16	6.12	6.4	2		0.05	0.1	0.6	0.1	0.018	0.01	1.1	0.147
SW-05	23L1794-05	2023-12-13	M	2.2	3.47	2.69		12.75	6.77	5	3.6		0.05		0.65	0.05	0.05	0.01	1.1	0.122
SW-06	22D2212-24	2022-04-20	M			3.7		11.85	6.3	7	3.3		0.05	0.1	0.31	0.1	0.116	0.01	1.7	0.143
SW-06	22E2480-18	2022-05-18	M			5.71		11.61		7.6	4.3		0.05	0.1	0.35	0.1	0.065	0.01	1.9	0.184
SW-06	22F3538-06	2022-06-22	M			3.21		10.13	6.42	13.6	5.1		0.091	0.1	0.16	0.1	0.092	0.01	1.8	0.116
SW-06	22G1944-05	2022-07-14	M		19.5	3.64		9.05	7.08	15.9	2.8		0.05	0.1	0.27	0.1	0.176	0.01	2	0.09
SW-06	22K1308-06	2022-11-09	M		7.43	3.82		11.85	6.57	7	2		0.05	0.1	1.09	0.1	0.094	0.01	1.9	0.139
SW-06	22L0650-06	2022-12-06	M		8.58	2.75		12.56	5.62	4.217	3.2		0.05	0.1	1.2	0.1	0.175	0.005	2	0.113
SW-06	23A2725-06	2023-01-26	M		6.3	4.3		12.16	6.49	5.19	2		0.05	0.1	0.42	0.1	0.0682	0.005	1.7	0.157
SW-06	23B2818-06	2023-02-27	M		6.92	3.97		12.94	6.59	3.4	4		0.054	0.1	0.48	0.1	0.07	0.01	1.6	0.148
SW-06	23C1944-06	2023-03-16	M		5.24	4.18		12.67	6.31	5.7	3.3		0.05	0.1	0.41	0.1	0.052	0.01	1.7	0.155
SW-06	23D3227-06	2023-04-27	M		5.79	3.91		11.3	6.43	8.5	4		0.05	0.1	0.38	0.1	0.038	0.01	1.6	0.156
SW-06	23E2501-06	2023-05-18	M		10.2	3.43		10.06	7.26	14.3	5		0.05	0.1	0.35	0.05	0.0899	0.005	1.8	0.113
SW-06	23J2428-06	2023-10-19	M	3.1	6.47	5.99		10.84	5.98	11.6	2		0.05	0.1	0.87	0.1		0.01	1.6	0.227
SW-06	23K2005-06	2023-11-16	M	3.7	6.51	4.61		11.12	6.56	8.4	2		0.05	0.1	0.68	0.1	0.028	0.01	1.8	0.16
SW-06	23L1794-06	2023-12-13	M	4.4	6.17	4.16		11.34	6.83	6.6	2		0.05		0.6	0.05	0.049	0.01	1.5	0.163
SW-06	VA25A3845-009	2025-02-22	M	3	5.23	5.14	6.08				3	46	0.005	0.05	0.5	0.02	0.0634	0.001	1.53	0.207
SW-06	VA25A6440-010	2025-03-23	M	3.5	5.78	6.36	7.15				3.5	24	0.005	0.05	0.5	0.02	0.0514	0.001	1.46	0.23

Sample class definitions: F=field sample, M=monitoring sample.
Values preceded by # are non-detectable results omitted from statistical calculations because the reporting limit is greater than the 2 times the maximum detected value for a dissolved (D) metal parameter.

Values set equal to 0 are non-detectable results that are not detectable in > 95% of the reported results for a dissolved (D) metal parameter.

All other non-detectable results are set equal to the reporting limit value.
Blank cells indicate a result is not reported for that parameter.

Appendix 4.3-1: Background Water Quality Samples and Statistical Summary

				D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	D-Cr[VI]	D-Co	D-Cu	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Statistics																						
Sample Count				69	63	69	69	69	26	64	69	12	25	69	71	69	63	26	69	69	28	69
Minimum				0.00005	0.00005	0.00159	0	0	0.002	0.000002	1.07	0.00012	0	0.0000178	0.00031	0.0079	0.00005	0.00005	0.11	0.000326	0.00000066	0.000183
10th Percentile				0.00005	0.00005	0.001968	0	0	0.0029	0.0000026	1.236	0.000123	0	0.00002498	0.00042	0.01	0.00005	0.00005	0.131	0.000432	0.000001364	0.0002684
Median				0.0001	0.0001	0.00315	0	0	0.0039	0.000005	2.22	0.000205	0	0.0001	0.00068	0.014	0.00005	0.0001	0.162	0.00083	0.00000264	0.000505
90th Percentile				0.0002	0.00018	0.006506	0	0	0.0115	0.00000832	7.492	0.000349	0	0.0001	0.00111	0.0292	0.0001028	0.0003	0.3422	0.001822	0.000004758	0.001202
Maximum				0.00052	0.00071	0.00972	0	0	0.015	0.0000143	13	0.0006	0	0.00042	0.0016	0.24	0.000165	0.000409	1.46	0.0102	0.0000066	0.00267
Station ID	**Laboratory ID**	**Sample Date**	**Sample Class**																			
OUT-01	VA24A9285-003	2024-04-29	M	0.0001	0.0001	0.00356	0	0	#0.01	0.000005	2.28	#0.0005	0	0.0001	0.00071	0.031	0.00005	#0.001	0.149	0.0014	#0.000005	0.00032
OUT-01	VA24B1636-006	2024-05-23	M	0.0001	0.0001	0.00336	0	0	#0.01	0.000005	1.88	#0.0005		0.0001	0.00065	0.028	0.00005	#0.001	0.14	0.0014	#0.000005	0.000273
OUT-01	VA24C6562-005	2024-10-04	M	0.0001	0.00016	0.0059	0	0	#0.01	0.0000064	4.31	#0.0005	0	0.0001	0.00118	0.041	0.000093	#0.001	0.225	0.00287	#0.000005	0.000505
OUT-01	VA24C8965-004	2024-10-27	M	0.0001	0.00018	0.00348	0	0	#0.01	0.000005	2.43	#0.0005	0	0.0001	0.00111	0.04	0.000135	#0.001	0.178	0.00202	#0.000005	0.000623
OUT-01	661-455931031-0	2024-10-28	F																			
OUT-01	VA24D0618-001	2024-11-12	M	0.0001	0.00017	0.00354	0	0	#0.01	0.000005	2.22	#0.0005		0.0001	0.00091	0.022	0.000076	#0.001	0.165	0.0015	0.00000273	0.000518
OUT-01	VA24D4181-001	2024-12-20	M	0.0001	0.00011	0.00267	0	0	#0.01	0.000005	1.86	#0.0005		0.0001	0.00068	0.02	0.00005	#0.001	0.135	0.00077	0.00000245	0.00024
OUT-01	VA25A2292-001	2025-01-31	M	0.0002	0.00019	0.0081	0	0	0.015	0.0000124	9.28	#0.0005		0.00012	0.00083	0.24	0.000054	#0.001	1.46	0.0102	0.000001	0.000982
OUT-01	VA25A3846-001	2025-02-23	M	0.0001	0.0001	0.00262	0	0	#0.01	0.000005	1.53	#0.0005	0	0.0001	0.00062	0.014	0.00005	#0.001	0.131	0.00077	0.00000222	0.000226
OUT-01	VA25A5181-001	2025-03-09	M	0.0001	0.0001	0.00244	0	0	#0.01	0.000005	1.18	#0.0005		0.0001	0.00052	0.021	0.00005	#0.001	0.113	0.00095		0.000214
OUT-01	VA25A5326-001	2025-03-11	M																		0.00000066	
OUT-01	VA25A7638-004	2025-04-07	M	0.0001	0.00014	0.00439	0	0	#0.01	0.0000052	2.86	#0.0005	0	0.0001	0.0008	0.017	0.000051	#0.001	0.168	0.00122	0.00000252	0.00037
OUT-01	VA25A8149-001	2025-04-11	M	0.0001	0.00015	0.00397	0	0	#0.01	0.000005	2.58	#0.0005	0	0.0001	0.00056	0.015	0.00005	#0.001	0.159	0.00146	0.00000098	0.000429
OUT-01	VA25B1692-001	2025-05-20	M	0.0001	0.00012	0.00514	0	0	#0.01	0.000005	3.29	#0.0005		0.0001	0.00084	0.04	0.000104	#0.001	0.19	0.00263	0.00000175	0.00035
OUT-02	VA24A9285-004	2024-04-29	M	0.0001	0.0001	0.00393	0	0	#0.01	0.0000085	3.38	#0.0005	0	0.0001	0.0016	0.016	0.000111	#0.001	0.22	0.00137	0.0000059	0.00125
OUT-02	VA24B0452-003	2024-05-10	M	0.0001	0.0001	0.00424	0	0	#0.01	0.000005	4.2	#0.0005	0	0.0001	0.00076	0.011	0.00005	#0.001	0.288	0.00059	#0.000005	0.00138
OUT-02	VA24B1054-003	2024-05-16	M	0.0001	0.0001	0.00755	0	0	#0.01	0.0000101	8.64	#0.0005	0	0.0001	0.00099	0.01	0.00005	#0.001	0.469	0.00058	#0.000005	0.00203
OUT-02	VA24B1929-002	2024-05-27	M	0.0001	0.0001	0.00382	0	0	#0.01	0.000005	2.21	#0.0005		0.0001	0.00067	0.03	0.00005	#0.001	0.164	0.00175	#0.000005	0.000245
OUT-02	VA24B5289-006	2024-06-26	M	0.0001	0.0001	0.00972	0	0	0.012	0.0000143	10.5	#0.0005		0.0001	0.00086	0.01	0.00005	#0.001	0.603	0.00111	#0.000005	0.00267
OUT-02	VA24C6562-006	2024-10-04	M	0.0001	0.0001	0.00385	0	0	#0.01	0.000005	1.67	#0.0005	0	0.00011	0.00064	0.029	0.00005	#0.001	0.156	0.0014	#0.000005	0.000372
OUT-02	VA24C8483-001	2024-10-23	M	0.0001	0.0001	0.00311	0	0	#0.01	0.000005	1.45	#0.0005	0	0.0001	0.00053	0.014	0.00005	#0.001	0.14	0.00096	#0.000005	0.000407
OUT-02	VA24C8965-003	2024-10-26	M	0.0001	0.00012	0.0041	0	0	#0.01	0.0000079	2.78	#0.0005	0	0.0001	0.00129	0.042	0.000165	#0.001	0.216	0.0018	#0.000005	0.00131
OUT-02	VA24D0618-002	2024-11-12	M	0.0001	0.0001	0.00286	0	0	#0.01	0.000005	1.86	#0.0005		0.0001	0.00092	0.022	0.000091	#0.001	0.153	0.00082	0.0000038	0.000684
OUT-02	VA24D3590-001	2024-12-15	M	0.0001	0.0001	0.00279	0	0	#0.01	0.000005	1.86	#0.0005	0	0.0001	0.00085	0.02	0.000074	#0.001	0.157	0.00082	0.00000313	0.000618
OUT-02	VA25A2292-002	2025-01-31	M	0.0001	0.0001	0.0031	0	0	#0.01	0.000005	2.48	#0.0005		0.0001	0.00048	0.023	0.00005	#0.001	0.256	0.00087	0.00000227	0.00127
OUT-02	VA25A3846-002	2025-02-23	M	0.0001	0.0001	0.00272	0	0	#0.01	0.000005	1.22	#0.0005	0	0.0001	0.00045	0.016	0.00005	#0.001	0.12	0.00075	0.00000255	0.000262
OUT-02	VA25A5181-002	2025-03-09	M	0.0001	0.0001	0.00217	0	0	#0.01	0.000005	1.64	#0.0005		0.0001	0.00078	0.024	0.000125	#0.001	0.133	0.00138		0.000639
OUT-02	VA25A5326-002	2025-03-11	M																		0.0000033	
OUT-02	VA25A7638-005	2025-04-06	M	0.0001	0.0001	0.00309	0	0	#0.01	0.000006	1.88	#0.0005	0	0.0001	0.00062	0.026	0.000053	#0.001	0.162	0.00191	0.00000254	0.000863
OUT-02	VA25A8149-002	2025-04-11	M	0.0001	0.0001	0.00272	0	0	#0.01	0.000005	1.53	#0.0005	0	0.0001	0.00062	0.015	0.00005	#0.001	0.138	0.00048	0.00000253	0.000654
OUT-02	VA25A8563-001	2025-04-16	M	0.0001	0.0001	0.00278	0	0	#0.01	0.000005	1.37	#0.0005	0	0.0001	0.00041	0.01	0.00005	#0.001	0.133	0.00047	0.00000166	0.000504
OUT-02	VA25A8974-001	2025-04-22	M	0.0001	0.0001	0.00325	0	0	#0.01	0.000005	2.2	#0.0005		0.0001	0.00044	0.01	0.00005	#0.001	0.194	0.00155	0.00000152	0.00134
OUT-06	VA24A7873-AB-006	2024-04-12	M	0.00031	0.00031	0.00779	0	0	0.012	0.0000053	13	#0.0005		0.0001	0.0009	0.01	0.00006	#0.001	0.543	0.00111	#0.000005	0.00119
OUT-06	VA24A9263-003	2024-04-28	M	0.00052	0.00071	0.00273	0	0	#0.01	0.000005	7.58	0.0006		0.0001	0.00106	0.017	0.000098	#0.001	0.21	0.00145	#0.000005	0.000879
OUT-06	VA24C8159-007	2024-10-20	M	0.00014	0.00032	0.00647	0	0	0.011	0.000005	7.49	#0.0005	0	0.0001	0.00117	0.023	0.000116	#0.001	0.359	0.0014	0.0000066	0.000493
OUT-06	VA24C8964-001	2024-10-27	M	0.00015	0.00026	0.00675	0	0	0.01	0.0000092	7.5	#0.0005	0	0.0001	0.00104	0.017	0.00008	#0.001	0.351	0.00237	#0.000005	0.000636
OUT-06	VA24D0615-001	2024-11-11	M	0.00013	0.00016	0.00665	0	0	#0.01	0.000005	7.41	#0.0005		0.0001	0.00087	0.014	0.000074	#0.001	0.34	0.00083	0.00000421	0.000582
OUT-06	VA24D3590-002	2024-12-15	M	0.00013	0.00018	0.00601	0	0	#0.01	0.000005	7.14	#0.0005	0	0.0001	0.00083	0.014	0.00006	#0.001	0.338	0.00172	0.00000334	0.000735
OUT-06	VA25A2339-001	2025-02-01	M	0.00019	0.00032	0.0027	0	0	#0.01	0.000005	5.32	#0.0005		0.0001	0.00084	0.02	0.000098	#0.001	0.219	0.00107	0.00000415	0.000617
OUT-06	VA25A3650-001	2025-02-20	M	0.0001	0.00018	0.00311	0	0	#0.01	0.000005	4.08	#0.0005	0	0.0001	0.00073	0.013	0.000059	#0.001	0.204	0.0007	#0.000005	0.000562
OUT-06	VA25A3682-001	2025-02-20	M	0.0001	0.00017	0.00315	0	0	#0.01	0.000005	4.11	#0.0005		0.00042	0.0008	0.015	0.000067	#0.001	0.201	0.00115	0.00000399	0.000559
OUT-06	VA25A5181-003	2025-03-09	M	0.0001	0.00016	0.00376	0	0	#0.01	0.000005	3.99	#0.0005		0.0001	0.00083	0.02	0.000075	#0.001	0.211	0.00084		0.00042
OUT-06	VA25A7638-006	2025-04-07	M	0.0001	0.00018	0.00324	0	0	#0.01	0.000005	3.59	#0.0005	0	0.0001	0.00074	0.014	0.000052	#0.001	0.184	0.00107	0.00000494	0.000545
OUT-06	VA25A8149-003	2025-04-11	M	0.0002	0.00015	0.0084	0	0	0.01	0.0000061	11.7	#0.0005	0	0.0001	0.00076	0.01	0.00005	#0.001	0.525	0.0006	0.00000321	0.00114
SW-05	22D2212-23	2022-04-20	M	0.0002	#0.0005	0.005	0	0	#0.05	#0.00001	1.2	#0.0005		0.0001	0.0004	0.023	#0.0002	0.00014	0.135	0.00063	#0.00001	0.00045
SW-05	22E2480-17	2022-05-18	M	0.0002	#0.0005	0.005	0	0	#0.05	#0.00001	1.74	#0.0005		0.0001	0.00076	0.026	#0.0002	0.0002	0.138	0.00108	#0.00001	0.00048
SW-05	22F3538-05	2022-06-22	M	0.0002	#0.0005	0.005	0	0	#0.05	#0.00001	1.65	#0.0005		0.0001	0.00042	0.013	#0.0002	0.00031	0.146	0.00058	#0.00001	0.00041
SW-05	22K1308-05	2022-11-09	M	0.00005	0.00007	0.00319	0	0	0.003	0.0000052	1.67	0.00015		0.0000241	0.00044	0.0126	0.00005	0.00037	0.169	0.000726	#0.00001	0.000574

Appendix 4.3-1: Background Water Quality Samples and Statistical Summary

				D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca	D-Cr	D-Cr[VI]	D-Co	D-Cu	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Statistics																						
Sample Count				69	63	69	69	69	26	64	69	12	25	69	71	69	63	26	69	69	28	69
Minimum				0.00005	0.00005	0.00159	0	0	0.002	0.000002	1.07	0.00012	0	0.0000178	0.00031	0.0079	0.00005	0.00005	0.11	0.000326	0.00000066	0.000183
10th Percentile				0.00005	0.00005	0.001968	0	0	0.0029	0.0000026	1.236	0.000123	0	0.00002498	0.00042	0.01	0.00005	0.00005	0.131	0.000432	0.000001364	0.0002684
Median				0.0001	0.0001	0.00315	0	0	0.0039	0.000005	2.22	0.000205	0	0.0001	0.00068	0.014	0.00005	0.0001	0.162	0.00083	0.00000264	0.000505
90th Percentile				0.0002	0.00018	0.006506	0	0	0.0115	0.00000832	7.492	0.000349	0	0.0001	0.00111	0.0292	0.0001028	0.0003	0.3422	0.001822	0.000004758	0.001202
Maximum				0.00052	0.00071	0.00972	0	0	0.015	0.0000143	13	0.0006	0	0.00042	0.0016	0.24	0.000165	0.000409	1.46	0.0102	0.0000066	0.00267
Station ID	**Laboratory ID**	**Sample Date**	**Sample Class**																			
SW-05	22L0650-05	2022-12-06	M	0.00005	0.000072	0.0027	0	0	0.0038	0.0000045	1.8	0.00012		0.000019	0.00037	0.0079	0.00005	0.000409	0.186	0.000416	#0.00001	0.000826
SW-05	23A2725-05	2023-01-26	M	0.00005	0.00005	0.0026	0	0	0.0031	0.0000061	1.41	0.00017		0.0000241	0.00048	0.0125	0.00005	0.000244	0.131	0.000366	#0.00001	0.000484
SW-05	23B2818-05	2023-02-27	M	0.00005	0.00005	0.00229	0	0	0.0032	0.0000027	1.18	0.00023		0.0000178	0.00038	0.0105	0.00005	0.000251	0.133	0.000326	#0.00001	0.000433
SW-05	23C1944-05	2023-03-16	M	0.00005	0.00005	0.00231	0	0	0.0032	0.0000031	1.07	0.00012		0.0000198	0.00031	0.011	0.00005	0.00014	0.111	0.000328	#0.00001	0.00027
SW-05	23D3227-05	2023-04-27	M	0.00005	0.00005	0.00257	0	0	0.004	0.0000027	1.16	#0.0005		0.0000184	0.00039	0.0114	0.00005	0.00016	0.11	0.000398	#0.00001	0.000283
SW-05	23J2428-05	2023-10-19	M	0.00005	0.000081	0.00367	0	0	0.0048	0.0000096	2.07	#0.0005		0.0000381	0.00136	0.0254	0.000114	0.00029	0.162	0.00109	#0.00001	0.000765
SW-05	23J2428-05RE1	2023-10-19	M												0.00145							
SW-05	23J2428-05RE2	2023-10-19	M												0.00144							
SW-05	23K2005-05	2023-11-16	M	0.00005	0.00005	0.00265	0	0	0.002	0.0000026	1.24	#0.0005		0.0000261	0.00046	0.0132	0.00005	0.000151	0.119	0.000547	#0.00001	0.000183
SW-05	23L1794-05	2023-12-13	M	0.00005	0.00005	0.00257	0	0	0.004	0.0000022	1.19	#0.0005		0.0000223	0.00036	0.0136	0.00005	0.000184	0.12	0.000549	#0.00001	0.000242
SW-06	22D2212-24	2022-04-20	M	0.0002	#0.0005	0.005	0	0	#0.05	0.0000012	1.96	#0.0005		0.0001	0.00095	0.01	#0.0002	0.0001	0.147	0.00045	#0.00001	0.00049
SW-06	22E2480-18	2022-05-18	M	0.0002	#0.0005	0.005	0	0	#0.05	#0.00001	1.56	#0.0005		0.0001	0.00054	0.015	#0.0002	0.0001	0.139	0.00081	#0.00001	0.00051
SW-06	22F3538-06	2022-06-22	M	0.0002	#0.0005	0.005	0	0	#0.05	#0.00001	3.63	#0.0005		0.0001	0.00054	0.011	#0.0002	0.0001	0.183	0.00105	#0.00001	0.00054
SW-06	22G1944-05	2022-07-14	M	0.00005	0.00005	0.00336	0	0	0.0051	0.000002	7.43	0.00018		0.0000578	0.00054	0.0149	0.00005	0.00006	0.221	0.00328	#0.00001	0.000744
SW-06	22K1308-06	2022-11-09	M	0.00005	0.00005	0.00211	0	0	0.0034	0.0000041	2.68	0.00021		0.0000419	0.0006	0.0121	0.000053	0.000077	0.18	0.00066	#0.00001	0.000484
SW-06	22L0650-06	2022-12-06	M	0.00005	0.00005	0.00216	0	0	0.004	0.0000033	3.1	0.0002		0.0000392	0.00052	0.0122	0.00005	0.000058	0.202	0.00105	#0.00001	0.000483
SW-06	23A2725-06	2023-01-26	M	0.00005	0.00005	0.00184	0	0	0.0038	0.000002	2.27	0.00024		0.0000334	0.0006	0.011	0.00005	0.00005	0.153	0.000408	#0.00001	0.000463
SW-06	23B2818-06	2023-02-27	M	0.00005	0.00005	0.00188	0	0	0.0031	0.0000028	2.5	0.00025		0.0000252	0.00059	0.0107	0.00005	0.00008	0.165	0.000436	#0.00001	0.000497
SW-06	23C1944-06	2023-03-16	M	0.00005	0.00005	0.00159	0	0	0.0028	0.0000033	1.87	0.00036		0.000026	0.00057	0.0095	0.00005	0.00005	0.14	0.000364	#0.00001	0.000489
SW-06	23D3227-06	2023-04-27	M	0.00005	0.000054	0.00183	0	0	0.0035	0.0000032	2.07	#0.0005		0.0000306	0.0006	0.0101	0.000052	0.00005	0.148	0.000508	#0.00001	0.000496
SW-06	23E2501-06	2023-05-18	M	0.00005	0.000062	0.0027	0	0	0.0032	0.000002	3.78	#0.0005		0.0000346	0.00057	0.0115	0.00005	0.000062	0.195	0.000605	#0.00001	0.000638
SW-06	23J2428-06	2023-10-19	M	0.00005	0.000068	0.00208	0	0	0.0055	0.000002	2.32	#0.0005		0.0000311	0.00083	0.0127	0.000069	0.00005	0.161	0.000789	#0.00001	0.000457
SW-06	23K2005-06	2023-11-16	M	0.00005	0.000066	0.00199	0	0	0.0028	0.0000026	2.35	#0.0005		0.0000317	0.00064	0.0104	0.000061	0.00005	0.152	0.00048	#0.00001	0.000519
SW-06	23L1794-06	2023-12-13	M	0.00005	0.000063	0.00186	0	0	0.0042	0.000002	2.2	#0.0005		0.0000305	0.0008	0.0097	0.000066	0.000052	0.161	0.000605	#0.00001	0.000506
SW-06	VA25A3845-009	2025-02-22	M	0.0001	0.0001	0.00159	0	0	#0.01	0.000005	1.86	#0.0005	0	0.0001	0.00072	0.012	0.00005	#0.001	0.143	0.00057	0.00000427	0.00044
SW-06	VA25A6440-010	2025-03-23	M	0.0001	0.0001	0.00186	0	0	#0.01	0.000005	2.08	#0.0005	0	0.0001	0.00063	0.016	0.000055	#0.001	0.142	0.00055	0.00000468	0.000417

Sample class definitions: F=field sample, M=monitoring sample.
Values preceded by # are non-detectable results omitted from statistical calculations because the reporting limit is greater than the 2 times the maximum detected value for a dissolved (D) metal parameter.

Values set equal to 0 are non-detectable results that are not detectable in > 95% of the reported results for a dissolved (D) metal parameter.

All other non-detectable results are set equal to the reporting limit value.
Blank cells indicate a result is not reported for that parameter.

Appendix 4.3-1: Background Water Quality Samples and Statistical Summary

				D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Statistics																	
Sample Count				20	69	69	43	69	69	69	69	69	69	63	69	45	69
Minimum				0.00014	0	0.1	0.00005	1.3	0	0.496	0.00485	0	0	0.0002	0.000021	0.0004	0.001
10th Percentile				0.0001497	0	0.1496	0.00005	1.568	0	0.5998	0.005864	0	0	0.00027	0.00002584	0.0005	0.001
Median				0.000186	0	0.2	0.00005	1.93	0	0.749	0.00897	0	0	0.00054	0.000076	0.0005	0.0011
90th Percentile				0.0002261	0	0.373	0.0000532	2.44	0	1.218	0.03	0	0	0.001024	0.000222	0.000536	0.004
Maximum				0.000334	0	1.1	0.000074	3.7	0	12.6	0.049	0.0000044	0.00013	0.00193	0.000348	0.00109	0.0459
Station ID	**Laboratory ID**	**Sample Date**	**Sample Class**														
OUT-01	VA24A9285-003	2024-04-29	M	#0.0005	0	0.234	0.00005	1.73	0	1.25	0.00964	0	0	0.00031	0.000069	0.0005	0.013
OUT-01	VA24B1636-006	2024-05-23	M	#0.0005	0	0.148	0.00005	1.81	0	0.874	0.00783	0	0	0.0003	0.000046	0.0005	0.0105
OUT-01	VA24C6562-005	2024-10-04	M	#0.0005	0	0.365	0.00005	2.68	0	1.43	0.0165	0	0	0.00063	0.000134	0.0005	0.0102
OUT-01	VA24C8965-004	2024-10-27	M	#0.0005	0	0.25	0.00005	2.2	0	0.841	0.00893	0	0	0.0014	0.000171	0.0005	0.0027
OUT-01	661-455931031-0	2024-10-28	F														
OUT-01	VA24D0618-001	2024-11-12	M	#0.0005	0	0.202	0.00005	2.18	0	0.79	0.00827	0	0	0.0007	0.000136	0.0005	0.0028
OUT-01	VA24D4181-001	2024-12-20	M	#0.0005	0	0.175	0.00005	1.84	0	0.652	0.0078	0	0	0.00049	0.000072	0.0005	0.001
OUT-01	VA25A2292-001	2025-01-31	M	#0.0005	0	1.1	0.00005	2.44	0	12.6	0.0419	0	0	0.00054	0.000343	0.0005	0.0459
OUT-01	VA25A3846-001	2025-02-23	M	#0.0005	0	0.184	0.00005	1.61	0	0.601	0.00635	0	0	0.00039	0.000048	0.0005	0.001
OUT-01	VA25A5181-001	2025-03-09	M	#0.0005	0	0.202	0.00005	1.44	0	0.496	0.00514	0	0	0.00065	0.000029	0.0005	0.001
OUT-01	VA25A5326-001	2025-03-11	M														
OUT-01	VA25A7638-004	2025-04-07	M	#0.0005	0	0.249	0.00005	1.93	0	0.699	0.012	0	0	0.00045	0.000126	0.0005	0.001
OUT-01	VA25A8149-001	2025-04-11	M	#0.0005	0	0.229	0.00005	1.98	0	0.818	0.0117	0	0	0.0003	0.000201	0.0005	0.001
OUT-01	VA25B1692-001	2025-05-20	M	#0.0005	0	0.209	0.00005	2.36	0	0.838	0.0132	0	0	0.0013	0.0001	0.0005	0.001
OUT-02	VA24A9285-004	2024-04-29	M	#0.0005	0	0.241	0.00005	2.07	0	0.851	0.0114	0	0	0.0007	0.000348	0.0005	0.0011
OUT-02	VA24B0452-003	2024-05-10	M	#0.0005	0	0.244	0.00005	2.31	0	1.21	0.0152	0	0	0.0003	0.000266	0.0005	0.0026
OUT-02	VA24B1054-003	2024-05-16	M	#0.0005	0	0.369	0.00005	2.98	0	1.72	0.0288	0	0	0.0003	0.000276	0.0005	0.001
OUT-02	VA24B1929-002	2024-05-27	M	#0.0005	0	0.209	0.00005	1.94	0	1.07	0.00973	0	0	0.00042	0.000064	0.0005	0.0092
OUT-02	VA24B5289-006	2024-06-26	M	#0.0005	0	0.518	0.00005	3.7	0	2.36	0.0378	0	0	0.0003	0.000267	0.0005	0.0011
OUT-02	VA24C6562-006	2024-10-04	M	#0.0005	0	0.142	0.00005	2.44	0	1.01	0.00723	0	0	0.00062	0.000068	0.0005	0.0016
OUT-02	VA24C8483-001	2024-10-23	M	#0.0005	0	0.117	0.00005	2.21	0	0.776	0.00654	0	0	0.00031	0.000071	0.0005	0.001
OUT-02	VA24C8965-003	2024-10-26	M	#0.0005	0	0.228	0.00005	2.5	0	0.994	0.0099	0	0	0.00193	0.00025	0.0005	0.001
OUT-02	VA24D0618-002	2024-11-12	M	#0.0005	0	0.169	0.00005	2.17	0	0.73	0.00701	0	0	0.0008	0.000165	0.0005	0.001
OUT-02	VA24D3590-001	2024-12-15	M	#0.0005	0	0.168	0.00005	1.93	0	0.744	0.00714	0	0	0.0006	0.000146	0.0005	0.0015
OUT-02	VA25A2292-002	2025-01-31	M	#0.0005	0	0.212	0.00005	1.98	0	1.42	0.0096	0	0	0.0005	0.000129	0.0005	0.0018
OUT-02	VA25A3846-002	2025-02-23	M	#0.0005	0	0.171	0.00005	1.57	0	0.586	0.00546	0	0	0.00036	0.000038	0.0005	0.001
OUT-02	VA25A5181-002	2025-03-09	M	#0.0005	0	0.208	0.00005	1.55	0	0.542	0.00657	0	0	0.00103	0.000148	0.0005	0.0017
OUT-02	VA25A5326-002	2025-03-11	M														
OUT-02	VA25A7638-005	2025-04-06	M	#0.0005	0	0.191	0.00005	1.67	0	0.708	0.00793	0	0.00013	0.00061	0.000123	0.0005	0.0013
OUT-02	VA25A8149-002	2025-04-11	M	#0.0005	0	0.173	0.00005	1.77	0	0.671	0.0067	0	0	0.00043	0.000139	0.0005	0.0011
OUT-02	VA25A8563-001	2025-04-16	M	#0.0005	0	0.164	0.00005	1.91	0	0.693	0.00606	0	0	0.0003	0.000088	0.0005	0.001
OUT-02	VA25A8974-001	2025-04-22	M	#0.0005	0	0.17	0.00005	2.02	0	1.02	0.00832	0	0	0.0003	0.000215	0.0005	0.0042
OUT-06	VA24A7873-AB-006	2024-04-12	M	#0.0005	0	0.523	0.00005	2.42	0	1.21	0.049	0	0	0.00061	0.000203	0.00069	0.001
OUT-06	VA24A9263-003	2024-04-28	M	#0.0005	0	0.555	0.00005	2.46	0	1.48	0.0257	0	0	0.00111	0.000173	0.00109	0.001
OUT-06	VA24C8159-007	2024-10-20	M	#0.0005	0	0.464	0.000058	2.21	0	0.948	0.038	0	0	0.00133	0.000096	0.00067	0.0012
OUT-06	VA24C8964-001	2024-10-27	M	#0.0005	0	0.396	0.00005	2.49	0	0.965	0.0341	0	0	0.00086	0.000088	0.00065	0.0011
OUT-06	VA24D0615-001	2024-11-11	M	#0.0005	0	0.335	0.00007	2.27	0	0.849	0.0308	0	0	0.00081	0.000076	0.0005	0.001
OUT-06	VA24D3590-002	2024-12-15	M	#0.0005	0	0.314	0.00005	2.2	0	0.828	0.0298	0	0	0.00074	0.000072	0.0005	0.001
OUT-06	VA25A2339-001	2025-02-01	M	#0.0005	0	0.359	0.00005	2	0	0.927	0.0209	0	0	0.00134	0.000092	0.00056	0.001
OUT-06	VA25A3650-001	2025-02-20	M	#0.0005	0	0.256	0.000054	2.03	0	0.84	0.0175	0	0	0.00073	0.000066	0.0005	0.0013
OUT-06	VA25A3682-001	2025-02-20	M	#0.0005	0	0.253	0.000074	1.77	0	0.769	0.019	0	0	0.00093	0.000045	0.0005	0.0012
OUT-06	VA25A5181-003	2025-03-09	M	#0.0005	0	0.271	0.00005	1.77	0	0.622	0.0197	0	0	0.001	0.000042	0.0005	0.0014
OUT-06	VA25A7638-006	2025-04-07	M	#0.0005	0	0.222	0.000054	1.84	0	0.631	0.019	0	0	0.00087	0.000037	0.0005	0.0011
OUT-06	VA25A8149-003	2025-04-11	M	#0.0005	0	0.389	0.00005	2.28	0	1.07	0.0442	0	0	0.00055	0.000189	0.0005	0.001
SW-05	22D2212-23	2022-04-20	M	#0.0004	0	0.17	#0.0005	1.3	0	0.6	0.0059	0	0	#0.005	0.000095	#0.005	0.004
SW-05	22E2480-17	2022-05-18	M	#0.0004	0	0.15	#0.0005	1.6	0	0.61	0.0069	0	0	#0.005	0.000143	#0.005	0.004
SW-05	22F3538-05	2022-06-22	M	#0.0004	0	0.1	#0.0005	1.9	0	0.73	0.007	0	0	#0.005	0.000109	#0.005	0.004
SW-05	22K1308-05	2022-11-09	M	0.000217	0	0.161	#0.0001	2.15	0	0.862	0.00675	0	0	0.00024	0.000136	#0.001	0.0013

Appendix 4.3-1: Background Water Quality Samples and Statistical Summary

				D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-Tl	D-Sn	D-Ti	D-U	D-V	D-Zn
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Statistics																	
Sample Count				20	69	69	43	69	69	69	69	69	69	63	69	45	69
Minimum				0.00014	0	0.1	0.00005	1.3	0	0.496	0.00485	0	0	0.0002	0.000021	0.0004	0.001
10th Percentile				0.0001497	0	0.1496	0.00005	1.568	0	0.5998	0.005864	0	0	0.00027	0.00002584	0.0005	0.001
Median				0.000186	0	0.2	0.00005	1.93	0	0.749	0.00897	0	0	0.00054	0.000076	0.0005	0.0011
90th Percentile				0.0002261	0	0.373	0.0000532	2.44	0	1.218	0.03	0	0	0.001024	0.000222	0.000536	0.004
Maximum				0.000334	0	1.1	0.000074	3.7	0	12.6	0.049	0.0000044	0.00013	0.00193	0.000348	0.00109	0.0459
Station ID	**Laboratory ID**	**Sample Date**	**Sample Class**														
SW-05	22L0650-05	2022-12-06	M	0.00018	0	0.146	#0.0001	1.97	0	1.03	0.00723	0	0	0.0002	0.000178	#0.001	0.0036
SW-05	23A2725-05	2023-01-26	M	0.000155	0	0.17	#0.0001	1.72	0	0.717	0.00591	0	0	0.00027	0.000109	#0.001	0.0012
SW-05	23B2818-05	2023-02-27	M	0.000172	0	0.19	#0.0001	1.49	0	0.796	0.00502	0	0	0.00023	0.000085	#0.001	0.0017
SW-05	23C1944-05	2023-03-16	M	0.000183	0	0.171	#0.0001	1.53	0	0.666	0.00485	0	0	0.00026	0.0000678	#0.001	0.001
SW-05	23D3227-05	2023-04-27	M	0.000165	0	0.18	#0.0001	1.56	0	0.696	0.00513	0	0	0.00027	0.0000739	#0.001	0.001
SW-05	23J2428-05	2023-10-19	M	0.000334	0	0.193	#0.0001	2.15	0	0.878	0.0083	0.0000042	0	0.0008	0.00025	#0.001	0.0015
SW-05	23J2428-05RE1	2023-10-19	M														
SW-05	23J2428-05RE2	2023-10-19	M														
SW-05	23K2005-05	2023-11-16	M	0.000195	0	0.14	#0.0001	1.86	0	0.713	0.00572	0	0	0.00023	0.000047	#0.001	0.001
SW-05	23L1794-05	2023-12-13	M	0.000203	0	0.117	#0.0001	1.78	0	0.694	0.00557	0	0	0.00023	0.0000656	0.0004	0.0012
SW-06	22D2212-24	2022-04-20	M	#0.0004	0	0.18	#0.0005	1.4	0	0.52	0.0087	0	0	#0.005	0.000021	#0.005	0.004
SW-06	22E2480-18	2022-05-18	M	#0.0004	0	0.2	#0.0005	1.6	0	0.58	0.0073	0	0	#0.005	0.000033	#0.005	0.004
SW-06	22F3538-06	2022-06-22	M	#0.0004	0	0.16	#0.0005	1.9	0	0.68	0.0125	0	0	#0.005	0.00003	#0.005	0.004
SW-06	22G1944-05	2022-07-14	M	0.0002	0	0.166	#0.0001	2.06	0	0.736	0.0194	0	0	0.00031	0.0000329	#0.001	0.001
SW-06	22K1308-06	2022-11-09	M	0.000205	0	0.211	#0.0001	1.99	0	0.735	0.0104	0	0	0.00055	0.0000256	#0.001	0.001
SW-06	22L0650-06	2022-12-06	M	0.000147	0	0.201	#0.0001	1.81	0	0.849	0.0118	0	0	0.00042	0.000024	#0.001	0.001
SW-06	23A2725-06	2023-01-26	M	0.00015	0	0.209	#0.0001	1.67	0	0.614	0.00903	0	0	0.0005	0.0000259	#0.001	0.001
SW-06	23B2818-06	2023-02-27	M	0.000189	0	0.211	#0.0001	1.61	0	0.716	0.00897	0	0	0.00038	0.000025	#0.001	0.0012
SW-06	23C1944-06	2023-03-16	M	0.000193	0	0.193	#0.0001	1.62	0	0.599	0.00787	0	0	0.00054	0.0000236	#0.001	0.001
SW-06	23D3227-06	2023-04-27	M	0.000171	0	0.197	#0.0001	1.64	0	0.648	0.00844	0	0	0.00049	0.0000239	#0.001	0.001
SW-06	23E2501-06	2023-05-18	M	0.00014	0	0.185	#0.0001	2.01	0	0.776	0.0144	0	0	0.00034	0.0000289	#0.001	0.001
SW-06	23J2428-06	2023-10-19	M	0.000167	0	0.239	#0.0001	1.93	0	0.749	0.0102	0.0000044	0	0.00087	0.0000275	#0.001	0.001
SW-06	23K2005-06	2023-11-16	M	0.00029	0	0.191	#0.0001	1.94	0	0.675	0.00973	0	0	0.00042	0.000028	#0.001	0.001
SW-06	23L1794-06	2023-12-13	M	0.000219	0	0.18	#0.0001	1.89	0	0.735	0.00918	0	0	0.00062	0.0000288	0.0004	0.0013
SW-06	VA25A3845-009	2025-02-22	M	#0.0005	0	0.195	0.00005	1.68	0	0.62	0.00773	0	0	0.0008	0.000023	0.0005	0.001
SW-06	VA25A6440-010	2025-03-23	M	#0.0005	0	0.194	0.00005	1.57	0	0.572	0.00825	0	0	0.00095	0.000026	0.0005	0.001

Sample class definitions: F=field sample, M=monitoring sample.
Values preceded by # are non-detectable results omitted from statistical calculations because the reporting limit is greater than the 2 times the maximum detected value for a dissolved (D) metal parameter.

Values set equal to 0 are non-detectable results that are not detectable in > 95% of the reported results for a dissolved (D) metal parameter.

All other non-detectable results are set equal to the reporting limit value.
Blank cells indicate a result is not reported for that parameter.

APPENDIX 4.3-2: CONSTRUCTION NON-CONTAMINATED CONTACT WATER QUALITY

Appendix 4.3-2: Construction Non-Contaminated Contact Water Quality

Station ID	Laboratory ID	Sample Date	Sample Class	Total Suspended Solids (TSS)	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	T-Cr[VI]	T-Co	T-Cu	T-Fe	T-Pb	T-Li	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
2700GPM-IN	VA25C7022-002	2025-10-10	M	4.1	0.317	0.00137	0.0013	0.0151	<0.000020	<0.000050	0.056	0.0000481	46.5	0.0007	0.00067	0.00015	0.0018	0.168	0.000331	0.002	3.13	0.0212	0.00000214	0.0322	<0.00050
2700GPM-IN	VA25C7369-002	2025-10-15	M	9.9	0.716	0.00144	0.00122	0.0206	<0.000020	<0.000050	0.053	<0.0000250	35.1	0.00142	0.00098	0.00023	0.00309	0.44	0.00058	0.0032	3.61	0.0333	0.00000203	0.0488	0.00068
2700GPM-IN	VA25C7848-002	2025-10-20	M	51.3	5.83	0.00111	0.00167	0.049	0.000093	<0.000050	0.026	0.0000661	29.7	0.00244	0.0007	0.00161	0.00606	4.3	0.0045	0.003	4.1	0.177	0.0000172	0.0331	0.00137
2700GPM-IN	VA25C8641-002	2025-10-27	M	53.6	4.77	0.00095	0.00175	0.0548	0.000079	<0.000050	0.04	0.0000483	32.8	0.00189	0.00051	0.00119	0.00602	3.43	0.00317	0.0024	3.35	0.125	0.0000091	0.0199	0.00116
2700GPM-IN	VA25C9625-002	2025-11-05	M	188	11.9	0.00091	0.00278	0.0884	0.00017	0.000065	0.034	0.0000924	30.8	0.00392	<0.00050	0.00332	0.00994	9.45	0.00586	0.0047	6.53	0.357	0.0000173	0.0158	0.00252
2700GPM-IN	VA25D0087-002	2025-11-10	M	176	11	0.0009	0.00271	0.0974	0.00018	<0.000100	0.043	0.0000935	31.3	0.00356	<0.00050	0.0033	0.0136	8.98	0.0058	0.0044	5.59	0.36	0.0000174	0.0182	0.00234
2700GPM-IN	VA25D0614-002	2025-11-16	M	37.8	1.96	0.00108	0.0019	0.0294	0.000037	<0.000050	0.04	0.0000341	27.2	0.00131	<0.00050	0.00066	0.00431	1.63	0.00171	0.0023	2.5	0.0691	0.00000874	0.0188	0.00095
2700GPM-IN	VA25D1572-002	2025-11-25	M	15.3	0.581	0.0008	0.0013	0.0105	<0.000020	<0.000050	0.017	<0.0000125	31.4	<0.00050	<0.00050	0.00015	0.00165	0.267	0.000497	0.0012	1.87	0.0205	0.00000187	0.0155	<0.00050
2700GPM-IN	VA25D2656-002	2025-12-05	M	70.3	3.84	0.00082	0.00192	0.0339	0.000063	<0.000050	0.012	0.0000262	31.9	0.00165	<0.00050	0.0011	0.00322	3.15	0.00202	0.0022	3.1	0.138	0.00000731	0.0206	0.00087
2700GPM-IN	VA25D2839-002	2025-12-08	M	139	10.3	0.00081	0.00238	0.0925	0.00016	<0.000050	0.022	0.0000775	31.6	0.00404	0.00054	0.00314	0.00871	8.98	0.00532	0.0038	5.71	0.348	0.0000194	0.027	0.00229
2700GPM-IN	VA25D3427-002	2025-12-15	M	280	17	0.00071	0.00316	0.131	0.00026	0.000092	0.018	0.000178	29	0.00567	<0.00050	0.00472	0.0166	12.7	0.0109	0.0047	6.36	0.506	0.0000296	0.00837	0.0039
2700GPM-IN	VA25D4184-002	2025-12-26	M	29.5	1.66	0.00058	0.00117	0.0164	0.000027	<0.000050	0.012	0.0000203	18.4	0.00098	<0.00050	0.00049	0.00538	1.29	0.00195	<0.0010	1.19	0.0565	0.00000448	0.00815	0.00062
2700GPM-IN	VA25D4204-002	2025-12-28	M	8.1	0.471	0.0005	0.00096	0.00844	<0.000020	<0.000050	0.012	0.000011	16.5	<0.00050	<0.00050	0.00013	0.00304	0.27	0.000627	0.0011	0.832	0.0189	0.00000339	0.00887	<0.00050
2700GPM-IN	VA26A0077-002	2026-01-04	M	76.9	7.57	0.00063	0.00214	0.0631	0.000106	0.000055	0.013	0.0000696	18.3	0.00306	<0.00050	0.00223	0.0159	6	0.00645	0.0028	3.02	0.22	0.0000174	0.00947	0.00246
2700GPM-IN	VA26A0564-002	2026-01-11	M	298	18.6	0.00059	0.00312	0.151	0.00028	0.000082	0.019	0.000125	29.7	0.00572	<0.00050	0.00515	0.0177	14.8	0.00774	0.0048	7.64	0.632	0.0000179	0.0102	0.004
2700GPM-IN	VA26A1149-002	2026-01-18	M	30.2	2.38	0.00058	0.00214	0.0243	0.000038	<0.000050	<0.010	0.0000324	21.8	0.00066	<0.00050	0.00065	0.00281	1.69	0.00178	0.0018	1.94	0.0779	0.00000488	0.0105	<0.00060
2700GPM-IN	VA26A1779-002	2026-01-26	M	<3.0	0.0784	0.00054	0.00172	0.00364	<0.000020	<0.000050	<0.010	<0.0000050	19.1	<0.00050	<0.00050	<0.00010	0.00402	0.046	0.000203	0.001	1.42	0.0207	<0.00000050	0.00748	<0.00050
SP-W-IN	VA25C7022-001	2025-10-10	M	9.5	0.58	0.00187	0.00132	0.0197	<0.000020	<0.000050	0.068	<0.0000350	41.9	0.00109	0.00075	0.0003	0.00209	0.429	0.000868	0.0032	5.1	0.0568	0.00000385	0.0438	0.00068
SP-W-IN	VA25C7369-001	2025-10-15	M	10.1	0.623	0.00146	0.00119	0.0194	<0.000020	<0.000050	0.055	<0.0000300	37.9	0.00181	0.00118	0.00021	0.00178	0.416	0.000404	0.0037	3.82	0.0363	0.00000213	0.053	0.00093
SP-W-IN	VA25C7848-001	2025-10-20	M	35.9	4.03	0.00108	0.00115	0.0419	0.000061	<0.000050	0.036	<0.0000650	25.1	0.00228	0.00075	0.00125	0.0036	3.16	0.00139	0.0034	3.94	0.165	0.00000502	0.041	0.00117
SP-W-IN	VA25C8641-001	2025-10-27	M	47.4	3.75	0.00105	0.00185	0.0468	0.000061	<0.000050	0.049	0.0000447	36.4	0.00186	0.00063	0.00106	0.00478	2.93	0.0024	0.0024	3.54	0.111	0.00000737	0.0246	0.00111
SP-W-IN	VA25C9625-001	2025-11-05	M	497	27.6	0.00084	0.00435	0.199	0.000401	0.000128	0.046	0.000201	38	0.00807	<0.00050	0.00757	0.0201	21.5	0.0118	0.008	12.4	0.856	0.0000315	0.0159	0.00501
SP-W-IN	VA25D0087-001	2025-11-10	M	275	17.5	0.00095	0.00329	0.139	0.000299	<0.000100	0.05	0.000128	33.2	0.00526	0.00066	0.00496	0.0133	13.8	0.00818	0.0057	7.93	0.549	0.0000252	0.0191	0.00329
SP-W-IN	VA25D0614-001	2025-11-16	M	46.2	2.28	0.00088	0.00174	0.0318	0.000042	<0.000050	0.033	0.0000305	23.7	0.00134	0.00052	0.0007	0.00405	1.92	0.00194	0.0024	2.56	0.0718	0.00000948	0.0156	0.00088
SP-W-IN	VA25D1572-001	2025-11-25	M	62.1	3.23	0.00087	0.00166	0.0325	0.000053	<0.000050	0.023	0.0000315	30.3	0.00135	<0.00050	0.00089	0.00346	2.49	0.0018	0.0021	2.94	0.106	0.00000599	0.0172	0.00066
SP-W-IN	VA25D2656-001	2025-12-05	M	261	15.5	0.00087	0.00298	0.119	0.000238	0.000052	0.014	0.0000866	38	0.00508	<0.00050	0.00435	0.00967	12.9	0.00719	0.0048	7.53	0.521	0.0000268	0.0179	0.00277
SP-W-IN	VA25D2839-001	2025-12-08	M	220	14.6	0.00083	0.00282	0.126	0.000237	<0.000100	0.027	0.0000894	33.5	0.00538	0.00054	0.00455	0.012	12.7	0.00677	0.0046	7.7	0.493	0.0000236	0.0235	0.00325
SP-W-IN	VA25D3427-001	2025-12-15	M	221	11.6	0.00076	0.00269	0.0983	0.000178	0.000076	0.02	0.00012	29.1	0.00466	<0.00050	0.00353	0.0121	9.42	0.00827	0.004	4.85	0.348	0.0000232	0.00941	0.00302
SP-W-IN	VA25D4184-001	2025-12-26	M	45.1	2.38	0.00063	0.00146	0.0228	0.00004	<0.000050	0.014	0.0000331	19.1	0.00107	<0.00050	0.00063	0.00318	1.65	0.00258	0.0012	1.32	0.0672	0.00000886	0.00787	0.00058
SP-W-IN	VA25D4204-001	2025-12-28	M	13.9	0.709	0.00051	0.00104	0.0107	<0.000020	<0.000050	0.014	0.0000117	16.3	0.00051	<0.00050	0.00018	0.00148	0.459	0.000664	0.0012	0.881	0.0243	0.00000514	0.00929	<0.00050
SP-W-IN	VA26A0077-001	2026-01-04	M	99.9	9.26	0.00068	0.00244	0.0759	0.000123	0.000059	0.014	0.0000791	19.4	0.00381	<0.00050	0.00274	0.0103	7.56	0.00734	0.0035	3.75	0.264	0.0000221	0.00959	0.00228
SP-W-IN	VA26A0564-001	2026-01-11	M	194	17.5	0.00051	0.00257	0.147	0.000287	0.000058	0.02	0.0000938	31.4	0.00554	<0.00050	0.00496	0.013	13.4	0.00508	0.0039	7.75	0.625	0.000016	0.0103	0.00398
SP-W-IN	VA26A1149-001	2026-01-18	M	18	0.624	0.00058	0.00203	0.00861	<0.000020	<0.000050	<0.010	0.0000126	19.8	<0.00050	<0.00050	0.00019	0.00105	0.459	0.000457	0.0016	1.65	0.0328	0.00000126	0.0103	<0.00050
SP-W-IN	VA26A1779-001	2026-01-26	M	66.6	4.52	0.00064	0.00232	0.041	0.000084	<0.000050	<0.010	0.0000773	24	0.00271	<0.00050	0.00147	0.00633	3.95	0.004	0.0031	3.08	0.174	0.0000158	0.0283	0.00137

Sample class definitions: M=monitoring sample.
"<" indicates the result is below the specified reporting limit.
Blank cells indicate a result is not reported for that parameter.

Appendix 4.3-2: Construction Non-Contaminated Contact Water Quality

Station ID	Laboratory ID	Sample Date	Sample Class	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-Tl	T-Sn	T-Ti	T-U	T-V	T-Zn	D-Al	D-Sb	D-As	D-Ba	D-Be	D-Bi	D-B	D-Cd	D-Ca
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
2700GPM-IN	VA25C7022-002	2025-10-10	M	<0.050	4.76	0.000178	4.11	<0.000010	86.5	0.184	0.000016	<0.00010	0.0065	0.0121	0.00217	0.0051	0.0593	0.00138	0.00127	0.0134	<0.000020	<0.000050	0.053	<0.0000150	44.8
2700GPM-IN	VA25C7369-002	2025-10-15	M	<0.050	5.88	0.000247	4.7	<0.000010	152	0.181	0.000014	0.00015	0.0169	0.0134	0.00233	0.0091	0.13	0.00144	0.00111	0.0164	<0.000020	<0.000050	0.055	<0.0000200	36.7
2700GPM-IN	VA25C7848-002	2025-10-20	M	0.098	4.25	0.000151	11.1	0.000019	88.3	0.141	0.000028	0.00023	0.19	0.00738	0.00826	0.0258	0.0347	0.00107	0.00085	0.0123	<0.000020	<0.000050	0.024	<0.0000200	27
2700GPM-IN	VA25C8641-002	2025-10-27	M	0.091	3.76	0.000163	12.5	0.000013	90.6	0.157	0.000026	0.00017	0.161	0.00974	0.00724	0.02	0.0692	0.0009	0.00106	0.0155	<0.000020	<0.000050	0.034	<0.0000200	30.7
2700GPM-IN	VA25C9625-002	2025-11-05	M	0.256	7.62	0.000143	20.6	0.000026	72.1	0.129	0.000048	0.00028	0.458	0.00847	0.0167	0.0458	0.0475	0.00082	0.00126	0.0134	<0.000020	<0.000050	0.032	<0.0000100	26.4
2700GPM-IN	VA25D0087-002	2025-11-10	M	0.225	3.57	0.000154	18.8	0.000024	53.3	0.121	0.000038	0.00026	0.375	0.0103	0.0157	0.0498	0.056	0.00085	0.00124	0.0116	<0.000020	<0.000050	0.042	<0.0000100	26
2700GPM-IN	VA25D0614-002	2025-11-16	M	0.213	10.5	0.000093	6.4	<0.000010	66.6	0.126	0.000024	0.00011	0.073	0.0119	0.00468	0.0101	0.0437	0.00096	0.00153	0.0127	<0.000020	<0.000050	0.042	<0.0000150	26.4
2700GPM-IN	VA25D1572-002	2025-11-25	M	<0.050	3.61	0.000125	4.31	<0.000010	45.5	0.117	0.000013	<0.00010	0.011	0.00578	0.0014	0.0031	0.0297	0.00077	0.00119	0.00639	<0.000020	<0.000050	0.016	<0.0000050	29.6
2700GPM-IN	VA25D2656-002	2025-12-05	M	0.096	3.85	0.000104	9.9	<0.000010	48.3	0.115	0.000024	0.0001	0.142	0.00989	0.0056	0.0154	0.023	0.00079	0.00161	0.00673	<0.000020	<0.000050	0.011	<0.0000100	28.8
2700GPM-IN	VA25D2839-002	2025-12-08	M	0.195	4.26	0.000149	20.1	0.000017	74.1	0.147	0.000037	0.00029	0.4	0.00858	0.0152	0.0506	0.0307	0.00072	0.00118	0.0122	<0.000020	<0.000050	0.022	<0.0000100	27.6
2700GPM-IN	VA25D3427-002	2025-12-15	M	0.308	2.85	0.000109	28.2	0.000045	13.7	0.128	0.00006	0.00037	0.554	0.00448	0.0214	0.0656	0.298	0.00053	0.00088	0.00929	<0.000020	<0.000050	0.016	0.0000075	22
2700GPM-IN	VA25D4184-002	2025-12-26	M	0.061	1.82	0.000061	4.75	<0.000010	27.5	0.0694	0.000012	<0.00010	0.05	0.00358	0.00296	0.0132	0.0509	0.00056	0.00094	0.00576	<0.000020	<0.000050	0.013	<0.0000100	18.8
2700GPM-IN	VA25D4204-002	2025-12-28	M	<0.050	1.86	0.000059	3.25	<0.000010	60.7	0.0687	<0.000010	<0.00010	0.0112	0.00425	0.00136	0.0044	0.0279	0.00049	0.00083	0.00533	<0.000020	<0.000050	0.014	0.000006	16.6
2700GPM-IN	VA26A0077-002	2026-01-04	M	0.13	2.46	0.000083	13.8	0.000028	41.8	0.0844	0.000034	0.00025	0.271	0.00575	0.0116	0.0429	0.0327	0.00052	0.00088	0.0074	<0.000020	<0.000050	0.013	<0.0000150	16.3
2700GPM-IN	VA26A0564-002	2026-01-11	M	0.306	3.9	0.00009	29.5	0.000032	32.7	0.136	0.000054	0.0004	0.635	0.00461	0.0244	0.0721	0.168	0.00047	0.00092	0.0117	<0.000020	<0.000050	0.016	<0.0000100	21.1
2700GPM-IN	VA26A1149-002	2026-01-18	M	0.156	5.89	0.000078	6.83	0.00001	20.8	0.0788	0.000023	0.00011	0.0923	0.00778	0.00372	0.0086	0.0699	0.00054	0.00163	0.00575	<0.000020	<0.000050	<0.010	0.0000058	21.2
2700GPM-IN	VA26A1779-002	2026-01-26	M	0.107	5.21	0.000051	3.19	<0.000010	21.7	0.0657	0.000017	<0.00010	0.00184	0.00457	0.00067	<0.0030	0.0222	0.00054	0.00172	0.00306	<0.000020	<0.000050	<0.010	<0.0000050	19.5
SP-W-IN	VA25C7022-001	2025-10-10	M	<0.050	6.53	0.000145	4.87	<0.000010	153	0.23	0.000021	<0.00010	0.0154	0.0162	0.00262	0.0103	0.0742	0.00179	0.00115	0.0167	<0.000020	<0.000050	0.067	<0.0000150	44
SP-W-IN	VA25C7369-001	2025-10-15	M	<0.050	6.21	0.000302	5.12	<0.000010	161	0.187	0.000014	0.00011	0.0156	0.0135	0.00228	0.0054	0.0353	0.00142	0.00103	0.0142	<0.000020	<0.000050	0.052	0.0000202	35.4
SP-W-IN	VA25C7848-001	2025-10-20	M	0.092	5.1	0.000197	9.5	0.00001	163	0.141	0.000017	0.00019	0.14	0.0069	0.00609	0.02	0.0186	0.00106	0.00064	0.0153	<0.000020	<0.000050	0.033	<0.0000450	22.6
SP-W-IN	VA25C8641-001	2025-10-27	M	0.085	4.27	0.000156	9.65	0.000011	117	0.165	0.000022	0.00013	0.133	0.0141	0.00663	0.0164	0.0497	0.00106	0.00132	0.0172	<0.000020	<0.000050	0.043	<0.0000200	33.7
SP-W-IN	VA25C9625-001	2025-11-05	M	0.375	5.2	0.00015	42.5	0.000056	71.8	0.171	0.000087	0.00063	0.991	0.0103	0.0354	0.1	0.0445	0.00079	0.00106	0.0142	<0.000020	<0.000050	0.041	<0.0000100	26
SP-W-IN	VA25D0087-001	2025-11-10	M	0.293	3.85	0.000133	26.3	0.000029	52.9	0.13	0.000048	0.00032	0.561	0.0113	0.0232	0.0656	0.09	0.00087	0.00124	0.0119	<0.000020	<0.000050	0.046	<0.0000100	25.2
SP-W-IN	VA25D0614-001	2025-11-16	M	0.122	7.18	0.000105	6.68	<0.000010	60.3	0.109	0.000031	<0.00010	0.0887	0.0103	0.0049	0.0114	0.0378	0.00084	0.00135	0.0115	<0.000020	<0.000050	0.036	<0.0000100	24.3
SP-W-IN	VA25D1572-001	2025-11-25	M	0.081	3.81	0.000104	8.94	<0.000010	47.7	0.136	0.000018	<0.00010	0.107	0.00676	0.00513	0.0135	0.0291	0.00083	0.00122	0.00983	<0.000020	<0.000050	0.024	<0.0000100	29.1
SP-W-IN	VA25D2656-001	2025-12-05	M	0.3	5.03	0.000093	27.3	0.000025	44.2	0.153	0.000059	0.00038	0.619	0.00853	0.0204	0.0578	0.0257	0.00079	0.00154	0.00747	<0.000020	<0.000050	0.013	<0.0000100	29.4
SP-W-IN	VA25D2839-001	2025-12-08	M	0.24	4.17	0.000193	26.4	0.000026	65.1	0.15	0.000044	0.00038	0.556	0.00845	0.0213	0.0702	0.0766	0.00075	0.00111	0.0131	<0.000020	<0.000050	0.028	<0.0000100	26.9
SP-W-IN	VA25D3427-001	2025-12-15	M	0.245	2.59	0.000084	20.4	0.000028	13.4	0.123	0.00005	0.00028	0.416	0.00487	0.0166	0.0492	0.0665	0.00058	0.00087	0.00837	<0.000020	<0.000050	0.018	0.0000069	23.6
SP-W-IN	VA25D4184-001	2025-12-26	M	0.063	1.75	<0.000050	5.89	<0.000010	18.4	0.0695	0.000013	<0.00010	0.0642	0.00436	0.0041	0.0129	0.0596	0.00059	0.00108	0.00567	<0.000020	<0.000050	0.014	<0.0000100	18.7
SP-W-IN	VA25D4204-001	2025-12-28	M	<0.050	1.79	0.000072	3.78	<0.000010	62.5	0.0681	<0.000010	<0.00010	0.0185	0.0049	0.00172	0.0042	0.089	0.00052	0.00086	0.00655	<0.000020	<0.000050	0.017	0.0000082	15.7
SP-W-IN	VA26A0077-001	2026-01-04	M	0.179	2.61	0.000075	16.4	0.000025	40	0.0951	0.000042	0.00025	0.331	0.00571	0.0143	0.0392	0.031	0.00052	0.00089	0.00795	<0.000020	<0.000050	0.014	<0.0000100	17.1
SP-W-IN	VA26A0564-001	2026-01-11	M	0.265	2.96	0.000078	27.9	0.000023	39.3	0.149	0.00004	0.00032	0.591	0.00419	0.0231	0.0589	0.0422	0.00046	0.0007	0.0138	<0.000020	<0.000050	0.022	0.0000107	23.8
SP-W-IN	VA26A1149-001	2026-01-18	M	0.183	6.51	0.000069	4.46	<0.000010	22.7	0.0699	0.000022	<0.00010	0.0203	0.00687	0.00161	0.003	0.0276	0.00057	0.00187	0.0061	<0.000020	<0.000050	0.012	<0.0000050	19.7
SP-W-IN	VA26A1779-001	2026-01-26	M	0.228	4.8	0.000267	10.8	<0.000010	112	0.134	0.000038	0.00015	0.141	0.00804	0.00643	0.0288	0.0178	0.00063	0.00145	0.00817	<0.000020	<0.000050	<0.010	<0.0000250	21.4

Sample class definitions: M=monitoring sample.
"<" indicates the result is below the specified reporting limit.
Blank cells indicate a result is not reported for that parameter.

Appendix 4.3-2: Construction Non-Contaminated Contact Water Quality

Station ID	Laboratory ID	Sample Date	Sample Class	D-Cr	D-Cr[VI]	D-Co	D-Cu	D-Fe	D-Pb	D-Li	D-Mg	D-Mn	D-Hg	D-Mo	D-Ni	D-P	D-K	D-Se	D-Si	D-Ag	D-Na	D-Sr	D-Tl	D-Sn	D-Ti
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
2700GPM-IN	VA25C7022-002	2025-10-10	M	0.00064	0.00068	<0.00010	0.00133	<0.010	<0.000050	0.0018	3.1	0.0148	0.00000126	0.0326	<0.00050	<0.050	4.79	0.000166	3.56	<0.000010	86.4	0.183	0.000014	<0.00010	<0.00030
2700GPM-IN	VA25C7369-002	2025-10-15	M	0.00114	0.00087	0.0001	0.00148	0.04	0.000081	0.0031	3.39	0.0182	0.00000093	0.0484	<0.00050	<0.050	5.78	0.000251	3.63	<0.000010	156	0.177	0.000012	0.00013	0.0015
2700GPM-IN	VA25C7848-002	2025-10-20	M	0.00064	0.00066	<0.00010	0.00126	0.028	<0.000050	0.0017	2.09	0.0195	<0.00000050	0.0336	<0.00050	<0.050	3.76	0.000151	2.91	<0.000010	92.5	0.126	<0.000010	<0.00010	<0.00030
2700GPM-IN	VA25C8641-002	2025-10-27	M	0.00053	0.0006	<0.00010	0.00139	<0.010	<0.000050	0.0011	2	0.015	0.00000103	0.0202	<0.00050	<0.050	3.05	0.000126	3.39	<0.000010	90.6	0.147	<0.000010	<0.00010	<0.00030
2700GPM-IN	VA25C9625-002	2025-11-05	M	<0.00050	<0.00050	<0.00010	0.00116	<0.010	<0.000050	0.0015	2.12	0.0217	0.00000089	0.0149	<0.00050	0.076	6.79	0.000088	3.12	<0.000010	72.6	0.102	0.000011	<0.00010	0.00035
2700GPM-IN	VA25D0087-002	2025-11-10	M	<0.00050	0.00052	<0.00010	0.00164	0.012	<0.000050	0.0018	1.28	0.0232	0.00000098	0.0181	<0.00050	<0.050	2.49	0.0001	3.07	<0.000010	49.8	0.0898	<0.000010	<0.00010	0.00064
2700GPM-IN	VA25D0614-002	2025-11-16	M	<0.00050	<0.00050	<0.00010	0.00131	0.013	<0.000050	0.0018	1.96	0.017	0.000001	0.0189	<0.00050	0.156	10.5	0.000127	3.32	<0.000010	63.2	0.117	0.000013	<0.00010	0.00046
2700GPM-IN	VA25D1572-002	2025-11-25	M	<0.00050	<0.00050	<0.00010	0.00074	<0.010	<0.000050	0.0011	1.73	0.00827	<0.00000050	0.0156	<0.00050	<0.050	3.6	0.000116	3.15	<0.000010	43.5	0.117	0.00001	<0.00010	<0.00030
2700GPM-IN	VA25D2656-002	2025-12-05	M	<0.00050	<0.00050	<0.00010	0.00079	<0.010	<0.000050	0.0012	1.58	0.0176	0.00000061	0.0204	<0.00050	<0.050	3.45	0.000098	3.61	<0.000010	48.7	0.103	0.00001	<0.00010	<0.00030
2700GPM-IN	VA25D2839-002	2025-12-08	M	<0.00050	<0.00050	<0.00010	0.00112	<0.010	<0.000050	0.0015	1.32	0.0265	0.00000101	0.026	<0.00050	<0.050	3.2	0.000132	2.98	<0.000010	69	0.111	<0.000010	<0.00010	<0.00030
2700GPM-IN	VA25D3427-002	2025-12-15	M	<0.00050	<0.00050	<0.00010	0.00113	0.112	0.000193	<0.0010	0.898	0.0281	0.00000118	0.00735	<0.00050	<0.050	1.37	<0.000050	2.48	<0.000010	12.2	0.0734	<0.000010	<0.00010	0.00561
2700GPM-IN	VA25D4184-002	2025-12-26	M	<0.00050	<0.00050	<0.00010	0.00113	0.015	0.000052	<0.0010	0.719	0.0127	0.00000087	0.00803	<0.00050	<0.050	1.72	0.00009	2.43	<0.000010	27.6	0.0669	<0.000010	<0.00010	0.00051
2700GPM-IN	VA25D4204-002	2025-12-28	M	<0.00050	<0.00050	<0.00010	0.00122	<0.010	<0.000050	<0.0010	0.708	0.00917	0.00000077	0.00894	<0.00050	<0.050	1.83	0.000071	2.52	<0.000010	58.4	0.0697	<0.000010	<0.00010	<0.00030
2700GPM-IN	VA26A0077-002	2026-01-04	M	<0.00050	<0.00050	<0.00010	0.00147	<0.010	<0.000050	<0.0010	0.696	0.0177	0.00000139	0.00878	<0.00050	<0.050	1.56	0.000075	1.94	<0.000010	41.7	0.0622	<0.000010	<0.00010	<0.00030
2700GPM-IN	VA26A0564-002	2026-01-11	M	<0.00050	<0.00050	<0.00010	0.00117	0.061	0.000069	<0.0010	0.963	0.0459	0.00000086	0.00928	<0.00050	<0.050	2.25	0.000062	2.48	<0.000010	31.7	0.0834	<0.000010	<0.00010	0.00329
2700GPM-IN	VA26A1149-002	2026-01-18	M	<0.00050	<0.00050	<0.00010	0.00073	0.018	<0.000050	0.0011	1.28	0.0151	<0.00000050	0.0102	<0.00050	0.098	5.77	0.000068	2.9	<0.000010	20.4	0.0715	0.000014	<0.00010	0.00087
2700GPM-IN	VA26A1779-002	2026-01-26	M	<0.00050	<0.00050	<0.00010	0.00065	<0.010	0.000053	<0.0010	1.35	0.019	<0.00000050	0.00738	<0.00050	0.103	4.9	0.000054	2.93	<0.000010	21.9	0.0663	0.000018	<0.00010	<0.00030
SP-W-IN	VA25C7022-001	2025-10-10	M	0.00076	0.00068	0.00016	0.00092	0.016	0.000053	0.0031	4.96	0.0419	0.00000082	0.0431	0.00058	<0.050	6.4	0.00018	3.87	<0.000010	152	0.217	0.000013	<0.00010	<0.00030
SP-W-IN	VA25C7369-001	2025-10-15	M	0.00132	0.00118	<0.00010	0.00121	<0.010	<0.000050	0.0033	3.53	0.0212	0.00000066	0.0505	<0.00050	<0.050	6.21	0.000234	4	<0.000010	158	0.176	0.000011	0.00012	<0.00030
SP-W-IN	VA25C7848-001	2025-10-20	M	0.00084	0.00088	0.0001	0.00117	<0.010	0.000062	0.0025	2.37	0.0361	0.00000052	0.0402	<0.00050	<0.050	4.83	0.000226	3.15	<0.000010	166	0.129	<0.000010	<0.00010	<0.00030
SP-W-IN	VA25C8641-001	2025-10-27	M	0.00063	0.00068	<0.00010	0.00156	<0.010	<0.000050	0.0013	2.2	0.0142	0.00000096	0.026	<0.00050	<0.050	3.5	0.000118	3.67	<0.000010	113	0.172	<0.000010	<0.00010	<0.00030
SP-W-IN	VA25C9625-001	2025-11-05	M	<0.00050	<0.00050	<0.00010	0.00112	<0.010	<0.000050	0.0017	2.25	0.03	0.00000113	0.0146	<0.00050	<0.050	3.18	0.000106	2.7	<0.000010	72.4	0.105	<0.000010	0.00024	<0.00030
SP-W-IN	VA25D0087-001	2025-11-10	M	0.00057	0.00064	<0.00010	0.00134	0.024	<0.000050	0.0018	1.2	0.0281	0.00000108	0.0185	<0.00050	<0.050	2.23	0.000079	3.02	<0.000010	48.7	0.085	<0.000010	<0.00010	0.00136
SP-W-IN	VA25D0614-001	2025-11-16	M	<0.00050	<0.00050	<0.00010	0.0011	<0.010	<0.000050	0.0017	1.97	0.0135	0.00000102	0.0165	<0.00050	0.077	7.11	0.000097	3.22	<0.000010	61.2	0.109	0.000015	<0.00010	<0.00030
SP-W-IN	VA25D1572-001	2025-11-25	M	<0.00050	<0.00050	<0.00010	0.0009	<0.010	<0.000050	0.0013	1.64	0.0114	0.00000075	0.0172	<0.00050	<0.050	3.57	0.000127	3.44	<0.000010	47.3	0.116	<0.000010	<0.00010	<0.00030
SP-W-IN	VA25D2656-001	2025-12-05	M	<0.00050	<0.00050	<0.00010	0.00076	<0.010	<0.000050	0.0012	1.64	0.0181	0.00000057	0.0167	<0.00050	<0.050	3.68	0.000069	3.53	<0.000010	44.3	0.101	<0.000010	<0.00010	<0.00030
SP-W-IN	VA25D2839-001	2025-12-08	M	0.00059	0.00056	<0.00010	0.00111	0.019	<0.000050	0.0015	1.16	0.0285	0.00000118	0.0233	<0.00050	<0.050	2.69	0.000153	2.89	<0.000010	59.2	0.107	<0.000010	<0.00010	0.00091
SP-W-IN	VA25D3427-001	2025-12-15	M	<0.00050	<0.00050	<0.00010	0.00093	<0.010	<0.000050	<0.0010	0.938	0.0197	0.00000117	0.00825	<0.00050	<0.050	1.42	0.000054	1.93	<0.000010	12.2	0.0779	<0.000010	<0.00010	<0.00030
SP-W-IN	VA25D4184-001	2025-12-26	M	<0.00050	<0.00050	<0.00010	0.0009	<0.010	<0.000050	<0.0010	0.706	0.00767	0.00000081	0.00801	<0.00050	<0.050	1.47	0.000079	2.35	<0.000010	18.1	0.0633	<0.000010	<0.00010	0.0004
SP-W-IN	VA25D4204-001	2025-12-28	M	<0.00050	<0.00050	0.00022	0.00279	0.294	0.000052	<0.0010	0.742	0.0131	0.00000093	0.00918	<0.00050	<0.050	1.74	0.000058	2.89	<0.000010	60.8	0.0667	<0.000010	<0.00010	0.00354
SP-W-IN	VA26A0077-001	2026-01-04	M	<0.00050	<0.00050	<0.00010	0.00112	0.013	<0.000050	<0.0010	0.756	0.0198	0.00000123	0.00871	<0.00050	<0.050	1.52	0.00006	2.03	<0.000010	40.4	0.0677	<0.000010	<0.00010	0.00039
SP-W-IN	VA26A0564-001	2026-01-11	M	<0.00050	<0.00050	0.00011	0.00092	<0.010	<0.000050	<0.0010	1.01	0.0566	0.00000095	0.00986	<0.00050	<0.050	1.47	0.000075	2.24	<0.000010	37.2	0.0987	<0.000010	<0.00010	0.00054
SP-W-IN	VA26A1149-001	2026-01-18	M	<0.00050	<0.00050	<0.00010	0.00047	<0.010	<0.000050	0.0013	1.45	0.0217	<0.00000050	0.0107	<0.00050	0.137	6.2	0.000066	3.13	<0.000010	22	0.0696	0.000015	<0.00010	<0.00030
SP-W-IN	VA26A1779-001	2026-01-26	M	<0.00050	<0.00050	<0.00010	0.0006	<0.010	<0.000050	0.0013	1.33	0.0226	0.00000163	0.0298	<0.00050	0.067	4.39	0.000168	3.14	<0.000010	122	0.122	0.000021	<0.00010	<0.00030

Sample class definitions: M=monitoring sample.
"<" indicates the result is below the specified reporting limit.
Blank cells indicate a result is not reported for that parameter.

Appendix 4.3-2: Construction Non-Contaminated Contact Water Quality

Station ID	Laboratory ID	Sample Date	Sample Class	D-U	D-V	D-Zn	Benzene	Ethylbenzene	Methyl tert-butyl ether (MTBE)	Styrene	Toluene	Xylene, Total	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
2700GPM-IN	VA25C7022-002	2025-10-10	M	0.0117	0.00181	0.0035	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010
2700GPM-IN	VA25C7369-002	2025-10-15	M	0.013	0.00161	0.0048	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010
2700GPM-IN	VA25C7848-002	2025-10-20	M	0.00715	0.00132	0.0032	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	0.000016	0.0000157	0.00002	0.000011
2700GPM-IN	VA25C8641-002	2025-10-27	M	0.00948	0.00167	0.0012	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010
2700GPM-IN	VA25C9625-002	2025-11-05	M	0.00762	0.00138	0.001	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	0.000013	0.0000126	0.000015	0.00001
2700GPM-IN	VA25D0087-002	2025-11-10	M	0.00953	0.00156	0.002	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	0.0000113	0.000014	<0.000010
2700GPM-IN	VA25D0614-002	2025-11-16	M	0.0116	0.00187	0.0014	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010
2700GPM-IN	VA25D1572-002	2025-11-25	M	0.00562	0.00084	0.0013	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010
2700GPM-IN	VA25D2656-002	2025-12-05	M	0.00952	0.00083	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	0.000022	0.0000202	0.000022	0.000012
2700GPM-IN	VA25D2839-002	2025-12-08	M	0.00794	0.00116	0.0012	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	0.000028	0.0000287	0.000032	0.000017
2700GPM-IN	VA25D3427-002	2025-12-15	M	0.00331	0.00152	0.0016	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	0.000031	0.0000315	0.000036	0.000021
2700GPM-IN	VA25D4184-002	2025-12-26	M	0.00334	0.00094	0.0037	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010
2700GPM-IN	VA25D4204-002	2025-12-28	M	0.00417	0.00081	0.0026	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010
2700GPM-IN	VA26A0077-002	2026-01-04	M	0.00495	0.00128	0.0025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	0.000011	<0.000010	<0.000010	<0.000010	0.000019	0.0000188	0.000021	0.000014
2700GPM-IN	VA26A0564-002	2026-01-11	M	0.00367	0.00131	0.0034	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	0.000014	<0.000010	<0.000040	<0.000020	0.000036	0.0000406	0.000052	0.000029
2700GPM-IN	VA26A1149-002	2026-01-18	M	0.00701	0.00096	<0.0010														
2700GPM-IN	VA26A1779-002	2026-01-26	M	0.0047	0.00055	0.0016														
SP-W-IN	VA25C7022-001	2025-10-10	M	0.0159	0.00176	0.0044	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	0.000069	<0.000010	<0.000010	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010
SP-W-IN	VA25C7369-001	2025-10-15	M	0.0132	0.00148	0.0025														
SP-W-IN	VA25C7848-001	2025-10-20	M	0.0065	0.00113	0.0043														
SP-W-IN	VA25C8641-001	2025-10-27	M	0.0132	0.00203	0.0012														
SP-W-IN	VA25C9625-001	2025-11-05	M	0.00823	0.00142	<0.0010														
SP-W-IN	VA25D0087-001	2025-11-10	M	0.0103	0.00176	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	0.000011	<0.000010	<0.000010	<0.000010	<0.000020	0.0000208	0.000027	0.000017
SP-W-IN	VA25D0614-001	2025-11-16	M	0.0102	0.00163	<0.0010														
SP-W-IN	VA25D1572-001	2025-11-25	M	0.0066	0.0014	0.0011														
SP-W-IN	VA25D2656-001	2025-12-05	M	0.0075	0.00084	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	0.00001	<0.000010	<0.000010	0.000021	0.000069	0.0000657	0.000068	0.000037
SP-W-IN	VA25D2839-001	2025-12-08	M	0.00788	0.0014	0.0015														
SP-W-IN	VA25D3427-001	2025-12-15	M	0.00387	0.00143	<0.0010														
SP-W-IN	VA25D4184-001	2025-12-26	M	0.00396	0.00142	0.0012														
SP-W-IN	VA25D4204-001	2025-12-28	M	0.00464	0.00107	0.0019														
SP-W-IN	VA26A0077-001	2026-01-04	M	0.00464	0.00136	0.0022	<0.00050	<0.00050	<0.00050	<0.00050	<0.00040	<0.00050	0.000014	<0.000010	<0.000010	<0.000020	0.000029	0.0000275	0.000031	0.000021
SP-W-IN	VA26A0564-001	2026-01-11	M	0.00341	0.00124	0.0018														
SP-W-IN	VA26A1149-001	2026-01-18	M	0.00625	0.00083	<0.0010														
SP-W-IN	VA26A1779-001	2026-01-26	M	0.00743	0.00073	0.0013														

Sample class definitions: M=monitoring sample.
"<" indicates the result is below the specified reporting limit.
Blank cells indicate a result is not reported for that parameter.

Appendix 4.3-2: Construction Non-Contaminated Contact Water Quality

Station ID	Laboratory ID	Sample Date	Sample Class	Benzo(k)fluoranthene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	EPH (C10-C19)	EPH (C19-C32)	EPH (C10-C32)
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
2700GPM-IN	VA25C7022-002	2025-10-10	M	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25C7369-002	2025-10-15	M	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25C7848-002	2025-10-20	M	<0.000010	0.000015	<0.0000050	0.000029	<0.000010	0.000013	<0.000010	<0.000010	<0.000050	<0.000020	0.000032	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25C8641-002	2025-10-27	M	<0.000010	<0.000010	<0.0000050	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	0.000018	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25C9625-002	2025-11-05	M	<0.000010	0.000016	<0.0000050	0.000029	<0.000010	<0.000010	0.000013	0.000018	<0.000050	0.000021	0.000034	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25D0087-002	2025-11-10	M	<0.000010	<0.000020	<0.0000050	0.000031	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	0.000023	0.000035	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25D0614-002	2025-11-16	M	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	0.000011	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25D1572-002	2025-11-25	M	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25D2656-002	2025-12-05	M	<0.000010	0.000023	<0.0000050	0.000038	<0.000010	0.000012	<0.000010	<0.000010	<0.000050	0.000024	0.000038	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25D2839-002	2025-12-08	M	0.000013	0.000031	0.0000052	0.000052	<0.000010	0.000017	<0.000010	<0.000010	<0.000050	0.000036	0.000055	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25D3427-002	2025-12-15	M	0.000014	0.000032	0.0000055	0.000059	<0.000010	0.000023	<0.000010	0.000014	<0.000050	0.000037	0.000065	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25D4184-002	2025-12-26	M	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	0.000012	<0.000050	<0.000020	0.00001	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA25D4204-002	2025-12-28	M	<0.000010	<0.000010	<0.0000050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000050	<0.000020	<0.000010	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA26A0077-002	2026-01-04	M	<0.000010	0.000023	<0.0000050	0.000042	<0.000010	0.000014	<0.000010	0.000012	<0.000050	0.000038	0.000042	<0.000050	<0.25	<0.25	<0.25
2700GPM-IN	VA26A0564-002	2026-01-11	M	0.000022	0.000034	<0.0000100	0.000081	0.000014	0.000026	0.000013	0.000018	<0.000050	0.000072	0.000104	<0.000050	<0.25	0.72	0.72
2700GPM-IN	VA26A1149-002	2026-01-18	M															
2700GPM-IN	VA26A1779-002	2026-01-26	M															
SP-W-IN	VA25C7022-001	2025-10-10	M	<0.000010	<0.000010	<0.0000050	<0.000010	0.000027	<0.000010	0.000019	0.000016	0.000101	<0.000020	<0.000010	<0.000050	<0.25	<0.25	<0.25
SP-W-IN	VA25C7369-001	2025-10-15	M															
SP-W-IN	VA25C7848-001	2025-10-20	M															
SP-W-IN	VA25C8641-001	2025-10-27	M															
SP-W-IN	VA25C9625-001	2025-11-05	M															
SP-W-IN	VA25D0087-001	2025-11-10	M	<0.000015	<0.000030	<0.0000050	0.000054	<0.000010	0.000015	<0.000010	<0.000010	<0.000050	0.000037	0.000057	<0.000050	<0.25	<0.25	<0.25
SP-W-IN	VA25D0614-001	2025-11-16	M															
SP-W-IN	VA25D1572-001	2025-11-25	M															
SP-W-IN	VA25D2656-001	2025-12-05	M	0.000032	0.000062	0.0000102	0.000129	<0.000010	0.000037	<0.000010	<0.000010	<0.000050	0.00008	0.00013	<0.000050	<0.25	<0.25	<0.25
SP-W-IN	VA25D2839-001	2025-12-08	M															
SP-W-IN	VA25D3427-001	2025-12-15	M															
SP-W-IN	VA25D4184-001	2025-12-26	M															
SP-W-IN	VA25D4204-001	2025-12-28	M															
SP-W-IN	VA26A0077-001	2026-01-04	M	0.000013	0.000034	0.0000063	0.00006	0.000012	0.000021	<0.000010	0.000012	<0.000050	0.00005	0.000058	<0.000050	<0.25	<0.25	<0.25
SP-W-IN	VA26A0564-001	2026-01-11	M															
SP-W-IN	VA26A1149-001	2026-01-18	M															
SP-W-IN	VA26A1779-001	2026-01-26	M															

Sample class definitions: M=monitoring sample.
"<" indicates the result is below the specified reporting limit.
Blank cells indicate a result is not reported for that parameter.

APPENDIX 4.3-3: TSS LOADING RATES AND STATISTICAL SUMMARY

Appendix 4.3-3: TSS Loading Rates and Statistical Summary

				Total Suspended Solids (TSS)	T-Al	T-Sb	T-As	T-Ba	T-Be	T-Bi	T-B	T-Cd	T-Ca	T-Cr	T-Cr[VI]	T-Co	T-Cu	T-Fe	T-Pb
				mg/L	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS
Statistics																			
Sample Count				29	29	29	29	29	25	9	26	26	29	27	9	29	29	29	29
Minumum				10.1	0.033133333	0	4.40967E-06	0.000139444	2.37288E-07	7.66284E-09	0	2.30441E-07	0	7.19424E-07	0	0	0	0.011870504	2.26111E-05
Median				66.6	0.061852349	6.42857E-07	8.44156E-06	0.000462182	8.64979E-07	9.00901E-08	6.41234E-06	4.59077E-07	0.02885906	1.84643E-05	0	1.69463E-05	5.64356E-05	0.049459732	3.71946E-05
90th Percentile				276	0.093508767	1.67344E-06	1.58701E-05	0.000717183	1.13257E-06	1.51388E-07	9.77529E-05	7.47649E-07	0.059497197	3.40091E-05	5.02266E-07	2.66808E-05	9.2227E-05	0.07601511	6.60658E-05
Maximum				497	0.112968811	3.9604E-06	1.68874E-05	0.000740947	1.423E-06	1.56942E-07	0.00029703	8.98635E-07	0.247524752	4.85149E-05	7.79727E-07	3.20334E-05	0.000187646	0.087743733	8.67446E-05
Station ID	**Laboratory ID**	**Sample Date**	**Sample Class**																
SP-W-IN	VA25C7369-001	2025-10-15	M	10.1	0.058188119	3.9604E-06	1.58416E-05	0.000514851	-	-	0.00029703	-	0.247524752	4.85149E-05	0	1.08911E-05	5.64356E-05	0.04019802	3.50495E-05
2700GPM-IN	VA25C7848-002	2025-10-20	M	51.3	0.112968811	7.79727E-07	1.59844E-05	0.0007154	1.423E-06	-	3.89864E-05	8.98635E-07	0.052631579	3.50877E-05	7.79727E-07	2.94347E-05	9.35673E-05	0.083274854	8.67446E-05
SP-W-IN	VA25C7848-001	2025-10-20	M	35.9	0.111738162	5.57103E-07	1.42061E-05	0.000740947	1.14206E-06	-	8.35655E-05	-	0.069637883	4.01114E-05	0	3.20334E-05	6.7688E-05	0.087743733	3.69916E-05
SP-W-IN	VA25C8641-001	2025-10-27	M	47.4	0.078065401	0	1.11814E-05	0.000624473	8.64979E-07	-	0.000126582	5.21097E-07	0.056962025	2.59494E-05	0	2.02532E-05	6.79325E-05	0.061603376	4.95781E-05
2700GPM-IN	VA25C8641-002	2025-10-27	M	53.6	0.087701493	9.32836E-07	1.28731E-05	0.000733209	1.10075E-06	-	0.00011194	5.27985E-07	0.039179104	2.53731E-05	0	2.03358E-05	8.63806E-05	0.06380597	5.8209E-05
SP-W-IN	VA25C9625-001	2025-11-05	M	497	0.055443662	1.00604E-07	6.61972E-06	0.000371831	7.666E-07	1.56942E-07	1.00604E-05	3.84306E-07	0.024144869	1.52314E-05	-	1.50302E-05	3.81891E-05	0.043239437	2.36419E-05
2700GPM-IN	VA25C9625-002	2025-11-05	M	188	0.063045213	4.78723E-07	8.08511E-06	0.000398936	7.97872E-07	7.97872E-08	1.06383E-05	4.38298E-07	0.023404255	1.81915E-05	-	1.71277E-05	4.67021E-05	0.050212766	3.09043E-05
2700GPM-IN	VA25D0087-002	2025-11-10	M	176	0.062181818	2.84091E-07	8.35227E-06	0.0004875	9.09091E-07	-	5.68182E-06	4.74432E-07	0.030113636	1.73864E-05	-	1.81818E-05	6.79545E-05	0.050954545	3.26705E-05
SP-W-IN	VA25D0087-001	2025-11-10	M	275	0.063309091	2.90909E-07	7.45455E-06	0.000462182	1.01455E-06	-	1.45455E-05	4.29091E-07	0.029090909	1.70545E-05	7.27273E-08	1.76727E-05	4.34909E-05	0.050094545	2.95636E-05
2700GPM-IN	VA25D0614-002	2025-11-16	M	37.8	0.050695767	3.1746E-06	9.78836E-06	0.000441799	4.49735E-07	-	0	5.05291E-07	0.021164021	2.14286E-05	-	1.48148E-05	7.93651E-05	0.042777778	4.39153E-05
SP-W-IN	VA25D0614-001	2025-11-16	M	46.2	0.048532468	8.65801E-07	8.44156E-06	0.000439394	4.7619E-07	-	0	4.43723E-07	0	1.81818E-05	4.329E-07	1.2987E-05	6.38528E-05	0.041341991	4.09091E-05
2700GPM-IN	VA25D1572-002	2025-11-25	M	15.3	0.03603268	1.96078E-06	7.18954E-06	0.000268627	-	-	6.53595E-05	-	0.117647059	-	-	3.26797E-06	5.94771E-05	0.016797386	2.92157E-05
SP-W-IN	VA25D1572-001	2025-11-25	M	62.1	0.051544283	6.44122E-07	7.08535E-06	0.000365056	5.31401E-07	-	0	3.46216E-07	0.019323671	1.36876E-05	-	1.27214E-05	4.12238E-05	0.039935588	2.81804E-05
SP-W-IN	VA25D2656-001	2025-12-05	M	261	0.059288506	3.06513E-07	5.51724E-06	0.000427318	8.35249E-07	7.66284E-09	3.83142E-06	2.93487E-07	0.032950192	1.75479E-05	-	1.62835E-05	3.41379E-05	0.049386973	2.73563E-05
2700GPM-IN	VA25D2656-002	2025-12-05	M	70.3	0.054295875	4.26743E-07	4.40967E-06	0.000386486	6.11664E-07	-	1.42248E-05	2.30441E-07	0.044096728	1.63585E-05	-	1.42248E-05	3.45661E-05	0.044665718	2.80228E-05
SP-W-IN	VA25D2839-001	2025-12-08	M	220	0.066015455	3.63636E-07	7.77273E-06	0.000513182	9.86364E-07	-	0	3.60909E-07	0.03	2.17727E-05	0	2.02273E-05	0.0000495	0.057640909	3.05455E-05
2700GPM-IN	VA25D2839-002	2025-12-08	M	139	0.073879856	6.47482E-07	8.63309E-06	0.000577698	1.00719E-06	-	0	4.85612E-07	0.028776978	2.54676E-05	2.8777E-07	2.18705E-05	5.46043E-05	0.064532374	3.79137E-05
2700GPM-IN	VA25D3427-002	2025-12-15	M	280	0.05965	6.42857E-07	8.14286E-06	0.000434679	8.57143E-07	0.00000015	7.14286E-06	6.08929E-07	0.025	1.84643E-05	-	0.0000165	0.00005525	0.044957143	3.82393E-05
SP-W-IN	VA25D3427-001	2025-12-15	M	221	0.052187783	8.1448E-07	8.23529E-06	0.000406923	7.14932E-07	1.17647E-07	9.04977E-06	5.11765E-07	0.024886878	1.88235E-05	-	1.55204E-05	5.0543E-05	0.042579186	3.71946E-05
2700GPM-IN	VA25D4184-002	2025-12-26	M	29.5	0.054545763	6.77966E-07	7.79661E-06	0.000360678	2.37288E-07	-	0	3.49153E-07	0	1.62712E-05	-	1.32203E-05	0.000144068	0.043220339	6.4339E-05
SP-W-IN	VA25D4184-001	2025-12-26	M	45.1	0.051450111	8.86918E-07	8.42572E-06	0.000379823	4.43459E-07	-	0	5.12195E-07	0.00886918	1.26386E-05	-	1.17517E-05	5.05543E-05	0.036363636	5.60976E-05
SP-W-IN	VA25D4204-001	2025-12-28	M	13.9	0.044604317	0	1.29496E-05	0.000298561	-	-	0	2.51799E-07	0.043165468	7.19424E-07	-	0	0	0.011870504	4.40288E-05
2700GPM-IN	VA26A0077-002	2026-01-04	M	76.9	0.098014304	1.43043E-06	1.63849E-05	0.000724317	1.11834E-06	6.50195E-08	0	7.10013E-07	0.026007802	3.329E-05	-	2.76983E-05	0.000187646	0.077893368	8.3225E-05
SP-W-IN	VA26A0077-001	2026-01-04	M	99.9	0.092382382	1.6016E-06	1.55155E-05	0.00068018	1.03103E-06	9.00901E-08	0	6.91692E-07	0.023023023	3.31331E-05	-	2.64264E-05	9.18919E-05	0.075545546	7.2973E-05
2700GPM-IN	VA26A0564-002	2026-01-11	M	298	0.061852349	4.02685E-07	7.38255E-06	0.00046745	8.72483E-07	1.07383E-07	1.00671E-05	3.85906E-07	0.02885906	1.75168E-05	-	1.69463E-05	5.54698E-05	0.049459732	2.57416E-05
SP-W-IN	VA26A0564-001	2026-01-11	M	194	0.08998866	2.57732E-07	9.63918E-06	0.000686598	1.37629E-06	4.12371E-08	0	4.28351E-07	0.039175258	2.59794E-05	-	0.000025	6.2268E-05	0.069020619	2.59278E-05
SP-W-IN	VA26A1149-001	2026-01-18	M	18	0.033133333	5.55556E-07	8.88889E-06	0.000139444	-	-	-	4.22222E-07	0.005555556	-	-	0.000005	3.22222E-05	0.024944444	2.26111E-05
2700GPM-IN	VA26A1149-002	2026-01-18	M	30.2	0.076493377	1.3245E-06	1.68874E-05	0.000614238	5.96026E-07	-	-	8.80795E-07	0.01986755	5.29801E-06	-	1.82119E-05	6.88742E-05	0.055364238	5.72848E-05
SP-W-IN	VA26A1779-001	2026-01-26	M	66.6	0.067600601	1.5015E-07	1.30631E-05	0.000492943	9.60961E-07	-	-	7.85285E-07	0.039039039	3.31832E-05	-	2.05706E-05	8.6036E-05	0.059159159	5.93093E-05

Sample class definitions: M=monitoring sample.
"-" indicates a total (T) metal parameter was not detectable or an organic parameter was not reported, therefore a loading rate was not calculated.
Values are set equal to zero for a total (T) metal parameter if it is less than the corresponding dissolved metal value.
Values are set equal to zero for an organic parameter if it is not-detectable.

Appendix 4.3-3: TSS Loading Rates and Statistical Summary

				T-Li	T-Mg	T-Mn	T-Hg	T-Mo	T-Ni	T-P	T-K	T-Se	T-Si	T-Ag	T-Na	T-Sr	T-Tl	T-Sn	T-Ti	T-U
				mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS
Statistics																				
Sample Count				28	29	29	29	29	25	26	29	28	29	18	29	29	28	22	29	29
Minumum				4.43459E-06	0.009150327	0.000616667	4.22222E-08	0	1.77384E-06	0.000288248	0	0	0.064028777	0	0	0	6.65188E-08	0	0.000699346	2.1645E-06
Median				1.48606E-05	0.02256705	0.001894182	1.22373E-07	2.61569E-06	1.19048E-05	0.00094656	0.0056899	1.58408E-07	0.091072797	7.32764E-08	0.005429864	0.000186567	1.95532E-07	9.60866E-07	0.002112613	4.85075E-06
90th Percentile				2.51511E-05	0.032214641	0.002690531	2.0968E-07	9.16491E-06	1.8373E-05	0.001714233	0.012012063	8.6334E-07	0.155310839	1.57737E-07	0.096418104	0.00029833	3.2812E-07	1.90568E-06	0.003351559	2.02892E-05
Maximum				3.9604E-05	0.043732591	0.003590529	3.25536E-07	0.000247525	4.25743E-05	0.002555556	0.017222222	6.73267E-06	0.176880223	2.3407E-07	0.297029703	0.001089109	3.88889E-07	2.53411E-06	0.003891365	3.44444E-05
Station ID	**Laboratory ID**	**Sample Date**	**Sample Class**																	
SP-W-IN	VA25C7369-001	2025-10-15	M	3.9604E-05	0.028712871	0.00149505	1.45545E-07	0.000247525	4.25743E-05	-	0	6.73267E-06	0.110891089	-	0.297029703	0.001089109	2.9703E-07	0	0.001514851	2.9703E-05
2700GPM-IN	VA25C7848-002	2025-10-20	M	2.53411E-05	0.039181287	0.003070175	3.25536E-07	0	1.69591E-05	0.000935673	0.009551657	0	0.159649123	1.75439E-07	0	0.000292398	3.50877E-07	2.53411E-06	0.003697856	4.48343E-06
SP-W-IN	VA25C7848-001	2025-10-20	M	2.50696E-05	0.043732591	0.003590529	1.25348E-07	2.22841E-05	1.8663E-05	0.001169916	0.007520891	0	0.176880223	0	0	0.000334262	1.94986E-07	2.50696E-06	0.003891365	1.11421E-05
SP-W-IN	VA25C8641-001	2025-10-27	M	2.32068E-05	0.028270042	0.002042194	1.35232E-07	0	1.28692E-05	0.000738397	0.016244726	8.01688E-07	0.126160338	2.1097E-08	0.084388186	0	2.53165E-07	6.32911E-07	0.002799578	1.89873E-05
2700GPM-IN	VA25C8641-002	2025-10-27	M	2.42537E-05	0.025186567	0.002052239	1.5056E-07	0	1.23134E-05	0.000764925	0.013246269	6.90299E-07	0.169962687	5.59701E-08	0	0.000186567	2.98507E-07	1.30597E-06	0.002998134	4.85075E-06
SP-W-IN	VA25C9625-001	2025-11-05	M	1.26761E-05	0.020422535	0.001661972	6.11066E-08	2.61569E-06	9.07445E-06	0.000653924	0.004064386	8.85312E-08	0.080080483	9.25553E-08	0	0.000132797	1.5493E-07	7.84708E-07	0.00199336	4.16499E-06
2700GPM-IN	VA25C9625-002	2025-11-05	M	1.70213E-05	0.023457447	0.001783511	8.72872E-08	4.78723E-06	1.07447E-05	0.000957447	0.004414894	2.92553E-07	0.092978723	8.51064E-08	0	0.000143617	1.96809E-07	9.57447E-07	0.002434309	4.52128E-06
2700GPM-IN	VA25D0087-002	2025-11-10	M	1.47727E-05	0.024488636	0.001913636	9.32955E-08	5.68182E-07	1.04545E-05	0.000994318	0.006136364	3.06818E-07	0.089375	7.95455E-08	0.019886364	0.000177273	1.59091E-07	9.09091E-07	0.002127045	0.000004375
SP-W-IN	VA25D0087-001	2025-11-10	M	1.41818E-05	0.024472727	0.001894182	8.77091E-08	2.18182E-06	1.01455E-05	0.000883636	0.005890909	1.96364E-07	0.084654545	6.90909E-08	0.015272727	0.000163636	1.38182E-07	0.0000008	0.002035055	3.63636E-06
2700GPM-IN	VA25D0614-002	2025-11-16	M	1.32275E-05	0.014285714	0.001378307	2.04762E-07	0	1.19048E-05	0.001507937	0	0	0.081481481	-	0.08994709	0.000238095	2.91005E-07	2.6455E-07	0.001919048	7.93651E-06
SP-W-IN	VA25D0614-001	2025-11-16	M	1.51515E-05	0.012770563	0.001261905	1.83117E-07	0	8.22511E-06	0.000974026	0.001515152	1.7316E-07	0.074891775	-	0	0	3.4632E-07	-	0.00191342	2.1645E-06
2700GPM-IN	VA25D1572-002	2025-11-25	M	6.53595E-06	0.009150327	0.000799346	8.95425E-08	0	-	-	0.000653595	5.88235E-07	0.075816993	-	0.130718954	0	1.96078E-07	-	0.000699346	1.04575E-05
SP-W-IN	VA25D1572-001	2025-11-25	M	1.28824E-05	0.020933977	0.001523349	8.438E-08	0	2.57649E-06	0.000499195	0.003864734	0	0.088566828	-	0.006441224	0.000322061	1.28824E-07	-	0.001718196	2.57649E-06
SP-W-IN	VA25D2656-001	2025-12-05	M	1.37931E-05	0.02256705	0.00192682	1.00498E-07	4.5977E-06	8.69732E-06	0.000957854	0.005172414	9.1954E-08	0.091072797	5.74713E-08	0	0.000199234	1.87739E-07	1.0728E-06	0.002370498	3.94636E-06
2700GPM-IN	VA25D2656-002	2025-12-05	M	1.42248E-05	0.021621622	0.00171266	9.53058E-08	2.84495E-06	5.26316E-06	0.000654339	0.0056899	8.53485E-08	0.089473684	-	0	0.000170697	1.99147E-07	0	0.002015647	5.26316E-06
SP-W-IN	VA25D2839-001	2025-12-08	M	1.40909E-05	0.029727273	0.002111364	1.01909E-07	9.09091E-07	0.0000125	0.000863636	0.006727273	1.81818E-07	0.106863636	7.27273E-08	0.026818182	0.000195455	1.54545E-07	1.27273E-06	0.002523136	2.59091E-06
2700GPM-IN	VA25D2839-002	2025-12-08	M	1.65468E-05	0.031582734	0.00231295	1.32302E-07	7.19424E-06	1.28777E-05	0.001043165	0.007625899	1.22302E-07	0.123165468	5.03597E-08	0.036690647	0.000258993	1.94245E-07	1.36691E-06	0.00287554	4.60432E-06
2700GPM-IN	VA25D3427-002	2025-12-15	M	1.32143E-05	0.019507143	0.001706786	1.015E-07	3.64286E-06	1.21429E-05	0.000921429	0.005285714	2.10714E-07	0.091857143	0.000000125	0.005357143	0.000195	1.78571E-07	9.64286E-07	0.001958536	4.17857E-06
SP-W-IN	VA25D3427-001	2025-12-15	M	1.35747E-05	0.017701357	0.00148552	9.96833E-08	5.24887E-06	1.14027E-05	0.000882353	0.005294118	1.35747E-07	0.083574661	8.1448E-08	0.005429864	0.000204072	1.80995E-07	8.1448E-07	0.001880995	4.52489E-06
2700GPM-IN	VA25D4184-002	2025-12-26	M	-	0.015966102	0.001484746	1.22373E-07	4.0678E-06	4.0678E-06	0.000372881	0.003389831	0	0.078644068	-	0	8.47458E-05	6.77966E-08	-	0.001677627	8.13559E-06
SP-W-IN	VA25D4184-001	2025-12-26	M	4.43459E-06	0.013614191	0.001319956	1.78492E-07	0	1.77384E-06	0.000288248	0.006208426	-	0.078492239	-	0.006651885	0.000137472	6.65188E-08	-	0.001414634	8.86918E-06
SP-W-IN	VA25D4204-001	2025-12-28	M	1.43885E-05	0.01	0.000805755	3.02878E-07	7.91367E-06	-	-	0.003597122	1.00719E-06	0.064028777	-	0.122302158	0.000100719	-	-	0.001076259	1.8705E-05
2700GPM-IN	VA26A0077-002	2026-01-04	M	2.3407E-05	0.030221066	0.002630689	2.08192E-07	8.97269E-06	2.54876E-05	0.001040312	0.011703511	1.04031E-07	0.154226268	2.3407E-07	0.00130039	0.000288687	3.12094E-07	1.95059E-06	0.003520156	1.04031E-05
SP-W-IN	VA26A0077-001	2026-01-04	M	2.5025E-05	0.02996997	0.002444444	2.08909E-07	8.80881E-06	1.78178E-05	0.001291291	0.010910911	1.5015E-07	0.143843844	1.5015E-07	0	0.000274274	3.2032E-07	1.5015E-06	0.003309409	1.07107E-05
2700GPM-IN	VA26A0564-002	2026-01-11	M	1.27517E-05	0.02240604	0.001966779	5.71812E-08	3.08725E-06	1.1745E-05	0.00085906	0.005536913	9.39597E-08	0.090671141	7.38255E-08	0.003355705	0.00017651	1.47651E-07	1.00671E-06	0.002119832	3.15436E-06
SP-W-IN	VA26A0564-001	2026-01-11	M	1.49485E-05	0.034742268	0.002929897	7.75773E-08	2.26804E-06	1.79381E-05	0.001108247	0.007680412	1.54639E-08	0.132268041	6.70103E-08	0.010824742	0.000259278	1.54639E-07	1.13402E-06	0.003043608	4.02062E-06
SP-W-IN	VA26A1149-001	2026-01-18	M	1.66667E-05	0.011111111	0.000616667	4.22222E-08	0	-	0.002555556	0.017222222	1.66667E-07	0.073888889	-	0.038888889	1.66667E-05	3.88889E-07	-	0.001111111	3.44444E-05
2700GPM-IN	VA26A1149-002	2026-01-18	M	2.31788E-05	0.021854305	0.00207947	1.45033E-07	9.93377E-06	-	0.00192053	0.00397351	3.31126E-07	0.13013245	0	0.013245033	0.000241722	2.98013E-07	3.31126E-07	0.003027483	2.54967E-05
SP-W-IN	VA26A1779-001	2026-01-26	M	2.7027E-05	0.026276276	0.002273273	2.12763E-07	0	1.30631E-05	0.002417417	0.006156156	1.48649E-06	0.115015015	-	0	0.00018018	2.55255E-07	7.50751E-07	0.002112613	9.15916E-06

Sample class definitions: M=monitoring sample.
"-" indicates a total (T) metal parameter was not detectable or an organic parameter was not reported, therefore a loading rate was not calculated.
Values are set equal to zero for a total (T) metal parameter if it is less than the corresponding dissolved metal value.
Values are set equal to zero for an organic parameter if it is not-detectable.

Appendix 4.3-3: TSS Loading Rates and Statistical Summary

				T-V	T-Zn	Benzene	Ethylbenzene	Methyl tert-butyl ether (MTBE)	Styrene	Toluene	Xylene, Total	Acenaphthene	Acenaphthylene	Acridine	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene
				mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS
Statistics																			
Sample Count				29	29	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Minumum				3.66013E-05	0.000111111	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median				7.79636E-05	0.000251656	0	0	0	0	0	0	0	0	0	0	1.10714E-07	1.125E-07	1.28571E-07	0.000000075
90th Percentile				0.000130464	0.000417796	0	0	0	0	0	0	1.02876E-07	0	0	0	3.03251E-07	2.82514E-07	3.11891E-07	1.98948E-07
Maximum				0.000138162	0.000525358	0	0	0	0	0	0	1.43043E-07	0	0	8.04598E-08	3.12945E-07	3.06043E-07	3.89864E-07	2.14425E-07
Station ID	**Laboratory ID**	**Sample Date**	**Sample Class**																
SP-W-IN	VA25C7369-001	2025-10-15	M	7.92079E-05	0.000287129	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25C7848-002	2025-10-20	M	0.000135283	0.000440546	0	0	0	0	0	0	0	0	0	0	3.11891E-07	3.06043E-07	3.89864E-07	2.14425E-07
SP-W-IN	VA25C7848-001	2025-10-20	M	0.000138162	0.000437326	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP-W-IN	VA25C8641-001	2025-10-27	M	9.70464E-05	0.000320675	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25C8641-002	2025-10-27	M	0.000103918	0.000350746	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SP-W-IN	VA25C9625-001	2025-11-05	M	6.83702E-05	0.000199195	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25C9625-002	2025-11-05	M	8.14894E-05	0.000238298	0	0	0	0	0	0	0	0	0	0	6.91489E-08	6.70213E-08	7.97872E-08	5.31915E-08
2700GPM-IN	VA25D0087-002	2025-11-10	M	8.03409E-05	0.000271591	0	0	0	0	0	0	0	0	0	0	0	6.42045E-08	7.95455E-08	0
SP-W-IN	VA25D0087-001	2025-11-10	M	7.79636E-05	0.000234909	0	0	0	0	0	0	0.00000004	0	0	0	0	7.56364E-08	9.81818E-08	6.18182E-08
2700GPM-IN	VA25D0614-002	2025-11-16	M	7.43386E-05	0.000230159	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SP-W-IN	VA25D0614-001	2025-11-16	M	7.07792E-05	0.000225108	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25D1572-002	2025-11-25	M	3.66013E-05	0.000117647	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SP-W-IN	VA25D1572-001	2025-11-25	M	6.00644E-05	0.000199678	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP-W-IN	VA25D2656-001	2025-12-05	M	7.49425E-05	0.000217625	0	0	0	0	0	0	3.83142E-08	0	0	8.04598E-08	2.64368E-07	2.51724E-07	2.60536E-07	1.41762E-07
2700GPM-IN	VA25D2656-002	2025-12-05	M	6.78521E-05	0.000204836	0	0	0	0	0	0	0	0	0	0	3.12945E-07	2.8734E-07	3.12945E-07	1.70697E-07
SP-W-IN	VA25D2839-001	2025-12-08	M	9.04545E-05	0.000312273	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25D2839-002	2025-12-08	M	0.000101007	0.000355396	0	0	0	0	0	0	0	0	0	0	2.01439E-07	2.06475E-07	2.30216E-07	1.22302E-07
2700GPM-IN	VA25D3427-002	2025-12-15	M	0.000071	0.000228571	0	0	0	0	0	0	0	0	0	0	1.10714E-07	1.125E-07	1.28571E-07	0.000000075
SP-W-IN	VA25D3427-001	2025-12-15	M	6.86425E-05	0.0002181	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25D4184-002	2025-12-26	M	6.84746E-05	0.000322034	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SP-W-IN	VA25D4184-001	2025-12-26	M	5.94235E-05	0.000259424	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP-W-IN	VA25D4204-001	2025-12-28	M	4.67626E-05	0.000165468	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA26A0077-002	2026-01-04	M	0.0001342	0.000525358	0	0	0	0	0	0	1.43043E-07	0	0	0	2.47074E-07	2.44473E-07	2.73082E-07	1.82055E-07
SP-W-IN	VA26A0077-001	2026-01-04	M	0.00012953	0.00037037	0	0	0	0	0	0	1.4014E-07	0	0	0	2.9029E-07	2.75275E-07	3.1031E-07	2.1021E-07
2700GPM-IN	VA26A0564-002	2026-01-11	M	7.74832E-05	0.000230537	0	0	0	0	0	0	4.69799E-08	0	0	0	1.20805E-07	1.36242E-07	1.74497E-07	9.73154E-08
SP-W-IN	VA26A0564-001	2026-01-11	M	0.00011268	0.00029433	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP-W-IN	VA26A1149-001	2026-01-18	M	4.33333E-05	0.000111111	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA26A1149-002	2026-01-18	M	9.13907E-05	0.000251656	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP-W-IN	VA26A1779-001	2026-01-26	M	8.55856E-05	0.000412913	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Appendix 4.3-3: TSS Loading Rates and Statistical Summary

				Benzo(k)fluoranthene	Chrysene	Dibenz(a-h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene	Naphthalene	Phenanthrene	Pyrene	Quinoline	EPH (C10-C19)	EPH (C19-C32)	EPH (C10-C32)
				mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS	mg/mg TSS
Statistics																		
Sample Count				15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Minumum				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Median				0	1.14094E-07	0	2.10714E-07	0	8.21429E-08	0	0	0	1.32143E-07	3.38983E-07	0	0	0	0
90th Percentile				1.10973E-07	3.15937E-07	3.84123E-08	5.57647E-07	2.81879E-08	1.98948E-07	2.61745E-08	1.41676E-07	0	4.33047E-07	5.66814E-07	0	0	0	0
Maximum				1.3013E-07	3.4034E-07	6.30631E-08	6.00601E-07	1.2012E-07	2.53411E-07	6.91489E-08	4.0678E-07	0	5.00501E-07	6.23782E-07	0	0	0.002416107	0.002416107
Station ID	**Laboratory ID**	**Sample Date**	**Sample Class**															
SP-W-IN	VA25C7369-001	2025-10-15	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25C7848-002	2025-10-20	M	0	2.92398E-07	0	5.65302E-07	0	2.53411E-07	0	0	0	0	6.23782E-07	0	0	0	0
SP-W-IN	VA25C7848-001	2025-10-20	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP-W-IN	VA25C8641-001	2025-10-27	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25C8641-002	2025-10-27	M	0	0	0	0	0	0	0	0	0	0	3.35821E-07	0	0	0	0
SP-W-IN	VA25C9625-001	2025-11-05	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25C9625-002	2025-11-05	M	0	8.51064E-08	0	1.54255E-07	0	0	6.91489E-08	9.57447E-08	0	1.11702E-07	1.80851E-07	0	0	0	0
2700GPM-IN	VA25D0087-002	2025-11-10	M	0	0	0	1.76136E-07	0	0	0	0	0	1.30682E-07	1.98864E-07	0	0	0	0
SP-W-IN	VA25D0087-001	2025-11-10	M	0	0	0	1.96364E-07	0	5.45455E-08	0	0	0	1.34545E-07	2.07273E-07	0	0	0	0
2700GPM-IN	VA25D0614-002	2025-11-16	M	0	0	0	0	0	0	0	0	0	0	2.91005E-07	0	0	0	0
SP-W-IN	VA25D0614-001	2025-11-16	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25D1572-002	2025-11-25	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SP-W-IN	VA25D1572-001	2025-11-25	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP-W-IN	VA25D2656-001	2025-12-05	M	1.22605E-07	2.37548E-07	3.90805E-08	4.94253E-07	0	1.41762E-07	0	0	0	3.06513E-07	4.98084E-07	0	0	0	0
2700GPM-IN	VA25D2656-002	2025-12-05	M	0	3.27169E-07	0	5.40541E-07	0	1.70697E-07	0	0	0	3.41394E-07	5.40541E-07	0	0	0	0
SP-W-IN	VA25D2839-001	2025-12-08	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25D2839-002	2025-12-08	M	9.35252E-08	2.23022E-07	3.74101E-08	3.74101E-07	0	1.22302E-07	0	0	0	2.58993E-07	3.95683E-07	0	0	0	0
2700GPM-IN	VA25D3427-002	2025-12-15	M	0.00000005	1.14286E-07	1.96429E-08	2.10714E-07	0	8.21429E-08	0	0.00000005	0	1.32143E-07	2.32143E-07	0	0	0	0
SP-W-IN	VA25D3427-001	2025-12-15	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA25D4184-002	2025-12-26	M	0	0	0	0	0	0	0	4.0678E-07	0	0	3.38983E-07	0	0	0	0
SP-W-IN	VA25D4184-001	2025-12-26	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP-W-IN	VA25D4204-001	2025-12-28	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA26A0077-002	2026-01-04	M	0	2.9909E-07	0	5.46164E-07	0	1.82055E-07	0	1.56047E-07	0	4.94148E-07	5.46164E-07	0	0	0	0
SP-W-IN	VA26A0077-001	2026-01-04	M	1.3013E-07	3.4034E-07	6.30631E-08	6.00601E-07	1.2012E-07	2.1021E-07	0	1.2012E-07	0	5.00501E-07	5.80581E-07	0	0	0	0
2700GPM-IN	VA26A0564-002	2026-01-11	M	7.38255E-08	1.14094E-07	0	2.71812E-07	4.69799E-08	8.72483E-08	4.36242E-08	6.04027E-08	0	2.41611E-07	3.48993E-07	0	0	0.002416107	0.002416107
SP-W-IN	VA26A0564-001	2026-01-11	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP-W-IN	VA26A1149-001	2026-01-18	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2700GPM-IN	VA26A1149-002	2026-01-18	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP-W-IN	VA26A1779-001	2026-01-26	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample class definitions: M=monitoring sample.
"-" indicates a total (T) metal parameter was not detectable or an organic parameter was not reported, therefore a loading rate was not calculated.
Values are set equal to zero for a total (T) metal parameter if it is less than the corresponding dissolved metal value.
Values are set equal to zero for an organic parameter if it is not-detectable.

APPENDIX 4.3-4: EFFLUENT MODEL WATER QUALITY SOURCE TERMS

Appendix 4.3-4: Effluent Model Water Quality Source Terms

Parameters	Units	Untreated Effluent (OWTS Influent)		OWTS Treated Effluent		Non-Contaminated Contact Water and Non-Contact Water	
		Expected Case	Extreme Case	Expected Case	Extreme Case	Expected Case	Extreme Case
General Parameters							
Alkalinity, Total	mg/L	5.1	2.5	5.1	2.5	5.1	2.5
Hardness	mg/L	6.3	20	6.3	20	6.3	20
Organic Carbon, Dissolved (DOC)	mg/L	4.0	6.0	4.0	6.0	4.0	6.0
Organic Carbon, Total (TOC)	mg/L	4.5	6.6	4.5	6.6	4.5	6.6
Oxygen, Dissolved	mg/L	12	10	12	10	12	10
pH	pH units	6.6	6.1	6.6	6.1	6.6	6.1
Temperature	°C	8.2	12	8.2	12	8.2	12
Total Suspended Solids (TSS)	mg/L	200	200	25	25	3.0	4.2
Total Dissolved Solids (TDS)	mg/L	24	16	24	16	24	16
Nutrients and Anions							
Ammonia, Total (as N)	mg/L	0.0062	0.050	0.0062	0.050	0.0062	0.050
Bromide	mg/L	0.050	0.10	0.050	0.10	0.050	0.10
Chloride	mg/L	0.51	0.96	0.51	0.96	0.51	0.96
Fluoride	mg/L	0.020	0.10	0.020	0.10	0.020	0.10
Nitrate (as N)	mg/L	0.077	0.22	0.077	0.22	0.077	0.22
Nitrite (as N)	mg/L	0.0010	0.010	0.0010	0.010	0.0010	0.010
Sulfate	mg/L	1.8	2.9	1.8	2.9	1.8	2.9
Total Metals							
Aluminum, Total (T-Al)	mg/L	13	19	1.7	2.6	0.33	0.61
Antimony, Total (T-Sb)	mg/L	0.00023	0.00053	0.00012	0.00024	0.00010	0.00021
Arsenic, Total (T-As)	mg/L	0.0018	0.0034	0.00031	0.00058	0.00013	0.00025
Barium, Total (T-Ba)	mg/L	0.096	0.15	0.015	0.024	0.0045	0.0095
Beryllium, Total (T-Be)	mg/L	0.00017	0.00023	0.000022	0.000028	0.0000026	0.0000048
Bismuth, Total (T-Bi)	mg/L	0.000018	0.000030	0.0000023	0.0000038	0.00000027	0.00000064
Boron, Total (T-B)	mg/L	0.0052	0.031	0.0041	0.014	0.0039	0.012
Cadmium, Total (T-Cd)	mg/L	0.000097	0.00016	0.000016	0.000027	0.0000064	0.000011
Calcium, Total (T-Ca)	mg/L	8	19	2.9	9	2.3	7.7
Chromium, Total (T-Cr)	mg/L	0.0039	0.0072	0.00067	0.0012	0.00026	0.00049
Chromium, Total Hexavalent [(T-Cr(VI)]	mg/L	0	0.00010	0	0.000013	0	0.0000021
Cobalt, Total (T-Co)	mg/L	0.0035	0.0054	0.00052	0.00077	0.00015	0.00021
Copper, Total (T-Cu)	mg/L	0.012	0.020	0.0021	0.0034	0.00085	0.0015
Iron, Total (T-Fe)	mg/L	9.9	15	1.3	1.9	0.16	0.35
Lead, Total (T-Pb)	mg/L	0.0075	0.013	0.00098	0.0018	0.00016	0.00038
Lithium, Total (T-Li)	mg/L	0.0031	0.0053	0.00047	0.00093	0.00014	0.00041
Magnesium, Total (T-Mg)	mg/L	4.7	6.8	0.73	1.1	0.23	0.48
Manganese, Total (T-Mn)	mg/L	0.38	0.54	0.048	0.069	0.0065	0.013
Mercury, Total (T-Hg)	mg/L	0.000027	0.000047	0.0000057	0.000010	0.0000030	0.0000056
Molybdenum, Total (T-Mo)	mg/L	0.0010	0.0030	0.00057	0.0014	0.00051	0.0012
Nickel, Total (T-Ni)	mg/L	0.0026	0.0039	0.00048	0.00069	0.00022	0.00030
Phosphorus, Total (T-P)	mg/L	0.19	0.34	0.024	0.043	0.0028	0.0072
Potassium, Total (T-K)	mg/L	1.3	2.8	0.34	0.67	0.22	0.42
Selenium, Total (T-Se)	mg/L	0.000082	0.00023	0.000054	0.000075	0.000050	0.000057
Silicon, Total (T-Si)	mg/L	20	34	4.2	6.3	2.2	3.1
Silver, Total (T-Ag)	mg/L	0.000015	0.000032	0.0000018	0.0000039	0.00000022	0.00000066
Sodium, Total (T-Na)	mg/L	1.8	21	0.88	3.6	0.77	1.6
Strontium, Total (T-Sr)	mg/L	0.046	0.09	0.014	0.037	0.0095	0.031
Thallium, Total (T-Tl)	mg/L	0.000039	0.000066	0.0000049	0.0000082	0.00000059	0.0000014
Tin, Total (T-Sn)	mg/L	0.00019	0.00038	0.000024	0.000048	0.0000029	0.0000080
Titanium, Total (T-Ti)	mg/L	0.42	0.67	0.053	0.085	0.0069	0.015
Uranium, Total (T-U)	mg/L	0.0010	0.0043	0.00020	0.00073	0.000091	0.00031
Vanadium, Total (T-V)	mg/L	0.016	0.027	0.0024	0.0038	0.00073	0.0011
Zinc, Total (T-Zn)	mg/L	0.051	0.088	0.0074	0.014	0.0019	0.0058
Dissolved Metals							
Aluminum, Dissolved (D-Al)	mg/L	0.14	0.22	0.14	0.22	0.14	0.22
Antimony, Dissolved (D-Sb)	mg/L	0.00010	0.00020	0.00010	0.00020	0.00010	0.00020
Arsenic, Dissolved (D-As)	mg/L	0.00010	0.00018	0.00010	0.00018	0.00010	0.00018
Barium, Dissolved (D-Ba)	mg/L	0.0032	0.0065	0.0032	0.0065	0.0032	0.0065
Beryllium, Dissolved (D-Be)	mg/L	0	0	0	0	0	0
Bismuth, Dissolved (D-Bi)	mg/L	0	0	0	0	0	0
Boron, Dissolved (D-B)	mg/L	0.0039	0.012	0.0039	0.012	0.0039	0.012
Cadmium, Dissolved (D-Cd)	mg/L	0.0000050	0.0000083	0.0000050	0.0000083	0.0000050	0.0000083
Calcium, Dissolved (D-Ca)	mg/L	2.2	7.5	2.2	7.5	2.2	7.5
Chromium, Dissolved (D-Cr)	mg/L	0.00021	0.00035	0.00021	0.00035	0.00021	0.00035
Chromium, Dissolved Hexavalent [D-Cr(VI)]	mg/L	0	0	0	0	0	0
Cobalt, Dissolved (D-Co)	mg/L	0.00010	0.00010	0.00010	0.00010	0.00010	0.00010
Copper, Dissolved (D-Cu)	mg/L	0.00068	0.0011	0.00068	0.0011	0.00068	0.0011
Iron, Dissolved (D-Fe)	mg/L	0.014	0.029	0.014	0.029	0.014	0.029
Lead, Dissolved (D-Pb)	mg/L	0.000050	0.00010	0.000050	0.00010	0.000050	0.00010
Lithium, Dissolved (D-Li)	mg/L	0.00010	0.00030	0.00010	0.00030	0.00010	0.00030
Magnesium, Dissolved (D-Mg)	mg/L	0.16	0.34	0.16	0.34	0.16	0.34
Manganese, Dissolved (D-Mn)	mg/L	0.00083	0.0018	0.00083	0.0018	0.00083	0.0018
Mercury, Dissolved (D-Hg)	mg/L	0.0000026	0.0000048	0.0000026	0.0000048	0.0000026	0.0000048
Molybdenum, Dissolved (D-Mo)	mg/L	0.00051	0.0012	0.00051	0.0012	0.00051	0.0012
Nickel, Dissolved (D-Ni)	mg/L	0.00019	0.00023	0.00019	0.00023	0.00019	0.00023
Phosphorus, Dissolved (D-P)	mg/L	0	0	0	0	0	0
Potassium, Dissolved (D-K)	mg/L	0.20	0.37	0.2	0.37	0.2	0.37
Selenium, Dissolved (D-Se)	mg/L	0.000050	0.000053	0.000050	0.000053	0.000050	0.000053
Silicon, Dissolved (D-Si)	mg/L	1.9	2.4	1.9	2.4	1.9	2.4
Silver, Dissolved (D-Ag)	mg/L	0	0	0	0	0	0
Sodium, Dissolved (D-Na)	mg/L	0.75	1.2	0.75	1.2	0.75	1.2
Strontium, Dissolved (D-Sr)	mg/L	0.0090	0.030	0.0090	0.030	0.0090	0.030
Thallium, Dissolved (D-Tl)	mg/L	0	0	0	0	0	0
Tin, Dissolved (D-Sn)	mg/L	0	0	0	0	0	0
Titanium, Dissolved (D-Ti)	mg/L	0.00054	0.0010	0.00054	0.0010	0.00054	0.001
Uranium, Dissolved (D-U)	mg/L	0.000076	0.00022	0.000076	0.00022	0.000076	0.00022
Vanadium, Dissolved (D-V)	mg/L	0.00050	0.00054	0.0005	0.00054	0.0005	0.00054
Zinc, Dissolved (D-Zn)	mg/L	0.0011	0.0040	0.0011	0.0040	0.0011	0.004
Volatile Organic Compounds (VOCs), Non-Halogenated							
Benzene	mg/L	0	0	0	0	0	0
Ethylbenzene	mg/L	0	0	0	0	0	0

Appendix 4.3-4: Effluent Model Water Quality Source Terms

Parameters	Units	Untreated Effluent (OWTS Influent)		OWTS Treated Effluent		Non-Contaminated Contact Water and Non-Contact Water	
		Expected Case	Extreme Case	Expected Case	Extreme Case	Expected Case	Extreme Case
Methyl tert-butyl ether (MTBE)	mg/L	0	0	0	0	0	0
Styrene	mg/L	0	0	0	0	0	0
Toluene	mg/L	0	0	0	0	0	0
Xylene, Total	mg/L	0	0	0	0	0	0
Polycyclic Aromatic Hydrocarbons (PAHs)							
Acenaphthene	mg/L	0	0.000021	0	0.0000026	0	0.00000043
Acenaphthylene	mg/L	0	0	0	0	0	0
Acridine	mg/L	0	0	0	0	0	0
Anthracene	mg/L	0	0	0	0	0	0
Benz(a)anthracene	mg/L	0.000022	0.000061	0.0000028	0.0000076	0.00000033	0.0000013
Benzo(a)pyrene	mg/L	0.000023	0.000057	0.0000028	0.0000071	0.00000034	0.0000012
Benzo(b+j)fluoranthene	mg/L	0.000026	0.000062	0.0000032	0.0000078	0.00000039	0.0000013
Benzo(g-h-i)perylene	mg/L	0.000015	0.000040	0.0000019	0.0000050	0.00000023	0.00000084
Benzo(k)fluoranthene	mg/L	0	0.000022	0	0.0000028	0	0.00000047
Chrysene	mg/L	0.000023	0.000063	0.0000029	0.0000079	0.00000034	0.0000013
Dibenz(a-h)anthracene	mg/L	0	0.0000077	0	0.00000096	0	0.00000016
Fluoranthene	mg/L	0.000042	0.00011	0.0000053	0.000014	0.00000063	0.0000023
Fluorene	mg/L	0	0.0000056	0	0.00000070	0	0.00000012
Indeno(1,2,3-cd)pyrene	mg/L	0.000016	0.000040	0.0000021	0.0000050	0.00000025	0.00000084
1-Methylnaphthalene	mg/L	0	0.0000052	0	0.00000065	0	0.00000011
2-Methylnaphthalene	mg/L	0	0.000028	0	0.0000035	0	0.0000006
Naphthalene	mg/L	0	0	0	0	0	0
Phenanthrene	mg/L	0.000026	0.000087	0.0000033	0.000011	0.0000004	0.0000018
Pyrene	mg/L	0.000068	0.00011	0.0000085	0.000014	0.000001	0.0000024
Quinoline	mg/L	0	0	0	0	0	0
Petroleum Hydrocarbons							
EPH (C10-C19)	mg/L	100	100	7.5	7.5	0	0
EPH (C19-C32)	mg/L	100	100	7.5	7.5	0	0
EPH (C10-C32)	mg/L	200	200	15	15	0	0

APPENDIX 4.3-5: EFFLUENT MODEL PREDICTIONS FOR OUT-10 WATER QUALITY

Appendix 4.3-5: Effluent Model Predictions for OUT-10 Water Quality

Parameters	**Units**	**OUT-10**		**OUT-10**	
		Expected Case		**Extreme Case**	
General Parameters		**Min**	**Max**	**Min**	**Max**
Alkalinity, Total	mg/L	5.1	5.1	2.5	2.5
Hardness	mg/L	6.3	6.3	20	20
Organic Carbon, Dissolved (DOC)	mg/L	4	4	6	6
Organic Carbon, Total (TOC)	mg/L	4.5	4.5	6.6	6.6
Oxygen, Dissolved	mg/L	12	12	10	10
pH	pH units	6.6	6.6	6.1	6.1
Temperature	°C	8.2	8.2	12	12
Total Suspended Solids (TSS)	mg/L	3	6.9	4.2	7.9
Total Dissolved Solids (TDS)	mg/L	24	24	16	16
Nutrients and Anions					
Ammonia, Total (as N)	mg/L	0.0062	0.0062	0.05	0.05
Bromide	mg/L	0.05	0.05	0.1	0.1
Chloride	mg/L	0.51	0.51	0.96	0.96
Fluoride	mg/L	0.02	0.02	0.1	0.1
Nitrate (as N)	mg/L	0.077	0.077	0.22	0.22
Nitrite (as N)	mg/L	0.001	0.001	0.01	0.01
Sulfate	mg/L	1.8	1.8	2.9	2.9
Total Metals					
Aluminum, Total (T-Al)	mg/L	0.33	0.57	0.61	0.95
Antimony, Total (T-Sb)	mg/L	0.0001	0.0001	0.00021	0.00021
Arsenic, Total (T-As)	mg/L	0.00013	0.00016	0.00025	0.00031
Barium, Total (T-Ba)	mg/L	0.0045	0.0063	0.0095	0.012
Beryllium, Total (T-Be)	mg/L	0.0000026	0.000006	0.0000048	0.0000089
Bismuth, Total (T-Bi)	mg/L	0.00000027	0.00000062	0.00000064	0.0000012
Boron, Total (T-B)	mg/L	0.0039	0.0039	0.012	0.012
Cadmium, Total (T-Cd)	mg/L	0.0000064	0.0000082	0.000011	0.000014
Calcium, Total (T-Ca)	mg/L	2.3	2.4	7.7	8
Chromium, Total (T-Cr)	mg/L	0.00026	0.00033	0.00049	0.00062
Chromium, Total Hexavalent [(T-Cr(VI)]	mg/L	0	0	0.0000021	0.000004
Cobalt, Total (T-Co)	mg/L	0.00015	0.00022	0.00021	0.00031
Copper, Total (T-Cu)	mg/L	0.00085	0.0011	0.0015	0.0018
Iron, Total (T-Fe)	mg/L	0.16	0.36	0.35	0.63
Lead, Total (T-Pb)	mg/L	0.00016	0.00031	0.00038	0.00062
Lithium, Total (T-Li)	mg/L	0.00014	0.0002	0.00041	0.0005
Magnesium, Total (T-Mg)	mg/L	0.23	0.32	0.48	0.6
Manganese, Total (T-Mn)	mg/L	0.0065	0.014	0.013	0.023
Mercury, Total (T-Hg)	mg/L	0.000003	0.0000035	0.0000056	0.0000064
Molybdenum, Total (T-Mo)	mg/L	0.00051	0.00052	0.0012	0.0013
Nickel, Total (T-Ni)	mg/L	0.00022	0.00027	0.0003	0.00037
Phosphorus, Total (T-P)	mg/L	0.0028	0.0065	0.0072	0.014
Potassium, Total (T-K)	mg/L	0.22	0.24	0.42	0.47
Selenium, Total (T-Se)	mg/L	0.00005	0.000051	0.000057	0.00006
Silicon, Total (T-Si)	mg/L	2.2	2.6	3.1	3.7
Silver, Total (T-Ag)	mg/L	0.00000022	0.00000051	0.00000066	0.0000012
Sodium, Total (T-Na)	mg/L	0.77	0.79	1.6	2
Strontium, Total (T-Sr)	mg/L	0.0095	0.01	0.031	0.032
Thallium, Total (T-Tl)	mg/L	0.00000059	0.0000013	0.0000014	0.0000026
Tin, Total (T-Sn)	mg/L	0.0000029	0.0000066	0.000008	0.000015
Titanium, Total (T-Ti)	mg/L	0.0069	0.015	0.015	0.027
Uranium, Total (T-U)	mg/L	0.000091	0.00011	0.00031	0.00038
Vanadium, Total (T-V)	mg/L	0.00073	0.001	0.0011	0.0016
Zinc, Total (T-Zn)	mg/L	0.0019	0.0028	0.0058	0.0073
Dissolved Metals					
Aluminum, Dissolved (D-Al)	mg/L	0.14	0.14	0.22	0.22
Antimony, Dissolved (D-Sb)	mg/L	0.0001	0.0001	0.0002	0.0002
Arsenic, Dissolved (D-As)	mg/L	0.0001	0.0001	0.00018	0.00018
Barium, Dissolved (D-Ba)	mg/L	0.0032	0.0032	0.0065	0.0065
Beryllium, Dissolved (D-Be)	mg/L	0	0	0	0
Bismuth, Dissolved (D-Bi)	mg/L	0	0	0	0
Boron, Dissolved (D-B)	mg/L	0.0039	0.0039	0.012	0.012
Cadmium, Dissolved (D-Cd)	mg/L	0.000005	0.000005	0.0000083	0.0000083
Calcium, Dissolved (D-Ca)	mg/L	2.2	2.2	7.5	7.5
Chromium, Dissolved (D-Cr)	mg/L	0.00021	0.00021	0.00035	0.00035
Chromium, Dissolved Hexavalent [D-Cr(VI)]	mg/L	0	0	0	0
Cobalt, Dissolved (D-Co)	mg/L	0.0001	0.0001	0.0001	0.0001
Copper, Dissolved (D-Cu)	mg/L	0.00068	0.00068	0.0011	0.0011
Iron, Dissolved (D-Fe)	mg/L	0.014	0.014	0.029	0.029
Lead, Dissolved (D-Pb)	mg/L	0.00005	0.00005	0.0001	0.0001
Lithium, Dissolved (D-Li)	mg/L	0.0001	0.0001	0.0003	0.0003
Magnesium, Dissolved (D-Mg)	mg/L	0.16	0.16	0.34	0.34
Manganese, Dissolved (D-Mn)	mg/L	0.00083	0.00083	0.0018	0.0018
Mercury, Dissolved (D-Hg)	mg/L	0.0000026	0.0000026	0.0000048	0.0000048
Molybdenum, Dissolved (D-Mo)	mg/L	0.00051	0.00051	0.0012	0.0012
Nickel, Dissolved (D-Ni)	mg/L	0.00019	0.00019	0.00023	0.00023
Phosphorus, Dissolved (D-P)	mg/L	0	0	0	0
Potassium, Dissolved (D-K)	mg/L	0.2	0.2	0.37	0.37
Selenium, Dissolved (D-Se)	mg/L	0.00005	0.00005	0.000053	0.000053
Silicon, Dissolved (D-Si)	mg/L	1.9	1.9	2.4	2.4
Silver, Dissolved (D-Ag)	mg/L	0	0	0	0
Sodium, Dissolved (D-Na)	mg/L	0.75	0.75	1.2	1.2
Strontium, Dissolved (D-Sr)	mg/L	0.009	0.009	0.03	0.03
Thallium, Dissolved (D-Tl)	mg/L	0	0	0	0
Tin, Dissolved (D-Sn)	mg/L	0	0	0	0
Titanium, Dissolved (D-Ti)	mg/L	0.00054	0.00054	0.001	0.001
Uranium, Dissolved (D-U)	mg/L	0.000076	0.000076	0.00022	0.00022
Vanadium, Dissolved (D-V)	mg/L	0.0005	0.0005	0.00054	0.00054
Zinc, Dissolved (D-Zn)	mg/L	0.0011	0.0011	0.004	0.004

Appendix 4.3-5: Effluent Model Predictions for OUT-10 Water Quality

Parameters	**Units**	**OUT-10**		**OUT-10**	
		Expected Case		**Extreme Case**	
Volatile Organic Compounds (VOCs), Non-Halogenated					
Benzene	mg/L	0	0	0	0
Ethylbenzene	mg/L	0	0	0	0
Methyl tert-butyl ether (MTBE)	mg/L	0	0	0	0
Styrene	mg/L	0	0	0	0
Toluene	mg/L	0	0	0	0
Xylene, Total	mg/L	0	0	0	0
Polycyclic Aromatic Hydrocarbons (PAHs)					
Acenaphthene	mg/L	0	0	0.00000043	0.00000081
Acenaphthylene	mg/L	0	0	0	0
Acridine	mg/L	0	0	0	0
Anthracene	mg/L	0	0	0	0
Benz(a)anthracene	mg/L	0.00000033	0.00000076	0.0000013	0.0000024
Benzo(a)pyrene	mg/L	0.00000034	0.00000078	0.0000012	0.0000022
Benzo(b+j)fluoranthene	mg/L	0.00000039	0.00000089	0.0000013	0.0000025
Benzo(g-h-i)perylene	mg/L	0.00000023	0.00000052	0.00000084	0.0000016
Benzo(k)fluoranthene	mg/L	0	0	0.00000047	0.00000087
Chrysene	mg/L	0.00000034	0.00000079	0.0000013	0.0000025
Dibenz(a-h)anthracene	mg/L	0	0	0.00000016	0.0000003
Fluoranthene	mg/L	0.00000063	0.0000015	0.0000023	0.0000044
Fluorene	mg/L	0	0	0.00000012	0.00000022
Indeno(1,2,3-cd)pyrene	mg/L	0.00000025	0.00000057	0.00000084	0.0000016
1-Methylnaphthalene	mg/L	0	0	0.00000011	0.00000021
2-Methylnaphthalene	mg/L	0	0	0.0000006	0.0000011
Naphthalene	mg/L	0	0	0	0
Phenanthrene	mg/L	0.0000004	0.00000091	0.0000018	0.0000034
Pyrene	mg/L	0.000001	0.0000023	0.0000024	0.0000045
Quinoline	mg/L	0	0	0	0
Petroleum Hydrocarbons					
EPH (C10-C19)	mg/L	0	1.3	0	1.3
EPH (C19-C32)	mg/L	0	1.3	0	1.3
EPH (C10-C32)	mg/L	0	2.7	0	2.7

Appendix 6.1: Water Quality Monitoring

6.1-1: WATER QUALITY MONITORING PARAMETERS

Appendix 6.1-1: Water Quality Monitoring Parameters

Parameter Group	Parameter	Unit	Method Detection Limit - Freshwater	Method Detection Limit - Marine Water
Field	pH	s.u.	-	-
	Temperature	° C	-	-
	Turbidity	NTU	-	-
	Conductivity	µS/cm	-	-
	Dissolved Oxygen	mg/L	-	-
	Salinity	ppt	-	-
	Visibility of Sheen	-	-	-
Physical Parameters	pH, lab	s.u.	0.10	0.10
	Total Suspended Solids	mg/L	3.0	2.0
	Total Dissolved Solids	mg/L	10	10
	Turbidity, Lab	NTU	0.10	0.10
General Parameters	Hardness (as $CaCO_3$), Dissolved	mg/L	0.50	0.50
	Hardness (as $CaCO_3$), Total	mg/L	0.50	0.50
	Chloride	mg/L	0.50	50
	Flouride	mg/L	0.020	1.0
	Sulphate (SO_4)	mg/L	0.30	30
	Ammonia, as N	mg/L	0.0050	0.0050
	Nitrate, as N	mg/L	0.0050	0.50
	Nitrite, as N	mg/L	0.0010	0.10
	Total Organic Carbon (TOC)*	mg/L	0.50	0.50
	Dissolved Organic Carbon (DOC)*	mg/L	0.50	0.50
	Total Alkalinity*	mg/L	1.0	1.0
BTEX and Volatile Hydrocarbons	Benzene	mg/L	0.00050	0.00050
	Toluene	mg/L	0.00040	0.00040
	Ethylbenzene	mg/L	0.00050	0.00050
	Xylene, m & p-	mg/L	0.00040	0.00040
	Xylene, o-	mg/L	0.00030	0.00030
	Xylenes, Total	mg/L	0.00050	0.00050
	Methyl tert-butyl ether (MTBE)	mg/L	0.00050	0.00050
	Styrene	mg/L	0.00050	0.00050
	VH (C6-C10)	mg/L	0.100	0.100
	VPH (C6-C10 Minus BTEX)	mg/L	0.100	0.100
Extractable Petroleum Hydrocarbons (EPHs)	EPH C10-C19	mg/L	0.250	0.250
	EPH C19-C32	mg/L	0.250	0.250
	LEPH (C10-C19 less PAH)	mg/L	0.250	0.250
	HEPH (C19-C32 less PAH)	mg/L	0.250	0.250
Polycyclic Aromatic Hydrocarbons (PAHs)	Acenaphthene	mg/L	0.000010	0.000010
	Acenaphthylene	mg/L	0.000010	0.000010
	Acridine	mg/L	0.000010	0.000010
	Anthracene	mg/L	0.000010	0.000010
	Benzo(a)anthracene	mg/L	0.000010	0.000010
	Benzo(a)pyrene	mg/L	0.0000050	0.0000050
	Benzo(b)pyridine (Quinoline)	mg/L	0.000050	0.000050
	Benzo(b/j)fluoranthene	mg/L	0.000010	0.000010
	Benzo(g,h,i)perylene	mg/L	0.000010	0.000010
	Benzo(k)fluoranthene	mg/L	0.000010	0.000010
	Chrysene	mg/L	0.000010	0.000010
	Dibenzo(a,h)anthracene	mg/L	0.0000050	0.0000050
	Fluoranthene	mg/L	0.000010	0.000010
	Fluorene	mg/L	0.000010	0.000010
	Indeno(1,2,3-cd)pyrene	mg/L	0.000010	0.000010
	Methylnaphthalene, 1-	mg/L	0.000010	0.000010
	Methylnaphthalene, 2-	mg/L	0.000010	0.000010
	Naphthalene	mg/L	0.000050	0.000050
	Phenanthrene	mg/L	0.000020	0.000020
	Pyrene	mg/L	0.000010	0.000010
	Low Molecular Weight PAHs	mg/L	0.000030	0.000030
	High Molecular Weight PAHs	mg/L	0.000030	0.000030
	Total PAH	mg/L	0.000040	0.000040

Appendix 6.1-1: Water Quality Monitoring Parameters

Parameter Group	Parameter	Unit	Method Detection Limit - Freshwater	Method Detection Limit - Marine Water
Metals, Total	Aluminum	mg/L	0.0030	0.0050
	Antimony	mg/L	0.00010	0.0010
	Arsenic	mg/L	0.00010	0.00040
	Barium	mg/L	0.00010	0.0010
	Beryllium	mg/L	0.000020	0.00050
	Bismuth	mg/L	0.000050	0.00050
	Boron	mg/L	0.010	0.30
	Cadmium	mg/L	0.0000050	0.000020
	Calcium	mg/L	0.050	1.0
	Chromium	mg/L	0.00050	0.00050
	Cobalt	mg/L	0.00010	0.000050
	Copper	mg/L	0.00050	0.00050
	Iron	mg/L	0.010	0.010
	Lead	mg/L	0.000050	0.00010
	Lithium	mg/L	0.0010	0.020
	Magnesium	mg/L	0.0050	1.0
	Manganese	mg/L	0.00010	0.00020
	Mercury	mg/L	0.00000050	0.0000050
	Methylmercury	mg/L	0.000000020	0.000000020
	Molybdenum	mg/L	0.000050	0.00010
	Nickel	mg/L	0.00050	0.00050
	Potassium	mg/L	0.050	1.0
	Selenium	mg/L	0.000050	0.00050
	Silicon	mg/L	0.10	1.0
	Silver	mg/L	0.000010	0.00010
	Sodium	mg/L	0.050	2.5
	Strontium	mg/L	0.00020	0.010
	Sulfur	mg/L	0.50	5.0
	Thallium	mg/L	0.000010	0.000050
	Tin	mg/L	0.00010	0.0010
	Titanium	mg/L	0.00030	0.0050
	Uranium	mg/L	0.000010	0.000050
	Vanadium	mg/L	0.00050	0.00050
	Zinc	mg/L	0.0030	0.0030
	Zirconium	mg/L	0.00020	0.00050
Metals, Dissolved	Aluminum	mg/L	0.0010	0.0050
	Antimony	mg/L	0.00010	0.0010
	Arsenic	mg/L	0.00010	0.00040
	Barium	mg/L	0.00010	0.0010
	Beryllium	mg/L	0.000020	0.00050
	Bismuth	mg/L	0.000050	0.00050
	Boron	mg/L	0.010	0.30
	Cadmium	mg/L	0.0000050	0.000020
	Calcium	mg/L	0.050	1.0
	Chromium	mg/L	0.00050	0.00050
	Cobalt	mg/L	0.00010	0.000050
	Copper	mg/L	0.00020	0.00050
	Iron	mg/L	0.010	0.010
	Lead	mg/L	0.000050	0.00010
	Lithium	mg/L	0.0010	0.020
	Magnesium	mg/L	0.0050	1.0
	Manganese	mg/L	0.00010	0.00010
	Mercury	mg/L	0.00000050	0.0000050
	Methylmercury	mg/L	0.000000020	0.000000020
	Molybdenum	mg/L	0.000050	0.00010
	Nickel	mg/L	0.00050	0.00050
	Potassium	mg/L	0.050	1.0
	Selenium	mg/L	0.000050	0.00050
	Silicon	mg/L	0.10	1.0
	Silver	mg/L	0.000010	0.00010
	Sodium	mg/L	0.050	2.5
	Strontium	mg/L	0.00020	0.010
	Sulfur	mg/L	0.50	5.0
	Thallium	mg/L	0.000010	0.000050
	Tin	mg/L	0.00010	0.0010
	Titanium	mg/L	0.00030	0.0050
	Uranium	mg/L	0.000010	0.000050
	Vanadium	mg/L	0.00050	0.00050
	Zinc	mg/L	0.0030	0.0010
	Zirconium	mg/L	0.00020	0.00050

* To be monitored for freshwater, influent, and effluent samples only.

Appendix 7: QP Forms

APPENDIX 7.1-1: QUALIFIED PROFESSIONAL DECLARATIONS OF CONFLICT OF INTEREST AND DECLARATIONS OF COMPETENCY FORMS

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

I Jane May, as a member of EGBC declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Technical Assessment Report for Stormwater Effluent from WLNG Facility. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Sean Babulic, B.C. Energy Regulator, erring on the side of caution.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

_____

_____

_____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Signature:

X _____

Print name: Jane May

Witnessed by:

X _____

Print name: Melissa Cook

Date: May 11, 2026

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

Ministry of
Environment and
Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Jane May

   Title Senior Chemical Engineer

2. Are you a registered member of a professional association in B.C.? ☒ Yes ☐ No

   Name of Association: EGBC Registration # 54903

3. Brief description of professional services:

   Author of Section 4.2 and Section 6, and reviewer of Section 1 and Section 2 of the WLNG Operations WDA Technical Assessment Report.

This declaration of competency is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Declaration

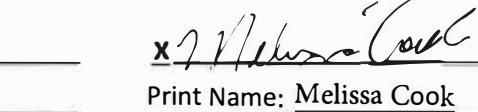
I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

x 

Print Name: Jane May

Witnessed by:

x 

Print Name: Melissa Cook

Date signed: May 11, 2026

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

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A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's **business**;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

I Patrick Mueller, as a member of The Association of the Chemical Profession of British Columbia declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Technical Assessment Report for Stormwater Effluent from WLNG Facility. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Sean Babulic, B.C. Energy Regulator, erring on the side of caution.

BRITISH COLUMBIA

Ministry of
Environment and
Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

_____

_____

_____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Signature:

X _____

Print name: PATRICK MUELLER

Date: July 22, 2026

Witnessed by:

X _____

Print name: Patrick Fraser

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

Ministry of
Environment and
Climate Change Strategy

Declaration of Competency

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1. Name of Qualified Professional: Patrick Mueller

   Title: Senior Environmental Chemist

2. Are you a registered member of a professional association in B.C.? ☒ Yes ☐ No

   Name of Association: The Association of the Chemical Profession of British Columbia Registration # 2008135

3. Brief description of professional services:

   Author of Section 3.1, 3.2, 4.1 and 4.3. Technical reviewer of to Sections 3.6, 3.8, 3.9, 4.2, 4.4 and 6.0 of the WLNG Operations WDA Technical Assessment Report

This declaration of competency is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X

Print Name: PATRICK MUELLER

Date signed: July 22, 2026

Witnessed by:

X

Print Name: Patrick Fraser

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

Ministry of
Environment and
Climate Change Strategy

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

I Holly Pedletier, as a member of Engineers & Geoscientists BC declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Technical Assessment Report for Stormwater Effluent from WLNG Facility. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Sean Babulic, B.C. Energy Regulator, erring on the side of caution.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

_____

_____

_____

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

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Signature:

X _____

Print name: Holly Pelletier

Date: May 21, 2026

Witnessed by:

X _____

Print name: JASMINE CHASE

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Holly Pelletier

   Title Environmental Geoscientist (P.Geo)

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: Engineers & Geoscientists BC Registration # 66533

3. Brief description of professional services:

   Author of Section 3.3 (Overburden and Bedrock Geology) and Section 3.9 (Marine Water Quality) for WLNG Operations WDA Technical Assessment Report.

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Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X [signature]

Print Name: Holly Pelletier

Date signed: May 21, 2026

Witnessed by:

X [signature]

Print Name: JASMINE CHASE

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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Declaration

I Melissa Cook, as a member of Association of the Chemical Profession of British Columbia declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Technical Assessment Report for Stormwater Effluent from WLNG Facility. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Sean Babulic, B.C. Energy Regulator, erring on the side of caution.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

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Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

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Signature:

X Melissa Cook

Print name: Melissa Cook

Date: May 21, 2026

Witnessed by:

X Jasmine Chase

Print name: JASMINE CHASE

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

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1. Name of Qualified Professional: Melissa Cook

   Title: Environmental Chemist

2. Are you a registered member of a professional association in B.C.? ☒ Yes ☐ No

   Name of Association: Association of the Chemical Profession of British Columbia Registration # 2022838

3. Brief description of professional services:

   Author of Section 3.6 (Surface Water Quality) of the WLNG Operations WDA Technical Assessment Report.

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Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

x Melissa Cook

Print Name: Melissa Cook

Witnessed by:

x Jasmine Chase

Print Name: JASMINE CHASE

Date signed: May 21, 2026

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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Declaration

I **Cheng Kuang**, as a member of **BC College of Applied Biologists**

declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Technical Assessment Report for Stormwater Effluent from WLNG Facility. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Sean Babulic, B.C. Energy Regulator, erring on the side of caution.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

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Signature:

X Cheng Kuang

Print name: Cheng Kuang

Date: June 1, 2026

Witnessed by:

X Melissa Cook

Print name: Melissa Cook

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Ministry of Environment and Climate Change Strategy

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1. Name of Qualified Professional: Cheng Kuang

   Title: Environmental Scientist

2. Are you a registered member of a professional association in B.C.? ☒ Yes ☐ No

   Name of Association: BC College of Applied Biologists Registration #: 4186

3. Brief description of professional services:

   Author of Section 3.11 (Marine Ecology) and Section 5 (Environmental Effects) of the WLNG Operations WDA Technical Assessment Report

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Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

x C D

Print Name: Cheng Kuang

Date signed: June 1, 2021

Witnessed by:

x Melissa Cook

Print Name: Melissa Cook

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Declaration

I Jordi Helsen (Print Full Name), as a member of Engineers and Geoscientists BC (Print Name of Professional Association)

declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Technical Assessment Report for Stormwater Effluent from WLNG Facility. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Sean Babulic B.C. Energy Regulator, erring on the side of caution.

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

_____

_____

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Signature:

X Jordi Helsen

Print name: Jordi Helsen

Date: May 22, 2026

Witnessed by:

X

Print name: Laura-Lee Findlater

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BRITISH COLUMBIA

Ministry of
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Declaration of Competency

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1. Name of Qualified Professional Jordi Hetsen

   Title Senior Hydrogeologist

2. Are you a registered member of a professional association in B.C.? ☒ Yes ☐ No

   Name of Association: Engineers and Geoscientists BC Registration # 39810

3. Brief description of professional services:

   Hydrogeology - author of section 3.7 (Hydrogeology) of the [redacted] Operations WDA Technical Assessment Report

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Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

x Jordi Hetsen

Print Name: Jordi Hetsen

Witnessed by:

x L Findlater

Print Name: Laura-Lee Findlater

Date signed: May 22, 2026

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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Declaration

I Robert Goldblatt (First and Last Name), as a member of BC College of Applied Biologists (Name of Professional Association) declare

Select one of the following:

☒ Absence from conflict of interest

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Ministry of
Environment and
Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

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Signature:

x R. Goldblatt

Print name: Robert Goldblatt

Witnessed by:

x

Print name: Patrick Mueller

Date: April 20, 2026

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Ministry of
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1. Name of Qualified Professional: Robert Goldblatt

   Title: Aquatic Biologist

2. Are you a registered member of a professional association in B.C.? ☒ Yes ☐ No

   Name of Association: BC College of Applied Biologists Registration # 3372

3. Brief description of professional services:

   Reveiw sections of the WLNG Technical Assessment Report that present baseline oceanography and marine ecology, and review the environmental effects assessment section.

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Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X R. Goldblatt

Witnessed by:

X

Print Name: Robert Goldblatt

Print Name: Patrick Mueller

Date signed: April 20, 2026

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Ministry of Environment and Climate Change Strategy

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Declaration

I Jonathan Mackin (Print First and Last Name), as a member of EGBC (Print Name of Professional Association) declare

Select one of the following:

☑ Absence from conflict of interest

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☐ Real or perceived conflict of interest

Description and nature of conflict(s):

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_____

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Signature:

X _____

Print name: Jonathan Mackin

Date: 2026-05-25

Witnessed by:

X Jane May

Print name: Jane May

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Jonathan Mackin

   Title Senior Environmental Geoscientist

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: EGBC Registration # 61156

3. Brief description of professional services:

   Technical reviewer of Section 3.3 (Overburden and Bedrock Geology) for the WLNG Operations WDA Technical Assessment Report.

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Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X _____

Print Name: Jonathan Mackin

Date signed: 2026-05-25

Witnessed by:

X Jane May

Print Name: Jane May

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BRITISH COLUMBIA Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

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Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

I Scott Jackson, as a member of EGBC declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Technical Assessment Report for Stormwater Effluent from WLNG Facility. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Sean Babulic, B.C. Energy Regulator, erring on the side of caution.

BRITISH COLUMBIA
Ministry of
Environment and
Climate Change Strategy

☐ **Real or perceived conflict of interest**

Description and nature of conflict(s):

_____

_____

_____

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

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Signature:

x Scott Jackson

Print name: Scott Jackson

Date: MAY 23, 2026

Witnessed by:

x Meghan Goertzen

Print name: Meghan Goertzen

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BRITISH COLUMBIA
Ministry of
Environment and
Climate Change Strategy

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1. Name of Qualified Professional Scott Jackson

   Title Senior Hydrologist

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: EGBC Registration # 41813

3. Brief description of professional services:

Technical reviewer of Section 3.4 (Climate + Meteorology) and Section 4.1 (Water Management), and Section 3.5 (Hydrology) for the WLNG Operations WDA Technical Assessment Report.

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Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X Scott Jackson

Print Name: Scott Jackson

Witnessed by:

X

Print Name: Meghan Goertzen

Date signed: MAY 23, 2026

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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Declaration

I Clint A. Strittmatter, as a member of McDermott International Inc. declare

Select one of the following:

☒ Absence from conflict of interest

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☐ Real or perceived conflict of interest

Description and nature of conflict(s):

_____

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Signature:

X _____

Print name: Clint A. Strittmatter

Date: 8-Oct-2026

Witnessed by:

X _____

Print name: Louis J. Garces

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1. Name of Qualified Professional Clint A. Strittmatter

   Title Senior Principal Process Engineer

2. Are you a registered member of a professional association in B.C.? ☐ Yes ☒ No

   Name of Association: _____ Registration # _____

3. Brief description of professional services:

   Reviewer/Approver of Operations Phase BATA, Reviewer/Approver of Unit 64 Process Basis Design, Approver of Unit 64 Operating Manual

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Declaration

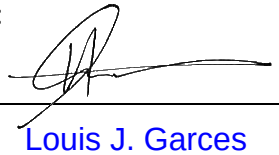
I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X 

Print Name: Clint A. Strittmatter

Witnessed by:

X 

Print Name: Louis J. Garces

Date signed: 8-Oct-2026

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BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

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Declaration

I Ruidong Zhang, as a member of McDermott International Inc. declare

Select one of the following:

☒ Absence from conflict of interest

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Description and nature of conflict(s):

_____

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Signature:

X _____

Print name: Ruidong Zhang

Date: 8-Oct-2026

Witnessed by:

X _____

Print name: Clint A. Strittmatter

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1. Name of Qualified Professional: Ruidong Zhang

   Title: Principal Civil Engineer

2. Are you a registered member of a professional association in B.C.? ☒ Yes ☐ No

   Name of Association: Engineers and Geoscientists BC Registration # 44685

3. Brief description of professional services:

   Reviewer Stormwater Drainage Philosophy, Reviewed/Stamped drawings for Stormwater Management/Discharge Works

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Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X 

Print Name: Ruidong Zhang

Witnessed by:

X 

Print Name: Clint A. Strittmatter

Date signed: 8-Oct-2026

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Declaration

I Louis J. Garces, as a member of McDermott International Inc. declare

Select one of the following:

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Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

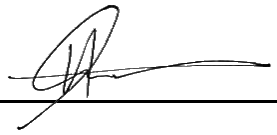
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Signature:

X 

Print name: Louis J. Garces

Date: 8-Oct-2026

Witnessed by:

X 

Print name: Clint A. Strittmatter

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1. Name of Qualified Professional: Louis J. Garces

   Title: Principal Process Engineer

2. Are you a registered member of a professional association in B.C.? ☒ Yes ☐ No

   Name of Association: Engineers and Geoscientists BC Registration # 54780

3. Brief description of professional services:

   Reviewer/Stamper of Oily Water Storage Tank P&ID

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Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

X _____

Print Name: Louis J. Garces

Witnessed by:

X _____

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Declaration

I Antonio Catalano, as a member of Cannon Artes declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Technical Assessment Report for Stormwater Effluent from WLNG Facility. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Sean Babulic, B.C. Energy Regulator, erring on the side of caution.

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Signature:

X _____

Print name: Antonio Catalano

Date: 12/Oct/2026

Witnessed by:

X _____

Print name: Clint A. Strittmatter

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1. Name of Qualified Professional Antonio Catalano

   Title PM

2. Are you a registered member of a professional association in B.C.? ☐ Yes ☒ No

   Name of Association: _____ Registration # _____

3. Brief description of professional services:

   Signatory on Process Guarantee letter, Supplier of Oily Water Treatment Package including: P&ID, O&M Manual, Control Philosophy and Logic Diagram, Cause and Effect Charts

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Declaration

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Signature:

X _____

Print Name: Antonio Catalano

Witnessed by:

X _____

Print Name: Clint A. Strittmatter

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c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

I Faruk Kharadi, as a member of APEGA declare

Select one of the following:

☒ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Technical Assessment Report for Stormwater Effluent from WLNG Facility. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Sean Babulic, B.C. Energy Regulator, erring on the side of caution.

Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Signature:

X _____

Print name: Faruk Kharadi

Witnessed by:

X _____

Print name: Wendy Lang

Date: October 16, 2026

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional: Faruk Kharadi

   Title: Senior Water Resources Engineer

2. Are you a registered member of a professional association in B.C.? ☐ Yes ☒ No

   Name of Association: APEGA Registration #: 49745

3. Brief description of professional services:

   Prepared construction phase stormwater managment and environmental protection plan.

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Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature: Witnessed by:

x _____ **x** _____

Print Name: Faruk Kharadi Print Name: Wendy Lang

Date signed: October 16, 2026

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a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

Ministry of Environment and Climate Change Strategy

Conflict of Interest Disclosure Statement

A qualified professional [1] providing services to either the Ministry of Environment and Climate Change Strategy ("ministry"), or to a regulated person for the purpose of obtaining an authorization from the ministry, or pursuant to a requirement imposed under the *Environmental Management Act,* the *Integrated Pest Management Act* or the *Park Act* has a real or perceived conflict of interest when the qualified professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a qualified professional has

a) an ownership interest in the regulated person's business;

b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);

c) a personal or professional interest in a specific outcome;

d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;

e) a spouse or other family member who will benefit from a specific outcome; or

f) any other interest that could be perceived as a threat to the independence or objectivity of the qualified professional in performing a duty or function.

Qualified professionals who work under ministry legislation must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

I Rashedul Islam, as a member of Engineers and Goescientists BC declare

Select one of the following:

☑ Absence from conflict of interest

Other than the standard fee I will receive for my professional services, I have no financial or other interest in the outcome of this Technical Assessment Report for Stormwater Effluent from WLNG Facility. I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Sean Babulic, B.C. Energ yRegulator, erring on the side of caution.

Ministry of Environment and Climate Change Strategy

☐ Real or perceived conflict of interest

Description and nature of conflict(s):

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purposes of increasing government transparency and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact the Ministry of Environment and Climate Change Strategy Headquarters Office at 1-800-663-7867.

Signature:

X 

Print name: Rashedul Islam

Date: Oct 09, 2026

Witnessed by:

X

Print name: Wendy Lang

[1]*Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

Declaration of Competency

The Ministry of Environment and Climate Change Strategy relies on the work, advice, recommendations and in some cases decision making of qualified professionals[1], under government's professional reliance regime. With this comes an assumption that professionals who undertake work in relation to ministry legislation, regulations and codes of practice have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional: Rashedul Islam

   Title: Senior Water Resources Engineer

2. Are you a registered member of a professional association in B.C.? ☑ Yes ☐ No

   Name of Association: Engineers and Goescientists BC Registration # 56288

3. Brief description of professional services:

This scope developed the design basis of the construction-phase stormwater treatment systems and the approach for management of stormwater during construction of the Woodfibre Liquefied Natural Gas Project

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Declaration

I am a qualified professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature: Witnessed by:

X  X

Print Name: Rashedul Islam Print Name: Wendy Lang

Date signed: Oct 09, 2026

[1] *Qualified Professional, in relation to a duty or function under ministry legislation, means an individual who*

a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and

b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*